Bowman

Revegetation Testing Program Monitoring Report

Submitted by:

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Submitted to:

Barton Mines Company, LLC
Ruby Mountain Garnet Mine
PO Box 400
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February 23, 2024

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1.0 Project Overview

A reclamation testing program for the Ruby Mountain facility was developed in 1995 by Bamberg Associates and Pine Creek Associates (**Appendix A**), as a requirement of Condition #7 in Adirondack Park Agency (APA) Permit #87-39B (**Appendix B**). The program was intended to provide robust and practical testing of the reclamation procedures as described in "The Design of the Expanded Tailings Valley Tailings Facility Ruby Mountain Project" (1993) (**Appendix C**). Monitoring of the test plots was conducted from 1996-1999 by Bamberg Associates to fulfill reporting requirements (**Appendix D and E**).

Barton submitted a Mine Land Use Permit (MLUP) modification application on October 15, 2021. As part of this application, the APA has requested an updated assessment of the vegetation test plot area (**Appendix F**). The purpose of this report is to summarize the conditions of the test plot using monitoring methodologies that resemble those utilized in the previous monitoring reports. Monitoring reports prior to 1998 are unavailable.

2.0 Site Conditions

The Ruby Mountain Garnet Mine is located in the hamlet of North River, in the town of Johnsburg, Warren County, New York, and also within the Adirondack Park (**Figure 1**). The Revegetation Testing Plot (Site) is approximately two acres, located on the southwestern portion of the mine overtop a residual minerals (RM) pile (**Figure 2**).

2.1 Residual Mineral Storage

Residual minerals (RM) produced by the mine are hydraulically placed in the RM pile, where they are separated by a cyclone system into fine-grained (silt/clay particle size) and coarse-grained (sand particle size) RM. Fine-grained RM that leaves the cyclone system are in the form of a slurry that is conveyed via gravity to either the upper or middle ponds where they settle to the bottom and water filters through the pile and is recovered in the lower ponds for reuse in the beneficiation process. The currently permitted peak elevation for the RM pile is 2,275 ft. amsl with a reclamation side slope of 2:1 based on Reclamation Plan Map and Cross-Sections updated in March of 2009 (**Figures 3 and 4**). The resulting material overlaying the RM pile is approximately 93% fine to medium sands (0.1-1.1.mm) and 7% fines of silt and clays (0.001-0.1mm).

2.2 Topography

The topography throughout the Barton property is steep, with elevation ranging from about 2,700 ft amsl atop Ruby Mountain to 1,600 ft amsl in Thirteenth Brook Valley to the east. The RM pile lies adjacent to steep slopes on its northwestern border; a topographic swale extends from the pile with eastern progression. A similar pattern occurs directly east of the quarry, where the cliff face decreases in elevation east and south towards Thirteenth Brook. The mine is bordered to the north and south by mountainous terrain, steep topographic drop offs occur to the north and east of the active mining area (**Figure 1).**

2.3 Surface Water Features

A riverine feature is mapped to intersect with the western corner of the Site (**Figure 5**). This feature was not observed during the field effort for this report, and likely no longer exists.

2.4 Soils

The Site is mapped to contain Hermon very boulder fine sandy loam, sloping (**Figure 6**). RM now overlays the mapped soils.

2.5 Threatened and Endangered Species

The Site is mapped to contain potential habitat for bats listed as endangered or threatened (**Figure 7**). Due to proximity to the mine and previous disturbance, the site likely contributes little value to the habitat.

3.0 Revegetation Testing Program 1995-2000

3.1 Proposed Revegetation Testing Program (1995)

The purpose of the Revegetation Testing Program proposed in 1995 was to provide robust practical testing of potential reclamation procedures, with a goal to achieve a successional trend in vegetation toward a mature forest ecosystem. Four ½-acre plots were to be treated with various planting techniques and then monitored for success. The testing variables were surface preparation, placement of topsoil substrates, possible soil amendments, and plant species. Each plot was prepared through rough and fine grading processes prior to treatment.

Monitoring was to be conducted to assess the success of each plot according to the following aspects: plant species cover, diversity, density and productivity. Each treatment plot was to be assessed using 20 sampling plots along a transect line. Two transect lines would be allotted to each plot, for a total of 40 sampling plots. Each sampling plot would be assessed for species cover by percent, total cover estimated by percent, shrub and tree density by count, height of shrub and tree strata, and productivity estimates.

3.2 Revegetation Testing Program Monitoring (1998)

The 1998 monitoring report summarizes the third year of quantitative survey results for the revegetation testing plots. The prior 1996 and 1997 reports have not been located.

The 1998 monitoring included quantitative evaluation and measurement of plant species cover, density and diversity during the growing season. The report refers to evaluation of five test plots, instead of the original 4 in the 1995 proposal. The plot schematic was not depicted in a figure or map.

A total of 56 species were identified in the plots, with variations of estimated cover from 5% to 57.3% per treatment plot. The controlling factors for species diversity and cover were identified as substrate and topographic conditions.

3.3 Final Revegetation Testing Program Monitoring (1999)

The assessment provided in the 1999 monitoring report was qualitative in nature. Estimated cover per testing plot and general condition were described. The report is incomplete and discontinues after section 3.0.

4.0 Methodology

The revegetation testing plot was reassessed by Bowman Consulting staff on 29 September 2023. The methodology to assess the vegetation within the test plot was based on the previous monitoring reports and additional guidance documents, which are referenced throughout this section. The monitoring reports did not supply sufficient information to confidently replicate the sampling methodologies and were supplemented where needed.

The quantitative assessment as described in the 1998 report is conducted according to five treatment plots. These plots are not depicted within the report and deviate from the original sampling design of four plots in the 1995 report. The controlled variables for the five sampling plots included surface soil preparations. Variations in surface soil from placement of topsoil, forest humus, and wood were not clearly visible at the site. Frequency sampling was utilized in place of sampling the treatment plots, as it is objective and repeatable (Technical Reference 1734-4, 1985).

Five transects were oriented northwest to southeast spaced equidistant within the Site. Eight 1-meter^2 sampling plots were spaced equidistant along each transect (**Figure 8**). The transects were followed infield using Geospatial Information Systems (GIS) Field Maps and the sampling plots were verified using a Daubenmire Frame. Each sampling plot was labeled according to its transect number from west (1) to east (5) and its plot number from north (1) to south (8) along the transect (i.e. T1-1). Supplemental site photos can be found in **Appendix G**.

The vegetation variables listed in the 1995 report are species composition, densities, dominance, frequency, canopy cover by species, vegetation structure and heights, an estimate of productivity and trend analysis of plant succession. Species and percent cover were recorded for each sampling plot to inform these variables. Cover was estimated according to canopy density within the sampling plot. An individual plant was considered within the sampling plot if its canopy overlapped with the edge of the Daubenmire Frame.

4.0 Results

40 meter^2 plots were sampled throughout the revegetation testing plot. 19 species were observed throughout the plots (**Tables 1-5**). This included 7 species of trees, 2 species of shrubs, and 10 herbaceous species.

Table 6 depicts the Relative Frequency of each species (RF_i), where J_i=number of plots containing species i and F_i=the frequency of species i. The species with the greatest relative frequency were spotted knapweed (*Centaurea stoebe*) (RF_i=0.26), paper birch (*Betula papyrifera*) (RF_i=0.15), and quaking aspen (*Populus tremuloides*) (RF_i=0.12).

The average cover per plot was approximately 47.4%. An ANOVA Single Factor test showed no significant difference in plot cover per transect (P=0.09). Calculation of relative cover would not provide accurate representation of the Site due to the combined sampling of different stratums. This is taken into consideration in **Section 5.1: Future Sampling Considerations**.

4.1 Sample Adequacy

The initial number of sampling plots (40) was based on hypothesized community homogeneity and previous sampling effort (DaBerry 2018). Sampling adequacy was determined with a species-area analysis (**Figure 9**). A 10% effort, where a 10% increase in effort yields a 10% increase in species richness, is satisfied at 12 plots. However, the "stairstep" curvature shape depicted in the curve of the data indicates that the transects did not display a homogeneity relative to the cumulative species richness. This is taken into consideration in **Section 5.1: Future Sampling Considerations**.

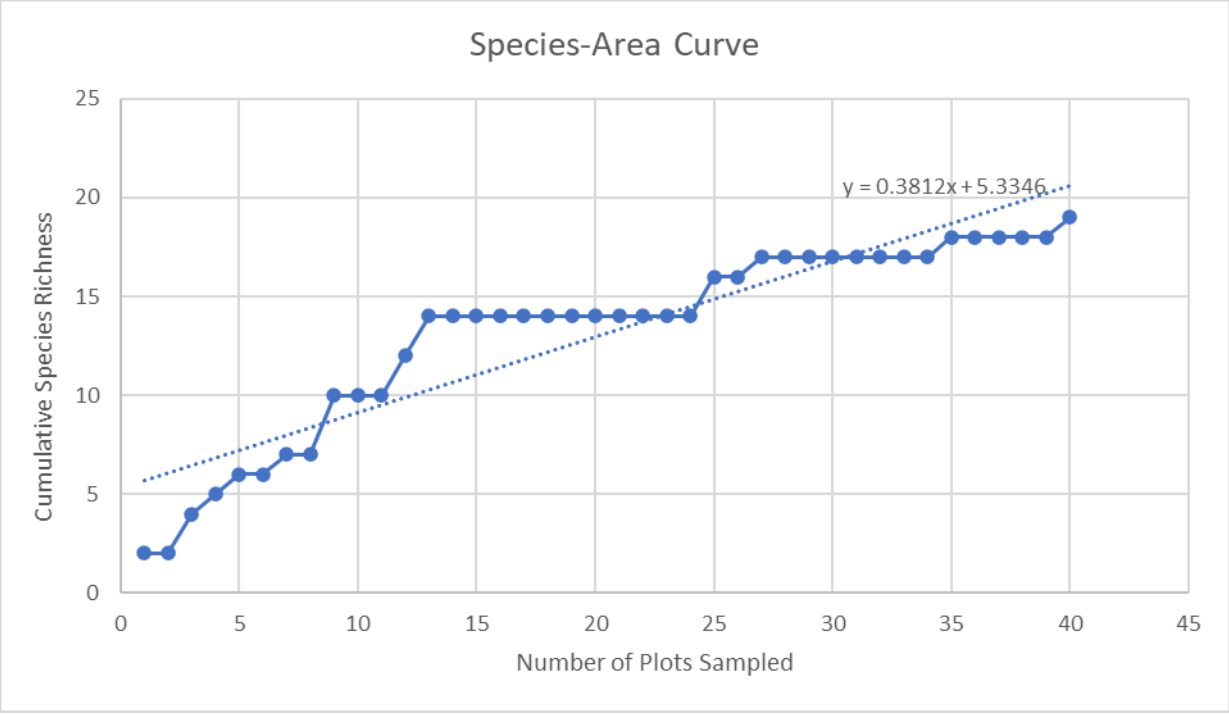

Figure 9: 10% Effort over Species-Area Curve

5.0 Discussion

The specific goals of the reclamation program and testing procedures as discussed during a meeting with the APA in 1994 are as follows:

- Establish soil and substrate conditions that promote vegetative germination and growth,
- Establish a plant cover to dissipate energy of wind and rain to prevent blowing and erosion,
- Quickly reduce visual impacts by establishment of shrubs and pioneer tree species,
- Create diversity and change by restoring a compatible stable vegetation type with succession trends toward a mature forest ecosystem,
- Develop a monitoring program and determine achievable performance standards,
- Determine the most economical methods using the time, effort and resources necessary to accomplish the objectives and results.

This assessment can contribute to the goals in only a limited manner. Because the schematic of the treatment plots has not been established, it is impossible to know which areas have received which treatments. This assessment can and does provide a general inventory and relative frequency of species and an estimation of cover to compare to previous results in the 1998 and 1999 reports.

There is an overlap of 11 species identified in the 2023 and 1998 report. Six out of the 11 original tree species can still be observed onsite, which may indicate a level of success within those species. The species richness in the 1998 report is much higher, though sampling efforts may have been for a greater area. Spotted knapweed was the species observed with the highest relative frequency in 2023, while it was absent in 1998. It is highly invasive and has clearly established in the testing plot.

Although the average cover per transect from 2023 does not directly relate to the average cover per plot, the numbers do appear to be comparable. The plots average cover in 1998 ranged from 5-57.3%. The average cover per transect ranged from 32-65.25%, perhaps indicating succession over time.

Treatment Plot #2 was described as the most successful in terms of cover in the 1998 report (57.3%). This plot was treated with topsoil, humus, fertilizer, and transplanted with balsam fir (*Abies balsamea*), beech (*Fagus sp*.), and maple (*Acer sp*.). This treatment style with an adjusted planting strategy may be optimal for future reclamation.

5.1 Future Sampling Considerations

The sampling plots designed for usage in the 1995 proposal cannot be used for ongoing analysis of reclamation success onsite unless the original schematic is located. Without knowing the orientation of the design, the treatments are also unknown. If this testing procedure is to be replicated, it will have to be done so from the very beginning, with documented treatment plots in a new testing site. The monitoring was designed to be finalized in 1999 and is no longer applicable.

The existing testing site can be monitored, but sampling will have to be altered to adequately characterize the Site. Sampling plots instead of transects may be more effective for capturing all vegetative types and characterizing relative cover. Species cover should be identified according to

stratum within the plots. Data for tree height and width may provide further insight to successional growth.

6.0 References

DeBerry, Douglas. 2018. Vegetation Sampling on Compensatory Mitigation Sites. Vegetation Sampling Literature Review, College of William and Mary, Williamsburg, VA.

Interagency Technical Reference. Sampling Vegetation Attributes. Technical Reference 1734-4, Bureau of Land Management.

Tables

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Plot ID	Stratum	Species		Percent Cover	Total cover
		Common Name	Scientific Name		
T1-1	Herb	Spotted knapweed	*Centaurea stoebe*	15%	20%
	Tree	Striped maple	*Acer pensylvanicum*	5%	
T1-2	Herb	Spotted knapweed	*Centaurea stoebe*	25%	40%
	Tree	Striped maple	*Acer pensylvanicum*	15%	
T1-3	Herb	Coltsfoot	*Tussilago farfara*	5%	65%
	Tree	Paper birch	*Betula papyrifera*	25%	
	Tree	Striped maple	*Acer pensylvanicum*	35%	
T1-4	Tree	Sugar maple	*Acer saccharum*	15%	45%
	Tree	Paper birch	*Betula papyrifera*	30%	
T1-5	Tree	Sugar maple	*Acer saccharum*	90%	92%
	Tree	Green ash	*Fraxinus pennsylvanica*	2%	
T1-6	Tree	Striped maple	*Acer pensylvanicum*	70%	95%
	Tree	Sugar maple	*Acer saccharum*	25%	
T1-7	Tree	Sugar maple	*Acer saccharum*	80%	90%
	Shrub	Bush honeysuckle	*Lonicera sp.*	10%	
T1-8	Herb	Coltsfoot	*Tussilago farfara*	75%	75%

Table 1: Species cover per plot, Transect 1

Plot ID	Stratum	Species		Percent Cover	Total cover
		Common Name	Scientific Name		
T2-1	Herb	Canada goldenrod	*Solidago canadensis*	8%	43%
	Herb	Spotted knapweed	*Centaurea stoebe*	20%	
	Shrub	Purple willow	*Salix purpurea*	10%	
	Herb	Late golenrod	*Solidago altissima*	5%	
T2-2		Bedrock		95%	2%
	Herb	Spotted knapweed	*Centaurea stoebe*	2%	
T2-3	Herb	Spotted knapweed	*Centaurea stoebe*	20%	25%
	Tree	Paper birch	*Betula papyrifera*	5%	
T2-4	Herb	Pearly everlasting	*Anaphalis margaritacea*	5%	60%
	Shrub	Purple willow	*Salix purpurea*	30%	
	Tree	Quaking aspen	*Populus tremuloides*	15%	
	Herb	Canada goldenrod	*Solidago canadensis*	10%	
T2-5	Herb	Spotted knapweed	*Centaurea stoebe*	15%	85%
	Herb	Canada goldenrod	*Solidago canadensis*	15%	
	Tree	Quaking aspen	*Populus tremuloides*	40%	
	Herb	Engelmann daisy	*Engelmannia peristenia*	5%	
	Tree	Black cherry	*Prunus serotina*	10%	
T2-6	Herb	Spotted knapweed	*Centaurea stoebe*	10%	20%
	Herb	Canada goldenrod	*Solidago canadensis*	10%	
T2-7	Tree	Black cherry	*Prunus serotina*	60%	60%
T2-8	Herb	Canada goldenrod	*Solidago canadensis*	20%	70%
	Herb	Pearly everlasting	*Anaphalis margaritacea*	5%	
	Tree	Quaking aspen	*Populus tremuloides*	35%	
	Tree	Paper birch	*Betula papyrifera*	10%	

Table 2: Species cover per plot, Transect 2

Plot ID	Stratum	Species		Percent Cover	Total cover
		Common Name	Scientific Name		
T3-1	Herb	Spotted knapweed	*Centaurea stoebe*	10%	10%
T3-2	Herb	Spotted knapweed	*Centaurea stoebe*	10%	10%
T3-3	Herb	Spotted knapweed	*Centaurea stoebe*	5%	20%
	Shrub	Purple willow	*Salix purpurea*	5%	
	Tree	Paper birch	*Betula papyrifera*	10%	
T3-4	Herb	Spotted knapweed	*Centaurea stoebe*	40%	40%
T3-5	Herb	Spotted knapweed	*Centaurea stoebe*	8%	8%
T3-6	Herb	Spotted knapweed	*Centaurea stoebe*	10%	35%
	Herb	Cananda goldenrod	*Solidago canadensis*	20%	
	Tree	Paper birch	*Betula papyrifera*	5%	
T3-7	Herb	Spotted knapweed	*Centaurea stoebe*	60%	60%
T3-8	Tree	Paper birch	*Betula papyrifera*	20%	75%
	Tree	Quaking aspen	*Populus tremuloides*	50%	
	Herb	Spotted knapweed	*Centaurea stoebe*	5%	

Table 3: Species cover per plot, Transect 3

Plot ID	Stratum	Species		Percent Cover	Total cover
		Common Name	Scientific Name		
T4-1	Herb	Pearly everlasting	*Anaphalis margaritacea*	5%	30%
	Herb	Nodding ladies'-tresses	*Spiranthes cernua*	5%	
	Herb	Spotted knapweed	*Centaurea stoebe*	15%	
	Tree	Balsam poplar	*Populus balsamifera*	5%	
T4-2	Herb	Spotted knapweed	*Centaurea stoebe*	5%	5%
T4-3	Herb	Spotted knapweed	*Centaurea stoebe*	5%	20%
	Tree	Quaking aspen	*Populus tremuloides*	10%	
	Herb	St John's wort	*Hypericum perforatum*	5%	
T4-4	Tree	Quaking aspen	*Populus tremuloides*	5%	25%
	Herb	Spotted knapweed	*Centaurea stoebe*	10%	
	Herb	Sweet goldenrod	*Solidago odora*	10%	
T4-5	Herb	Spotted knapweed	*Centaurea stoebe*	20%	45%
	Tree	Sugar maple	*Acer saccharum*	10%	
	Herb	St John's wort	*Hypericum perforatum*	5%	
	Tree	Paper birch	*Betula papyrifera*	10%	
T4-6	Tree	Quaking aspen	*Populus tremuloides*	25%	40%
	Herb	Spotted knapweed	*Centaurea stoebe*	5%	
	Shrub	Purple willow	*Salix purpurea*	10%	
T4-7	Tree	Quaking aspen	*Populus tremuloides*	25%	65%
	Tree	Paper birch	*Betula papyrifera*	30%	
	Herb	Spotted knapweed	*Centaurea stoebe*	10%	
T4-8	Herb	Canada goldenrod	*Solidago canadensis*	25%	65%
	Tree	Paper birch	*Betula papyrifera*	40%	

Table 4: Species cover per plot, Transect 4

Plot ID	Stratum	Species		Percent Cover	Total cover
		Common Name	Scientific Name		
T5-1	Herb	Canada goldenrod	*Solidago canadensis*	5%	10%
	Tree	Quaking aspen	*Populus tremuloides*	5%	
T5-2	Tree	Quaking aspen	*Populus tremuloides*	15%	45%
	Herb	Pearly everlasting	*Anaphalis margaritacea*	10%	
	Herb	St John's wort	*Hypericum perforatum*	15%	
	Herb	Spotted knapweed	*Centaurea stoebe*	5%	
T5-3	Tree	Quaking aspen	*Populus tremuloides*	20%	50%
	Herb	Spotted knapweed	*Centaurea stoebe*	10%	
	Herb	Pearly everlasting	*Anaphalis margaritacea*	10%	
	Tree	Paper birch	*Betula papyrifera*	10%	
T5-4	Tree	Paper birch	*Betula papyrifera*	15%	35%
	Tree	Quaking aspen	*Populus tremuloides*	10%	
	Herb	Spotted knapweed	*Centaurea stoebe*	10%	
T5-5	Tree	Black cherry	*Prunus serotina*	10%	55%
	Tree	Sugar maple	*Acer saccharum*	25%	
	Herb	Spotted knapweed	*Centaurea stoebe*	15%	
	Herb	St John's wort	*Hypericum perforatum*	5%	
T5-6	Tree	Paper birch	*Betula papyrifera*	85%	85%
T5-7	Tree	Paper birch	*Betula papyrifera*	75%	75%
T5-8	Tree	Paper birch	*Betula papyrifera*	20%	100%
	Tree	Black cherry	*Prunus serotina*	10%	
	Herb	Large-leaved aster	*Eurybia macrophylla*	70%	

Table 5: Species cover per plot, Transect 5

Species		J_i	F_i	RF_i
Common Name	**Scientific Name**			
Spotted Knapweed	*Centaurea stoebe*	25	0.625	0.25773
Striped Maple	*Fraxinus pennsylvanica*	4	0.1	0.04124
Coltsfoot	*Tussilago farfara*	2	0.05	0.02062
Paper birch	*Betula papyrifera*	15	0.375	0.15464
Sugar Maple	*Acer saccharum*	6	0.15	0.06186
Green ash	*Fraxinus pennsylvanica*	1	0.025	0.01031
Bush honeysuckle	*Lonicera sp.*	1	0.025	0.01031
Canada goldenrod	*Solidago canadensis*	8	0.2	0.08247
Purple willow	*Salix purpurea*	4	0.1	0.04124
Late goldenrod	*Solidago altissima*	1	0.025	0.01031
Pearly everlasting	*Anaphalis margaritacea*	5	0.125	0.05155
Quaking aspen	*Populus tremuloides*	12	0.3	0.12371
Engelmann daisy	*Engelmannia peristenia*	1	0.025	0.01031
Black Cherry	*Prunus serotina*	4	0.1	0.04124
Nodding ladies'-tresses	*Spiranthes cernua*	1	0.025	0.01031
Balsom Poplar	*Populus balsamifera*	1	0.025	0.01031
St. Johns Wort	*Hypericum perforatum*	4	0.1	0.04124
Large-leaved aster	*Eurybia macrophylla*	1	0.025	0.01031
Sweet goldenrod	*Solidago odora*	1	0.025	0.01031

Table 6: Relative Frequency per Species

Figures

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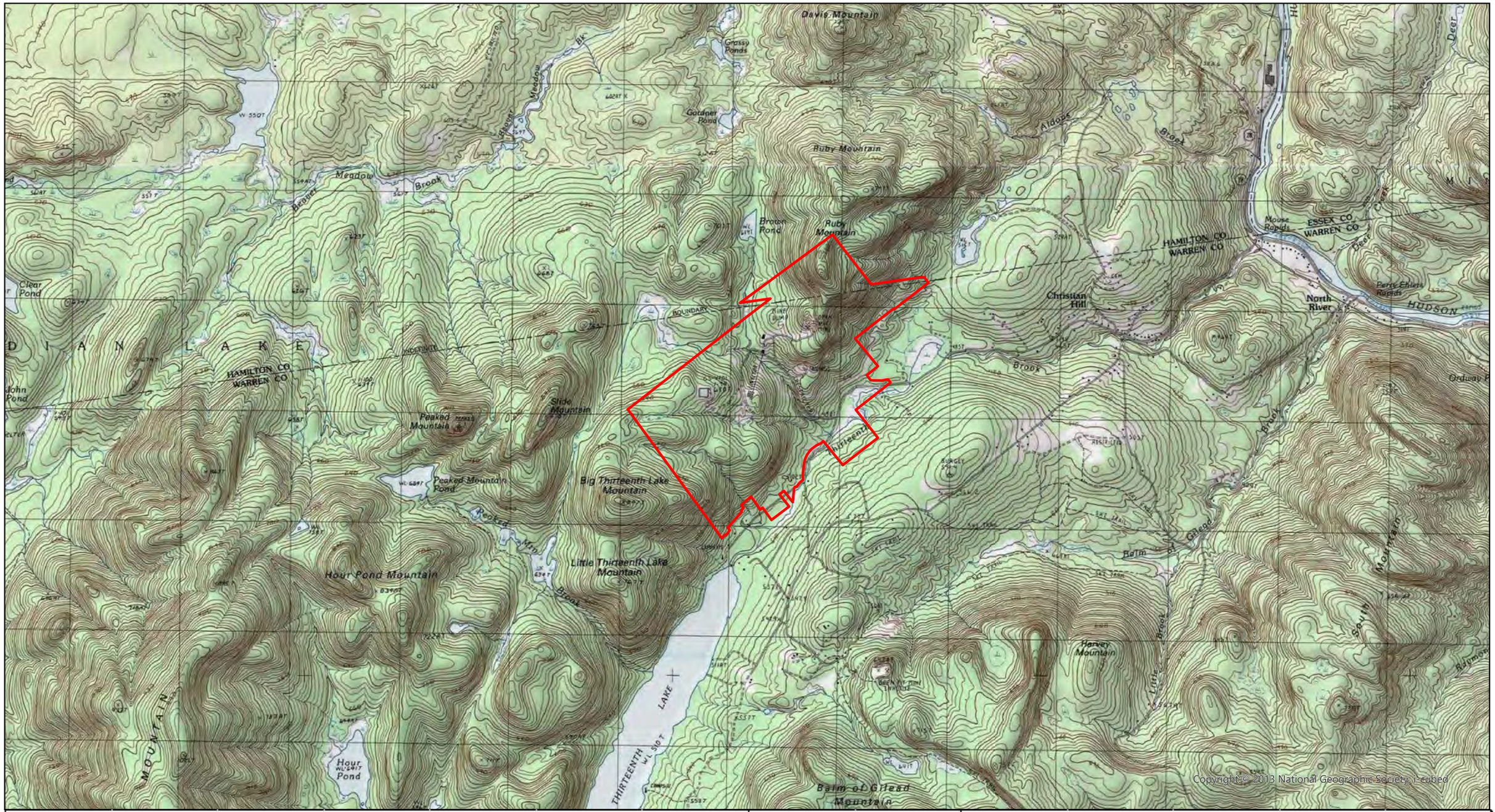
0 1 2 4 Miles



Legend

Property Boundary

N

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Barton Mines Company, LLC, Ruby Mt Mine, North Creek, Warren County, NY

Site Location

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Figure 1

February 2024

0 0.17 0.35 0.7 Miles

Legend

- Property Boundary
- Test Plot

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Barton Mines Company, LLC, Ruby Mt Mine, North Creek, Warren County, NY

Test Plot

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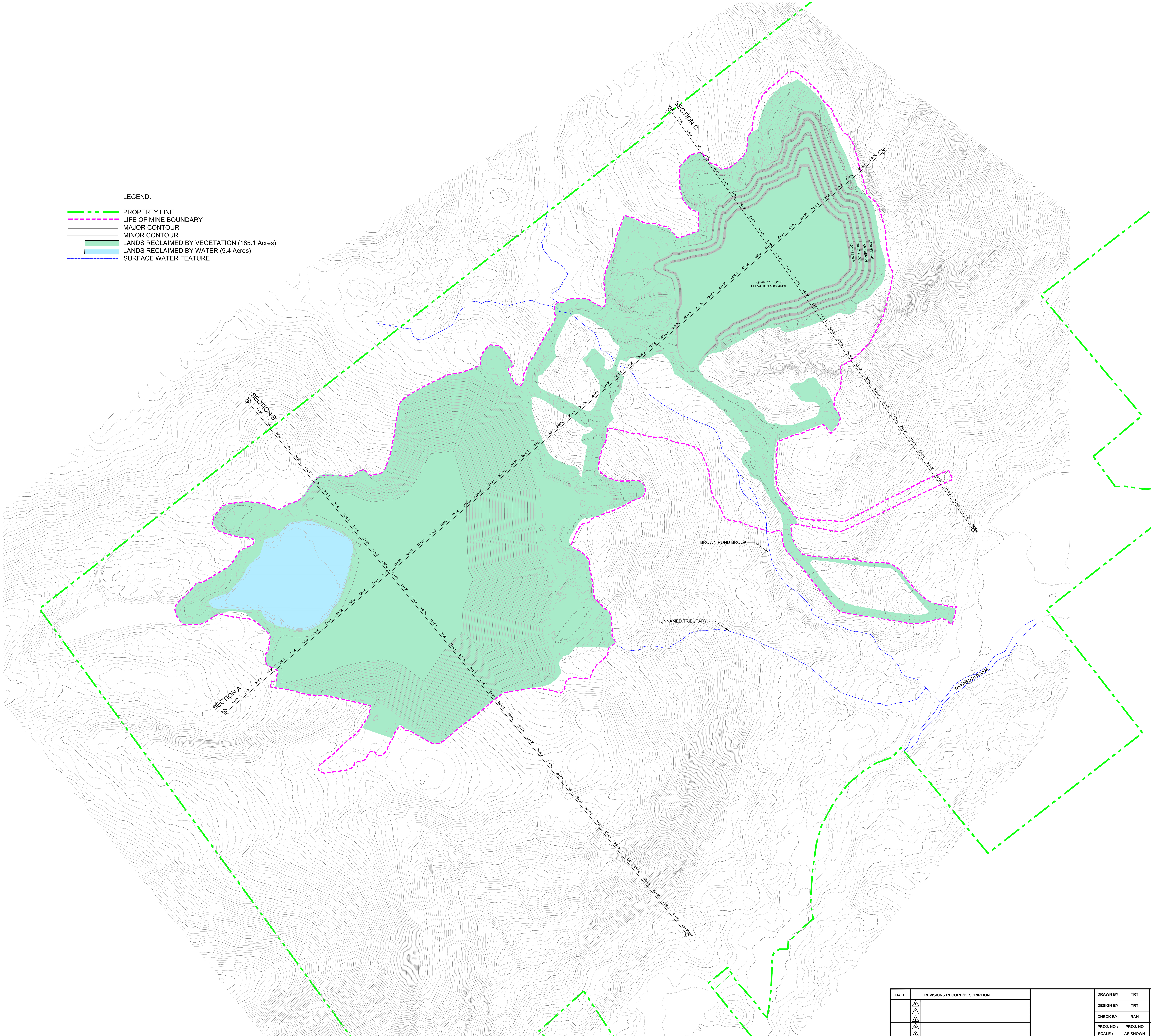
Figure 2

February 2024



Reclamation Notes:

Grading & Slopes

• All slopes will be final graded and contoured to a slope not exceeding 2:1.

• Final pit walls will be blasted and/or pre-split at an angle which will maintain stability of the rock face and will be scaled of loose material upon final blasting.

Revegetation

• A minimum 75% revegetation will be established over the mine site. Lime, fertilizer and mulch will be applied as necessary to support vegetative growth.

• A minimum of 6" of cover material with a soil composition capable of sustaining plant growth shall be used on all areas to be revegetated.

• Mulch in the form of hay or straw will be used during seeding and applied generally to a wetted thickness of about ½ inch.

• Seed mixtures and application rates will be selected based on specific site/soil conditions as outlined in Table-7 of the NYS DEC Revegetation Procedures Manual.

• Mine benches will be covered with a minimum two feet of topsoil (where accessible), mulched/fertilized (as required) and seeded with a mixture of warm-season grasses and perennial legumes to establish vegetative cover. Drought tolerant native shrub species will be utilized wherever possible to supplement the revegetation of benches within the pit boundary.

• Tailings areas are slated to be reclaimed in a manner consistent with summary findings contained in Section 4.0 of the report titled "Revegetat ion Te sting Program Monitoring: Summe r 199 8 and Sections 2.1-2.3 of the report titled " Revegetation Testing Program Monitoring: Summer/Fall 1999" . These findings are the result on-site test plots designed and monitored by Bamberg Associates of Littleton, Colorado. This study was conducted from 1995-1999, copies of which are included with this submission.

Drainage and Erosion Control

• Control structures will be utilized and constructed to prevent erosion from concentrated runoff.

• Water courses and/or impoundments constructed during mining will either be incorporated into the final land use plan or reclaimed.

Structures and Equipment

• All buildings, structures, machinery, equipment and other personal property, will be removed from the permit area or incorporated into the final land use plan. • Building sites will be covered with topsoil sufficient to support vegetation and planted.

End Land Use

In view of the projected mine life, it is not possible to state a final end-land use determination for the property. Current plans are to restore the potential for lumbering and/or other type of resource management on the property.

DATE	REVISIONS RECORD/DESCRIPTION
	1
	2
	3
	4
	5
	6

DRAWN BY :	TRT
DESIGN BY :	TRT
CHECK BY :	RAH
PROJ. NO :	PROJ. NO
SCALE :	AS SHOWN
DATE :	1/21/2020

CURRENT RECLAMATION PLAN MAP

BARTON MINES COMPANY, LLC

NORTH CREEK — WARREN COUNTY, NY

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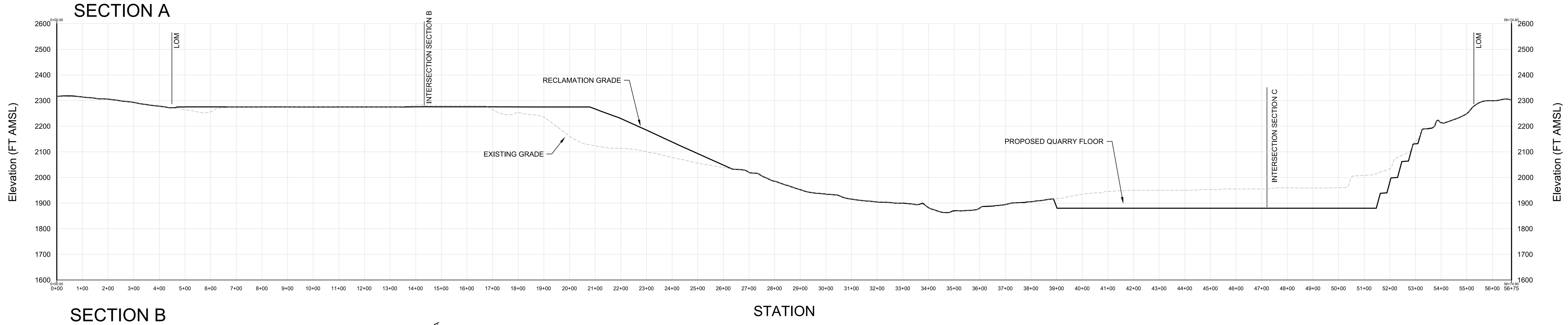
Figure 3

SHEET 01 OF 01

SECTION A



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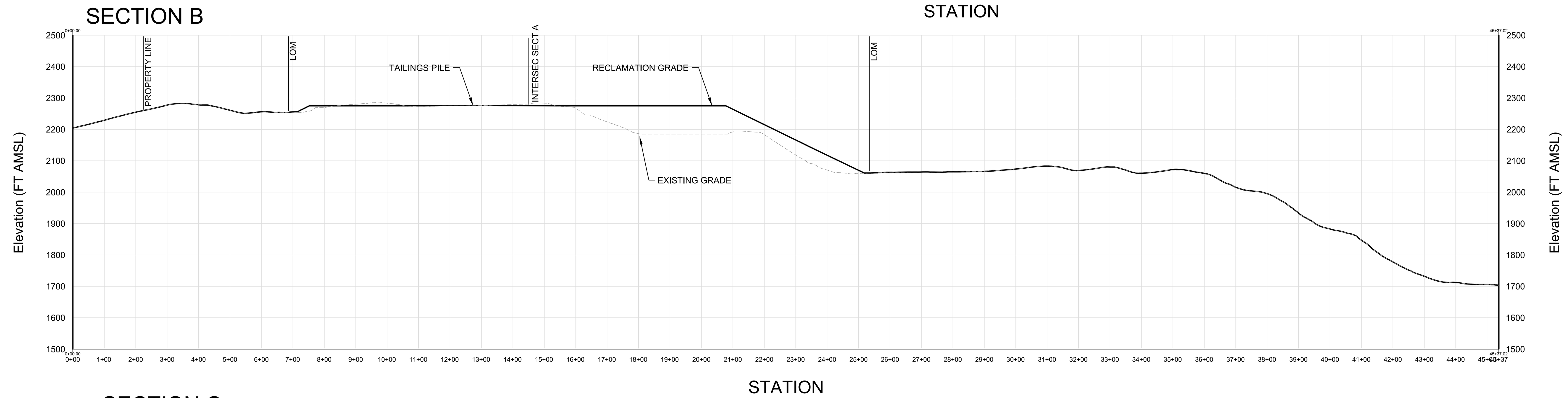

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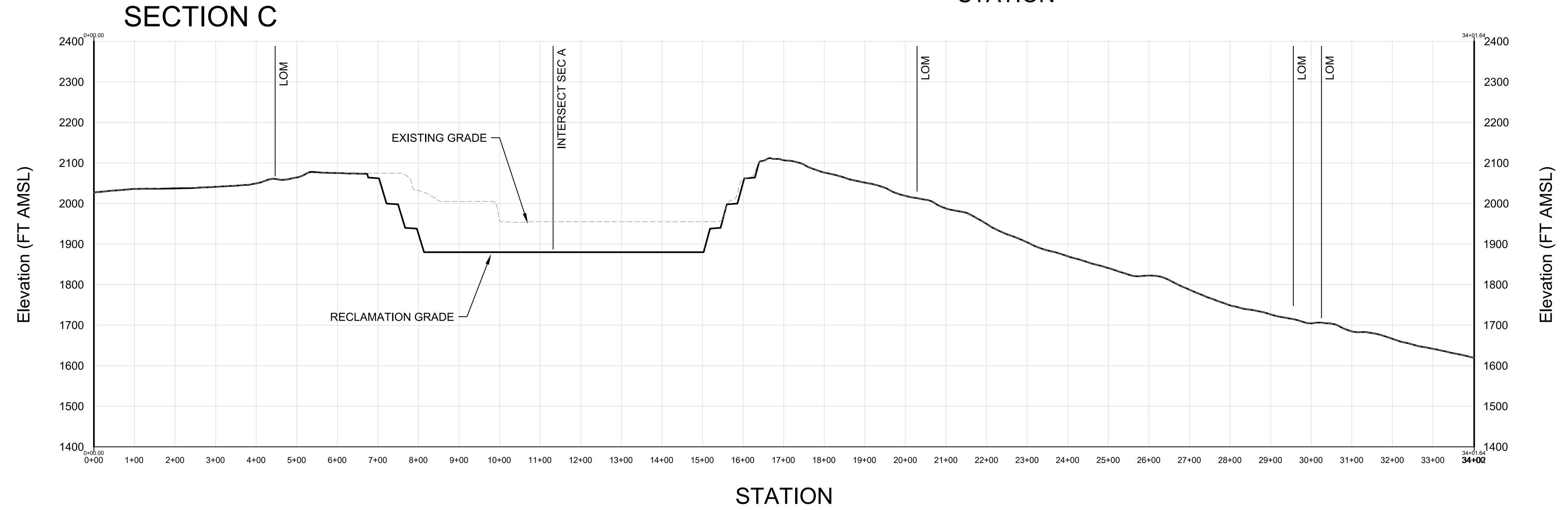

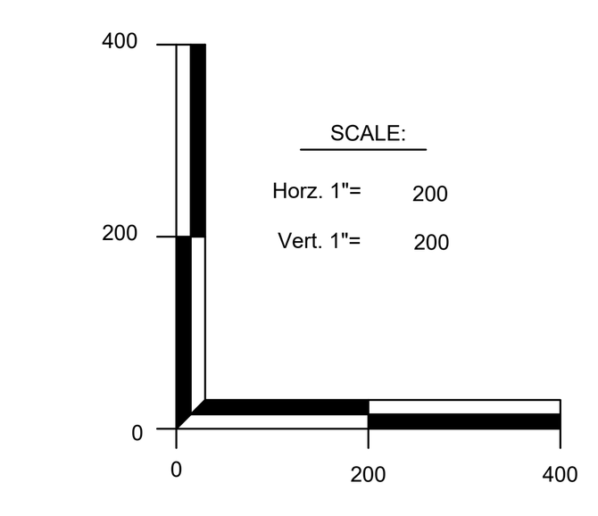

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	2			DESIGN BY : TRT
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	4			PROJ. NO : PROJ. NO
	5			SCALE : AS SHOWN
	6			DATE : 1/21/2020

CURRENT RECLAMATION PLAN CROSS SECTIONS

BARTON MINES COMPANY, LLC

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Figure 4

SHEET 01 OF 01

0 0.03 0.06 0.12 Miles

Legend

Test Plot

NWI Surface Water Classification

- Freshwater Emergent Wetland
- Freshwater Forested/ Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

N

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Barton Mines Company, LLC, Ruby Mt Mine, North Creek, Warren County, NY

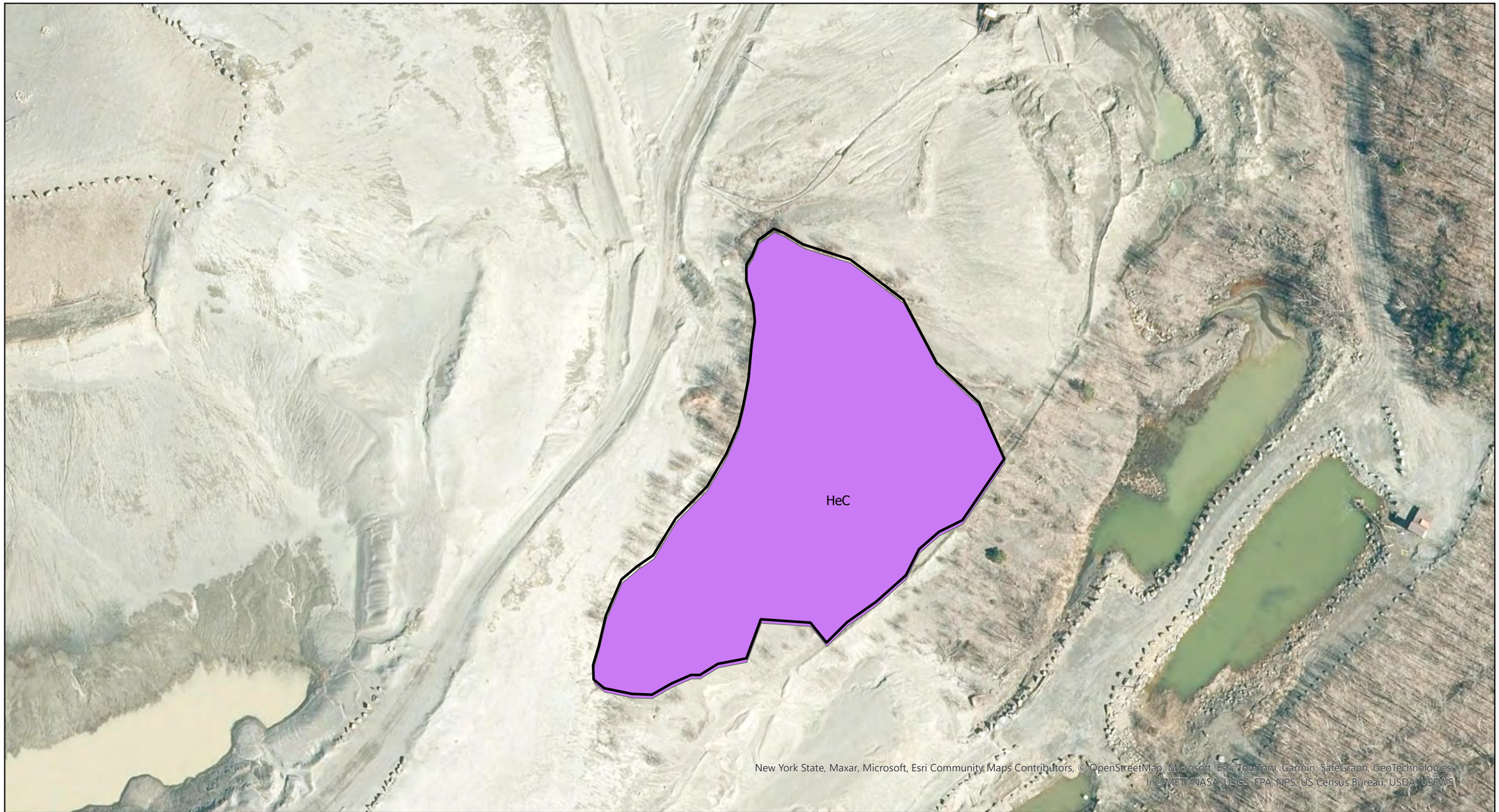
NWI Surface Water Features

Bowman

Figure 5

February 2024

0 0.03 0.06 0.12 Miles



Legend

Test Plot

NRCS Soils

Soil Type

N

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NRCS Soils

Bowman

Figure 6

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Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HeC	Hermon very bouldery fine sandy loam, sloping	1.5	100.0%
Totals for Area of Interest		**1.5**	**100.0%**

0 0.02 0.04 0.08 Miles

T5
T4
T3
T2
T1

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Legend

Test Plot

Sampling Design

Sampling Plot

Transect

N

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Barton Mines Company, LLC, Ruby Mt Mine, North Creek, Warren County, NY

Sampling Design

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Figure 7

February 2024

Appendices

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bowman.com

Appendix A

Proposed Revegetation Testing Program

(1995)

PROPOSED REVEGETATION TESTING PROGRAM
RUBY MOUNTAIN MINE
TAILING VALLEY TAILINGS FACILITY

Submitted to:

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March 1995

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1.0 INTRODUCTION

Barton Mines Corporation (BMC) is presently operating the Ruby Mountain Mine, an industrial abrasive (garnet) mine in Warren County, New York, under permits from the New York Department of Environmental Conservation and the Adirondack Park Agency (APA). Barton Mines is currently disposing of tailing using a wet disposal system, the Tailing Valley Tailings Facility (TVTF), in the drainage valley to the west of the mill. This system was permitted (Project & Permit No. 87-39) issued on January 7, 1988 under a major amendment to Permit P79-356. The original operations design included two tailings disposal sites: the Tailings Valley Tailings Facility (TVTF) and the Finger Valley Tailings Facility (FVTF). BMC has changed the planned operations from the two disposal site system to a single enlarged system in the Tailings Valley site. In order to affect this change in operations, BMC submitted a formal amendment request to their present permits and received a Draft Permit #87-39B for the change in the tailings disposal system.

A detailed reclamation testing program for the Ruby Mountain Site is required as Condition #7 in the Draft Permit #87-39B. This report presents a proposed detailed revegetation testing program for development of interim and final reclamation procedures at the Ruby Mountain Mine. The program was discussed on the site during a visit in late September 1994, and has been reviewed in a annotated outline form. In order to produce a timely and site specific program, this site visit was conducted to the Ruby Mine to confer with mine personnel, and meet with APA personnel. During this visit actual conditions at the proposed testing site and the area in general were observed to aid in developing the reclamation testing procedures. This plan presents the details of the proposed revegetation testing to be started in 1996.

1.1 Background

The Ruby Mountain Property is located in upstate New York, approximately 3 and 7 miles, respectively, northwest of North River and North Creek. The property is situated in the Adirondack Mountains with the state park boundaries.

The tailing disposal facility operates to dispose of the tailings in a slurry form and return process water to the mill. The slurried tailings is separated into a coarse fraction to build an embankment with the fines deposited in an impoundment behind the embankment (see Figures

3-2 and 3-3). The wet disposal of tailings at Tailings Valley starts by pumping a tailings slurry from the mill using one of two four-inch pipelines. The cyclone mounted on a moveable crane segregates the slurried tailings into fine (slimes) and coarse (sand) components. The heavier sand drops directly out of the cyclone underflow and flows down the embankment and stacks in place (see Figures 3-1 to 3-3). This sand embankment is subsequently dozed to maintain slope and configuration.

Sands are discharged downstream of the starter embankment and are used to increase the size of the embankment. The slimes are spigotted to form a beach which slopes away from the embankment on its upstream side. Clarified pond water is collected from the extreme upstream (west) end of the impoundment using a decant line. This water flows to the seepage return dam and is pumped to the mill for re-use in the mill circuit.

The maximum elevation to the top of the slimes deposit will be determined by the height of the final embankment constructed at the time of closure. Minimal embankment construction will permit storage to an elevation of 2275 feet. The impoundment will have a total area of approximately 32 acres compared with the catchment basin of 23.9 acres. The top of the embankment and dry beach portion of the impoundment will occupy about 24 acres, and it is anticipated that about 8 acres will remain as wet slimes ponds or depressions at closure. These wet areas can possibly be reclaimed as wetlands. A small amount of seepage is expected to occur from the embankment for several years which will decrease to insignificant amounts after a few years.

Based on the revised embankment dimensions, the total quantity of tailings present in the embankment will be 4.1 million cubic yards, and will have the capacity for storage for about 35 years at the current rate of production. Crest length of the anticipated final tailings embankment will vary from 3250 to 3500 feet. The crest width will be approximately 400 feet, but will be irregular in shape to accommodate the slime pond and drainage. At closure, the face of the embankment may be modified by fine grading to control water retention and accommodate revegetation. Options include benches at intervals on the downstream face, catchment basins, or a combination of these surface configurations. Earth moving equipment may be required to form these benches or catchment basins on the final downstream slope.

The catchment for the seepage return dam is approximately 8.8 acres but will vary during the continued construction of the tailings embankment. A small spillway has been constructed around the south abutment of the seepage return dam to pass flood waters. The seepage return dam, particularly during the starter embankment construction, has acted as a sediment trap. Consequently, the sediment caught behind the seepage return dam has been removed as necessary.

The portion of the tailings embankment proposed for the revegetation testing is on the southwest side of the presently constructed embankment.

1.2 Environmental Setting

The climate is characterized by moderate summers and cold winters. The average annual precipitation at the site is 45 inches. The average annual runoff is 27 inches and the average annual lake evaporation is 26 inches.

Local topography varies from elevation 2625 feet mean sea level (msl) atop Ruby Mountain to 1600 feet msl in Thirteenth Brook Valley immediately south of the property. Slopes in the vicinity of the property are generally moderate (less than 15^0) to steep (15^0 to 35^0).

Bedrock on the mine site is intrusive igneous rock metamorphosed into anorthositic gneiss mixed with garnet gneiss which is the ore. Other types of rock include syenite and syenitic granite with labradorite. There are some Precambrian sediments in the vicinity. The mineralogy is mainly feldspars (50%) and hornblende (35%) with smaller components of magnetite (5%), garnet (2%), and accessory minerals (8%). The surface soils are weathered bedrock with up to 20 feet of till over bedrock in depressions. Soils have textures of loamy sand to mixed fine sand with a large amounts of rock fragments . The tailing embankment material are 93% fine to medium sand (0.1 to 1.1 mm), and 7% fines of silts and clays (.001 to 0.1 mm). The soils and bedrock generally do not contain materials of a toxic or plant growth inhibiting nature.

Tailings Valley Creek is fed primarily from local runoff and, to a lesser extent, from groundwater discharge from the upper regions of Finger Valley (see Figure 1-1). Tailings

Valley Creek flows southeast across the Ruby Mountain property for approximately one mile before entering Lower Brown Pond Brook several hundred feet upstream of its confluence with Thirteenth Brook. Approximately 4 miles to the east, Thirteenth Brook flows into the Hudson River. Groundwater levels are generally very close to the existing ground surface. Springs and artesian water conditions are not uncommon in the vicinity of Tailings Valley.

The mine is surrounded by a terrestrial forest ecosystem that has been logged and managed for timber as well as mining. The area around the mine has typical eastern deciduous forest plants and animals. There is controlled access on the mine site so the principal land uses are mining and timber harvesting. Recreation and other uses are restricted.

The surrounding upland forest is a diverse mixture of hardwoods (striped and sugar maple), birch, beech, and conifers (red spruce and balsam fir). The forest structure is composed of an open canopy of deciduous trees with a sparse understory of shrubs and an herbaceous layer only in open disturbed sites from recent or past logging and access roads. The forest is in various stages of maturity depending on the length of time since and the intensity of land use activities. A small wetland (about 2 acres) occurs in Finger Valley upgradient to the tailing facility, and was described in detail in a report (Countryman, 1991). This area will not be disturbed under the present operating plans.

1.3 Specific Site Conditions

The specific features of the site as related to reclamation concern the surface conditions, types of soils, drainage and erosion potential, and substrate for plant growth and succession. The natural, undisturbed soils at Tailings Valley typically consist of a vegetative mat less than 2 inches thick, overlying a mixture of brown to black, organic silt, sand and clay up to several inches thick, overlying a 0 to 20 foot layer of a dense to very dense mixture of sand, gravel and fines (till) and bedrock. Bedrock on the Tailings Valley consists typically of anorthositic gneiss and fine-grained dyke rock. The top one to two feet of gneiss are fractured and weathered, but grade sharply into lightly fractured, slightly weathered to fresh gneiss.

The surfaces of the forest are hummocky with incomplete drainage patterns. This is a result of continental glaciation, the presence of undifferentiated till and/or bedrock, and the

depressions created by wind-felled trees. Roads for access to timber and mining are present as fresh trails or old overgrown roads.

Former mined areas that were reseeded or allowed to revegetate naturally were observed at the Ruby Mine, and also at the Gore Mountain Mine. The vegetation type that quickly becomes established is a tall shrub/small tree thicket of aspen ("pople"), alder, birch, and willow. There is an understory of other shrubs, grasses, sedges, and forbs that are adapted to a low nutrient substrate. Figures 3-4 to 3-7 are photographs of recent natural revegetation of the tailings materials and surrounding disturbed soils.

2.0 BASIC APPROACH

There will be a robust practical testing of the reclamation procedures presented in the reclamation plan already submitted as a portion of the revised permit application (SRK 1993). The approach will not be an experimental design of all possible revegetation testing methods, but will focus on techniques for this site-specific environment. It will be based on the climate, soils, ecological setting, and plant species adapted to growing in this region of the Adirondack Park. This final detailed test program was devised after a 2 acre site was chosen; and the aspect, slope, embankment substrates, drainage and moisture conditions surveyed during a site visit in September 1994.

During the meetings on site, the objectives of the reclamation program and the testing procedures were redefined as follows:

- establish soil and substrate conditions that promote vegetative germination and growth,
- establish a plant cover to dissipate energy of wind and rain to prevent blowing and erosion,
- quickly reduce visual impacts by establishment of shrubs and pioneer tree species,
- create diversity and change by restoring a compatible stable vegetation type with succession trends toward a mature forest ecosystem,
- develop a monitoring program and determine achievable performance standards.

An additional goal of the testing program is to determine the most economical methods using the time, effort, and resources necessary to accomplish the objectives and results.

There are no documented comparable testing programs or reclamation projects found in this area of New York that are similar to the revegetation of the tailings facility at Barton Mines. There are no programs that can either provide guidelines or testing results for the type of reclamation planned at the Ruby Mountain Mine. Reclamation along highways and revegetating sand and gravel borrow pits in Northeast, including the state of New York, have different substrates and objectives (US Soil Conservation Service, 1987). The purpose of the testing program is to determine the feasibility of the proposed reclamation since documented and proven methods do not exist. The objective of this reclamation testing is to provide a vegetation and habitat type that is compatible with the surrounding landscape.

The surrounding upland forest is a diverse mixture of hardwoods which have good means of seed dispersal, and will germinate in the reclaimed tailings from the natural seed production in the vicinity of the tailings. Natural succession to an upland forest in the Adirondack Park is fairly rapid, with the seedling and sapling stage occurring within a few years. This conclusion was based on observations on areas disturbed during the early construction of the tailing facility (see Figures 3-4 to 3-7). There is natural plant succession to a maturing forest with a few decades. A stable upland forest can be expected to reestablish with a minimum of resources used, if the slope and substrate are stable and promote a good growth medium.

2.1 Testing Program Development

The program will test methods most likely to succeed based on observation of natural reseeding and revegetation on surrounding older mine facilities. This approach to the reclamation testing program has been provided earlier in documents and responses to request for additional information by APA personnel. A summary of this approach is provided here, along with details on the proposed testing. The plan will focus on techniques for this site-specific environment including climate, soils, ecological setting, and the species adapted to growing in this region of the Adirondack Park. The test program procedures as proposed in this scope for the plan include surface preparation, placement of topsoiling substrates, possible soil amendments, and different plant types and species for seeding.

Four large size plots (about ½ acre each) will be used to simulate actual techniques that are feasible on the tailings surface. The size and placement of the plots will be field determined

at the time of the initial testing program setup. This would involve the initial placement and rough grading of tailings to form or configure surfaces that will not require further rough grading during final reclamation. The loose, sandy surface of the embankment will be fine graded into one of several forms to control erosion and runoff using a series of berms or ditches. The utility or necessity of this technique can be tested for water control and erosion runoff. Other grading systems or configurations may be used during final reclamation depending on final slopes. These will not be tested due to the small area of the test plots.

2.2 Surface Preparation

The testing program will start with surface preparation. First, the loose, sandy surface of the embankment will be rough graded into basins. Then fine grading will construct a series of berms and ditches forming mostly elliptical catchment basins on this sloping edge of the embankment. The spacing and size will be field determined based on observations and measurements in the surrounding upland slopes. The series of berms and ditches will be off-set to control erosion and runoff. The surfaces will then receive surface and topsoiling substrates.

2.3 Fine Grading

The purpose of fine grading is to stabilize the soil surface, and to speed up natural plant succession and development of soils to support pioneer and mature forest species.

The grading will simulate natural topography and relief by:

- duplicating forest floor depressions and hummocks during final grading by forming irregular basins and berms,
- forming basins that control surface water movement and flows,
- adding coarse rock materials when appropriate for surface roughness to control wind and water erosion,
- leaving surfaces rough to help maintain a more even seed coverage and germination.

3.0 TECHNIQUES TO BE TESTED

The layout details of the test program and the techniques to be tested are discussed in this section. The general layout of the plots with appropriate designations is presented in Figure

1.1 and depicted on photographs in Figures 3.1 to 3.3. In addition to implementing the testing program, the plan includes monitoring of the test plots and a means of analyzing the resulting data for application to final reclamation of the entire tailing disposal site.

3.1 Setup of Test Plot Size, Number, and Configuration

Four plots are planned in the configuration shown on the map in Figure 1-1 and on the photographs in Figures 3-1 and 3-2. The plots will be located on the southwest portion of the present tailings embankment. Each plot will be approximately 100 x 220 feet, that is, about ½ acre. There will be a minimum of rough grading since drainage control is not needed for this small area, and deposition controls the slope.

The treatments proposed for each of the four plots is presented in Table 3-1. Each plot may be further subdivided after treatments and materials are applied and the plots have stabilized. There will be variations within the plots that will be observed and analyzed, where possible. Proposed treatments may also be changed after locating and procuring the materials available at the time the test plots are set up.

Table 3-1 Proposed Treatments for the Four Test Plots

TREATMENTS		PLOTS			
		1	2	3	4
Topsoil		0"	0"	0"	6"
Mine material		12"	12"	0"	6"
Chemical fertilizer*		yes	yes	yes	no
Organics	wood mulch	heavy	none	heavy	none
	sludge	heavy	heavy	heavy	none
	humus	none	heavy	heavy	light
Local forest humus		no	yes	yes	no
Seed sources	commercial	yes	yes	yes	yes
	collected	yes	no	yes	no
	forest litter	no	yes	yes	no

* Recommended amounts are given in Table 3-2

The materials to be used during the testing program are as follows:

- substrate materials and soil amendments to simulate forest floor soils conditions,
- salvaged soil from facilities construction,
- recycled forest wood or other by products from local industries,
- rocks and fine materials from mine as substrates, and
- forest humus for seed source and as inoculum for microorganisms.

The addition of soil amendments will generally include:

- nutrients (such as fertilizers),
- organic materials (such as peat, other vegetation, sewage sludge, or forest products depending of availability), or
- biological agents in the form of forest humus (such as mycorrhizal inoculum).

The treatments are further explained in the following sections.

3.2 Fine Grading for Surface Microtopography

Each plot will be formed by ditching and berming the perimeter. The surface of each plot will be graded to form depressions and hummocks or berms after application of the treatment materials. The size and placement of basins will be field determined at the time of the grading. In general, irregular depressions and hummocks will be spaced 25 to 30 feet apart, depending on the type of soil substrate applied. The surface will be left in a rough condition to enhance seed being incorporated in the soil, minimize windblown loss and to promote germination. The treatment materials to be applied to each plot will be sequentially added after fine grading.

3.3 Topsoil Placement

Topsoil for final reclamation is very limited, therefore minimal emphasis is being placed on topsoil as a resource during this testing program. Topsoil will be placed on Plot 4 to a 6 inch depth. The source for the topsoil will be the stockpiled topsoil on the mine site. Outside sources of topsoil are minimal, and difficult for procurement.

3.4 Mine Materials

Mine material will be used as a surface amendment material and tested for effectiveness for

plant growth when mixed with amendments. The testing will use locally available materials for surface and substrate preparation. Suitable mine material for final reclamation has been and will continue to be removed and stockpiled at a convenient location upslope for later spreading. The mine waste rock is a source of coarse fragments and/or fines that will be selectively placed depending on surface configuration.

The mine material will be added to a depth of 12 inch as a soil substrate on top of the tailings in two plots (Plots 1 and 2), additional amendments will be tested on these two plots in varying amounts. If possible a source of fines, to be added to the surface, will be located and worked into the top layers with the coarse mine materials. Plot 4, which will receive 6 inches of salvaged topsoil, will also receive 6 inches of mine material for a total of 12 inches of added material. The topsoil will be added onto the mine rock and not mixed.

Plot 3 will not receive any material on top of the sandy embankment substrate. The intention of this plot is to test the feasibility of revegetating the existing sandy embankment material with only added amendments. Instead, substitute organic material will be used to simulate topsoil (i.e. spreading digested sewage material or tilling in locally obtained forest by-products). Some studies (US SCS 1987) have shown that a clean, sandy substrate with >15% fines and good moisture is adequate for successful reclamation if a good stand of vegetation can be maintained for a few years to provide the organic matter and nutrient pool buildup necessary for continued growth. Fines in the embankment materials are about 7%, and this limitation must be compensated for by appropriate amendments. A vigorous stand of grasses and shrubs generally provides the needed organic matter buildup.

3.5 Chemical Fertilizer

The sandy embankment substrate has been tested for nutrients and organic matter status to determine which of the amendments may be necessary. A sample of the tailings material was tested for soil properties and nutrient status for reclamation to a temperate grassland. This sample was also tested for acid/base potential to see if acid generation from weathering of the tailings was a problem. The results of these tests indicated that the organic matter and nitrogen are low and that both phosphorus and potassium are deficient. Table 3-2 gives the rates of chemical fertilizer recommended for application to the raw sandy substrate of the

Table 3-2 Recommended Rates of Fertilizer Application

Fertilizer	Amount (in lbs/acre)
Nitrogen as N	100
Phosphorus as P_2O_5	170
Potassium as K_2O	70

embankment. The acid/base potential indicates a positive neutralization potential of 5.5 T/1000T $CaCO_3$ equivalent, and a pH of 8.6. Therefore, the acid generation and an acid soil will not be a problem for revegetation.

3.6 Organic Material Sources

Forest products, heavy organics, or humus materials will be added to the substrate surfaces and mixed into the top layers. The possible exception is the mine material; if worked with implements, this material will have the rock sorted to the surface. The mine is presently obtaining wood by-products for use in the mill, this and other local sources of these products will be located for use. The use of hay, straw, or other light mulches will not be used due to the possibility of weed contamination and rapid decay. Additional amendments that will be used are nutrients sources of nitrogen (such as sewage sludge). This amendment will be applied concurrently during the application of surface materials or incorporated into the top layer during roughening of the surface. A local and inexpensive source for organic materials will need to be located. Possible sources could be forest products such as partially decomposed humus, surface horizons of forest soils, or wood chips or shaving from wood mills.

3.7 Local Forest Humus

The local forest litter and humus can provide a source of inoculum. This can be obtained from the surrounding forest floor. It will need to be collected using hand shovels from a variety of places to disrupt the surrounding forest as little as possible. During final reclamation, the forest humus would not be evenly spread, but would be placed in strategic locations to act as a source for further natural distribution.

3.8 Sources of Plant Seed and Seedings

Seed will be applied immediately after surface preparation is completed when the soil is loose and rough. This allows the seed to be covered and incorporated into the soil without the use of a drill or other implements. The sources of seed that will be tested are:

- commercially available from local seed companies,
- locally collected from plants growing in the vicinity of the mine, and
- locally collected forest floor litter.

In addition to the seeding mixture given in the revised reclamation plan (SRK, 1993), other species will be selected and tested for applicability to the situation on the embankment. These species will include other grass species, herbaceous dicots, and shrub or tree species local to the area collected by hand.

The feasibility of including pioneer tree species in the test will be specifically addressed during the early testing program. In order to test trees, the species of tree has been identified, however, a source of seeds or seedlings must be located. If a source of seeds can be found, tree seeds will be included in the sowing mixture. The testing program should give good results on the use of tree seeds or seedings, and whether a grassland vegetation can provide good nursery conditions for the natural forest succession to occur.

Commercial Seed Sources

A source of locally adapted seeds will be determined by contacting local seed companies (i.e. Lofts Seed Company). Pricing and availability will help determine the seed mix from the commercial source.

Natural Seed Sources

The best success with reclamation to a vegetation approaching the natural surrounding ecosystems is to use native or locally adapted plants species. These can be obtained by:

- collecting seeds from species on the property during the summer and fall seasons before start of revegetation, or
- using forest floor litter layer as source of seeds collected from areas to be disturbed by enlargement of the tailings facility or along roads for timber access.

The most advantageous source in a genetic sense for adapted species is locally collected seeds from plants already growing at the mine. These seeds can be hand collected in the fall of 1995, or in the spring as humus from areas to be disturbed by tailings expansion.

4.0 SCHEDULE AND MONITORING

A schedule for the revegetation testing program and monitoring for performance will be needed for the first year during the initial set up, and later for measuring progress. The following sections present a detailed schedule for program setup and recommends monitoring techniques.

4.1 Schedule for Testing Program

The tentative schedule for the initiation of the testing program are given in Table 4-1.

Table 4-1. Tentative Schedule for Revegetation Testing Program

Date	Activity
March 1995	complete draft detailed testing plan
April 1995	submit plan and complete review
September/ November 1995	finish deposition of tailings on location of test plots; set up local collection of seeds, and locate areas for forest humus collection; locate other sources of materials for plots
May 1996	set up test plots and implement program
June 1996	complete test plots
September 1996	monitoring plots for physical conditions and early germination of plants

4.2 Monitoring Test Plots

During the next few years the test program will be monitored for an adequate period to determine the germination and growth of vegetation, and the physical conditions of the plots. The specific revegetation features to be monitored are important vegetation variables that measure plant species growth, diversity, productivity, and successional trends. The information will serve the dual purpose of guiding subsequent final reclamation procedures,

and determining if the reclamation testing results are satisfactory based on vegetation growth and trends. The monitoring program is generally developed as the test plots are set up, and by subsequent inspection of the test results.

The purpose of a monitoring program is to track the progress of the different treatments in the test plots, and to use this information to determine the best and most efficient (cost-effective) methods to use during final reclamation. This tracking is necessary to provide the qualitative analysis and quantitative data for measuring test plot success. "Success" is measured by the plant species cover, density, diversity, and productivity of the established vegetation. Eventually, the successional trend in the vegetation toward the mature forest ecosystem type is the desired reclamation goal.

The vegetation variables for each vegetation plot and treatment needed to provide data and information for additional baseline conditions are:

- species composition, densities, dominance, and frequency,
- canopy coverage by species (total percent cover maybe more than 100),
- vegetation structure and heights,
- an estimate of productivity, and
- trend analysis of plant succession.

The methods proposed for conducting these surveys and providing the information needed are efficient and cost effective. The methodology uses linear plots to quantify all of the variables needed for vegetation analysis. These quantitative plots allow a large and statistically valid sample to be taken in a short time. This sampling protocol has been developed for sampling vegetation attributes and characteristics in relationship to plot treatment, substrate, amendments, and seed source. Vegetation established on any disturbed site will be in an early successional status and not uniform.

The method proposed uses short linear coupled transects. These are linear plots (typically 1 x 3 meters in size) laid end to end along the gradients in the test plots. Vegetative and treatment parameters will be recorded in each plot. The transects will be analyzed for the vegetation parameters as they relate to different treatments.

4.2.1 Specific Procedures

The procedures for the sampling locations and marking, number of samples, and analysis of the data are detailed in this section.

Sampling Location

Linear sets of sampling plots will be conducted in each test plot. The transects will be run from set points in a direction (specific azimuth) along gradients until an edge is encountered (that is, approximately 20 plots along each line). A 30 meter steel tape will be stretched along the transect line.

Variables

The variables to be measured in each transect are vegetation and treatment features. Specific field forms have been developed which will be used during the field measurements. These forms will be transferred to computer spreadsheets for general analysis and statistical testing. The following table gives the evaluations for each variable that will be measured in the field.

Table 4-2 Field Measurements for Variables

Variable	Field Measurements
Vegetation	species cover by percent
	total cover by estimated percentage
	shrub and tree density by count height of shrub and tree strata
	productivity estimate
Treatment	topsoil or mine material amounts
	fertilizer
	organics
	humus as an inoculum source
	seed source

Number of Samples

The number of samples will depend on the number of linear plots being surveyed. Sample adequacy for the number of factors being measured will be adequate for the required statistical

and correlation analysis. At the present time, the number of samples planned is a minimum of 40 plots on 2 transects lines (20 plots per line) in each plot.

Analysis

The results of the transects will be analyzed for:

- vegetative parameters, types, and characteristics,
- species percentage cover and frequency, and
- relative productivity.

The statistical parameters for each variable will be determined to characterize the plots. The parameters will be developed using statistical means and standard deviations. If the data permits, a correlation coefficient between each set of parameters will be determined using a computer program.

Schedule

The schedule for monitoring will be based on seasonal growth and results of initial monitoring. We suggest June and September for first year, 1997, and yearly in late summer thereafter until end of test period suggested as lasting four years until 1999. The criteria and performance standards can be set up during this time period, perhaps during third or fourth year based on monitoring data.

4.2.2 Documentation

The results of this Revegetation Testing Program will be written into a report to be submitted to Barton Mines Corporation. Any changes to this program will be documented and included in the report with a rationale for each change. The results of each monitoring period will be reported and yearly progress reports will be submitted.

4.3 Comparison to Natural Environment for Performance Standards

The vegetative cover, diversity, productivity, and frequency parameters can be compared to a standard established for the vegetation type to determine test plot conditions. A site in vicinity of the mine in a similar state of succession and abiotic condition can be located. The vegetation parameters on this site can then be assigned a numeric value as a relative percentage of cover and diversity to compare to the revegetation areas. This data will also

provide baseline information for determining trends in plant succession and vegetation conditions during subsequent years. The statistical parameters and correlation coefficients will provide a quantitative basis for future reclamation standards to be developed.

5.0 REFERENCES

Countryman, W.D. 1991. Physical and Biological Characteristics of the Finger valley Wetland. Report to Barton Mines Corporation.

US Soil Conservation Service. 1987. Revegetation Sand and Gravel Borrow Pits in the Northeast. Plant Material #1. 6pp, mimeo.

SRK. 1993. Design of the Expanded Tailings Valley Tailings Facilities Ruby Mountain Project. Report # B112102.

Figure 3-1. Aerial view toward SW across the present tailings disposal facility showing the proposed location of revegetation test plots. Ruby Mountain Mine, BMC, September 1994.

Figure 3-2. Aerial view toward NW showing proposed location of revegetation test plots. Ruby Mountain Mine, BMC, September 1994.

Figure 3-3. Ground level view of location of test plots. Ruby Mountain Mine, BMC, September 1994.

Figure 3-4. Natural revegetation by pioneer species on tailings.. Ruby Mountain Mine, BMC, September 1994.

Figure 3-5. Natural revegetation by pople (aspen) trees on tailings Trees are about three years old. Ruby Mountain Mine, BMC, September 1994.

Figure 3-6. Disturbed soil during initial tailings construction. Ruby Mountain Mine, BMC, December 1988.

Figure 3-7. Natural revegetation on the disturbed site shown in Figure 3-6 after five and a half years. Ruby Mountain Mine, BMC, September 1994.

Appendix B

Adirondack Park Agency Permit # 87-39B

(1988)

State of New York
Adirondack Park Agency
P.O. Box 99
Ray Brook, NY 12977
Telephone (518) 891-4050

In the Matter of the Application of the

BARTON MINES CORPORATION

Project & Permit
No. 87-39

for a permit pursuant to Section 809 of the Adirondack Park Agency Act and the New York State Freshwater Wetlands Act

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SUMMARY

Barton Mines Corporation, which operates an open pit garnet mine in the unincorporated community of North Creek, Town of Johnsburg, Warren County, intends to change its tailings disposal process from a dry to wet method and seeks an amendment to its existing permit (No. 79-356) to develop two drainage basins, Tailings Valley and Finger Valley, for wet tailings disposal. Tailings Valley would be developed first and it is expected to have an operational life of eight years. Finger Valley would be developed next and would provide an additional nine years of tailings storage capacity. However, the life of both of these facilities may decrease if BMC increases its annual production, which it has indicated it may do. The Tailings Valley and Finger Valley sites would occupy 29 and 30 acres, respectively, at peak capacity.

The project site lies in areas designated Resource Management, Rural Use and Industrial Use on the Official Adirondack Park Land Use and Development Plan Map.

AUTHORIZATION

This permit authorizes the project as described in the Findings of Fact and subject to the Conditions contained herein. Failure to undertake the project in accordance with the Findings of Fact and Conditions voids the permit.

FINDINGS OF FACT

Background

1. On May 18, 1979, the Agency conceptually approved, pursuant to Section 809(13)(d) of the Adirondack Park Agency Act, for Project No. 78-401, a mineral extraction, proposed by Barton Mines Corporation (BMC) in the Town of Johnsburg and in the Town of Indian Lake, Hamilton County. On May 23, 1979, BMC applied for final approval of the first phase (initial clearing and grading) of this large scale project. On June 26, 1979, the Agency issued Permit No. P79-140 approving this phase on several conditions.

2. On February 11, 1980, the Agency issued Permit No. P79-356 approving the final phase of the mineral extraction use on a 580 acre parcel of land on the slopes of Ruby Mountain and Big Thirteenth Lake Mountain in the Towns of Johnsburg (548 acres) and Indian Lake (32 acres).

3. On March 2, 1987, BMC applied for a major amendment to Permit P79-356 to allow it to dispose of its tailings using a wet disposal method in two drainage basins on its property.

4. The 580 acre project site is roughly bisected by Brown Pond Brook, which flows in a southerly direction. Lands east of the brook are classified Industrial Use on the Adirondack Park Land Use and Development Plan Map, lands west of the brook are Resource Management. A small portion of the project site, southeast of Thirteenth Lake Road, is classified Rural Use.

5. A portion of the Finger Valley site lies in a critical environmental area since it will be developed within one-eighth of a mile of State land designated Wilderness pursuant to the State Land Master Plan.

Proposed Amendment

6. BMC intends to change its tailings disposal process from a dry to wet method and seeks an amendment to its existing permit to develop two drainage valleys on the western portion of its property known as Tailings Valley and Finger Valley for wet tailings disposal. Tailings valley would be developed first and is expected to have an operation life of eight years. Finger Valley would be developed next and would provide an additional nine years of tailings storage capacity. However, the life of both of these facilities may decrease if BMC increases its annual production, which it has indicated it may do. The Tailings Valley and Finger Valley sites would occupy 29 and 30 acres, respectively, at peak capacity.

7. In order to affect this change in operations, BMC has submitted applications to the Agency and to the Department of Environmental Conservation for State Pollution Discharge Elimination System (SPDES) and Dam Safety permits.

Alternatives Considered

8. Several factors influenced BMC's decision to pursue an alternative waste disposal scheme at its Ruby Mountain site. Primary factors include:

a. An average of 35 gallons per minute (gpm) of seepage is presently occurring from an existing settling pond below the dry tailings disposal area in Tailings Valley. Redevelopment of this facility will permit alternative methods of containing and/or releasing tailings and process water.

b. The existing dry tailings disposal scheme is proving considerably more costly to operate than was originally anticipated. These costs are expected to increase with the increased haulage distance required for continued use of the existing tailings disposal site.

c. The wet tailings process will diminish the overall volume of the tailings and thereby extend the disposal capacity of the Ruby Mountain site.

9. BMC considered a total of four alternative sites for wet tailings disposal. These sites are described in detail in Report 80201/1 entitled Barton Mines - Tailings Impoundment Design, Stage I - Site Evaluation and Alternatives Identification submitted as part of the application are summarized as follows:

a. Tailings Valley - Tailings are currently being placed on this site. Approximately 300,000 cubic yards have been deposited to date.

b. Finger Valley - Located on the northwestern portion of the Ruby Mountain site.

c. Brown Pond Brook Valley - Extends across the northern property boundary onto Forest Preserve lands and also straddles the Hamilton/Warren county line.

d. Barton Valley - Located immediately below the mill in the Lower Brown Pond Brook Valley.

10. The alternative sites and the method of disposal were evaluated by comparing the systems for location, capacity, visual exposure, environmental impacts and water balance. Details of alternatives and site selection are described in a report by Steffen Robertson and Kirsten (SRK) (October 1985) and in the Design Report (80201/2) submitted as part of the application.

11. Based on the evaluation described in Finding of Fact No. 10, BMC elected to employ a wet tailings disposal process in the Tailings Valley and Finger Valley drainage basins.

Economic Considerations

12. The life of the mine at BMC's Ruby Mountain site is limited to the life of disposal capacity at the site. If new disposal capacity is not developed on the site, mining operations will cease.

13. BMC currently employs 97 persons with 42 positions directly attributed to the Ruby Mountain operation.

14. Although other disposal options exist on the project site, the use of a wet disposal method in Finger Valley and Tailings Valley represents the only practical and economically feasible option at this time. BMC eliminated Brown Pond Brook Valley as an option due to its location on State land and Barton Valley due to its high development costs and relatively short life.

Site Preparation and Construction

15. The two tailings disposal facilities will consist of the following general components that will require site preparation:

    a. Tailings embankments will be developed initially as small starter embankments constructed of glacial till, tailings and waste rock. These small starter embankments will be used to initiate construction of the main embankments. A cyclone will separate the tailings slurry from the mill into coarse (sand) and fine (slimes) materials for disposal. Cycloned sand will be deposited above and downstream of the starter embankment. Slimes will flow by gravity from the cyclone to the impoundment behind the embankment.

    b. A seepage return dam will be constructed of glacial till, tailings and waste rock below the lower tailings embankment to collect water and sediment from the upstream portions of the facility. It is designed to store a 10-year 24-hour storm event. Sediment from the lower tailings embankment will be collected behind a small structure built of waste rock between the starter embankment and the seepage return dam.

    c. A return water and seepage pump-back system will control water flows in the system. The location and size of each of these components are illustrated in Drawings 80201/A and 80201/B and are described in detail in Design Report 80201/2 submitted as part of the application.

16. Clearing for the Tailings Valley site is anticipated to begin in the winter of 1987-88 and construction of the components described in Finding of Fact No. 15 are anticipated to begin in the spring of 1988.

17. The starter embankment for the Tailings Valley site and seepage return dam are designed to occupy about 3.2 acres. The access roads and maintenance trails for the slurry pipeline will occupy another 3.1 acres. The initial construction, therefore, will occupy about 6.3 acres, and is expected to be completed in approximately 3 to 4 months. The tailings embankment and impoundment will be enlarged during operation of the mine and mill facilities. The final area to be utilized for the Tailings Valley facility is 26 acres plus the 3 acres for ancillary systems and roads for a total site disturbance of 29 acres. The Finger Valley facility will ultimately occupy about 30 acres for a combined tailings disposal area of approximately 60 acres.

18. Site preparation for the initial construction and operating phase of the project will consist of vegetative clearing at the sites of the starter embankment for the Tailings Valley facility and seepage return dam and along the roads and access routes. Soil and substrate will then be removed and graded to prepare suitable foundations for the two dams, slurry pipeline and return water line. Suitable topsoil material to be used later for reclamation will be removed and stockpiled at the location indicated on drawings 80201/A and 80201/B submitted as part of the application. Final site preparation will include grading and preparing the foundation material on the dam and embankment site and along the pipeline routes. During site preparation, areas which are exposed and subject to erosion will be stabilized by installing hay bales and small check dams or berms.

19. Topsoil stockpiled as a result of site preparation will be contained and planted with a quick growing vegetation cover to prevent erosion prior to its use in reclamation.

20. BMC proposes to divert storm water into Slide Valley Brook by means of a spillway constructed around the east abutment of the Finger Valley facility. The spillway is designed to handle 1.5 times the 100 year storm event. As presently designed, discharge from this spillway will flow onto State lands.

Potential Environmental Impacts and Proposed Controls

21. The environmental impacts from the proposed change in tailings disposal method and locations will be primarily on site from the construction and operation of the tailings disposal facilities. Off site impacts on adjacent land and on the regional environment will not change significantly from present operations. Since present mining operations involve the use of heavy machinery during operating hours, construction and operating activities associated with this project will not have any additional impact on noise levels, traffic or safety on or off the project site. Additionally, the project will not have any impact on public services or the regional economy.

22. A 4.9 acre wetland in Finger Valley will be impacted by the project. This wetland is essentially an undisturbed, pristine wetland showing little physical impact from man's activities.

Wetlands Impacts

23. Finger Valley wetland is a decidous swamp value rated "2" pursuant to 9 NYCRR 578.5. Its primary functions are to contribute to the diversity of plant and animal species on the site and to filter and cool water which passes through it.

24. The Finger Valley wetland is a "discharge" wetland accepting ground water inflow from a spring/seep area at the head of the valley and funneling that water downslope through Tailings Valley and into Tailings Valley Creek. The spring/seep area is the primary source of water for the wetlands on this site and is responsible for their creation and maintenance. This water is minerotrophic and consequently the wetlands that have developed are considered relatively "rich" sites with a high diversity of plant and animal species.

25. The Finger Valley wetland will be dredged and filled as outlined in Findings of Fact No. 15. BMC proposes to create two 6 acre wetlands on the project site as part of its reclamation activities. The creation of the two wetlands is described in Report 80201/3 submitted as part of the application.

26. After closure of the tailings facilities, the two wetlands to be created will be located on top of the slimes impoundment areas in Finger Valley and Tailings Valley. Finger Valley, which is upgradient, will be fed solely from precipitation. Tailings Valley, which is downgradient, will be fed by precipitation and seepage collected from the Finger Valley tailings embankment. Since the spring water will be capped by slimes, it will no longer provide a source of fresh water to this area unless it is captured and piped prior to filling.

27. The proposed water inputs to the Tailings Valley wetland, precipitation and seepage, will be of lesser quality and quantity than the spring waters which presently maintain the existing wetland in Finger Valley. Further, the proposed water input to the Finger Valley wetland will be of less quality and quantity than the amount now needed for maintenance of the existing wetland.

28. The amount of water which will be available for the two wetlands to be created is insufficient to generate or maintain a wetland of similar value to the one which presently exists in Finger Valley.

Erosion and Sedimentation

29. Site preparation and construction for each facility will require a three to four month period during which clearing of vegetation, stripping of soils and grading for the dam foundations will occur. There is significant potential for soil erosion and sedimentation of the drainage basins on the site during this period. BMC proposes to control erosion and sedimentation during this phase by building the seepage return dam first. This dam will collect and store sediment produced during construction of the Tailings Valley starter embankment.

30. BMC will construct a diversion structure and diversion ditches around the perimeter of the final embankment location to direct drainage out and around the facility as described in Section 8.1.9.1. of the Design Report (80201/2).

31. Areas subject to erosion along the pipelines outside the catchment area of the seepage return dam will be controlled by small check dams and temporary hay bale dams. These disturbed areas, including the downslope portion of the seepage return dam, will be revegetated following construction.

    To ensure that all surface runoff from the tailings impoundment is captured, BMC will construct a series of interceptor ditches as shown on Drawing 80201/A submitted as part of the application.

Dust

32. During construction, the only significant source of dust will be haul roads. Because of the small quantity of materials to be hauled and the short construction period, the haul roads will not be a large source of dust. BMC proposes to suppress dust by applying calcium chloride on the haul roads if and when dust becomes a problem.

33. During initial operations, the slimes deposits and embankments will be small and not subject to the prevailing winds. In later years, as the facility reaches its final height, the impact of the prevailing winds is likely to be more significant. The slimes deposit will contain fine grained materials, which, if allowed to dry, could become a source of wind blown dust. During winter months, portions of the slimes deposit will have little opportunity to dry out. During summer months, most areas of the deposit will regularly receive a new covering of slimes. Because these slimes are nearly impermeable, water will remain at or near the surface, preventing wind erosion. For short periods during the summer, some small areas may become sources for dust. If dust becomes a problem, cyclone overflow can be directed at these areas to wet them.

34. A small portion of wind blown dust is expected from the embankment face during operation. This impact is likely to be more significant during later years of operation as the buffering effect of the hills and vegetation surrounding the facility tends to diminish. However, unlike the slimes deposit, most of the material in the embankment will be too coarse to make wind suspension a significant problem. If dust becomes a problem, BMC proposes to apply cyclone underflow (tailings and water) or water to the embankment face. After closure, reclamation and revegetation of the embankment and slimes deposit surfaces will prevent any significant wind erosion and dust.

Seepage and Discharges

35. The fractured nature of the underlying bedrock on the project site will allow seepage through the tailings disposal areas. Water quality impacts from seepage will be controlled by constructing an underdrainage system consisting of finger drains and a main collector drain as described in Section 7.1.8 and 8.1.9.1 of Report 80201/2. Seepage collected by this system will be directed to the impoundment created by the seepage return dam referred to in Finding of Fact No. 15(b).

Water collected in this impoundment will be pumped to the mill for reuse or discharged into Tailings Valley Creek. Remaining seepage losses to ground water are estimated to average 5 gpm from each of the tailings impoundments and from the seepage return dam. These quantities are not expected to impact significantly groundwater resources of the area.

36. All discharges from BMC mining operations will be subject to a State Pollution Discharge Elimination System (SPDES) permit issued by the Department of Environmental Conservation. There will be an average 60 gpm discharge from the BMC mill facility. After the Finger Valley facility is completed, the discharge is expected to double. This discharge will have an impact to surface water that will be minimized and regulated by a SPDES permit.

Fresh Water Consumption/Supply

37. Fresh water required for BMC's present milling operation is primarily withdrawn from Brown Pond Brook as authorized in BMC's existing permit No. 79-358, Condition G, and is pumped to a reservoir north of the crusher building. Condition G prohibits BMC from withdrawing water from Brown Pond Brook when flows fall below 100 gallons per minute (gpm). Fresh water consumption presently averages 35 gpm during operating periods.

38. In 1981, BMC sought and was granted authorization by the Agency to withdraw water by tanker from Thirteenth Brook on an emergency basis. During low flow periods, BMC has pumped water on an intermittent basis from Thirteenth Brook to its reservoir to supplement its fresh water supply.

39. Although BMC designed and constructed its existing reservoir to store approximately 7 million gallons, a tear in the reservoir liner in the fall of 1982 has limited its capacity to approximately 2 million gallons.

40. BMC has not been able to maintain a sufficient reserve of fresh water during low flow periods due to the withdrawal restrictions described in Finding of Fact No. 37 and due to the limited storage capacity of its reservoir.

41. BMC is unable to repair its reservoir and restore its design capacity without shutting down its milling operation for a 12 to 16 week period. BMC has also expressed doubts about the feasibility of repairing the reservoir from an engineering standpoint.

42. BMC's current average fresh water consumption of 35 gpm during operating periods is not anticipated to change as a result of the change from a dry to wet tailings disposal process.

43. Both Brown Pond Brook and Thirteenth Brook are classified C(T) and support naturally reproducing populations of native brook trout.

44. Flows in Thirteenth Brook are approximately 15 times greater than in Brown Pond Brook based on a single mid-summer flow measurement in August, 1987. Flow data are currently not available from Thirteenth Brook.

45. Brown Pond Brook is an important source of cool water at its confluence with Thirteenth Brook and provides a spawning and nursery area for native trout.

46. Water withdrawals from Brown Pond Brook may reduce its cold water influence on Thirteenth Brook and may have a negative impact on aquatic insect population and the native trout population in Brown Pond Brook.

47. Due to the significantly greater flows in Thirteenth Brook, limited water withdrawals from this source are less likely to have adverse environmental impacts than similar withdrawals from Brown Pond Brook.

Visual Impacts

48. BMC conducted a visual impact analysis of both the Tailings Valley and Finger Valley sites based on a worst case scenario of each facility at maximum capacity. Vegetation at the reference points was not considered. From a total of seventeen reference points, adverse visual impacts may occur at the following six locations:

Reference Points

5 Hudson River 3.8 miles from Ruby Mountain. No intervening land forms are present and a potential view to tailings area exists for approximately 1,000 ft. along the river.

7A Recreational Home Development 2.1 miles from Ruby Mountain. No intervening land forms are present and a potential view to tailings area exists therefrom.

7B Recreational Home Development 2.4 miles form Ruby Mountain. No intervening land forms are present and a potential view to tailings area exists therefrom.

7C Recreational Home Development 1.5 miles from Ruby Mountain. No intervening land forms are present and a potential view to tailings area exists therefrom.

10. Big 13th Mountain 1.4 miles from Ruby Mountain. No intervening land forms are present and a potential view to tailings area exists therefrom. However, no trails currently exist up Big 13th Mountain. The dominant views are from the southwest toward 13th Lake with significant views to the west and northwest. Views to the east and south are screened by vegetation.

11. Slide Mountain 1.6 miles from Ruby Mountain. No intervening land forms exist and a potential view to the tailings area exists. The dominant views are to the west and north.

Since the visual analysis considered topography only, existing vegetation both on the project site and at the reference points will mitigate any adverse visual impacts.

Reclamation of the Tailings Impoundments and Embankments

49. Reclamation of each wet impoundment facility will start when the tailings slimes reach the maximum impoundment level. Reclamation will involve the following key elements: drainage establishment and control, final grading and contouring of the embankment and impoundment, topsoil placement, soil surface preparation and amendments, and revegetation.

50. Due to the nature of the tailings disposal method, the sites will be treated as three separate zones or habitat types for reclamation methods. These are: the embankment top, the slopes of the embankment, and the impoundment area behind the embankment. Treatments will reflect the differences in topography and substrate.

51. It will be possible to treat and manage the impoundment areas of approximately 6 acres each as wetlands due to the fine substrate, flat surface and lack of complete drainage. Open water and marshy areas may remain in places on these areas due to differential settling. The top of the embankments, about 10 acres, will be managed as a meadow grassland with warm season bunchgrass. The embankment slopes will be stabilized and revegetated with a mixture of warm and cool season grasses that control erosion and runoff. All three habitat types will revert back to a forest type through natural succession.

Specific reclamation plans including drainage establishment and control, final grading and contouring, soil surface preparation and amendments and revegetation are contained in Report 80201/3 submitted as part of the application.

Prior Violation

52. At its November 1987 meeting, the Agency members considered enforcement file E87-244 and determined that BMC had violated Condition G of its existing permit, P79-356, by exceeding the allowable withdrawal of water from Brown Pond Brook. BMC has agreed to comply with the settlement proposed by the Agency's Enforcement Committee.

CONCLUSIONS OF LAW

1. The project would be consistent with the Land Use and Development Plan pursuant to Section 809(10) of the Adirondack Park Agency Act.

2. The project would be compatible with the character descriptions and purposes, policies and objectives of the land use area wherein it is proposed to be located.

3. The project would be consistent with the overall intensity guidelines since no new principal buildings will be constructed as part of the project.

4. The project would comply with the shoreline restrictions of Section 806 of the Adirondack Park Agency Act since no shorelines are involved in the project.

5. The project would not have an undue adverse impact pursuant to Section 809(10)(e) of the Adirondack Park Agency Act or Section 24-0801(2) of the Freshwater Wetlands Act provided that:

   a. accelerated siltation and erosion are controlled and existing water quality is maintained;

   b. measures are undertaken to create new wetlands in partial mitigation of those to be filled; and,

   c. the tailings disposal areas are reclaimed to restore the acreage to a natural setting compatible with adjacent undisturbed lands.

6. The economic and social benefits of the project, including the creation of two new wetlands, compel a departure from the guidelines of Section 578.10 of the Agency's Rules and Regulations.

CONDITIONS

1. The project shall be undertaken as described in the Findings of Fact and in compliance with these Conditions.

2. This permit shall be recorded in the name of Barton Mines Corporation.

3. The enclosed stamped and addressed post cards shall be returned to the Agency upon recording this permit with the Warren County Clerk's Office and upon completing the Special Conditions noted thereon.

4. Prior to any earth disturbance, BMC shall submit and receive written Agency approval for an erosion control plan which describes and details and shows the location of all temporary and permanent erosion control measures to be undertaken on the project site.

5. All temporary erosion control measures shall be inspected and maintained weekly during project construction. Any structure that is found to be failing at any time shall be repaired and replaced immediately.

6. All temporary erosion control measures shall be left in place until the Agency determines that the project site is properly stabilized and authorizes their removal in writing.

7. BMC is authorized to withdraw up to 68 gallons per minute from Thirteenth Brook for a 16 month period, commencing on the date this permit is recorded, for use in its mill operation. BMC is required to keep a daily record of such water withdrawals and provide such records to the Agency at the end of 12 months. This record keeping shall commence on the date this permit is recorded. BMC is required to use its existing submersible pump (or equivalent) and above ground piping to withdraw such water.

8. BMC is required to stock a replacement pump to prevent unplanned interruption in withdrawals from Thirteenth Brook.

9. BMC is required to provide the Agency with flow data for Brown Pond and Thirteenth Brook for a 12 month period. Within one month from the date on which this permit is issued, BMC shall submit a flow monitoring plan for Agency approval. Such plan shall provide for the monitoring of flows in Brown Pond and Thirteenth Brooks on a weekly basis for 12 months. At the end of such 12 month period, BMC shall submit the flow data to the Agency for review.

10. Following the submission of the flow data required in Condition 9 above, BMC may submit an application to the Agency and the Department of Environmental Conservation, if necessary, requesting authorization to withdraw water from Thirteenth Brook on a permanent basis.

11. Future withdrawals from Brown Pond Brook are prohibited and Condition G of APA Permit No. 79-356 issued on February 11, 1980 is deleted. To prevent such withdrawals, BMC shall construct and install a non-corrosive metal collar on the dropbox in Brown Pond Brook within one month of the issuance of this permit. The collar shall be constructed and caulked as indicated in BMC's correspondence to the Agency dated November 3, 1987. To minimize the further impeding of flows downstream of its weir on Brown Pond Brook, BMC is also required to remove the metal framing present in the notch of the weir within 30 days of the issuance of this permit.

12. In the event that it is permanently authorized to withdraw water from Thirteenth Brook, BMC will be required to remove its weir and dropbox from Brown Pond Brook.

13. Within one year of the issuance of this permit, BMC shall submit a detailed plan for Agency review and approval to mitigate the ecological impacts associated with the loss of the Finger Valley wetland. This plan shall include:

    (i) a sampling protocol to develop a quantitative inventory of plant and animal species and plant communities in the Finger Valley wetland. This should take place at intervals during the filling of Tailings Valley to describe community dynamics.

    (ii) A species list of plants from bryophytes through the seed plants which presently exist in the Finger Valley wetland.

    (iii) A species list of animals including invertebrates (aquatic, semi-aquatic, terrestrial), amphibians, reptiles, birds and mammals which presently exist in the Finger Valley wetland.

    (iv) Construction of a trap and conduit to capture and direct spring waters from the spring(s) at the head of Finger Valley to the surface of the new wetland in Tailings Valley insuring an adequate supply of minerotrophic groundwater to the new wetland site.

(v) Removal and possible storage of plant materials (trees, shrubs, herbs, mosses) and removal and storage of organic sediments from the Finger Valley wetland for deposition and transplantation to Tailings Valley at the time of closure of Tailings Valley, assuring the quickest possible recovery of the wetland and the highest possibility of mitigation success.

(vi) A sampling protocol to study the plant and animal community of the new Tailings Valley wetland for comparison with the Finger Valley wetland prior to disturbance. This protocol should mimic "(i)" above and will be conducted on the same temporal basis.

(vii) Modification of the stormwater drainage plan for Finger Valley tailings facility to eliminate the diversion of any discharge onto State lands and to provide for the maintenance of a 50 foot buffer between the final elevation of water impounded in Finger Valley and State lands.

(viii) A monitoring protocol of the quantity of inflow and outflow waters of the new Tailings Valley wetland.

(ix) A proposal to manage the expected volume of relatively clear water which will flow out of the Tailings Valley wetland after implementation of the above plan.

(x) An alternative site and wetland mitigation proposal if it is determined from statistical and descriptive comparisons that the attempts to create a wetland in Tailings Valley equal in value to the one destroyed in Finger Valley has failed.

14. BMC shall be limited to the vegetative clearing necessary for the construction of the Tailings Valley wet tailings disposal facility components as described in Findings of Fact No. 15. Any additional clearing is prohibited unless authorized by the Agency in writing. BMC is prohibited from commencing any clearing or site preparation activities in Finger Valley without prior written approval from the Agency.

15. Should additional disposal areas be developed by BMC, either through improvements in technology or as the result of additional land acquisition, the Agency reserves the right to restrict or prohibit the use of Finger Valley as a disposal area any time prior to or during its development.

16. If the project authorized hereby is not undertaken within two years of the date of recordation hereof, the project may not thereafter be undertaken or continued unless a new permit is granted by the Adirondack Park Agency.

17. The Adirondack Park Agency may conduct such on-site investigations, examinations, tests and evaluations from time-to-time as it deems necessary to ensure compliance with the terms and conditions hereof.

18. At the request of the Adirondack Park Agency, BMC shall report in writing the status of the project including details of compliance with any terms and conditions of this permit.

19. Nothing contained in this permit shall be construed to satisfy any legal obligations of BMC to obtain any governmental approval or permit from any entity other than the Adirondack Park Agency, whether federal, state, regional or local.

THIS PERMIT SHALL EXPIRE WITHIN SIXTY DAYS OF THE DATE OF ISSUANCE UNLESS THE ORIGINAL PERMIT IS DULY RECORDED IN THE OFFICE OF THE CLERK OF WARREN COUNTY. IN ORDER FOR THE PERMIT TO BE RECORDED, THE APPLICANT MUST PAY THE COUNTY CLERK THE FOLLOWING FEES AT THE TIME OF RECORDING: FIVE DOLLARS AND, IN ADDITION THERETO, THREE DOLLARS FOR EACH PAGE OR PORTION OF A PAGE OF THE PERMIT AND ANY ATTACHMENTS TO IT. THE ORIGINAL OF THE PERMIT WILL BE RETURNED TO THE APPLICANT BY THE COUNTY CLERK.

Project & Permit
No. 87-39

PERMIT issued this 7th day
of January, 1988.

ADIRONDACK PARK AGENCY

BY: William J. Curran
William J. Curran
Director of Operations

STATE OF NEW YORK)
: ss:
COUNTY OF ESSEX)

On this 7th day of January, 1988, before me, the subscriber personally appeared, William J. Curran, to me personally known and known to me to be the same person described in and who executed the within instrument, and he acknowledged to me that he executed the same.

Richard R. Terry
Notary Public

RICHARD R TERRY
Notary Public, State of New York
Qualified in Essex County
No. 4697681
Commission Expires Dec. 31, 1989

THIS PERMIT A[illegible]DS PERMIT 87-39 ISSUED J[illegible]ARY 7, 1988

STATE OF NEW YORK
EXECUTIVE DEPARTMENT
ADIRONDACK PARK AGENCY
P.O. Box 99
Ray Brook, New York 12977
(518) 891-4050

In the Matter of the Application of

BARTON MINES CORPORATION

for a permit pursuant to §809 of of the Adirondack Park Agency Act and 9 NYCRR Part 578

PERMIT

Project 87-39A

SUMMARY

Barton Mines Corporation is granted an amended permit, on conditions, for a regulated activity involving a wetland in areas classified Rural Use and Resource Management by the Official Adirondack Park Land Use and Development Plan Map in the Town of Johnsburg, Warren County.

AUTHORIZATION

This amended permit authorizes the construction of an effluent pipe line across a wetland, provided it is undertaken as described in the application and the Findings of Fact herein and in compliance with the Conditions herein. Failure to undertake the project in accordance with the application, Findings of Fact and Conditions voids the permit. In the case of conflict, the Conditions control. In issuing this permit, the Adirondack Park Agency has found that the authorized project meets all pertinent statutory criteria for approval of projects.

FINDINGS OF FACT

1. A request was made on May 18, 1992 by the applicant for approval of, and issuance of an amendment to Adirondack Park Agency Permit 87-39 which was issued January 7, 1988 authorizing two new wet tailing disposal facilities totaling 59 acres in Tailings and Finger Valleys on the project site.

2. The amendment to the project and permit is described as follows:

   a. Barton Mines Corporation, at its Ruby Mountain Garnet Mine, operates a series of settling ponds as part of the garnet concentrating process that separates mine tailings and water to reuse in the refining process. On December 4, 1991, the corporation executed an Order on Consent, File R5-0846-90-3 with the New York State

2. No construction of buildings or expansion of existing buildings, subdivision of land, or other land use or development not expressly authorized by this permit may be undertaken without an additional Agency permit, amended permit, or letter of non-jurisdiction pursuant to 9 NYCRR Part 571.

3. This permit shall be void unless recorded in the Warren County Clerk's Office, in the name of the landowner at the time of recordation, within 60 days of issuance.

4. This permit shall be void if the project authorized hereby is not substantially commenced and substantial expenditures made for structures or improvements directly related thereto within two years from the date the permit is recorded.

5. This permit is binding on the applicant and all present and future owners of the project site.

6. Copies of this amended permit and Permit 87-39 shall be furnished by the applicant to all subsequent owners or lessees of the project site prior to sale or lease. All deeds conveying all or a portion of the lands subject to this permit shall contain references to this permit as follows: "The lands conveyed are subject to Adirondack Park Agency Permits 87-39 and 87-39A issued January 7, 1988 and July 24, 1992 the terms and conditions of which are binding upon the heirs, successors and assigns of the grantors and all subsequent grantees."

7. No grading, vegetative cutting or other disturbance shall occur in the wetland area east of Thirteenth Lake Road during installation and maintenance of the overland discharge pipeline, that would adversely affect the values and functions of the wetland. Install pipe during periods of no rain events and low water runoff in the wetland.

8. The Adirondack Park Agency may conduct such on-site investigations, examination, tests and evaluations from time-to-time as it deems necessary to ensure compliance with the terms and conditions hereof.

9. At the request of the Adirondack Park Agency, the applicant shall report in writing the status of the project including details of compliance with any terms and conditions of this permit.

10. Nothing contained in this amended permit shall be construed to satisfy any legal obligations of the applicant to obtain any governmental approval or permit from any entity other than the Adirondack Park Agency, whether federal, State, regional or local.

**Mean High-Water Mark means the average annual high-water level, in essence, the high-water mark.

Department of Environmental Conservation (DEC), which requires redirection of discharged suspended and settleable solids to Thirteenth Brook with conditions and monitoring as detailed in the order.

b. The corporation proposes to install a six inch effluent discharge pipe approximately 2870 ft. on top of ground to Thirteenth Brook. No excavation or vegetative cutting is required. A rock cluster at the outlet in Thirteenth Brook will be constructed to eliminate effluent velocity and enhance mixing. The pipe will utilize an existing culvert to cross Thirteenth Lake Road. Construction is to occur during July and August 1992.

c. The discharge pipe is subject to DEC SPDES permits. Agency Permit 87-39, issued January 7, 1988 authorized the corporation's tailing disposal process. The DEC Order on Consent will eliminate authorized discharges from the tailings disposal areas into Brown Pond Brook. Finding of Fact 36 of Agency Permit 87-39 indicates that all discharges from the mining process will be subject to DEC SPDES requirements.

3. An Agency wetlands expert has determined by examination of aerial photography that there are shrub wetlands subject to Agency jurisdiction on the property associated with Thirteenth Lake Brook along the proposed pipeline east of Thirteenth Lake Road. These wetlands have a "3" value rating. The effluent pipeline is a structure, to be located in a wetland area, and therefore is a regulated activity pursuant to 9 NYCRR 578.3(n)(1)(iv). Since no significant disturbance to the wetland is proposed, this amendment request is deemed a minor amendment.

4. The requested amendment is a minor amendment within Section 809(8)(b)(1) of the Adirondack Park Agency Act in that it do not involve a material change in permit conditions, applicable law, environmental conditions or technology since the issuance of Permit 87-39.

5. The project will not cause any change in the quality of "registered," "eligible," or "inventoried" property as those terms are defined in 9 NYCRR 426.2 for the purposes of implementing §14.09 of the New York State Historic Preservation Act of 1980.

CONDITIONS

1. The project shall be undertaken as described in the application and Findings of Fact herein, and in compliance with the Conditions herein. Failure to comply with the application, Findings of Fact or Conditions voids the permit. In the case of conflict, the Conditions control.

THIS PERMIT SHALL EXPIRE WITHIN SIXTY DAYS OF THE DATE OF ISSUANCE UNLESS THE ORIGINAL PERMIT IS DULY RECORDED IN THE OFFICE OF THE CLERK OF WARREN COUNTY IN THE NAME(S) OF THE OWNER(S) OF RECORD OF LAND AT THE TIME OF RECORDATION. IN ORDER FOR THE PERMIT TO BE RECORDED IN THE COUNTY CLERK'S OFFICE, THE APPLICANT MUST PAY THE COUNTY CLERK THE FOLLOWING FEES AT THE TIME OF RECORDING: TEN DOLLARS, AND IN ADDITION THERETO, THREE DOLLARS FOR EACH PAGE OR PORTION OF A PAGE OF THE PERMIT AND ANY ATTACHMENTS TO IT. THE ORIGINAL OF THE PERMIT WILL BE RETURNED TO THE APPLICANT BY THE COUNTY CLERK.

PERMIT issued this 24th day of July, 1992.

ADIRONDACK PARK AGENCY

BY: William J. Curran
William J. Curran
Director of Operations

STATE OF NEW YORK)
: ss:
COUNTY OF ESSEX)

On this 24th day of July, 1992, before me, the subscriber, personally appeared William J. Curran, to me personally known and known to me to be the same person described in and who executed the within instrument, and he acknowledged to me that he executed the same.

Karen A. Duckett
Notary Public

RDJ:RLH:kad

KAREN A. DUCKETT
Notary Public, State of New York
No. 4885133
Qualified in Franklin County
Commission Expires March 23, 1993

To The County Clerk: This permit is void unless recorded before September 26, 1994
Please index it in the grantor index under the following names:

1. Barton Mines Corporation
2. Trust of C.R. Barton, Jr.

THIS PERMIT AMENDS PERMIT 87-39 ISSUED JANUARY 7, 1988

STATE OF NEW YORK
EXECUTIVE DEPARTMENT
ADIRONDACK PARK AGENCY
P.O. Box 99
Ray Brook, New York 12977
(518) 891-4050

In the Matter of the Application of

BARTON MINES CORPORATION
AND TRUST OF C.R. BARTON, JR.

for a permit pursuant to §809
of the Adirondack Park Agency Act

PERMIT

Project 87-39B

SUMMARY

Barton Mines Corporation is granted a permit, on conditions, for an amended mineral extraction tailing pile in an area classified Resource Management by the Official Adirondack Park Land Use and Development Plan Map in the Town of Johnsburg, Warren County.

AUTHORIZATION

This permit authorizes a single wet tailing disposal area at Tailing Valley, Ruby Mountain Site, provided it is undertaken as described in the application and the Findings of Fact herein and in compliance with the Conditions herein. Failure to undertake the project in accordance with the application, Findings of Fact and Conditions voids the permit. In the case of conflict, the Conditions control.

FINDINGS OF FACT

General

1. The 801± acre project site is currently owned by H. Hudson Barton, Clarence J. Lewis, Jr., and A.D. Barton, Jr., as Trustees under an Agreement of Trust established by C.R. Barton, Jr., et al. dated August 25, 1953. The property is described in the following four deeds recorded in the Warren County Clerk's Office:

Date of Recordation	Book	Page
March 16, 1948	262	129
June 22, 1960	399	313
April 6, 1988	704	239
April 6, 1988	704	249

Barton Mines Corporation, a New York corporation, has its principal office at North Creek, Warren County, New York, and leases the project site.

The project site is a shown on the Town of Johnsburg, Warren County Tax Map Section 2, Block 1 as Parcels 29, 2 and 3 and Section 4, Block 1, Parcels 19 and 20.

2. The property lines for the project site are shown on a map entitled "Topographic Maps of Barton Mines Corporation-Ruby Mountain Project," by David F. Barrass, L.S., dated December 15, 1990 and "Map of Part of Lands of Barton Mines Corporation," by Leslie W. Coulter, dated December 24, 1947.

3. The original 580± acre project site is roughly bisected by Brown Pond Brook, which flows in a southerly direction. Lands east of the brook are classified Industrial Use and lands west of the brook are Resource Management on the Adirondack Park Land Use and Development Plan Map. A small portion of the project site, southeast of Thirteenth Lake Road, is classified Rural Use. In 1988, the applicant purchased an additional 221 acres southwest of Tailings Valley Area.

A portion of the Finger Valley site lies in a critical environmental area within one-eighth of a mile of State land designated the Siamese Ponds Wilderness Area pursuant to the State Land Master Plan.

Project History

4. On May 18, 1979, the Agency conceptually approved, pursuant to Section 809(13)(d) of the Adirondack Park Agency Act, Project 78-401, a mineral extraction, proposed by Barton Mines Corporation (BMC). On May 23, 1979, BMC applied for final approval of the first phase (initial clearing and grading) of this large scale project. On June 26, 1979, the Agency issued Permit P79-140 approving this phase on several conditions.

5. On February 11, 1980, the Agency issued Permit P79-356 approving the final phase of the mineral extraction use on a 580 acre parcel of land on the slopes of Ruby Mountain and Big Thirteenth Lake Mountain in the Towns of Johnsburg (548 acres) and Indian Lake (32 acres).

In Agency Project 81-20, the electric powerline to serve the site was authorized.

6. On March 2, 1987, BMC applied for a major amendment to Permit P79-356 to allow it to dispose of its tailings using a wet rather than a dry disposal method at two locations in one drainage basin on its property. This was deemed a material change, resulting in Agency Permit 87-39 issued January 7, 1988. The starter dam and initial disposal at Tailing Valley was started but no disturbance has occurred at the Finger Valley site. As a result of a feasibility study required by Condition 13, the Agency staff and applicant recognized difficulties in a wetland replacement proposal.

   The Tailings Valley and Finger Valley sites would occupy 29 and 30 acres, respectively, at peak capacity, and have an estimated operational life of 8 and 9 years respectively.

   On July 24, 1992, the Agency issued Permit 87-39A authorizing an effluent pipeline across a wetland. To date, an estimated 1 million cubic yards has already been disposed in Tailing Valley.

7. The effluent discharge to Thirteenth Brook from the settling ponds is subject to DEC SPDES Permit NY-0034959 and consent order R5-0846-90-3 dated December 4, 1991. The starter dam is subject to DEC file 5-5230-00002/00003-1.

Description of the Amended Project as Proposed

8. The applicant proposes to amend the mineral tailing disposal area from 2 areas to one single area (Tailings Valley) and thereby avoid disturbance to Finger Valley area and its associated wetland and water resources. A summary of the details and documents on the proposed changes to Project 87-39 are as follows:

   a. The single disposal area would have a final 73 acre size, a peak elevation of 2,275 ft. msl, 5.9 million cubic yard volume capacity, and an estimated life of 35 years or the year 2033.

   b. The design of the project is described in a report entitled "B112102, Design of the Expanded Tailings Valley Tailings Facilities, Ruby Mt. Project," by Steffen, Robertson and Kirsten, Inc., dated October 1993.

   c. Site reclamation is described in a report entitled "Addendum to Report 80201/3, Ruby Mt. Garnet Mine, Mine and Reclamation Plan Design," by Samuel B. Bamberg, dated September 1993. In a letter dated February 24, 1994, the applicant agreed to modify the reclamation plan by concentrating the deposition for the next two years into the southwest corner or the area of greatest off-site visibility, so that a test area and phased reclamation can begin as soon as practical. Once the

upper embankment becomes operational, some final reclamation process would begin between the seventh and fourteenth year of operation.

d. The advantages of the amended project are numerous:

(1) Volume capacity increased from 2.14 to 5.9 million cubic yards.
(2) Extension of mine life from 17 to 30 to 35 years.
(3) Lower pile elevations and shorter distances to pump slurry, hence lower operating costs.
(4) Avoid costs for wetland replacement, shorter road and one less starter embankment.
(5) Negligible increase of total acreage of disturbance,
(6) Reduced areas of off-site visibility, including receptor sites 5, 6A and 7B,
(7) Avoid disturbing 1.9 acre wetland and drainage associated with Finger Valley.

e. A topsoil storage area is shown on Figure 4.7. A letter of credit for reclamation is currently at $226,600 as required by DEC.

f. To assist in mitigating visual impact, "Area 9" and "Area 7B," located on a copy of a topographic map labeled "Exhibit 1, Location of Potential Visual Screening Vegetation," have been identified as "no cut area" during operation of the disposal facility.

g. Currently 87 people are employed by BMC with 41 employees dependent on Ruby Mountain operations.

h. Finger Valley wetland, subject of a report entitled "Physical and Biological characteristics of the Finger Valley Wetland," by William D. Countryman, dated December 20, 1991, will be retained undisturbed in its natural condition. The slimes pond, depending on its condition when it is reclaimed, may develop as a wetland through natural succession as shown on Figure 4.11 dated November 1993.

i. As the disposal pile progresses uphill, additional diversion ditches will be constructed and the current east-west ditches will be modified to function as a seepage drainage. Additional finger drains will be installed per original specifications. Discharge from the wet tailing system is piped to Thirteenth Lake Brook.

j. The leaking water reservoir is no longer used for water supply, but BMC has adapted to the limited supply and water withdrawal prohibition from Brown Pond Brook.

Flow data on Thirteenth Lake Brook is part of an ongoing monitoring program. BMC requests to permanently withdraw up to 68 gpm from Thirteenth Lake Brook.

Project Site

9. The site of the single tailing facility overlays and expands the original authorized and commenced Tailings Valley area. A comparison of the area of disturbance is shown on Figure 4.1 dated November 1993. The expanded area has similar site characteristics. The topsoil stockpile is within 30 to 150 feet of an unnamed stream.

10. In a letter dated January 6, 1994, the DEC indicated that their mining permit will have to be modified by submitting APA approved and updated reclamation narrative and maps.

11. The 1992 Countryman report on Finger Valley Wetland states that it is a typical northern forested wetland with limited biological communities and physical extent, and is a relatively undisturbed natural ecosystem that is neither diverse nor complex. No unusual or rare species were found.

12. Brown Pond Brook is still an important cold water brook trout fishery per DEC fisheries personnel, including a spawning and nursery area for native trout, aquatic insects and source of cool water during critical summer low flows. The existing 26.6 ft. by 1.8 ft. dam on the brook creates a small water pool and traps sediments; the tree cover and very short water retention time prevents any significant water temperature increases. The water from Thirteenth Brook is pumped to the modified drop box at the Brown Pond Brook dam which is sealed to prevent water withdrawals from the brook.

Project Impacts

13. Agency staff review of the "Wetland Mitigation Plan for Barton Mine Site Finger Valley Wetland," by Southern Tier Consulting, Inc., dated March 6, 1992, found substantive concerns and problems with the design, construction, monitoring and maintenance of a proposed replacement wetland stated in a letter dated December 24, 1992. Avoiding any disturbance to the existing Finger Valley wetland will preserve the values and functions of this wetland, including seasonal food sources for members of the surrounding forest community, maintain natural ground and surface water quality, and provide a seed source for the eventual Tailings Valley slimes pond area. Further compliance with Condition 13 of Permit 87-39 is no longer necessary.

14. The single failing facility will have a final height of 2,275 ft. msl, which is 45 ft. lower that the two piles originally authorized. As a result, based on an updated

visual analysis, three of the seven visible receptor sites will not be visible or will be screened vegetationally. There will be a slight increase in the number of acres where the piles will not be visible. There will be an increased duration of visibility due to the lengthened life of the facility and uncertainty of phased reclamation. The applicants' effort to begin disposal and earlier reclamation and test plots in the more visible areas will enhance mitigation. Limiting vegetation or timber harvesting on intervening treed areas between the tailing area and visual impact receptor areas during operations is a good interim mitigative measure.

15. The mine operation and its employment and economic benefits are dependent upon economical disposal of tailings. The significant lengthening of the life of the tailing pile and concomitant reduction in operating expenses provides a positive employment and local economy benefit.

16. The elimination of the tailing pile and operations in Finger Valley significantly increases the undisturbed buffer to the adjoining State Wilderness area.

17. A public notice of the permit amendment request was sent to adjoining property owners. One telephone call concerning water quality in Thirteenth Lake Brook was received, however, BMC reports required by a DEC permit indicates compliance with established water quality standards. One letter expressing no objection to the amendment request and support for the applicant was received.

18. Maintaining an undisturbed soil and vegetation buffer with properly installed erosion control is important to protecting the water quality of the unnamed stream immediately south of the topsoil stockpile area. Timely implementation and regular maintenance of the erosion control measures are important preventative measures.

19. Implementation of test vegetation plots will enhance prompt and successful reclamation when operations permit. Research and design of the test plot, including details on soil amendments, fertilizing and plant species will help ensure prompt and successful revegetation of the tailings to control erosion and mitigate the visual impact of the 73 acre tailing pile.

20. Considering the environmental and economic benefits and no public opposition of the amended tailing pile, the permit amendment request has been deemed a non-material change pursuant to 9 NYCRR 572.19.

The requested amendments are minor amendments within Section 809(8)(b)(1) of the Adirondack Park Agency Act in that they do not involve a material change in permit conditions, applicable law, environmental conditions or technology since the issuance of Permit 87-39.

21. The project will not cause any change in the quality of "registered," "eligible," or "inventoried" property as those terms are defined in 9 NYCRR 426.2 for the purposes of implementing §14.09 of the New York State Historic Preservation Act of 1980.

22. Continuing the prohibition of water withdrawals from Brown Pond Brook will maintain this valued aquatic ecosystem with limited natural flows. DEC fisheries personnel have not observed adverse impacts from limited water withdrawal from Thirteenth Brook to date, however, sedimentation in Brown Pond Brook and Thirteenth Lake Brook is a continuing concern. Retaining the existing dam at Brown Pond Brook as a component of the erosion and sedimentation control plan can help mitigate impacts to their value aquatic resource and its associated wetlands.

CONCLUSIONS OF LAW

If undertaken in compliance with the conditions herein:

1. The project would be consistent with the Land Use and Development Plan.

2. The project would be compatible with the character description and purposes, policies and objectives of the land use area wherein it is proposed to be located.

3. The project would be consistent with the overall intensity guidelines for the land use area involved.

4. The project would comply with the shoreline restrictions.

5. The project would not have an undue adverse impact upon the natural, scenic, aesthetic, ecological, wildlife, historic, recreational or open space resources of the Park or upon the ability of the public to provide supporting facilities and services made necessary by the project, taking into account the economic and social benefits that might be derived therefrom.

6. The Agency has considered the public policy of the State set forth in ECL 24-0103, the statement of legislative findings set forth in ECL 24-0105, and the effect of the project upon the public health and welfare, fishing, flood, hurricane and storm dangers, and the protection and enhancement of the several wetland functions and benefits.

CONDITIONS

1. The project shall be undertaken as described in the application and Findings of Fact herein, and in compliance with the Conditions herein. Failure to comply with the application, Findings of Fact or Conditions voids the permit. In the case of conflict, the Conditions control.

2. No construction of buildings, subdivision of land, or other "land use or development" as defined in §802(28) of the Adirondack Park Agency Act, not expressly authorized by this permit shall be undertaken without an additional Agency permit, amended permit, or letter of nonjurisdiction pursuant to 9 NYCRR Part 571.

3. This project may not be undertaken until this permit is recorded in the Warren County Clerk's Office. This permit shall be void unless so recorded by September 26, 1994, in the names of all persons listed on the first page hereof and in the names of all owners of record of any portion of the project site on the date of recordation. The applicant shall ensure that all landowners' names are included on the first page of this permit.

4. This permit is binding on the applicant, any person undertaking the project, and all present and future owners of any part of the project site. If the amended project is not substantially commenced within two years of the date the permit is recorded, it may not be undertaken or continued unless a new or renewed permit is issued.

5. Copies of this amended permit and Permits 87-39 and 87-39A shall be furnished by the applicant to all subsequent owners or lessees of the project site prior to sale or lease. All deeds conveying all or a portion of the lands subject to this permit shall contain references to this permit as follows: "The lands conveyed are subject to Adirondack Park Agency Permits 87-39, 97-39A and 87-39B issued July 28, 1994, the terms and conditions of which are binding upon the heirs, successors and assigns of the grantors and all subsequent grantees."

6. All conditions of Permit 87-39 regarding erosion control (5, 6) and water withdrawal (8, 11) shall be adhered to, except as amended by the findings of fact and conditions herein.

   The dam at Brown Pond Brook shall be maintained as a supplemental sedimentation basin. The pool created by the dam shall be periodically cleaned of trapped sediment, as needed, during low flows, using the existing cleared access. Prior to dredging, a temporary flow diversion dam and pipe(s) shall be installed to maintain natural flow of clean water. Existing vegetation within 35 feet of the impoundment area shall be preserved.

7. Beginning in the 1994 operating season, deposition of tailings shall be as described in Finding of Fact 8c and revised Figure 4.3, to promote earlier reclamation of the pile most visible by off-site receptors. By March 31, 1995, the research and proposed test revegetation program shall be submitted for the 0.9 acre test area for Agency review and approval. The test revegetation program shall include design and layout of test plots; details on site preparation, soil amendments, and fertilizing; plant species and planting density including some tree seeds or seedlings; and evaluation methods. The plant species shall be indigenous species and analysis of proposed soil amendments shall ensure that groundwater and surface water quality shall be maintained and at a minimum, shall not exceed established DEC standards. The approved test reclamation program shall be implemented in the spring of 1996. Based on deposition progress and successful reclamation test(s), the final reclamation process shall be implemented in phases to the extent possible.

8. Temporary and permanent erosion control measures shall be timely implemented and maintained for the topsoil stockpile area. A minimum 35 ft. undisturbed and uncut vegetation buffer shall be maintained between the unnamed stream and the southerly limits of the stockpile.

9. Prior to any timber harvest operations south of the Tailings Valley facility on BMC leased land, the "no cut areas" described in Finding of Fact 8f shall be marked in the field. This "no cut area" is intended to provide natural screening to minimize off-site visual impacts. The applicant or any successors in interest can seek to modify any portion of this "no cut area" for good cause shown, including but not limited to, inapplicability due to implementation of phased reclamation areas, harvesting requirements which would otherwise impede other critical mining operations, and changes or alterations in operational plans which render such screening of no effect. In any event, this "no cut area" shall no longer be operative effective October 1 of the year following written certification by the Adirondack Park Agency that the subject reclamation plan has been successfully implemented.

   Timber harvesting activities shall comply with Agency jurisdiction, application and standards in 9 NYCRR 573.7.

10. No "regulated activity" as defined in the Agency's Freshwater Wetland Regulations (9 NYCRR Part 578) shall occur on the project site without prior Agency approval. Such activities include, but are not limited to, new land use or development in, subdivision of, clearcutting more than three acres within, or dredging or filling of a wetland, or any other activity, whether or not occurring within the wetland, which pollutes it or substantially impairs its functions, benefits or values.

11. Any new on-site sewage disposal system installed on the project site shall comply with New York State Department of Health's "Wastewater Treatment Standards for Individual Household Systems" (10 NYCRR Appendix 75-A) and with Agency standards in 9 NYCRR Appendix Q-4. Additionally, no new conventional on-site sewage disposal system shall be installed on existing slopes in excess of 15%, nor located within 100 ft. of any water supplies, bodies of water, wetlands and permanent or intermittent streams.

12. The Agency may conduct such on-site investigations, examinations, tests and evaluations as it deems necessary to ensure compliance with the terms and conditions hereof. Such activities shall take place at reasonable times and upon advance notice where possible.

13. At the request of the Agency, the applicant shall report in writing the status of the project including details of compliance with any terms and conditions of this permit.

14. Nothing contained in this permit shall be construed to satisfy any legal obligations of the applicant to obtain any governmental approval or permit from any entity other than the Agency, whether federal, State, regional or local.

THIS PERMIT SHALL EXPIRE WITHIN SIXTY DAYS OF THE DATE OF ISSUANCE UNLESS THE ORIGINAL PERMIT IS DULY RECORDED IN THE OFFICE OF THE CLERK OF WARREN COUNTY IN THE NAME(S) OF THE OWNER(S) OF RECORD OF LAND AT THE TIME OF RECORDATION. IN ORDER FOR THE PERMIT TO BE RECORDED IN THE COUNTY CLERK'S OFFICE, THE APPLICANT MUST PAY THE COUNTY CLERK THE FOLLOWING FEES AT THE TIME OF RECORDING: TEN DOLLARS, AND IN ADDITION THERETO, THREE DOLLARS FOR EACH PAGE OR PORTION OF A PAGE OF THE PERMIT AND ANY ATTACHMENTS TO IT. THE ORIGINAL OF THE PERMIT WILL BE RETURNED TO THE APPLICANT BY THE COUNTY CLERK.

PERMIT issued this 28th day of July, 1994.

ADIRONDACK PARK AGENCY

BY: William J. Curran
William J. Curran
Director of Regulatory Programs

STATE OF NEW YORK)
: ss:
COUNTY OF ESSEX)

On this 28th day of July, 1994, before me, the subscriber, personally appeared William J. Curran, to me personally known and known to me to be the same person described in and who executed the within instrument, and he acknowledged to me that he executed the same.

Notary Public

RICHARD R. TERRY
Notary Public, State of New York
Qualified in Essex County
No. 4697021
Commission Expires Dec. 31, 1995

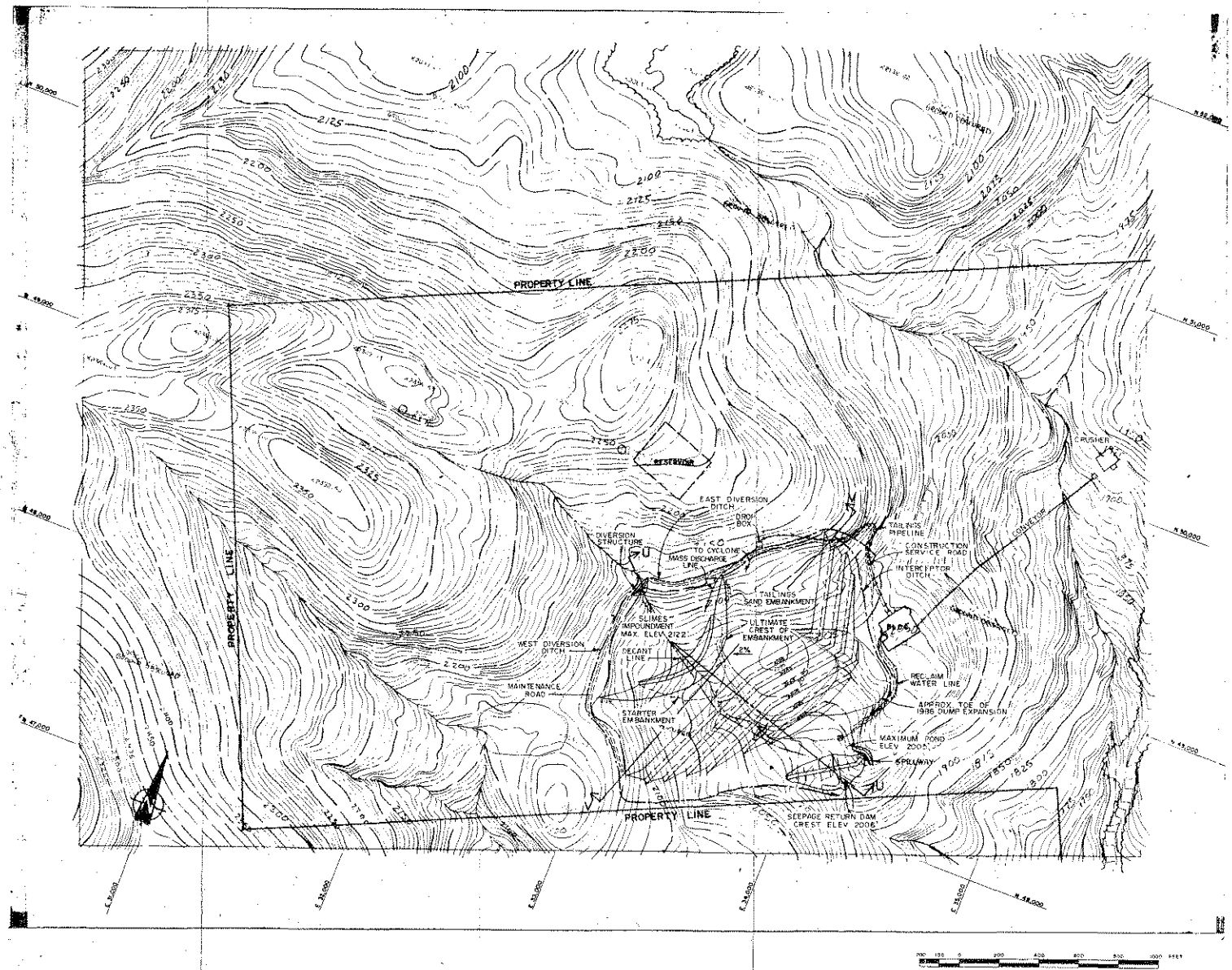
RDJ:tal

NOTES

1. Mapping prepared by aerial photogrammetric methods from photography dated November 11, 1978. At the time of photography the site was undeveloped. Present conditions in the developed portion of the site differ significantly from the conditions shown hereon. The location of the tailings, reservoir, and reference marks were established by ground surveying methods in March 1980.
2. The horizontal coordinate grid is based on an arbitrary state coordinate system and the contour interval of five feet is based on the national geodetic vertical datum of 1929.
3. Contours of the existing tailings valley dry tailings dumps are approximate, and were developed by an independent ground survey in October 1980.

BASE MAP PREPARED BY BIST-FROST ASSOCIATES N.Y.

PREPARED BY	STEFFEN ROBERTSON & KIRSTEN
TOPOGRAPHIC MAP OF A PORTION OF	DRAWN BY / CHECKED BY
RUBY MOUNTAIN PROPERTY	DATE / PROJECT NO. 80201
WARREN COUNTY NEW YORK	SCALE AS NOTED
RECLAMATION PLAN FINGER VALLEY & TAILINGS VALLEY	DRAWING NO. 80201 C
	SHEET ___ OF ___ REV NO



NOTES

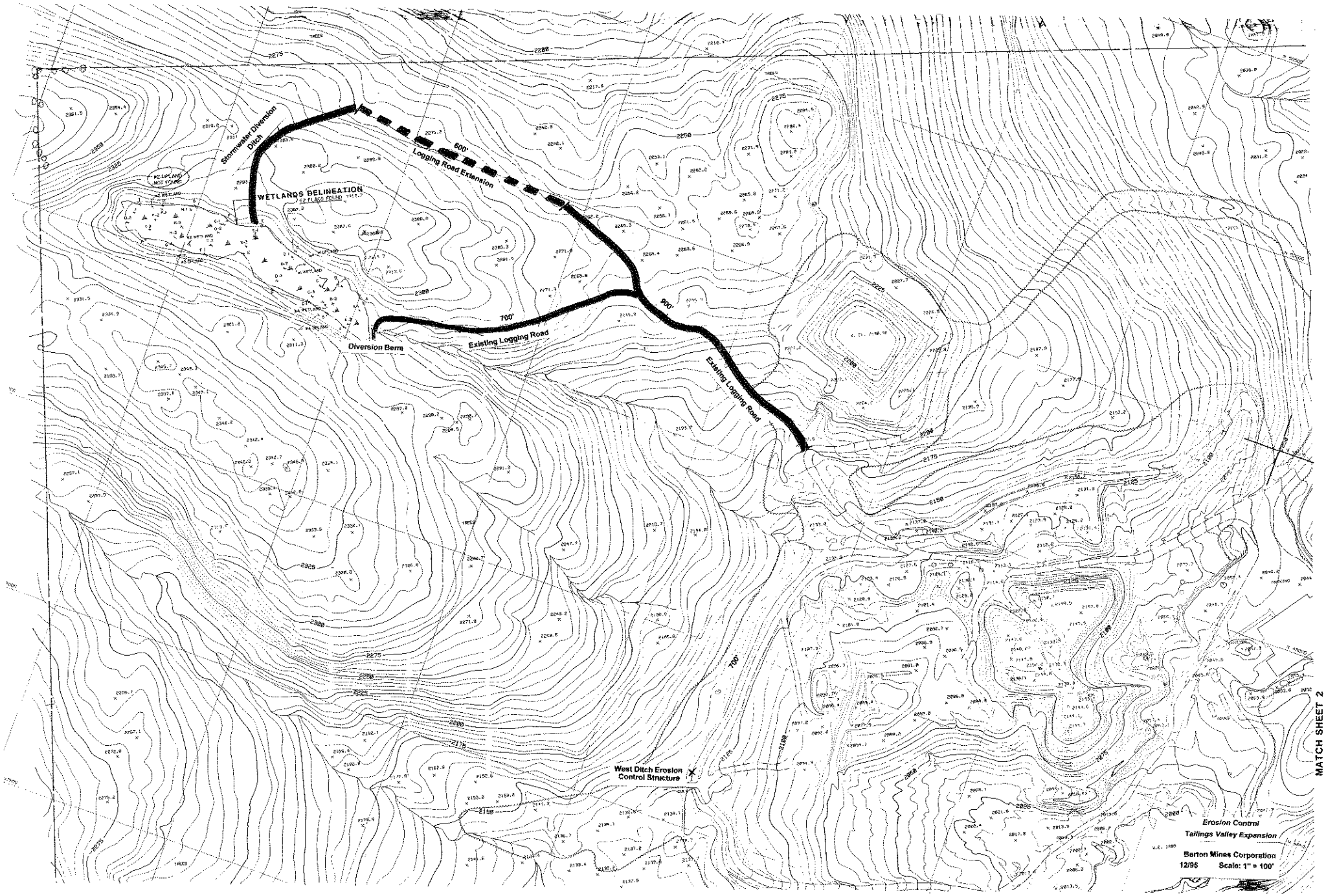
1. Mapping prepared by aerial photogrammetric methods from photography dated November 11, 1978. At the time of photography the site was undeveloped. Ground conditions in the developed portion of the site reflect significantly from the conditions shown hereon. The location of the buildings, reservoir, and reference marks were established by ground surveying methods in March 1986.

2. The horizontal coordinate grid is based on an arbitrary plane coordinate system and the contour interval of five feet is based on the national geodetic vertical datum of 1929.

3. Contours of the existing tailings valley and tailings dams are approximate, and were generated by an independent ground survey in October 1986.

BASE MAP PREPARED BY RIST-FROST ASSOCIATES N.Y.

PREPARED BY: STEFFEN ROBERTSON & KIRSTEN	
TOPOGRAPHIC MAP OF A PORTION OF RUBY MOUNTAIN PROPERTY	DRAWN BY: D. HUGHES '87
WARREN COUNTY NEW YORK	DATE: 80201
	SCALE: AS NOTED
LAYOUT OF TAILINGS VALLEY TAILINGS DISPOSAL FACILITIES	DRAWING NO.: 80201 A
	SHEET ___ OF ___ REV. '88


Stormwater Diversion Ditch
WETLANDS DELINEATION
500'
Logging Road Extension
700'
Existing Logging Road
900'
Existing Logging Road
Diversion Berm
700'
West Ditch Erosion Control Structure
MATCH SHEET 2
Erosion Control
Tailings Valley Expansion
Berton Mines Corporation
12/95 Scale: 1" = 100'

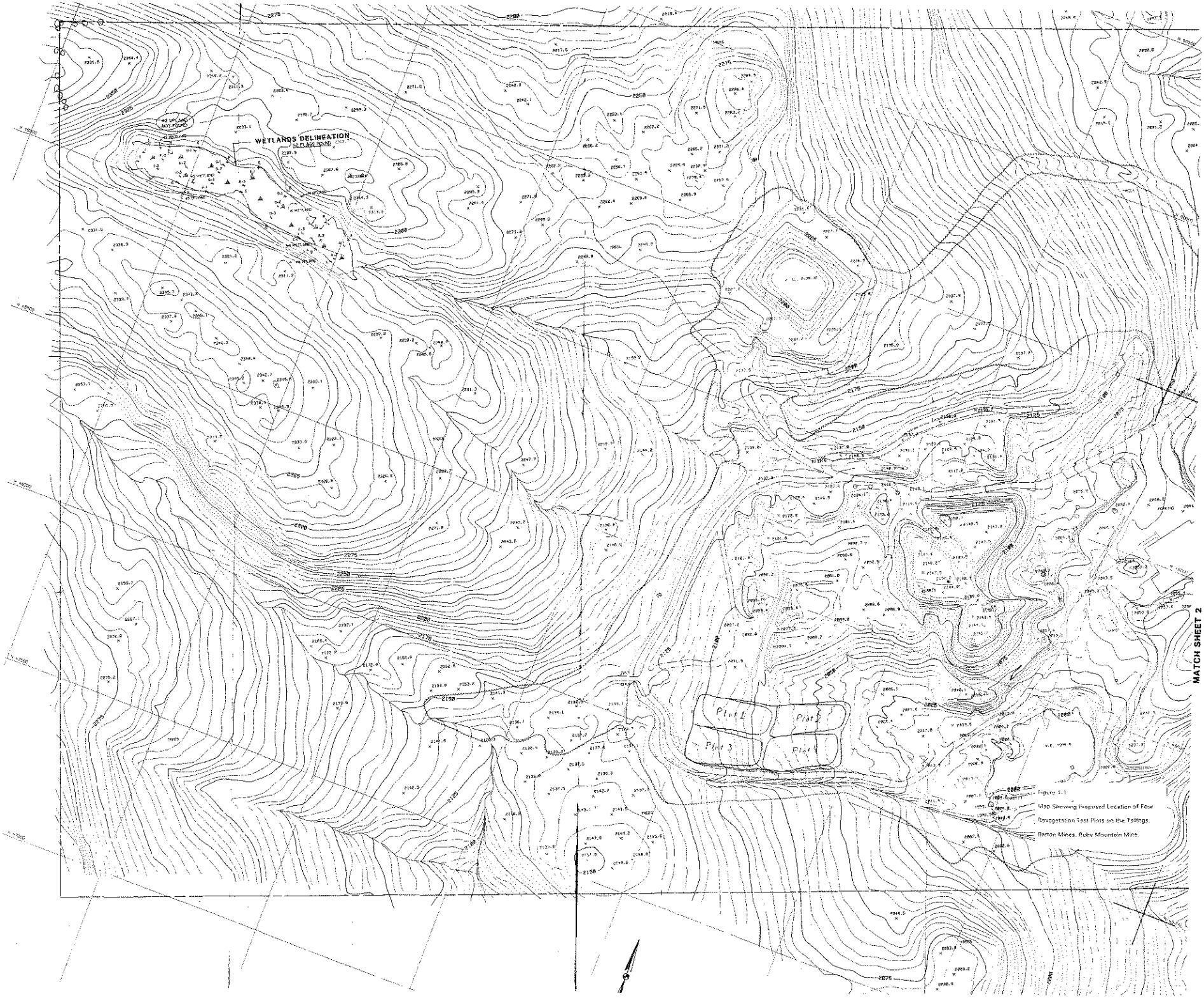
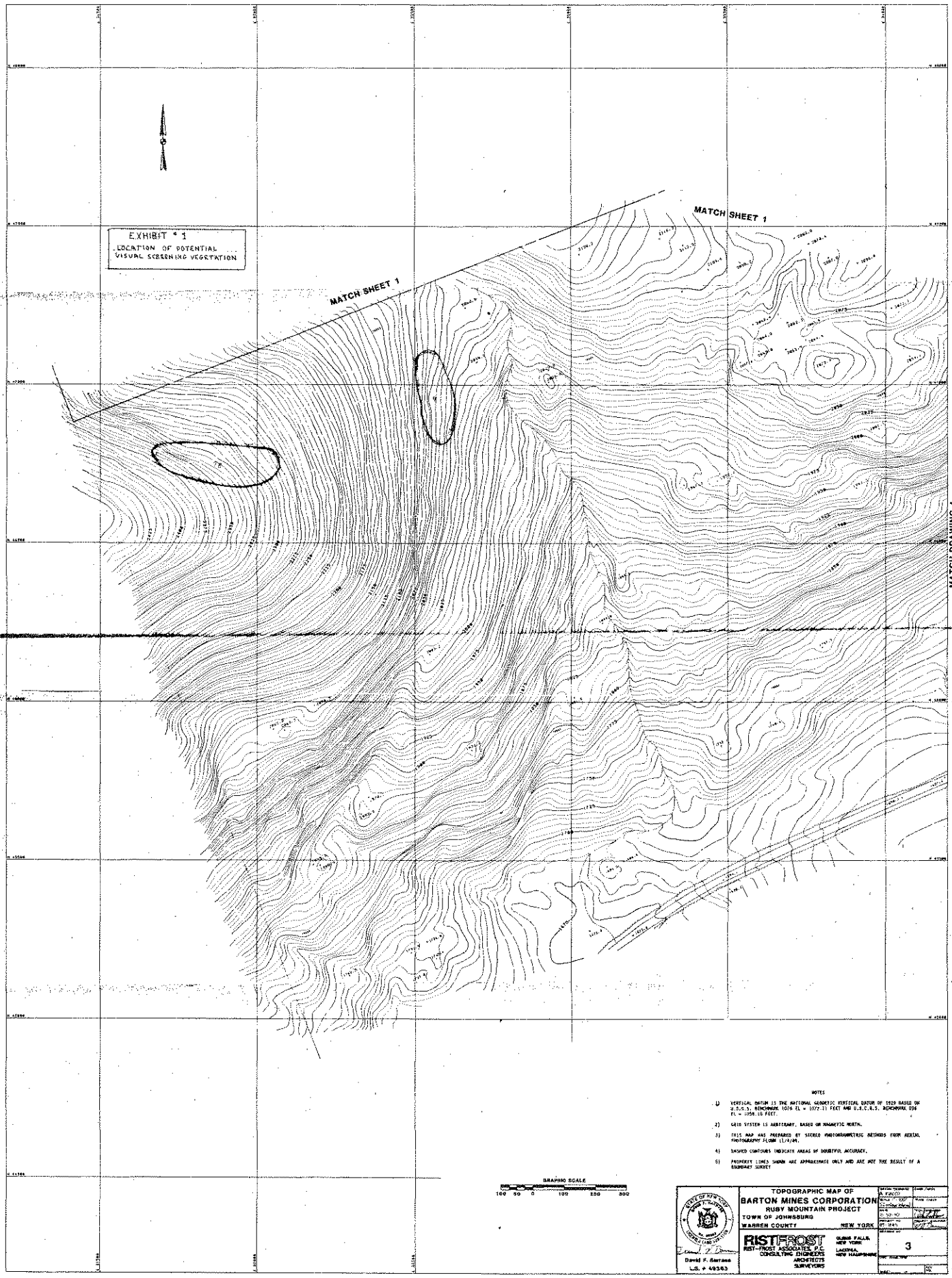


Figure 5.1

Map Showing Proposed Location of Four Revegetation Test Plots on the Tailings.

Barton Mines, Ruby Mountain Mine.



NOTES

1) VERTICAL DATUM IS THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 BASED ON U.S.G.S. BENCHMARK 1076 EL = 1072.11 FEET AND U.S.C.&G.S. BENCHMARK 056 EL = 1008.18 FEET.

2) GRID SYSTEM IS ARBITRARY, BASED ON MAGNETIC NORTH.

3) THIS MAP WAS PREPARED BY SECOND PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY FLOWN 11/4/94.

4) DASHED CONTOURS INDICATE AREAS OF DOUBTFUL ACCURACY.

5) PROPERTY LINES SHOWN ARE APPROXIMATE ONLY AND ARE NOT THE RESULT OF A BOUNDARY SURVEY

GRAPHIC SCALE
100 50 0 100 200 300

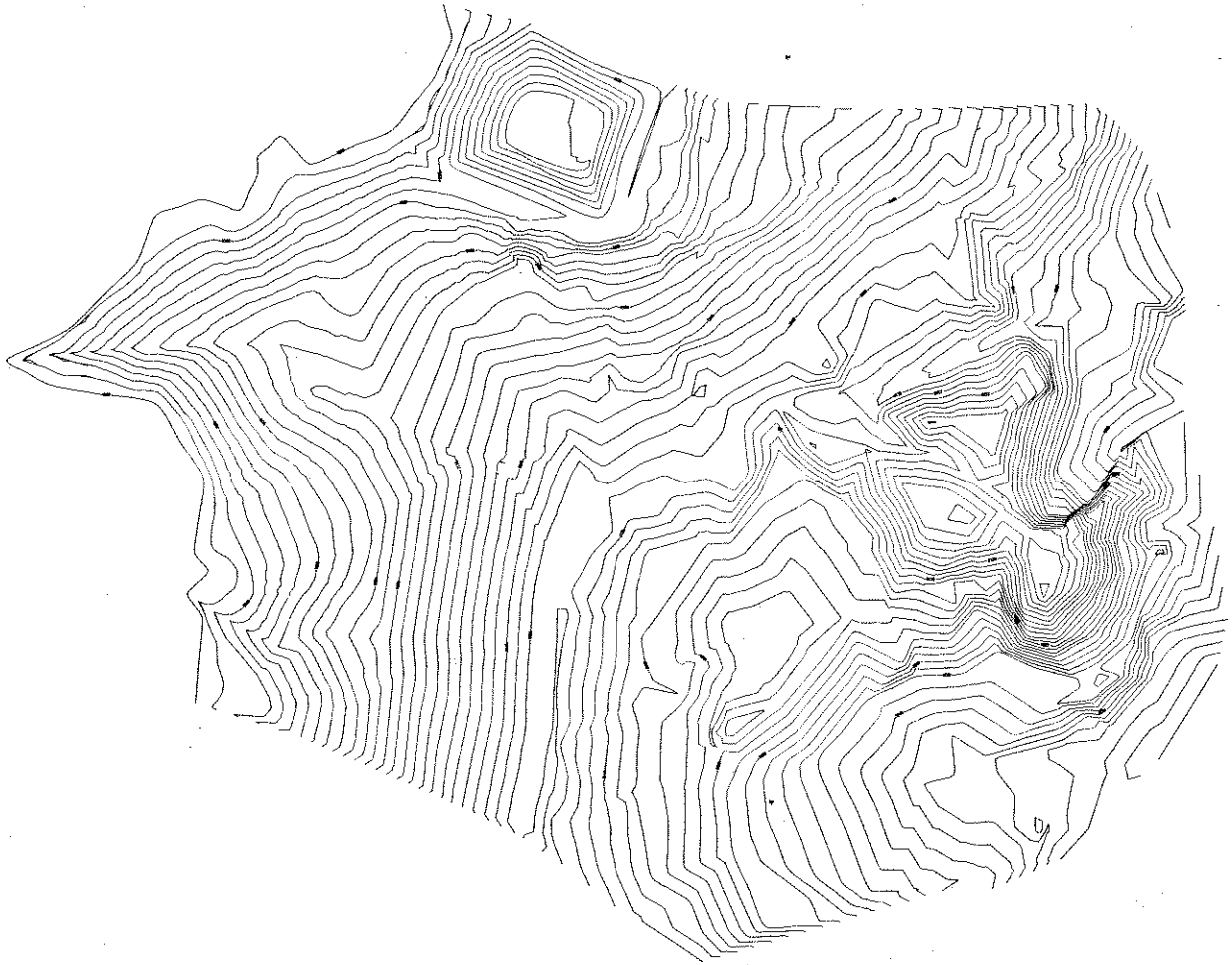
STATE OF NEW YORK
DAVID F. BARRESE
LICENSED LAND SURVEYOR

David F. Barrese
L.S. # 49363

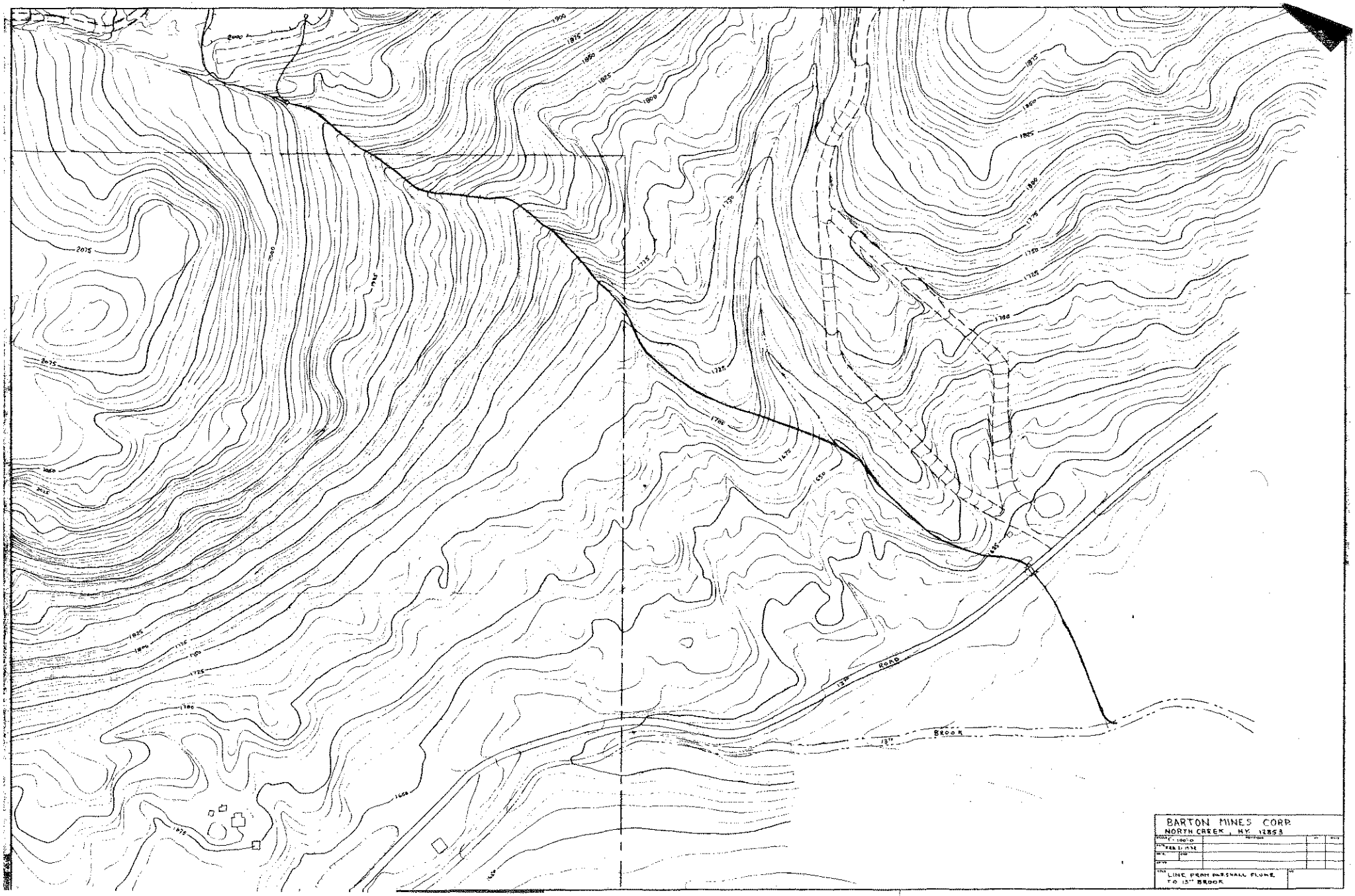
TOPOGRAPHIC MAP OF
BARTON MINES CORPORATION
RUBY MOUNTAIN PROJECT
TOWN OF JOHNSBURG
WARREN COUNTY NEW YORK

RIST-FROST ASSOCIATES, P.C.
CONSULTING ENGINEERS
ARCHITECTS
SURVEYORS
GLENS FALLS, NEW YORK
LACONIA, NEW HAMPSHIRE

3



DAVID F. BARRASS LAND SURVEYOR 9 MAPLE STREET CORINTH, NEW YORK	EXISTING GROUND TOPOGRAPHY USED FOR PROPOSED TAILINGS PILE VOLUME CALCULATION BARTON MINES NORTH CREEK, N.Y. SCALE 1"=100' 5' CONTOUR INTERVAL 2/26/93 93-204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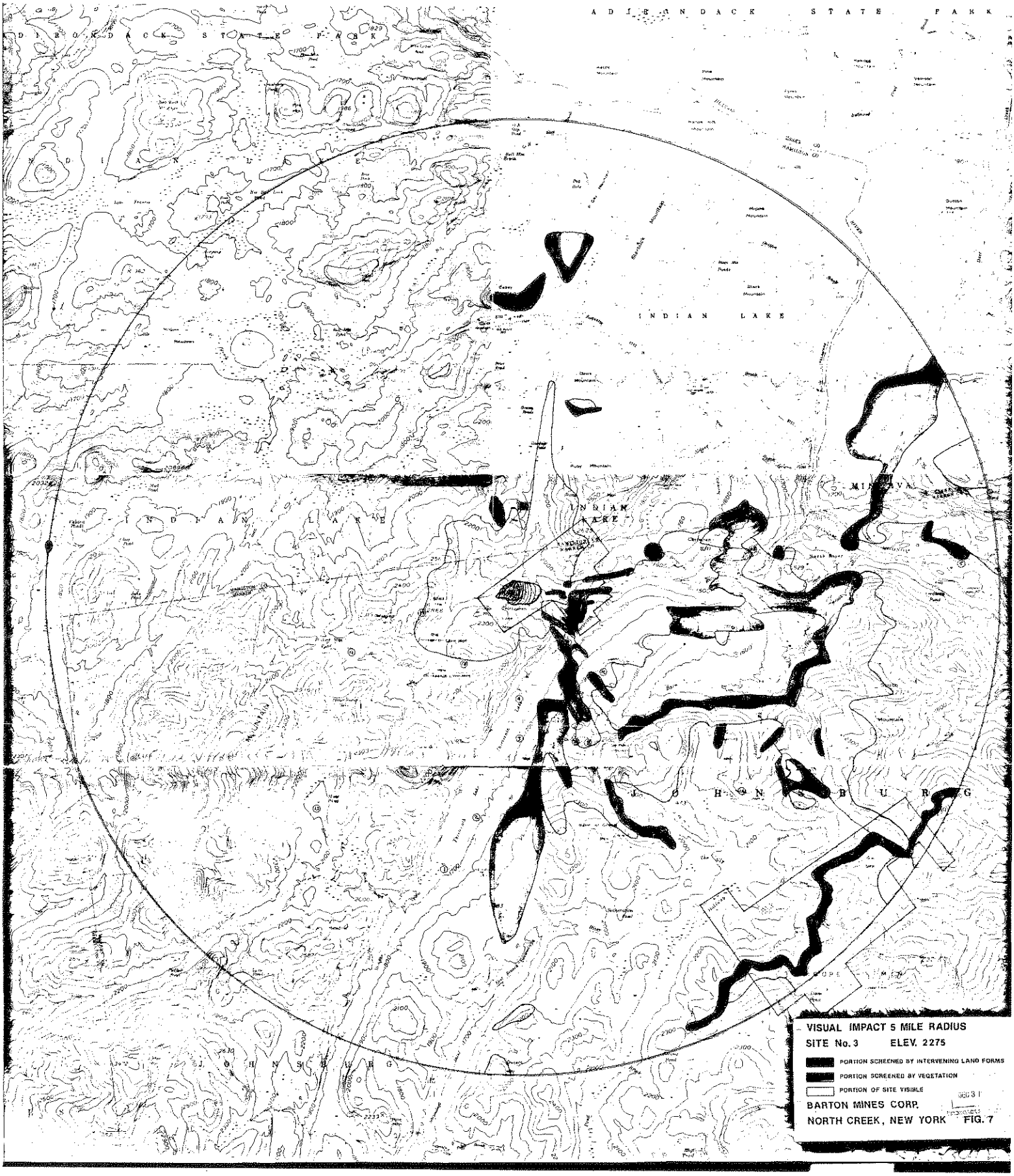
NORTH CREEK, NY 12853
1" = 100'-0"
FEB 1, 1974
LINE FROM MARSHALL FLUME TO 13" BROOK
ROAD
BROOK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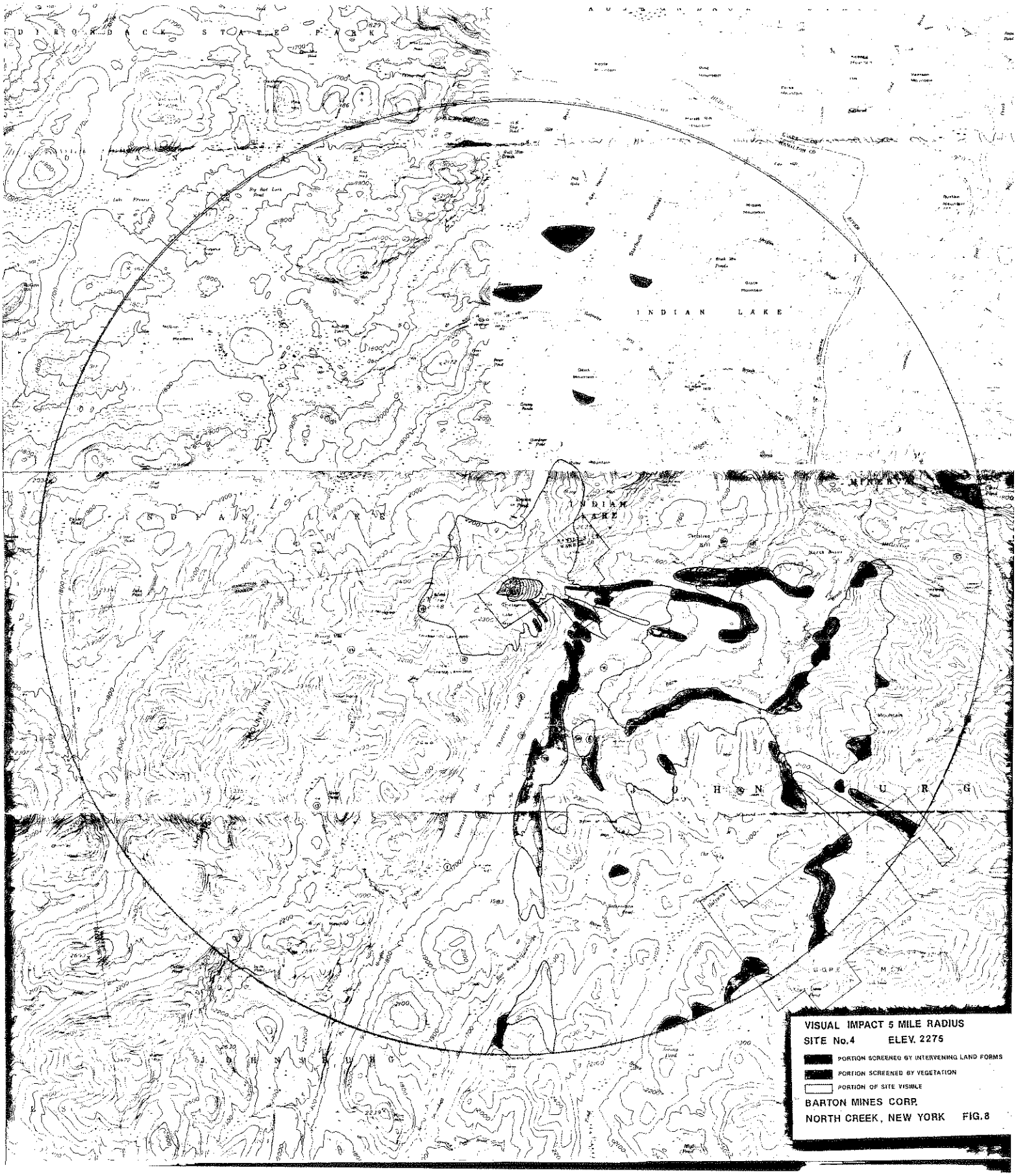
BLACK ROCK STATE PARK
INDIAN LAKE
INDIAN LAKE
INDIAN LAKE
JOHNSBURG
JOHNSBURG
VISUAL IMPACT 5 MILE RADIUS
SITE No. 3 ELEV. 2275
PORTION SCREENED BY INTERVENING LAND FORMS
PORTION SCREENED BY VEGETATION
PORTION OF SITE VISIBLE
BARTON MINES CORP.
NORTH CREEK, NEW YORK
FIG. 7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VISUAL IMPACT 5 MILE RADIUS
SITE No.4 ELEV. 2275
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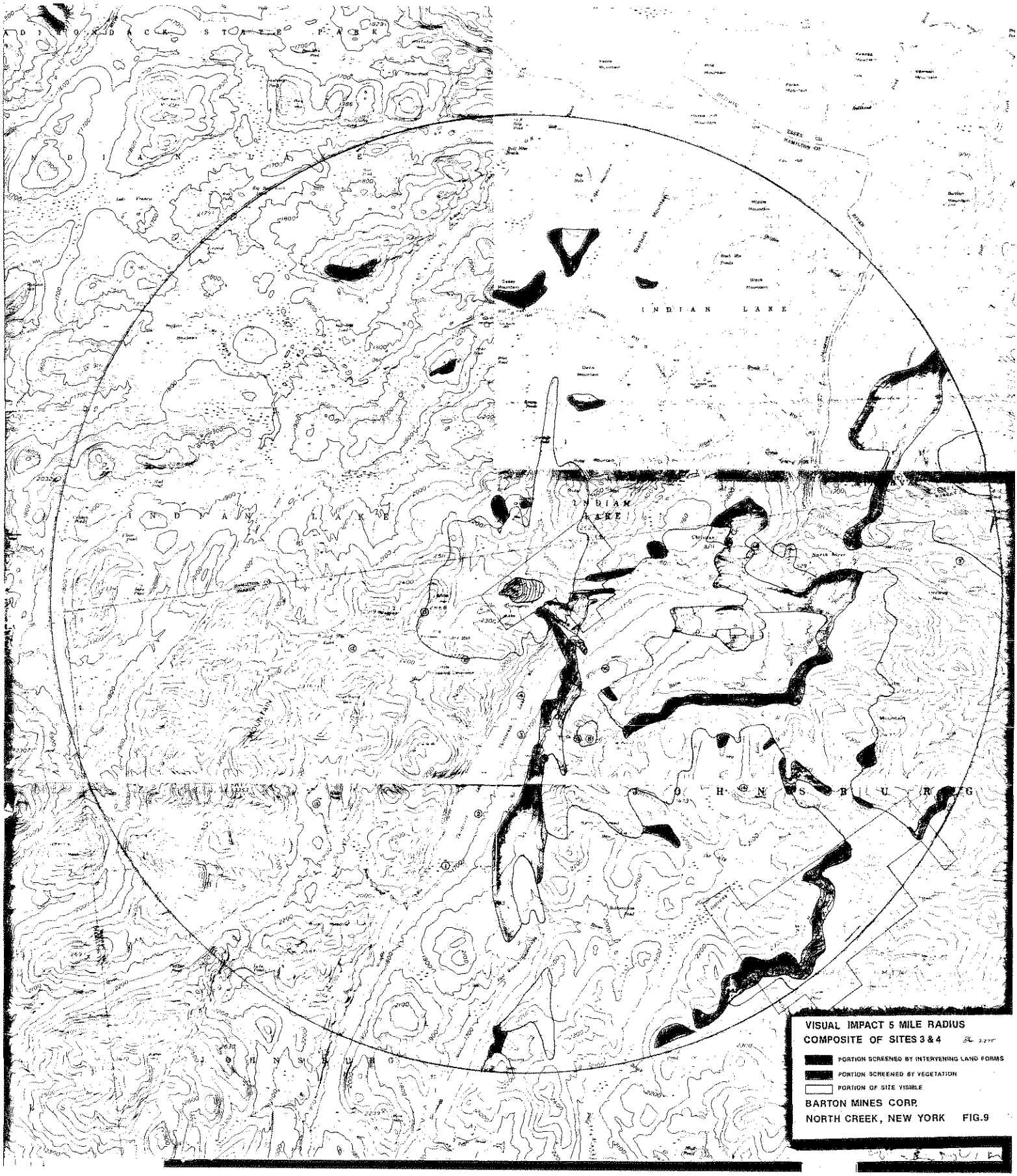
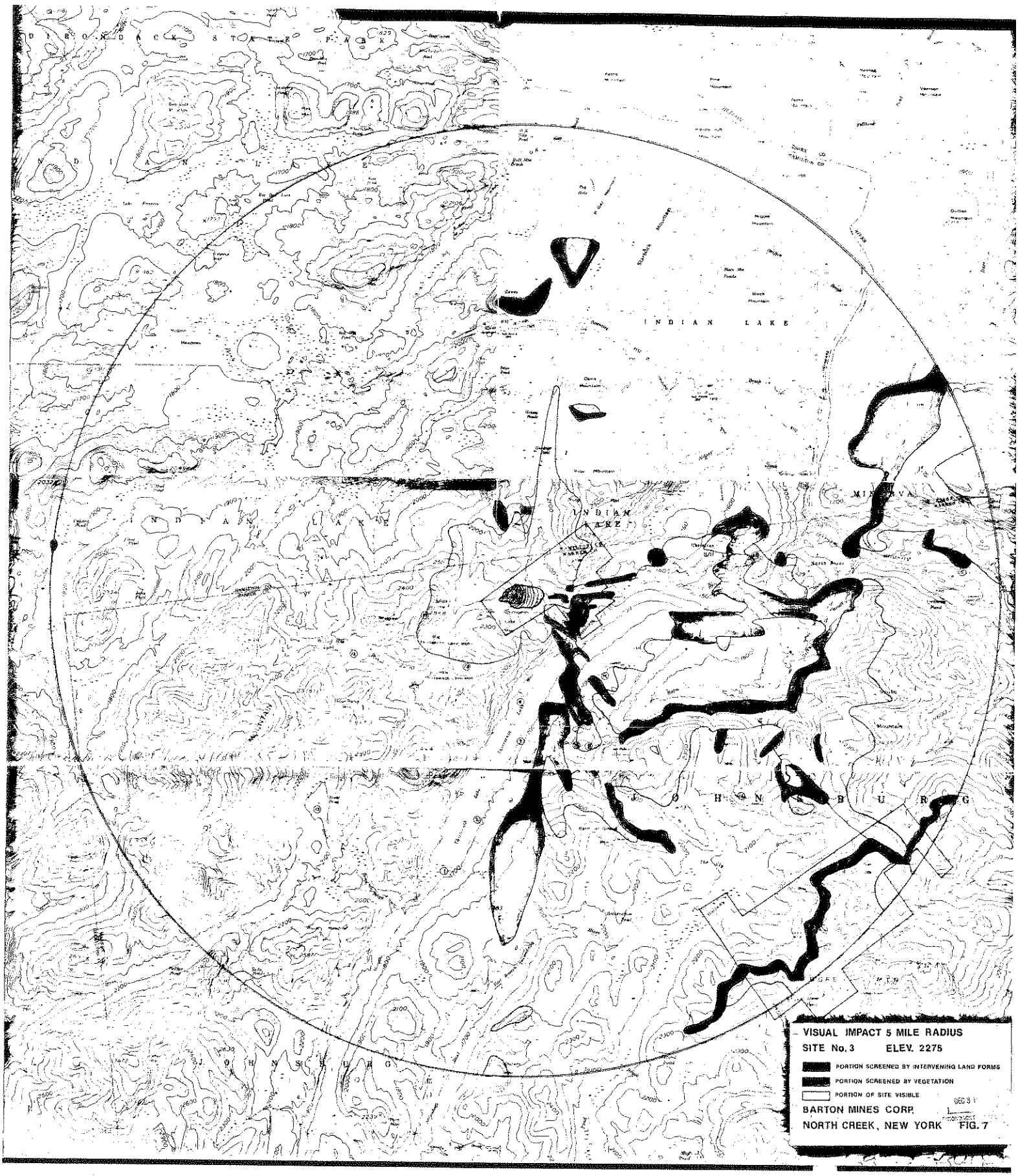
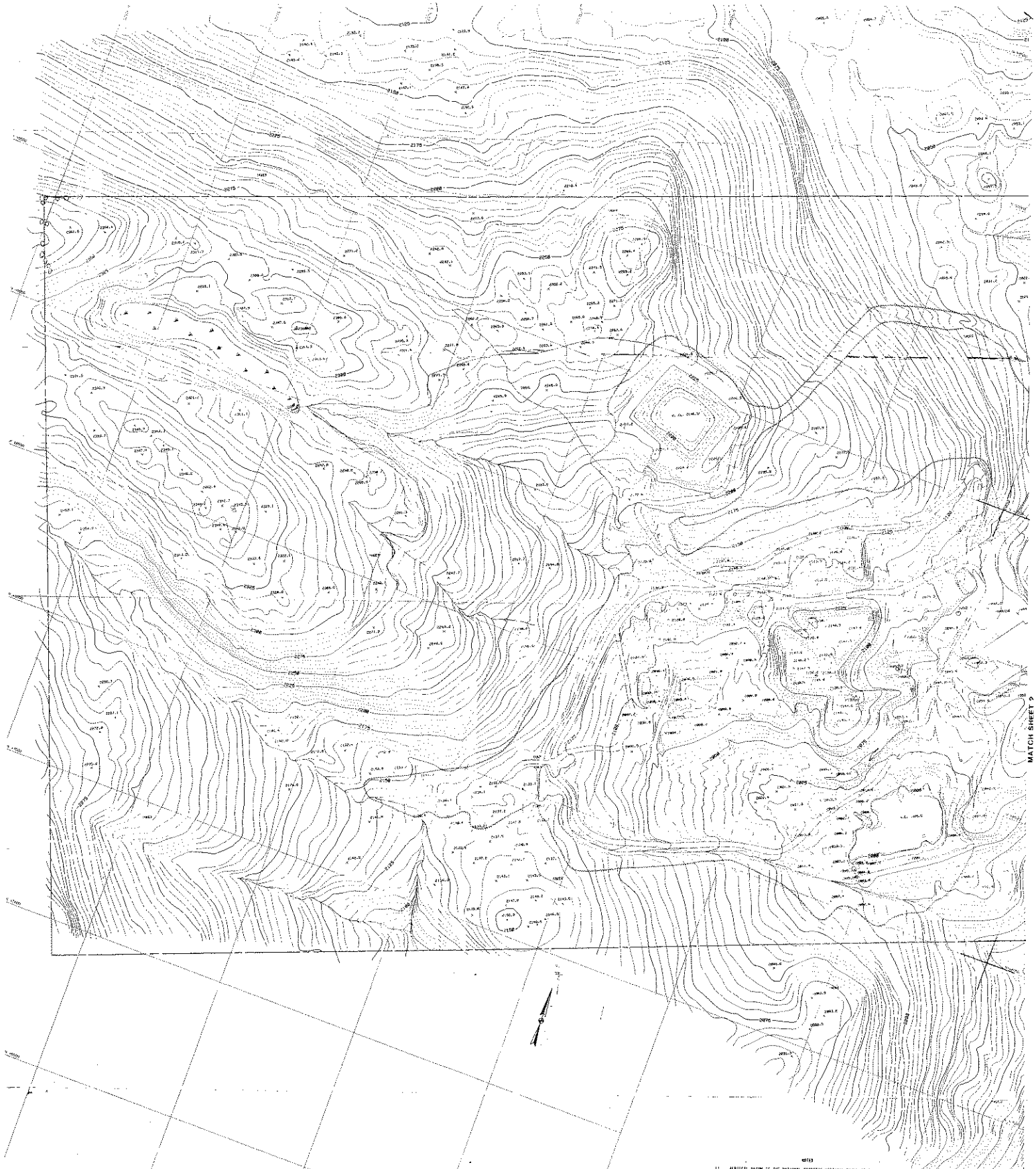
PORTION SCREENED BY VEGETATION
PORTION OF SITE VISIBLE
BARTON MINES CORP.
NORTH CREEK, NEW YORK FIG.8


VISUAL IMPACT 5 MILE RADIUS
COMPOSITE OF SITES 3 & 4
PORTION SCREENED BY INTERVENING LAND FORMS
PORTION SCREENED BY VEGETATION
PORTION OF SITE VISIBLE
BARTON MINES CORP.
NORTH CREEK, NEW YORK FIG.9


INDIAN LAKE
INDIAN LAKE
JOHNSBURG
JOHNSBURG
VISUAL IMPACT 5 MILE RADIUS
SITE No. 3 ELEV. 2275
PORTION SCREENED BY INTERVENING LAND FORMS
PORTION SCREENED BY VEGETATION
PORTION OF SITE VISIBLE
BARTON MINES CORP.
NORTH CREEK, NEW YORK
FIG. 7



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2) GRID SYSTEM IS ARBITRARY, BASED ON MAGNETIC NORTH.

3) THIS MAP WAS PREPARED BY STEREO PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY FLOWN 12/4/08

4) DASHED CONTOURS INDICATE AREAS OF QUESTION ACCURACY.

5) PROPERTY LINES SHOWN ARE APPROXIMATE ONLY AND ARE NOT THE RESULT OF A BOUNDARY SURVEY.

GRAPHIC SCALE
100 50 0 100 200 300

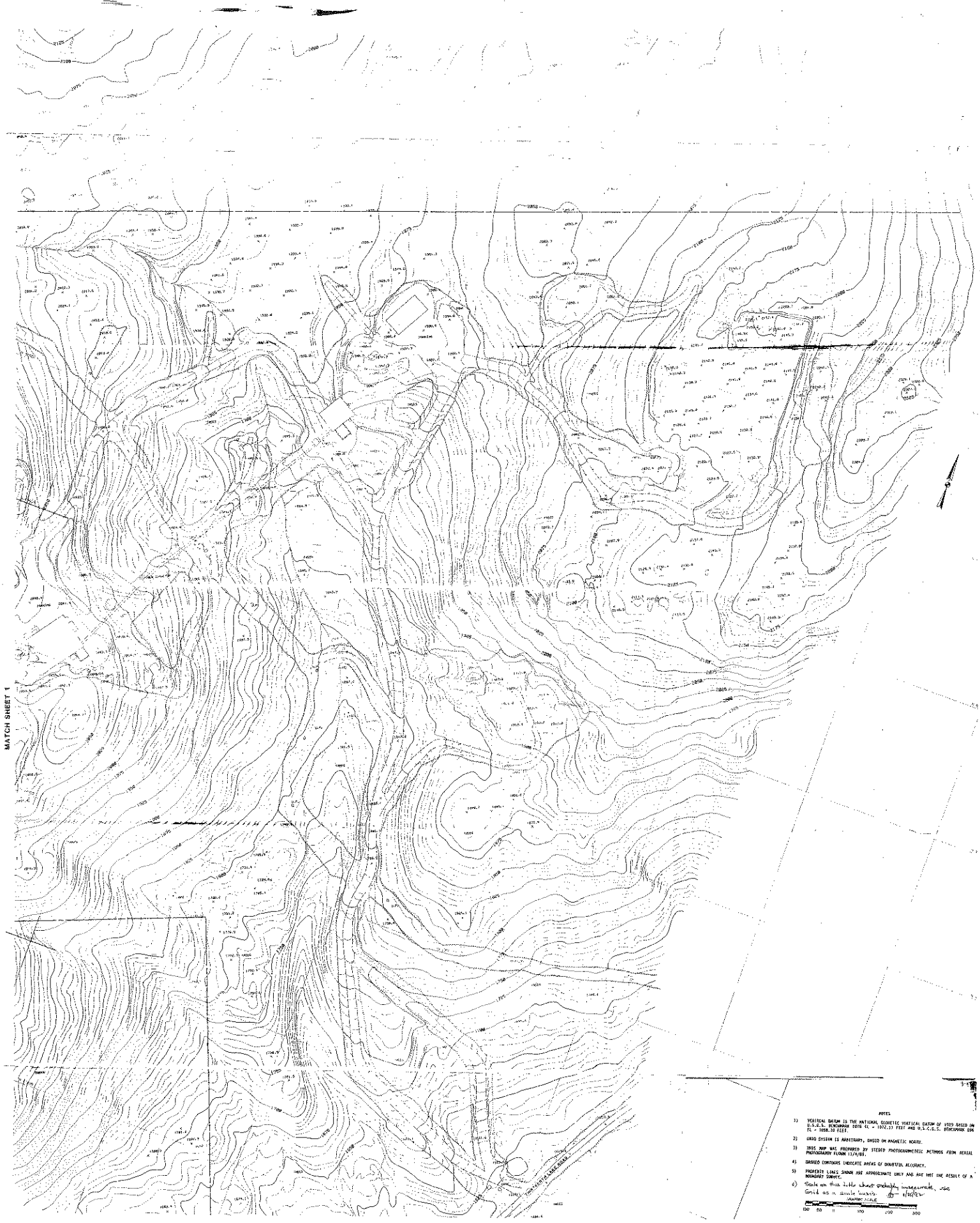
TOPOGRAPHIC MAP OF
BARTON MINES CORPORATION
RUBY MOUNTAIN PROJECT
TOWN OF JOHNSBURG
WARREN COUNTY, NEW YORK

DAVID P. BARNASS
LSP 49342

RISTFROST
RIST-FROST ASSOCIATES, P.C.
CONSULTING ENGINEERS
ARCHITECTS
SURVEYORS
GLENS FALLS, NEW YORK
LACONIA, NEW HAMPSHIRE

99-184507

1


MATCH SHEET 1
MATCH SHEET 2
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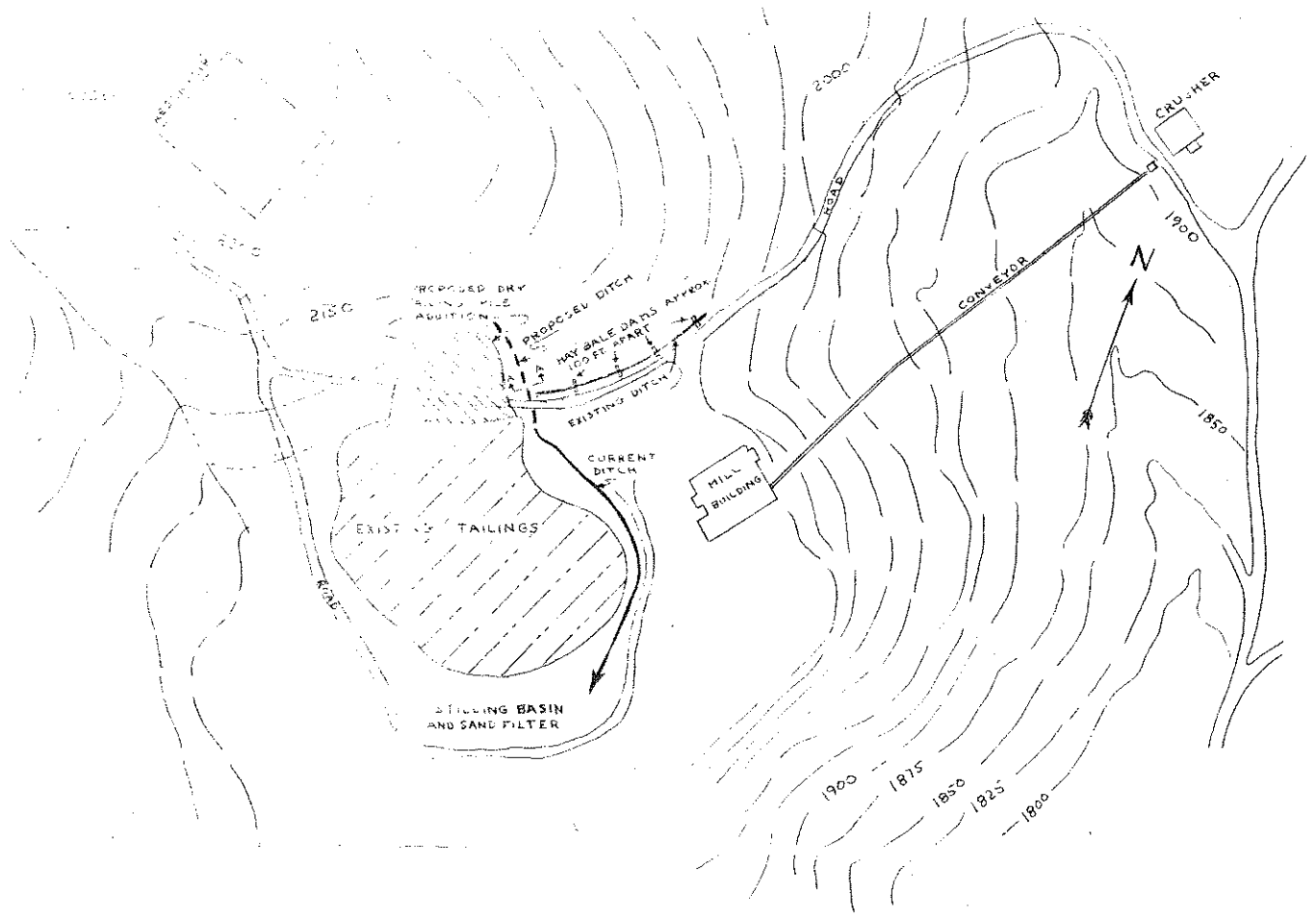
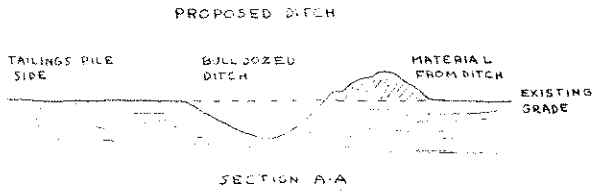
2) GRID SYSTEM IS ARBITRARY, BASED ON MAGNETIC NORTH.
3) 2005 MAP WAS PREPARED BY STEREO PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPH FLOWN 11/9/05.
4) DASHED CONTOURS INDICATE AREAS OF DOUBTFUL ACCURACY.
5) PROPERTY LINES SHOWN ARE APPROXIMATE ONLY AND ARE NOT THE RESULT OF A BOUNDARY SURVEY.
6) Scale on this little chart probably inaccurate, use Grid as a scale instead. 1/25/12
GRAPHIC SCALE
100 50 0 100 200 300

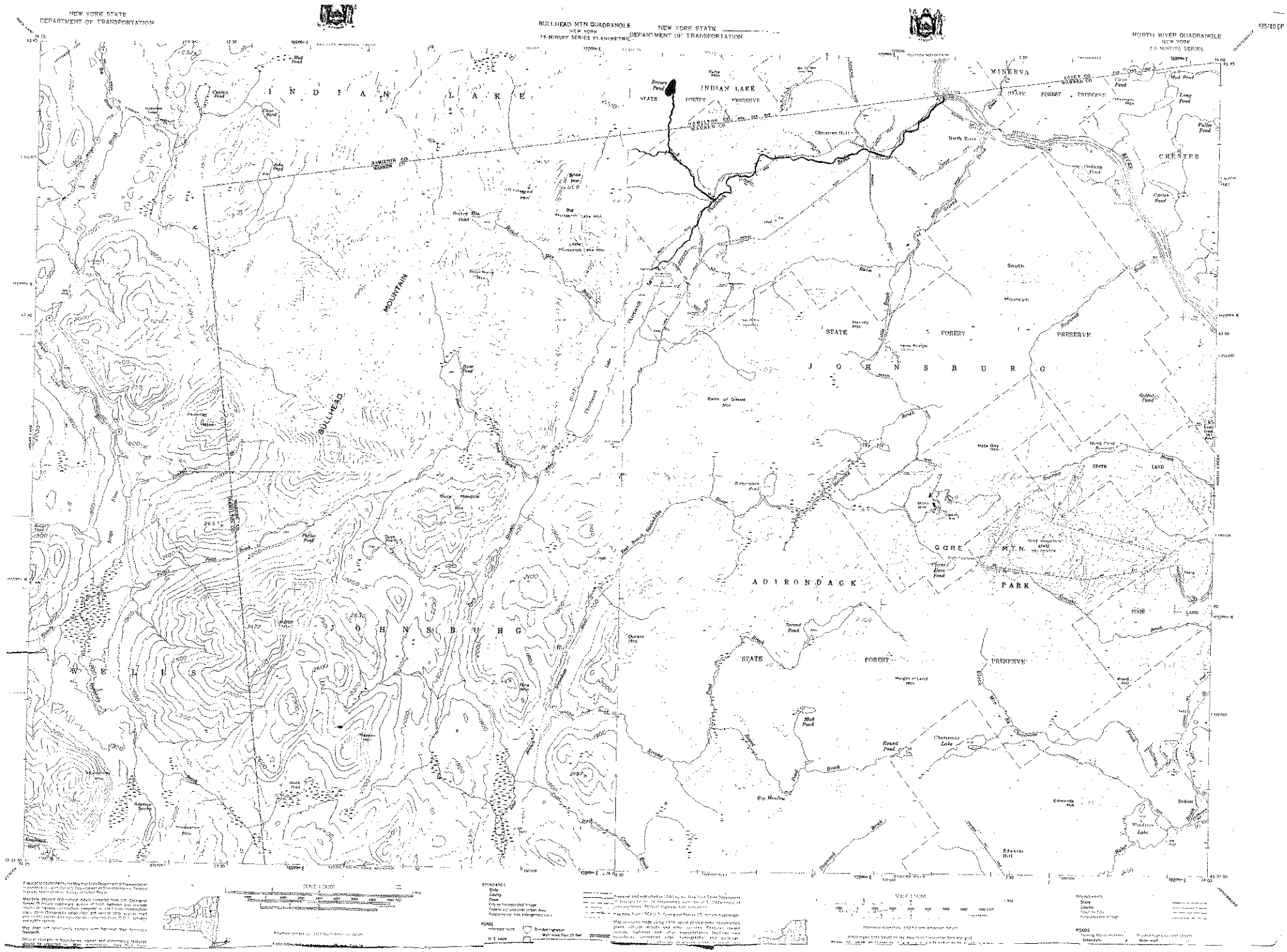
DATE	BY	REVISION RECORD	CH	CK





SECTION A-A

TOLERANCES (EXCEPT AS NOTED)	BARTON MINES CORP. NORTH CREEK, N.Y. 12853	
DECIMAL ±		SCALE 1"=200'-0" / DRAWN BY ELLIFRITZ / APPROVED BY
FRACTIONAL ±	TITLE EROSION CONTROL PROPOSAL RUBY MT. PROJECT	
ANGULAR ±	DATE JUNE 17 88	DRAWING NUMBER 88-627


NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
BULLHEAD MTN QUADRANGLE
NEW YORK
7.5 MINUTE SERIES PLANIMETRIC
NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
NORTH RIVER QUADRANGLE
NEW YORK
7.5 MINUTE SERIES
INDIAN LAKE
MINERVA
CHESTER
JOHNSBURG
WELLS
ADIRONDACK
PARK
STATE
FOREST
PRESERVE
MOUNTAIN
BULLHEAD
GORE MTN.
HAMILTON CO
WARREN CO
ESSEX CO

Appendix C

Design of the Expanded Tailings Valley

(1993)

B112102

CONCEPTUAL DESIGN OF THE EXPANDED TAILINGS VALLEY TAILINGS FACILITIES RUBY MOUNTAIN PROJECT

Prepared for:

Barton Mines Corporation
North Creek, New York
U.S.A. 12853

Prepared by:

STEFFEN ROBERTSON AND KIRSTEN (CANADA) INC.
Suite 800 - 580 Hornby Street
Vancouver, B.C. V6C 3B6
Canada

OCTOBER 1993

B112102

CONCEPTUAL DESIGN OF THE EXPANDED TAILINGS VALLEY TAILINGS FACILITIES RUBY MOUNTAIN PROJECT

CONTENTS

LIST OF FIGURES

B112102

CONCEPTUAL DESIGN OF THE EXPANDED TAILINGS VALLEY TAILINGS FACILITIES RUBY MOUNTAIN PROJECT

1.0 INTRODUCTION

1.1 General

Barton Mines Corporation (BMC) is presently operating the Ruby Mountain Mine, an industrial abrasives (garnet) mine in Warren and Hamilton Counties, New York, under permits from the New York Department of Environmental Conservation and the Adirondack Park Agency. BMC is presently disposing of tailings using a wet disposal system at the Tailings Valley Tailings Facility in the drainage valley immediately west of the mill. This system was permitted (Project & Permit No. 87-39) issued on January 7, 1988 under a major amendment to develop and operate two sequentially developed disposal sites in this valley. The first of these sites is the Tailings Valley Tailings Facility (TVTF) and the second, situated further up the valley, is referred to as the Finger Valley Tailings Facility (FVTF). The TVTF has been constructed and operated since the permit was issued in 1988.

As the operational life of the TVTF draws to a close, BMC is faced with either developing the FVTF as currently permitted, or changing the two disposal site system to a single enlarged system which extends from the TVTF to the lower portions of the FVTF. For a variety of reasons, details of which are included in the addendum to the reclamation plan design, BMC is proposing the latter option.

This report has been prepared as part of the documentation for submission to the regulatory agencies to obtain an amendment to the existing permits regulating disposal of BMC's tailings. It describes the conceptual design related to changing the two disposal site system to a single enlarged system.

A separate document, entitled Addendum to: Ruby Mountain Garnet Mine Mine and Reclamation Plan Design has been prepared to outline the changes to the reclamation plan arising from the proposed changes to a single enlarged tailings disposal system.

1.2 Background Reports

The system of dewatered tailings disposal that was used by BMC between 1983 and 1988, and the design of the current tailings disposal facilities for the Ruby Mountain Mine are included in Report 80201/2: Ruby Mountain Garnet Mine - Tailings Impoundment Design, issued by Steffen, Robertson and Kirsten (SRK) in November 1986. A report describing the site selection study was prepared by SRK, but it bears no relevance to the current proposal.

The details of the reclamation plan associated with the currently permitted tailings disposal facilities are provided in Report 80201/3: Ruby Mountain Garnet Mine - Mine and Reclamation Plan Design issued by SRK in November 1986.

Details of the facilities that were constructed in Tailings Valley between September 1988 and November 1989 are described in Report 80203: As-built Report on Wet Tailings Disposal Facilities for the Ruby Mountain Project, issued by SRK in February, 1990.

2.0 SETTING

Although SRK Report 80201/2 describes the physical characteristics of the Tailings Valley and Finger Valley sites, a brief description of the physical setting, at least insofar as it relates to the proposed change to an enlarged single system, is included here for the benefit of the reader. Further detail can be obtained by referring to SRK Report 80201/2.

2.1 Location and Physiographic Setting

The Ruby Mountain Property is located in upstate New York, approximately 3 and 7 miles, respectively, northwest of North River and North Creek (Figure 2.1).

The property is situated in the Adirondack Mountains. Local topography varies from elevation 2625 atop Ruby Mountain to 1600 feet in Thirteenth Brook Valley immediately south of the property. Slopes in the vicinity of the property are generally moderate (less than 15°) to steep (15° to 35°).

In the vicinity of the proposed expansion, Tailings Valley is an irregular bowl-shaped valley with slopes which range typically between 5° and 25°.

2.2 Climate

The climate is characterized by moderate summers and cold winters. The average annual precipitation at the site is 45 inches. The average annual runoff is 27 inches and the average annual lake evaporation is 26 inches.

2.3 Regional Hydrology

Tailings Valley Creek is fed primarily from local runoff and, to a lesser extent, groundwater discharge from Finger Valley. It flows southeast across the Ruby Mountain property for approximately one mile before entering Lower Brown Pond Brook several hundred feet upstream of its confluence with Thirteenth Brook. Approximately 4 miles to the east, Thirteenth Brook flows into the Hudson River (Figure 2.1).

Tailings Valley Creek is designated a small, intermittent Class D stream. Lower Brown Pond Brook and Thirteenth Brook are Class C streams.

2.4 Regional Bedrock and Soils

Bedrock in the vicinity of Tailings Valley consists typically of anorthositic gneiss and fine-grained dyke rock. The top one to two feet of gneiss are fractured and weathered, but grade sharply into lightly fractured, slightly weathered to fresh gneiss.

The natural, undisturbed soils at Tailings Valley typically consist of:

a vegetative mat less than 2 inches thick overlying

a mixture of brown to black, organic silt, sand and clay up to several inches thick overlying

0 to 20 feet of a dense to very dense mixture of sand, gravel and fines (till).

2.5 Regional Geohydrology

Groundwater levels are generally very close to the existing ground surface. Springs and/or artesian water conditions are not uncommon in the vicinity of Tailings Valley.

2.6 Regional Seismicity

The earthquake hazard of the project area is classed as Zone 2 according to maps published by the U.S Army Corps of Engineers. This corresponds to a moderate earthquake hazard and a recommended horizontal acceleration of 0.05g for purposes of design.

3.0 EXISTING OPERATIONS AT TAILINGS VALLEY TAILINGS FACILITY

3.1 General

The TVTF is used to dispose of tailings in a slurry form and return process water to the mill. The facility has been has been operating successfully in Tailings Valley since 1988. A review of the existing system is included here, because the basic operations related to the proposed expansion would remain essentially unchanged.

3.2 Permitted Facilities

The two facilities that are currently permitted for tailings disposal are TVTF and FVTF. The locations of these facilities are shown on Figure 3.1. Sections through these two facilities are shown on Figure 3.2. Currently only the TVTF has been developed and, as the layout indicated on Figure 3.1 represents conditions just prior to closure, the actual stage of development is less than what is shown on Figure 3.1. Construction of the FVTF has not yet commenced.

3.3 Operations

The disposal of tailings at Tailings Valley consists of a series of pumps at the mill (elevation 2050 feet) which pump the tailings slurry through a four-inch pipeline to a hydrocyclone (cyclone) suspended from a track-mounted crane on the tailings pile (currently about elevation 2125 feet). The cyclone segregates the slurried tailings into coarse (sand) and fine (slimes) components.

The sand, used to construct the embankment, is heavier and therefore drops out of the cyclone underflow onto the crest and/or flows slowly down the face of the embankment. The sand fraction is discharged with a moisture content of about 27% and, with gravel underdrains removing excess water, stacks as a granular "dry" product. Approximately 90% of the total tailings, by weight, reports as cyclone underflow.

The slimes are lighter and therefore report as a low solids-content slurry to the cyclone overflow, following which they flow through a series of hoses and are discharged into the impoundment. Due to the fine-grained nature of the slimes, they form a beach which slopes away from the upstream face of the sand embankment. Approximately 10% of the total tailings, by weight, reports as cyclone overflow.

3.4 Till Face on the Upstream Side of the Sand Embankment

After the sand embankment was constructed, and with each of its raises, a till blanket was placed on its upstream face. The purpose of this blanket is to prevent the unimpeded flow of process water through the embankment. If the sand embankment was insufficiently wide or inadequately underdrained, such flow could cause internal erosion of the sand. Over time, however, the sand embankment has gradually

increased in thickness (in an upstream-downstream direction) and the need for this till blanket has diminished.

3.5 Blanket Drain and Underdrains

A blanket drain was constructed that underlies part of the facility footprint and ties into a central collector drain running down the centre of Tailings Valley. Tributary finger drains (underdrains) constructed of clean, uniform gravel and wrapped in filter fabric to prevent clogging have been constructed over large portions of the facility footprint. The purpose of these underdrains is to drain water entering the sand embankment due to infiltration from the slimes pond and sand placement. Water captured by these underdrains, estimated to be in the order of several gallons per minute, is directed to the seepage return dam. The flow from these drains varies visibly with the season and operating period.

3.6 Water Management

Clarified pond water collects at the toe of the slimes beach, near the north side of the slimes pond. This water flows into a decant line which then directs the water to the seepage return dam (Figure 3.1). Ditches, to capture runoff from the tailings pile and seepage from finger drains on the east side of the pile, are present on both sides of the pile. The ditches direct this water to the seepage return dam. Most of the time, the water behind the seepage return dam is pumped to the mill for re-use in the mill circuit.

Water is managed and discharged as necessary and prudent within the guidelines of the SPDES Permit. Periodically, between February and August, excess water has been discharged from the tailings facility at a quality and rate that is in compliance with the permitted discharge parameters.

Flow from Finger Valley is diverted around the west side of the existing tailings pile and rejoins the natural channel at a point immediately downstream of the seepage return dam. A second diversion ditch runs along the east side of the tailings pile but, due to the small catchment and the permeable condition of the near-surface materials on this side of the pile, the ditch rarely, if ever, contains visible flow.

4.0 PROPOSED EXPANSION OF TAILINGS VALLEY TAILINGS FACILITY

4.1 General

As noted previously, the proposed expansion requires the consolidation of the two-site disposal system to an enlarged single system. This is achieved by developing a second slimes pond at an elevation above the existing TVTF slimes pond, but not so high as to encroach on the slimes pond that would have been developed over the wetlands at the FVTF. The main features of this modification are compared, in plan and section, with those of the permitted facilities at Tailings Valley and Finger Valley, on Figures 4.1 and 4.2, respectively.

The basic operational concepts will remain the same as those currently used (i.e., material segregation using cyclones to provide sand for embankment construction, use of an impoundment to store slimes, use of underdrains to maintain low water levels in the sand embankment and a pipe system to decant pond water, etc.). Further discussions of the proposed expansion are provided below.

4.2 Main Design Concepts

The main design concepts associated with the expanded facility are as follows:

- develop an access road for movement of equipment and personnel to key areas of the site;
- flow from Finger Valley to be diverted to the south, into the adjacent drainage;
- installation of additional finger drains below the sides of the final embankment footprint so that water levels within the embankment are maintained at low levels;
- construction of a sand starter embankment to elevation 2230 feet, underlain by finger drains, to initiate the development of an upper slimes pond;
- placement of a till face on the upstream slope of the starter embankment, to reduce infiltration to the sand embankment;
- placement of the sand over the footprint of the lower slimes pond at a rate controlled by monitoring to ensure that construction pore pressures in the slimes significantly dissipate before additional sand is deposited (this, in turn, will prevent the development of slope instability, manifested as a failure through the slimes);
- maintaining a tight footprint to the final tailings embankment so that runoff and seepage from the toe can be easily captured and directed, by gravity flow, into the existing catchment facilities;
- establishment of catchment ditches on either side of the pile to direct runoff from the pile into the pond behind the seepage return dam;
- final crest elevation (cycloned sand) of 2275 ft; and,
- slopes of 3H:1V on the final face of the pile.

4.3 Development

The development of the enlarged single site is illustrated in plan on Figures 4.3 through 4.6. Corresponding sections are provided on Figures 4.7 through 4.10.

4.3.1 Site Preparation

First, a road will be developed from existing roads on the site to provide access to areas where equipment and/or personnel must work. Then, from about elevation 2280, a diversion ditch will be constructed to direct the flow from Finger Valley to the south, around the footprint of the final tailings pile. Next, the area beneath the footprint of the starter embankment and zone where tailings will be deposited over the first few years will be cleared of trees and stripped of topsoil. The stripped topsoil will be stockpiled for use in conjunction with reclamation activities. Finger drains will be installed under the downstream portions of the starter embankment and these would be connected to new lengths of finger drain which will be extended upslope from the existing finger drains. Small ditches to capture runoff from the tailings pile and flow from finger drains under the east side of the pile will be constructed on either side of the pile to direct this water to the seepage return dam. On the west side of the pile, the existing diversion ditch can be used as a collection ditch by re-aligning the lower limits of the ditch so that directs flow into the seepage return pond. Finally, the decant line would be extended up to the beach area of the upper slimes pond.

4.3.2 Starter Embankment Construction

A starter embankment would be constructed over the finger drains using sand obtained from cycloning of tailings (Figures 4.3 and 4.7). Side slopes are expected to be 3H:1V and the minimum crest width will be 30 feet. During this period, slimes would be piped to the lower slimes pond.

After about 5.2 months (equivalent to about 70,000 cy of sand), the sand component of the starter dam would be completed (el. 2230). A facing of till would then be constructed on the upstream slope of the starter dam.

4.3.3 Commencement of Operations Using Upper Slimes Pond

Once the till facing has been installed on the upper starter dam, the discharge of the cyclone overflow would shift to the upper slimes pond. To about elevation 2228 feet, the capacity of the upper slimes pond is equivalent to about 3.2 years of slimes production (70,000 cy of slimes). Cycloned sand would be used to raise the embankment and the slimes would continue to be piped into the upper slimes pond.

4.3.4 Long Term Operation of the Expanded TVTF

After a few years (say, by 1998), the sand would start to encroach on the slimes in the lower pond (Figures 4.4 and 4.8). By this time, some sand would have been deposited over the lower slimes pond to initiate the consolidation of the slimes. This deposition could be done either hydraulically using the cyclone or mechanically using equipment such as a dozer and/or scrapers.

Instrumentation would be in place to monitor the rate of pore pressure dissipation within the slimes. Sand deposition would shift to another area of the facility while the slimes consolidate. There is expected to be enough storage area outside of the footprint of the lower slimes pond, but within the final total footprint, to allow deposition of tailings over the slimes at a rate which is consistent with pore pressure dissipation within the lower slimes deposit.

The sequence of sand placement in lifts, followed by pore pressure dissipation would continue through the development of the sand embankment to elevation 2275 (Figures 4.5, 4.6, 4.9 and 4.10).

Based on the layout provided in Figure 4.10 and the parameters indicated in Appendix A, the storage volume (sand and slimes) associated with the proposed expansion of the TVTF is 4.8 million cy. This corresponds to approximately 35 years of additional storage.

4.4 Water Management

The water management of the expanded system will remain essentially consistent with the existing water management system. However, there are differences that will exist depending on the stage of development. A brief description of these is provided below.

First, the decant line will be extended up the side of the valley to the general location of the upstream slimes pond. When the initial stage of cycloning is carried out to develop the sand starter dam, the slimes will continue to be piped to the lower slimes pond. Therefore, most of the water will report directly to the lower slimes pond. During this period, the decant line inlets at the lower slimes pond must remain open so that the process water can be directed to the seepage return dam. Once the sand starter embankment is constructed, the slimes will be piped directly to the upper slimes pond. At this time, the decant line inlets in the lower slimes pond will be permanently sealed off and those in the upper slimes pond will be made operational. Clarified pond water which collects at the toe of the beach in the upper slimes pond will flow into the decant line and down to the seepage return dam. As during previous operational phases, the water behind the seepage return dam will be pumped to the mill for re-use in the mill circuit.

Water will be managed and discharged as necessary and prudent within the guidelines of the SPDES Permit.

4.5 Monitoring

The rate at which sand can be deposited over the lower slimes pond, and therefore the rate at which much of the sand embankment can be raised, is a function of the rate at which there is dissipation of the pore pressures within the slimes following the placement of each lift of sand. The approach that will be used to track pore pressure dissipation will include direct measurement of pore pressures using piezometers installed at various depths in the slimes. Depending on the success of this approach, it may also be necessary to consider use of settlement plates installed on the surface of the sand tailings which overlie the slimes.

4.6 Reclamation

As noted previously, details of the reclamation plan are included in a separate document, entitled Addendum to: Ruby Mountain Garnet Mine and Reclamation Plan Design. The addendum has been prepared to outline the changes to the reclamation plan arising from the proposed shift to a single enlarged tailings disposal system.

This report, **B112102, Conceptual Design of the Expanded Tailings Valley Tailings Facilities, Ruby Mountain Project**, has been prepared by:

STEFFEN, ROBERTSON AND KIRSTEN (CANADA) INC.

Cameron C. Scott, P.Eng.
Senior Geotechnical Engineer

Andy Robertson, P.Eng.
Review Principal

CCS/R-30

Appendix D

Revegetation Testing Program Monitoring:

Summer 1998

BAMBERG ASSOCIATES
Environmental Services

August 27, 1998

Mr. Gordon Hersey
Executive Vice President
Barton Mines Corporation
North Creek, NY 12853

Re: Transmittal of the 1998 monitoring survey reports for the revegetation testing program at the Ruby Mountain Site

Dear Gordon:

Enclosed are two copies of the 1998 monitoring report for the revegetation testing program. The results are consistent with earlier qualitative monitoring for the vegetative growth in relationship to plot treatment. Changes to the vegetation are still evident, but slower. There were more seedlings of shrubs and trees than previously noted, and these plants should survive and become part of the vegetation over the next several years.

Let me know if you need more information or copies of the report.

Sincerely,

Samuel A. Bamberg

Samuel A. Bamberg, Ph.D.
Reclamation specialist

26050 E. Jamison Cir. • Aurora, Colorado 80016 • (303) 690-7402

REVEGETATION TESTING PROGRAM
MONITORING: SUMMER 1998

RUBY MOUNTAIN MINE
TAILING VALLEY TAILINGS FACILITY

Submitted to:

Gordon Hersey
BARTON MINES CORPORATION
North Creek, New York 12853

Prepared by:

Samuel A. Bamberg, Ph.D.
BAMBERG Associates
26050 E. Jamison Circle
Aurora, Colorado 80016

July 1998

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LIST OF PHOTOGRAPHS

1.0 INTRODUCTION

Barton Mines has an active revegetation testing program at the Ruby Mountain Mine. We, Bamberg Associates, helped established this revegetation testing program on the tailings embankment of the Ruby Mountain Mine during the fall of 1995. This program was required in Condition #7 of the Draft Permit #87-39B. The Condition required monitoring the testing results for 4 years. This monitoring report presents the July 1998, the third year, quantitative survey results of the revegetation testing plots. This report, along with our previous 1995 setup, and the 1996 and 1997 monitoring reports, serves as the basis for the yearly monitoring report requirement.

Our third season monitoring consisted of:

- an overall qualitative evaluation
- a quantitative survey of each of the 5 test plots
- a photographic documentation of plot condition and plant growth

Barton Mines considered a detailed quantitative monitoring survey necessary because of new plant germination and growth during the past 3 years. We conducted a quantitative evaluation and measurement of plant species cover, density, and diversity during the summer growing season. No maintenance or other testing activities were performed during the 1997 and early 1998 growing season. Included in this report is our qualitative discussion of the test results for each plot type, photographic documentation, and comparisons of plant growth in most plots.

The monitoring confirmed our earlier conclusions that vegetative growth reflects the type of surface treatment used (Bamberg Associates 1995, 1997, and 1998). All plots received surface grading with a rough final finish. The following information summarizes the plot treatments and results:

Plot	Surface covering	Plant cover	Diversity	Erosion stability
2	topsoil & forest humus	57.3 %	10.1 sp./m^2	excellent
3	topsoil, humus, & wood.	35.8 %	7.0 sp./m^2	excellent
4	run-of-mine rock	14.8 %	5.2 sp./m^2	excellent
1	crusher fines	20.6 %	6.0 sp./m^2	fairly good
5	no soil cover	~5.0 %	NA	average

sp. = plant species

Plot 2 had the most intense soil surface preparation and responded with the highest plant cover and species diversity. Plot 3 had similar results to Plot 2, but less germination and growth. Plot 4 had excellent stability but only a sparse cover of grasses and forbs. Plot 1 had the least soil cover preparation and had poor vegetation parameters but the surface stability was fairly good. Plot 5 was only rough graded with no soil cover. This resulted in only average surface stability with evidence of some wind erosion and some clumps of grass creating very low plant cover.

Unaltered tailings deposited to the east of the test plots are our control plots. The control plots continued to have no plant germination or growth. Transplanted pioneer species of trees had poor survival at 7.3% for balsam fir, and about 5% for other transplanted trees.

The vegetation parameters we monitored on the test plots are generally considered indicative of plant growth and success. We identified plant species on the plots with the help of a local botanist, and prepared a floristic list. The variables measured were canopy cover by species, and plant species diversity. Density measurements of the numbers of trees and shrubs per plot were not taken.

2.0 MONITORING RESULTS

The site has 3 separate zones or habitat types due to the mine's varying methods of tailings disposal. These separate zones were developed in the approved Reclamation Plan, . These 3 separate areas were:

- the embankment top
- the slopes of the embankment
- the impoundment area behind the embankment

Only the slopes of the embankment were available for our testing due to ongoing mining operations. Barton Mines plans to treat and manage the impoundment areas as a wetland at the end of tailings disposal operations. The reason for this is that the fine substrate, flat surface and lack of complete drainage will make the area moderately water logged for part of the year. These are ideal conditions for a wetland. Small ponds and marshy conditions will remain on these areas. Barton Mines will develop reclamation and management treatments for the top of the embankments based on the results of our slope revegetation testing. It is expected that, with time, all 3 habitat types will revert back to forest habitat through natural succession.

This report presents the results of our surveys for a comparison of the general surface conditions and vegetation parameters within the 5 test plots. This is followed by a

comparison of plant species cover and diversity. Our measurements of trees and shrubs densities were low, therefore we did not consider them significant at this time. Two series of photographs of the test plots are presented: one set taken in July 1997 and a recent set in July 1998.

2.1 Summary of Revegetation Test Plot Set Up

This section provides a brief discussion of test plots we set up and completed on October 9 to 14, 1995 (see Bamberg Associates 1995). This set-up was used in the report as a basis for the qualitative and quantitative evaluations. Barton Mines provided a portion of the tailings embankment on the southwest side of the present embankment for the test plots. Five irregular shaped, linear plots were oriented downslope along the southwest side of the tailing embankment in an area set aside for this revegetation program.

The soil and substrate materials used on site were materials available at that time, and included:
crusher fines and rock refuse,

- stockpiled soil
- forest humus
- run-of-mine rock
- wood blocks and sawdust
- mixed soil/rock/wood mulch from the former clearing of soil surfaces

The 3 sources of seed used were:

- 2 commercial mixes of grass seed
- seeds contained in the stockpiled soil
- seed contained in the forest surface humus applied to the plots

Trees that we transplanted into portions of some plots were pioneer species and balsam fir. The pioneer species included birch, dogwood, and pople and were taken from the humus on the forest floor along mine site roads. The balsam fir seedlings came from a disturbed area on the edge of a reservoir at the Gore Mountain property.

Using a dozer and a backhoe, Barton Mines simulated the hummocky, incomplete drainage pattern surfaces of the nearby forest with rough grading. These methods included:

- grading to form irregular basins and berms
- forming basins that collect surface water and wind-blown seeds and soil
- adding coarse rock materials to enhance surface roughness for wind and water erosion control
- leaving surfaces rough to help maintain a more even seed coverage and germination

Fine grading was not necessary. The surface of each plot had depressions and hummocks formed by grading before application of the treatment materials. After grading, the plots received surface dressings, topsoiling substrates, fertilizer, and seed.

The following is a brief description of the 5 revegetation test plots:

Plot 1 - 0.3 acres; rough graded; spread 200 cubic yards of crusher fines and rock over entire plot; seeded with grass and fertilized over entire plot; upper ⅓ (30 feet) of slope spread with some forest humus; transplanted with balsam fir seedlings (57 seedlings in 16 clumps) and tree saplings

Plot 2 - 0.4 acres; rough graded; spread 420 cubic yards of topsoil over entire plot; spread a layer of forest humus over upper ⅓ (30 feet) of slope; seeded with grass and fertilized on 20 feet of upper edge; transplanted with balsam fir seedlings (52 seedlings in 21 clumps) and some clumps of beech and maple

Plot 3 - 0.4 acres; rough graded; spread with wood products (220 cubic yards) and soil/rock/wood mix (220 cubic yards) over entire plot; spread forest humus along top 30 feet; seeded with grass and fertilized along 20 feet of upper edge; transplanted balsam fir seedlings along upper edge (28 seedlings in 8 clumps)

Plot 4 - 0.4 acres; spread with run-of-mine rock (850 cubic yards) to an average depth of 16 inches; seeded with grass and fertilized

Plot 5 - 0.4 acres; graded into catchment basins; seeded with grass and fertilized

Plot 5 did not receive any material on top of the sandy embankment tailings substrate. The intention of this plot was to test the feasibility of revegetating the existing sandy embankment material as a temporary measure with only added amendments and seed.

2.2 General Discussion of Results

During the 1998 growing season, we evaluated the plots for general surface condition and appearance and photographed them for visual comparison with previous monitoring surveys. Our previous reports described the completion of the test plots and the results of the 1996 and 1997 monitoring surveys (Bamberg Associates, January 1997, and March 1998). The purpose of this current survey was to monitor how well the revegetation is proceeding.

Since the plots were established in mid-October 1995, weather conditions have affected plot response in subsequent years. Winter weather patterns for 1995/96 were typical with abundant rains in October and a first freeze by late October. There was a late, wet spring in 1996 followed by normal rainfall. Weather in 1997 was normal with no unusual events. The early summer of 1998 had been very wet and cool, so that plant growth has been slow. Recent weather sequence and patterns affect the test plot plants' growth but not germination and survival. Transplant survival has continued to decline, but we could not determine any specific cause.

2.3 Monitoring Survey Results

Table A-1 in the appendix lists the plant species identified in the test plots. Richard Futyma, of the LA group, helped with species identification. There were a total of 56 species identified on the plots: 11 trees, 1 fern, 14 grasses/grass-like, and 30 forbs. Since these test plots are in an early stage of plant succession, most plants are pioneer species. The majority of the plant species grow in open fields or colonize bare ground. These open and bare areas will be filled in with vegetation as the revegetation proceeds. Some of the tree seedlings are species that will become part of the mature forest.

Tables A-2 to A-6 present the results of our monitoring survey. Plot were monitored by recording canopy cover by plant species in 1 square meter quadrats. Refer also to the summary table in Section 1. Total vegetative cover varied from an estimated 5% on Plot 5 to 57.3% measured in quadrats in Plot 2. Plant diversity was also greatest in Plot2. The other plots had intermediate values of vegetative cover and diversity depending on the soil treatment. These numbers show that substrate and topographic conditions are the controlling factors in revegetation for species cover and diversity. Erosional stability was good to excellent in all the plots due to the grading and plating techniques.

2.4 Plot Evaluations

The time period for the test plots is still short, less than 3 full summer growing seasons, so these evaluations are preliminary. Also, the favorable weather during this time may falsely effect the long term prognoses. The plot with the best overall performance was Plot 2 that was plated with topsoil and forest humus, sown with seed, and fertilized. In this plot, vegetation growth and survival were good, but the extremely rainy, cool weather slowed this growth. Plots 3 and 4 had excellent stability, but poor germination and growth. Plot 1 had poor vegetation parameters and fairly good stability. Plot 5 had average stability with some wind erosion. This plot had sparse plant germination and growth on the graded but unaltered tailings, with some germination and growth of grasses. Unaltered tailings deposited to the

east of the test plots, that acted as an experimental control, had no plant germination or growth.

The general conditions of the plots in 1998 were as follows:

Plot 1 - fairly sparse growth with estimated 20.6% vegetation cover; some grasses and forbs with a few shrubs and berry bushes; one 8-foot striped maple tree, and 4 surviving balsam fir; some erosion has continued, but is not significant

Plot 2 - significant growth with a variety of species, 57.3% plant cover, mostly grasses with weeds and shrubs; some berry bushes and trees including a 3-foot maple and several 1 to 2 foot "pin cherry" saplings, 2 surviving balsam fir; little evidence of erosion

Plot 3 - sparse to moderate growth with some overlap form Plot 2, 35-45% plant cover, much higher percent of clover, some grasses, weeds, and berries (between 1 and 2 feet high); a few surviving balsam firs though not vigorous; little evidence of erosion

Plot 4 - sparse growth of grasses only, 20-30% plant cover, not vigorous growth with grasses only a few inches in heigh; some minor erosion

Plot 5 - very sparse growth, less than 5% plant cover, and almost all of it in the dendritic hollows and on the inward slope of the hollows, mostly grasses, though individual plants are large and show more vigor than in Plot 4; some wind erosion but not recently; plant growth concentrated in lower left-hand corner in an obvious diagonal line from upper left to lower right

The survival of transplanted balsam fir seedlings in Plots 1, 2, and 3 averaged about 25% in the 1996 season. Very few of these fir seedlings survived in 1997 at 7.3%. We feel that transplanting fir seedlings into this sandy substrate will not be worth the effort.

These early plot evaluations, after the first 3 winter and 2½ summer growth periods, will need to be confirmed during the final monitoring period, and perhaps again in several years before final reclamation. In our revegetation test plots in drier, desert climates, we have found that the rougher substrates, such as the run-of-mine rock, tend to weather into a decent plant growth media. This weathering is dependent on the type of rock from the mine. After several years, these weathered substrates support good plant stands when the vegetative communities have matured. The differences between the plots may not be as evident after several years of vegetative growth and maturation. Plots 4 and 5 would take a longer time for a dense mature vegetation to develop.

3.0 PHOTOGRAPHIC TIME COMPARISONS AND DOCUMENTATION

The pages following the text are companion photographs showing each of the 5 plots:

- in July or October 1997 showing vegetative growth after 2 years
- in July 1998 after 3 years showing change in vegetative growth

The photographs demonstrate that the test plot results are related to treatment within a short time frame (2 to 3 years). In summary, Plot 2 with soil and forest humus had good germination and growth during this early establishment period. Plot 5 modified by grading into rough catchment basins and then seeded with grass, had spotty and sparse grass germination but large individual clumps. This treatment may be appropriate for short term stabilization but not long-term revegetation results. Plot 1 had crusher fines added and showed low germination and sparse plant growth. This treatment may be an alternative if topsoil/humus is not available and a long-term period is available for revegetation. Plots 3 and 4 were designed for shorter revegetation periods and results, and as tests for stability. They will need to be reevaluated during the remaining monitoring period for a better indication longer term vegetation success.

4.0 SUMMARY AND RECOMMENDATIONS

We conducted a quantitative monitoring and photographic documentation of the revegetation testing plots on the Ruby Mountain Mine Tailings Facility during the 1998 growing season for plots established in October 1995. We monitored the 5 plots for environmental and vegetation parameters. Our earlier qualitative preliminary results in 1996 and 1997 showed the plots differed in vegetative growth, erosion, and stability depending on the surface treatment and slope. These earlier results determined that, during the short term, the most stable plot was plated with run-of-mine rock. In 1998, Plot 2 that was partially covered with fresh forest soil/humus had good vegetative results as expected, and was also stable. Plot 5, simply dozed into basins, had some wind affected pattern to plant survival and growth, and low plant cover.

Transplanted balsam fir seedlings had about a 25% survival rate in 1996, few survived into 1997, and only 7.3% survived into 1998. This tree transplanting technique has not proven to be cost effective, and probably should not be used in the future.

It is still early, based on the preliminary results, for us to make firm recommendations on the appropriate reclamation or revegetation techniques. All of the plots had some revegetation, but differed greatly in amounts and kind. Differences in plots after longer term maturation of

the soil surfaces and vegetation may not be as pronounced. Short-term stabilization and partial revegetation can be achieved with simple grading and seeding of rough catchment basins in the tailings material. Recommendations on the best long-term and cost effective revegetation methods will need to wait on the maturation of the test plots over the next several years. All of the different treatments now being tested may be appropriate depending on the topographic features of slope, availability of materials, and desired results at the time of final reclamation.

REFERENCES

Bamberg Associates, March 1998. Revegetation testing program - Monitoring: summer/fall, 1997 - Ruby Mountain Mine, Tailing Valley Tailings Facility. 20 pp.

Bamberg Associates, January 1997. Revegetation testing program - Monitoring: summer/fall, 1996 - Ruby Mountain Mine, Tailing Valley Tailings Facility. 14 pp.

Bamberg Associates, October 1995. Revegetation testing program - Establishment: fall, 1995 Ruby Mountain Mine, Tailing Valley Tailings Facility. 8 pp.

Mitchell, Richard S. and Gordon C. Tucker. 1997. Revised Checklist of New York State Plants. New York State Museum, Bulletin no. 490, 400 pp.

Table A-1 List of Plant Species on Revegetation Test Plots, July 1998.		
Scientific Name	Common name	Abundance/plot# location
Trees and Tall Shrubs		
Abies balsamea	balsam fir	few transplant - 123
Acer pensylvanicum	striped maple	some transplants - 2
Acer saccharum	sugar maple	some, seedlings - 234
Acer rubrum	red maple	few seedlings - 23
Betula papyrifera	paper birch	some seedlings -123
Fraxinus pennsylvanica	green ash	few seedlings - 23
Prunus serotina	black cherry	few seedlings -23
Populus tremuloides	quacking aspen	few seedlings - 2345
Salix amygdaloides	peachleaf willow	few - 234
Salix bebbiana	beaked willow	few - 235
Sorbus americana	mountain ash	few - 23
Shrubs/vines		
Rubus allegheniensis	common blackberry	few - 23
Rubus idaeus	red raspberry	some - 123
Rubus odoratus	thimbleberry	few - 23
Ferns		
Dennstaedtia punctilobula	hay-scented fern	one plant - 4
Grasses/grasslike		
Agrostis gigantea	redtop	few - 34
A. capillaris	colonial bentgrass	common -12345
Carex debilis	weak sedge	few - 23
Carex cf. *scoparia*	sedge	few - 23
Carex spp.	sedges	some - 234
Festuca arundinacea	tall fescue	few - 5
Festuca filiformis	sheep fescue	some - 12345
Festuca rubra	red fescue	common - 12345
Glyceria striata	fowl mannagrass	few - 12
Lolium perenne	ryegrass	few -12
Phleum pratense	timothy	some - 12345
Poa pratensis	bluegrass	common - 12345
Scirpus sp.	rush	few - 12
Forbs		
Achillea millefolium	yarrow	some - 123
Anaphalis margaritacea	pearly everlasting	common - 1234
Aster macrophyllus	aster	few - 23
Equisetum arvense	horsetail	few - 12
Equisetum sylvaticum	wood horsetail	few - 12
Erigeron sp.	fleabane	some - 23
Euthamia graminifolia	flat-top goldenrod	common - 12345
Fragaria virginiana	strawberry	some - 23
Galeopsis tetrahit	hemp nettle	few - 2
Galium mollugo	bedstraw	few - 23
Hieracium sp.	hawkweed	some - 123

Abies balsamea	balsam fir	few transplant - 123
Hypericum punctatum	spotted st. john's-wort	some - 123
Leucanthemum vulgare	ox-eye daisy	common - 123
Lotus corniculatus	bird's-foot trefoil	few - 23
Melilotus alba	white sweet clover	some - 123
Oenothera biennis	evening primrose	some - 12345
Plantago major	plantain	some - 23
Polygonum cilinode	climbing buckwheat	few - 23
Polygonum persicaria	lady's-thumb	some - 23
Potentilla recta	sulphur cinquefoil	few - 2345
Potentilla norvegica	three-leaf cinquefoil	few - 3
Silene cf. *nutans*	catchfly	some - 234
Solidago canadensis	Canada goldenrod	common - 1234
Solidago rugosa	rough-leafed goldenrod	some - 23
Trifolium hybridum	alsike clover	few - 23
Trifolium pratense	red clover	common - 12345
Tussilago farfara	colt's-foot	some - 123
Verbascum thapsus	mullein	common - 12345
Veronica officinalis	common speedwell	some - 23
Vicia americana	American vetch	few - 23

(Nomenclature according to Mitchell and Tucker, 1997)

Table A-2. Results of the quantitative quadrats for Plot 1 in percent plant cover by species.

Quadrat Number	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	ave.
TREES AND TALL SHRUBS									
Betula papyrifera	1								0.1
Prunus serotina					6				0.8
SHRUBS AND VINES									
Rubus idaeus		6			1	4	12		2.9
GRASSES AND GRASS-LIKE									
Carex sp1						1			0.1
Festuca filiformis		10	4	4		2	1		2.6
Festuca rubra	8		6	3	6	1	3		3.4
Lolium perenne				4					0.5
Phleum pratense							4	4	1.0
Poa pratense		1			3	2			0.8
FORBS									
Anaphalis mararitacea	1	3		5					1.1
Euthamia graminifolia	1	2		3	3	2		3	1.8
Fragaria virginiana								1	0.1
Hypericum punctatum						6			0.8
Melilotus alba								4	0.5
Oenothera biennis			4						0.5
Solidago canadensis	2	4	1	2	1	2		3	1.9
Trifolium pratense	6								0.8
Tussilago farfara						3			0.4
Verbascum thapsus	2			4					0.8
PLANT COVER	21	26	15	25	20	23	20	15	20.6
STANDING DEAD	5	2	0	1	6	5	0	0	2.4
LITTER	2	10	2	10	2	3	0	1	3.8
ROCK	2	1	3	1	1	2	0	10	2.5
BARE GROUND	70	61	80	63	71	67	80	74	70.8

Table A-3 Results of the quantitative quadrats for Plot 2 in percent plant cover by species.

Plot Number	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8	2-9	ave.
TREES AND TALL SHRUBS										
Acer pensylvanicum					3					0.3
Acer saccharum						3				0.3
Betula papyrifera		4	3		2	6				1.7
Prunus serotina	1		2					2		0.6
SHRUBS AND VINES										
Rubus alleghaniensis						4				0.4
Rubus idaeus	2	12	2	3	8	7		1		3.9
GRASSES AND GRASS-LIKE										
Agrostis capillaris						2				0.2
Carex sp1	2				1	2				0.6
Carex sp2			3		2			10		1.7
Festuca filiformis	12		4	2	4	6	6	5	12	5.7
Festuca rubra						5		15	14	3.8
Phleum pratense		4	4	1	2	4		4		2.1
Poa pratense		1			1					0.2
FORBS										
Achillea millefolium	t	6							8	1.6
Anaphalis mararitacea	1			3			6			1.1
Aster macrophyllis							1			0.1
Equisetum arvense			7	4				1	4	1.8
Euthamia graminifolia		10				2		4	12	3.1
Fragaria virginiana	1	3	5	4						1.4
Hieracium sp.					3		1			0.4
Hypericum punctatum		6			5					1.2
Leucanthemum vulgare				9		4				1.4
Polygonum cilinode						1				0.1
Polygonum persicaria		3								0.3
Potentilla recta					t		1	1	2	0.4
Silene cf. nutans					5					0.6
Solidago canadensis	5	10	9	20	12	10	8	4	12	10.0
Trifolium pratense	30		8				2			4.4
Tussilago farfara			6			4		18	6	3.8
Verbascum thapsus	1								t	0.1
Veronica officianalis							35			3.9
PLANT COVER	55	59	53	46	48	60	60	65	70	57.3
STANDING DEAD	6	10	5	4	5	10	4	2	10	6.2
LITTER	12	15	10	12	10	15	5	15	10	11.6
ROCK	1	5	6	12	5	8	8	5	5	6.1
BARE GROUND	26	11	26	26	32	7	23	13	5	18.8

Table A-4 Results of the quantitative quadrats for Plot 3 in percent plant cover by species.

Plot Number	3-1	3-2	3-3	3-4	3-5	3-6	3-7	3-8	3-9	ave.
TREES AND TALL SHRUBS										
Abies balsamea			.1						3	0.3
Acer rubrum				1	2					0.3
SHRUBS AND VINES										
Rubus idaeus		4	6		8	18	3	3		4.7
GRASSES AND GRASS-LIKE										
Agrostis capillaris		6								0.7
Carex sp1	5		2	2	2		2			1.4
Carex sp2					3	4				0.8
Festuca filiformis	5		8	22			3	2	1	4.6
Festuca rubra	3		2	6		3	5	2	5	2.9
Phleum pratense	6	8	12	4	28		8		2	7.6
Poa pratense		3			4					0.8
FORBS										
Anaphalis mararitacea	1			3				10	3	1.9
Euthamia graminifolia		12	10		3			2	2	3.2
Fragaria virginiana		4								0.4
Hieracium sp.	3									0.3
Hypericum punctatum				4						0.4
Polygonum persicaria						3			3	0.7
Potentilla recta									4	0.4
Solidago canadensis	10	6	8		4			6	1	3.9
Verbascum thapsus							4			0.4
Veronica officianalis					.1					0.0
PLANT COVER	33	43	48	42	54	28	25	25	24	35.8
STANDING DEAD	5	10	4	1	5	3	0	0	0	3.1
LITTER	35	25	25	30	3	12	18	15	20	20.3
ROCK	6	5	3	10	5	20	15	35	8	11.9
BARE GROUND	21	17	20	17	33	37	42	25	48	28.9

Table A-5 Results of the quantitative quadrats for Plot 4 in percent plant cover by species.

Plot Number	4-1	4-2	4-3	4-4	4-5	ave.
TREES AND TALL SHRUBS						
Acer saccharum		.1				0.1
GRASSES AND GRASS-LIKE						
Festuca filiformis	1	1	1	8	5	3.2
Festuca rubra	6	2	2	2	1	2.6
Phleum pratense	10	6	4	3	2	5.0
FORBS						
Anaphalis mararitacea			5			1.0
Euthamia graminifolia			2			0.4
Potentilla recta				.1		0.1
Silene cf. nutans		3				0.6
Solidago canadensis		.1			1	0.2
Trifolium pratense			1		2	0.6
Verbascum thapsus				4	2	1.2
PLANT COVER	17	12	15	17	13	14.8
STANDING DEAD	1	2	2	1	1	1.4
LITTER	8	5	3	4	1	4.2
ROCK	50	60	65	50	60	57.0
BARE GROUND	24	21	15	28	25	22.6

Table A-6. Species present and estimation of total cover in Plot 5.

Plot Number	*5-1*
TREES AND TALL SHRUBS	
Populus tremuloides	t
Salix bebbiana	t
GRASSES AND GRASS-LIKE	
Agrostis capillaris	t
Agrostis gigantea	t
Festuca arundinacea	t
Festuca filiformis	t
Festuca rubra	t
Phleum pratense	t
Poa pratense	t
FORBS	
Euthamia graminifolia	t
Oenothera biennis	t
Potentilla recta	t
Trifolium pratense	t
Verbascum thapsus	t
PLANT COVER	5

t = trace

PHOTOGRAPHS

P-1. Comparison of Plot 1, revegetation testing program, Ruby Mountain Mine, 1997/98.

July 1997

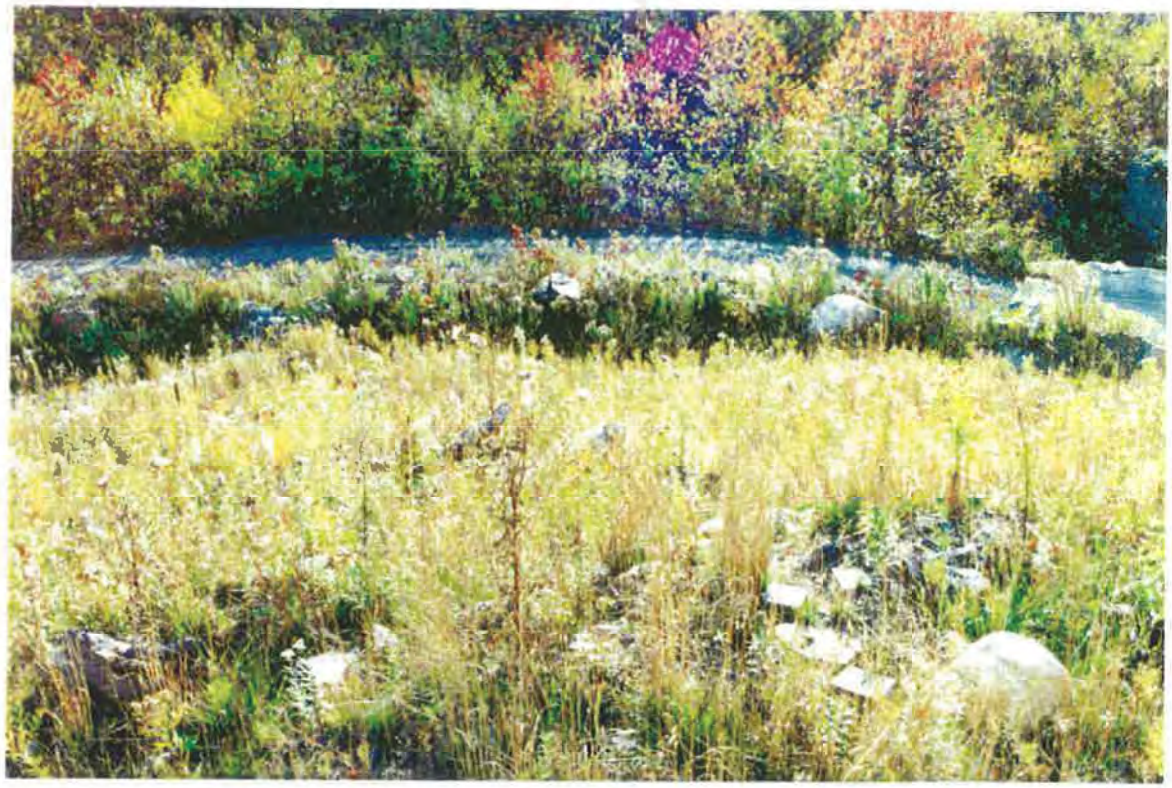
July 1998

P-2. Comparison of Plot 2, revegetation testing program, Ruby Mountain Mine, 1997/98.

July 1997

July 1998

P-3. Comparison of Plot 3, revegetation testing plots, Ruby Mountain Mine



October 1997

July 1998

P-4. Comparison of Plot 4, revegetation testing plots, Ruby Mountain Mine.

July 1997

July 1998

P-5. Comparison of Plot 5, revegetation testing plots, Ruby Mountain Mine.

July 1997

July 1998

Appendix E

Revegetation Testing Program Monitoring:

Summer/Fall 1999

FINAL REPORT
REVEGETATION TESTING PROGRAM
MONITORING: SUMMER/FALL, 1999

RUBY MOUNTAIN MINE
TAILING VALLEY TAILINGS FACILITY

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July 2000

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1.0 Introduction

A revegetation testing program was established on the tailings embankment of the Ruby Mountain Mine during fall, 1995. This program was required in Condition #7 of the Draft Permit #87-39B. This final monitoring report presents the Summer1999 quantitative survey results of the revegetation testing plots. These reports, the1995 setup document, the three1996, 97,and 98 monitoring reports, and this final report, will serve as the basis for the final monitoring report requirements.

The monitoring during this fourth growing season consisted of a qualitative evaluation, and photographic documentation of the test plot conditions and plant growth in the revegetation test plots. A detailed quantitative monitoring survey was conducted in summer 1998, and reported in 1999 (Bamberg Associates, 1998). A detailed quantitative was not considered necessary since little change had taken place over the past year. No maintenance or other testing activities were performed during the late1998 or entire 1999 growing seasons. This report includes a qualitative discussion of the test results for each plot type, photographic documentation, and comparisons of plant growth in most plots. We then provide recommendations for methods for reclaiming the tailings embankment and top at closure.

In the approved Reclamation Plan, due to the tailings disposal method, the site was to be treated as three separate zones or habitat types for reclamation methods. These are: the embankment top, the slopes of the embankment, and the impoundment area behind the embankment. Only the slopes of the embankment were available for testing due to ongoing operations. The impoundment area, at the end of tailings disposal operations, will be treated and managed as a wetland due to the fine substrate, flat surface and lack of complete drainage. Small ponds and marshy conditions would remain on these areas. The top of the embankments will be managed based on the results of the slope revegetation testing. It is expected that with time all three habitat types would revert back to a forest type through natural succession.

The final conclusions of this revegetation testing program was that the vegetative growth reflects the surface treatment and added substrates (Bamberg Associates 1995, 1997, and 1998). As expected Plot 2 that was graded into basins and covered with topsoil and forest humus soil maintained the highest plant cover and species diversity. Plot 3 - also graded into basins and plated with a mixture of soil, humus, and wood fragments- had similar results but less germination and growth. Plot 4 plated with run-of-mine rock had excellent stability but only a sparse cover of grasses and forbs, but would develop more plant growth over time. Plot 1 covered with crusher fines and graded had sparse vegetation growth and fairly good stability. Plot 5 was graded into rough basin with no soil cover added. This plot had average stability with some wind erosion with some growth of medium and large clumps of grasses at less than 5% cover. Unaltered tailings deposited to the east of the test plots, which acted as a control area, continued to have little plant germination or vegetation growth except on the

lower edges along a road and ditch. Transplanted pioneer tree species had poor survival of less than 10 %.

2.0 Monitoring Results

The results are presented for a comparison of general surface condition and vegetation parameters within the 5 test plots. This is followed by a comparison of plant species cover and diversity for each treatment area. Density of trees and shrubs has been measured at low amounts, and was not considered significant at the time the tests were concluded. Three series of photographs of the test plots are presented: one set taken at initial setup in 1995, a second set in July 1998, and the last set in Fall 1999.

2.1 Summary of Revegetation Test Plot Set Up and Monitoring

The following is a brief discussion of test plots as set up and completed on October 9 to 14, 1995 (see Bamberg Associates 1995). This set-up was used in the report as a basis for the final qualitative and quantitative evaluations. A portion of the tailings embankment on the southwest side of the present embankment was available and used for the revegetation testing plots. Five irregular shaped, linear plots were oriented downslope along the southwest side of the tailing embankment in an area permanently set aside for this revegetation program.

Soil and substrate materials used on site were available materials, soils and organic matter. These included 1) crusher fines and rock refuse, 2) stockpiled soil, 3) forest humus, 4) run-of-mine rock, 5) wood blocks and sawdust, and a mixture of 6) aged soil/rock/wood muck from former clearing. The three sources of seed used were 1) two commercial mixes of grass seed, 2) seeds contained in the stockpiled soil, and 3) seed contained in the forest surface humus applied to the plots. Trees transplanted into portions of some plots were pioneer species of trees (birch, dogwood, pople, etc.) taken from the humus on the forest floor along mine site roads, and balsam fir seedlings obtained from a disturbed area on the edge of a reservoir at the Gore Mountain property.

The hummocky, incomplete drainage pattern surfaces of the forest observed in the vicinity were simulated with rough grading. These methods included: 1) grading to form irregular basins and berms, 2) forming basins that collect surface water and wind-blown seeds and soil, 3) adding coarse rock materials to enhance surface roughness for wind and water erosion control, and 4) leaving surfaces rough to help maintain a more even seed coverage and germination. Fine grading was not necessary. The surface of each plot had depressions and hummocks formed by grading before application of the treatment materials. After grading, the plots received surface dressings, topsoiling substrates, fertilizer, and seed.

The following is a brief description of the five revegetation test plots established in 1995:

Plot 1 0.3 acres; rough graded; spread 200 cubic yards of crusher fines and rock over entire plot; seeded with grass and fertilized over entire plot; upper one-third (30 feet) of slope

spread with some forest humus and transplanted with balsam fir seedlings (57 seedlings in 16 clumps),

Plot 2 0.4 acres; rough graded; spread 420 cubic yards of topsoil over entire plot; spread a layer of forest humus over upper one-third (30 feet) of slope; seeded with grass and fertilized on 20 feet of upper edge; transplanted with balsam fir seedlings (52 seedlings in 21 clumps) and some clumps of beech and maple,

Plot 3 0.4 acres; rough graded; spread with wood products (220 cubic yards) and soil/rock/wood mix (220 cubic yards) over entire plot; spread forest humus along top 30 feet; seeded with grass and fertilized along 20 feet of upper edge; transplanted balsam fir seedlings along upper edge (28 seedlings in 8 clumps),

Plot 4 0.4 acres; spread with run-of-mine rock (850 cubic yards) to an average depth of 16 inches; seeded with grass and fertilized, and

Plot 5 0.4 acres; graded into catchment basins; seeded with grass and fertilized. Plot 5 did not receive any material on top of the sandy embankment tailings substrate. The intention of this plot was to test the feasibility of revegetating the existing sandy embankment material with only added amendments and seed.

2.2 General Discussion of Results

The plot conditions were again evaluated for general surface conditions and appearance and photographed during the 1999 growing season for visual comparison. Previous reports present the test plots as constructed and the results of the 1996, 1997 and 1998 monitoring (Bamberg Associates: January 1997, March 1998, and July 1998). The present monitoring was for a final comparison of visual appearance and growth.

Weather conditions since the plots were established in mid-October, 1995, have affected plot conditions. Weather patterns for 1995/96 were typical winter with abundant rains in October and a first freeze by late October. There was a late, wet spring in 1996 followed by normal rainfall. Weather in 1997 was normal with no unusual events. The early summer of 1998 was again very wet and cool, so that plant growth was slow. Recent weather sequence and patterns have not affected the revegetation growth, and germination and survival have somewhat stabilized. Transplant survival has continued to slowly decline, but no specific causes could be determined. It is assumed that soil and substrate conditions are too skeletal and immature for good tree establishment and survival.

2.3. Monitoring Survey Results in 1998

In 1998 the plot with the best overall performance in this short time period was Plot 2, plated with topsoil and forest humus. In this plot vegetation growth and survival were good with the effects of the extremely rainy weather. Plots 3 and 4 had excellent stability, but poor germination and growth. Plot 1 had poor vegetation parameters and fairly good stability. Plot 5 had average stability with some wind erosion. In this plot there was sparse plant germination and growth on the graded but unaltered tailings, with some germination and

growth of grasses. Unaltered tailings deposited to the east of the test plots, which acted as an experimental control, had no plant germination or vegetation growth. The conditions of the plots in 1998 were:

Plot 1 - Fairly sparse growth with estimated 20.6% vegetation cover. Some grasses and forbs with a few shrubs and berry bushes, one 8-foot striped maple tree, and 4 surviving balsam fir. Some erosion has continued, but it is not significant.

Plot 2 - Significant growth with a variety of species, measured 57.3% plant cover. Mostly grasses with weeds and shrubs. Some berry bushes and trees including a 3-foot maple and several 1 to 2 foot "pin cherry" samplings. There are two surviving balsam fir, and there is little evidence of erosion.

Plot 3 - Sparse to moderate growth with some overlap form Plot 2, estimated 35-45% plant cover. Much higher percentage of clover. Some grasses, weeds, and berries between 1 and 2 feet high. A few surviving balsam firs though not vigorous. Little evidence of erosion.

Plot 4 - Sparse growth of grasses only, estimated 20-30% plant cover. No vigorous growth with grasses only a few inches in height. Some minor erosion has occurred.

Plot 5 - Very sparse growth. Less than 5% plant cover, and almost all of it in the dendritic hollows and on the inward slope of the hollows. Mostly grasses, though individual plants are large and show more vigor than in Plot 4. Some wind erosion has taken place, but not recently. Plant growth was concentrated in the lower left-hand corner in an obvious diagonal line from upper left to lower right in the direction of prevailing winds.

The differences between the plots may not be as evident after several years of vegetative growth and maturation of plants. Plots 4 and 5 would evidently take a longer time for a dense mature vegetation to occur. In revegetation test plots in drier climates, the rougher substrates, such as the run-of-mine rock, weathers into decent plant growth media. These weathered substrates after several years eventually support good stands of vegetation after plant communities have matured. The survival of transplanted balsam fir seedlings in Plots 1, 2, and 3 averaged about 25% in the 1996 season. Very few of these fir seedlings survived into the 1999 season. It is questionable whether transplanting fir seedlings into this sandy substrate is worth the effort.

3.0 Photographic Time Comparisons and Documentation

The pages following the text are companion photographs showing the plots: 1) after initial setup in October 1995, again 2) in October 1998, and then 3) a final set of photographs taken in 1999.

It is evident from the photographs that the test plot results within the four-year frame of the revegetation testing program are related to treatment. Plot 2 with soil and forest humus had the best germination and vegetative growth during this test period. Plot 5, which was simply modified by grading into rough catchment basins, and then seeded with grass, had spotty and sparse grass germination and growth, but good stability. This treatment may be appropriate

Appendix F

Second Notice of Incomplete Permit Application (2023)

New York State Adirondack Park Agency

KATHY HOCHUL
Governor

BARBARA RICE
Executive Director

SECOND NOTICE OF INCOMPLETE PERMIT APPLICATION

APA Project No. 2021-0245

Project Sponsor:	**Authorized Representative:**
Barton Mines, LLC c/o Mario Cangemi PO Box 400, North Creek, NY 12853	Bernard Melewski, Esq. 32 Fryer Lane, Altamont, NY 12009 bmelewski@gmail.com

Date Permit Application Received: October 15, 2021
Type of Project: amendment to a previously-approved mineral extraction
Location of Project: Town of Johnsburg, Warren County
Land Use Area: Industrial Use, Resource Management, Rural Use
Tax Map Nos.: 29.-1-5, 4, and 1; 46.-1-63, 62, 61, 57.1 and 58
Town of Indian Lake, Hamilton County
Land Use Area: Industrial Use
Tax Map No.: 67.000-1-39

Dear Bernard Melewski, Esq.:

Thank you for the recent submissions in relation to APA Project No. 2021-0245, received by the Agency on May 4, 2023 and June 6, 2023. The submissions provided important information in response to the Agency's November 16, 2021 Notice of Incomplete Permit Application (NIPA).

Based upon staff review of your proposal and the information submitted in response to the Agency's November 16, 2021 NIPA, the following questions must be addressed in order to review your application. Also, as outlined below, some of the information requested in the November 16, 2021 NIPA was not submitted and is required to review the application.

Agency Permits 78-401, 79-358, 79-174 allow for the current mineral extraction and industrial use on the project site. Review of your proposal and Agency requirements included in prior permits indicate that the following proposals require Agency review:

- Expansion of the residual mineral (RM) pile from 73 acres to 85 acres in size (P87-39B);
- Lowering of the quarry floor depth from 1860 feet above mean sea level (amsl) to 1,720 feet (P78-401);
- Increasing hours of on-site trucking from 7:00am-3:30pm M-F to 7:00am-4:30pm (P79-358):
- Increased trucking from the project site from 5 trips per day to a maximum of 16 trips per day (P79-358): and
- Any changes to water withdrawal from Thirteenth Brook (P2019-0136).

You will receive a notice in writing informing you when staff has received the information necessary to complete the application. At the time the application is deemed complete, the required time period for Agency action on your proposed project will begin.

The proposal may not be undertaken until a permit has been issued by the Agency. "Undertake" means any commencement of a material disturbance of land preparatory to the proposed project, including but not limited to road construction, grading, installation of utilities, excavation, clearing of building sites, or other landscaping, or in the case of subdivision, the conveyance of any lots.

If you have any questions regarding this notice or the project review process, please contact APA Environmental Program Specialist 1 (EPS1) **Corrie Magee**, who is assigned to review your project.

June 12, 2023
Date

David J. Plante, AIC CEP
Deputy Director, Regulatory Programs

Attachment: List of Requested Information, Local Government Notice Form

REQUESTED INFORMATION

APA Project No. 2021-0245

Please submit your response to this notice by e-mail to corrie.magee@apa.ny.gov
All application submissions should be in PDF or similar format and be legible.
Electronic copies of plans must be fully scalable.

1. **Site Plans, Maps & Figures:** Why do the submitted maps and site plans contain the disclaimer "not to be used for engineering purposes"?

The submissions received on May 4, 2023 and June 6, 2023 indicate that edits have been made to various site plans, maps and figures since the original October 15, 2021 application submission. However, the site plans and figures have been revised but appear to have all been backdated to February 6, 2020, which is older than the original application materials, with no revision dates indicated, making it difficult to discern which figures or maps have been revised. Please update all maps and figures to indicate the most recent revision date.

As requested in Item 6 of the November 16, 2021 NIPA, please revise all maps, plans and narratives to indicate the location and volume of the existing topsoil stockpiles and the proposed estimated volume, footprint, and location of the topsoil stockpiles in each of the proposed phases.

The maps and plans have been revised to indicate a 100-foot vegetated buffer from wetlands, however at the scale of 1" = 200' the Life of Mine (LOM) boundary

is approximately 20 feet wide, and therefore the LOM appears to be approximately 80 feet from wetlands. As requested in the November 16, 2021 NIPA, please revise all maps and plans to maintain a 100-foot vegetative buffer from the Finger Valley Wetland.

Figure 2 titled “Life of Mine Phases” within the narrative titled “Mine Permit Amendment and Modification” indicates that Residual Mineral (RM) pile lateral expansion began in year 2020. Please revise this figure and all references to it to clearly indicate that RM pile expansion beyond what is currently permitted by Agency Permit 87-39B has not been authorized and Phase 1 has not commenced.

2. **RM Geotechnical Report:** The “Tailings Storage Facility Expansion Geotechnical Assessment of Proposed Permit Modification Expansion” report (Appendix T) states that the total tailings throughput is approximately 450,000 dry tons per year. Assuming the density of RM material is similar to dry sand at approximately 100 lbs per CF, the response narrative statement of an annual RM production rate of 250,000 CY results in approximately 337,500 tons of RM. Please explain this production rate discrepancy.

   The Appendix T report also states that numerous assumptions were made in the geotechnical assessment, and due to the nature of the facility and the lack of engineered fill placement throughout the impoundment, additional geotechnical evaluations will be required at regular intervals to confirm that conditions remain as proposed and to assess whether revisions to the RM pile geometry or construction procedures are necessary. As recommended by Appendix T, please provide a schedule for site investigations and routine geotechnical evaluations for the RM pile.

   Also, the analyses presented in the Appendix T geotechnical assessment do not consider a post-construction case, which would include normal-stress induced pore pressure generation in fine-grained materials, such as the tailings slimes. This assumption will need to be confirmed throughout the phases in areas where tailings sands are to be placed overtop of existing slimes. Based on this, the proposed mine expansion, specifically the RM tailings pile footprint, height, configuration, and construction methods are subject to change over the entire proposed estimated quarry life of 75 years. Therefore, it is unclear as to whether the Agency can authorize the expansion of the geotechnically complex RM pile at this time when it is subject to change during construction and those unanticipated changes have not been evaluated for potential undue environmental impacts.

3. **Residual Mineral Storage:** The submissions received by the Agency on May 4, 2023 and June 6, 2023 do not evaluate RM pile configuration alternatives that include: expansion of the pile to the east and northeast, re-location of the access road for increased low-elevation RM storage, and storage of RM in the area of the processing mill once it is removed at the end of Phase 4. Please consider these alternatives as a means to reduce noise and visual impacts.

Why is the Phase 4 quarry area not proposed to be filled in with coarse or fine-grained RM? It appears as if the final height of the RM pile could be reduced if the Phase 4 quarry area was utilized for RM storage.

As requested in the November 16, 2021 NIPA, please describe and depict on site plans how the fine-grained RM will be transported from the settling pond near the top of the RM pile to the proposed containment cells within the quarry. Please revise site plans to include the proposed locations of all equipment associated with transporting the fine-grained RM, including all decanting/dewatering equipment (cyclones, pumps, hoses, etc.) If trucking onsite is proposed, please calculate the proposed number of truck trips associated with transporting the fine-grained RM between the settling pond and the quarry. Please quantify and assess the noise and visual impacts of transport method of the fine-grained RM. If the conveyance method for the fine-grained RM is still undetermined at this time, then the associated potential noise and visual impacts of the proposal cannot be fully assessed.

Section 3.4 of the narrative, titled “Mine Permit Amendment and Modification,” states that “APA Permit 87-39B allows for a RM engineered pile lateral footprint of 73.7 acres…” Please revise the narrative to indicate the correctly permitted 73 acres.

Section 4.3.2 of the narrative, titled “Mine Permit Amendment and Modification,” states that “approximately 10% of the RM generated is fine grained and would require significant processing and potentially chemical addition to transform it into a state where it would be loaded into a truck for transport.” However, the submitted response to the November 16, 2021 NIPA Item 6 regarding alternatives analysis states that “fine grained RM could be decanted through gravitational and mechanical means to improve internal strength to a point whereby trucking is possible, which is time consuming and more expensive method that may occasionally be employed when resources permit.” Please reconcile how trucking fine-grained material would be possible occasionally for onsite disposal but not for offsite disposal.

The submissions received by the Agency on May 4, 2023 and June 6, 2023 state that the there are no plans for increased production, and that the estimated production is to remain at approximately 250,000 CY per year of RM. However, the past, current and project annual proposed production amounts of garnet are not specified. Please provide this information. P87-39B FOF No. 8(a) required that single disposal area have a final 73-acre size, peak elevation of 2275 feet amsl, 5.9 million CY volume capacity, and estimated life of 35 years or 2033. The final footprint area of 85 acres is only described in the Visual Impact Assessment (VIA). Please provide a table of the four proposed mining phases that includes: time start, duration, RM pile height, RM pile footprint, RM pile volume, fine-grained RM disposal activities, and concurrent and final reclamation activities, and revise other application materials as needed for consistency.

4. **Revegetation Testing Program:** The application materials state that the RM pile will be reclaimed in a manner consistent with the reports titled “Revegetation Testing Program Monitoring: Summer 1998” and “Revegetation Test Program

Monitoring, Summer/Fall 1999." The complete documents were not received in the November 16, 2021 NIPA response received by the Agency on May 4, 2023, as the last page of the document ends in an incomplete sentence. Please send the complete reports.

If the RM pile will be reclaimed in a manner consistent with the abovementioned reports, what specific parameters and which of the five plot methods will reclamation be consistent with? The application materials do not articulate what aspects of the revegetation testing program would be implemented and the reports do not provide concrete recommendations.

It was discussed by Barton staff at the site visit that the RM pile revegetation test plot area appears to have been successful, however aside from visual observation, there is no data on the success of these test plots since 1999, where no test plot achieved greater than 57.3% vegetative cover. There is no data to support the notion that the species planted in the revegetation testing program are the species that comprise the test plot area today, what the coverage percentage is, and what percentage would be considered successful. Please revise the application materials to provide an updated assessment of the revegetation test plot area, to report what species, percent cover, and other conditions currently exist in each test plot. Please provide an updated RM pile reclamation plan that describes what specific reclamation methods and species will be utilized in the final reclamation of the entire RM pile area, and what percentage cover after what time frame would be considered successful reclamation, versus what would require additional reclamation activities.

5. **Visibility:** The Visual Impact Analysis (VIA) narrative describes that the final RM pile shape will mimic local topography to mitigate visual impacts, but the provided RM pile visual renderings depict a flat-topped feature. Please explain.

The VIA does not address the visual impact of industrial machinery, conveyors, vehicles etc. at or near the top of the RM pile prior to project completion. Please revise the VIA to account for this element of visibility.

As described in Item 10 if the November 16, 2021 NIPA, the proposed RM pile expansion will result in a face view area increase of approximately 4.13 acres above the currently permitted 2,275-foot RM pile elevation, as viewed from the south or north. This face view estimate area does not account for the side slope triangular areas on the east or west sides or the proposed lateral expansion below 2,275 feet, beyond the 73-acre currently permitted area. Please revise the VIA to assess the potential impacts to off-site locations resulting from the increased surface area of the RM pile described above.

Visual analysis and simulation photos were taken in dusk or hazy conditions, which do not provide an accurate representation of visual impacts. Please revise the VIA to include visual analysis and simulation photos that are taken during more appropriate conditions for a proper assessment.

It is not clear what percentage of vegetation cover was used in the visual simulations. As described in #3 above, no test plot achieved greater than 53.7% cover in the 1999 report, and there is no data to support anything greater than that exists on site today, and if what exists today can be attributed to the test plot activities. Please revise the visual simulations to accurately represent data-supported coverage conditions.

Several of the digital simulations provided in the submission received by the Agency on May 4, 2023 make assumptions that intervening vegetative cover between visual receptors and the project site will provide sufficient screening. Please provide detailed simulations illustrating vegetative cover over time to determine to the extent of vegetative screening from each digitally-modeled location.

As requested in the November 16, 2021 NIPA, please assess the potential environmental impacts associated with the proposed Phase 4 removal of the 2,100-foot forested ridgeline to an elevation of 1,950 feet, including off-site visual impacts. The current proposal would increase visibility of the quarry area by an area approximately 150 feet tall by 1,400 feet long, totaling 4.82 acres of potential visibility increase. Please revise the VIA to include off-site visual impacts of the proposed quarry expansion, including at off-site visual receptors such as: Gore Mountain, Thirteenth Lake (shoreline and on-water), Thirteenth Lake Road, Harvey Road, Old Farm Road. Please revise the application materials to further mitigate potential visual impacts of the quarry expansion beyond simply delaying this activity until Phase 4.

6. **Reclamation:** Please confirm that all structures, stationary equipment, mobile equipment, storage tanks, etc. will be removed from the site upon cessation of mining, provide a timeline for removal, and describe the method for disposal of materials.

As requested in the November 16, 2021 NIPA, please revise the proposed reclamation cross-sections to show and differentiate between the proposed fine-grained and now-proposed coarse-grained RM material depths within the excavation area.

Section 4.3.2 of the narrative, titled “Mine Permit Amendment and Modification,” states that containment cells are routinely used in mining operations across the country for storage of fine-grained RM. Please provide examples of mineral extraction operations that utilize these containment cells for both fine grained and coarse-grained materials as proposed, and provide their associated regulatory approved mine land use plans and reclamation plans for reference.

At the June 1, 2023 site visit, Barton staff described that Barton had recently purchased a hydro-seeder. Please describe how hydro-seeding will be incorporated into ongoing and final reclamation of the RM pile and revise application materials.

Please describe the binder/dust suppressant product that is proposed to be applied annually to the RM pile, including product composition, safety information, potential impacts to wildlife, method, timing, and rate of application.

Please also revise the reclamation plan as appropriate for the RM pile to incorporate the use of this binder/dust suppressant product.

The SWPPP assumes only a 50% RM pile revegetation at final reclamation, and only with grasses. It does not include or evaluate the proposed binder/dust suppressant product to be applied to the RM pile and its effect on the runoff in the drainage areas associated with the RM pile. Please revise.

Please remove the use of hay mulch from all reclamation plans.

7. **RM Pile Growth Rate & Phasing:** Section 4.4.2 states that "No changes are proposed for operations and the production rates of rock crushing and processing," but then Section 4.5 states that "Changes to sales will impact the rate of mining and rate of growth of the RM storage piles and the volume of trucks needed to meet the market demand" and that "garnet produced here is a global commodity, therefore production rates can be impacted by operations, sales and new market developments well outside of any influence of Barton." Please reconcile these conflicting statements to provide a better understanding of how the phased proposal will proceed.

   The submissions received by the Agency on May 4, 2023 and June 6, 2023 indicate that the mine expansion proposal is estimated to be fully reclaimed approximately two years after mining is complete, or in year 2098. Agency Permit 87-39B FOF No. 8(a) required that single disposal area have a final 73-acre size, peak elevation of 2275 feet amsl, 5.9 million CY volume capacity, and estimated life of 35 years or 2033. The above-referenced submissions indicate that the current RM pile area currently has a footprint of 73.7-acres, a peak elevation of 2275 feet amsl (as witnessed during our June 1, 2023 site visit) or taller as shown on the provided topographic maps, and the current permitted "quarry functional life is estimated to be 6 years, primarily related to storage of RM materials." As the estimated functional life of the P87-39B permitted mine is near or past permitted threshold limits approximately ahead of the 33-year functional quarry life estimate, how much limit of error is there in the proposed projected functional quarry life estimate of 75 years or until year 2098? Section 4.5 of the narrative, titled "Mine Permit Amendment and Modification" states that the ore variability and quality affect the rate of mining and that the "poorer quality ore accelerates the rate of growth of the RM storage engineered piles and better-quality ore decreases the rate of growth of the RM storage engineered piles." Please explain how this ore variability and quality affect the rate of mining and thereby the associated estimated functional quarry life and RM pile dimensions. The narrative and response to comments state that the rate of production will not increase. Please explain how ore variability and quality affects the growth rate of the RM pile but the production rates are to remain the same at an estimated RM production of 250,000 CY per year with approximately 25,000 CY per year of coarse-grained RM proposed to be trucked off site.

8. **Noise:** The revised sound study received as Appendix P of the submission received by the Agency on May 4, 2023 recorded ambient conditions while the processing mill

was in operation. However, as witnessed at the June 1, 2023 site visit, the processing mill was shut down on June 1, 2023. Barton staff discussed that the processing mill shuts down routinely for approximately two days per month for maintenance and/or repairs, and the crusher shuts down weekly for maintenance. As requested in the November 16, 2021 NIPA, please revise the sound study to obtain noise measurements during ambient conditions (without the mill, crusher, RM pile cyclone, excavation activities, equipment or other noise generating activities) in order to revise the noise assessment. Please note that, as the corrected ambient noise conditions will change the noise assessment, the Agency may have additional comments or questions following receipt of the revised sound study.

As the ambient noise conditions are most likely quieter than the sound study presented (with the mill in operation), additional noise mitigation measures may need to be implemented to the extent feasible on site to prevent adverse noise impacts. Please reconsider the use of berms, noise barriers and other noise mitigation measures along with relocating expansion and operations further from residential receptors. Please quantify all existing and proposed noise mitigation measures, including the sound dampening blanket on the rock hammer, in a revised noise assessment. In addition, the provided noise assessment did not mention or evaluate the proposed hydro-seeder use during concurrent reclamation of the RM pile. Please add the hydro-seeder and binder/dust suppressant product applicator to a revised noise assessment. Please also specify the time duration of proposed greatest increases in noise generation on site, i.e., how many months instead of just "months." In addition, the provided noise assessment does not evaluate the recorded sound levels and estimated future sound levels against changes in environmental conditions, such as changes in topography, temperature, wind, humidity, atmospheric inversions, and vegetation including leaf off conditions. Please include in a revised noise assessment.

9. **Trucking:** Agency Permit 79-358 authorized garnet hauling to the Hudson River Plant via Thirteenth Lake Road from 7:00am to 10:00pm. The current proposal includes a reduction in these trucking hours to 7:00am to 5:00pm. Please confirm if this also means limiting trucking of RM to these hours.

The Traffic Impact Assessment prepared by Creighton Manning, dated March 17, 2021 (Appendix Q) states that the traffic assessment was performed "for the proposed increase in production of the Barton Mine located on Ruby Mountain Road in the Town of Johnsburg. The purpose of this evaluation is to identify potential transportation issues associated with the increased production…" Additionally, Section 2.0, titled "Traffic Forecasts", states that "Trips associated with the increase of material production at the Barton Mine were distributed at the study intersection based on the location of the Hudson River Plant and anticipated travel patterns for the additional truckloads." The response narrative repeatedly states that Barton is not proposing to increase production of garnet but to improve production, yet the provided traffic study is based upon increased production. Please clarify.

10. **Wetlands and Water Usage:** A map showing photo point locations and orientation were provided, but a map showing the locations of the data points referenced on the data forms in the Wetland and Stream Delineation report were not provided as requested in Item 3 of the November 16, 2021 NIPA. Please provide this revised map.

    Condition 6 of Agency Permit 2019-0136 authorized water withdrawal from Thirteenth Brook at a maximum rate of 68 gallons per minute (gpm), and requires that "any change to the location, dimensions, or other aspect of the water intake system shall require a new or amended permit or prior written Agency authorization." Page 5 of the response to comment document, received by the Agency on May 4, 2023, states that "…Utilizing freshwater from the proposed TW-04 well will be in lieu of water that is currently bring withdrawn from Thirteenth Brook. TW-04 will be the primary water withdrawal source and Thirteenth Brook will be used to supplement the freshwater needs." As requested in the November 16, 2021 NIPA, please clarify how water withdrawal from Thirteenth Brook would be decreased when the total combined freshwater demand of 110 gpm appears to include the existing maximum 68 gpm from Thirteenth Brook and the proposed 42 gpm from proposed well TW-04. Please explain how increasing water withdrawal does not result in increased and improved production rates. Please describe any proposed change in withdrawal rate from Thirteenth Brook, its proposed change from a primary to a secondary water source and assess whether it is possible to eliminate water withdrawal from Thirteenth Brook and its associated wetland impacts.

11. **Groundwater:** Please support the assertions made in the response comment document received by the Agency on May 4, 2023 regarding absence of groundwater in the quarry by providing the supplemental wells' (Shop Well, Raft Pond Well, and Brook Well) monitoring data summary reports and well logs.

12. **Lighting:** Is there any existing or proposed lighting associated with expanding, accessing, maintaining, or reclaiming the RM pile, or transporting RM material from the pile to the quarry? If so, please describe the timing of such lighting, and incorporate into the VIA.

    Please provide information regarding any lighting associated with the water withdrawal from Thirteenth Brook as authorized in Agency Permit 2019-0136.

13. **Other Regulatory Approvals:** The Agency has received a completed Local Government Notice Form (LGNF) from the Town of Indian Lake. Please submit a completed LGNF from the Town of Johnsburg.

    To provide for a coordinated review, please copy the Agency on all correspondence, comments and approvals from NYSDEC.

Enc: LGNF

cc: Ruby Mountain Holdings, LLC – mcangemi@barton.com
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Appendix G

Photo Log (2023)

Photo 1: T1-2

Photo 2: T1-3

Photo 3: T2-8

Photo 4: T4-8

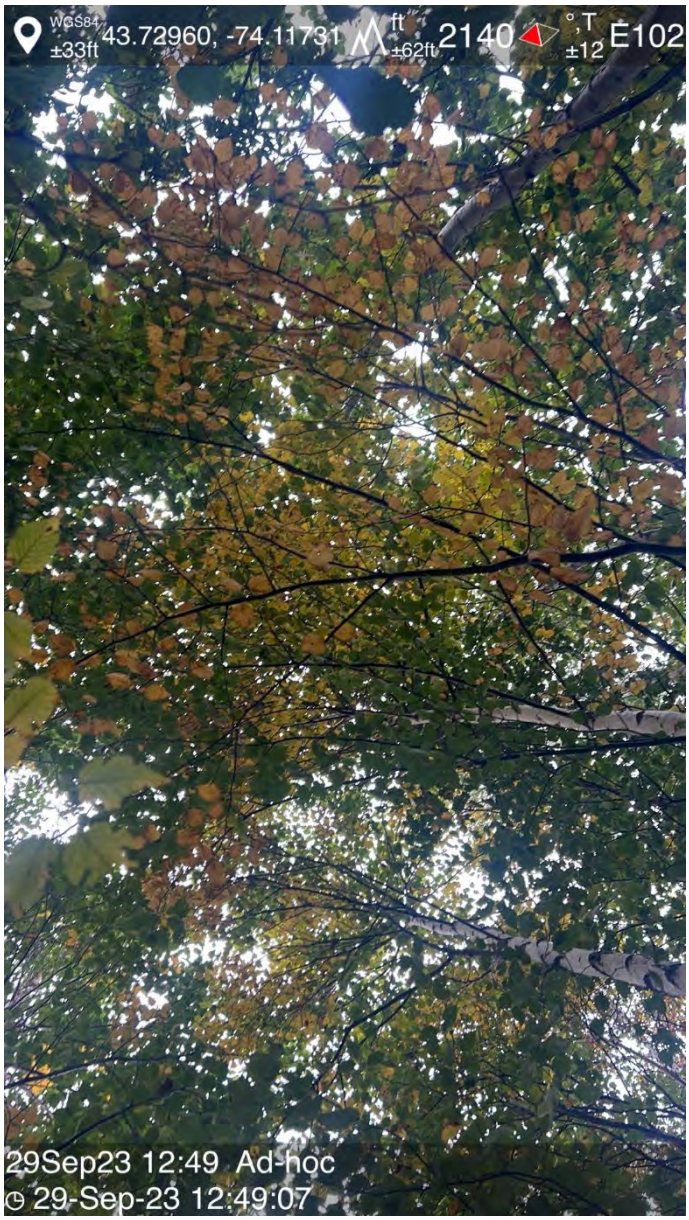

Photo 5: Canopy Cover at T3-8

Photo 6: T5-2

Photo 7: T5-8

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12