FREEPORT-McMoRan

Freeport-McMoRan Chino Mines Company
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June 6, 2017

Certified Mail #70160750000113393929
Return Receipt Requested

David Ennis
Energy, Minerals and Natural Resources Department
Mining and Minerals Division
Mining Act Reclamation Program
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Certified Mail #70160750000113393912
Return Receipt Requested

Brad Reid
New Mexico Environmental Department
Ground Water Quality Bureau
Mining and Environmental Compliance Sections
1190 South St. Francis Drive
Santa Fe, New Mexico 87502

Dear Messrs Ennis and Reid:

Re: Freeport-McMoRan, Chino Mines Company -
Permits GR009RE and DP-1340 Lampbright Rubio Peak Test Plot Work Plan

Find enclosed the Freeport-McMoRan Chino Mines Company Rubio Peak formation cover, erosion and revegetation test plot study work plan. The Mining and Minerals Division and the Ground Water Bureau of the New Mexico Environment Department will each receive two hard copies of this report.

Please contact Ms. Rita Lloyd-Mills at (575) 912-5778 if you have questions regarding this plan.

Sincerely,

Lynn A. Lande

Lynn A. Lande, Chief Environmental Engineer

LAL:rlm
20170605-001

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Lampbright Rubio Peak Formation

Test Plot Work Plan

Prepared by

Freeport-McMoRan Chino Mines Company
99 Santa Rita Mine Road
Vanadium, New Mexico 88023

Distribution:
2 Copies – Mining and Minerals Division
2 Copies – New Mexico Environment Department

June 6, 2017

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1.0 Introduction

Freeport-McMoRan Chino Mines Company (Chino) is evaluating reclamation options with respect to meeting pertinent applicable requirements of the New Mexico Mining Act, the New Mexico Water Quality Control Act (WQA), and the Water Quality Control Commission (WQCC) Regulations. Chino is permitted, as an existing mine (Permit No. GR009RE) with the New Mexico Mining and Minerals Division (MMD). In 2006, the New Mexico Environment Department (NMED) issued Supplemental Discharge Permit DP-1340 (DP-1340) to regulate closure activities for the Chino Mine. As part of this process, sources of cover material that can be used in reclamation are being identified.

Chino identified an additional source for Tertiary volcanic (Rubio Peak Formation) cover material in the Lampbright Draw area. The materials were determined to meet the MMD physical and chemical soil suitability criteria and support vegetation based on preliminary demonstration plot data (Section 2). The MMD requested that Chino construct an additional test plot to assess vegetation response on direct hauled versus in-situ disturbed materials and to evaluate erosion on the 3:1 slopes. Thus, Chino proposes to construct a test plot near the Lampbright Stockpile (Figure 2) using Rubio Peak cover material to evaluate vegetation success and erosion rates.

2.0 Background

The Lampbright stockpiles will require substantial quantities of cover material for reclamation. The Lampbright stockpiles are located at a considerable long distance from the approved cover stockpiles. Hauling from these cover stockpiles to the Lampbright stockpiles would result in unnecessary costs and energy expenditures compared to local sources. In an effort to increase the efficiency of the reclamation process for the Lampbright stockpiles, Chino identified possible cover and riprap sources in this area (Figure 3). The Rubio Peak material is very similar to other cover materials currently approved for reclamation at New Mexico Operations with respect to soil texture. The use of the Rubio Peak materials was first proposed in the North Lambright Waste Rock Stockpile Closure Closeout Plan (CCP) submitted to the agencies in 2015.

In 2014, Chino collected five soil samples from the Rubio Peak cover material for chemical and physical analyses. Results from the analysis indicate a neutral pH ranging between 7.6. and 7.9. The cover materials are moderately coarse-textured, represented mainly by sandy loams.

Chino further investigated the suitability of the Rubio Peak cover material to support vegetation by constructing an in-situ demonstration plot in 2015. The plot was constructed by removing the upper 3 to 4 feet of soil and then ripping *in situ* friable material, immediately below, to emulate the conditions of disturbed materials. Chino understands that the MMD questions whether this type of disturbance is an adequate analog to represent the conditions that would exist if the materials were excavated, hauled, and placed on a slope. The slope gradient of the demonstration plot was 5:1, which is less than the typical 3:1 slopes specified in the CCP. The lower slope gradient on the demonstration was an area of concern for the MMD.

Based on the first year response, the vegetation on the demonstration plot is performing well. An As-Built for the demonstration plot was prepared and submitted to the MMD and NMED as part of Chino's response to MMD's comments on the North Lampbright Stockpile CCP application. In recent discussions, the MMD conditionally approved the Rubio Peak cover material pending results from a test plot study. The MMD requested that Chino construct a test plot by excavating and placing the cover material to evaluate vegetation success and erosion rates. This work plan is intended to satisfy this MMD request.

3.0 Objectives and Goals

The specific objectives and goals associated with the Lampbright Rubio Peak test plot are to evaluate vegetation success on direct hauled cover materials and erosion of the Rubio Peak Conglomerate cover material on a 3:1 slope. Vegetation performance and erosion rates will be the primary performance criteria that will be assessed.

4.0 Test plot construction

The test plot will be constructed using mine equipment. Construction will include site grading, cover placement, and revegetation. The approximately 100 ft. X 150 ft., (approximately half an acre) Lampbright Rubio Peak (LRP) test plot will be constructed by cut and fill to achieve a slope gradient of 3:1 with a slope length of 150ft. A minimum of three feet of cover material will then be placed on the graded area. Cover material will be end-dumped and then graded by bulldozers. Reclamation practices identified in the Chino CCP will be used to achieve revegetation of the test plots.

The test plot will be seeded using seeding practices approved in appendix C of Permit GR009RE. The site will be scarified on contour, prior to seeding. The test plot seed mix listed in Table 2.0 is consistent with the primary seed mix in appendix C of GR009RE Modification 08-02, except that cool-season grasses have been eliminated from the mix. Vegetation survey data collected from the Tyrone and Chino mines test plots and reclaimed areas indicate that cool-season grasses are generally lacking and do not meet the minimum cover levels specified in the success standards for this life-form. This statement is also true for the reference areas and the surrounding ecosystem. The viability of achieving the cool season grass requirement on the test plot and reclamation in this region is becoming increasingly unlikely based on the survey data referenced above. The inability of the cool season grasses to meet the vegetation success criteria set, will not affect the wildlife post mine land use. Erosion control mulch will be applied at a rate of 2 tons/ac.

5.0 Cover Material, Material Handling and Quality Control/Assurance

Cover material for the test plots will be excavated from a borrow area established within the Rubio Peak conglomerate identified in Figure 3.

Chino will follow the cover specifications outlined in the Quality Control-Standard Operation Procedure, Cover

material Hauling and Placement, West Stockpile test Plots plan submitted to the MMD and NMED on March 16, 2007. The rock fragment guidelines used for the West stockpile test plot are illustrated in Table 1.The cover is expected to have a rock fragment content not to exceed 70 percent on a whole (volumetric) soil basis.

Paste pH measurements will be made in the field prior to excavating the cover material. In addition to the quality control measures discuss, quality assurance steps will be taken for the cover material delivered to the test plots. Three test pits within the test plot area will be excavated, described, and sampled to document the textural characteristics of the cover. Laboratory tests will include soil texture, rock fragments, saturated paste pH and electrical conductivity.

TABLE 1

Cover Material Rock Fragment Guidelines - Chino Test Plots

Cover Material	* Total Rock Content	† Maximum Percentage Allowed			
		Gravel	Cobble	Stone	‡ Boulder
§ Reclamation Cover Material	≤ 70	70	30	10	< 1

* Percent by volume materials > 2 mm in diameter (i.e., retained on No. 10 sieve)

† USDA classification: gravel 2 mm to 3 inches, cobble 3 to 10 inches, stone 10 to 24 inches, boulder > 24 inches)

‡ Guideline applied on test plots

§ Current reclamation material staged at Upper South Stockpile

6.0 Monitoring and Reporting

Vegetation monitoring will be conducted at year three following seeding to evaluate vegetation establishment. Semi-quantitative vegetation monitoring will be conducted at years one and three following seeding to evaluate vegetation establishment. These surveys will be conducted to understand vegetation establishment, plant density and trajectory.

Erosion will be assessed using the Revised Universal Soil Loss Equation (Toy and Foster, 1998) given the anticipated duration of the program for the LRP (i.e., ≈3 years). The erosion modeling approach will be adopted because the erosionometer measurements conducted at other test plots are likely to be unrepresentative of the long-term conditions in the first several years during the vegetation establishment period. The erosion modeling will be conducted in year 3 based on existing vegetation and ground cover conditions and projected to the estimated cover conditions at year 12. The erosion modeling will be complemented with site-specific annual evaluations of erosion, such as, riling and pedestalling. The site-specific erosion monitoring will include photo documentation of the slope. Results of the vegetation and erosion monitoring will be reported in the test plot annual report.

7.0 Reference

Toy, T.J., and G. R. Foster. 1998. Guidelines for the use of the Revised Universal Soil Loss Equation (RUSLE v. 1.06) on mined lands, construction sites, and reclaimed lands. J.R. Galetovic (ed.) Office of Surface Mining, Denver, CO.

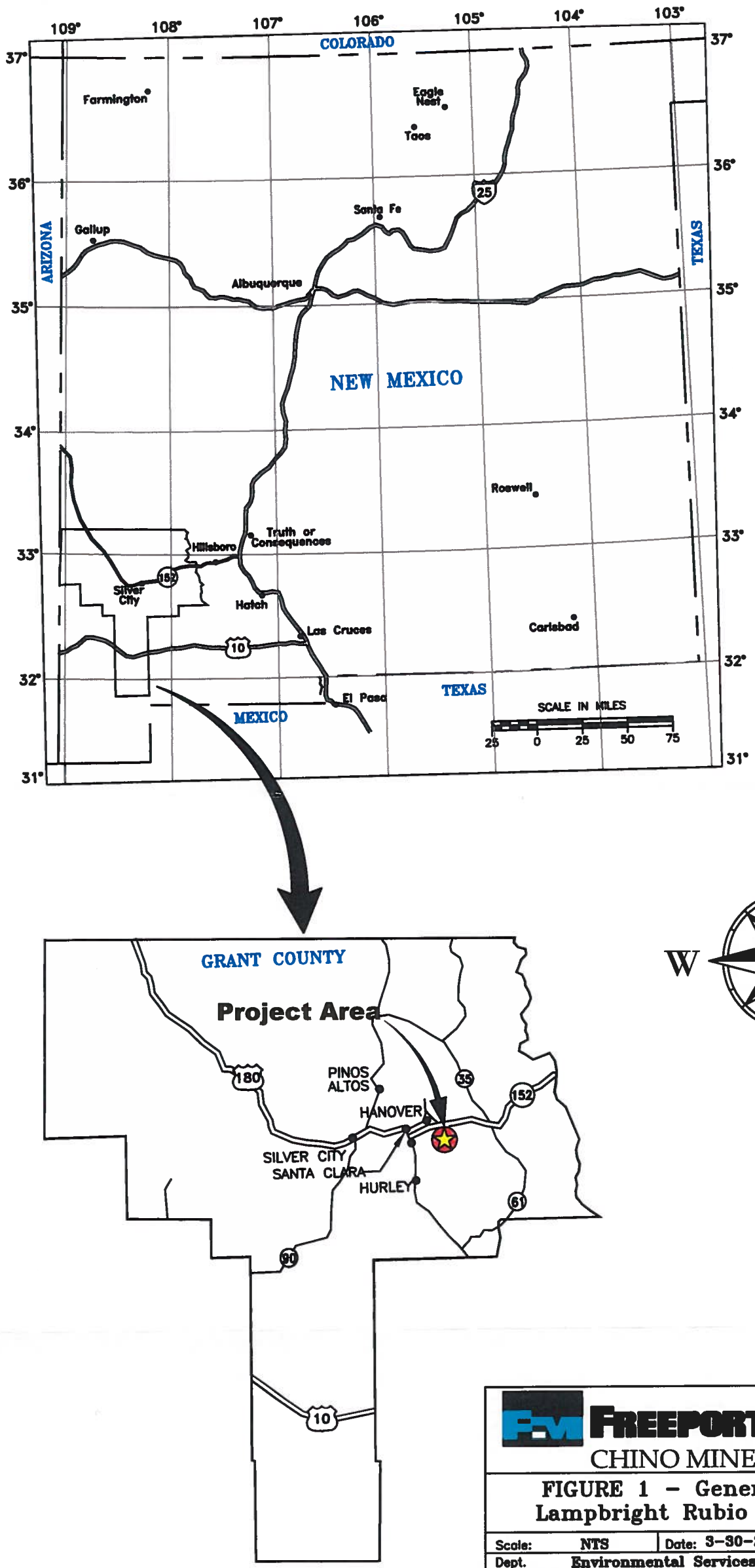

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FIGURE 1 – General Location of Lampbright Rubio Peak Test Plot

Scale: NTS	Date: 3-30-2017	Notes:
Dept. Environmental Services		
Drawn By: SMG	Checked By: RLM	

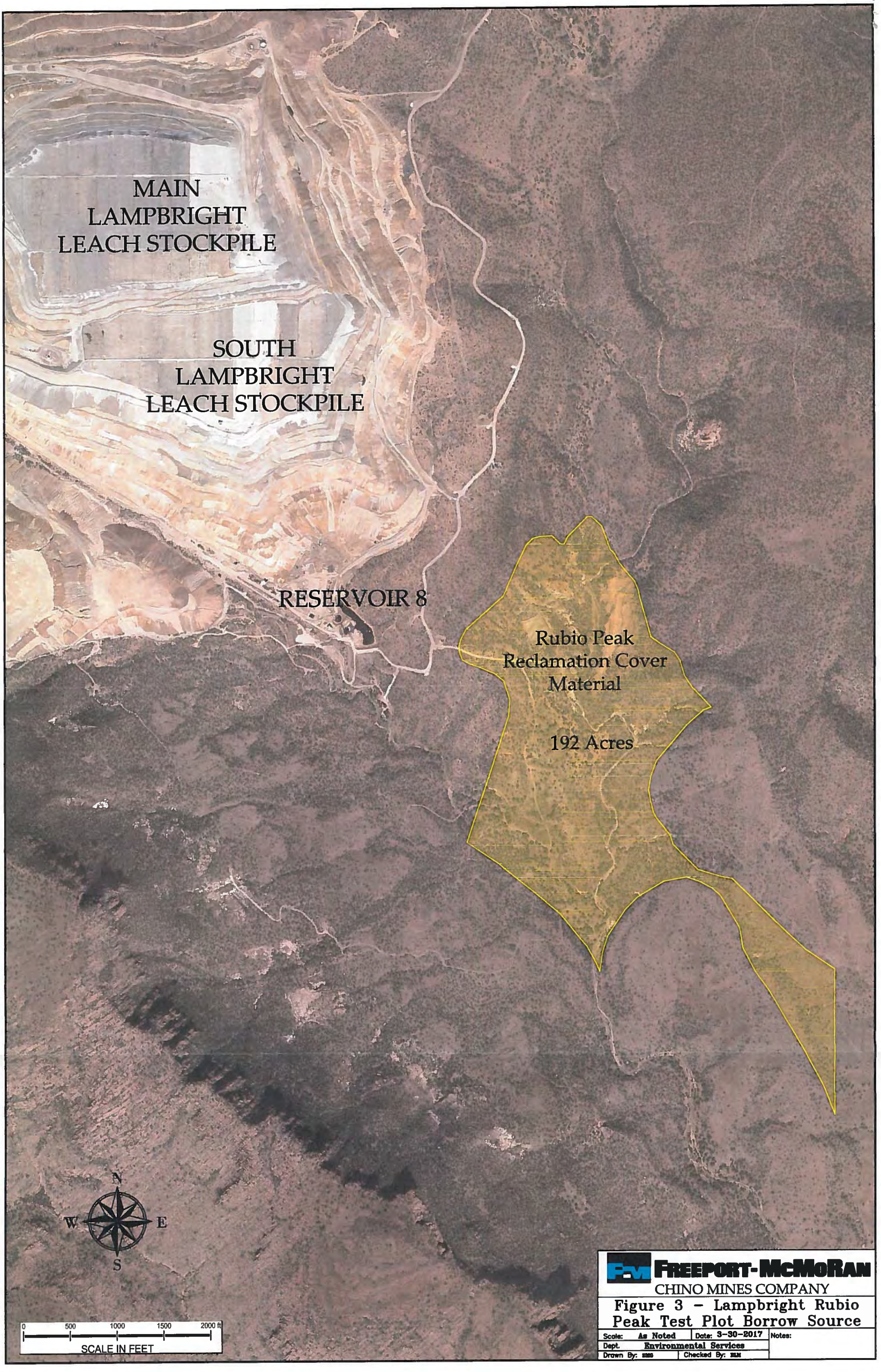

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Figure 3 – Lampbright Rubio Peak Test Plot Borrow Source

Scale: As Noted	Date: 3-30-2017	Notes:
Dept. Environmental Services		
Drawn By: mss	Checked By: mm	

RESERVOIR 8

Rubio Peak Reclamation
Cover Material

150'

100'

Rubio Peak
Test Plot

N
W
E
S

0 200 400 600 800 1000ft
SCALE IN FEET

DRAFT

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Figure 2 – Lampbright Rubio Peak Test Plot Location

Scale: As Noted	Date: 5-4-2017	Notes:
Dept. Environmental Services		
Drawn By: sss	Checked By: RLM	