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MINING & MINERALS DIVISION

**FREEPORT-MCMORAN CHINO MINES
COMPANY:**

APPLICATION TO REVISE

MINING PERMIT GR009RE

FOR

**NORTH LAMPBRIGHT WASTE ROCK
STOCKPILE**

Date: January 19, 2016

Submitted To: New Mexico Mining and Minerals Division

Prepared by: Freeport-McMoRan Chino Mines Company

Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

January 20, 2016

Certified Mail #70151660000060769149
Return Receipt Requested

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

Dear Mr. Eustice:

**Re: Freeport-McMoRan Chino Mines Company –
Permit No. GR009RE: Design Limit Expansion and
North Lampbright Waste Rock Stockpile Closure Closeout Plan**

Freeport-McMoRan Chino Mines Company (Chino) submits the enclosed application to the Mining and Minerals Division (MMD) to revise the Santa Rita Beneficiation Design Limit (DL) and update the CCP in accordance with 19.10.5 NMMA. The increase in the DL will enable Chino to expand the Main Lampbright Stockpile to the north. This part of the stockpile will be constructed from mine waste rock and thus will not be part of the leach system. This portion of the stockpile is called the North Lampbright Waste Rock Stockpile (NLS). As part of this application a Closure/Closeout Plan (CCP) for the NLS is also enclosed. The NLS CCP was developed as a standalone stockpile and will be integrated with the Main Lampbright Stockpile with submittal of the site-wide CCP. Chino believes this approach results in a more conservative FA cost estimate by not reducing the corresponding cost estimate for the Main Lampbright north facing outslope.

Chino is proposing to increase the existing DL by approximately 273 acres as illustrated in Figure 2 of this application. This increase will allow for the construction of the proposed NLS as well as a contemplated expansion of the Northeast Stockpile at the Reservoir 6 location. This application only includes the regulatory information for the NLS. Chino will submit the regulatory information for an extension of the Northeast Stockpile under a separate application.

The footprint of the NLS is expected to cover approximately 187 acres. Approximately 101 acres will be located beyond the currently approved DL. Chino assumed for the purpose of this application that the portion of the stockpile facility that occurs beyond the current DL will be subject to Section 19.10.5.508 NMAC.

The NLS CCP includes the reclamation plans and basis for the Financial Assurance (FA) third party cost estimate, but not the final cost estimate. The NLS CCP was developed as a standalone CCP and will be integrated with the Main Lampbright Stockpile in the site-wide CCP in the future. Chino believes this approach is conservative with respect to the FA cost estimate because there will likely be synergies

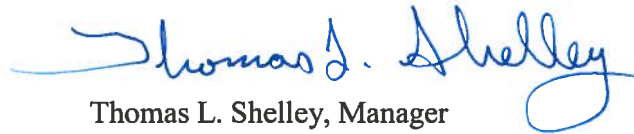
Mr. Chris Eustice
January 20, 2016
Page 2

realized (for example in downdrain channel planning) when the integrated conceptual design is developed. The earthwork material takeoff was developed by Telesto Solutions, Inc. in accordance with standard engineering practice and is supported with data from various references and is fully documented in Appendix B of this application. Upon approval of this scope of work by State agencies, Chino will submit a FA cost estimate for approval. This will allow Chino to develop a more timely FA cost estimate with a fully vetted scope of work.

A check in the amount of \$4,500 is enclosed to process this application.

I certify that I have personally examined and am familiar with the information submitted herein, and based on my inquiry of those individuals responsible for obtaining this information. I believe the submitted information is true, accurate and complete. Chino looks forward to meeting with you in the near future to facilitate your review of this important project.

Sincerely,



Thomas L. Shelley, Manager
Reclamation Services

TLS: rlm
Enclosures
20160120-001

c: Brad Reid, NMED
Holland Shepherd, MMD



Freeport-McMoRan Inc.
333 North Central Ave
Phoenix AZ 85004

For inquiries, contact us via e-mail:
AP@FMI.com<mailto:AP@FMI.com> Self-service
website: http://partners.fmi.com



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NM ENRGY MNRLS & NAT RES DPT
MINING ACT RECLAMATION BUREAU
1220 S SAINT FRANCIS DR
SANTA FE NM 87505-4225

Page 2 OF 2

INVOICE NUMBER	INVOICE DATE	PURCHASE ORDER	COMPANY	GROSS AMOUNT	DISCOUNT	NET AMOUNT
10515 MMD PERMIT REVISION	11/05/15 NORTH LAMPBRIGHT		FREEPORT MINERALS CORPORA	4,500.00	0.00	4,500.00
Check Number		Date	Vendor Number	Name	Total Amount	
0000849498		11/12/15	0000101184	NM ENRGY MNRLS & NAT RES DPT	\$4,500.00	

CH249 v0.02 01-12-2012

WARNING: THIS DOCUMENT CONTAINS SEVERAL DOCUMENT SECURITY FEATURES



Freeport-McMoRan Inc.
333 North Central Ave
Phoenix AZ 85004

CHECK NO.
0000849498

64-1278/611-GA

DATE OF CHECK

11/12/15

PAY: FOUR THOUSAND FIVE HUNDRED AND 00/100 DOLLARS

TO THE ORDER OF NM ENRGY MNRLS & NAT RES DPT
MINING ACT RECLAMATION BUREAU
1220 S SAINT FRANCIS DR
SANTA FE NM 87505-4225

CHECK AMOUNT

\$4,500.00



Bank of America, N.A.

Authorized Signature

DO NOT CASH IF THE WORD VOID IS VISIBLE *SEE REVERSE SIDE FOR LIST OF SECURITY FEATURES

⑈0000849498⑈ ⑆061112788⑆ 3299998445⑈

**FREEPORT-MCMORAN CHINO MINES
COMPANY:**

APPLICATION TO REVISE

MINING PERMIT GR009RE

FOR

**NORTH LAMPBRIGHT WASTE ROCK
STOCKPILE**

Date: January 19, 2016

Submitted To: **New Mexico Mining and Minerals Division**

Prepared by: **Freeport-McMoRan Chino Mines Company**

FIGURES:

- FIGURE 1-1 – MINE LOCATION MAP, NORTH LAMPBRIGHT WASTE ROCK STOCKPILE EXTENSION, CLOSURE/CLOSEOUT PLAN, JANUARY 2016
- FIGURE 2 – PROPOSED DESIGN LIMIT ADJUSTMENTS, 12/3/2015
- FIGURE 3 – DRAFT “SANTA RITA BENEFICIATION DESIGN LIMIT, FIGURE 2-4, REVISION 7, 1/14/2016”
- FIGURE 4 – “LAMPBRIGHT AREA TRIBUTARY 1 WATERSHED”, 12/23/2015

ATTACHMENTS:

- ATTACHMENT 1 – CHINO MINE NORTH LAMPBRIGHT WASTE ROCK STOCKPILE “OPERATIONAL DESIGN”, KNIGHT PIESOLD CONSULTING, DRAWING NUMBER 110, REVISION C
- ATTACHMENT 2 – NORTH LAMPBRIGHT WASTE ROCK STOCKPILE EXTENSION, CLOSURE/CLOSEOUT PLAN, JANUARY 2016
- ATTACHMENT 3 – KNIGHT PIESOLD CONSULTING “NON-IMPACTED STORMWATER DIVERSION CHANNEL, PLAN AND PROFILE, REVISION F”, AND “HYDROLOGIC AND HYDRAULIC ANALYSES: NON-IMPACTED STORMWATER DIVERSION CHANNEL”, REV 2, 1/12/16

APPLICATION REQUEST

Freeport-McMoRan Chino Mines Company (Chino) owns and operates an existing mining operation located in southwestern New Mexico (Figure 1). This document constitutes Chino's application to the New Mexico Mining and Mineral Division (MMD) to revise Permit No. GR009RE (Permit) pursuant to 19.10.5 New Mexico Administrative Code (NMAC). Chino is requesting that its mining Permit be revised to:

- 1.) Expand the Santa Rita Beneficiation Design Limit boundary to include the proposed North Lampbright Waste Rock Stockpile Extension, as indicated in Figure 2 of this application; and
- 2.) Incorporate into the Permit a closeout plan and financial assurance instruments for the North Lampbright Waste Rock Stockpile, pursuant to 19.10.5.506.J NMAC.

The area of the currently approved Santa Rita Beneficiation Design Limit Unit is approximately 6350 acres. The current Santa Rita Unit was approved by MMD on September 17, 2012 as "*Santa Rita Beneficiation Design Limit, Figure 2-4, Rev 6, August 1, 2012*" under Permit Modification 12-1. Chino proposes to expand the approved Santa Rita Design Limit by 273 acres. This increase will allow for the construction of the proposed North Lampbright Waste Rock Stockpile Extension (NLS) as well as a contemplated expansion of the Northeast Stockpile at the Reservoir 6 location. Figures 2 delineates the proposed change to the currently approved Santa Rita Beneficiation Design Limit boundary. Chino proposes that Figure 3 of this application, titled "*Santa Rita Beneficiation Design Limit, Figure 2-4, Rev 7, dated 1/14/2016*", replace "Figure 2-4, Rev 6" as the currently approved Santa Rita Beneficiation Design Limit Unit.

The proposed North Lampbright Waste Rock Stockpile Extension (NLS) will be contiguous to Chino's existing mining operations, specifically the existing Main Lampbright Leach Stockpile. The footprint of the NLS lies partially within the currently approved Santa Rita Beneficiation Design Limit Unit. The footprint of the NLS will cover approximately 187 acres, of which approximately 101 acres will result in new disturbances within Chino's approved mining permit boundary. The NLS capacity will be about 84 million tons of mine waste rock. The toe of the Main Lampbright Stockpile is approximately at the 6500 ft elevation. The stockpile will be placed over the northern outslope of the existing Main Lampbright Leach Stockpile, up to an elevation of approximately 6800 ft. elevation. The NLS fill thins to the north as the as construction moves to the north along a south facing hillside. The Main Lampbright Stockpile and south facing hillside buttress the NLS. The NLS has been designed at approximately a 3.5V:1.0H overall

slope to facilitate final closure. The operational design for the NLS is included as Attachment 1 of this application. Pursuant to MMD's regulations at 19.10.5.506 A. and B. NMAC, a closeout plan for the NLS is attached (Attachment 2). Chino prepared this application to also comply with the New Mexico Environment Department (NMED) Ground Water Quality Bureau's applicable requirements for closure of copper mine facilities, 20.6.7.33 NMAC. The Closure/Closeout Plan (CCP) describes how the NLS will be reclaimed to achieve a post mining land use of wildlife habitat and to comply with 20.6.7.33 NMAC. Reclamation means the employment during and after a mining operation of measures designed to mitigate the disturbance of affected areas and permit areas and, to the extent practicable, providing for the stabilization of a permit area following closure that will minimize future impacts to the environment from the mining operation and protect air and water resources (19.10.1.7.R.1). The Mining Act requires reclamation to meet certain requirements and to reach a certain point of stability, after which the Mining Act Permit is released, and the reclaimed land is not treated any differently than property used for a non-mining purpose.

APPLICANT INFORMATION

19.10.5.502.D NMAC

Applicant Name:

Freeport-McMoRan Chino Mines Company is the applicant to whom the permit will be issued.

Mailing Address: PO Box 10, Bayard, New Mexico, 88023

Physical Address: 99 Santa Rita Mine Road, Vanadium, NM

Ownership: Chino owns all property associated with the NLS and supporting infrastructure.

SITE SPECIFIC CHARACTERISTICS

Pursuant to 19.10.5.506.A and 19.10.5.508 NMAC, Chino here describes the relevant site specific characteristics of the area to be covered by the proposed NLS. These site specific characteristics support

the proposed CCP and substantiate how the NLS will comply with the applicable portions of 10.10.5.508 NMAC.

Existing Mining Operations in the Lampbright area: Chino's existing Lampbright facilities and operational activities are authorized by NMED under Discharge Permit 376 (DP-376) and also occur within the GR009RE permit design limit boundary. The proposed NLS is a waste rock storage stockpile and as such leaching activities will not occur on the stockpile. However, Chino actively leaches the Main Lampbright Leach Stockpile. Two sumps (Sumps 1 and 2) exist at the toe of the Main Lampbright Leach Stockpile and collect pregnant leach solution (PLS) which is delivered to Chino's SX/EW production facility. Sump 3 consists of both a french drain and open sump that gravity feeds PLS to Sump 2. Sumps 1, 2, and 3 will be covered by the NLS. Chino is separately submitting an application to NMED to modify DP-376 to authorize the NLS and construction of a stormwater impoundment on the east side of the NLS. The east impoundment is designed to manage impacted stormwater from the NLS and incidental seepage from the NLS. The impoundment will direct flows into the existing PLS collection system associated with the Main Lampbright Leach Stockpile. The proposed PLS impoundment is located within the current design limits..

Geology: The attached CCP, Section 2.3.2, describes the geology underlying the proposed NLS.

Climate: The climate at Chino is warm and dry, with a mean annual precipitation of about 400 mm (16 inches) and a mean annual temperature near 10 C (50 F). Precipitation falls mainly as rain, but snow may occur from November to March. In the NLS area, Telesto Solutions, Inc. has calculated the 100-year/24-hour precipitation event as approximately 3.9 inches for the general area associated with the NLS.

Surface and Ground Water: This proposal does little to change the existing surface and ground water conditions in this area of the mine. The proposed NLS will lie almost entirely within the ephemeral Tributary 1 drainage basin of the Lampbright Draw watershed. Figure 4 delineates the Tributary 1 drainage basin. Chino's Main Lampbright Leach Stockpile is also located within the Tributary 1 basin, with almost all the PLS reporting to the Reservoir 8 collection system. In prior years, Chino developed a stormwater diversion channel to carry non-impacted stormwater from within the Tributary 1 watershed to the east and into the Tributary 2 drainage, which reports to Lampbright Draw. Chino plans to construct a new diversion channel for non-impacted stormwater around the east side of the proposed NLS into Tributary 2. Surface water along the north west side of the NLS will flow toward the Santa Rita Mine or beneath the proposed stockpile and be collected at Reservoir 8. Details of this new stormwater diversion are described below in

regards to 19.10.5.508.(B)(5) NMAC. This proposed diversion is also being submitted to NMED for approval as part of the application to modify DP-376. Groundwater resources as they relate to reclamation are discussed in the CCP, Section 2.3.5.

MMD REGULATORY STANDARDS AND REQUIREMENTS

19.10.5.508.B(1) NMAC SIGNS, MARKERS, AND SAFEGUARDING

Chino will use existing procedures and practices to safeguard the public from “unauthorized entry into shafts, adits, and tunnels and falls from highwalls or pit edges”. Activities at Chino are regulated, and regularly inspected, by the Mine Safety and Health Administration. Ingress and egress by the public is limited to manned security gates. Perimeter gates are locked except during entry and exit by approved personnel and contractors.

19.10.5.508.B(2) NMAC WILDLIFE PROTECTION

Chino contracted Golder to conduct a pedestrian wildlife survey in August 2015 for the NLS area. No special-status species of wildlife or plants were observed in the project areas during the survey. No State or Federal threatened or endangered species were identified in the study area. The wildlife and vegetation communities in the NLS are typical of the greater region and are non-descript. The native vegetation is composed primarily of Alligator juniper-oak woodland and Ponderosa Pine Oak forest. The NLS extension is not expected to markedly change wildlife populations in the area due to the fact that similar habitat is common on undisturbed mine property and in other nearby areas. One tree of heaven (Class B Weed) was identified.

19.10.5.508.B(3) NMAC CULTURAL RESOURCES

Chino will adhere to all applicable New Mexico Cultural Properties Act (CPA 08-6-1 0 through 18-6-17) rules as they relate to project construction on private property. If a human burial or associated objects are discovered during operations, work in that area will cease activity and local law enforcement will be notified by a Chino Mine representative.

19.10.5.508.B(4) NMAC HYDROLOGIC BALANCE

Table 1 describes how Chino will comply with 19.10.5.508.B(4) as applicable. Chino will minimize impacts to the hydrologic balance by containing and utilizing impacted stormwater and incidental seepage from the NLS within its existing Main Lampbright Leach Stockpile. Currently, stormwater from undisturbed acreage north of the Main Lampbright Stockpile and the proposed NLS is diverted off-site through an existing stormwater channel system. Chino plans to construct a new permanent diversion channel for stormwater around the east side of the proposed NLS that flows into Tributary 2 and in accordance with 19.10.5.508B(5). Surface water along the north west side of the NLS will flow toward the Santa Rita Mine or beneath the proposed stockpile and be collected at Reservoir 8. This proposed diversion channel is also being submitted to NMED for approval as part of the application to modify DP-376.

Table 1	
MMD Regulation	Description of Compliance
<i>19.10.5.508.B(4) Hydrologic Balance Operations shall be planned and conducted to minimize negative impact to the hydrologic balance in both the permit and potentially affected areas.</i>	Chino will minimize impacts to the hydrologic balance by complying with the applicable portions of 19.10.5.508.(B)(4)(a)-(d).
<i>(a) Operations shall be designed so that non-point source surface releases of acid or other toxic substances shall be contained within the permit area, and that all other surface flows from the disturbed area are treated to meet all applicable state and federal regulations.</i>	The NLS has been designed to avoid any releases of impacted stormwater and seepage from the NLS. This design includes an impoundment on the east side of the NLS to temporarily store and route impacted stormwater within the Main Lampbright leach system. As discussed above, an application to modify DP-376 to include this impoundment has been submitted to NMED for review and approval.
<i>(b) The disturbed areas shall not contribute suspended solids above background levels, or where applicable the Water Quality Control Commission's standards, to intermittent and perennial streams.</i>	The area north of the NLS receives storm water flow only during precipitation events. A permanent diversion channel will be constructed to collect and divert as much stormwater as practical to the east and will be released toward the Tributary 2 drainage which is ephemeral. This plan is consistent with current operating practice.

<i>(c) To provide data to determine background levels for surface water entering the permit area, appropriate monitoring shall be conducted on drainages leading into the permit area.</i>	Not applicable. As discussed above and in the next section, most of the Tributary 1 drainage will be covered by the NLS. However, Chino is proposing to divert stormwater from undisturbed ground to the east. Engineering plans and designs for the diversion of the Tributary 1 drainage are discussed further below.
<i>(d) All diversions of overland flow shall be designed, constructed and maintained to minimize adverse impacts to the hydrologic balance and to assure the safety of the public.</i>	As discussed earlier in this application, Chino will be diverting stormwater and incidental overland flow from undisturbed ground north of the proposed NLS towards the east. Please refer to the discussion in the next section for more detail.

19.10.5.508.B(5) NMAC STREAM DIVERSIONS

Water flow in the area of the proposed NLS only occurs as a direct result of precipitation events and no springs have been identified at this site. A permanent diversion channel will be constructed to collect and divert as much stormwater as practical to the east toward the Tributary 2 drainage channel. This plan is consistent with current operating practice. Attachment 4 of this application provides the engineering design and calculations by Knight Piesold Consulting for this proposed diversion channel (see Calculation Summary Sheet: "Non-Impacted Stormwater Diversion Channel in Attachment 4). The total watershed area for the diversion is approximately 38 acres (0.06 square miles). The diversion channel will be permanent and has been designed for a 100-year/24-hour storm event of 3.9 inches. The diversion design has been certified by a New Mexico P.E.

19.10.5.508.B(6) NMAC IMPOUNDMENTS

Chino is not proposing to construct any impoundments with earthen embankments as part of the NLS facility.

NMAC 19.10.5.508.B(7) MINIMIZATION OF MASS MOVEMENT

The operational NLS extension will be constructed to allow for efficient closure of the facility and to ensure that the slope stability requirements listed in the Copper Rules (20.6.7.33.B NMAC) are met. The stockpile

is abutted by a natural hillside on the north and the Main Leach Lampbright Stockpile on the south. On the east side the overall outslope will be approximately 3.5H:1V and approximately 300 feet high. The attached CCP, Section 4.0, "Structural Stability" provides additional supporting references that the proposed NLS will meet the slope stability criteria of 20.6.7.33.B NMAC.

NMAC 19.10.5.508.B(8) RIPARIAN AND WETLAND AREAS

Not applicable: No riparian areas, as defined by MMD regulation, 19.10.1.7(R) NMAC, have been identified within or adjacent to perennial or intermittent water bodies at the proposed NLS area. Water flow in the area of the proposed NLS occurs as a direct result of precipitation events. Likewise, no springs or wetland areas have been identified.

NMAC 19.10.5.508.B(9) ROADS

Not applicable: No new haulage roads are being constructed for the NLS.

NMAC 19.10.5.508.B(10) SUBSIDENCE CONTROL

Not applicable: The North Lampbright Waste Rock Stockpile will not have any underground or in situ solution mining activities associated with it.

NMAC 19.10.5.508.B(11) EXPLOSIVES

Not applicable: No blasting is required to build the NLS.

NMAC 19.5.508.C SITE STABILIZATION AND SURFACE CONFIGURATION

Sections 3.0 and 4.0 of the North Lampbright CCP (Attachment 2) describes the measures to achieve a the approved post-mining land use.

NMAC 19.5.508.D EROSION CONTROL FOR RECLAMATION

Sections 4.0 of the CCP, Attachment 2, describes the measures to control erosion after reclamation. Reclamation activities will be consistent with current practice although general practices may change in the future. Prior to reclamation a CQA/CQC plan shall be submitted for department review as part of the final cover design. The plan shall identify a licensed New Mexico professional engineer as the designated CQA officer and include his or her supervision of the CQA plan and shall identify the methods proposed to ensure that the closure construction will be completed in accordance with the design and specifications. BMP's will be utilized during construction and operation of the stockpile to limit sediment transport. Long-term erosion control measures may include the installation of berms, designed channels, and sediment traps, as necessary. Short-term erosion control measures may include, but not limited to: silt fences, hay bales, water bars, and mulching. Runoff will be diverted into natural drainages and final shaping will stabilize all disturbed areas. After reclamation is complete erosion inspections will be conducted for the first year on a monthly schedule and thereafter quarterly. The FA cost estimate for this CCP includes long term O&M.

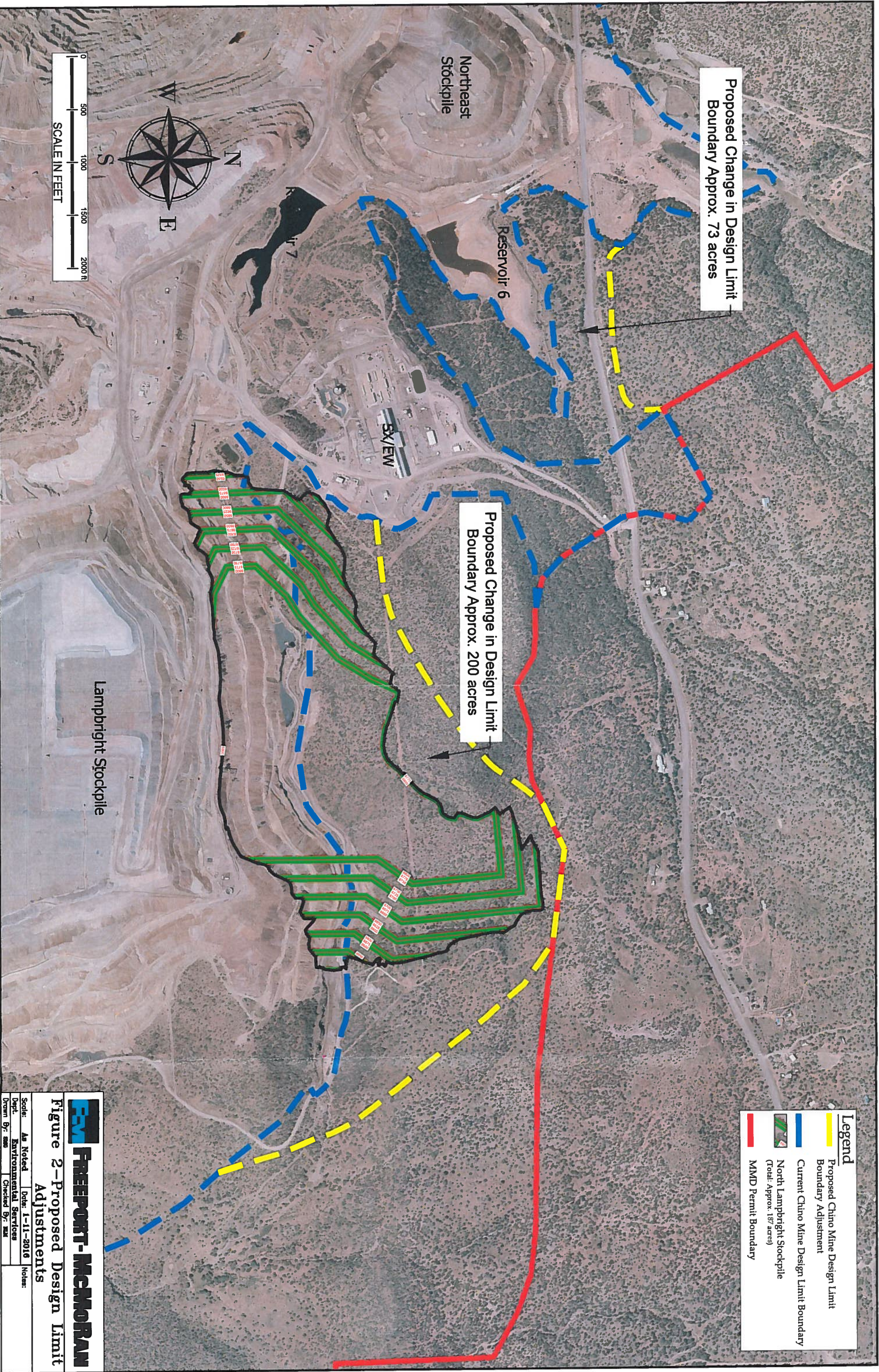
Figure 1-1

MINE LOCATION MAP

(See “North Lampbright Waste Rock Stockpile Extension, Closure/Closeout Plan”, Attached)

Figure 2

PROPOSED DESIGN LIMIT ADJUSTMENTS



Proposed Change in Design Limit
Boundary Approx. 73 acres

Proposed Change in Design Limit
Boundary Approx. 200 acres

Legend

- Proposed Chino Mine Design Limit Boundary Adjustment
- Current Chino Mine Design Limit Boundary
- North Lampbriht Stockpile (Total: Approx. 187 acres)
- MMD Permit Boundary



Freeport-McMurray

Figure 2-Proposed Design Limit Adjustments

Scale:	As Noted	Date:	1-11-2010	Notes:
Dept:	Environmental Services			
Drawn By:	am	Checked By:	am	

Figure 3

DRAFT SANTA RITA BENEFICIATION DESIGN LIMIT

FIGURE 2-4, REVISION 7



Legend	
	Proposed China Mine Design Limit Boundary
	MMD Permit Boundary

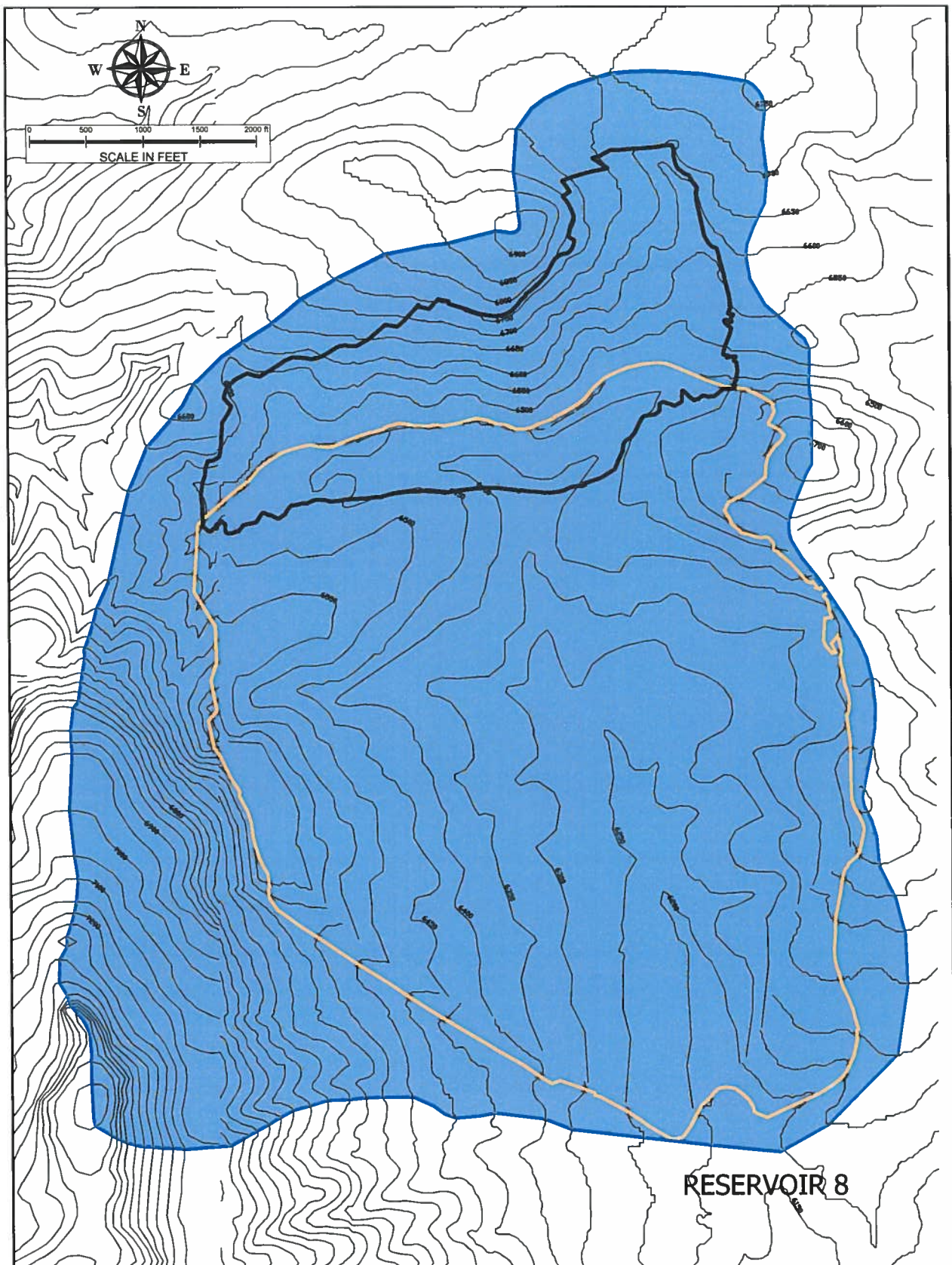
**F&W Engineering**

Santa Rita Beneficiation Design
Limit Figure 2-4 Rev 7

Scale:	As Shown	Date:	1-14-2018	Notes:
Drawn By:	Geotechnical Services	Checked By:	SA	Issue:
Drawn By:	SA	Checked By:	SA	Issue:

Figure 4

**LAMBRIGHT AREA
TRIBUTARY 1 WATERSHED, 12/23/2015**



Legend



Tributary 1 Watershed
(Reservoir 8 Drainage Area)



Main Lampbright Foot Print



Pre Mine Topography

DRAFT

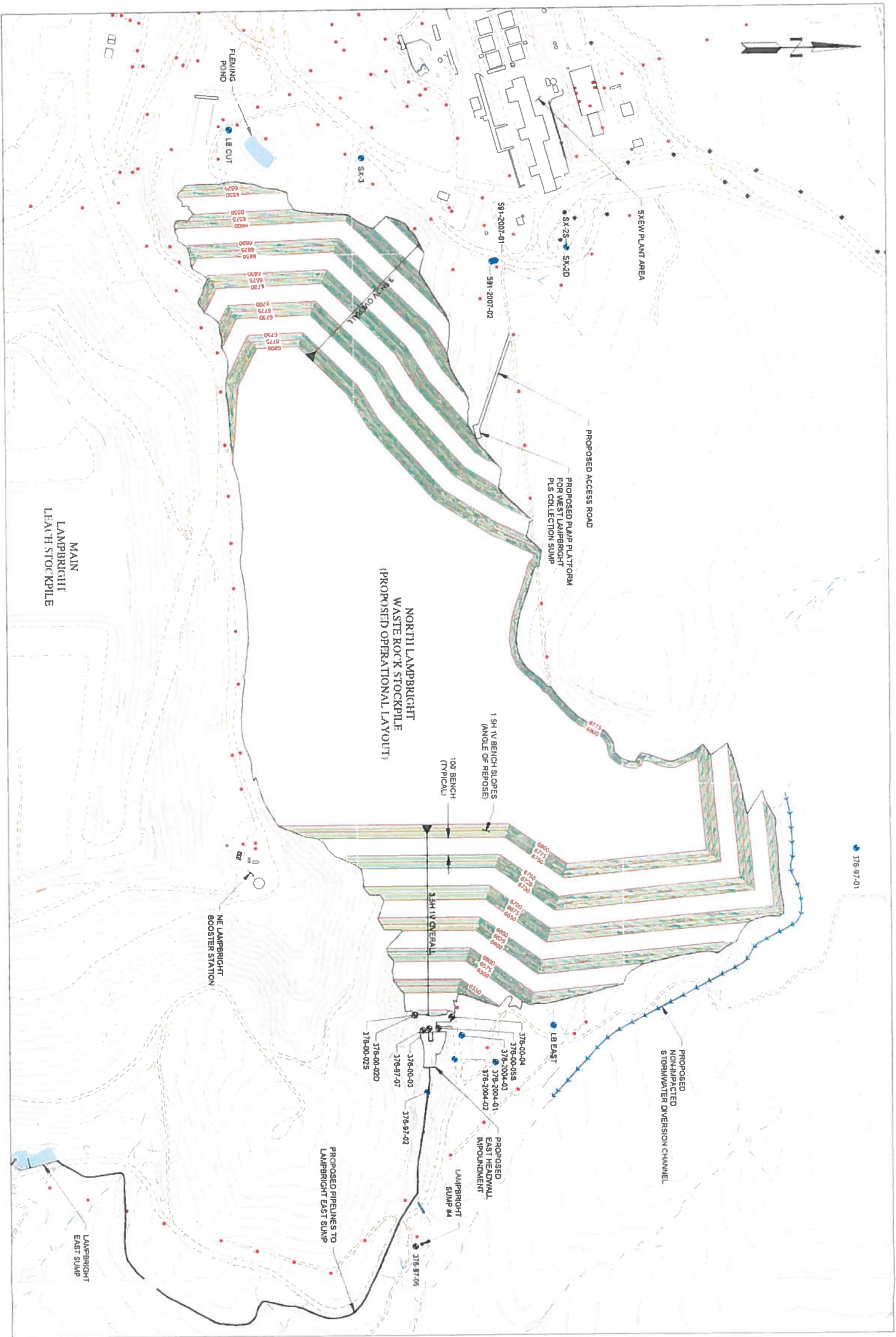
Freeport-McMoRan

Lampbright Area
Tributary 1 Watershed

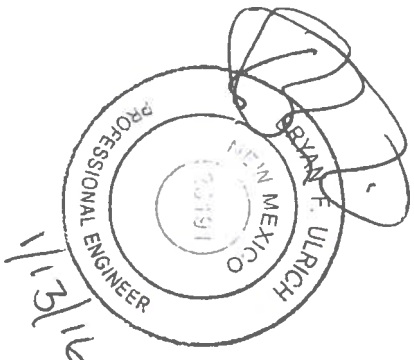
Scale: As Noted Date: 12-03-2010
Dept: Environmental Services
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APPLICATION TO MMD (NLS)

Attachment 1



- LEGEND:**
- EXISTING GROUND SURFACE CONTOUR AND EL. FEET
 - PROPOSED GROUND SURFACE CONTOUR AND EL. FEET
 - EXISTING DRAINAGE
 - EXISTING ROAD
 - EXISTING POWERPOLE
 - EXISTING LIGHTPOLE
 - EXISTING BUILDINGS AND INFRASTRUCTURE
 - MONITORING WELL (TO REMAIN)
 - MONITORING WELL (TO BE PLUGGED AND ABANDONED)



NOTES:

1. SCALE BAR MEASURES 1" ON A FULL SIZE PLOT (ANSI D) AND 1/5" ON A HALF SIZE PLOT (ANSI B).

REV	DATE	DESCRIPTION	APPROVED
A	12/01/15	ISSUED FOR INTERNAL REVIEW	AB
B	12/21/15	ISSUED FOR CLIENT REVIEW	AB
C	01/12/16	ISSUED FOR PERMITTING	AB

DISCLAIMER

KNIGHT PRESDO AND CO. PROVIDES THE DATA SHOWN HEREON, USING BOTH TECHNICAL INFORMATION AND METHODS, RECEIPT OF THIS DRAWING DOES NOT IMPART TO THE RECIPIENT ANY WARRANTIES TO SUCH INFORMATION OR DATA. THE DATA SHOWN HEREON SHALL BE AT USER'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL RESPONSIBILITY TO KNIGHT PRESDO AND CO.

CLIENT

FREEPORT-MCMORAN CHINO MINES COMPANY

PROJECT			
NORTH LAMPBRIGHT WASTE ROCK STOCKPILE			
OPERATIONAL DESIGN			
DESIGNED BY	AB	PROJECT NUMBER	00636.02
DRAWN BY	CS	DRAWING NUMBER	110
			VERSION
			C

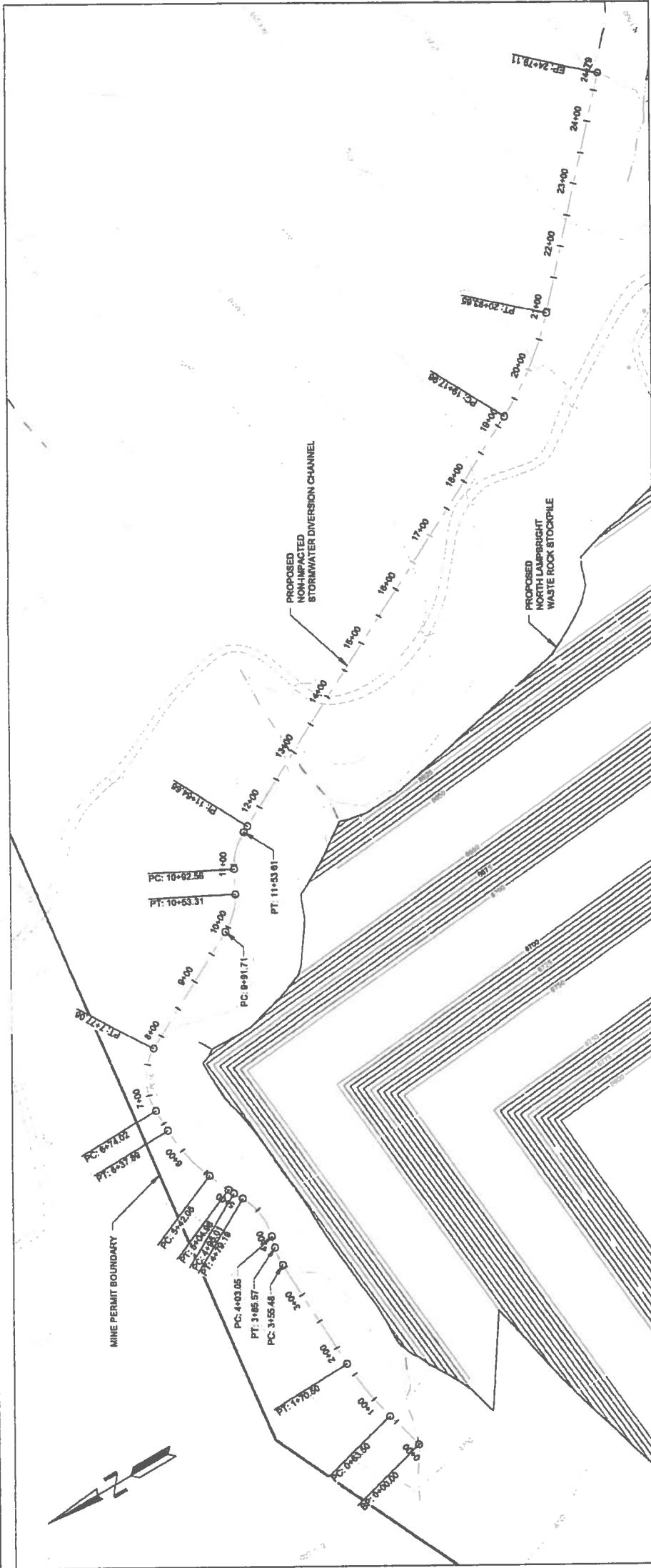
APPLICATION TO MMD (NLS)

Attachment 2

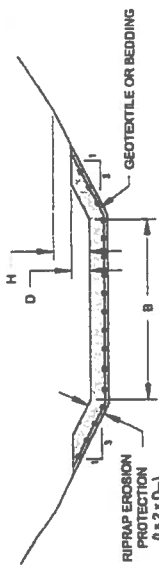
(See separate document)

APPLICATION TO MMD (NLS)

Attachment 3



- LEGEND:**
- EXISTING GROUND SURFACE CONTOUR AND EL. FEET
 - PROPOSED GROUND SURFACE CONTOUR AND EL. FEET
 - EXISTING DRAINAGE
 - EXISTING ROAD
 - MINE PERMIT BOUNDARY
 - EXISTING POWERPOLE



NON-IMPACTED STORMWATER DIVERSION CHANNEL
TYPICAL SECTION
N/S

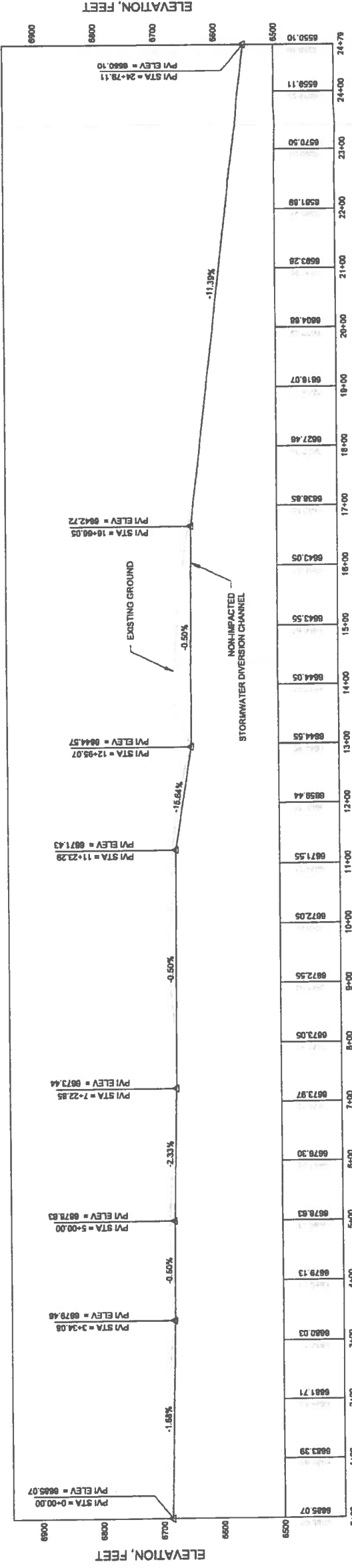
- NOTES:**
- SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).
 - IF COMPETENT ROCK IS ENCOUNTERED DURING CONSTRUCTION, RIPRAP EROSION PROTECTION MAY NOT BE REQUIRED.

REFERENCE: LANSBURY STATE UNIVERSITY OF APPLIED SCIENCES, LANSBURY, ONTARIO, CANADA

PLAN
1"=100' AT FULL SIZE (ANSI-D)
1"=200' AT HALF SIZE (ANSI-B)

NORTH LAMPBRIGHT STOCKPILE
NON-IMPACTED STORMWATER DIVERSION CHANNEL DESIGN DATA

STATION	BOTTOM WIDTH B (ft)	CHANNEL DEPTH H (ft)	RIPRAP THICKNESS t (ft)	RIPRAP D ₅₀ (in)	MAX V (ft/s)	MAX Q (cfs)
0+00 TO 11+23.26	10	2	1	0.5	3	2.0
11+23.26 TO 12+95.07	15	1.5	0.5	1	8	5.2
12+95.07 TO 16+66.05	10	2	1	0.5	3	2.1
16+66.05 TO END	15	1.5	0.5	1	6	5.2

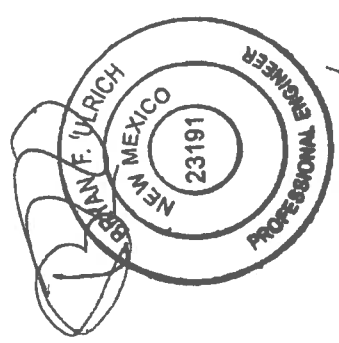


PROFILE
1"=100' AT FULL SIZE (ANSI-D)
1"=200' AT HALF SIZE (ANSI-B)

REV	DATE	DESCRIPTION	APPROVED	CLIENT
C	11/24/15	ISSUED FOR CLIENT REVIEW	BU	KNIGHT PIESOLD
D	12/22/15	ISSUED FOR PERMITTING	BU	KNIGHT PIESOLD
E	01/12/16	ISSUED FOR PERMITTING	BU	KNIGHT PIESOLD
F	01/12/16	ISSUED FOR PERMITTING	BU	KNIGHT PIESOLD

CHINO MINE
FREEPORT-MCMORAN CHINO MINES COMPANY
KNIGHT PIESOLD CONSULTING

PROJECT	CHINO MINE
TITLE	NORTH LAMPBRIGHT WASTE ROCK STOCKPILE
TITLE	NON-IMPACTED STORMWATER DIVERSION CHANNEL
TITLE	PLAN AND PROFILE
DESIGNED BY	AS
DRAWN BY	CS
LOCATION	TU101
PROJECT NUMBER	00636.02
DRAWING NUMBER	120
REVISION	F



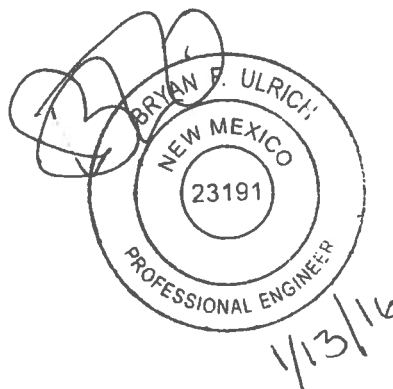
1/18/16

Calculation Summary Sheet

Project Name: Chino Mines Company – North Lampbright Waste Rock Stockpile
Project No.: TU101-00636.02
Task No.: 0303.1000: Hydrologic and Hydraulic Analyses: Non-Impacted Stormwater Diversion Channel
Calc. Rev. No.: 2

Description of Calculation:

The purpose of this calculation is to provide a conceptual level design of the non-impacted stormwater diversion channel proposed to the east of the North Lampbright Waste Rock Stockpile (NLS).



Calculation by: Bryan Fahl/Antonio Belmar	Date: 1/12/16
Reviewed by: Victor Lishnevsky	
Results included in (Deliverable): Permitting Design Report	
Or Superseded by (Calculation File): 	



1.1 Objective

The objective of this calculation is to provide conceptual level capacity and erosion protection design parameters for the NLS non-impacted stormwater diversion channel.

1.2 Methodologies

The hydrologic analyses to estimate the peak flows to the diversion channel were performed using the United States Army Corps of Engineers (USACE) Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS) precipitation-runoff model (USACE, 2010). The methods used within the model include the Natural Resource Conservation Service (NRCS) curve number (CN) runoff method (NRCS, 1986) and Kinematic Wave flow routing techniques.

The hydraulic capacity design of the channel was completed using Manning's equation for normal flow conditions (Chow, 1959). The riprap erosion protection was sized using the shear stress method presented in the United States Federal Highway Administration's (FHWA) Hydraulic Engineering Circular (HEC) Number 15 (FHWA, 2005).

1.3 Inputs and Assumptions

Channel Layout

The purpose of the channel is to divert storm water runoff from the natural ground area to the northeast/east of the facility to a nearby natural drainage that flows away from the project. This will reduce the amount of storm water runoff that will contribute to the stockpile. The channel will not capture storm water runoff generated from the stockpile and is thus, considered a non-impacted stormwater diversion channel. The contributing area to the channel was estimated to be 1.66 million square feet (ft²). The general layout and basin delineation of the channel are presented on Figure 1.

Hydrologic Analyses

The 100-year/24-hour storm event was applied as the design storm event for the channel, per Freeport-McMoRan Chino Mines Company. Per the National Oceanic and Atmospheric Administration (NOAA) Precipitation Frequency Data Server (PFDS), the depth of this storm event at the project location is 3.93 inches (NOAA, 2015). This rainfall depth was distributed over 24 hours according to the NRCS Type II rainfall distribution (NRCS, 1986).

An NRCS CN of 71 (Telesto, 2015) was applied to the model to represent the natural ground runoff potential (NRCS, 1986).

Hydraulic Analyses

The channel slopes are generally dictated by the natural ground topography and were thus, used as inputs to the channel design. The slopes will range from approximately 0.5 percent to 15 percent.

Channel Manning's roughness coefficients for riprap were calculated based on the riprap D₅₀ size and flow depths. It was assumed that riprap will be required for the entire length of the channel.

The side-slopes of the channel were designed to 3H:1V for slope/riprap stability. The channel will generally be constructed in cut. A freeboard depth of 1.0 foot above the 100-year flow depths was applied to the design.

1.4 Results

The flow routing diagram and peak flow results from the HEC-HMS hydrologic modeling for the 100-year/24-hour rainfall event are presented on Figure 2 and in Table 1, respectively.

The conceptual level hydraulic analyses indicate that the following channel design parameters will be sufficient based on the peak flows:

- Bottom width: 10 feet (for constructability considerations, per Freeport-McMoRan Chino Mines Company) for 0.5%, 2%, or similar
- Bottom width: 15 feet (for constructability considerations, per Freeport-McMoRan Chino Mines Company) for 11.5%, 15.0%, or similar
- Depth (from top of riprap in channel invert to top of freeboard): 1.5 to 2 feet
- Side-slopes: 3H:1V
- Riprap
 - 0.5%, 2.0%, or similar, channel slopes D_{50} : 3 inches (0.5 feet thick)
 - 11.5%, 15.0%, or similar, channel slopes D_{50} : 6 inches (1.0 feet thick)
 - All riprap to be underlain by geotextile or bedding

References:

Chow, V.T., Ph.D., 1959, *Open-Channel Hydraulics*.

Federal Highway Administration (FHWA), 2005, *Design of Roadside Channels with Flexible Linings*, Hydraulic Engineering Circular No. 15, Third Edition, Publication No. FHWA-NHI-05-114, United States Department of Transportation (USDOT), September.

Telesto Solutions Incorporated (Telesto), 2015, Design Calculation for 100 Year, 24-Hour Stormwater Calculations – “NMA DP Renewal”, Computed by W. Niccoli, October 8, 2015.

United States Army Corps of Engineers (USACE), 2010, HEC-HMS, Version 3.5.

United States Department of Commerce National Oceanic and Atmospheric Administration (NOAA), 2015, Precipitation Frequency Data Server (PFDS), Atlas 14, Volume 1, Version 5, Latitude: 32.7922°, Longitude: -108.0378°, Access date November 2.

United States Natural Resources Conservation Service (NRCS), 1986, *TR-55 Urban Hydrology for Small Watersheds*, U.S. Department of Agriculture, Washington, D.C., June.

Attached:

Figure 1 – North Lampbright Stockpile Non-Impacted Stormwater Diversion Channel Basin Delineation
Figure 2 – North Lampbright Stockpile Non-Impacted Stormwater Diversion Channel HEC-HMS Routing Diagram
Table 1 – North Lampbright Stockpile Non-Impacted Stormwater Diversion Channel 100-year/24-hour Peak Flows

Attachments

1. SCALE BAR MEASURES 5" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).



PROJECT CHINO MINES COMPANY
NORTH LAMPBRIGHT WASTE ROCK STOCKPILE
NLS NON-IMPACTED STORMWATER DIVERSION

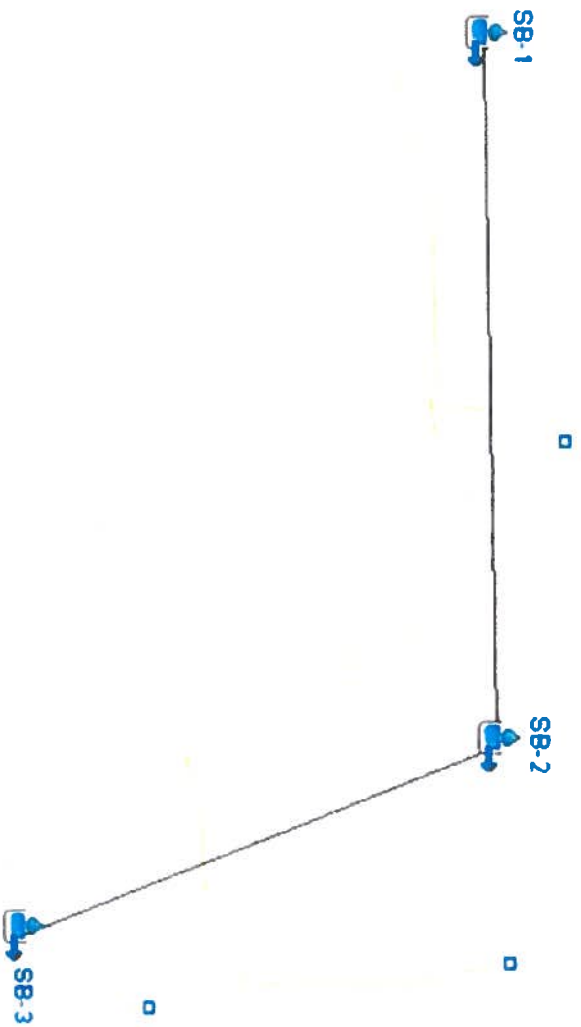
CLIENT
FREEPORT-MCMORAN CINCINNATI MINES COMPANY

Knight Piesold
CONSULTING

DESIGNED BY	IN	LOCAL ITEM	PROJECT NUMBER	POSING NUMBER	REPLICATOR
DESIGNED BY	IN	TU101	00036.02	1	2

Figure 2
Freeport-McMoRan Chino Mines Company

North Lampbright Stockpile Non-Impacted Stormwater Diversion Channel HEC-HMS Routing Diagram



□

Table 1
Freeport-McMoRan Chino Mines Company

North Lampbright Stockpile Non-Impacted Stormwater Diversion Channel 100-year/24-hour Peak Flows

Project: NlmpbrihtStockChannel Simulation Run: 100yr24hr

Start of Run: 04Nov2015, 00:00 Basin Model: Contributing
End of Run: 05Nov2015, 00:15 Meteorologic Model: 100yr24hr
Compute Time: 09Nov2015, 09:19:47 Control Specifications: 24hr

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
SB-1	0.0248	12.8	04Nov2015, 12:15	1.27
SB-2	0.0503	22.9	04Nov2015, 12:15	1.28
SB-3	0.0596	26.3	04Nov2015, 12:15	1.28

Notes:

1. Drainage areas, peak discharges, and volumes in table are cumulative.
2. SB-1, Drainage Area = 0.0248 square miles = 15.9 acres
3. SB-2, Drainage Area = 0.0255 square miles = 16.3 acres; cumulative Drainage Area = 0.0503 square miles = 32.2 acres
4. SB-3, Drainage Area = 0.0093 square miles = 5.9 acres; cumulative Drainage Area = 0.0596 square miles = 38.1 acres