

Attachment 31

Phase 1 Waste Rock Management Plan

(67 Pages)

Baffinland Iron Mines Corporation

PHASE 1 WASTE ROCK MANAGEMENT PLAN

BAF-PH1-830-P16-0029

Rev 0

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1 PURPOSE

A waste rock disposal area designed for storage of waste rock in perpetuity will be located north and west of the open pit.

A modification of the mining plan has resulted in a smaller tonnage of waste rock being produced in earlier years 1-4 of operations from 2015-2018 when ore will be mined and shipped through Milne Port at a rate of up to 3.5 Mtpa. During this Phase 1, it is estimated that about 2.5 Mt will be placed in the stockpile.

This is reflected in a smaller waste rock storage area footprint and a new run-off collection pond to be constructed. As additional geological, geotechnical and geochemical data is collected, the waste rock management plan will be updated based on the application of best management practices.

Following the planned construction of the rail line and Steensby Port, production of ore and waste rock will increase quickly with a Life of Mine total of about 600 Mt of waste rock and 30 Mt of overburden produced over the mine life of Deposit No. 1. The existing "Waste Rock Management Plan" document number H349000-1000-07-126-0009, approved under NIRB Project Certificate #005 remains in effect as the approved Life of Mine waste rock management plan.

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2 SCOPE

This plan has been developed for Phase 1 of the waste rock stockpile (dump) development for Deposit 1 at the Mary River Mine Site and describes the geochemical characterization of the waste rock and how this influences the way waste rock is deposited and how the stockpile is constructed.


Closure considerations are included as well as environmental monitoring and reporting.

Updates to this plan will be developed as new information is available and is included in ongoing optimization of the waste rock storage area (dump) design.

2.1 RELATIONSHIP WITH STANDARD OPERATING PROCEDURES

This Phase 1 Waste Rock Management Plan should be reviewed with other Baffinland Standard Operating Procedures:

- BAF-PH1-340-PRO-0006 r0 - Haul Truck Operation Procedure
- BAF-PH1-340-PRO-0012 r0 - Dozer Operation Procedure.

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3 RESPONSIBILITIES

3.1 MINE OPERATIONS SUPERVISOR RESPONSIBILITIES

The Mine Operations supervisor is responsible for the following:

- The safety and health of all persons while managing and directing activities associated with the hauling and placement of waste rock. Nothing relieves the mine operations supervisor for ensuring a safe work place and compliance with federal and provincial regulations and those of Baffinland.
- Preparation and execution of the waste rock stockpile deposition plan.

3.2 HAUL TRUCK OPERATOR RESPONSIBILITIES

Haul truck operators are responsible for the safe operation of their haul truck as follows:

- Carry out all pre-start up and shut down inspections as specified in the Baffinland regulations.
- Observe all speed limits and adjust driving for the conditions during bad weather.
- Follow closely all directional signs when proceeding loaded to the waste rock stockpile.
- When approaching, dumping and leaving the stockpile area follow closely the instructions of the spotter.


3.3 DOZER OPERATOR AND SPOTTER RESPONSIBILITY

The dozer operator and spotter have the following responsibilities:

- Maintain safe conditions for haul truck dumping at the edges of the stockpile lift and at the dumping location.
- Give clear communication and signals to the haul truck operator.
- On bottom lift, avoid pushing large boulders down at the edge of the stockpile footprint to prevent damage to run off pond liner at the north end of the stockpile.

3.4 SAFETY

- PPE is essential and is required to be worn at all times.
- Appropriate speed limit and direction signs will be posted.
- A daily safety huddle and review of Job Safety Assessments will be made.

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3.5 ENVIRONMENT

Haul truck, Dozer Operators and the Spotter must take every precaution to protect the environment and wildlife as follows:

- Haul truck, Dozer Operators and the Spotter must have completed WHMIS training.
- Haul truck, Dozer Operators and the Spotter must have completed training in oil spill reporting, containment and cleanup.
- Return all waste and empty containers to the Mary River Waste Management facility for appropriate disposal.

The Environmental Department will be responsible for:

- Regular inspections of the waste rock stockpile and run off pond and dam.
- Monitoring of the water quality of the run off pond before controlled release into the environment.
- All required reporting to the regulators.


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4 REGULATORY REQUIREMENTS

All mining operations are carried out under the Mines Act and the requirements will be reflected in Baffinland procedures which must be followed.

The Mary River Operation is permitted under Nunavut Impact Review Board Project Certificate #005 and Nunavut Water Board Type A Water Licence, 2AM-MRY1325. The specific environmental requirement related to the waste rock stockpile is for run-off to be collected in a downstream pond with capacity sized to reduce suspended solids in the discharge to meet discharge requirements of <30 mg/L (Maximum concentration of any grab sample) and 15 mg/L maximum average concentration.

In addition, the discharge from the pond is established as a monitoring and discharge point under the Metal Mining Effluent Regulations (MMER) SOR/2002-222.

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5 WASTE ROCK CHARACTERIZATION

5.1 DEPOSIT GEOLOGY

Deposit No.1 occurs at the nose of a syncline plunging steeply to the north-east (Aker Kvaerner, 2008). The iron formation occupies the nose and two limbs of this feature with a ~1,300 m long northern portion and a ~700 m long southern portion. The footwall to the iron formation mainly consists of gneiss with minor schist, psammitic gneiss (psammite) and amphibolite. The hanging wall is primarily composed of schist and volcanic tuff with lesser amphibolite and metasediment.

The hanging wall primarily encompasses chlorite–actinolite schist and garnetiferous amphibolites. Meta-volcanic tuff is also a significant lithology identified in the hanging wall. The footwall mainly consists of quartz-feldspar-mica gneiss with lesser meta-sediment (greywacke) and quartz-mica schist. Microcline and albite are the predominant feldspars within the gneiss and biotite is generally more abundant than muscovite.

The iron ore deposits at the Mary River project represent high-grade examples of Algoma-type iron formation and are composed of hematite, magnetite and mixed hematite-magnetite-specular hematite varieties of ore (Aker Kvaerner, 2008). The iron deposits consist of a number of lensoidal bodies that vary in their proportions of the main iron oxide minerals and impurity content of sulphur and silica in the ore. The massive hematite ore is the highest grade ore and also has the fewest impurities, which may indicate it was derived from relatively pure magnetite or that chert, quartzite and sulphides were leached and oxidized during alteration of the iron formation.


Intense deformation and lack of outcrop limit the ability to subdivide by lithology on the basis of future mined tonnages.

5.2 SUMMARY OF GEOTECHNICAL CONSIDERATIONS

The existence of the ridge north of Deposit No. 1 and outcrop appearing along the ridge support existing evidence from geotechnical drilling of the geotechnical stability of the area and make it a suitable location to start construction of the waste rock stockpile. Ongoing geotechnical drilling to complement existing data will be used to optimize the stockpile design.

5.3 SUMMARY OF GEOCHEMICAL SAMPLING AND TEST WORK

Metal leaching and acid rock drainage (ML/ARD) characterization studies in support of the Life of Mine pit waste rock are provided in the report entitled “Mine Rock ML/ARD Characterization Report Deposit 1, Mary River Project”, March 2014 as appended to the Life-of-Mine Waste Rock Management Plan. A further analysis of the available ML/ARD results related to the five year pit is provided in Appendix A.

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The waste rock was subdivided based on broad geo-structural categories about the iron ore zone, mainly by hanging wall and footwall zones. A total of 776 waste rock samples were selected as representing the waste rock categories and broad spatial coverage of non-ore mine rock in the vicinity of the Life of Mine open pit development. All 776 waste rock samples were analyzed for modified Sobek acid base accounting (ABA), NAG pH and elemental content. Subsets of drillcore samples were also analyzed for downhole variability, NAG leachate, short-term metal leaching, whole rock elemental content, detailed mineralogical analysis, and long-term kinetic testing.

Results of ABA testing determined that waste rock is generally characterized as having low neutralization potentials (NP) and low acid potentials (AP). Data suggests that the waste rock is dominated by non-carbonate sources of NP (e.g. silicates) with lesser NP derived from carbonate sources. Sulphide was the primary form of sulphur. Approximately 85% of waste rock samples had neutralization potential ratios (NPR) greater than 2 and are classified as non potentially acid generating (Non-PAG) and are unlikely to generate acidic drainage. Approximately 10% of the samples had NPR values of less than 1, and 5% of the samples were classified as having uncertain acid generating potential ($1 < \text{NPR} < 2$). Extrapolating these results to the project waste rock model, indicates that approximately 11% of the Life of Mine in-pit waste rock is expected to have $\text{NPR} < 2$ and is considered potentially acid generating (PAG). Proximity to ore appears to correlate to increased PAG quantities (defined as $\text{NPR} < 2$) with the hanging wall schist (HWS) and footwall schist (FWS) zones identified with the greatest proportion of PAG of the major waste units.

Analysis of a set of samples proximal to the proposed five year pit indicates a lower sulphur and sulphide content is likely to be encountered in the shallower HWS and FWS rock of early development than at depth during later production. This lower sulphide content is expected to result in a lower percentage of PAG rock being encountered during early operations than would be predicted by extrapolating the overall (including deeper) HWS and FWS waste rock data to near surface.


For planning related to the Phase 1 Waste Rock Management Plan, 10% PAG rock plus allowances for expansion due to field screening limitations and dilution has been assumed.

Ten waste rock samples were run in humidity cells for 53 weeks in 2008 and 2009. A further 17 waste rock samples were initiated in humidity cell tests in May 2011 for between 109 and 120 weeks of reported data. Nine of these samples were standard humidity cells and eight were NP depleted humidity cells designed to assess drainage quality in the absence of carbonate NP. The pH of most cells was in the range of 5.5 to 7 throughout testing. Of the 17 cells in operation since 2011, three cells exhibited slowly declining pH throughout testing reaching a minimum measured weakly acidic pH between 4.5 and 5 after approximately two (2) years of operation (under laboratory conditions). Metal release rates from humidity cells were generally low.

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Kinetic testing results and cold climate conditions at site suggest the lag time to acid on-set in PAG rock with potentially increased metal release rates would be on the order of five years or longer.

Work is continuing to confirm the feasibility of developing field test pads at the site using selected waste rock material generated during early mine development. Operation and monitoring of such test piles (if feasible) would better inform the project about projected drainage quality and water quality modeling assumptions under site-specific cold climate conditions.

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6 CONSTRUCTION OF THE WASTE ROCK STOCKPILE

6.1 DEPOSITION STRATEGY


Waste rock will be deposited in lifts using the guidelines presented in Section 6.4. The primary objective is safety of personnel and stability of the waste rock stockpile. However, these deposition methods will also enhance permafrost aggradations into the Waste Rock Stockpile

The design of the waste rock storage area is based on the conservative results from drilling and laboratory test work.

Phase 1 of the WRD will be built oriented along the ridge extending Northwards from the top of Deposit 1 as shown in Figure 6.1. Stockpile construction will start at the northern perimeter of the stockpile footprint. The stockpile will be bounded on the east and west by WRD roads which join to form the downstream wall of the run off pond. Berms constructed along the upstream edge of the WRD roads will divert run off towards the run off pond. A plan of the northern section of the WRD, the WRD roads and the run off pond is included in Appendix B.

It is important that the bottom layer of the waste rock is placed while the ground is frozen allowing the freezing level to rise in elevation by conduction. In addition, the first lift of material to be placed will be non-PAG material. It expected that a permanently frozen impermeable core will form in the waste rock storage area within the first few years after placement. A technical memorandum with recommendations on the development of permafrost in waste rock stockpiles has been completed by Thurber (refer to Appendix B, Life-of-Mine Waste Rock Management Plan) Temperature modeling of the waste rock regime including climate change included in the technical memorandum will be carried out as part of the ongoing waste rock characterization program.

It is expected that the interior of the waste rock stockpile material will become permanently frozen, and that only the outer layer of material will be subject to seasonal freezing and thawing. The frozen condition will increase both the physical and chemical stability of the structure. The final surficial “active” layer, which will be subject to seasonal freeze-thaw, will be constructed of non acid generating rock as the waste rock stockpile develops.

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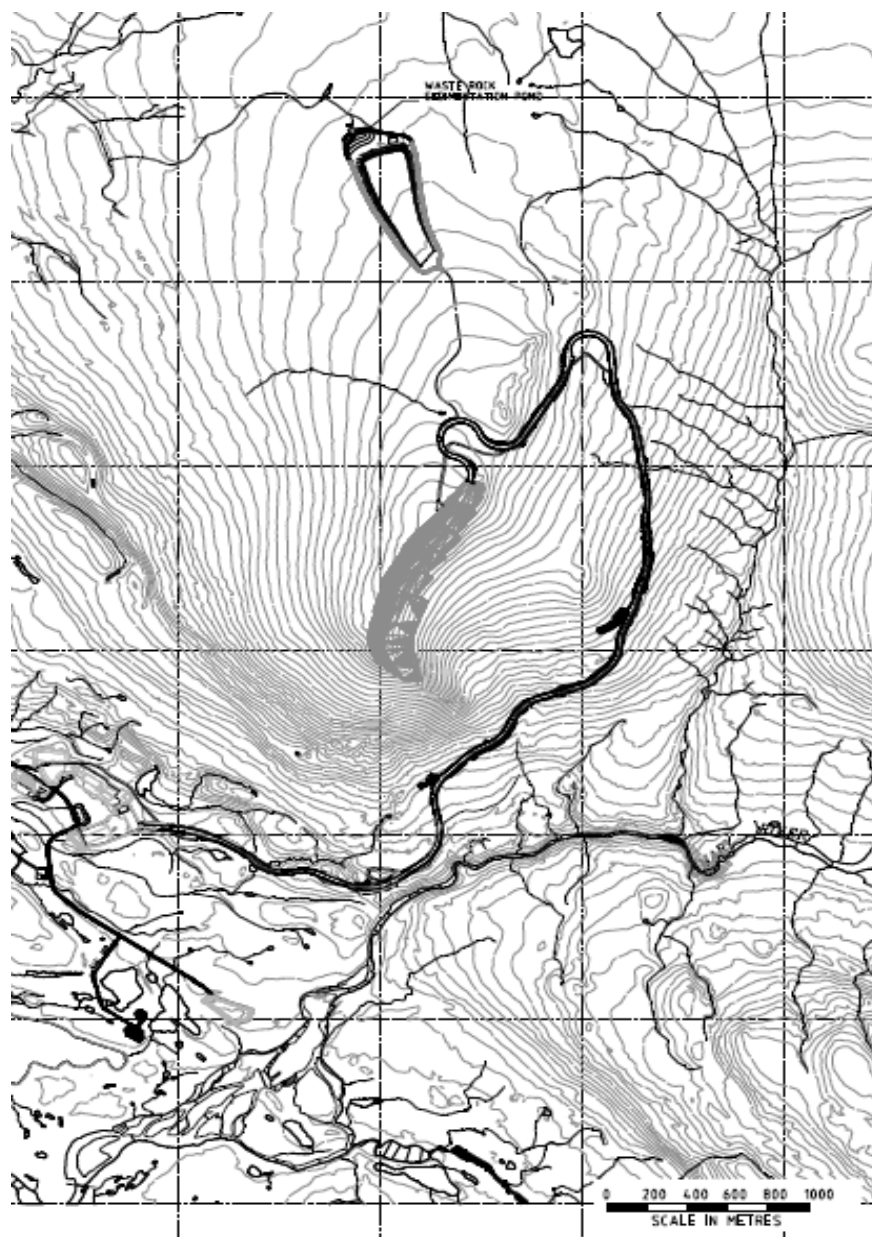



FIGURE 6-1: PHASE 1 OF THE WASTE ROCK STOCKPILE AND RUN OFF POND

6.2 PHASING OF WASTE ROCK DEPOSITION OVER TIME

A modification of the mining plan has resulted in a smaller tonnage of waste rock being produced in the earlier years of operation.

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The initial, Phase 1, waste rock storage layout for the first five years of mining is illustrated in Figure 6-1. As additional geological, geotechnical and geochemical data is collected, the waste rock deposition plan will be updated based on the application of best management practices. A geotechnical investigation will be carried out in areas where there are potential instabilities. These results will be incorporated into the ongoing waste rock stockpile design. Specifically a stability analysis of the waste rock stockpile and the open pit will be carried out to show that the combined structures are stable.

Following the planned construction of the rail line and Steensby Port, production of ore and waste rock will increase quickly with a Life of Mine for Deposit 1 total of about 600 Mt of waste rock and 30 Mt of overburden produced over the mine life.

The volume of waste rock delivered to the waste rock storage area will be recorded and will be reported as required by the NWB Type A Water Licence, 2AM-MRY1325 and the Commercial Lease, Q13C301.

6.3 MANAGEMENT OF POTENTIALLY ACID GENERATING (PAG) WASTE ROCK


The low percentage of PAG material identified in waste rock and an estimated lag time of more than five years support the management of PAG by encapsulation of the PAG material in the ultimately frozen core of the waste rock stockpile.

PAG waste rock will be identified by processing on-site analytical data from blast hole drill cuttings samples. Laboratory determination of PAG waste materials will be completed using total sulphur analysis by Leco sulphur analyser and guidance provided in Appendix A. Materials identified with a total sulphur content greater than 0.20% will be considered PAG rock or subjected to standard ABA testing for confirmation as either PAG or non-PAG rock. NAG pH testing may also be used as a screening tool for this purpose. The on-site processing of blast hole samples in the environmental laboratory will allow timely development of the waste rock deposition plan.

All material within a specified 3D radius from a sample determined to be PAG will be assigned as PAG and incorporated into the mine scheduling. When that material is loaded into the haul truck it will be directed according to the mine scheduling plan to a specific section of the waste stockpile where all the PAG rock will be encapsulated together within non-PAG waste rock.

The permanently frozen core of the stockpile will limit sulphide oxidation and prevent seepage of PAG drainage to the environment.


The outer “active” layer of the WRD which freezes and thaws seasonally will be constructed of non-PAG rock.

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6.4 GENERAL GUIDELINES USED TO DEVELOP THE WASTE ROCK STOCKPILE

The design of the waste rock storage area is based on the conservative results from laboratory test work. The design guidelines which follow will develop over time as the results of the ongoing studies and field piles become available:

- The stockpile will be constructed in lifts from the bottom up with lift and bench characteristics appropriate for the geotechnical conditions and waste handling equipment. These characteristics will be approved by the Mine Manager
- A 2-3 m thermal barrier of non-PAG waste rock will be placed during the winter months to protect the permafrost layer during the summer months and allow development of the permafrost through conduction.
- PAG waste rock should be segregated from non-PAG rock and encapsulated within the pile.
- At closure, the active layer of the waste rock stockpile should consist of non-PAG rock.
- PAG rock should all be placed in the section of the WRD which drains to the Mary River watershed.
- The perimeter of the WRD will be a minimum of 31 m from any water body.

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7 WASTE ROCK RUNOFF MANAGEMENT

The first phase of runoff management for years 1-4 for the waste rock stockpile area will consist of channels formed by berms around the stockpile perimeter produced by two roads, one on each side of the waste rock stockpile. These will channel the run off downstream of the waste rock stockpile where a sedimentation pond is formed by construction of a berm about 3 m high. The watershed, including the waste rock stockpile, contributing to this pond has an area of 20ha. The sedimentation pond will be lined and is sized to contain the 1:10 year 24 hr storm event falling on the waste rock stockpile area. The sedimentation pond will have an overflow weir capable of passing the 1:200 year storm event. Clean, non contact water from upstream of the waste rock stockpile will be diverted around the waste rock stockpile by upstream diversion berms.

Further phased drainage management berms and ponds will be designed as mining progresses. All phases of the run off management system are designed such that the discharge from sedimentation ponds flows directly into existing water courses such that surface erosion is minimized and no additional impacts are created.


Figure 6-1 shows that the initial footprint of the waste rock storage area is partially in the western watershed of the two watersheds that drain the area to the north of the open pit and which drain into Camp Lake. In order to divert the discharge from the run off pond to the Mary River watershed a berm/channel will be constructed to convey the water to an existing water course draining into a tributary of Mary River. A drawing of the waste rock drainage diversion ditch plan and profile is included as Appendix C.

Snow will accumulate on the waste rock stockpile during the winter and during the summer the melted snow along with any rainfall will seep through the active zone and run off the sides of the stockpile or drain from the foot of the perimeter of the stockpile.

Stockpile drainage water quality is expected to meet MMER discharge limits. Specifically, the existing water quality model developed in support of the larger Life-of-Mine Waste Rock Management Plan predicts that after sedimentation, drainage water quality from the non-acidic mine rock exposed during operations will meet MMER discharge requirements. Kinetic testing results and cold climate conditions at site suggest the lag time to acid on-set in PAG rock would be on the order of five years or longer providing adequate time to isolate PAG materials within the waste rock stockpile. This supports the key modeling assumption of non-acidic drainage from PAG rock during waste rock stockpile construction.

7.1 ORE STORAGE

Ore mined in the pit will be dumped on a small run-of-mine (ROM) stockpile located near the mobile crusher in the Crushing and Screening area located on the South side of the pit east of the Site Services Pad.


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Following crushing, the ore is loaded directly into ore transport trucks for transportation to Milne Port. Since ore will be stored in these locations only temporarily and the drainage during operations is controlled, there is no concern about long-term potential effects of PAG material stored at these locations.

7.2 RUNOFF WATER TREATMENT ALTERNATIVES

As identified above, existing water quality modeling and kinetic testing data indicate that runoff water quality in the Phase 1 period is not expected to contain concentrations of metals in excess of discharge requirements based upon the Metal Mining Effluent Regulations. In addition, ammonia and nitrate in the runoff are not expected to cause receiving water impacts or regulatory exceedances.

However, in the event that ongoing investigations or field monitoring of the runoff pond shows a trend toward exceedance of discharge requirements, then water treatment facilities as described in the (Life of Mine) Waste Rock Management Plan will be constructed and operated for as long as required.

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8 CLOSURE

At closure the principal objectives are the safety of the public and maintaining the physical and chemical stability of the permanent structures to ensure that there is no long-term safety or environmental impact.


Mine planning will ensure that at closure the exterior of the final stockpile consists of an active layer of non-PAG material up to 50 m thick so that the interior of the stockpile remains frozen year round in the long term. The thickness of this active layer will be determined after some years of mining experience and taking climate change into account. To minimize active layer thickness a stockpile of overburden will be retained to spread a layer of less porous material over the top of the waste rock stockpile.

When monitoring shows that runoff meets water quality objectives for closure the runoff ponds will be decommissioned and runoff will be discharged directly to the environment.

8.1 CLIMATE CHANGE CONSIDERATIONS

Studies of waste rock in permafrost demonstrate that permafrost forms an effective long-term barrier to water and oxygen, thereby preventing significant oxidation of sulphidic waste rock located below the surficial active zone. The surficial “active” zone, which will be subject to seasonal freeze-thaw, will not reach the 50 m thickness of non-PAG material in the long-term (within 200 years) under the influence of current climate change criteria (Intergovernmental Panel on Climate Change, 2007).

Therefore, over the long term, runoff water quality which is influenced by contact water that flows through the active layer in the waste rock stockpile will not be affected.

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9 ENVIRONMENTAL PERFORMANCE INDICATORS AND THRESHOLDS

Runoff quality from the waste rock and ore storage runoff management ponds is the most relevant environmental performance indicator. Discharge from these ponds shall not exceed the effluent quality limits of Part F, Item 25 in Type A Water Licence 2AM-MRY1325 and site-specific indicators shown in Table 9-1.

TABLE 9-1: DISCHARGE PERFORMANCE INDICATORS AND THRESHOLDS


Indicator	Units	Maximum Concentration of Any Grab Sample
pH		6.0 < pH < 9.5
Ammonia	mg/L	Monitored but not regulated
Nitrate	mg/L	Monitored but not regulated
Sulphate	mg/L	To be established
Arsenic	mg/L	0.5
Copper	mg/L	0.30
Lead	mg/L	0.20
Nickel	mg/L	0.50
Zinc	mg/L	0.5
TSS	mg/L	15
Oil and Grease		No visible sheen
Toxicity		Non-Acutely Toxic

In addition, Environmental Effects Monitoring or biological monitoring will be carried out as required by MMER.

Conductivity, pH and sulphate will be used as early-warning indicators to identify potential acid generation in the waste rock storage area. Ammonia and Nitrate will be monitored in run-off to ensure that no explosive material remaining on the blasted waste rock has been dissolved by water infiltrating the active layer.

Any contaminants of potential concern identified from on-going testing will be measured to provide temporal data on effluent quality that could potentially affect the receiving water quality.

The Aquatic Effects Monitoring Plan (AEMP) will be implemented to monitor environmental effects of effluent discharge from the SWM ponds at Mary River. Results of the AEMP can trigger additional adaptive management actions such as further treatment of pond effluent, if required.

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10 MONITORING AND REPORTING REQUIREMENTS

All monitoring and reporting of runoff water quality will be carried out by the Environmental Department.


This includes the annual reporting to NIRB, NWB, QIA and others.

10.1 GROUND TEMPERATURE MONITORING

Following consultation with experts from NRCan, the appropriate instrumentation will be installed in the waste rock stockpile to monitor ground temperatures and confirm the aggradation of permafrost within the waste rock stockpile and the thickness of the active layer.

Data from temperature sensors installed to monitor the ground temperatures will be collected on a regular basis and used to ensure that frozen conditions are maintained below the waste rock stockpile. In addition, the data will be used to calibrate the waste rock stockpile thermal model.

Baffinland will carry out thermal modeling of the waste rock stockpile when suitable data is available to demonstrate the robustness of the proposed waste rock stockpile deposition design and confirm that frozen conditions are maintained in the waste rock stockpile. This will take long-term climate change into account (200 years).

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11 REFERENCES

NWT Mine Health and Safety Act and Regulations

Aker Kaeverner. 2008. Definitive Feasibility Study Report Mary River Iron Ore Project Northern Baffin Island, Nunavut.


AMEC TDM-159952-0000-170-0001. Memo. July 16, 2010.

2002. Metal Mine Effluent Regulations (MMER) SOR/2002-222. Schedule 5, Part I.

Intergovernmental Panel on Climate Change. 2007.

INAC. 1992. Mine Reclamation in Northwest Territories and Yukon, prepared by Steffen Robertson and Kirsten (B.C.) Inc. for Indian and Northern Affairs Canada.

Johns, S.M. and M.D. Young. 2006. Bedrock Geology and Economic Potential of the Archean Mary River Group, Northern Baffin Island, Nunavut. Geology Survey of Canada. Current Research 2006-C5.

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Appendix A:

AMEC ML/ARD Characterization for Five Year Pit

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TECHNICAL MEMORANDUM

To **Jim Millard, Baffinland** File no **TC123908**
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Date **April 28, 2014**

**Subject Mary River Deposit 1, 5-Year Pit ML/ARD Characterization
Rev. 1 – Issued for Phase 1, WRMP**

1.0 INTRODUCTION

AMEC was retained by Baffinland Iron Mines Corporation to investigate the metal leaching and acid rock drainage (ML/ARD) potential of mine rock from the Mary River project. The current Deposit 1 mine plan includes a reduced production schedule in the first five years of operation in comparison to that originally envisioned for the project. This memo provides an updated evaluation of the available geochemical characterization results related to this revised five year mine plan. The basis for this evaluation is the data-base and report developed for the Mary River life of mine plan (AMEC 2014). This evaluation also includes recommended guidance to assist in developing appropriate waste rock management planning for the proposed five year mine plan.

1.1 Background

ML/ARD characterization of Mary River Deposit 1 waste rock within the life of mine pit has been reported (AMEC 2014). In summary, the waste rock was subdivided based on broad geo-structural categories about the iron ore zone, mainly by hanging wall and footwall zones. A total of 776 waste rock samples were selected as representing the waste rock categories and broad spatial coverage of non-ore mine rock in the vicinity of the life of mine open pit development. All 776 waste rock samples were analyzed for modified Sobek acid base accounting (ABA), NAG pH and elemental content. Subsets of drillcore samples were also analyzed for downhole variability, NAG leachate, short-term metal leaching, whole rock elemental content, detailed mineralogical analysis, and long-term kinetic testing.

Results of ABA testing determined that waste rock is generally characterized as having low neutralization potentials (NP) and low acid potentials (AP). Data suggests that the waste rock is dominated by non-carbonate sources of NP (e.g. silicates) with lesser NP derived from carbonate sources. Sulphide was the primary form of sulphur. Approximately 85% of waste rock samples had neutralization potential ratios (NPR) greater than 2 and are classified as non potentially acid generating (Non-PAG) and are unlikely to generate acidic drainage. Approximately 10% of the samples had NPR values of less than 1, and 5% of the samples were classified as having uncertain acid generating potential ($1 < \text{NPR} < 2$). Extrapolating these results to the project waste rock model, indicates that approximately 11% of the life of mine in-pit waste rock is expected to have $\text{NPR} < 2$ and is considered potentially acid generating (PAG). Proximity to ore appears to correlate to increased PAG quantities (defined as $\text{NPR} < 2$) with the hanging wall schist (HWS) and footwall schist (FWS) zones identified with the greatest proportion of PAG of the major waste units.

The revised five year mine plan is projected to produce approximately 2.5 Mt of waste rock primarily from the HWS and FWS defined waste rock regions.

1.2 Objective and Scope of Work

The objective of this analysis is to support development of the Phase 1 waste rock management plan for the project. The content of this analysis includes:

- reinterpretation of the available geochemical data to develop an understanding of early mine life waste rock in terms of ML/ARD, and
- identification of analytical options that will be effective for determination of PAG rock during mining to support the planned segregation of PAG rock during operations.

2.0 SAMPLE SELECTION RELATIVE TO FIVE YEAR PIT

Analysis of geochemical data across the life of mine pit provides reduced resolution of the much more localized waste rock units adjacent to ore within the five year pit (Figures 1 to 3). Therefore, to aid in planning for rock encountered during early mine development, a subgrouping of samples were selected from within and adjacent to the five year pit limit. Essentially only the HWS and FWS waste rock units are intersected within the volume of the five year pit. Small regions of FW material are identified along the upper-most regions on the west side of the five year pit; however, for the purposes of this analysis treating this limited region as FWS is reasonable and conservative (FWS contains proportionally more PAG rock than FW). Therefore, the subsample list was populated by extracting all HWS and FWS samples from within approximately 150m adjacent to and below the five year pit (Figures 4 and 5). The extension of the sample area laterally and below the pit was necessary due to the paucity of samples within the actual five year pit envelope which is located at high elevations above the majority of existing exploratory drilling.

3.0 COMPARISON OF FIVE YEAR AND LIFE OF MINE DATA SETS

The following sections describe the ABA and elemental content results of HWS and FWS samples within and just below the five year pit limit as described in Section 2 and compare these results to overall results for the life of mine data (AMEC 2014).

3.1 ABA

The subset of ABA data extracted from the life of mine data set in support of the five year pit development is provided in Appendix A, Tables A-1 and A-2. A statistical summary of this data in comparison to the life of mine data is provided in Table A-3 with selected parameters provided as side by side comparison in Table 1. Analysis and discussion of this comparative analysis for both the HWS and FWS zones is provided in the following sections.

3.1.1 Hanging Wall Schist

ABA results for the HWS five year data set are generally comparable to the life of mine data with the exception of distinctly lower overall sulphide content leading to a lower proportion of PAG samples in the five year data. Results for the five year data are summarized as follows.

- Paste pH values for footwall schist samples were circum-neutral to alkaline with values that ranged from 7.4 to 9.7 and a median of 8.5.
- Total sulphur contents ranged from the minimum detection limit (MDL) of 0.005 to 1.2% with a median and average of 0.11 and 0.14% respectively.
- The majority of the sulphur is in the form of sulphide (Figure 6) with concentrations that ranged from the MDL of 0.01 to 0.97% with a median and average of 0.02 and 0.08% respectively.

- The sulphide content for the five year data is distinctly less than the life of mine data with a median sulphide content of 0.02% in comparison to 0.06% and a 90th percentile sulphide content of 0.15% in comparison to 0.72%.
- The NP ranged from 7.0 to 104 kg CaCO₃/t with median and mean values of 16 and 23 kg CaCO₃/t respectively.
- In general the carbonate NP (CarbNP) was lower than the NP (Figure 7) indicating a predominance of non-carbonate NP (silicates).
- One of 53 samples had CarbNP higher than the corresponding NP, which was interpreted to be due to the presence of iron or manganese carbonates that do not provide effective neutralization potential.
- NPR ranged from 0.41 to 268 with median and mean values of 26 and 9.5 respectively.
- Based on the NPR distribution where values less than 2 are considered PAG, one of 53 samples (2%) would be classified as PAG (Table 2; Figure 8).

3.1.2 Footwall Schist

ABA results for the FWS five year data set are generally comparable to the life of mine data with the exception of slightly lower sulphide content resulting in a lower proportion of PAG samples in the five year data. Results for the five year data are summarized as follows.

- Paste pH values for footwall schist samples were circum-neutral to alkaline with values that ranged from 6.4 to 10 and a median of 9.1.
- Total sulphur contents ranged from the MDL of 0.005 to 5.6% with a median and average of 0.01 and 0.32% respectively.
- The majority of the sulphur is in the form of sulphide (Figure 9) with concentrations that ranged from the MDL of 0.01 to 4.2% with a median and average of 0.01 and 0.23% respectively.
- At the 90th percentile, the sulphide content for the five year data is less than half that of the life of mine data (0.31% in comparison to 0.72%).
- The NP ranged from 5.3 to 59 kg CaCO₃/t with median and mean values of 13 and 17 kg CaCO₃/t respectively.
- The NP at the 90th percentile for the five year data was slightly higher than that of the life of mine data (29 kg CaCO₃/t in comparison to 26 kg CaCO₃/t).
- In general the CarbNP was lower than the NP (Figure 10) indicating a predominance of non-carbonate NP (silicates).
- Five of 40 samples had CarbNP higher than the corresponding NP, which was interpreted to be due to the presence of iron or manganese carbonates that do not provide effective neutralization potential.
- NPR ranged from 0.21 to 176 with median and mean values of 36 and 2.4 respectively.
- Based on the NPR distribution where values less than 2 are considered PAG, 5 of 40 samples (8%) would be classified as PAG (Table 2; Figure 11).

3.1.3 Analysis of Decreased PAG Proportion in Five Year Pit

From the analysis above it is observed that the proportion of PAG on the basis of NPR <2 is lower in the HWS and FWS units projected to surface in the vicinity of the five year pit than the overall life of mine pit. In order to further support this observation, the life of mine ABA data was evaluated in comparison to elevation.

Plots of total sulphur, sulphide, NP and NPR variation by elevation are provided in Figures 12 through 15. A distinct decrease in total sulphur and sulphide is observed in both the HWS and FWS sample sets above an elevation of 420 masl. The majority of HWS and FWS samples above the lowest elevation of the five year pit (~570 masl) are less than 0.5% total sulphur and less than 0.3% sulphide (Figures 12 and 13). The variation of NP with depth (Figure 14) is observed to decrease in the highest range and increase in lowest range with little change in average NP. The net result of the sulphide (and AP) and NP responses with decreasing depth are an overall shift toward higher NPR at shallower depths (Figure 15) and especially for those samples above the base of the five year pit.

3.2 Elemental Content

The subset of elemental content data extracted from the life of mine data set in support of the five year pit development is provided in Appendix A, Table A-4. A statistical summary of this data in comparison to the life of mine data is provided in Table 3. For screening purposes, elemental content of the mine rock samples were compared to 10 times average continental crust values (Price, 1997). The number of enriched samples are summarized in Table 4 and compared to results for the life of mine data set.

The list of elements exceeding the 10 times screening criteria are similar between the five year data set and the life of mine data set. Some infrequently observed enriched elements in the larger life of mine data set are not observed in the five year data set.

Concentrations of Bi exceeded the screening value of 0.25 µg/g for 14% of the samples (13 of 93 samples). Bi exceedances of the 10 times criteria for the various waste types on a percentage basis are lowest in the hanging wall schist.

A total of 8 of the 93 samples were greater than the MDL for selenium which also exceeded the screening value. It is noted that the MDL for selenium (0.7 µg/g) is greater than the 10 times crustal abundance value of 0.5 µg/g.

Three elements (arsenic, silver and molybdenum) had 3-8% of their concentrations above their respective screening values. Chromium, gold, iron, lithium, manganese and antimony had 1-2% of their samples concentrations above the applicable screening values.

4.0 GUIDANCE ON PAG ROCK MANAGEMENT

Total sulphur, sulphide and NAG pH can be interpreted as predictors of PAG materials on the basis of NPR <2 (Figures 16 through 18). Specifically, a total sulphur content of >0.2% and NAG pH of <4.5 are predictors of PAG material (NPR <2).

An analysis of the effectiveness and errors associated with the use of the above thresholds for categorization of PAG and Non-PAG samples in relation to the life of mine ABA data set is provided in Table 5 and Figures 19 through 21. Use of sulphur content in excess of 0.2% results in a small percent of PAG samples (0.1%) being incorrectly categorized as Non-PAG. A higher percentage (10%) of Non-PAG samples were incorrectly categorized as PAG. The use of NAG pH <4.5 resulted in 3% of PAG samples incorrectly categorized as Non-PAG and 2% of Non-PAG samples incorrectly categorized as PAG.

For the critical segregation factor which is to prevent PAG being identified as Non-PAG the sulphur cut-off of $>0.2\%$ is the most effective approach. PAG quantity estimates using the sulphur cut-off ($>0.2\%$) in comparison to the original ABA data (NPR <2) are provided in Table 6. Using the sulphur cut-off results in an increase in the life of mine projected PAG quantity (without considering increased volumes due to dilution effects) from 63 Mt to 110 Mt.

Applying the sulphur cut-off followed by NAG pH check increased the reliability of PAG classification with the combined analyses resulting in a decrease in misclassification of Non-PAG as PAG from 10% to 1% (Table 5, Figure 21). However, there is a subset of 23 PAG samples (3%) that are misclassified as Non-PAG using NAG pH <4.5 . The reason for the misclassifications is presently unknown; however, it was noted that a high proportion of these samples (12) are iron formation samples. For comparison, the misclassified samples that aren't iron formation represent 1.6% of all non-iron formation samples.

5.0 SUMMARY AND CONCLUSIONS

Analysis of a set of samples proximal to the proposed five year pit has been completed that indicates a lower sulphur and sulphide content is likely to be encountered in the shallower rock of early development than at depth during later production. This lower sulphide content is expected to result in a lower percentage of PAG rock being encountered during early operations than would be predicted by extrapolating waste rock data in similar proximity to the ore to near surface. A comparison of the overall percentages and quantities of PAG materials for the HWS and FWS for the life of mine pit as well as the five year pit are provided in Table 7.

A sulphur content of $>0.2\%$ has been determined to be indicative of PAG material (NPR <2) and would be a suitable screening test to segregate PAG and Non-PAG using sulphur by Leco S analyser. The addition of the NAG pH test to those PAG samples identified by sulphur $>0.2\%$ can substantially reduce the potential for incorrect classification of Non-PAG samples as PAG. However, the data presently suggests use of the NAG pH test could result in a misclassification of PAG samples as Non-PAG in 1 to 3% of samples (for available data).

The NAG pH test should be explored further as a potential means of refining PAG and Non-PAG segregation through the Phase 1 development. The additional test if proven in the operational setting may provide a relatively efficient means to allow a significant reduction in the amount of Non-PAG material managed as PAG for the Life of Mine project.

It is noted that due to ore body geometry and availability of exploration drilling intersects there is an inherent limitation in sample coverage of the waste rock within the five year pit envelope. Therefore, for planning purposes and the Phase 1 waste rock management plan, AMEC recommends that a minimum of 10% PAG rock be assumed for HWS and FWS waste rock (Table 7). The above 10% PAG allowance excludes any increases due to field screening and dilution.

6.0 REFERENCES

- AMEC, 2014. Mine Rock ML/ARD Characterization Report Deposit 1, Mary River Project, March 2014.
- Price, W.A. 1997, DRAFT Guidelines and Recommended Method for Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. British Columbia Ministry of Employment and Investment, Energy and Minerals Division. Smithers, B.C.

TABLES

Table 1: Summary and Comparison of ABA Results (Five Year and End of Mine Sample Sets)

		Total Sulphur		Sulphide*		AP		NP		CarbNP		NPR		CarbNPR	
		%		%		kg CaCO ₃ /t		kg CaCO ₃ /t		kg CaCO ₃ /t					
		5 Year Pit	LOM Pit	5 Year Pit	LOM Pit	5 Year Pit	LOM Pit	5 Year Pit	LOM Pit	5 Year Pit	LOM Pit	5 Year Pit	LOM Pit		
Footwall Schist	Count	40	143	40	143	40	143	40	143	40	143	40	143	40	143
	Min	0.0050	0.0050	0.010	0.010	0.31	0.31	5.3	4.6	0.083	0.083	0.21	0.21	0.019	0.0034
	Max	5.6	5.6	4.2	4.2	130	130	59	71	129	178	176	176	345	345
	Median	0.011	0.044	0.010	0.010	0.31	0.31	13	13	0.54	0.50	36	23	1.6	1.0
	Average	0.32	0.29	0.23	0.23	7.1	7.0	17	16	11	8.5	2.4	2.3	1.5	1.2
	Standard Deviation	1.00	0.70	0.74	0.58	23	18	12	11	30	27	35	27	55	30
	10th Percentile	0.0050	0.0050	0.010	0.010	0.31	0.31	7.2	7.4	0.083	0.083	1.4	0.90	0.19	0.039
	90th Percentile	0.53	0.74	0.31	0.72	9.5	22	29	26	17	14	78	62	17	6.8
Hanging Wall Schist	Count	53	270	53	270	53	270	53	270	53	270	53	270	53	270
	Min	0.0050	0.0050	0.010	0.010	0.31	0.31	7.0	-6.5	0.083	0.083	0.41	0.000033	0.019	0.00035
	Max	1.2	22	0.97	22	30	693	104	487	79	514	268	621	232	571
	Median	0.11	0.12	0.019	0.057	0.59	1.8	16	18	1.0	0.62	26	13	1.3	0.37
	Average	0.14	0.60	0.076	0.48	2.4	15	23	26	8.0	17	9.5	1.7	3.4	1.1
	Standard Deviation	0.19	2.0	0.14	1.8	4.5	56	20	46	19	56	42	50	39	41
	10th Percentile	0.0050	0.0080	0.010	0.010	0.31	0.31	11	7.7	0.090	0.083	4.1	0.41	0.069	0.0095
	90th Percentile	0.26	0.91	0.15	0.72	4.7	22	31	33	18	21	55	73	20	19

*As total sulphur - sulphate

Table 2: Five Year Pit NPR Distribution

Waste Classification	Number of Samples	NPR Distribution				
		NPR < 1	1 < NPR < 2	2 < NPR < 3	3 < NPR < 4	NPR > 4
All	93	3	3	3	2	82
Footwall Schist	40	2	3	0	1	34
Hanging Wall Schist	53	1	0	3	1	48
Waste Classification	Number of Samples	Carbonate NPR Distribution				
		NPR < 1	1 < NPR < 2	2 < NPR < 3	3 < NPR < 4	NPR > 4
All	93	42	12	7	7	25
Footwall Schist	40	16	8	4	4	8
Hanging Wall Schist	53	26	4	3	3	17

Table 3: Summary of Elemental Content for the 5 Year Pit

		Hg	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Li	Mg
		µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
Footwall Schist	Count	40	13	13	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	Min	0.10	0.020	0.010	1,700	0.50	0.90	0.21	0.090	110	0.020	4.4	12	1.8	20,000	40	2.0	8,600
	Max	0.10	0.15	1.3	100,000	147	1,600	5.0	2.3	19,000	0.38	52	600	380	470,000	39,000	244	91,000
	Median	0.10	0.020	0.060	34,000	0.60	180	0.71	0.095	1,500	0.040	12	72	10	70,000	9,050	17	21,500
	Average	0.10	0.030	0.22	42,860	7.0	234	1.0	0.26	3,157	0.096	15	114	33	118,125	10,414	24	31,970
	Standard Deviation	4.2E-17	0.036	0.36	24,634	26	307	0.88	0.40	4,519	0.096	10	119	68	114,764	10,130	38	23,918
	10th Percentile	0.10	0.020	0.014	17,700	0.50	3.1	0.37	0.090	368	0.020	6.3	27	3.1	29,000	177	3.8	10,840
	90th Percentile	0.10	0.020	0.47	80,100	4.7	534	2.0	0.52	8,290	0.20	25	240	70	234,000	20,800	36	70,000
Hanging Wall Schist	Count	53	33	33	53	53	53	53	53	53	53	53	53	53	53	53	53	53
	Min	0.10	0.020	0.010	10	0.50	0.010	0.020	0.090	25	0.020	0.25	0.50	0.10	33	1.0	2.0	19
	Max	0.10	0.040	1.3	116,000	59	660	3.5	28	43,000	0.60	67	1,260	180	600,000	31,000	370	110,000
	Median	0.10	0.020	0.05	39,000	0.50	31	0.32	0.090	1,700	0.080	26	150	73	63,000	2,500	19	25,000
	Average	0.10	0.021	0.12	40,885	2.6	123	0.62	0.65	7,233	0.12	27	215	71	82,548	7,239	32	30,238
	Standard Deviation	5.6E-17	0.0035	0.29	22,623	8.4	185	0.78	3.8	9,994	0.11	15	213	53	89,986	8,500	51	21,715
	10th Percentile	0.10	0.020	0.010	16,200	0.50	2.2	0.070	0.090	312	0.020	9.9	61	5.1	15,000	114	7.2	7,920
	90th Percentile	0.10	0.020	0.12	71,000	3.5	472	1.6	0.22	24,000	0.20	48	500	140	159,000	20,000	56	54,800

		Mn	Mo	Na	Ni	P	Pb	S	Sb	Se	Sn	Sr	Ti	Tl	U	V	Y	Zn
		µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
Footwall Schist	Count	40	40	40	40	13	40	20	40	40	40	40	40	40	40	40	13	40
	Min	83	0.30	28	5.3	32	1.3	41	0.80	0.70	0.50	0.8	72	0.020	0.42	2.0	1.1	3.9
	Max	11,000	360	1,100	260	5,400	32	1,200	1.4	6.2	4.6	28	3,100	1.6	8.4	170	14	110
	Median	530	2.1	275	27	390	4.1	89	0.80	0.70	0.80	3.4	745	0.23	1.8	32	3.7	32
	Average	1,430	18	306	46	1,030	5.9	260	0.82	0.95	1.2	5.5	1,000	0.31	2.2	45	5.7	40
	Standard Deviation	2,770	62	248	51	1,587	5.8	362	0.09	0.95	1.02	5.3	803	0.34	1.7	41	4.3	26
	10th Percentile	170	0.30	55	8.1	56	1.8	54	0.80	0.70	0.50	1.8	238	0.030	0.68	7.9	1.6	14
	90th Percentile	2,210	13	570	101	2,960	13	911	0.80	0.76	2.9	12	2,310	0.64	4.1	101	12	77
Hanging Wall Schist	Count	53	53	53	53	33	53	0	53	53	53	53	53	53	53	53	33	53
	Min	2.3	0.30	9.0	0.10	7.0	0.40	-	0.80	0.70	0.50	0.22	0.10	0.020	0.0080	1.0	0.63	0.70
	Max	2,600	39	2,000	430	2,200	113	-	14	1.4	4.6	35	3,000	1.6	7.3	210	6.5	145
	Median	370	0.90	350	93	280	2.2	-	0.80	0.70	0.50	9.7	1,000	0.10	0.22	65	2.7	37
	Average	502	2.3	527	109	348	5.2	-	1.1	0.74	0.90	11	1,060	0.23	0.83	87	2.8	41
	Standard Deviation	440	5.7	522	93	402	15	-	1.8	0.14	0.79	7.5	789	0.33	1.3	58	1.4	29
	10th Percentile	152	0.42	86	30	42	0.85	-	0.80	0.70	0.50	2.8	180	0.020	0.012	22	1.2	14
	90th Percentile	850	3.0	1,378	200	612	6.0	-	0.80	0.70	1.7	21	2,000	0.49	1.8	170	4.5	71

Table 4: Summary of Enriched Elements (> 10x Crustal Abundance)

5 Year Pit	Waste Classification	Au	Ag	As	Bi	Cd	Cr	Fe	Li	Mn	Mo	Ni	S	Sb	Se*	Zn
		µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
	Number of Samples	46	46	93	93	93	93	93	93	93	93	93	93	93	93	93
	Avg Crustal	0.004	0.075	1.8	0.025	0.15	102	56300	20	950	1.2	84	350	0.2	0.05	70
	10x Avg Crustal	0.04	0.75	18	0.25	1.5	1020	563000	200	9500	12	840	3500	2	0.5	700
	All	1	3	3	13	-	1	1	2	2	7	-	-	1	8	-
	Footwall Schist	1	1	2	9	-	-	-	1	2	5	-	-	-	4	-
	Hanging Wall Schist	-	2	1	4	-	1	1	1	-	2	-	-	1	4	-

LOM Pit	Waste Classification	Au	Ag	As	Bi	Cd	Cr	Fe	Li	Mn	Mo	Ni	S	Sb	Se*	Zn
		µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
	Number of Samples	261	261	413	413	413	413	413	413	413	413	413	413	413	413	413
	Avg Crustal	0.004	0.075	1.8	0.025	0.15	102	56300	20	950	1.2	84	350	0.2	0.05	70
	10x Avg Crustal	0.04	0.75	18	0.25	1.5	1020	563000	200	9500	12	840	3500	2	0.5	700
	All	11	4	28	81	2	5	18	3	9	32	3	10	3	62	1
	Footwall Schist	5	2	4	32	1	-	10	3	5	15	1	2	2	18	1
	Hanging Wall Schist	6	2	24	49	1	5	8	-	4	17	2	8	1	44	-

*Only values above detection are included

Table 5: Assessment of Sulphur and NAG pH to Define PAG Material

Description		Correctly Categorized		Incorrectly Categorized	
		Non-PAG as Non-PAG	PAG as PAG	Non-PAG as PAG	PAG as Non-PAG
		776	776	776	776
Sulphur >0.2% as PAG	Number of Samples	584	114	77	1
	Percent	75%	15%	10%	0.1%
NAG pH <4.5 as PAG	Number of Samples	648	92	13	23**
	Percent	84%	12%	2%	3%
Sulphur >0.2% followed by NAG pH check*	Number of Samples	652	92	9	23**
	Percent	84%	12%	1%	3%

* NAG pH check on apparent PAG samples from sulphur >0.2%.

**Includes 12 iron formation samples which is proportionally high for the data set (see text).

Table 6: Tonnage Distribution for Life of Mine Pit (Comparison of PAG by NPR <2 and S >0.2%)

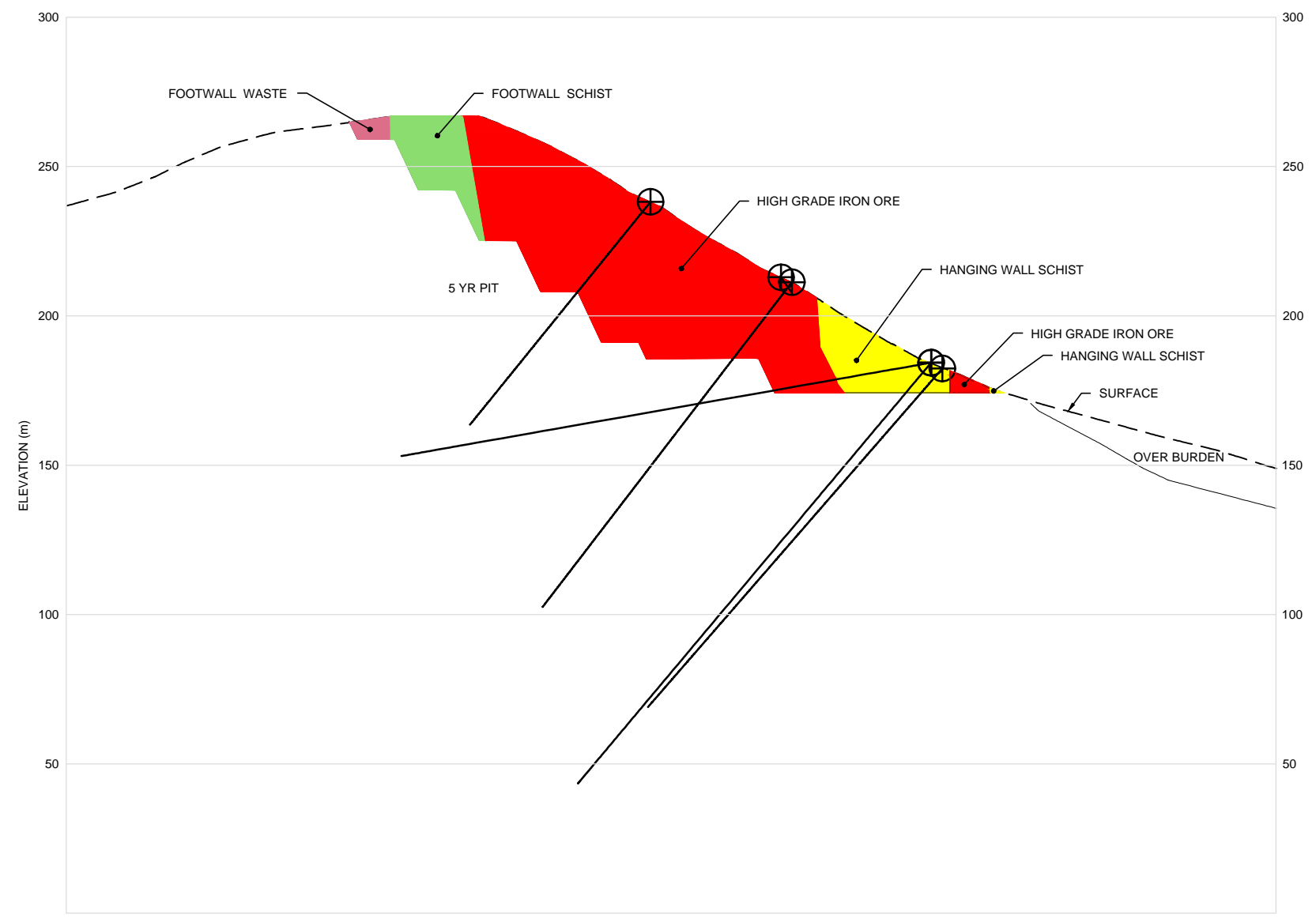
Waste Rock Domain	Tonnage	No. Samples	Mean Sulphur	Mean NPR*	% Samples NPR <2	PAG tonnage	% Samples Sulphur >0.2%	PAG tonnage
	(Mt)		%			(Mt)		(Mt)
Footwall Schist	74.1	143	0.29	2.3	20%	15.0	28%	20.7
Footwall Waste	263	271	0.070	12	4%	9.7	8%	21.4
Hanging Wall Schist	139.6	270	0.60	1.7	24%	33.1	40%	56.4
Hanging Wall Waste	77.5	62	0.074	20	0%	0	5%	3.8
Internal Waste	2.1	12	0.61	1.0	42%	0.9	42%	0.9
Mineralized Waste	9.7	18	0.81	1.7	41%	4.0	67%	6.5
Total	566	776				62.7		109.5

Table 7: HWS and FWS PAG Tonnage Estimates

Waste Classification	Number of Samples		Tonnage (Mt)		% PAG*		Tonnage (Mt) PAG*		For Planning (5 year pit)	
	LOM Pit	5 Year Pit	LOM Pit	5 Year Pit	LOM Pit	5 Year Pit	LOM Pit	5 Year Pit	% PAG	Tonnage (Mt) PAG
Footwall Schist	143	40	74.1	0.81	20%	8%	14.8	0.07	10%	0.08
Hanging Wall Schist	270	53	140	1.70	24%	2%	33.5	0.03	10%	0.17






*Based on NPR<2

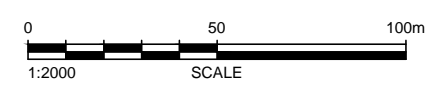
FIGURES





- NOTES:
1. DRAWING PRODUCED FROM DIGITAL FILES PROVIDED BY BAFFINLAND IRON MINES CORPORATION.
 2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.

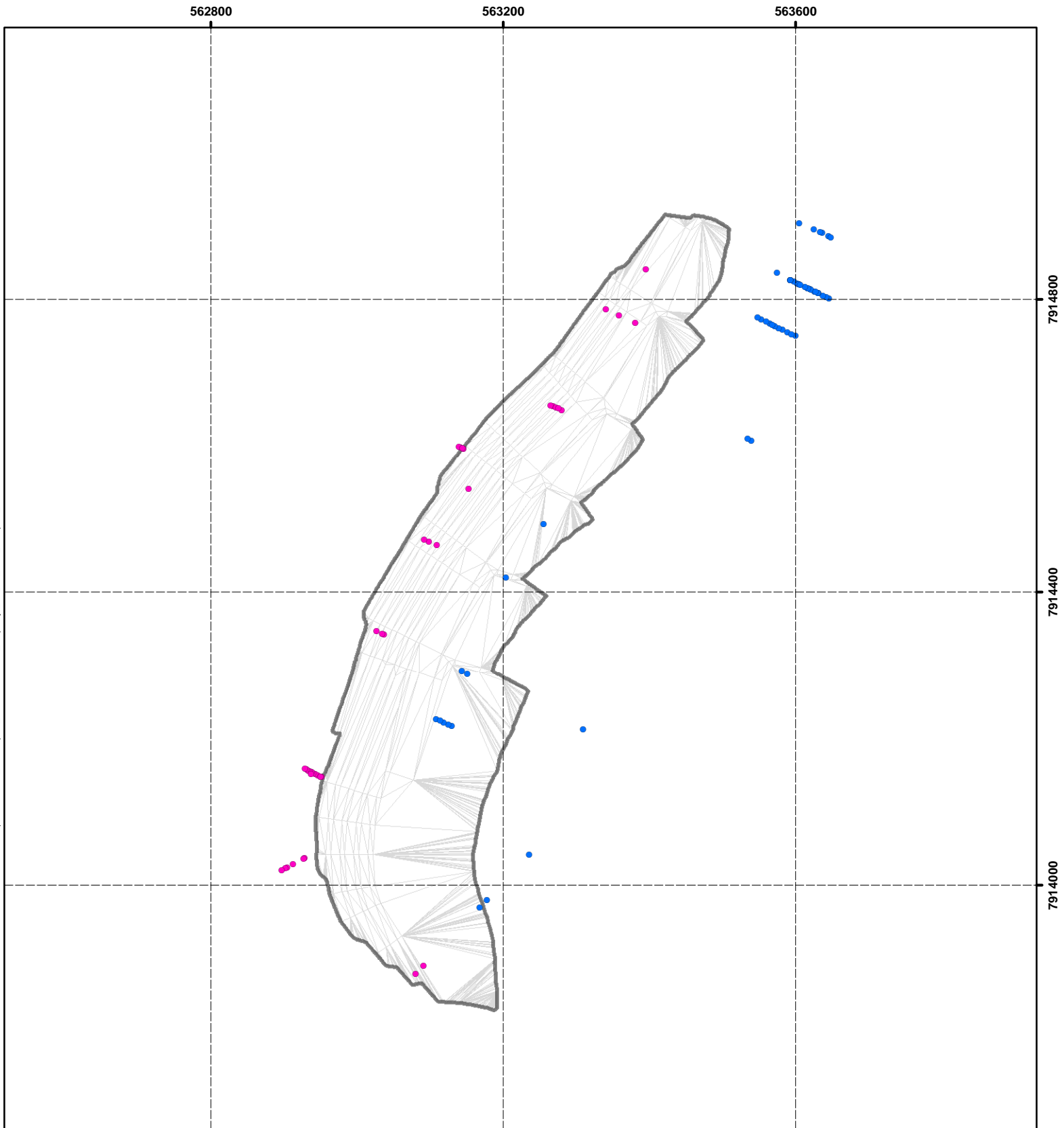
LEGEND:

	HIGH GRADE IRON ORE
	FOOTWALL SCHIST
	HANGING WALL SCHIST
	FOOTWALL WASTE
	EXISTING BOREHOLE






CLIENT LOGO 	CLIENT: BAFFINLAND IRON MINES CORPORATION AMEC Environment & Infrastructure 160 Traders Boulevard East Mississauga, Ontario, Canada L4Z 3K7 	DWN BY: NR	PROJECT MARY RIVER PROJECT DEPOSIT 1 TITLE FIVE YEAR PIT CROSS SECTION #2	DATE: APRIL 2014
		CHK'D BY: SW		PROJECT NO.: TC123908
		DATUM: NAD 83		REV. NO.: A
		PROJECTION: UTM ZONE 17N		FIGURE No. 3
		SCALE: AS SHOWN		

P:\Geo1 - PROJECTS\2012\TC123908-Baffinland Iron Mines Corp\07. GIS\3D_PitSamples_March2014\MXD_Maps\5yr_Pit_2D_ABA_Samples_4.mxd



LEGEND

-  Proposed 5 Year Open Pit Boundary
-  Footwall Schist ARD Sample Locations
-  Hanging Wall Schist ARD Sample Locations

NOTES:

Datum: NAD83
Projection: UTM Zone 17N



MARY RIVER PROJECT

Plan View of ARD Sample Distribution Adjacent to the 5 Year Deposit 1 Pit Shell

PROJECT N^o: TC123908

FIGURE: 4

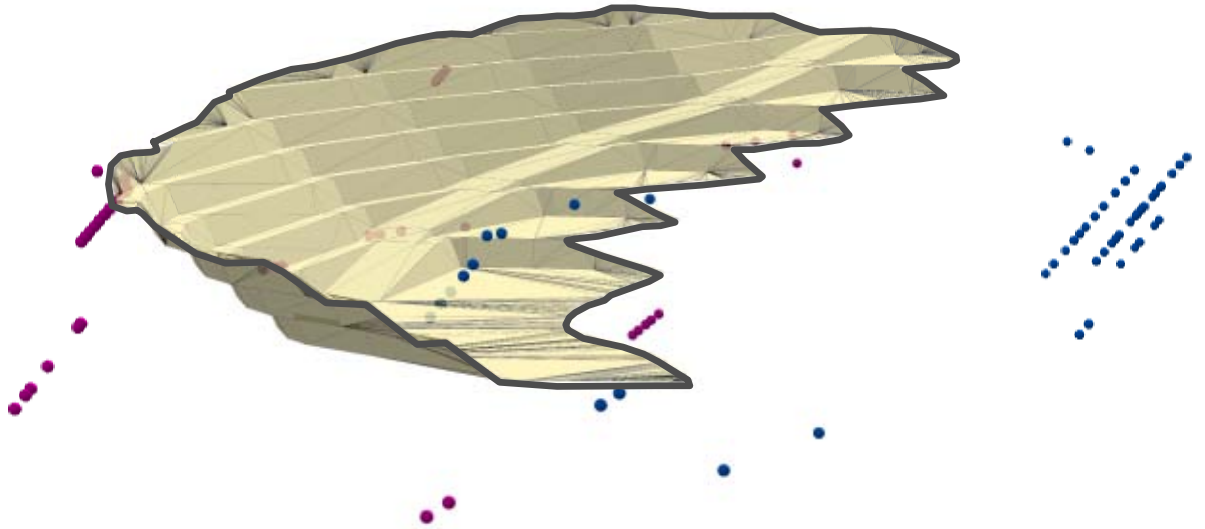
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DATE: April 2014

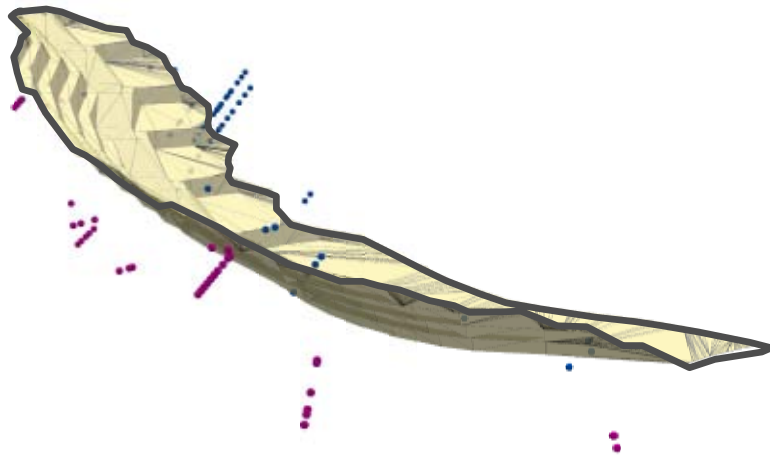
0 75 150 300 450 600
Metres






Three-Dimensional Looking North (linear scale varies in this perspective)



Three-Dimensional Looking Northeast (linear scale varies in this perspective)



LEGEND

-  Proposed 5 Year Open Pit Boundary
-  Footwall Schist ARD Sample Locations
-  Hanging Wall Schist ARD Sample Locations

NOTES:

-



MARY RIVER PROJECT

**Oblique View of ARD Sample Distribution
Adjacent to the 5 Year Deposit 1 Pit Shell**

Datum: NAD83
Projection: UTM Zone 17N

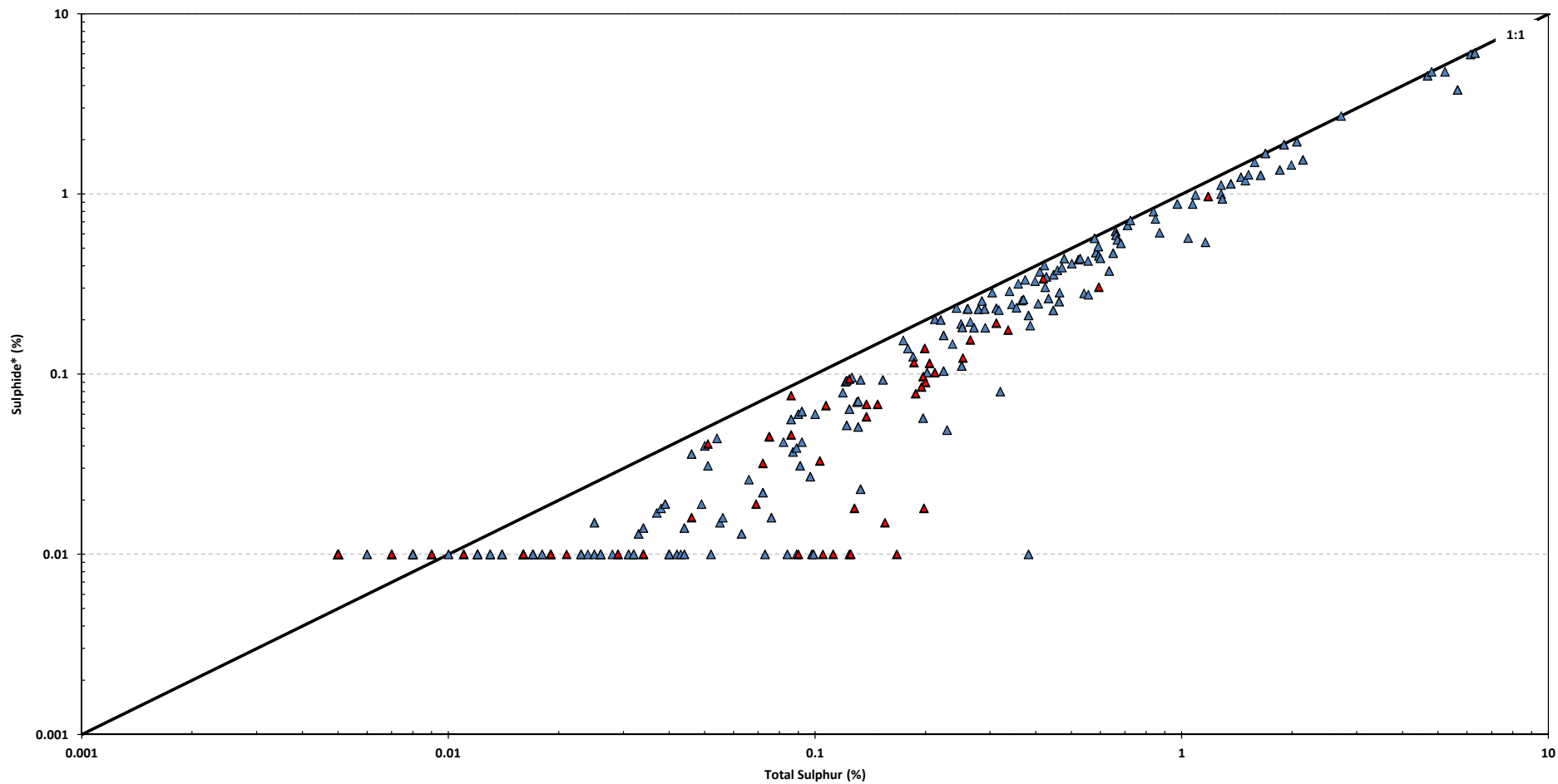


PROJECT N^o: TC123908

FIGURE: 5



SCALE:

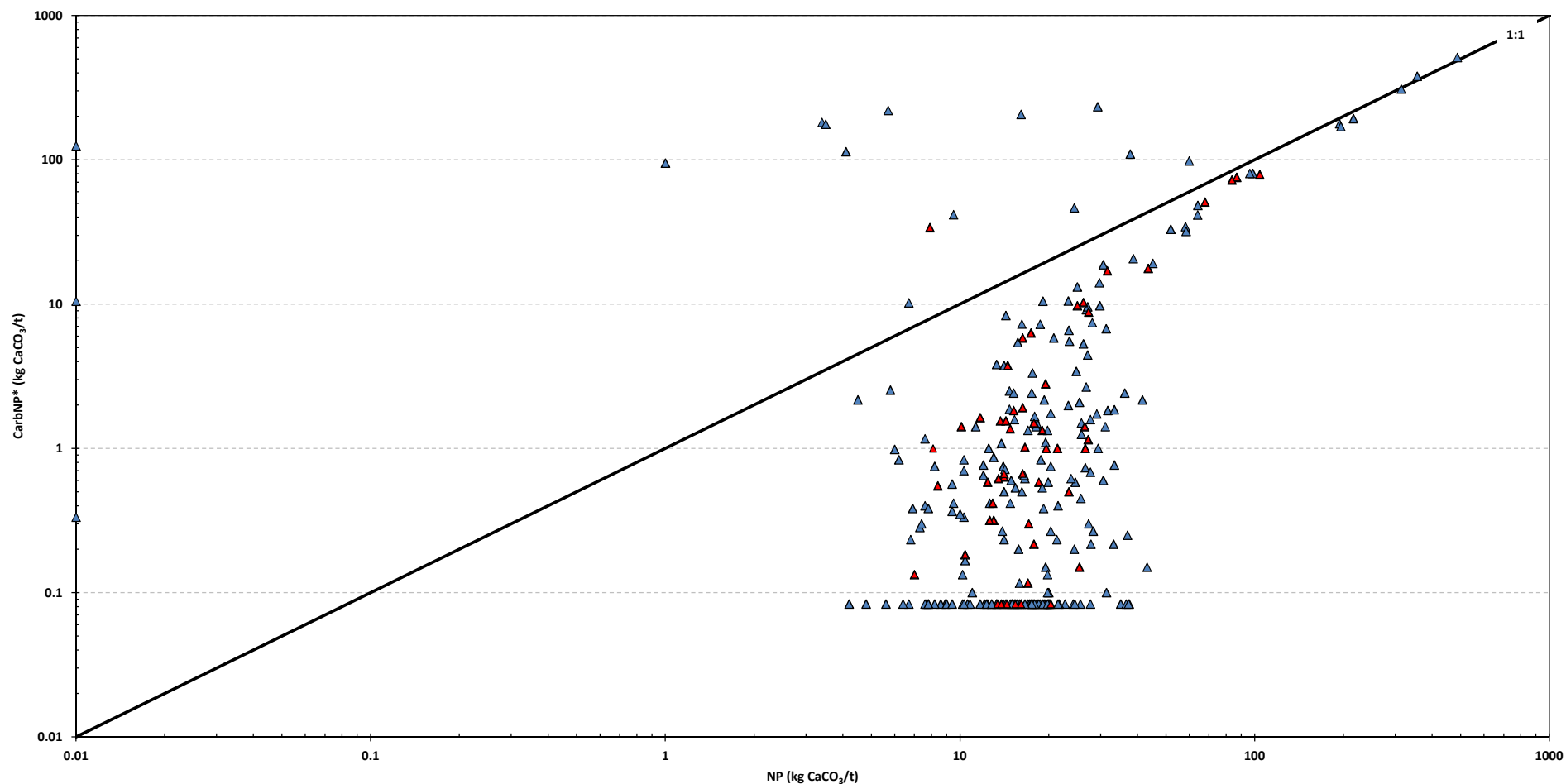
DATE: April 2014



*Sulphide = Total Sulphur - Sulphate

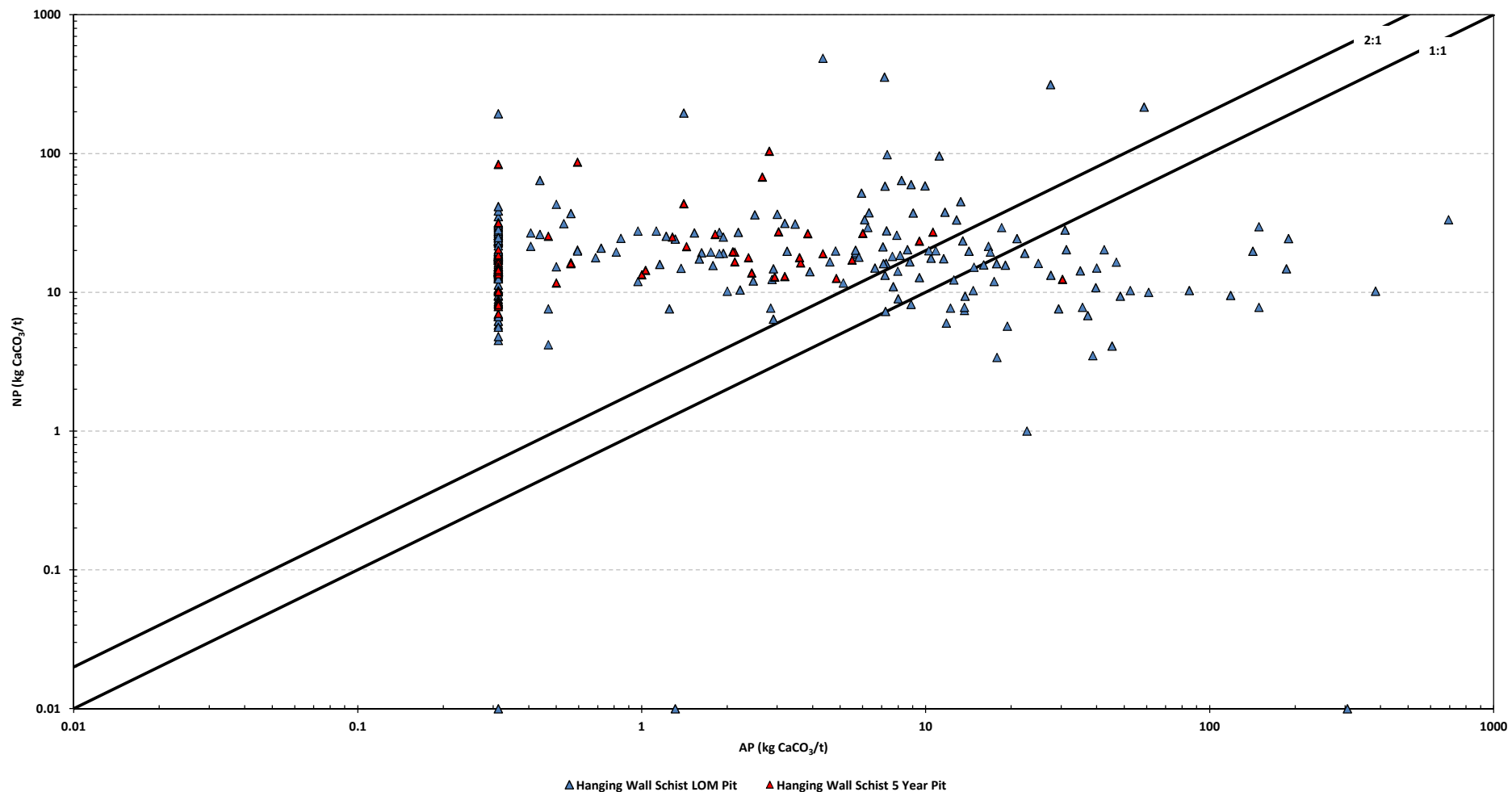
▲ Hanging Wall Schist LOM Pit ▲ Hanging Wall Schist 5 Year Pit



 	
Mary River Project	
Total Sulphur vs Sulphide for Hanging Wall Schist	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 6

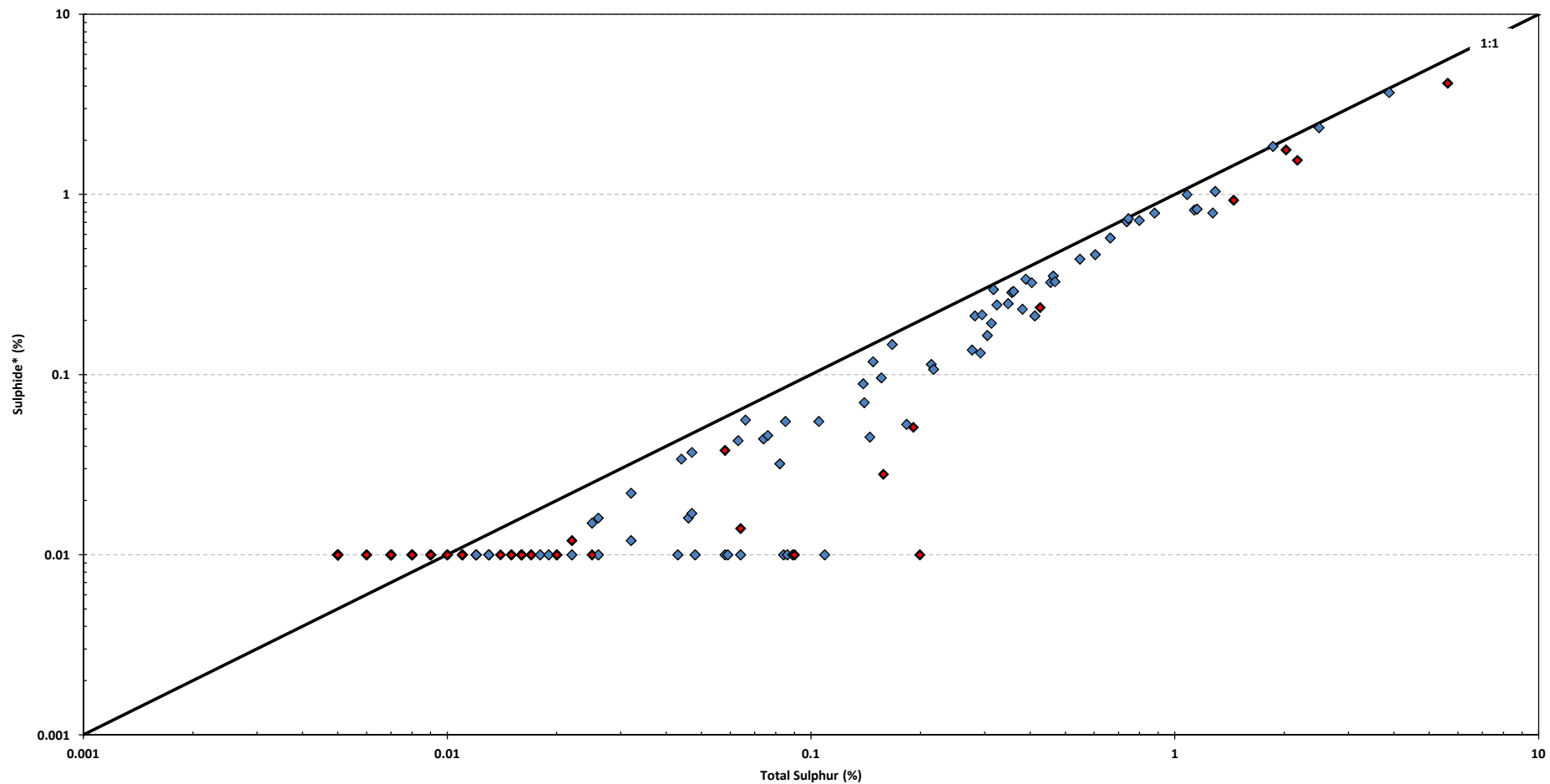


*Samples from 2010 CarbNP calculated off total carbon, samples from 2011 onwards CarbNP calculated off carbonate carbon

 	
Mary River Project	
NP vs. CarbNP for Hanging Wall Schist	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 7



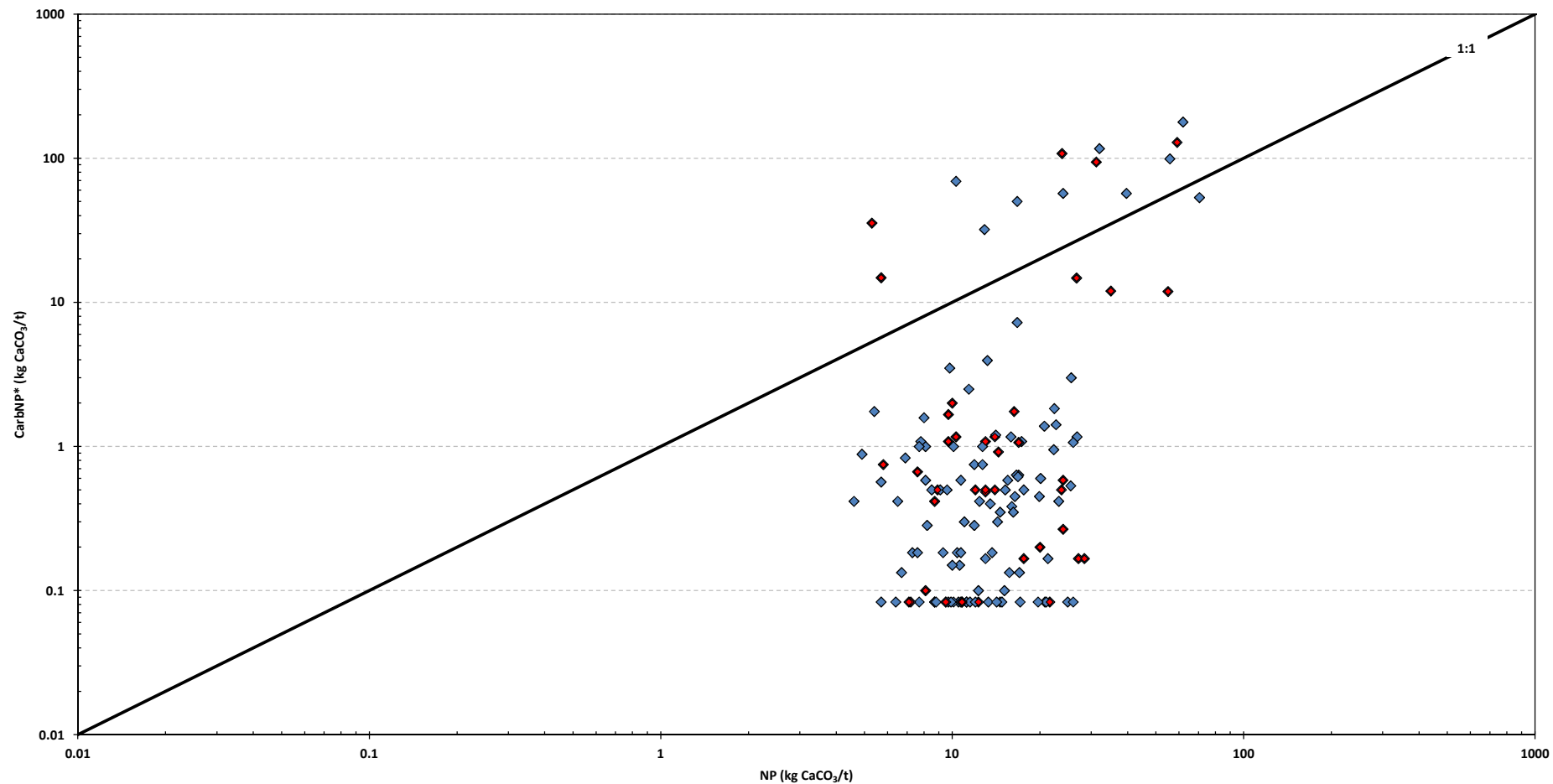
 	
Mary River Project	
NP vs. AP for Hanging Wall Schist	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 8



*Sulphide = Total Sulphur - Sulphate

◆ Footwall Schist LOM Pit ◆ Footwall Schist 5 Year Pit

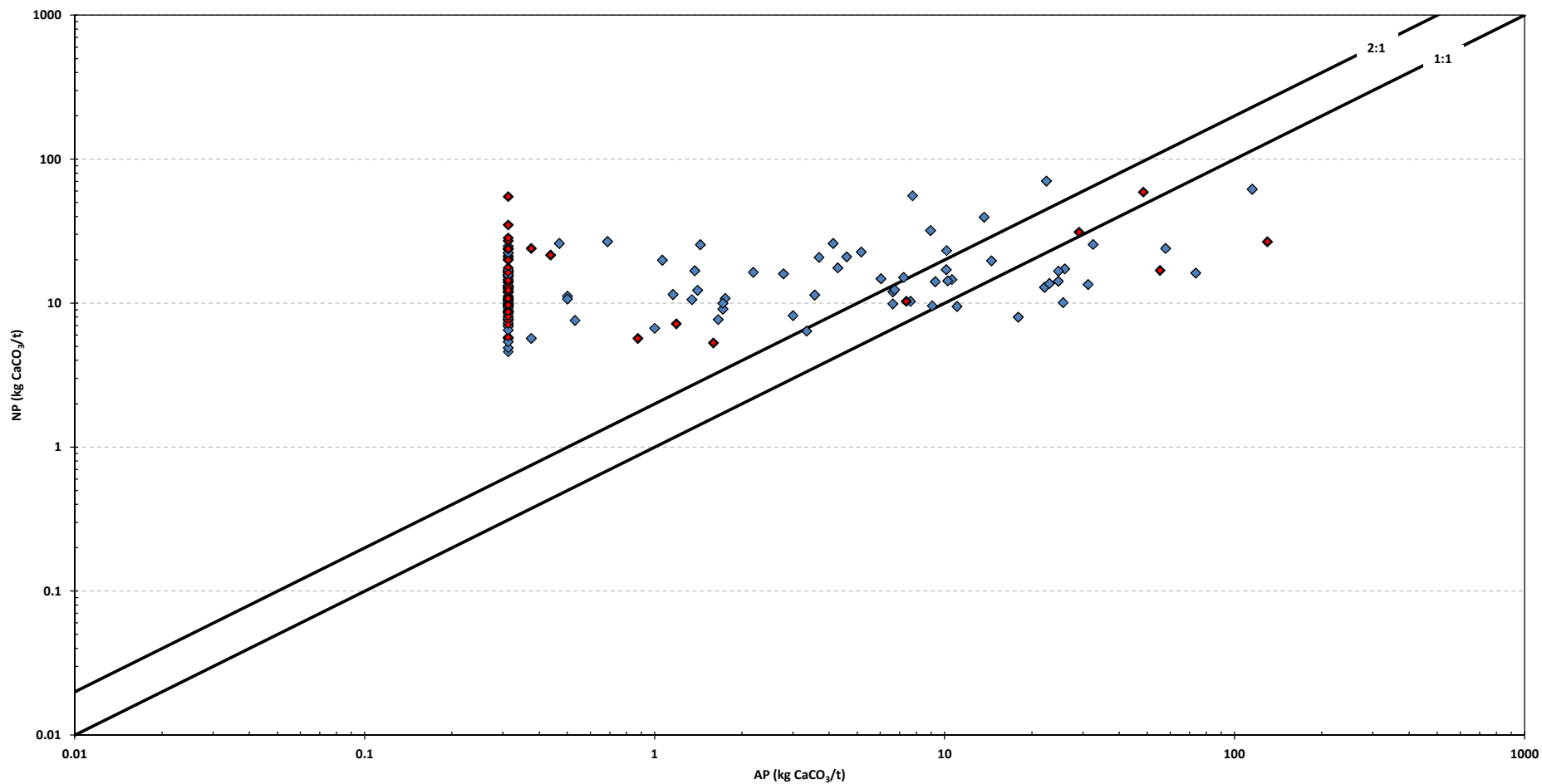
 	
Mary River Project	
Total Sulphur vs Sulphide for Footwall Schist	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 9



*Samples from 2010 CarbNP calculated off total carbon, samples from 2011 onwards CarbNP calculated off carbonate carbon

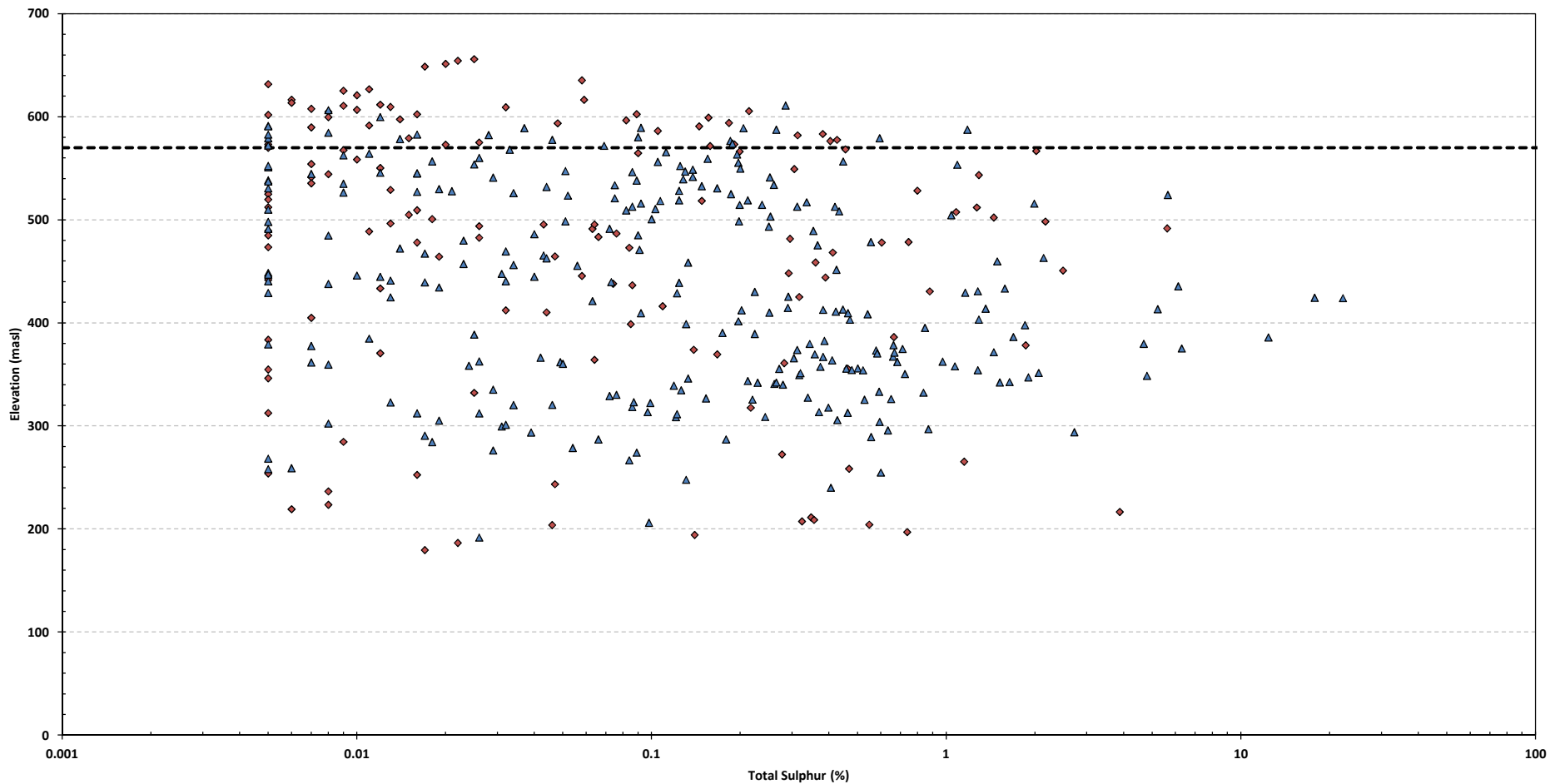
◆ Footwall Schist LOM Pit ◆ Footwall Schist 5 Year Pit

 	
Mary River Project	
NP vs. CarbNP for Footwall Schist	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 10




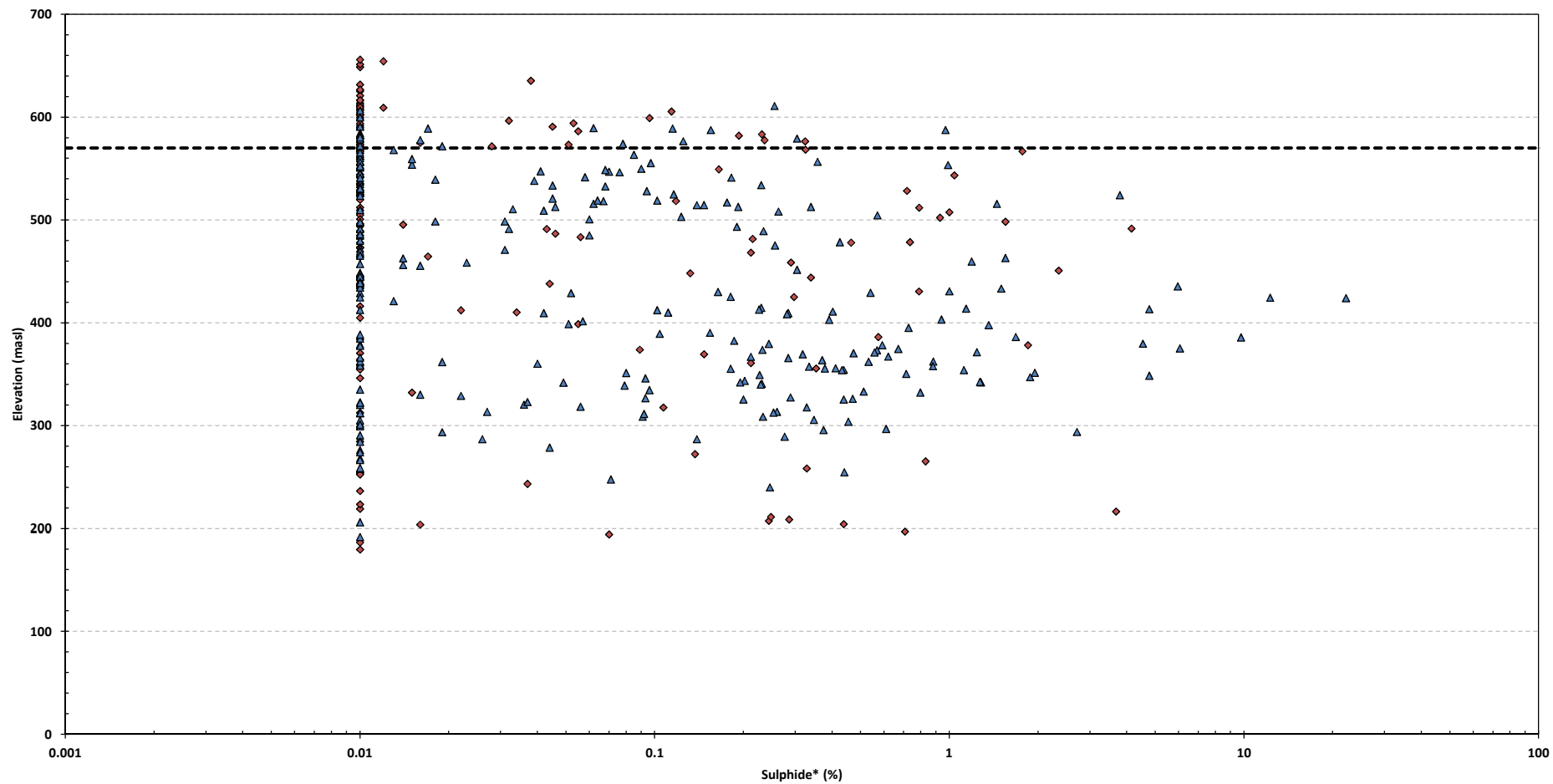
◆ Footwall Schist LOM Pit ◆ Footwall Schist 5 Year Pit

 	
Mary River Project	
NP vs. AP for Footwall Schist	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 11



◆ Footwall Schist LOM Pit ▲ Hanging Wall Schist LOM Pit - - - 5 Year Pit Lowest Elevation

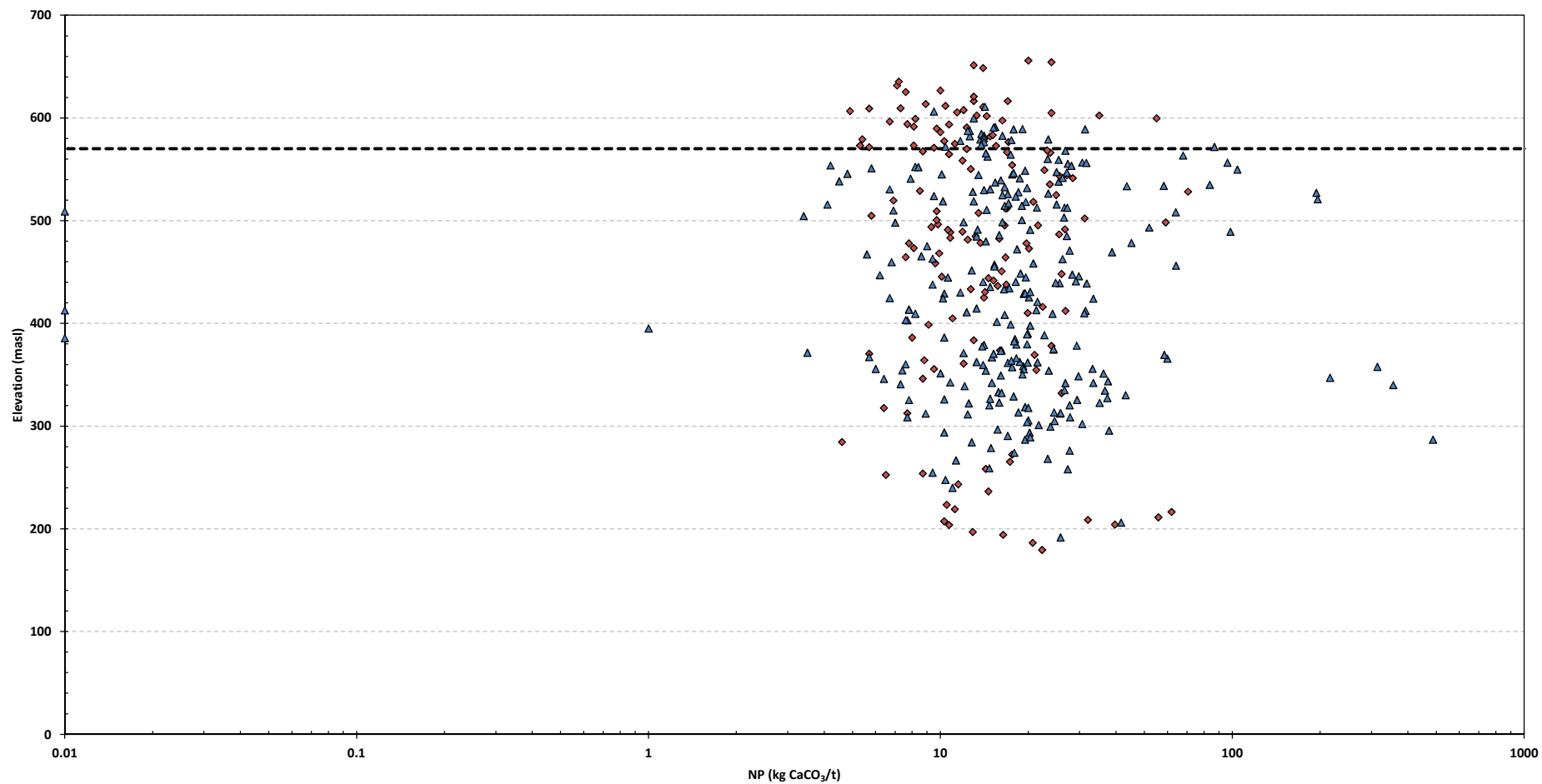
 	
Mary River Project	
Total Sulphur vs. Elevation for Footwall Schist and Hanging Wall Schist	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 12



*Sulphide = Total Sulphur - Sulphate

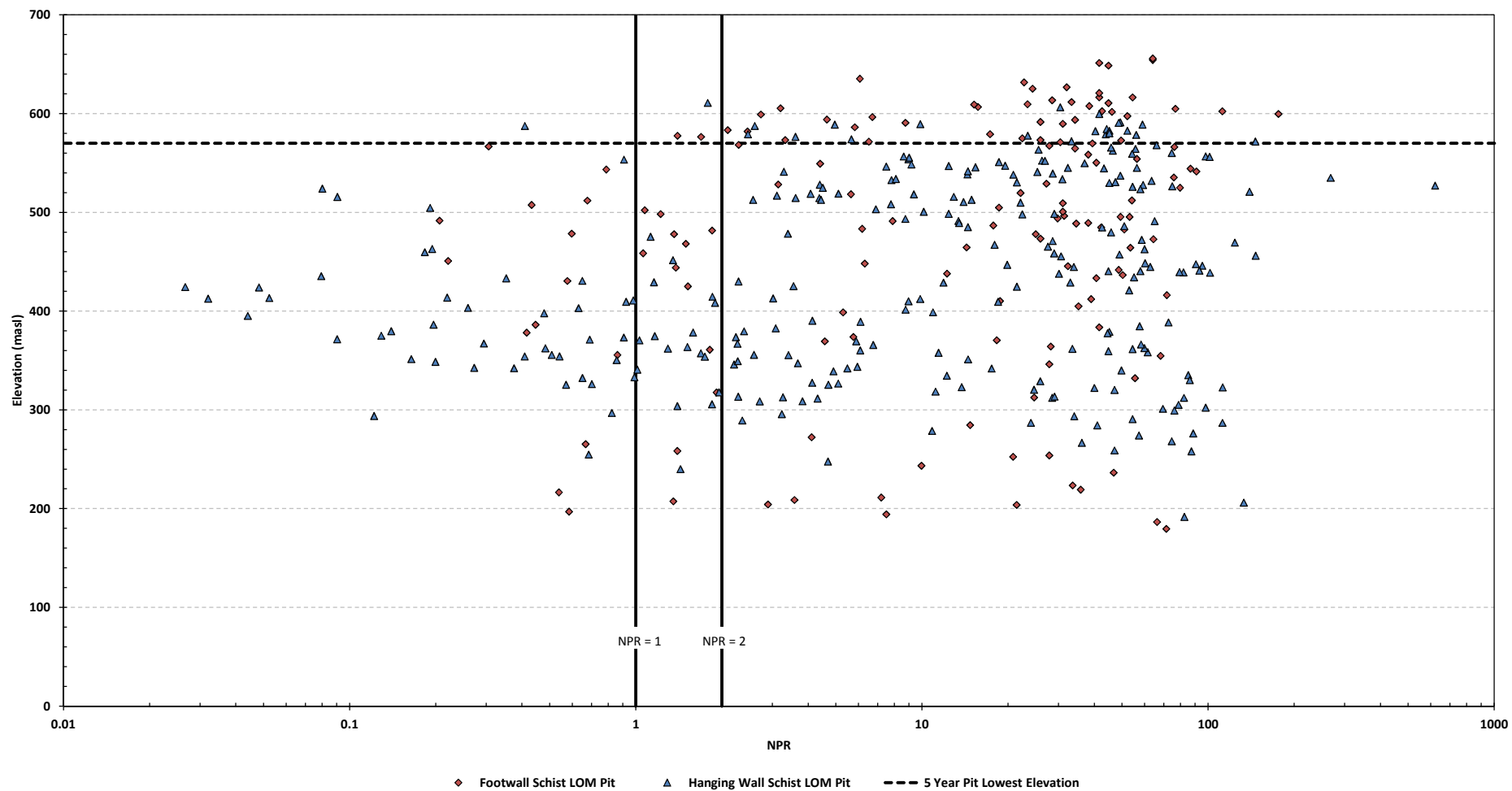
◆ Footwall Schist LOM Pit ▲ Hanging Wall Schist LOM Pit --- 5 Year Pit Lowest Elevation

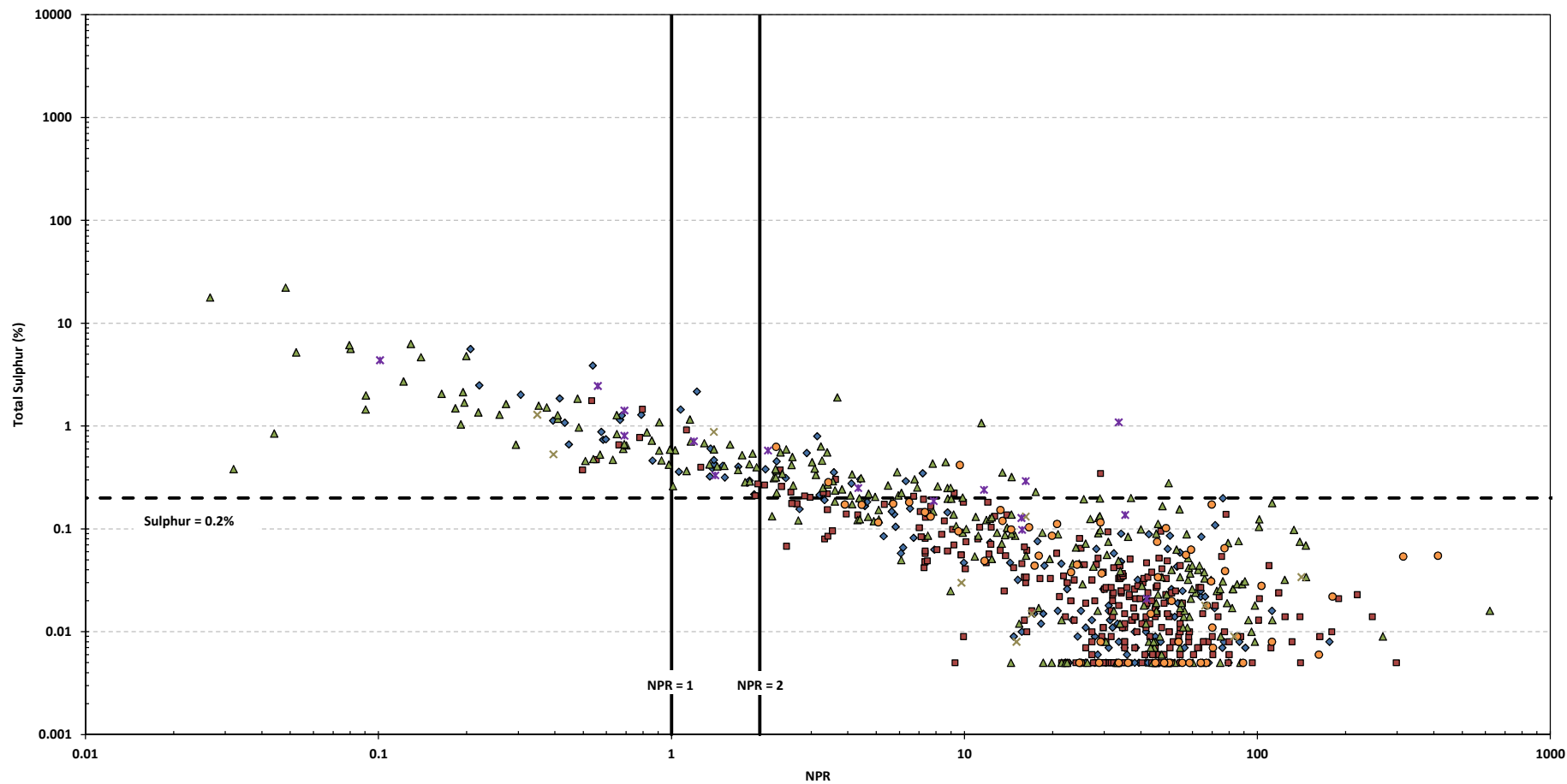
 	
Mary River Project	
Sulphide vs. Elevation for Footwall Schist and Hanging Wall Schist	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 13





◆ Footwall Schist LOM Pit
 ▲ Hanging Wall Schist LOM Pit
 --- 5 Year Pit Lowest Elevation

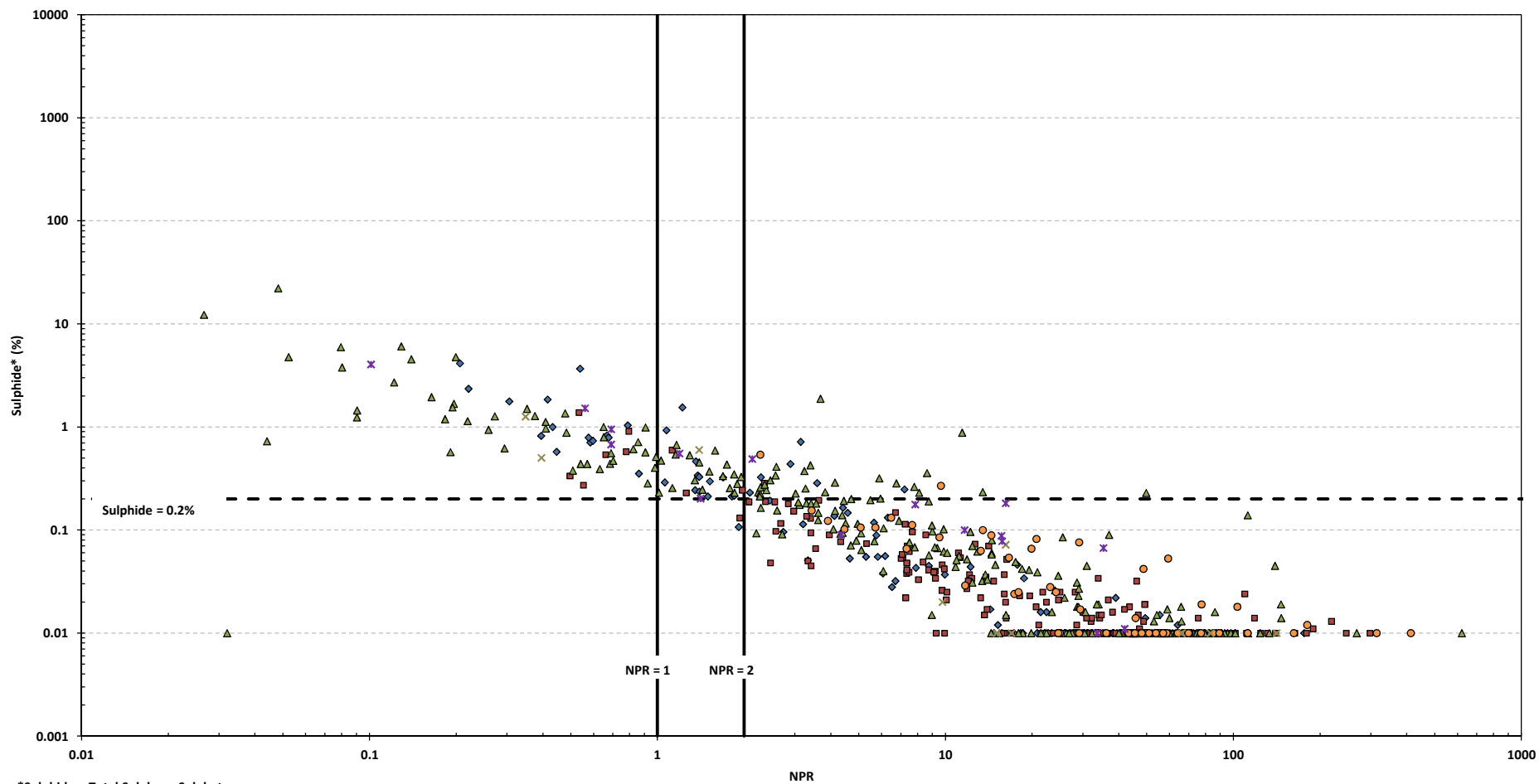
 	
Mary River Project	
NP vs. Elevation for Footwall Schist and Hanging Wall Schist	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 14







◆ Footwall Schist ■ Footwall Waste ▲ Hanging Wall Schist ● Hanging Wall Waste × Internal Waste × Mineralized Waste

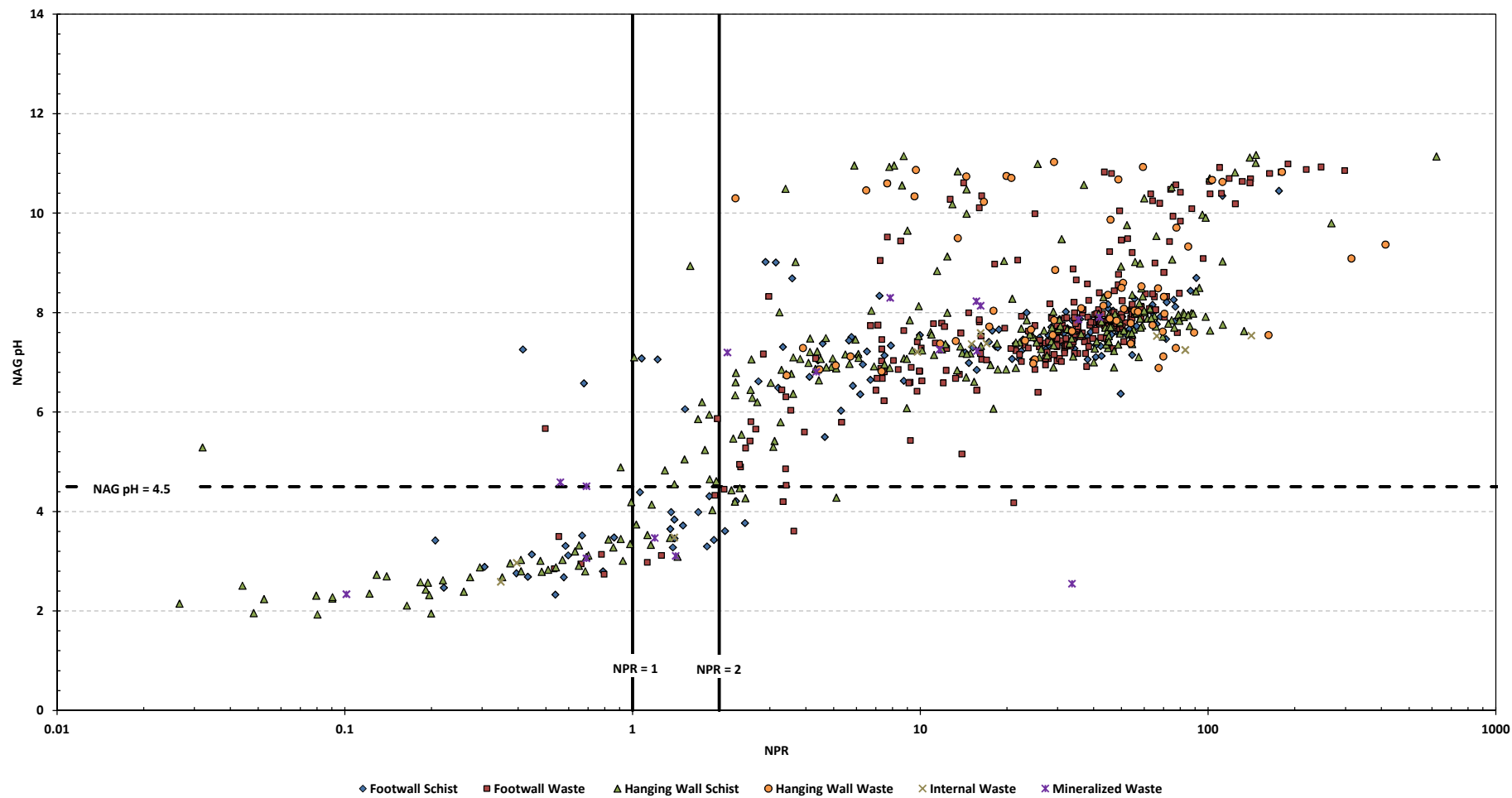
 	
Mary River Project	
Total Sulphur vs. NPR for the LOM Pit	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 16

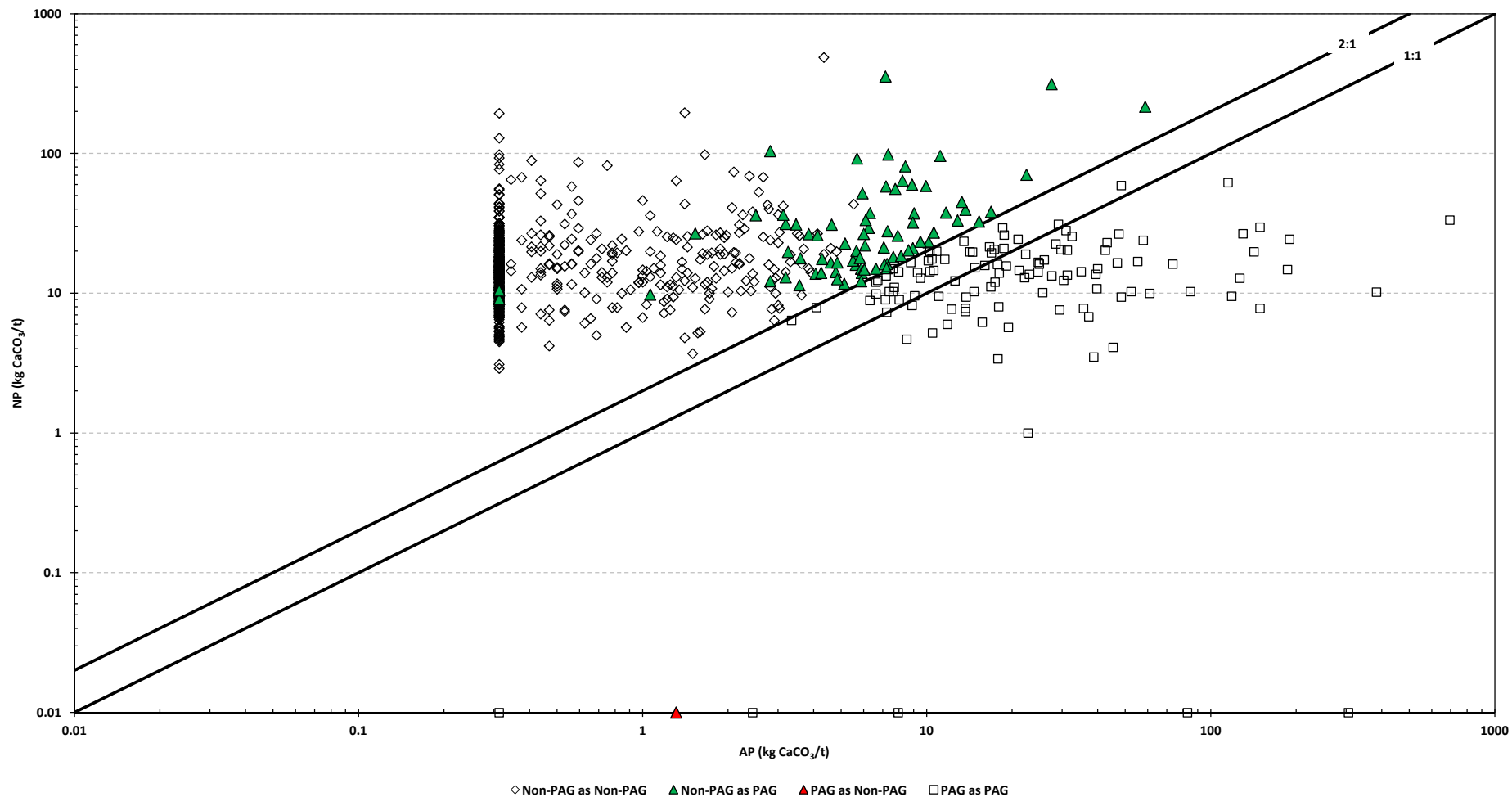




*Sulphide = Total Sulphur - Sulphate

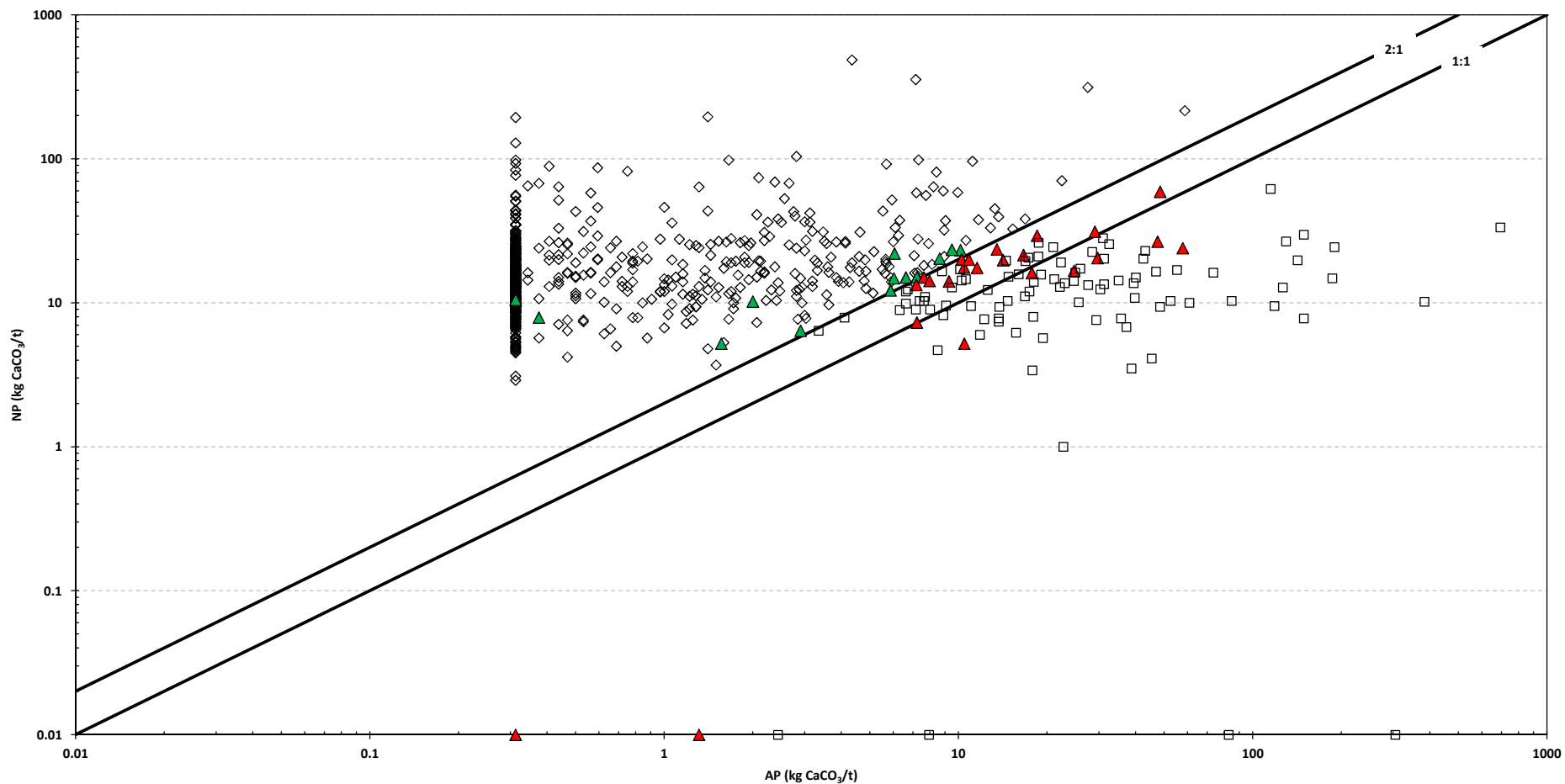
◆ Footwall Schist ■ Footwall Waste ▲ Hanging Wall Schist ● Hanging Wall Waste × Internal Waste × Mineralized Waste

 	
Mary River Project	
Sulphide vs. NPR for the LOM Pit	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 17




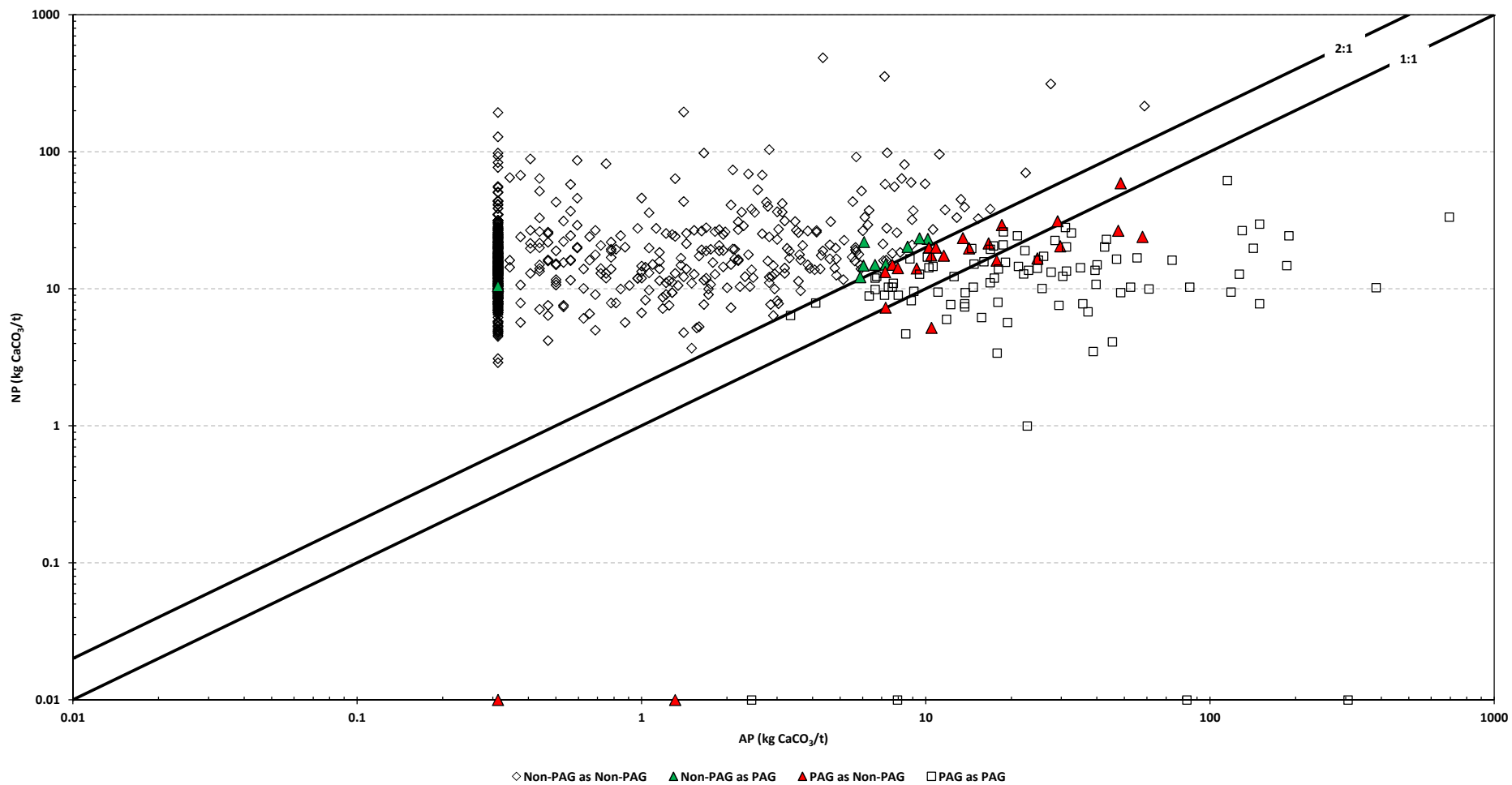


 	
Mary River Project	
Misclassification Using a Total Sulphur Content >0.2% to Determine PAG	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 19





◇ Non-PAG as Non-PAG ▲ Non-PAG as PAG ▲ PAG as Non-PAG □ PAG as PAG

 	
Mary River Project	
Misclassification Using a NAG pH < 4.5 to Determine PAG	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 20



Note: NAGpH test applied to samples identified as PAG by sulphur >0.2%.

 	
Mary River Project	
Misclassification Using a Total Sulphur Content >0.2% and NAG pH < 4.5	
Drawn by: LC	Checked by: SW
Date: April 2014	
Project: TC123908	FIGURE 21

APPENDIX A

Table A-1: ABA Results for the 5 Year Pit

Easting	Northing	Elevation	Hole ID	Sample ID	Program	From	To	Waste Classification	Lithology	Paste pH	Fiz Rate	Total Sulphur	Sulphate	Sulphide*	%	Total Carbon	Carbonate	APP**	NP	kg CaCO ₃ /t	Car/NP	NPR	Car/NPR
7914597.909	56341.566	651.436	MR1-12-224	15482	Baff2012	27.5	29.5	Footwall Schist	Gneiss	9.16	1	0.02	0.01	0.01	0.01	0.027	0.029	0.3	13	0.5	41.6	1.5	
7914599.171	56319.381	648.73	MR1-12-224	15484	Baff2012	31.3	33.1	Footwall Schist	Gneiss	10	1	0.017	0.01	0.01	0.01	0.019	0.07	0.3	14	1.2	44.8	3.7	
7914147.995	562951.331	626.809	MR1-12-225	15702	Baff2012	14	16	Footwall Schist	Gneiss	9.09	1	0.011	0.01	0.01	0.01	0.063	0.12	0.3	10	2.0	32.0	6.4	
7914148.592	562950.105	625.346	MR1-12-225	15703	Baff2012	16	18	Footwall Schist	Gneiss	9.46	1	0.009	0.01	0.01	0.01	0.024	0.04	0.3	7.6	0.7	24.3	2.1	
7914150.386	562946.428	620.958	MR1-12-225	15706	Baff2012	22	24	Footwall Schist	Gneiss	9.15	1	0.01	0.01	0.01	0.01	0.018	0.065	0.3	13	1.1	41.6	3.5	
7914152.18	562942.75	616.57	MR1-12-225	15709	Baff2012	28	30	Footwall Schist	Gneiss	9.46	1	0.006	0.01	0.01	0.01	0.013	0.03	0.3	13	0.5	41.6	1.6	
7914151.376	562940.298	613.644	MR1-12-225	15711	Baff2012	32	34	Footwall Schist	Gneiss	9.51	1	0.006	0.01	0.01	0.01	0.013	0.03	0.3	8.9	0.5	28.5	1.6	
7914154.572	562937.846	610.719	MR1-12-225	15713	Baff2012	36	38	Footwall Schist	Gneiss	9.57	1	0.009	0.01	0.01	0.01	0.013	0.05	0.3	14	0.5	44.8	1.6	
7914155.768	562935.394	607.793	MR1-12-225	15715	Baff2012	40	42	Footwall Schist	Gneiss	9.78	1	0.007	0.01	0.01	0.01	0.016	0.03	0.3	12	0.5	38.4	1.6	
7914156.919	562933.034	604.978	MR1-12-225	15717	Baff2012	44	45.7	Footwall Schist	Gneiss	9.37	1	0.008	0.01	0.01	0.01	0.019	0.035	0.3	24	0.6	76.8	1.9	
7914644.386	563109.225	573.328	MR1-08-145	16310	Baff2011	132.5	133.65	Footwall Schist	Gneiss	8.53	1	0.005	0.01	0.01	0.01	0.023	0.006	0.3	8.1	0.1	25.9	0.3	
7914649.619	563098.002	571.144	MR1-08-145	16312	Baff2011	145.2	146.1	Footwall Schist	Gneiss	8.63	1	0.005	0.01	0.01	0.01	0.034	0.005	0.3	9.5	0.1	30.4	0.3	
7914472.537	563091.745	569.927	MR1-08-145	16314	Baff2011	152.16	153.36	Footwall Schist	Gneiss	8.3	1	0.005	0.01	0.01	0.01	0.016	0.005	0.3	12.3	0.1	39.4	0.3	
7914152.497	562936.859	605.446	MR1-07-118	15715	Baff2012	14.61	15.56	Footwall Schist	Gneiss	9.15	1	0.008	0.02	0.02	0.02	0.038	0.024	0.005	1.2	7.2	0.1	6.1	
7914148.235	562949.976	631.75	MR1-07-118	16520	Baff2011	28.9	29.83	Footwall Schist	Gneiss	9.39	1	0.005	0.01	0.01	0.01	0.012	0.005	0.3	7.1	0.1	22.7	0.3	
7914347.059	563026.427	564.832	MR1-06-90	16726	Baff2011	153.4	154.38	Footwall Schist	Gneiss	9.05	1	0.009	0.09	0.09	0.01	0.015	0.005	0.3	10.7	0.1	34.2	0.3	
7913890.018	563090.826	509.355	MR1-09-179	MMAR010.004	AMEC 2010	160	161	Footwall Schist	Gneiss	9.5	1	0.016	0.02	0.01	0.01	0.013	0.026	0.3	9.7	1.1	31.0	3.5	
7913878.955	563080.142	504.455	MR1-09-179	MMAR010.005	AMEC 2010	176	177	Footwall Schist	Gneiss	9.4	1	0.015	0.02	0.01	0.01	0.009	0.011	0.3	5.8	0.8	18.6	2.4	
7914840.815	563394.858	577.665	MR1-08-163	MMAR010.007	AMEC 2010	160	161	Footwall Schist	Gneiss	9.49	1	0.026	0.19	0.236	0.014	0.042	7.4	10.3	1.2	1.4	0.2	0.2	
7914540.881	563152.285	567.574	MR1-08-140	16004	AMEC 2010	165	166	Footwall Schist	Gneiss	8.41	1	0.009	0.01	0.01	0.01	0.005	0.005	0.3	8.7	0.4	27.8	1.3	
7914654.151	563267.972	491.753	MR1-06-105	16076	Baff2011	182.01	182.96	Footwall Schist	High Grade Iron Formation	7.66	1	1.42	1.47	4.15	1.25	0.885	129.7	26.7	14.8	0.2	0.1		
7914649.263	563279.902	502.306	MR1-06-105	16070	Baff2011	165.6	166.05	Footwall Schist	High Grade Iron Formation	7.2	1	1.45	0.52	0.93	3.29	5.65	29.1	31.2	94.2	1.1	3.2		
7914651.088	563275.469	498.382	MR1-06-105	16072	Baff2011	171.52	172.52	Footwall Schist	High Grade Iron Formation	7.82	2	2.17	0.62	1.55	3.34	7.73	48.4	59.1	128.9	1.2	2.7		
7914595.8	563145.219	655.96	MR1-12-224	15479	Baff2012	21.23	23.4	Footwall Schist	Schist	8.86	4	0.025	0.02	0.01	0.01	0.026	0.012	0.3	20	0.2	64.0	0.6	
7914596.528	563143.958	654.398	MR1-12-224	15480	Baff2012	23.4	25.5	Footwall Schist	Schist	8.34	1	0.022	0.01	0.01	0.01	0.021	0.016	0.4	24	0.3	64.0	0.7	
7914037.25	562928.144	573.304	MR1-12-226	15631	Baff2012	75.27	77.37	Footwall Schist	Schist	6.44	1	0.191	0.14	0.051	0.427	2.13	1.6	5.3	35.5	3.3	22.3		
7914036.549	562926.826	571.702	MR1-12-226	15632	Baff2012	77.37	79.65	Footwall Schist	Schist	6.4	1	0.158	0.13	0.028	0.202	0.889	0.9	5.7	14.8	6.5	16.9		
7914028.919	562912.476	554.274	MR1-12-226	15644	Baff2012	101.34	103.34	Footwall Schist	Schist	8.21	1	0.007	0.01	0.01	0.01	0.027	0.03	0.7	27.1	0.2	56.3	0.5	
7914024.568	562904.293	544.335	MR1-12-226	15651	Baff2012	134.93	136.93	Footwall Schist	Schist	8.4	1	0.008	0.01	0.01	0.01	0.022	0.01	0.3	27.1	0.2	86.7	0.5	
7914023.321	562901.947	541.487	MR1-12-226	15653	Baff2012	138.93	140.72	Footwall Schist	Schist	8.64	1	0.007	0.01	0.01	0.01	0.02	0.01	0.3	28.4	0.2	90.9	0.5	
7914157.935	562930.95	602.491	MR1-12-225	15719	Baff2012	47.4	49.1	Footwall Schist	Schist	9.66	1	0.016	0.01	0.01	0.01	0.194	0.719	0.3	55	12.0	112.0	38.4	
7914150.056	562928.651	599.749	MR1-12-225	15721	Baff2012	51	53	Footwall Schist	Schist	9.9	4	0.008	0.01	0.01	0.01	0.222	0.714	0.3	55	11.9	176.0	38.1	
7914020.687	562896.994	591.712	MR1-12-226	15658	Baff2012	137.05	139.05	Footwall Schist	Schist	9.62	1	0.005	0.01	0.01	0.01	0.022	0.03	0.3	23.7	0.5	75.8	1.6	
7914165.524	563264.597	488.763	MR1-06-105	16078	Baff2011	186.7	187.7	Footwall Schist	Schist	9.05	1	0.011	0.01	0.01	0.01	0.009	0.005	0.3	10.8	0.1	34.6	0.3	
7914342.277	563036.682	566.827	MR1-06-90	16722	Baff2011	141.9	142.9	Footwall Schist	Schist	7.62	1	2.02	0.25	1.77	0.014	0.064	55.3	16.9	1.1	0.3	0.02		
7914343.44	563034.388	566.342	MR1-06-90	16724	Baff2011	144.7	145.69	Footwall Schist	Schist	8.07	1	0.199	0.2	0.01	1.45	6.47	0.3	23.8	107.9	76.2	345.3		
7914786.719	563340.21	594.098	MR1-08-163	MMAR010.035	AMEC 2010	155	156	Footwall Schist	Schist	7.89	1	0.007	0.01	0.01	0.01	0.02	0.207	0.3	9.7	1.7	31.0	5.3	
7914767.99	563380.274	601.312	MR1-08-163	MMAR010.047	AMEC 2010	140	141	Footwall Schist	Schist	8.5	1	0.011	0.005	0.01	0.01	0.014	0.005	0.3	14.4	0.9	46.1	2.9	
7914778.295	563358.063	597.571	MR1-08-163	MMAR010.049	AMEC 2010	135	136	Footwall Schist	Schist	8.15	1	0.014	0.01	0.01	0.01	0.021	0.005	0.3	16.3	1.8	52.2	5.6	
7914652.408	563272.251	495.535	MR1-06-105	16074	Baff2011	176	177.03	Footwall Schist	Ultramafic	8.31	1	0.064	0.05	0.014	0.028	0.005	0.4	21.6	0.1	49.4	0.2		
7914607.255	563539.17	498.078	MR1-05-72	16022	Baff2011	92.7	93.65	Hanging Wall Schist	Amphibolite	7.77	1	0.005	0.01	0.01	0.01	0.014	0.008	0.3	7	0.1	22.4	0.4	
7914609.72	563534.114	491.375	MR1-05-72	16024	Baff2011	101.4	102.45	Hanging Wall Schist	Amphibolite	8.16	1	0.072	0.04	0.032	0.008	0.005	1.0	13.4	0.1	13.4	0.1		
7914753.246	563588.188	564.313	MR1-05-77	16059	Baff2011	41	42.1	Hanging Wall Schist	Amphibolite	9.27	2	0.011	0.01	0.01	0.114	0.378	0.3	17.4	6.3	55.7	20.2		
7914758.512	563581.502	555.435	MR1-05-77	16059	Baff2011	52.7	53.7	Hanging Wall Schist	Amphibolite	9.45	2	0.019	0.1	0.097	0.158	0.529	3.0	27.3	8.8	9.0	2.9		
7914760.988	563576.426	548.705	MR1-05-77	16059	Baff2011	61.5	62.48	Hanging Wall Schist	Amphibolite	9.26	1	0.138	0.07	0.068	0.07	0.168	2.1	19.5	2.8	9.2	1.3		
7914761.569	563571.134	541.688	MR1-05-77	16056	Baff2011	70.65	71.65	Hanging Wall Schist	Amphibolite	9.2	2	0.138	0.08	0.058	0.184	0.616	1.8	26.2	10.3	14.5	5.7		
7914772.622	563552.572	517.075	MR1-05-77	16004	Baff2011	102.8	103.76	Hanging Wall Schist	Amphibolite	8.86	1	0.336	0.16	0.176	0.018	0.018	5.5	17.1	0.3	3.1	0.1		
7914775.024	563547.446	510.544	MR1-05-77	16005	Baff2011	111.32	112.29	Hanging Wall Schist	Amphibolite	8.84	1	0.193	0.07	0.033	0.023	0.005	1.0	14.4	0.1	14.0	0.1		
7914766.867	56																						

Table A-2: NAG pH Results for the 5 Year Pit

Easting	Northing	Elevation	Hole ID	Sample ID	Program	From	To	Waste Classification	Lithology	NAG pH after Reaction	Volume of 0.1 N NaOH (mL)		NAG (kg H ₂ SO ₄ /tonne)	
											to pH 4.5	to pH 7	to pH 4.5	to pH 7
7914597.909	563141.566	651.436	MR1-12-224	15482	Baff2012	27.5	29.5	Footwall Schist	Gniess	7.89	0	0	0	0
7914599.171	563139.381	648.73	MR1-12-224	15484	Baff2012	31.3	33.1	Footwall Schist	Gniess	8.17	0	0	0	0
7914147.995	562951.331	626.809	MR1-12-225	15702	Baff2012	14	16	Footwall Schist	Gniess	8.02	0	0	0	0
7914148.592	562950.105	625.346	MR1-12-225	15703	Baff2012	16	18	Footwall Schist	Gniess	7.67	0	0	0	0
7914150.386	562946.428	620.958	MR1-12-225	15706	Baff2012	22	24	Footwall Schist	Gniess	7.97	0	0	0	0
7914152.18	562942.75	616.57	MR1-12-225	15709	Baff2012	28	30	Footwall Schist	Gniess	7.83	0	0	0	0
7914153.376	562940.298	613.644	MR1-12-225	15711	Baff2012	32	34	Footwall Schist	Gniess	7.71	0	0	0	0
7914154.572	562937.846	610.719	MR1-12-225	15713	Baff2012	36	38	Footwall Schist	Gniess	8.09	0	0	0	0
7914155.768	562935.394	607.793	MR1-12-225	15715	Baff2012	40	42	Footwall Schist	Gniess	7.9	0	0	0	0
7914156.919	562933.034	604.978	MR1-12-225	15717	Baff2012	44	45.7	Footwall Schist	Gniess	8.12	0	0	0	0
7914464.386	563109.225	573.328	MR1-08-145	16310	Baff2011	132.5	133.65	Footwall Schist	Gniess	7.49	0	0	0	0
7914469.619	563098.002	571.144	MR1-08-145	16312	Baff2011	145.2	146.1	Footwall Schist	Gniess	7.87	0	0	0	0
7914472.537	563091.745	569.927	MR1-08-145	16314	Baff2011	152.16	153.16	Footwall Schist	Gniess	7.75	0	0	0	0
7914152.497	562936.858	635.446	MR1-07-118	16518	Baff2011	14.61	15.56	Footwall Schist	Gniess	7.13	0	0	0	0
7914148.235	562949.976	631.75	MR1-07-118	16520	Baff2011	28.9	29.83	Footwall Schist	Gniess	7.46	0	0	0	0
7914347.059	563026.427	564.832	MR1-06-90	16726	Baff2011	153.4	154.38	Footwall Schist	Gniess	7.46	0	0	0	0
7913890.018	563090.826	509.355	MR1-09-179	MRARD10 004	AMEC, 2010	160	161	Footwall Schist	Gniess	7.72	0	0	0	0
7913878.955	563080.142	504.945	MR1-09-179	MRARD10 005	AMEC, 2010	176	177	Footwall Schist	Gniess	7.3	0	0	0	0
7914840.815	563394.858	577.665	MR1-08-161	MRARD10 057	AMEC, 2010	160	161	Footwall Schist	Gniess	3.46	0.7	1.6	2.3	5.2
7914540.881	563152.285	567.574	MR1-08-140	MRARD10 104	AMEC, 2010	165	166	Footwall Schist	Gniess	7.35	0	0	0	0
7914654.151	563267.972	491.753	MR1-06-105	16076	Baff2011	182.01	182.96	Footwall Schist	High Grade Iron Formation	3.42	1.24	10.76	4	35
7914649.263	563279.902	502.306	MR1-06-105	16070	Baff2011	165.6	166.05	Footwall Schist	High Grade Iron Formation	7.08	0	0	0	0
7914651.088	563275.469	498.382	MR1-06-105	16072	Baff2011	171.52	172.52	Footwall Schist	High Grade Iron Formation	7.06	0	0	0	0
7914595.8	563145.219	655.96	MR1-12-224	15479	Baff2012	21.23	23.4	Footwall Schist	Schist	7.88	0	0	0	0
7914596.528	563143.958	654.398	MR1-12-224	15480	Baff2012	23.4	25.5	Footwall Schist	Schist	8.16	0	0	0	0
7914037.25	562928.144	573.304	MR1-12-226	15631	Baff2012	75.27	77.37	Footwall Schist	Schist	7.31	0	0	0	0
7914036.549	562926.826	571.702	MR1-12-226	15632	Baff2012	77.37	79.65	Footwall Schist	Schist	7.22	0	0	0	0
7914028.919	562912.476	554.274	MR1-12-226	15644	Baff2012	101.34	103.34	Footwall Schist	Schist	7.73	0	0	0	0
7914024.568	562904.293	544.335	MR1-12-226	15651	Baff2012	114.93	116.93	Footwall Schist	Schist	8.44	0	0	0	0
7914023.321	562901.947	541.487	MR1-12-226	15653	Baff2012	118.93	120.72	Footwall Schist	Schist	8.7	0	0	0	0
7914157.935	562930.95	602.491	MR1-12-225	15719	Baff2012	47.4	49.1	Footwall Schist	Schist	10.35	0	0	0	0
7914159.056	562928.651	599.749	MR1-12-225	15721	Baff2012	51	53	Footwall Schist	Schist	10.45	0	0	0	0
7914020.687	562896.994	535.471	MR1-12-226	15658	Baff2012	127.05	129.05	Footwall Schist	Schist	8.26	0	0	0	0
7914655.524	563264.597	488.761	MR1-06-105	16078	Baff2011	186.7	187.7	Footwall Schist	Schist	7.62	0	0	0	0
7914342.277	563036.682	566.827	MR1-06-90	16722	Baff2011	141.9	142.9	Footwall Schist	Schist	2.89	5.21	9.28	17.1	30
7914343.44	563034.188	566.342	MR1-06-90	16724	Baff2011	144.7	145.69	Footwall Schist	Schist	7.82	0	0	0	0
7914786.719	563340.21	594.098	MR1-08-163	MRARD10 035	AMEC, 2010	155	156	Footwall Schist	Schist	7.64	0	0	0	0
7914767.99	563380.374	601.912	MR1-08-163	MRARD10 047	AMEC, 2010	110	111	Footwall Schist	Schist	7.56	0	0	0	0
7914778.395	563358.061	597.571	MR1-08-163	MRARD10 049	AMEC, 2010	135	136	Footwall Schist	Schist	7.55	0	0	0	0
7914652.408	563272.251	495.535	MR1-06-105	16074	Baff2011	176	177.03	Footwall Schist	Ultramafic	7.58	0	0	0	0
7914607.255	563539.17	498.078	MR1-05-72	16022	Baff2011	92.7	93.65	Hanging Wall Schist	Amphibolite	7.68	0	0	0	0
7914609.72	563534.114	491.375	MR1-05-72	16024	Baff2011	101.4	102.45	Hanging Wall Schist	Amphibolite	6.84	0	0.05	0	0.2
7914755.246	563588.198	564.313	MR1-05-77	16590	Baff2011	41.13	42.1	Hanging Wall Schist	Amphibolite	9.02	0	0	0	0
7914758.512	563581.502	555.435	MR1-05-77	16592	Baff2011	52.71	53.7	Hanging Wall Schist	Amphibolite	9.65	0	0	0	0
7914760.988	563576.426	548.705	MR1-05-77	16594	Baff2011	61.5	62.48	Hanging Wall Schist	Amphibolite	7.85	0	0	0	0
7914763.569	563571.134	541.688	MR1-05-77	16596	Baff2011	70.65	71.65	Hanging Wall Schist	Amphibolite	9.99	0	0	0	0
7914772.622	563552.572	517.075	MR1-05-77	16604	Baff2011	102.8	103.76	Hanging Wall Schist	Amphibolite	5.42	0	0.36	0	1.2
7914775.024	563547.646	510.544	MR1-05-77	16606	Baff2011	111.32	112.29	Hanging Wall Schist	Amphibolite	7.19	0	0	0	0
7914766.867	563564.372	532.721	MR1-05-77	16600	Baff2011	82.35	83.36	Hanging Wall Schist	Gniess	6.89	0	0.6	0	1.9
7914769.349	563559.282	525.973	MR1-05-77	16602	Baff2011	91.15	92.18	Hanging Wall Schist	Gniess	7.56	0	0	0	0
7914749.753	563599.461	579.247	MR1-05-77	16586	Baff2011	21.62	22.62	Hanging Wall Schist	Metasediment	7.7	0	0	0	0
7914752.385	563594.064	572.092	MR1-05-77	16588	Baff2011	30.96	31.96	Hanging Wall Schist	Metasediment	7.65	0	0	0	0
7914801.516	563645.605	582.739	MR1-08-156	16694	Baff2011	8.73	9.79	Hanging Wall Schist	Metasediment	9.76	0	0	0	0
7914803.299	563641.781	577.71	MR1-08-156	16696	Baff2011	15.34	16.31	Hanging Wall Schist	Metasediment	7.85	0	0	0	0
7914765.211	563567.766	537.222	MR1-05-77	16598	Baff2011	76.5	77.46	Hanging Wall Schist	Schist	7.58	0	0	0	0
7914821.987	563601.703	525.01	MR1-08-156	16712	Baff2011	84.07	85.17	Hanging Wall Schist	Schist	7.07	0	0	0	0
7914824.14	563597.087	518.939	MR1-08-156	16714	Baff2011	92.03	93.06	Hanging Wall Schist	Schist	6.99	0	0.07	0	0.2
7914826.342	563592.365	512.731	MR1-08-156	16716	Baff2011	100.18	101.12	Hanging Wall Schist	Schist	6.45	0	0.11	0	0.4
7914217.513	563129.414	580.306	MR1-06-84	16740	Baff2011	16.55	17.63	Hanging Wall Schist	Schist	7.42	0	0	0	0
7914219.703	563124.716	574.128	MR1-06-84	16742	Baff2011	24.68	25.63	Hanging Wall Schist	Schist	6.97	0	0.05	0	0.2
7914222.7	563118.29	565.679	MR1-06-84	16744	Baff2011	35.7	36.67	Hanging Wall Schist	Schist	7.71	0	0	0	0
7914227.474	563108.051	552.215	MR1-06-84	16748	Baff2011	53.21	54.31	Hanging Wall Schist	Schist	7.64	0	0	0	0
7913979.772	563177.5	545.133	MR1-09-179	MRARD10 002	AMEC, 2010	30.2	31.2	Hanging Wall Schist	Schist	7.67	0	0	0	0
7913969.538	563167.617	541.054	MR1-09-179	MRARD10 003	AMEC, 2010	45	46	Hanging Wall Schist	Schist	7.4	0	0	0	0
7914042.297	563235.419	498.607	MR1-09-177	MRARD10 007	AMEC, 2010	55	56	Hanging Wall Schist	Schist	6.9	0	0.1	0	0.3
7914493.018	563254.927	587.544	MR1-08-140	MRARD10 068	AMEC, 2010	50	51	Hanging Wall Schist	Schist	2.8	4.5	7.3	15	24
7914820.868	563604.104	528.166	MR1-08-153	MRARD10 078	AMEC, 2010	80	81	Hanging Wall Schist	Schist	6.86	0	0.1	0	0.3
7914890.585	563636.278	518.342	MR1-08-147	MRARD10 086	AMEC, 2010	90	91	Hanging Wall Schist	Schist	7.24	0	0	0	0
7914904.285	5636													


Table A-3: Summary of ABA Results

		Paste pH	Total Sulphur	Sulphate	Sulphide*	Total Carbon	Carbonate	AP	NP	CarbNP	NPR	CarbNPR
			%				kg CaCO ₃ /t					
Footwall Schist (5 Year Pit)	Count	40	40	40	40	40	40	40	40	40	40	40
	Min	6.4	0.005	0.010	0.010	0.0050	0.0050	0.31	5.3	0.083	0.21	0.019
	Max	10	5.6	1.5	4.2	3.3	7.7	130	59	129	176	345
	Median	9.1	0.011	0.010	0.010	0.021	0.030	0.31	13	0.54	36	1.6
	Average		0.32	0.100	0.23	0.28	0.65	7.1	17	11.0	2.4	1.5
	Standard Deviation	0.89	1.0	0.26	0.74	0.77	1.8	23	12.0	30	35	55
	10th Percentile	7.7	0.005	0.010	0.010	0.012	0.0050	0.31	7.2	0.083	1.4	0.19
	90th Percentile	9.6	0.53	0.21	0.31	0.51	1.01	9.5	29	17	78	17
Footwall Schist (LOM Pit)	Count	143	143	143	143	143	143	143	143	143	143	143
	Min	4.8	0.005	0.010	0.010	0.005	0.0050	0.3125	4.6000	0.08	0.2	0.003
	Max	10	5.6	1.5	4.15	3.3	10.7	129.7	70.5	178	176	345
	Median	8.9	0.044	0.020	0.010	0.015	0.011	0.313	13.000	0.50	23	0.99
	Average		0.29	0.07	0.225	0.20	0.50	7.04	15.94	8.5	2	1.2
	Standard Deviation	0.86	0.70	0.15	0.58	0.62	1.61	18.0	10.86	27	27	30
	10th Percentile	7.7	0.005	0.010	0.010	0.006	0.005	0.313	7.3600	0.08	1	0.04
	90th Percentile	10	0.74	0.14	0.716	0.218	0.85	22.4	25.92	14.2	62	7
Hanging Wall Schist (5 Year Pit)	Count	53	53	53	53	53	53	53	53	53	53	53
	Min	7.4	0.005	0.010	0.010	0.0050	0.0050	0.31	7.0	0.083	0.41	0.019
	Max	9.7	1.2	0.29	0.97	1.1	4.7	30	104	79	268	232
	Median	8.5	0.11	0.060	0.019	0.021	0.037	0.59	16	1.0	26	1.3
	Average		0.14	0.070	0.076	0.11	0.44	2.4	23	8.0	9.5	3.4
	Standard Deviation	0.58	0.19	0.061	0.14	0.25	1.1	4.5	20	19	42	39
	10th Percentile	7.9	0.005	0.010	0.010	0.0088	0.0050	0.31	11	0.090	4.1	0.069
	90th Percentile	9.5	0.26	0.14	0.15	0.22	0.97	4.7	31	18	55	20
Hanging Wall Schist (LOM Pit)	Count	270	270	270	270	270	270	270	270	270	270	270
	Min	4.3	0.005	0.010	0.010	0.005	0.0050	0.3125	-6.5000	0.08	0.0	0.000
	Max	9.8	22.2	5.5	22.19	6.69	30.8	693.4	487.00	514	621	571
	Median	8.4	0.12	0.04	0.057	0.022	0.022	1.766	17.5500	0.62	13	0.4
	Average		0.60	0.12	0.485	0.259	0.97	15.14	26.450	16.7	2	1.1
	Standard Deviation	0.68	2.04	0.39	1.807	0.83	3.35	56.5	45.84	56.1	50	41
	10th Percentile	7.7	0.008	0.010	0.010	0.010	0.0050	0.3125	7.7000	0.08	0	0.009
	90th Percentile	9.6	0.90	0.18	0.72	0.37	1.26	22.43	33.40	21.0	73	19

*As total sulphur - sulphate

Table A-4: Elemental Content Results for the 5 Year Pit

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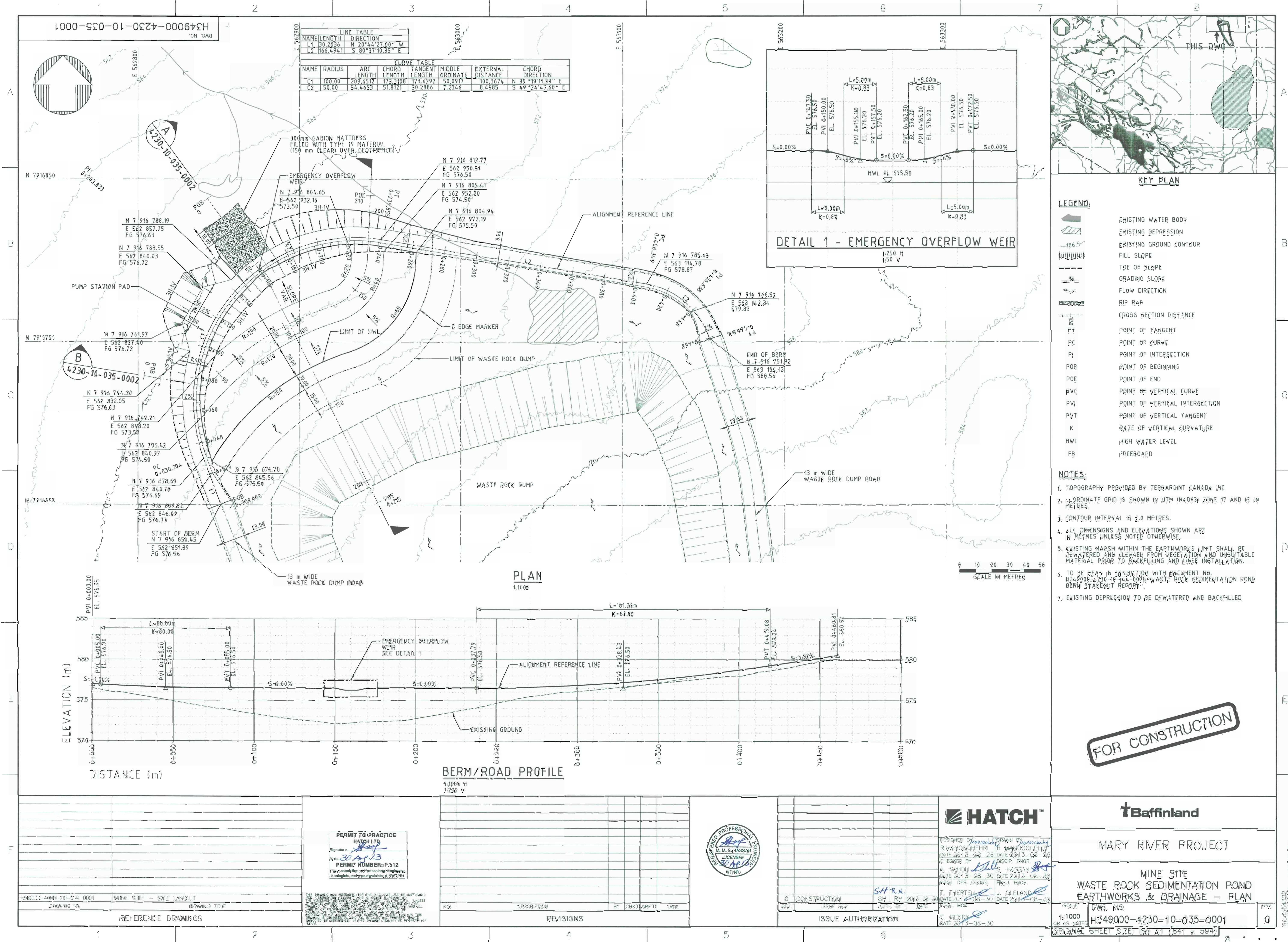
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Appendix B:

Mine Site Waste Rock Sedimentation Pond Earthworks & Drainage Plan

The information contained herein is proprietary to Baffinland Iron Mines Corporation and is used solely for the purpose for which it is supplied. It shall not be disclosed in whole or in part, to any other party, without the express permission in writing by Baffinland Iron Mines Corporation.

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Appendix C:

Mine Site Waste Rock Drainage - Diversion Ditch Plan and Profile

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