TMAC Resources Inc.

Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water Licence No. 2AM-DOH1323

TMAC Resources Inc.
901-372 Bay Street
Toronto, ON M5H 2W9
Tel: (416) 628-0216
info@tmacresources.com

November 2013

DORIS NORTH MINE MODIFICATIONS AND RELATED AMENDMENTS TO PROJECT CERTIFICATE NO. 003 AND TYPE A WATER LICENCE NO. 2AM-DOH1323

November 2013
Project #0194098-035

Citation:

TMAC. 2013. *Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water Licence No. 2AM-DOH1323*. Prepared by TMAC Resources Inc.: Toronto, Ontario.

Prepared by:

TMAC Resources Inc.
Toronto, Ontario

Table of Contents

DORIS NORTH MINE MODIFICATIONS AND RELATED AMENDMENTS TO PROJECT CERTIFICATE NO. 003 AND TYPE A WATER LICENCE NO. 2AM-DOH1323

Table of Contents

List of Figures

List of Tables

List of Appendices

Appendix 12. Design Drawings of Proposed Outfall (Subsea Pipeline and Diffuser) and Associated Infrastructure, Doris North Project (PND Engineers, November 2013)

Appendix 13. Archaeological Review (Points West, October 2011)

Appendix 14. Tail Lake Water Cover Design (SRK, November 2011)

Appendix 15. Reclamation and Security Brief (SRK, November 2013)

Appendix 16. Engineering Drawings for the Doris Central Vent Raise Pad and Access Road (SRK, June 2011)

Appendix 17. Design Brief: Doris North Project, Roberts Bay Expanded Laydown Pads (SRK, August 2011)

Appendix 18. Design Brief: Doris North Project Expanded Ore Storage Pad (T; SRK, August 2011)

Appendix 19. Design Brief: Doris North Project Expanded Waste Rock Storage Pad (U; SRK, November 2013)

Appendix 20. Revised Waste Management Facility Drawings (Hatch, October 2011)

Appendix 21. Doris-Windy All-Weather Access Road: Proposed Freshwater Intake Line (SRK, September 2010)

Appendix 22. Camp Layout Revision (Hatch, October 2011)

Appendix 23. Screening of Socio-economic Effects for Proposed Doris North Infrastructure Changes (Rescan, November 2011)

Appendix 24. Footprint of Proposed Changes to Phase 1 Doris North Mine (SRK, October 2013)

Plain Language Summary (English, Inuktitut, Inuinnaqtun, French)

Plain Language Summary (English, Inuktitut, Inuinnaqtun, French)

This package describes the changes that TMAC Resources Inc. ("TMAC") would like to make to the Doris North Mine (the "Mine"). As support for making these changes, the package also includes supporting memos and drawings that give more details about the changes and confirms that the changes will not cause any negative impacts. The current Nunavut Impact Review Board ("NIRB") Project Certificate No. 003 (the "NIRB Certificate") and the Nunavut Water Board ("NWB") Type A Water Licence No. 2AM-DOH1323 (the "Type A Water Licence") will need to be amended to let TMAC go forward with some of the changes.

The main Mine changes are:

- TMAC plans to mine the entire Doris Deposit which is properly defined as any mineralized zones that can be accessed through the existing Doris North Mine Portal. Miramar Hope Bay ("Miramar") originally thought it could only mine the Doris North deposit through the Doris North Mine Portal. Miramar indicated that they thought the Mine would be open for only 2 years. TMAC has found more mineralization that can be mined via the Doris North Mine Portal, and therefore now expects to add about 2 to 4 years to the overall Doris mine life. This change will extend the benefits of the Mine for a longer period to Inuit, Nunavut, and Canada.
- The mining rate at first will be around 1,000 tonnes per day (tpd), and the milling rate will be about 800 tpd. TMAC plans to increase the mining rate to approximately 2,000 tpd and the mill throughput rate to approximately 1,800 tpd over time. All of these are yearly averages. The current renewed licence authorizes a mining rate of 720 tpd of ore and a milling rate of 800 tpd. Practically, you have to be able to mine more then you mill to make sure there is enough ore to feed the mill.
- Miramar said they would only find a little groundwater while they were mining in the permafrost at Doris North. Because the Doris trend extends into Doris Central and Doris Connector, which are under Doris Lake, TMAC now expects to encounter more groundwater. Testing shows it may be salty. This salty groundwater will be sent from the mine to the tailings pond (formerly Tail Lake). Eventually, the groundwater may turn the water in the tailings area salty. For this reason, it will be better to send the tailings water by pipeline directly to Roberts Bay, instead of Doris Creek which flows into Roberts Bay as Miramar originally planned. TMAC believes that discharging directly to Roberts Bay will be a better environmental water management plan than the original plan to discharge to Doris Creek. Before the water is put into Roberts Bay, TMAC will test it to make sure that it will not harm the environment and will comply with all laws. TMAC is planning to install a water treatment plant to clean the tailings pond water before discharge and therefore does not plan to build the water laboratory on site that Miramar originally permitted when it was proposed to discharge without treatment.
- TMAC will need bigger laydown areas for ore and waste rock storage than Miramar planned because more ore will be mined.
- TMAC plans to increase the size of the camp to accommodate approximately 360 from 180 people and will therefore need more sewage plants at the Doris North Camp. The larger mill and underground workforce needed to mine the increased mineral resources that have been discovered at Doris are the reason that more beds at camp are needed (the Miramar plan was for a mill smaller than the permits allow).

Other minor changes will be made to the Mine, including some site re-organization and some small changes to the current water licence to make the language clearer.

ᐅᖃᐅᓯᑦ ᐊᑐᖅᑕᑦ ᑐᑭᓯᐊᓇᕐᓯᐊᖅᑎᓪᓗᑎᑦ ᓇᐃᓐᓇᕐᓂᖅᓯᒪᔪᑦ

ᐅᖃᐅᓯᑦ ᐊᑐᖅᑕᑦ ᑐᑭᓯᐊᓇᕐᓯᐊᖅᑎᓪᓗᑎᑦ ᓇᐃᔨᖅᓯᒪᔪᑦ

ᐅᓇ ᐃᓗᐃᕐᑐᓂᒃ ᐱᑕᓂᒃ ᐅᓂᒃᑲᓂᒃ ᐱᓱᐊᑎᓪᓂᒃ ᐊᓯᔾᔨᖅᑎᑌᒍᑎᖅᑲᖏᖅᓂᒃ ᐅᑯᐊ Hope Bay ᐅᓴᖃᖅᓂᐊᖅᓇᖅ ᓂᒥᑎᕐᑯᑦ ᐅᕐᖓᓚᖓᔪᓂᒃ ᐅᓴᖃᖅᓂᐊᖅᓇᖅᐃᐊᖅᓂ Doris North Mine-ᑯᑦ. ᐃᑲᔪᓂᒃᖃᓂᐊᖅᓯᒪᑕ ᐅᑯᐊ ᐊᓯᔾᔨᖅᑎᑕᐅᔪᓯᓂᒃ, ᐊᓪᓚᓯᖏᓪᓕᔪᑦ ᐃᓗᐃᕐᑐᑦ ᐃᓕᖅᑭᒥᔪᑦ ᐊᒥᓯᐊᑦ ᐅᖅᑲᐅᓯᓚᐅᖅᓯᒪᔪᓂᒃ ᐱᓕᕆᐊᑐᓂᖅᓴᖅᓂᒃ ᐱᓕᕆᔨᐸᑎᑦ ᑐᑭᓯᐊᓂᒃ ᐅᖅᓱᓐᓂᖅᓴᖅᓂᒃ ᐅᓂᒃᑲᑦ ᐃᓗᐊᓂᑦ ᐅᓂᒃᑲᑦ ᐱᔪᓐᓂᑦ ᐊᓯᔾᔨᖅᑕᐅᔪᓯᖏᓐᓂᒃ ᐊᑐᓚᑕ ᓇᓗᓇᐃᖅᓯᔪᑕᐅᓪᓚᓐᓂᑕᓂᒃ ᐊᓯᔾᔨᖅᑕᐅᓂᖅᓴᖅᓂᒃ ᐃᓐᓇᐃᓐᓂᑦ ᐊᓯᔾᔨᖅᑕᐅᓂᖅᓴᖅᓂᒃ ᓴᓇᕐᓂᐊᔪᑕᐅᖅᓯᒪᓂᖅᓴᖅᓂᒃ ᓄᓇᕗᑦ ᐃᓗᐊᓂᑦ ᐅᓂᒃᑲᑦ ᐃᓗᐊᓂᑦ ᐱᔪᓐᓂᑦ ᐊᓯᔾᔨᖅᑕᐅᓴᐅᓂᒃ ᐊᓯᔪᓚᑦ ᓇᓗᓇᐃᓐᓇᖅᓯᔪᑕᐅᓂᖅᓴᖅᓂᒃ ᐊᓯᔪᑕᐅᓂᖅᓴᖅᓂᒃ ᓴᓇᕐᓂᐊᔪᑕᐅᓂᖅᓴᖅᓂᒃ ᐊᓯᔾᔨᖅᑕᐅᓂᖅᓴᖅᓂᒃ ᐃᓐᓇᐃᓐᓂᑦ ᐊᓯᔾᔨᖅᑕᐅᓂᖅᓴᖅᓂᒃ ᐊᓯ

ᐅძᐊ Miramar-ძᑦ ᑕᐃᒪᓐᓇ <ᕿᓇᓱᒪᓕᐅᕆᓱᒪᖏᑦ ᑕᑯძᐊ. ᒪᑐᒪᓕᐦ ᓱᐅᕐᓴᔪᑦ ᐃᒥᖅ ᐅᐅᓐᓄᑦᑕᕆᔨᒪᑦ ᑲᐃᓱᓕᐦᑐᑉ ᐃᒪᓐᓴᓄᑦ, ᐅძᐊ TMAC ᐅᓴᕋᓂᐊᕐᐃᐃᑲ ᓕᒥᑎᑦძᑦ ᖃᑲᐅᓴᕋᑦᑕᓭᖅᑐᑦ ᓱᑐᖅᑎᓬᓂᕐᒪᑦ ᐊᐢᑭᑦᓂᑲ. TMAC ᐅᓴᕋᖅᑕᓬᐊᑦ ᓕᒪᑎᑦძᑦ <ᕿᓇᐃᔨᑦ ᐊᐠᕈᓭᑭᒪᔨᑦ ᐃᒥᕐᒥᑲ ᓴᑐᒪᓐᓇᐃᐃᓴᖅᒥᑲ, ᐃᒥᖅ ᐱᐅᓱᖅᓯᑎᓪᓚᑦ ᖃᑲᐅᓴᕋᖅᑕᐅᖅᑕᑦᓂᐊᕐᒪᑦ ᓱᑦᑭᒪᓐᓴᖅ. ᓱᑦᖃᐃᒪᒪ TMAC ᐅᓴᕋᖅᑕᓬᐊᑦ ᓕᒪᑎᑦძᑦ ᐊᐠᕈᓭᑭᒪᕐᑦ ᐃᒥᕐᒥᑲ ᓴᓇᓕᒪᓐᓇᐃᐃᓴᖅᒥᑲ, TMAC ᐅᓴᕋᓂᐊᕐᐃᐃᑲ ᓕᒥᑎᑦძᑦ ᓴᓇᓭᑭᒪᓐᓴᖅᑎᑦᑐᑦ ᐃᒥᓕᓬᐃᐃᑲ ᖃᑲᐅᓴᕋᖅᑕᐅᖅᑕᑦᓂᐊᕐᒪᑦ ᐃᓐᓕᖅძᓕᓐᓄᓚᒥᑲ ᑕᒧᓂ ᓄᓇᒥ ᐅძᐊ ᑭᓱᐊᓂ Miramar-ძᑦ ᑕᐃᒪᓐᓇᐃᐅᑐᑦ ᐊᐠᕈᒍᒪᓕᐅᕆᓱᒪᓕᐦᑦ.

- TMAC ᐅᓴᕋᓂᐊᕐᐃᐃᑲ ᓕᒥᑎᑦძᑦ ᐊᐠᕈᑎᐊᓬᑦ ᓄᓇᒥ ᐃᓕᓴᕋᖅᐅᐃᐅᓴᖅᑕᕋᔪᖅᑐᑦ, ᐱᑕᓕᓐᓂᑲ ᐅᓴᖅᑕᑦ ᐊᓱᒪᐃᓐ ᐊᐢᑕᑯᓂᑲ ᐋᓴᖅᑕᐅᓂᑯᓂᑦ ᐅᓴᖅᑕᑦ ᐃᓂᓐᖅᓴᓐᓂᑲ ᐊᓐᓇᑦᑐᖅᑕᑦ ᓱᑦᑲᐃᒪᒪ ᐊᓐᓇᑦᑐᖅᑕᑦ ᐋᓴᖅᑕᐅᓴᖅᑕᑦᑕᓭᖅᑐᑦ ᐱᑕᓕᓐᓂᑲ ᐊᑭᓐᓂᑦ ᖃᑭᓂᖅᑕᑦ.
- TMAC ᐅᓴᕋᓂᐊᕐᐃᐃᑲ ᓕᒥᑎᑦძᑦ ᐊᐠᕈᑎᐊᓬᑦ ᓄᓇᒥ ᐃᓕᓴᕋᖅᐅᐃᐅᓴᖅᑕᕋᔪᖅᑐᑦ ᐅᐢᑭᓂ Doris North Camp ᐊᓱᓂ ᓄᓇᓕᒥᓴᐅᓱᒥ ᐊᒥᓱᓕᔪᓕᒪᑕ ᐃᓗᓐᓂᑦ ᓱᓂᖅᓴᐊᑦ ᐊᓱᓂ ᓄᓇᓕᒥᓴᐅᓱᒥ ᐃᒧᑎᑎ 180 ᑎᑭᑦᓗᑎᑦ 360-ᒧᑦ.

ᐊᓱᖅᑎᑦ ᐱᔭᕆᐊᑐᓗᖅᑎᑦᑐᑦ ᐊᓱᕈᓴᑎᓴᖅᑕᐅᓬᖅᑐᑦ ᐅᓴᕋᓂᐊᕐᐃᐃᑲᒥ, ᐃᓕᒥᔭᑦ ᒪძᐊ ᑕᓗᙳᓪᓕᑦ ᐊᐢᕿᑭᓱᒪᓂᖅᑎᑦ ᐊᐢᕿᑎᐊᓴᖅᑕᐅᓪᓗᑎᑦ.

Kangihimannattiatillugit Uqauhiit Nainaqhimayut

Kangihimannattiatillugit Uqauhiit Nainaqhimayut

Ukuat katihimayut unniqtutai tapkuat ahianguqnit tapkuat TMAC Resources Inc. ("TMAC-kut") piyumayai taphumunga Doris North Uyagakhiuqvik (tamna "Uyagakhiuqvik"). Ikayuqhiutininut tapkuat piyauni tahapkuat ahianguqnit, tapkuat katihimayut ilaqaqmiyut amihunik piluaqnaqtuliqutinik tuhaqhityutit unniqtuttiaqtai tapkuat ahianguqnit naunaiqhugitlu tapkuat ahianguqnit pityutaulaittut ihuittumik aktuanit. Ilai ahiangugutit taphumunga Uyagakhiuqvikmut piniat tapkuat tatya Nunavut Avatiligiyit Katimayit ("NIRB-kut") Havanguyuq Titigaqtaq Nappaa 003 (tapkuat "NIRB-kut Titigaqtat") tamapkuatlu Nunavut Imaligiyit Katimayit ("NWB-kut") Qanugitunia A Imaqmut Laisa Nappaa 2AM DOH1323 (tamna "Qanugitunia A Imaqmut Laisa") piyaqaqniat ihuaqhigiaqni.

Tapkuatatuqniqpat Havanguyuq ahianguqni tapkuat:

- TMAC-kut tatya upalungaiqtut uyagakhiuqnianik tamna tamaat Doris Piqaqni tahapkualuttauq kitutliqak ahii piqaqnit piyaulat atuqhugit tapkuat tatya atuqtut Doris North Uyagakhiuqvik Nunamuktaqvia. Miramar Hope Bay-kut ("Miramar-kut") ihumagihimayagaluangat pilaqnia kihimik uyagakhiuqnia tamna Doris North piqaqnia talvuna Doris North Uyagakhiuqvik Nunamuktaqvia. Piplugu TMAC-kut nalvaqni havikhaqaqpaliqnit haniani tamna Doris North Uyagakhiuqvik Nunamuktaqvia, nigiugiliqtat tatya ilani mikhaani 2 tikitlugu 4 ukiut uyagakhiuqtaulaqnia. Miramar-kut ihumagihimayagaluangat tamna Uyagakhiuqvik angmalaqnia kihimik 2 ukiuknut. Una ahianguqnia uiguniaq ihuaqutainut taphuma Uyagakhiuqviup hivitutqiyamut pivikhai Inuit, Nunavut tamnalu Kanatamut.
- Qanugitninut piyaulaqni havikhat TMAC-kut ilagialaqtai tapkuat uyagakhiuqniqmut aktilangi havikhat (tikitlugu 2000 tansit upluq tamaat) tapkuatlu aktilangi havikhaliuqnit hanayauni (tikitlugu 1800 tansit upluq tamaat). Nigiugiyauyut tapkuat uyagakhiuqniq aktilangi atuqpakniqhauniat mikhaani 1000 tansit upluq tamaat, tapkuatlu havikhaliuqni aktiulangi mikhaani 800 tansit upluq tamaat. Taya laeseoyok agikhimayok oyagaktageagani 720-tanik ukomaetilaaganik uplok ataohik oyakikilotiklo 800-tanik ukomaetilaaganik uplok ataohik.
- Miramar-kut ihumagihimayagaluangat nalauttaqnikhai kihimiuyuq mikkatakmik maniqami imait atuqtitlugu uyagakhiuqni Doris Qitqani tamnalu Atatyuta, uuktugautitlu takukhaupkaqtat tagiunginauniaqnia. Una maniqamit imaq nuktigauniaq talvangat uyagakhiuqvikmit talvunga uyagaktaqnikut kuvigaqvianut hiamaktailivikmut (tamnaugaluaq Tail Tahiq). Atuqpalianiaq, tahamna maniqami imaq akutyutiginiaqta imaq talvani uyagaktaqnikut hiamaktailivia imagiktumit tagiunginaqmut. Taimaittumik piplugu, nakutqiyauniaq nuktiqninut tapkuat uyagaktaqnikut imait tugaqtitlugit talvunga Roberts Bay-mun, talvungaungittuq Doris Kuugauyaqmut piyainut Miramar-kut upalungaiyaqtagaluangatut. Hivuani tamna imaq kuvipkagauniahaqtitlugu Roberts Bay-mun, TMAC-kut uuktugaqniaqtat atuqpiaquuplugu huguqtagutaulaitnia avatigiyauyumut. TMAC-kut upalungaiyaqtut iluqaqni imaqmut halumaqhautit halumaqtiqninut imaq naamagiyaungitpat uuktugaqni. Piplugit TMAC-kut uplaungaiyaqni ilauqaqni imaqmut halumaqhautit, TMAC-kut upalungaiqhimaittut hananinik imaqmut naunaiyaivik havakvikmi tapkuat Miramar-kut upalungaiyautigihimayagaluangatut hananikha.
- TMAC-kut piyaqaqtat iliuqaqvikhaq, havikhat iqakut uyaqat tutquqvi aglivaliqni piplugit ilavaliqni havikhat aktilangi uyagakhiuqtauniat.
- TMAC-kut upalungaiyaqtut ilavaliqnnik tapkuat anait halumaqhaivit talvani Doris North Hiniktaqvik pitquplugit ilavaliqni iglikhat hiniktaqvikmi talvangat 180 talvunga 360.

Ahii mikiyut ahianguqnit piyauniat Uyagakhiuqvikmi Mine, ilalgit ilai havakvikmi ihuaqhatqikhaqni.

Résumé en langage clair

Résumé en langage clair

Ce dossier décrit les changements que TMAC Resources Inc. (« TMAC ») aimerait apporter à la mine Doris North (la « mine »). Pour soutenir la réalisation de ces changements, le dossier inclus également les mémos et dessins de support qui donnent plus de détails sur les changements et confirment que ces derniers ne causeront aucuns effets négatifs. L'actuel certificat de projet No 003 (le « certificat ») délivré par la Commission du Nunavut chargée de l'examen des répercussions (la « CNCER ») et le permis d'utilisation des eaux de type A N^{o} 2AM-DOH1323 (le « permis d'utilisation des eaux de type A ») délivré par l'Office des eaux du Nunavut (l'« OEN ») auront besoin d'être amendés pour permettre à TMAC d'effectuer certains des changements.

Les principaux changements de la mine sont:

- TMAC planifie maintenant d'exploiter la totalité du gisement Doris, défini comme toute zone minéralisée accessible par le portail de la mine Doris North déjà existant. Miramar Hope Bay (« Miramar ») pensait originellement ne pouvoir exploiter que le gisement Doris North via le portail de la mine Doris North. Miramar avait précédemment estimé que la mine opérerait pendant seulement deux années. Suite à la découverte de minerai supplémentaire à exploiter accessible par le portail de la mine Doris North, TMAC s'attend maintenant à ajouter de deux à quatre ans à la durée de vie globale de la mine. Ce changement permettra aux Inuits, au Nunavut et au Canada de profiter plus longtemps des avantages de la mine.
- Le taux d'extraction dans un premier temps sera d'environ 1 000 tonnes par jour (tpj), et le taux d'usinage sera d'environ 800 tpj. TMAC prévoit d'augmenter le taux d'extraction jusqu'à environ 2 000 tpj et le taux d'usinage jusqu'à environ 1 800 tpj au fil du temps. Tous ces chiffres représentent des moyennes annuelles. Le permis actuel autorise un taux d'extraction de 720 tjp et un taux d'usinage de 800 tpj. En pratique, il faut avoir la capacité d'extraire plus de minerai que l'on ne peut en usiner, afin d'assurer un approvisionnement continu de minerai à l'usine.
- Miramar avait dit qu'elle ne trouverait que peu d'eau souterraine en minant dans le pergélisol à Doris North. Étant donné que la veine Doris s'étent jusque dans Doris Central et Doris Connector, qui sont situés sous le lac Doris, TMAC s'attend désormais à trouver plus d'eau souterraine. Les tests ont montré qu'elle serait salée. Cette eau souterraine salée sera envoyée de la mine au bassin de résidus (anciennement lac Tail). À la longue, l'eau souterraine rendra l'eau de la zone de résidus salée. De ce fait, il vaudrait mieux envoyer l'eau résiduelle par pipeline directement vers la baie Roberts, plutôt que vers le ruisseau Doris qui se déverse dans la baie Roberts tel qu'initialement prévu par Miramar. TMAC pense également que déverser directement dans la baie Roberts représente un meilleur plan de gestion de l'eau que le plan original de déverser dans le ruisseau Doris. Avant que l'eau soit mise dans la baie Roberts, TMAC la testera pour s'assurer qu'elle ne nuit pas à l'environnement et qu'elle est conforme à toutes les lois. TMAC prévoie d'installer des stations de traitement des eaux pour assainir l'eau des bassins de résidus avant de la rejeter, et n'envisage donc plus de construire sur le site le laboratoire de contrôle de l'eau pour lequel Miramar avait originellement obtenu un permis lorsqu'il était prévu de décharger sans traitement.
- TMAC aura besoin d'aires de dépôt pour le minerai et de zones de stockage des stériles plus grandes que celles prévues par Miramar parce que de plus grandes quantités de minerai seront extraites.

- TMAC prévoie d'aggrandir la taille du camp pour accueillir approximativement 360 personnes (au lieu de 180), et aura donc besoin de plus d'usines de traitment des eaux usées pour le camp Doris North. L'augmentation de l'usinage et de la main-d'œuvre de fond est nécessaire pour exploiter les ressources minières plus importantes qui ont été déouvertes à Doris, et c'est pour cela de plus de camp doit être aggrandi (Miramar avait planifié une usine plus petite que les permis ne l'y autorisaient).

D'autres changements mineurs seront apportés à la mine, incluant la réorganisation de certains éléments du site, ainsi que de légers changements au permis d'utilisation des eaux actuel afin d'en rendre la formulation plus claire.

Executive Summary (English, Inuktitut, Inuinnaqtun, French)

MAC RESOURCES

Executive Summary (English, Inuktitut, Inuinnaqtun, French)

This amendment application relates to the Doris North Mine (the "Mine") authorized by the Nunavut Impact Review Board ("NIRB") under Project Certificate No. 003 (the "Project Certificate") issued in September 2006 and the Nunavut Water Board ("NWB") under Type A Water Licence 2AM-DOH1323 (the "Type A Water Licence") issued in August 2013.

Based on encouraging results from its continuing exploration in the vicinity of the Doris North Mine, TMAC Resources Inc. ("TMAC") now anticipates it will use the existing Doris North Portal to access and mine the entire Doris deposit. This includes all mineralized zones that can be accessed from the existing Doris North Portal. The decision to use the existing Doris North decline to access all of the known Doris sub-deposits has led mine engineering and operations to identify changes to the existing mine footprint and facilities that will be necessary in order to optimize the operation and ensure a continuous ore feed. The changes presented in this document and the supporting appendices add approximately 2 to 4 years of mine life to the approximately 2 years originally reported in the Final Environment Impact Statement ("FEIS") approved by NIRB. The changes are within the scope of the currently approved closure plan for the Tail Lake Tailing Impoundment Area ("TIA").

The Mine changes described within this application are required in order to continue mineral exploration and development of the Phase 1 Doris North Mine and are not a "pre-build" to support the Phase 2 Hope Bay Belt Project. Phase 2 will be the subject of separate regulatory applications to the NIRB and NWB. In the Phase 2 Project Description, TMAC will describe how it intends to expand existing Doris site infrastructure in the future provided Phase 2 is approved in order to support development in the southern Hope Bay Belt. As well, Phase 2 will require a significant number of new stand-alone facilities. This approach will minimize disturbance of the land and maximize capital investment. The Phase 1 Doris North Mine discussed in this application is a stand-alone operation and does not depend on Phase 2 for the operation of either the Doris North Mine or changes now being proposed.

Proposed changes to the Doris North Mine are summarized briefly below.

- Mining all mineralized zones that are accessible via the existing Doris North Portal in addition to the Doris North deposit will extend the mine life of the Doris North Mine by an estimated 2 to 4 years. TMAC has conducted geochemical analysis to characterize the additional material expected to be mined and the composition of these materials supports the view that the waste rock can be managed via existing site controls and the changes to facilities described within this application.
- TMAC anticipates an initial mining rate of 1,000 tonnes per day (tpd; yearly average ore mining rate) and that ore from these deposits will be processed by the existing mill at a rate of 800 tpd (yearly average). These rates may ultimately grade up to a mining rate of up to 2,000 tpd yearly average and a 1,800 tpd yearly milling average depending upon what additional resources are found at Doris.
- Expanded mining activities will result in additional waste rock and ore that will require storage, therefore laydown areas and ore and waste rock pad areas will be expanded accordingly.

- TMAC anticipates that saline ground water will be encountered in the talik under Doris Lake during mining of Doris Central and Doris Connector and below the permafrost in Doris Lower. Any groundwater encountered during mining will be diverted to the TIA through an overland pipeline.
- In order to manage saline groundwater as well as reduce potential for negative impacts on the freshwater environment, TMAC will revise management of the TIA so that water is discharged directly to Roberts Bay via pipeline and a diffuser on the ocean floor, rather than to Doris Creek as previously planned. All regulatory parameters, including those listed in the Type A Water Licence and in the Metal Mining Effluent Regulations, will be met prior to discharge. Process water will be treated prior to deposit in the TIA and if needed prior to discharge to Roberts Bay. Footprint impacts will be minimal, as the on-land portion of the discharge pipeline will follow the existing all-weather road to Roberts Bay, where it will avoid the foreshore by passing down the jetty and then into Roberts Bay. The pipeline will run about 2.4 km from shore into a deep pocket.
- In order to maximize capacity of the TIA while continuing the subaqueous tailings disposal required by the current water licence, TMAC proposes to reduce the TIA water cover to 2.3 m (from the previously proposed 4 m). This depth is sufficient to prevent re-suspension and ice entrainment of the tailings.
- During operations and continuing into closure, mixed tailings (a combination of destructed cyanide tailings and flotation tailings) will report to the TIA. TMAC believes it is now appropriate to move to mixed tailings because TMAC is introducing additional treatment measures in the mill to destroy cyanide in the tailings slurry (which was not a measure proposed by Miramar). Cyanide will be destructed to 0.5 mg/L which will fall below management thresholds set out in the International Cyanide Management Code for the Gold Mining Industry and will meet all applicable Canadian regulatory standards.
- The revisions that TMAC is requesting to TIA water management (which include treatment) will ensure that discharge meets required criteria and as such, the on-site laboratory previously proposed by Miramar Hope Bay and described in the Project Certificate is no longer necessary.
- Doris North Camp will increase from approximately 180 to 360 camp occupants. The larger mill and increased underground workforce triggers the requirement for more beds. Sewage treatment capacity will increase commensurate to the size of the projected workforce as will domestic water use.
- A pipeline is proposed that would run along the Doris-Windy Road to supply water for Doris Camp use from Windy Lake.
- Materials from existing Windy Road quarries A, B, D, and new quarry I will be for general construction use.
- Waste management facilities (incineration, materials handling) currently located near Roberts Bay may be relocated to an area near Quarry A (where the approved landfill is located) (See Appendix 20). TMAC wishes to retain flexibility with respect to placement of these facilities.
- In addition, TMAC wishes to clarify that it is expected that certain measures originally anticipated to be temporary will continue. Specifically, TMAC plans to continue to:
  - supplement permanent accommodations located on site with continued use of the accommodation barges located in Roberts Bay or similar facilities, which will support approximately 125 additional workers during construction;

- from time to time and as needed, over-winter fuel barges and vessels in ice in order to ensure continuous delivery of fuel to site.

As part of this application, TMAC has described the direct associated changes to its reclamation and closure plan. The management plans associated with the Project Certificate and Type A Water Licence will be updated once the amendment process is complete and the final requirements relating to these proposed changes have been identified. Preliminary views on potential changes to these plans are included in this document. TMAC wishes to explore options with the Nunavut Water Board and Kitikmeot Inuit Association to address the issue of overbonding on Inuit owned lands. Currently TMAC has posted financial security in excess of the estimated reclamation and closure liability.

In order to proceed with the proposed Mine changes, TMAC is requesting all necessary amendments to the Project Certificate in addition to amendments to the Type A Water Licence. It is TMAC's desire to pursue a NIRB/NWB coordinated review process to the extent possible.

ᑐᕆᑲᖏᑦ ᓇᐃᓐᓇᕐᓂᒃᑯᑦ

MAC RESOURCES

ᑐᓴᖅᓴᑦ ᓇᐃᓐᓇᖅᓯᒪᔪᑦ

ᐅᑯᐊ ᑐᖅᓯᖅᑐᑎᑎᓗᑦ ᑐᖅᓯᖏᑦ ᐱᔨᔪᑎᓕᓪᑦ ᐅᑯᓂᖅᓱᓴᔨᔪᓂᖅ Doris North-ᒥ ᐅᓴᕋᖅᓴᓯᐅᕋᖅᓘᓐᓄᖅᓴᓕᑦ ᐱᔨᐣᓇᑭᑎᕋᖅᕈᑎᑕᐅᔨᑦ ᓄᓇᕗᑦ ᐊᐢᕈᑎᒥᓱᓕᕐᓂ ᑲᑎᒪᓕᖅᑭᑦᑕ ᓇᓗᓇᐃᖅᑯᑉᓂ ᐱᔨᐣᓇᐅᒪᒥᖅ ᐃᒪᖅ ᓀᓴᐅᑎᒥᖅᒥᖅ No. 003 ᐅᕐᓂ ᑐᓂᴥᐅᓪᓚᐅᕋᖅᓯᒪᔪᕋᖅ September 2006-ᒥ ᐅᑯᐊᓗ ᓄᓇᕗᑦ ᐃᒪᓕᒥᓱᓕᓪᑦ ᑲᑎᒪᓕᖅᑭᑦᑕ ᐃᒪᓕᒥᓱᓐᓇᐅᑎᖅᑲᑎᕈᑦᑎᑦ ᐃᒪᐃᑐᑐᒥᖅ Type A-ᒥᖅ ᓪᐃᓴᒥᖅ ᐅᒥᓐᒃ 2AM-DOH1323 ᒪᓕᖅᑕᐅᓪᓚᑐᖅ ᑲᔨᓯᐊᓇᐅᑎᖅᑲᒪᒪᓕ ᓯᕐᓂᕋᑐᑦ ᐊᑐᑕᐅᕐᓇᕆᐅᕋᖅᓯᒪᔪᑦ ᖃᐅᓂᖅᑎᓪᓚᑦᑕ ᑕᑯᒃᖏᓐᓄᑦᑐᒥᖅ Doris North ᐅᓴᕋᖅᓴᓯᐅᕋᖅᓘᐊᑕ, TMAC Resources Inc.-ᑯᑦ ᐃᓐᓇ ᐊᑐᑎᓪᓚᕐᒪᖏᓪᓕᑕ ᑕᕐᕈᓂ ᓴᖃᐅᒪᓴᐅᑎᑎᓕᖅᖢᒥ ᐅᓴᕋᖅᓴᓯᐅᕋᖅᓘᓐᓄᖅ Doris North-ᒥ ᐊᖏᓪᓚᒥ ᓄᓇᕗᐅᑦ ᐃᓚᐅᓄᑯ ᐊᓯᑯᑎᑎᕐᔪᐊᓯᖅ ᐃᓚᓪᒍᐊᖏᓪᓚᖅ ᐃᑎᖅᘻᐅᓯᖅ ᐊᒪᓚᓗ ᐱᔨᐃᒍᖏᓪᓕᒪᓕ ᐅᓴᕋᖅᓂᓂᐊᖅᑐᑎᑦ ᐃᓗᖅᓂᖏᓪᓕᒪᓕ Doris-ᒥ ᐱᑕᕐᓕᒥ. ᑕᑯᐅᖏᓪᓚᓪᓕᑦ ᐃᓕᓴᕐᕋᖅᓴᖅᑐᑦ ᐅᓴᕋᖅᓴᓯᐅᕋᖅᓘᐅᕐᓂᔨᓂᖅᑐᑦ ᐅᑯᓇᓂ Doris North-ᒍᑦ, ᐅᕐᓂᓗ Doris Lower ᐊᒃᑲᓗᓂᖅᑲᒥ, Doris Central ᖃᑎᖏᓪᓕᖅᑕᖅ, Doris Connector ᐊᒃᑐᐊᓪᖅ ᑕᑯᐅᖏᓪᓚᓪᖅ ᐊᒪᓚᓗ ᓇᒍᑐᐃᓇᖅᓯᐊᓪᓚᑦ ᑕᑯᐅᖏᓪᓚᓪᓕᑦ ᐅᕐᕈᓗᑭᐊᖅᖢᖅ ᓄᑦᑎᓂᑦ ᓇᓂᓗᓀᐅᓗᒪᔨᓂᖅᑐᑦ ᑕᑯᐅᖏᓪ ᑎᑭᐅᑐᐊᓇᕐᓂᖅᑐᑦ Doris North-ᒥ ᐅᐊᖏᓪᓚᓂ ᑲᑕᖏᓪᓕᖅᑕᖅ ᐃᓗᓪᒍᑦ.ᖃᓄᖅᑐᑭᑕᐅᒪᓕᒪᓕ ᐊᑐᖅᑕᐅᖅᑲᑕᓂᓂᐊᖅᓂᖅᑎᑦ ᒪᓐᓇ ᓴᖅᑭᐅᒪᔨᑦ ᐅᕐᓂ Doris North-ᒍᖏᓪᓚᑦ ᐊᒃᑲᓗᓂᖅᖢᒥ ᐃᓗᓐᓇᑎᒃ ᖃᐅᐅᔪᒪᕐᒃ Doris-ᒍᖏᓪᓚᓕᒫᑦ ᓇᓗᓇᐃᖅᓯᐊᐅᓯᒪᔪᓕᒫᑦ ᐱᑕᓕᑦ ᐱᓕᓪᓚᐃᖅᑲᑕᖅᓯᒪᔪᑦ ᓴᓇᓴᐅᓯᒪᔪᓂᖅ ᐱᑕᓕᑦ ᐊᒪᓚᓗ ᐊᐅᓚᓀᓯᑎᑦ ᑕᑯᐅᖏᓪᓚᓪᓕᑦ ᓇᓗᓇᐃᓐᓇᖅᑐᐅᓕᖅᓚᒪᓕ ᖃᐅᓂᖅᑎᑦ ᐊᐅᓚᓀᓯᑎᑦ ᐊᒪᓚᓗ ᓴᓇᓕᐅᓯᖅ ᐅᓴᖃᐅᓂᖅᑎᑦ ᐱᑕᓕᑦ ᐊᐅᓚᓀᓯᑎᑦ ᐊᒪᓚᓗ ᐅᓴᖃᐅᓂᖅᑎᑦ ᐃᓕᓴᕐᕋᖅᓴᖅᑐᑦ ᐅᑯᐊ ᐱᔨᔪᑎᓕᖅᑭᑦᑕ ᐊᐅᓚᓀᓯᑎᑦ ᐃᓕᓴᕐᕋᖅᓴᖅᑐ

ᑐᒃᓯᖏᑦ ᐊᓯᑭᖅᑎᖅᑕᐅᔨᒪᔨᑦ ᐅᖓᓂ Doris North-ᒥ ᐱᓕᕆᐊᖑᓚᐅᔨᑦ ᐅᑯᐊ ᐊᑕᐅᓪᓗᑎᑦ ᓇᐃᓇᖅᓯᓚᖅ.

- ᐅᓴᖅᓂᓕᐊᖅᐹᒃ ᑕᕐᓯᒪ Doris Central ᖃᑎᖅᑐᑦᓱᖅ ᐊᒻᒪᓗ ᐊᖏᑯᑦ ᐊᐅᑐᐊᔨᖅ ᐱᑕᓕᒥᑕᐅᖅ ᐃᓕᑭᓕᐅᑎᓯᒪᓕᒃᑕ ᐅᖃᖓᑕᖅᑐᓯᒪᔪᓂᑦ Doris North-ᒧᑦ ᐊᑕᐅᑦ ᐱᑕᓄᑦ ᓯᓂ ᐱᓕᕆᐊᖑᓴᖅᑐᓂᓄᑦ ᐅᐃᒧᓕᕆᓯᒪᓕᒃᑕ ᐅᓴᖅᓴᖅᓯᐅᖅᐹᐅᐳᖅᑐᓂᓕᕆᔨᖅᑐᑦᓱᖅᑐᓂᓄᑦ Doris North-ᒥ ᐱᓕᕆᐹᓴᖅ ᐃᒪᐃᑦ ᒥᖅᓴᕐᓴᖅᑐᓂᐅᑦ ᐱᓕᕆᐹᐅᐳᖅᑐᓂᓄᑦ ᒪᕐᒉᐅ 2 ᑎᐳᓕᔭᐊ ᓯᑕᒪᓂᓄᑦ 4 ᐊᖏᕐᒧᓂᑦ. ᐅᑯᐊ TMAC-ᒥ ᐅᓴᖅᓴᖅᓯᐅᖅᐹᐅᖅᓭᒥ ᐊᐅᓪᓚᕐᓯᖅᑕᖅᓯᒪᓕᕆᒪᑦ ᓄᓇᓕᓕᓵᓗᑎᒃ ᖃᐅᔨᓴᖅᓯᑎᒃ ᖃᐅᓄᓇᓕᖅᑐᓂᓕᕆᓂᖅᐹᒃ ᐱᑕᖅᓴᒪᓕᓴᐃᓐᓇᖅ Doris Central-ᒥ ᐊᒻᒪᓗ ᐊᐅᑐᐊᖅᓯᒪᓕᒃᑕᖅᑐᓂᖅ Doris Connector-ᒧᑦ, ᑕᐃᒪᓕᓴᓂᑦ ᖃᐅᔨᓴᖅᑕᐅᓴᖅᑕᖅᓯᒪᓕᒃᑕ ᖃᓄᐃᔅᑐᓂᖅ ᐱᑕᖅᑕᓕᒻᒥᓴᖅ ᑭᓱᖏᓕᓴᓂᑦ ᓇᓗᓇᐃᖅᓯᔨᑐᐊᓯᒪᓕᕆᓕᒃᑕ ᐅᓴᖅᑎᑦ ᐊᓴᖅᑕᐅᓂᖅ ᐱᑕᖅᑎᓂᓕᕆᔨᖅᑐᑦᓱᖅᑐᓂᖅ ᐊᒃᑐᐅᔨᓴᖅᓯᖏᓐᓂᖅᓴᓂᑦ ᖃᐅᔨᑕᐅᓚᐅᖅᑐᓂᖅ ᐊᒻᒪᓗ ᐊᓯᑭᖅᑕᐅᓚᕆᓴᖅᓯᒪᓕᒃᑕ ᖃᐅᔨᓴᖅᑐᓂᖅ ᐱᑕᖅᓴᒪᓕᓴᐃᓐᓇᖅ ᐃᓴᐃᖅᑕᓂᓕᓵᓗᑎᒃ ᐊᒃᑐᐅᔨᓴᖅᑐᓂᖅ ᐱᑕᖅᓴᒪᓕᓴᐃᓐᓇᖅ Doris-ᒥ.

- ᐊᖏᕐᓂᒥᐊᓚᓂᖅᓴᑕ ᐅᓴᖅᓴᖅᓯᐅᖅᐹᒃᖃᑦ ᐊᐅᓪᓚᕐᓯᑎᑦ ᓴᖅᑭᐊᑲᒦᓂᖅᓱᖅᓯᒪᓕᒃᑕ ᑭᒧᒋᓴᓕᒪᔪ ᐅᓴᖅᑕᑦ ᐃᓴᖅᑕᐅᓂᖅᓯᑦ ᓄᓇᕗᒻᒥ ᐊᒻᒪᓗ ᖃᑭᐅᓂᖅᑕᑦ ᐃᓂᖅᑲᓚᐊᖅᑐᖅᓱᖅᓯᒪᓕᒃᑕ ᐃᓕᐅᖅᑕᐅᓂᖅᐹᒃ, ᑕᐃᒪᐃᓪᓕᑦ ᐃᓂᖅᑲᓚᐊᖅᑐᖅᓱᖅᓯᒪᓕᒃᑕ ᓄᓇᕗᒻ ᐃᖃᓗᐃᑦᑕᓐᓇᑎᓂᑎᑐᖅ ᐊᒻᒪᓗ ᐱᓴᖅᑕᐅᓂᖅᑐᑦ ᐅᖃᖓᑕᖅᑐᓂᖅ ᐊᒃᑐᑎᓂᖅ ᐊᒻᒪᓗ ᑎᑭᐅᖅᑐᖅᑐᓂᖅ 2,000 ᑕᓐᓇᓂᖅ ᐅᑦᓂᖅ ᐊᑕᐅᓇᖅ ᑭᓇᐊᓂᒃᑲ ᓯᓂ ᐃᓕᓴᕐᓴᖅᑐᑦ ᐱᑕᖅᑦᑦᑕ ᐊᑐᐃᓐᓇᖅᑐᓂᖅ ᓇᓂᓇᐃᖅᑐᖅᑦᑦᑕ Doris-ᒥ.

- ᐊᖏᕐᓂᑕᒪᓕᕆᓂᖅᑦᑦᑕ ᐅᓴᖅᓴᖅᓯᐅᖅᐹᒃᖃᑦ ᐊᐅᓪᓚᕐᓯᔪᑎᑦ ᓴᖅᑭᐊᑲᒦᓂᖅᓱᖅᓯᒪᓕᒃᑕ ᑭᒧᒋᓴᓕᒪᔪ ᐅᓴᖅᑕᑦ ᐃᓴᖅᑕᐅᓂᖅᓯᑦ ᓄᓇᕗᒻ ᐊᒻᒪᓗ ᖃᑭᐅᓂᖅᑕᑦ ᐃᓂᖅᑲᓚᐊᖅᑐᖅᓱᖅᓯᒪᓕᒃᑕ ᐃᓕᐅᖅᑕᐅᓂᖅᐹᒃ, ᑕᐃᒪᐃᓪᓕᑦ ᐃᓂᖅᑲᓚᐊᖅᑐᖅᓱᖅᓯᒪᓕᒃᑕ ᓄᓇᕗᒻ ᐃᖅᑲᒦᑕᓐᓇᓕᓴᐃᓐᓇᑎᓂᑎᑐᖅ, ᐊᒻᒪᓗ ᐱᓴᖅᑕᐅᓂᖅᑐᑦᓱᖅ ᐅᖃᖓᑕᖅᑐᓂᖅᑐᑦ ᐊᓯᖏᓐᓂᒃᑯᑦ ᐊᒃᑐᓂᓄᑦ ᐊᒻᒪᓗ ᑎᑭᐅᖅᑐᖅᑐᓂᖅ 2,000 ᑕᓐᓇᓂᖅ ᐅᑦᓂᖅ ᐊᑕᐅᓇᖅ ᐅᓇᐊᓂᒃᑲ ᓯᓂ ᐃᓕᓴᕐᓴᖅᑐᑦ ᐱᑕᖅᑦᑦᑕ ᐊᑐᐃᓐᓇᖅᑐᓂᖅ ᓇᓂᓇᐃᖅᑐᖅᑦᑦᑕ Doris-ᒥ.

- ᐅᓴᖅᓴᖅᓯᐅᖅᐹᒃ ᑕᕐᓯᒪ ᐃᓐᓇᐃᓕᓴᐃᓐᓇᖅᑐᓂᖅ ᐊᐅᓪᓚᕐᓯᑎᑦ ᐱᑕᖅᑦᑦᑕ ᐊᒻᒪᓗ ᐊᖏᑯᑦ ᐃᓂᖅᑲᓚᐊᖅᑐᖅᓱᖅᓯᒪᓕᒃᑕ ᐅᖃᖓᑕᖅᑐᓂᖅᑐᑦ ᐃᓂᖅᑲᓚᐊᖅᑐᖅᓱᖅᓯᒪᓕᒃᑕ ᐃᓕᐅᖅᑕᐅᓂᖅᐹᒃ, ᑕᐃᒪᐃᓪᓕᑦ ᐃᓂᖅᑲᓚᐊᖅᑐᖅᓱᖅᓯᒪᓕᒃᑕ ᐃᓕᐅᖅᑕᐅᓂᖅᐹᒃ ᐊᒻᒪᓗ ᐱᓴᖅᑕᐅᓂᖅᑐᑦᓱᖅ ᐅᖃᖓᑕᖅᑐᓂᖅ ᐃᓂᖅᑲᓚᐊᖅᑐᖅᓱᖅᓯᒪᓕᒃᑕ ᓄᓇᕗᒻ ᐃᖅᑲᒦᑕᓐᓇᓕᓴᐃᓐᓇᑎᓂᑎᑐᖅ ᐊᒻᒪᓗ ᐱᓴᖅᑕᐅᓂᖅᑐᑦᓱᖅ ᐅᖃᖓᑕᖅᑐᓂᖅᑐᑦ ᐃᓂᖅᑲᓚᐊᖅᑐᖅᓱᖅᓯᒪᓕᒃᑕ ᐃᓕᐅᖅᑕᐅᓂᖅᐹᒃ, ᑕᐃᒪᐃᓪᓕᑦ ᐃᓂᖅᑲᓚᐊᖅᑐᖅᓱᖅᓯᒪᓕᒃᑕ ᐃᓕᐅᖅᑕᐅᓂᖅᐹᒃ ᐊᒻᒪᓗ ᐱᓴᖅᑕᐅᓂᖅᑐᑦᓱᖅ ᐅᖃᖓᑕᖅᑐᓂᖅᑐ

- ᐸᓪᓕᑎᑕᐅᓴᓯᐊᖅᑎᓯᐊᖅᓴᒪᑦ ᖃᓄᐃᓪᓗᓯᐊᖅᓂᖓ ᐃᓂᓪᑕᐅᖅᓯᒪᓴᖅ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᒃ ᐊᐅᑎᕐᕕᖅᐅᑦ ᐊᑐᑕᐅᔪᑦ ᑲᔪᓯᐊᖅᓯᓗᓯᐊᖅᑎᓪᓗᓂᑦ ᐱᑕᓪᓕᐅᖅ ᐃᒪᓐᓂᑐᓂᖅ ᐊᐅᑎᕐᕕᖅᐅᐸᑦ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᓂᖅ, ᐊᐅᑎᕐᕕᖅᐅᑦ, ᐅᑯᐊ TMAC ᐅᓴᖏᓐᓂᐊᖅᓇᒃᑲᒃ ᓕᒥᑎᓯᑯᑦ ᑐᓵᔪᓴᒪᒃᑕ ᒥᐅᓕᖅᓯᓇᓕᖅᑎᓪᓗᓂᒃ ᐊᐅᑎᕐᕕᖅᐅᑎᐅᐸᑦ ᐃᓂᓪᒃᑐᓂ 2.3 ᑭᑕᐃᑦ (ᐃᒪᐃᓪᓕᐊᖅᑐᖏᓪᓕ ᑐᓵᔪᖏᓐᓇᒪᑦ 4 ᑭᑕᐃᑦ). ᒡᔪᓭᒪ ᐃᑎᓂᓐᓇᑦ ᐱᓕᒪᓐᓇᑦ ᐱᓕᕆᐊᖅᑐᑦ ᐱᓴᕆᐊᖅᑐᑐᓴᖅᑎᓐᓂᒪᑦ ᐊᓯᒪᓗ ᓯᑯᓗᐊᖅᑐᓴᖅᑎᓐᓂᒪᑦ ᐊᐅᑎᕐᕕᖅᐅᑦ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᓂᖅ.

- ᐊᐅᓪᓚᔪᓴᖅᑎᑐᓪᓗᒍ ᐊᓯᒪᓗ ᑎᑭᐅᑎᖅᑐᑦ ᑲᔪᓯᔪᑦ ᒪᑐᓯᔪᑎᓄᑦ, ᐱᑕᓪᒃ ᖃᓄᐃᓪᓕᖅᑕᑐᐃᓐᓇᖅᓂᖅ ᐃᓪᓚᔭᑕᓴᓴᓂᖅ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᓂᖅ ᐊᐅᑎᕐᕕᐅᖅ (ᖃᓄᐃᓪᓕᖅᑕᑐᐃᓐᓇᕐᔪᕐᓗᐅᖅ ᔪᓐᑐᖅ ᓯᓴᒃᑦᓯᔪᑦ ᐅᑕᖅᓯᔪᐃᓐᓇᕐᓂᕐᒪᖅ ᐱᑕᓪᓕᐅᖅ ᐊᐅᑎᕐᕕᖅᐅᐸᑐᑎᑕᖅ) ᑐᓴᖅᓴᓪᓚᕐᔪᐊᖅᑐᖅᑎᓯᓴᒃᑲᖅᑐᖅ ᑕᒪᖅᓄᓐᓄᓴᓕᐊᑦ ᐊᑦᓪᓕᑎᑦᓓᓕᒃ ᐅᓄᒍᔪᓐ ᐃᓪᓕᑕᐅᑕᐅᔪᐃᓐᓇᐅᒃᑐᒥᖅᑐᒃ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᑐᒥᖅ ᐃᓂᓪᒃᑐᓂ ᐊᐅᑎᕐᕕᖅᐅᑦ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᓂᖅ (ᓯᓴᒃᑦᓯᔪᑦ ᔪᓐᑐᖅ ᓯᓴᒃᑦᓯᔪᑦᑐᖅᑐᒥᖅ ᐊᐅᑎᕐᕕᖅᐅᑦ ᐊᐅᓪᓚᔭᑕᓴᓴᓂᖅ) ᑐᓴᖅᓴᓪᓚᕐᔪᐊᖅᑐᖅᑎᓯᓴᒃᑲᖅᑐᖅ ᑕᒪᖅᓄᓐᓄᓴᓕᐊᑦ ᐊᑦᓪᓕᑎᑦᓓᓕᒃ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᓂᖅ ᐃᓂᓪᒃᑐᓂ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᓂᖅ ᐊᐅᑎᕐᕕᖅᐅᑦ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᑐᒥᖅ ᐃᓂᓪᒃᑐᓂ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᓂᖅ ᐊᐅᑎᕐᕕᖅᐅᑦ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᓂᖅ ᐃᓂᓪᒃᑐᓂ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᓂᖅ ᐊᐅᑎᕐᕕᖅᐅᑦ ᐅᓴᖏᖅᓴᓪᓚᕐᔪᐊᑎᒥᖅᑕᓪᓕᐅᖅᓂᖅ ᐃᓂᓪᒃᑐᓂ

ᐱᓕᕆᔨᐸᑎᒥᓂᑲᑦ ᐅᑭᐅᒥ ᐅᖅᓯᐊᓗᑲᒡᕕᑎᓂᑲᑦ ᓯᑯᑦᑯᓯᓂᑲᑦ ᑎᑭᑕᐅᖅᑎᕐᓂᖅᓯᐊᓗᖅᑐᑦ ᐅᖅᓯᐊᓗᖅᓂᑲᑦ ᑕᑯᐊᖅᓯᓗᒃ ᓄᓇᕗᒻᒥᐅᑦ.

ᐊᑐᑕᐅᔪᓐᓇᖅᑎᓪᓗᑕ ᑲᔨᓯᔪᑎᑲᓴᑦ ᑐᓴᕐᖅᑭᑦ ᐅᓴᖅᓂᒋᐊᖅᐊᖅᑎᒥ ᐊᓯᕗᖅᑕᐅᔪᒪᔨᑦ, ᐅᑯᐊ TMAC ᐅᓴᖅᓂᒋᐊᖅᐊᖅ ᓕᒥᑎᕐᑯᑦ ᑐᓴᕐᖅᑭᓕᖅᑐᖅ ᐊᖏᕐᕕᖏᓐᓂᖅᓂᑲᑦ ᓄᑖᖅᓯᒪᔨᑦ ᐊᖏᕐᕕᖏᓐᓂᖅᓂᑲᑦ ᓇᓗᓇᐃᑲᑦ No. 003 ᐃᓕᒥᓴᐅᔪᑎᒃ ᐊᖏᕐᕕᕈᑎᑲᓴᑦ ᐃᒥᖅᑲᑕᐅᔨᔪᑦ ᐃᒪᐃᑦᑐᒥᓂᖅ Type A-Γ ᓕᐃᓴ 2AM-DOH1323. ᐅᑯᐊ TMAC ᐅᓴᖅᓂᒋᐊᖅᐊᖅ ᓕᒥᑎᕐᑯᑦ ᐊᐅᓕᔪᓕᕈᒪᔨᑦ ᖃᑎᖅᑭᒍᑎᓂᖅ ᐊᓘᒪᓗ ᐱᓕᕆᔨᐸᑎᒥᒃᑲᓂᖅᓂᖅ ᐃᓕᒥᓕᐅᑎᑐᖅᑕᐅᓂᖅ. ᐃᓕᒥᓕᐅᑎᓪᓗᒥᑦ, ᐅᑯᐊ TMAC ᐅᓴᖅᓂᒋᐊᖅᐊᖅ ᓕᒥᑎᕐᑯᑦ ᑐᓴᕐᖅᑭᑦ ᐃᒥᖅᑲᑕᐅᔨᔪᑦ ᐃᒥᖅᑲᑕᐅᖅᑎᒥ ᐃᒪᐃᑦᑐᒥᒃ Type A-Γ ᓕᐃᓴᒃ ᐊᑐᑕᐅᒃᑲᓂᕕᖅᑕᐅᓂᖅ ᐱᔪᓐᓇᖅᑐᑦ ᖃᓄᐃᑦ 10 ᐊᖅᑭᒍᐃᑦ ᓕᐃᓴᖅᑲᑎᓄᑦ ᐊᑐᑕᐅᔪᒃᓴᖅᓂᒃ.

ᐅᑯᓂᖅ ᐃᓕᒥᔭᑦ ᑐᓴᕐᖅᑐᑎᑎᒍᑦ, TMAC ᐅᓴᖅᓂᒋᐊᖅᐊᖅ ᓕᒥᑎᕐᑯᑦ ᐅᓂᒃᑲᖅᑭᖅᓕᒥ ᖃᓄᐃᓕᐅᑐᖅᓂᖅ ᐊᖏᕐᕕᖏᓐᓂᕕᒃᑲᓂᖅᓂᖅ ᓴᓇᓕᖅᓴᐃᔨᑎᖅᓴᖅᓂᒃᑯᓂᖅᓂᖅ ᐊᓘᒪᓗ ᓕᑐᔨᔪᑎᒃᓴᖅᓂᒃ. ᐊᑐᑕᐅᓭᒥᓕᔪᑦ ᑲᒃᑯᓂᖅᓂᖅᓂᔪᑦ ᐱᓕᕆᔨᐸᑎᓕᐅᑕᓪᓗᒥᑦ ᐊᓇᓕᖅᑕᐅᑯᓂᕕᖅᑕᐅᓂᖅᓯᐊᓗᖅᑐᑦ ᐊᓘᒪᓗ ᐃᒥᖅᑲᑕᐅᖅᑎᒥ ᐃᒪᐃᑦᑐᒥᒃ Type A-Γ ᓕᐃᓴ ᐊᖅᑭᒃᑯᒍᓭᓕᖅᑕᒪᑦ ᐃᓐᓇᕐᓂᑕᐅᓕᖅᑕᖅᑐᑦ ᐱᓴᓇᖅᑕᐅᔨᔪᓕᖅᑕᖅᐸᑦ ᐊᓘᒪᓗ ᑭᖑᓪᓕᖅᑕᐅᑎᑦ ᐊᑐᑕᐅᓴᓇᐊᓕᒃᑯᑦ ᑲᒃᑯᓂᖅᓂᖅᓂᔪᑦ ᑲᔨᔪᑦᑕᐅᔨᔪᑦ ᐊᓘᒪᓗ ᑭᖑᓪᓕᖅᑕᐅᔨᔪᓕᖅᑕᖅᐸᑦ ᐊᓇᓕᖅᑕᐅᔪᒃᓴᖅᓂᒃ.

Tuhagahait Nainaqhimayut

Tuhagahait Nainaqhimayut

Una tukhigaut tugangayuq tapkununga Doris North Uyagakhiuqvik (tamna "Uyagakhiuqvik") piyungnaqtitauyut tapkunanga Nunavut Avatiligiyit Katimayit ("NIRB-kut") atuqhugit Havanguyumut Titigaqta Nappaa 003 tuniyauyuq talvani Saptaipa 2006 tapkuatlu Nunavut Imaligiyit Katimayit ("NWB-kut") atuqhugit Qanugittuni A Imaqmut Laisa 2AM-DOH1323.

Piplugit atugahuaqtitni qanugitni tapkuat kayuhini havikhaqhiuqnit tahamani ilangani Doris North Uyagakhiuqvik, TMAC Resources Inc. ("TMAC-kut") tatya nigiugiyauyut atuqtaunikhai tapkuat tataya atuqtuq Doris North nunamuktaqvia itiqnianut uyagakhiuqnialu tamna tamaat Doris piqaqni. Una ilalik piqaqnivaliit hivuagut unniqtuqhimayut tapkuanguyut Doris North, Doris Atpahiknia, Doris Qitqani tamnalu Doris Atatyuta tapkuatlu kitutliqak uigunit nutatluniit nalvaqnit piyaulat talvanga Doris North Nunamuktaqvia. Tapkuat ihumaliugutit atuqtai tapkuat tatya atuqtut Doris North ilunmukpalianiani pitaqnit tamaita ilihimayauyut Doris piqaqpaliqnit pityutauyut Havanguyumut qauyimayiuyut aulatauyutlu naunaiqnit ahianguqni tapkuat tatya atuqtut uyagakhiuqviup tupliqnit havagutitlu tapkuat piyaqaqniat pinahuaqhugit nakuuniqhamik aulanit atuqpiaqnilu kayuhini havikhat piqaqniniut. Tapkuat ahianguqni hatqiqtauyut ukunani titiqani ikayugutauyutlu ilaliutinini ilatyutauyut mikhani 2 tikittugu 4 ukiunut uyagakhiuqviup atuqnia talvunga 2 ukiut hivuagut unniqtauyut tapkunani Kinguliqpamik Avatiliqutit Aktuanit Uqauhit. Tapkuat ilaunittut ihumagiyauyut tapkunani tatya angiqtauyut umiknianut upalungaiyautit taphumunga Tail Tahiq Uyagakhiuqnikut Iqaqvia (TIA-nga).

Tapkuat Havanguyut ahianguqni unniqtai ukunani tukhigautini piyalgit pinahuaqhugit kayuhini pivaliatitni tapkuat Tukligikhat 1 Doris North Uyagakhiuqvik pingittutlu 'hivuagut-hanahimayut' ikayuqhiqninut Tukligikhat 2 Hope Bay QIminga Havanga. Tukligikhat 2 pityutauniat ilikkut maligaqnut tukhigautit tapkununga NIRB-kut tapkuatlu NWB-kut. Tapkunani Tukligikhat 2 Havanguyuq Unniqtuta TMAC-kut unniqtuqniaqtai qanuqtut attaqtuhivaliqniaqni tatya atuqtut Doris havakvia havagutit hivunikhami atuliqat Tukligikhat 2 angiqtaukpat piniaqlugit ikayuqhiqni pivaliatitni tahamani kanagnangani Hope Bay Qiminga. Una mikhigiagutigiya tupligaqnia taahmna nuna aglivaliqhugitlu angiyut hanivaiviuni. Tamna Tuligikhat 1 Doris North Uyagakhiuqvik uqauhiuyuq uumani tukhigautmi ilikkuqtuq aulania pihimaittuqlu utaqinianik Tukligikhat 2 tapkuat aulani naliak tamna Doris North Uyagakhiuqvik unniqtuqnia talvani hivuliqmi EIS-nga ahianguqniluniit tatya uuktugutauyut.

Uuktugutauyut ahianguqni taphuma Doris North Havanguyuq nainaqhimayut hivikittumik ataani.

- Uyagakhiuqnia tamna Doris Qitqani tamanlu Atatyuta piqaqpaligutauni ilagiplugit tapkuat Doris North piqaqnit uiguniaqtai tapkuat uyagakhiuqviup atuqnikha taphuma Doris North Havanga taphuminga mikhaani 2 tikitlugu 4 ukiut. TMAC-kut havaktai nunaliginiqmut naunaiyaqnit qanugittuyangi tapkuat hunat ilalgit talvani Doris Qitqani tamnalu Doris Atatyuta tapkautlu qanugittuni tahapkuat hunat ikayuqhiutiyut takuyauninik tapkuat iqakut uyaqat aulataulaqni piplugit tatya atuqtut havakvikmi munagiyauni tapkuatlu ahianguqnit havagutit unniqtuqnit tapkunani tukhigautini.
- TMAC-kut nigiuktut pigiaqninik uyagakhiuqniqmut aktilangi 1,000 tonnes/upluq (tpd-ngi) (ukiumut atuqpakniqhat havikhat uyagakhiuqni aktilangi) tapkuatlu havikhat tahapkunanga piqaqniqnit havaktauniat tatya atuqtumi havikhaliuqvikmi aktilanginut 800 tpd-ngi (ukiumut atuqpakniqhat). Tahapkuat aktilangi pityutauliqpalianiat nakuhivaliqninut tikitlugu 1,800 tpd-ngi havikhaliuqnit mikhautnit uyagakhiuqniqlu aktilanga tikitlugu 2,000 tpd-ngi piplugit tapkuat ilagiagutit piqaqnit nalvagauyut talvani Doris-mi.

- Ataqtuhivaliqnit uyagakhiuqniqmut huliniit pityutauniat ilagiagutinut iqakut uyaqat havikhatlu iqakut uyaqatlu tungavi attaqtuhivaliqlutik malikhugit.
- TMAC-kut nigiuktut tapkuat tagiuqaqanit maniqap imaqaqni piyauniat talvani auktuqtaqniani ataani Doris Tahiq atuqtitlugu uyagakhiuqniq talvani Doris QItqani tamnalu Doris Atatyuta, ataanilu nunap qiqumaitnaqnia talvani Doris Atpani. Kitutliqak nunap imaqtai nalautauni atuqtitlugu uyagakhiuqniq tugaqtitauniat talvunga TIA-ngi atuqlugit nunap qangagut huplut.
- TMAC-kut nutanguqniaqtai aulatyutainut tapkuat TIA-ngi pitquplugit imait talvangaqtut TIA-ngi kuvipkagauyut tugaqpiaqlugit tagiumut atuqlugit huplut hiamaktitnilu tagiup natqanut, talvungaungittuq Doris Kuugauyaq hivuagut upalungaiyaqhimagaluaqmat. Tamaita atuqtut maligait piyaqaqnit, ilautitlugit tahapkuat titigaqhimayut talvani 2AM-DOH1323 tapkunanilu Haviit Uyagakhiuni Halumaittut Immat Maligait, piyauniaqtut kuvittaqtitiniahaqtitlugit. Tapkuat nunamitni ilagiyai tapkuat kuvigautit huplut malikniaqtat tamna atuqtuq apqutaunginaqtuq talvunga Roberts Bay-mun, apquhaqlugu tamna tikigaq tahamungalu Roberts Bay-mun mikhaani 600 miitat hinaanit itiniqmut.
- Pinahuaqhugitatuqniqhaupkaqni pilaqnit taphuma TIA-ngi kayuhititlugit immap iluanipkaqni uyagaktaqnikut iqaqnit, TMAC-kut uuktugutilgit mikhigiaqnia tamna TIA-ngi immap ulihimania talvunga 2.3 miitat (talvanga hivuagut uuktutauhimayuq 4 miitat). Una itinia naamaktuq pittailiniinut puktallaqtitni hikumilu qangulaiqnit tapkuat uyagaktaqnikut.
- Atuqtitlugu aulataunia kayuhilunilu umiknikhaanut, akuhimayut uyagaktaqnikut iqakut (ilagit hiqumakut cyanide uyagaktaqnikut puktalaqnitlu ukagaktaqnikut) tuhagaqtitauniat talvunga TIA-ngi. TMAC-kut ukpiguhuktut tapkuat tatya naamaktut nuktiqni akuhimayut uyagaktaqnikut piplugu TMAC-kut atuqpaliayai ilagiagutit halumaqhautit piyauni talvani havikhaliuqvikmi huguqtigutauniat cyanide tapkunani uyagaktaqnikut imiqpalaniani (tapkuat pityuhiq uuktugauhimaittuq tapkunanga Miramar-kut). Cyanide huguqtigauniaq talvunga 0.5 mg/L tapkuat attaanitniat aulataunit piyakhanut ihuaqhihimayut tapkunani Hilaqyuaqmi Cyanide Aulatauninut Maligait tapkununga Guulit Uyagakhiuqnit Havaktit atuqniaqtatlu tamaita atuqnilgit Kanatamiuni maligaqnut atuqtauvaktut.
- Tapkuat nutanguqtiqnit tapkuat TMAC-kut tukhigautigiyai taphumunga TIA-ngi atuqpiaqtitniaqtai tapkuat kuvipkaqni piyaunit atugialgit uuktutai taimaittumiklu, tapkuat havakvikmi naunaiyaivik hivuagut uuktutauyuq tapkunanga Miramar Hope Bay-kut unniqtuqhimayuqlu talvani Havanguyumut Titigaqtaq Nappaa 003 atugiaqaguiqtuq piplugu TMAC-kut piniat atugiaqaligangat halumaqtiqni immat kuvipkagauniahaqtitlugit.
- Igliit talvani Doris North Hiniktaqvik ilavaliqniat talvanga 180 talvunga 360.
- Tmac-kut ahiangulaqtat tamna imiqtaqvik taphumunga Doris North hiniktaqvik talvanga Windy tahiq.
- Hunat talvanga atuqtumi Tuapaktaqviit A, B, D tamnalu 1 atuqtauniat tamaitnut hanayauyunut atuqni.
- Iqakut aulatauni havagutit tatya inilgit haniani Roberts Bay-mi nuttaulat nunamut hanianut Uyagaktaqvik A.
- TMAC-kut upalungaiyaqtat kayuhini ilagiagutit atuinaqtukhat hiniktaqvit inikha havakvikmi kayuhilutik atuqnikhai hiniktaqvit umiaqpait kalutai inilgit talvani Roberts Bay-mi, tapkuat ikayuqhiutiniat mikhaani 125 ilagiagutit havaktit havakvikmi atuqniani hanayaunia. Qakutikkut, TMAC-kut kayuhilat atuqtitni ukipkaqnit uqhukhalgiagutit umiaqpait hikumi pinahuaqlugit atuqpiaqnit kayuhini agyaqnit uqhukhat hannavikmut.

Pinahuaqhugit kayuhinit ukuat uuktugutit Uyagakhiuqviup ahianguqnit, TMAC-kut tukhigaqniat Avatiligiyikkut Havanga Titigaqtaq Nappaa 003 ilaliutiplugit ihuaqhigiagut Qanugittunia A Imaqmut Laisa 2AM-DOH1323. Piyut TMAC-kut piyumani pinahuaqnit ikayuqtigikluni naunaiyaqnit havaginilu ayuqnaitpat. TMAC-kon kinikheayomayun atulaaktonik Imaknik Atoknigagun laeseoyomik ihoakhiyaagani ihomagiyaoyok hivoagun akiliktoevalaaknikmik Inoen nanmnik nunagiyaenik atoknigagun.

Ilagiplugu uumunga tukhigautmut, TMAC-kut unniqtuqtai piqatai ahianguqnit halumaqhainikhanut umiknianutlu upalungaiyautit. Tapkuat uplaungaiyautit piqatai tapkuat Havanguyuq Titigaqtaq tamnalu Qanugittunia A Imaqmut Laisa nutanguqtauniaq pitaqat ihuaqhigiagut pityuhia iniqat tamnalu kinguliqpaamik piyaqaqnit tugangayut tahapkununga uuktugutauyut ahianguqnit naunaiqtauyut.

Résumé analytique

Résumé analytique

Cette demande concerne la mine Doris North (la « mine ») autorisée par la Commission du Nunavut chargée de l'examen des répercussions (la « CNCER ») sous le certificat de projet No. 003 (le « certificat de projet ») délivré en septembre 2006, et par l'Office des eaux du Nunavut (l'« OEN ») sous le permis d'utilisation des eaux de type A N^{o} 2AM-DOH1323 (le « permis d'utilisation des eaux de type A ») délivré en août 2013.

Suite aux résultats encourageants de l'exploration continue aux alentours de la mine Doris North, TMAC Resources Inc. (« TMAC ») anticipe maintenant d'utiliser le portail de la mine Doris North déjà existant pour accéder à, et exploiter, l'ensemble du gisement Doris. Cela inclut les gisements secondaires précédemment décris sous les noms Doris North, Doris Lower, Doris Central et Doris Connector, ainsi que toute extension ou nouvelle découverte accessible depuis le portail Doris North. La décision d'utiliser la rampe Doris North existante pour accéder à tous les gisements secondaires connus a conduit les responsables de l'exploitation et de l'ingénierie minière à déterminer quels changements s'avéreront nécessaires pour optimiser l'exploitation et permettre un approvisionnement continu en minerai. Les changements présentés dans ce document et ses annexes de support ajouteront approximativement 2 à 4 ans à la durée de vie de la mine, en plus des 2 années initialement indiquées dans l'Étude d'impact environnemental finale (« EIEF ») approuvée par la CNCER. Les changements restent dans le cadre du plan de fermeture présentement approuvé pour la zone de retenue des résidus du lac Tail (« ZRR »).

Les changements de la mine décrits dans cette demande sont nécessaires pour poursuivre l'exploration minière et le développement de la phase 1 - mine Doris North, et ne constituent pas une « pré-construction » en faveur de la phase 2 - projet de la ceinture Hope Bay. La phase 2 fera l'objet de demandes réglementaires séparées à la CNCER et l'OEN. Dans la description de projet de la phase 2, TMAC décrira les modalités de l'expansion des infrastructures existantes du site Doris dans l'avenir, lorsque la phase 2 sera approuvée, afin de soutenir le développement dans le sud de la ceinture Hope Bay. De même, la phase 2 requerra un nombre significatif de nouvelles installations autonomes. Cette approche permettra de minimiser les perturbations du terrain et de maximiser les investissements de capitaux. La phase 1 - mine Doris North discutée dans cette demande est une exploitation autonome qui ne dépend pas de la phase 2, que ce soit pour l'exploitation de la mine Doris North ou pour les changements ici proposés.

Les changements proposés pour la mine Doris North sont brièvement résumés ci-dessous:

- Exploiter toutes les zones minéralisées accessibles par le portail Doris North existant, en plus du gisement Doris North, prolongera la durée de vie de la mine Doris North d'approximativement 2 à 4 années. TMAC a conduit une analyse géochimique pour déterminer les caractéristiques des matériaux supplémentaires qu'elle s'attend à exploiter, et la composition de ces matériaux appuie l'opinion selon laquelle les stériles peuvent être gérés via les contrôles actuellement en place sur le site et les changements aux installations décrits dans cette application.
- TMAC estime que le taux d'extraction initial sera d'environ 1 000 tonnes par jour (tpj; taux annuel moyen d'extraction du minerai), et que le minerai de ces gisements sera usiné par l'usine actuelle à un taux de 800 tpj (moyenne annuelle). Ces taux pourraient augmenter jusqu'à une moyenne annuelle maximum de 2 000 tpj pour l'extraction et 1 800 tpj pour l'usinage, en fonction des ressources additionnelles qui seront découvertes à Doris.

- L'extension des activités d'extraction produira plus de stériles et plus de minerai qui auront besoin d'être entreposés; en conséquence, les aires de dépôt et les plates-formes de stockage de minerai et de stériles seront élargies.
- TMAC s'attends à rencontrer de l'eau souterraine saline dans le talik sous le lac Doris lors de l'extraction dans Doris Central et Doris Connector, et sous le pergélisol dans Doris Lower. Toute eau souterraine rencontrée lors de l'extraction sera détournée vers la ZRR par l'intermédiaire d'un pipeline terrestre.
- Afin de prendre en charge l'eau souterraine saline et de réduire les possibilités d'impact négatif sur l'eau douce, TMAC révisera la gestion de la ZRR de telle sorte que l'eau soit détournée directement vers la baie Roberts via un pipeline et un diffuseur sur le fond océanique, plutôt que vers le ruisseau Doris tel qu'initialement prévu. Tous les critères réglementaires, incluant ceux listés dans le permis d'utilisation des eaux de type A et dans le Règlement sur les effluents des mines de métaux, seront remplis avant le déversement. L'eau industrielle sera traitée avant d'être déposée dans la ZRR et au besoin avant d'être déchargée dans la baie Roberts. L'impact au niveau de l'empreinte au sol sera minimal, dans la mesure où la section terrestre du pipeline de déchargement suivra la route toute saison existante jusqu'à la baie Roberts, puis longera la jetée en plongeant dans la baie Roberts. Le pipeline s'avancera jusqu'à 600 m du rivage dans une fosse profonde.
- Dans le but de maximiser la capacité de la ZRR tout en continuant l'enfouissement subaquatique des résidus, TMAC propose de réduire la couverture aqueuse dans la ZRR à 2,3 m (par rapport à la proposition originelle de 4 m). Cette profondeur est suffisante pour prévenir la remise en suspension et le gel des résidus.
- Pendant l'exploitation et la fermeture, les résidus mélangés (une combinaison de résidus de cyanure détruits et de résidus de flottation) seront envoyés à la ZRR. TMAC pense qu'il est désormais approprié de concevoir des résidus mélangés parce qu'elle va incorporer des mesures de traitement supplémentaires au niveau de l'usinage pour détruire le cyanure dans la boue de résidus (ce qui n'était pas une mesure proposée par Miramar). Le cyanure sera détruit jusqu'à 0,05 mg/L, ce qui le mettra en-dessous des seuils de gestion définis dans le Code international de gestion du cyanure pour l'industrie minière aurifère, et répondra à tous les normes réglementaires canadiennes applicables.
- Les modifications que TMAC requiert pour la gestion de l'eau de la ZRR permettront d'assurer que l'eau déchargée rencontre les critères requis, et de ce fait le laboratoire sur site précédemment proposé par Miramar Hope Bay et décrit dans le certificat de projet n'est plus nécessaire.
- La capacité du camp Doris North passera de 180 à 360 personnes. Le camp a besoin d'offrir plus de places en raison de l'augmentation de l'usinage et de la main-d'œuvre de fond. La capacité de traitement des eaux usées augmentera proportionnellement à la quantité de main-d'œuvre prévue, ainsi que les besoins en eau à usage domestique.
- Il est proposé d'établir un pipeline le long de la route entre Doris et Windy pour acheminer l'eau du lac Windy pour utilisation au camp Doris.
- Les matériaux des carrières existantes A, B, D et la nouvelle carrière I de la route Windy seront utilisés pour la construction générale.
- Les installations de gestion des déchets (incinération, manutention) actuellement situées à proximité de la baie Roberts pourraient être déplacées vers une zone proche de la carrière A (où l'on propose de situer le dépotoir). TMAC souhaite conserver de la flexibilité quant à l'emplacement de ces installations.

- De plus, TMAC souhaite préciser qu'il faut s'attendre à ce que certaines mesures initialement annoncées comme temporaires se poursuivent. En particulier, TMAC prévoie de continuer à :
  - compléter les logements permanents situés sur place par l'usage continu des barges d'hébergement dans la baie Roberts, ou d'autres installations similailaires, qui pourront accueillir approximativement 125 travailleurs additionnels pendant la construction;
  - de temps à autre et au besoin, laisser les pétroliers passer l'hiver pris dans la glace afin d'assurer un approvisionnement constant en carburant sur le site.

Dans le cadre de la présente demande, TMAC a décrit les changements directs associés à son plan de réhabilitation et de fermeture. Les plans de gestion associés au certificat de projet et au permis d'utilisation des eaux de type A seront mis à jour une fois que le processus d'amendement sera complété et que les exigences finales relatives aux changements proposés auront été identifiées. Des observations préliminaires sur les changements potentiels apportés à ces plans sont incluses dans ce document. TMAC souhaite étudier avec l'Office des eaux quelles options pourraient répondre à la question du cautionnement excessif [*overbonding*] pour les terres inuites. TMAC a présentement déposé une caution financière supérieure au passif estimé pour la réhabilitation et la fermeture.

Afin d'aller de l'avant avec les changements proposés pour la mine, TMAC fera la demande de tous les amendements nécessaires au certificat de projet, en plus des amendements au permis d'utilisation des eaux de type A. TMAC souhaite que le processus d'examen soit coordonné entre la CNCER et l'OEN autant que possible.

1. Introduction

1. Introduction

This document describes changes to the Doris North Mine (the "Mine") identified by TMAC and its technical advisors to extend the mine life, optimize the Mine footprint and that are necessary in order to make the Doris Mine operationally feasible. In order to proceed, several of these changes will require amendments to and/or modifications under Project Certificate No. 003 issued by the Nunavut Impact Review Board (NIRB) in September 2006, and Type A Water Licence 2AM-DOH1323 (the "Type A Water Licence"), issued by the Nunavut Water Board (NWB) in August 2013. Figure 1-1 below shows the location of the Doris North Mine at a local and regional scale.

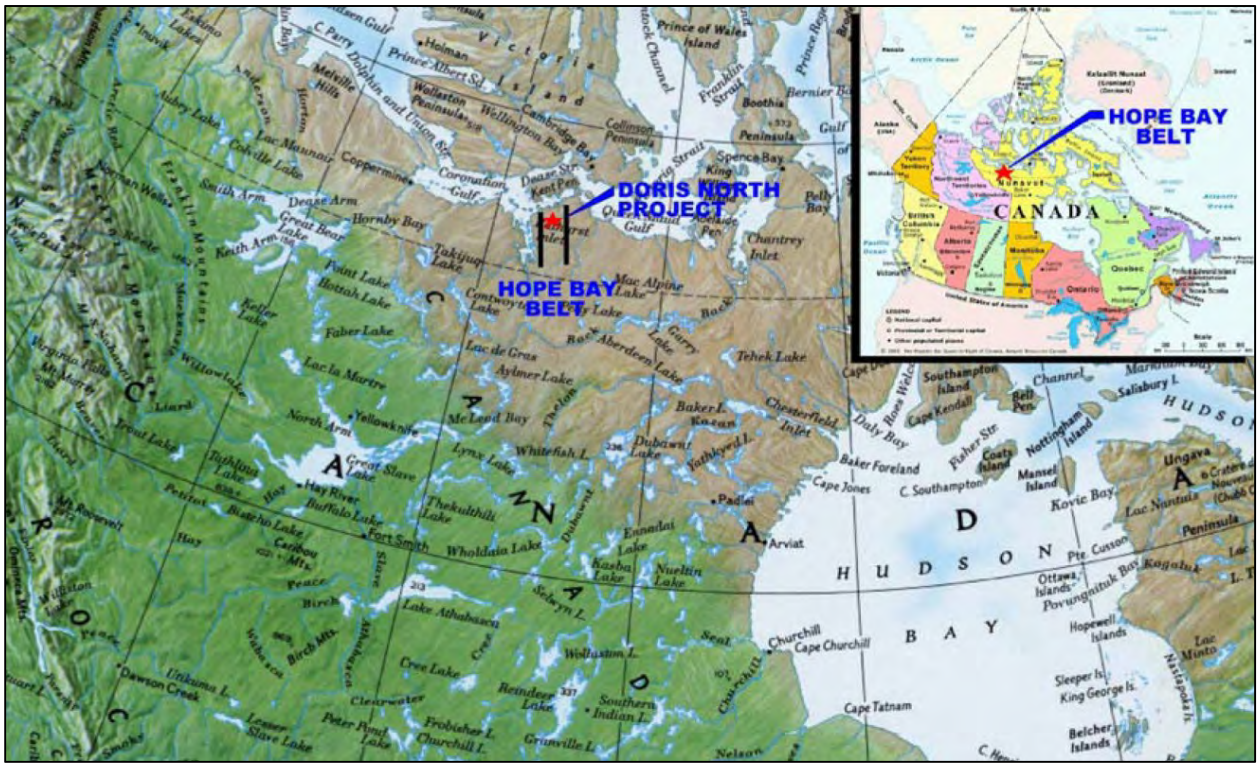

Figure 1-1. Location Doris North Mine (Local and Regional Scale)

The following Sections 1.1 to 1.2 provide background on the proponent TMAC and the need for the Mine changes. Section 2 provides an update of the Mine plan. Section 3 provides background detail on the geology of the Doris Central and Connector deposits, as well as a summary of updated geochemical analysis relating to the additional deposits. Section 4 summarizes the proposed changes to the Mine, and Section 5 describes the anticipated regulatory requirements. Section 6 describes the public consultation that has been completed to date in relation to the changes. Section 7 describes an update of the predicted environmental and socio-economic impacts of the Doris North Mine described in the Miramar Final Environmental Impact Statement ("FEIS"), in relation to the proposed changes (Miramar 2005). Section 8 addresses the updates to the closure and reclamation plan for the Mine triggered by the proposed changes and the work currently underway, in particular updating the reclamation security estimate at its peak. Section 9 describes changes to existing monitoring and management plans that will be necessary if the proposed changes go forward.

This document is supported by 24 appendices. Appendices 1 and 2 include the NIRB and NWB forms, respectively, and Appendices 3 to 24 provide detailed technical information prepared by TMAC's various professional advisors on matters relevant to the proposed Mine changes. Technical appendices drafted from 2011 for Hope Bay Mining Limited (HMBL) and now TMAC were reviewed and updated in September and November 2013, as required, and released for use by TMAC.

1.1 PROPONENT INFORMATION

TMAC Resources Inc.
372 Bay Street, Suite 901
Toronto, Ontario
M5H 2W9

TMAC is a privately held mineral exploration and development focused company comprised of the former senior executives of FNX Mining Company Inc. TMAC completed the acquisition of the Hope Bay Project from Hope Bay Mining Limited, a subsidiary of Newmont Mining Corporation, on March 12, 2013.

In late 2007, Hope Bay Mining Limited (HBML), an indirect wholly-owned subsidiary of Newmont, purchased Miramar Hope Bay Limited ("Miramar"), a Canadian gold company that controlled the Hope Bay Belt. This includes the Doris North Mine and exploration and mineral rights over one of the largest undeveloped greenstone belts in North America.

TMAC considers the Hope Bay Doris North Mine Project to be an opportunity to develop a positive working relationship with the Inuit, Nunavut, and Canada by managing risk and sharing the economic and social benefits with stakeholders through a responsible approach to exploration, mining, and gold production.

1.2 PURPOSE OF AND NEED FOR MINE CHANGES

The development of the Hope Bay Belt as a series of sustainable projects over a number of years is of potential great value to the people of the Kitikmeot Region and Nunavut, and it is of strategic importance for Canadian sovereignty in the Arctic. The objectives of the project include providing opportunities for the Kitikmeot Region and Nunavut while protecting the environment and minimizing negative socio-economic impacts.

TMAC views the Doris North Mine as Phase 1 of belt wide development, which proposes to start limited gold production from one stand-alone underground mine located at the north end of the belt near Doris Lake. Originally, Miramar Hope Bay anticipated a 2 year mine life for the Doris North Mine. Ongoing exploration by HBML and more recently since TMAC acquired the Mine suggests there are sufficient resources and tailings storage capacity to allow 2 to 4 years of additional mine life with some revisions to existing facilities, operating plans and new infrastructure. The proposed changes described here to the Phase 1 Doris North Mine will permit the mine to begin sustainably operating as a stand-alone operation, independent from potential future (Phase 2) Hope Bay Belt Project activities. The changes that are proposed to existing and planned Doris North Mine facilities are required for Phase 1 and are not a "pre-build" for any aspect of Phase 2.

To provide appropriate context for the proposed Phase 1 Doris North Mine changes within the potential long-term belt-wide development, TMAC is providing some information in this application regarding the potential Phase 2 Hope Bay Belt Project. Phase 2 of the Hope Bay Project will be the subject of separate future NIRB and NWB applications. The Phase 2 Project is currently anticipated to proceed in three phases: 1) exhaustion of the mineable areas of the Doris deposit including expansion of underground development beyond what is accessible from the Doris North decline, 2) moving into the

Madrid/Patch district with underground mining, and 3) moving into the Boston district with underground mining. Phase 2 will include the expansion of infrastructure at Doris beyond what is required for the operation of the existing stand alone Phase 1 Doris North Mine. In addition, future regional development will be supported by ongoing exploration, surface and advanced exploration (e.g., bulk sampling) in areas such as Madrid/Patch and Boston. These activities will be the subject of separate licencing applications. However, in the near term, the Phase 1 Doris North Mine will operate as a stand-alone project.

1.3 RATIONALE FOR CHANGES TO THE PROJECT

TMAC's rationale for the proposed changes to the Doris North Project is as follows. TMAC has evaluated Miramar's approved plans for development of the Doris North Project surface infrastructure and determined the project is not operationally feasible as envisioned by Miramar. However, in TMAC's view, the changes that are necessary in order for the mine to proceed are generally within the scope of the original project as described in the Doris North Final Environmental Impact Statement and NIRB Project Certificate No. 003. Further, TMAC has re-examined the geology of the Doris sub-deposits – North, Lower, Connector and Central and determined that they can all be accessed from the existing Doris North Portal. Finally, to take the Doris North Project to production, TMAC needs to be reasonably certain that the mine life is greater than two years for reasons related to economic sustainability.

The specific changes that have been proposed in the Amendment Application, as well as TMAC's rationale for these changes, can generally be summarized as follows.

Revisions to Phase 1 Doris North Mine Facilities to Optimize Engineering and Project Footprint

As detailed project planning and engineering has proceeded, TMAC has identified a number of changes to the originally permitted project that are, in its view, necessary for operational purposes but may require amendments to the key Doris North Mine regulatory approvals. These include items such as the change to the milling and mining rate, expanded laydown area at Roberts Bay, relocation of site waste management facilities, increase in site accomodations and subsequently water use and waste water generation. Additionally, TMAC wishes to clarify that certain activities originally anticipated in the Doris North Final Environmental Impact Statement to be temporary, such as accommodation of workers in barges in Roberts Bay and freezing in fuel from time to time, may continue for the life of project. As requested by several regulatory authorities, rather than submitting piecemeal applications TMAC has consolidated these changes into the single Amendment Application so that all of these changes may be considered together.

Access of Doris Lower, Central and Connector Gold Deposits via Doris North Mine Portal (Rather than Just Doris North Deposit)

TMAC's rationale for this change is that these near mine resources can be developed via the Phase 1 Doris North Project underground portal (in the original FEIS, Miramar contemplated that additional portals would be required to access these deposits). In TMAC's view, accessing the additional resources via the existing portal offers the opportunity to extend the benefits of the mine for several years longer without significantly modifying the project footprint.

Specific changes described in the Amendment Application related to the access of the additional Doris deposits include expanded waste rock storage, change to Tail Lake water cover, establishment of additional vent raises, and revisions to the tailings water management strategy (as described in the following paragraph).

Deposit of Compliant Tailings Water to Marine Environment Rather than to the Freshwater Environment in Doris Creek

TMAC has further considered the proposed tailings water management strategy and determined that marine discharge would be a more reliable and scientifically supported strategy than direct discharge of tailings water to Doris Creek. Additionally, a better understanding of the underground water chemistry has led to the conclusion that if underground water was encountered at any point during mining, a method for managing this saline water would be needed. The marine environment is a better receptor than the freshwater environment for saline water.

Overall, TMAC believes that the proposed changes in the Amendment Application improve the Phase 1 Doris North mine by making it safer, more environmentally sound, of greater benefit to Inuit and to the Kitikmeot, and of improved viablility for TMAC.

1.4 SCOPE OF PROPOSED PHASE 2 HOPE BAY DEVELOPMENT

The Phase 2 development is not a component of this amendment, but will rather be part of a future environmental assessment. Essentially, the Phase 2 Hope Bay Project proposes the development of new mining districts in the southern part of the Hope Bay belt: the Madrid/Patch district, and the Boston district. The scope of the proposed Phase 2 project can be viewed in detail in the Phase 2 Hope Bay Belt Project Proposal (HBML 2011), which has been submitted to NIRB. In particular, the project fact sheet included at Section 1.4 of the Phase 2 Project Proposal, and the detailed descriptions of the project in Sections 2 and 3, provide scoping details. TMAC continues its planning and evaluation of the Phase 2 project.

1.5 HOW PROJECT COMPONENTS AND ACTIVITIES WITHIN THE PHASE 1 DORIS NORTH PROJECT AMENDMENT APPLICATION WILL RELATE TO PHASE 2

The Phase 1 Doris North Project and the Phase 2 Hope Bay Belt Project are separate but related neighboring projects.

As background, HBML, and then TMAC, have undertaken significant regional geological investigations in the Doris District and south along in the Hope Bay Belt. During the last several years, the geology of the Doris sub-deposits has been better defined and more potential resources were discovered. TMAC conducted a detailed review of Miramar engineering and construction plans in order to determine whether it is feasible to construct the project as permitted and to evaluate the financial viability of a variety of potential development options.

Based on these investigations, TMAC now plans to develop the resources located within the Hope Bay Belt in a series of phases which will have the benefit of maintaining continuously producing mines over time. Maintaining continuous production mitigates the potential negative economic and social impacts of mine closures on TMAC, its workers, Inuit, the Kitikmeot Region, and Nunavut.

The first phase of development is the operation of the Doris North Project (as modified by this Amendment Application) as a stand alone mine. While the Doris North Mine is operating, TMAC plans to proceed with permitting and development of the second phase of development, the Phase 2 Hope Bay Belt Project.

To minimize overall project footprint and potential for impacts and maximize the existing investment, TMAC has designed the Phase 2 Hope Bay Belt Project to use facilities that already exist at Phase 1 Doris North to the extent possible. However, it is important to note that the revisions to Doris North facilities listed in this amendment are in support of the Doris North mine itself. Additonal changes will

later be required to support the Phase 2 project, but any such changes will be outlined and permitted separately as part of the Part 5 review of the Phase 2 Hope Bay Belt Project.

Phase 1 Doris North Project components that may be expanded further if the Phase 2 Hope Bay Belt Project is permitted to proceed include:

- Expansion of port facilities in Roberts Bay, which will continue to be used to unload and laydown equipment and supplies.
- Expansion of the Doris North airstrip, which lies between Roberts Bay and Doris Camp.
- Expansion of the Doris Mill and modification of the process to accommodate Madrid, Patch and Boston ores.
- Further expansion of Doris Camp accommodation, laydown, storage facilities, and waste management facilities.
- Expansion of the Tail Lake tailings impoundment area beyond the incremental expansion of capacity needed for the Doris North Project to continue forward as a stand alone mine. This could include, for example, changing to a sub-aerial tailings management strategy.

1.6 INFORMATION REGARDING ONGOING BELT-WIDE EXPLORATION

TMAC conducts its exploration program under two separate water licences (2BB-BOS1217 for Boston, and 2BE-HOP1222 for the rest of the Hope Bay Belt). Land use activities at the Hope Bay belt are conducted under permission by the KIA through land use licences, currently renewed annually.

Land tenure on the Hope Bay belt is a mix of Inuit Owned lands and Crown lands. For a list of TMAC's current land tenure, please refer to Section 3.2.1 of the Phase 2 Hope Bay Belt Project Proposal.

The exploration occurring on the Hope Bay belt will continue in much the same way it has been for the past several years. The exploration program consists of mapping and drilling programs aimed at discovering potential mineralized zones in the Hope Bay belt and better defining the known zones (Doris North, Madrid/Patch, Boston deposits). These activities are supplemented with ground and aerial geophysical programs. The majority of drilling is focused on known deposits with the goal of better defining the resources. Where possible, underground exploration diamond drilling may be performed to explore deposits at depth. TMAC will likely apply for permission to proceed with underground advanced exploration and bulk sample testing at Madrid and Boston deposits.

2. Overview of Updated Doris Mine Plan

2. Overview of Updated Doris Mine Plan

There are two sub-deposits associated with the Doris Deposit (called Doris Connector and Doris Central), which have the potential to be mined in addition to the deposits that were described in earlier Phase 1 Doris North Mine plans. In addition, preliminary exploration shows that the Doris North deposit extends to depth. Mining these deposits will increase the gold resources mined from the Doris North Portal, and in turn extend the near term life of the mine. In order to mine the deposits, further exploration and definition by detailed infill drilling is required. To complete this exploration, an underground drift will be extended parallel to Central and Connector. From this drift, diamond drill holes will be drilled into the sub-deposits where geologic and grade models have identified zones in the deposits that could potentially be mined. Once the exploration drilling has been completed and the geological and grade models have been updated with the new information, a decision will be made on feasibility and then if appropriate detailed mine plans will be finalized and the extraction of ore can commence.

The underground development method for the additional deposits will be the same as previously proposed by Miramar: conventional drill and blast. Figure 2-1 illustrates the general layout of the mining shapes and the locations of potential stope areas. It is expected that the actual extent of mining in this phase will ultimately be limited by the amount of subaqueous tailings storage that is available based on the current designs for the TIA.

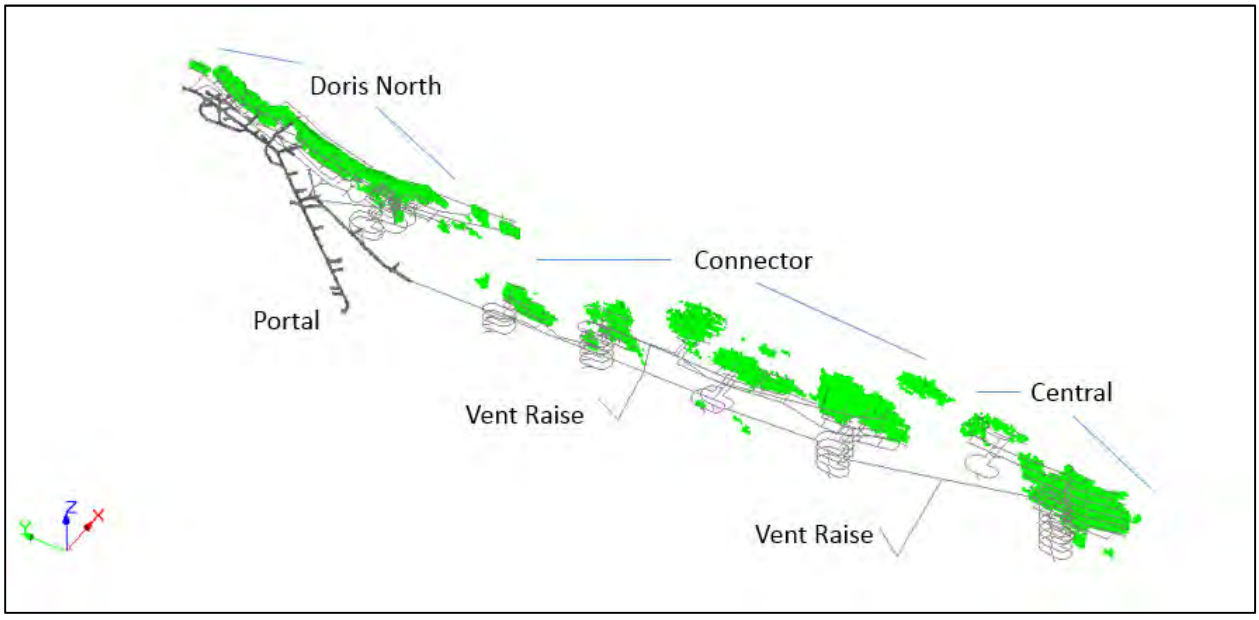

Figure 2-1. General Layout of Mining Shapes and Potential Locations of Stope Areas

Several mining methods suitable for deposits of this style were evaluated, including longhole with delayed backfill, room and pillar in the Doris North Hinge zone and some mechanized cut and fill or drift and fill. The longhole stoping will consist of “longitudinal” longhole in the strike direction and also “transverse” longhole in the Naartok zone where the zone widths can exceed ten metres. A “narrow vein” longhole method will be used for areas of limited width (2 m stope width). The transverse longhole stopes will be mined in a primary and secondary sequence with both unconsolidated and

consolidated backfill used. Mechanized cut and fill or drift and fill will be used as required but will be kept to a minimum due to cost and lower productivity. Potential water flow will be carefully monitored during the development of the stope overcuts and undercuts and grouting will be carried out as required. Should water inflows persist, then a more selective cut and fill or drift and fill method will be required.

Geotechnical work completed by SRK has indicated that longhole stoping methods can be utilized with reasonable stope dimensions while maintaining stable openings to manage dilution levels. As in many mines, several mining methods will be necessary to address the various geometries and ground conditions at Hope Bay. These will be optimized as experience is gained in each zone.

Table 2-1 shows the preliminary mining schedule for Doris North and the Central/Connector deposits based on an available tailings storage capacity (as presented in this amendment) equivalent to approximately 1.4 Mt of milled ore. TMAC plans to initially commence mining at a rate of approximately 1,000 tpd and an associated milling rate of 800 tpd. It is expected that the mining rates could increase to 2,000 tpd and milling rates to 1,800 tpd yearly averages for the Doris deposits. Mining rates are highly variable and dependent on the number of stopes and the width of the deposit. This schedule is approximate and projections will be revised as further information from the exploration programs becomes available over time. The mining schedule and sequence will also be dependent on the potential timing of the Phase 2 development. Estimated rates will vary day to day and are based on annual averages.

Table 2-1. Preliminary Mining Schedule

	Ore (tonnes)			Waste Rock and Backfill (tonnes)		
	Doris North	Central Connector	Total Ore	Doris North	Central Connector	Waste Stockpile (Peak)
Totals	698,700	694,500	1,393,000	1,095,000	1,010,000	1,500,000

Additional waste rock storage capacity is required to accommodate changes in the mine development schedule. Plans for waste rock storage to accommodate an additional 0.9 Mt of rock beyond current storage capacity are presented in Appendices 18 and 19. It is possible TMAC will not find it necessary to construct the full complement of proposed pads, but it is important to maintain this option.

Backfill requirements for the stopes are assumed to be sixty-five percent of the tonnes mined. Development waste will be dumped directly into stopes whenever possible to reduce the cost of haulage to surface. Mineralized waste material stockpiled on surface will be used for backfill first followed by the non-mineralized material. Current projections indicate that approximately 1,200,000 t [(1,095,000 tonnes +1,010,000 tonnes)-(0.65*1,393,000 tonnes)] of non-mineralized waste rock will be left on surface once the ore presented in Table 2.1 has been mined out. This material will be handled and reclaimed as specified in the Waste Rock and Ore Management Plan (SRK 2010) submitted to the NWB and KIA in December 2010 and as updated with Nunavut Water Board approval from time to time. It is anticipated that the geochemical characteristics and proportions of the waste rock from the additional development will be similar to that of Doris North (see Section 3.2 of this application for further details). As exploration and development advances, TMAC will periodically revise the Waste Rock and Ore Management Plan to reflect the updated mine plans.

As previously proposed, groundwater will be pumped directly to the TIA. However, as noted earlier in this application, greater volumes of groundwater flows are now anticipated and more is known regarding the composition of the groundwater. To prevent excessive groundwater inflows a grouting

program will be put in place during mining. This will consist of drilling test holes for water in advance of development and if substantial inflows are anticipated a grout curtain will be put in place prior to blasting of the rounds. Any leaking drillholes that are encountered will be plugged, likely using Margo type plugs. Initial inflow estimates are in the range of 100 L/s when the Mine is fully developed but this is expected to be managed to significantly lower levels with a grouting and plugging program in place.

During development fresh air will be supplied from the existing Doris North vent raise and forced into the headings with auxiliary fans and ventilation tubing. As the development advances, a Doris Central vent raise will be constructed. A new vent raise pad with a surface area of approximately 13,000 m^2 will be required on surface at each of the new raise breakthrough sites to facilitate the fan and heater arrangement, a 75,000 L fuel tank, air compressors, and an electrical transformer and the required switchgear. An access road to the pad leading from the Doris-Windy all weather road will also be required. The Doris Central site is illustrated in Appendix 16.

A second vent raise may be constructed south of Doris Camp to supply Doris Connector. This vent raise would be of a similar design to the Doris Central vent raise and would be connected to the main Doris Road by a spur road of the same design as the Doris Central vent raise.

3. Geology and Geochemistry

3. Geology and Geochemistry

3.1 GEOLOGY

The Hope Bay Belt is located in the Slave Structural Province, a geological sub-province of the Canadian Shield. The region is underlain by the late Archean Hope Bay Greenstone Belt, which is 7 to 20 km wide and over 80 km long in a north-south direction. The Archean Hope Bay Greenstone Belt lies entirely within the faulted Bathurst Block forming the northeast portion of the Slave Structural Province. The belt is mainly comprised of mafic metavolcanic (mainly meta-basalts) and meta-sedimentary rocks that are bound by Archean granite intrusives and gneisses. Archean volcanic greenstone hosts many of Canada's precious and base metal mines (i.e., Yellowknife, Timmins, and Rouyn-Noranda).

The Phase 1 Doris North Mine area is located on the north end of the Hope Bay greenstone belt and consists of a steeply dipping, over 3 km long quartz vein system that is hosted in folded and metamorphosed pillow basalts. The Mine can now be further divided into three sub-deposits from north to south: Doris North, Doris Connector, and Doris Central (Figure 3.1-1). All three related deposits are hosted within the same lithologies and share the same alteration and mineralization assemblages.

Lithology consists of mafic volcanic and plutonic lithologies with minor intercalated sediments. Mafic lithologies can be subdivided into Mg-tholeiites (C-type) and Fe-tholeiites (B-type) based on lithogeochemistry analyses. Felsic units such as the feldspar porphyry make up a minor component of stratigraphy and consist of a fine to medium grained pink moderately foliated dike intercepted in Doris Connector and Doris Central but not observed at Doris North.

A series of Proterozoic diabase dikes intrude the area and clearly crosscut all stratigraphy. The dikes vary in size, are coarse grained and display a felty texture. The largest dike is approximately 100 m thick and dips up to 30° east. The diabase dikes are pristine and do not appear to be offset by late faulting.

Early deformation of the Doris system caused a tight isoclinal fold of the mafic basalt stratigraphy. The fold axis of this isoclinal anticline strikes approximately north-south and is doubly plunging. The core of the anticline consists of more massive Mg-tholeiitic basalt with Fe-tholeiitic basalt out board of this unit. Belt-wide deformation associated with the gold event caused a localized near vertical extension along this contact in the anticline hinge and limbs where the Doris vein was formed. The regional fabric changes from a north-south orientation within the Central and Connector areas of Doris to a north-northeast orientation within Doris North area. Later movements within this stress field caused the vein to dislocate along foliation parallel shear planes. At a later point in time, the Doris vein has been broken and sinistral offset along northwest-striking brittle faults. In recent geologic time, a diabase dike has bisected the Doris system (Figure 3.1-2).

Two types of alteration systems are present within the region, a weak "distal" and a strong "proximal" system. The weak "distal" alteration system is defined by Mg-Ca carbonate alteration overprinting basaltic rocks and calcite-leucoxene alteration overprinting gabbroic rocks. A strong "proximal" hydrothermal alteration system is directly related to mineralized quartz veins. Alteration consists of iron dolomite-sericite-paragonite and quartz flooded zones. Sulphidization accompanying gold includes up to 5% pyrite, minor chalcopyrite, and arsenopyrite. Alteration intensity decreases away from veining with vein size directly reflecting the size of the alteration envelope. Alteration may extend up to 45 m above the crest of the fold and can range from 0 to 20 m along the limbs.

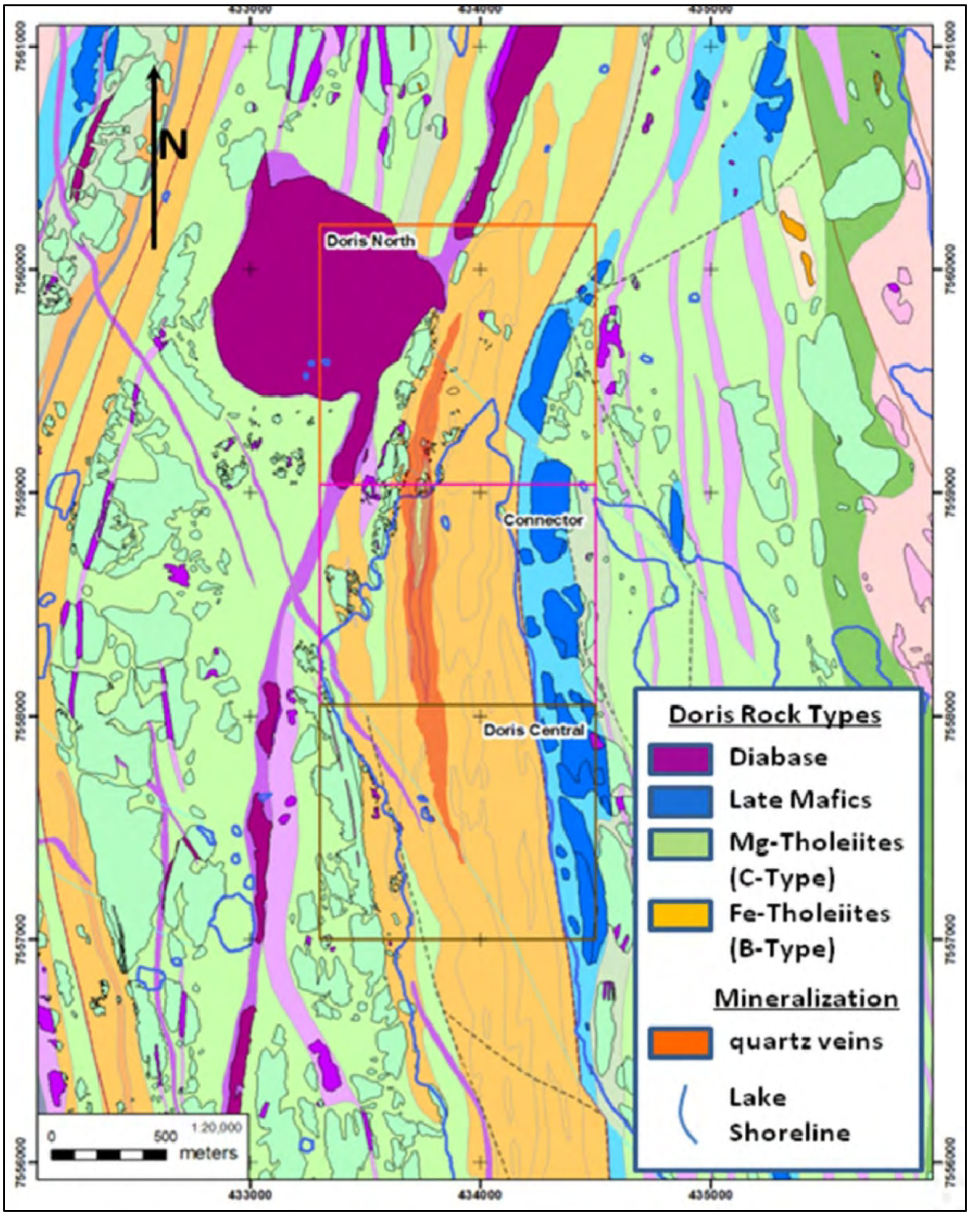

Figure 3.1-1. Surface Geology around the Doris Deposit with the Deposit Area Outlines, and the 2009 Vein Shapes Projected to Surface

Mineralization in the Doris system is typical of "Archean Lode" deposits. Visible and disseminated gold is found primarily within quartz veins that range from a few centimetres to about 10 m in scale. Gold is commonly associated with narrow tourmaline-chlorite septa oriented parallel to and along the vein margins. Veins contain high-grade intersections but are not consistently mineralized along strike. Visible gold (VG) mineralization consists of coarse, leafy, free-milling grains located along vein margins, tourmaline septa, wallrock fragments and is associated with pyrite. Disseminated sulphides consisting of trace to 2% pyrite, trace chalcopyrite, rare sphalerite and pyrrhotite, occur along the vein and septa margins as well as in clusters within the vein. Occasionally gold is present within brecciated zones adjacent to the quartz veins. Whole rock analysis has shown mineralization to be situated at the contact between titanium rich Fe-tholeiites and Mg-tholeiites (Kleespies and Mercer 2001).

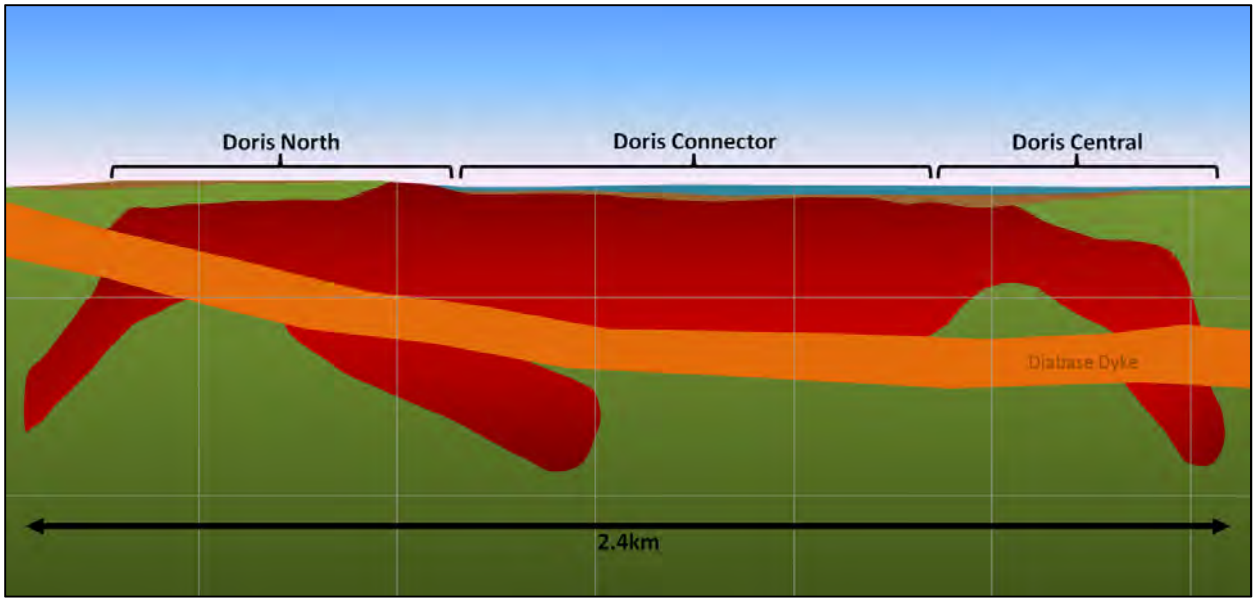

Figure 3.1-2. Long Section of the Doris Geology with Deposit Area Outlines, and the 2009 Vein Shapes Looking East

Doris Connector and Central mineralization has a strike-length of approximately 1.8 km which extends to the south beneath Doris Lake. Connector veins extend from the lake bottom, but the anticline hinge is eroded away (Figure 3.1-3). At Doris Central, the hinge begins to reappear as the anticline plunges gently to the south (~10°), but the fold tightens and the limbs begin to coalesce (Figure 3.1-4). Lithology and mineralogy in Doris North Lower is relatively similar to that found in Upper Connector and Central.

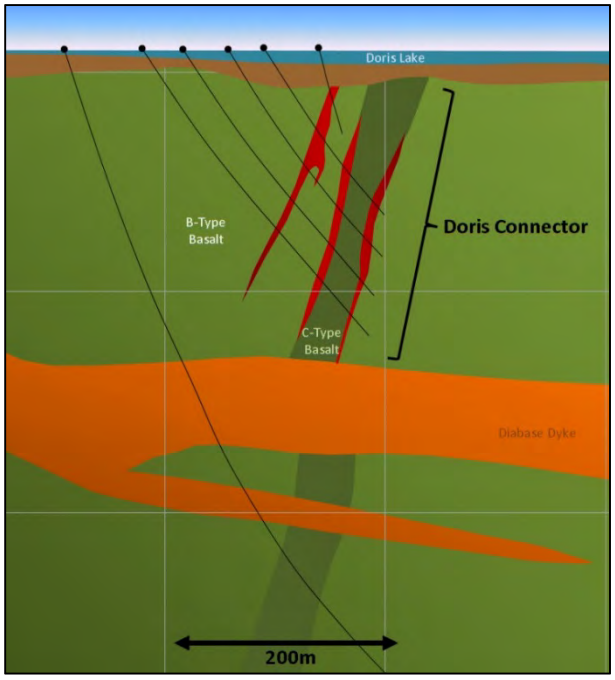

Figure 3.1-3. Doris Connector Cross-section

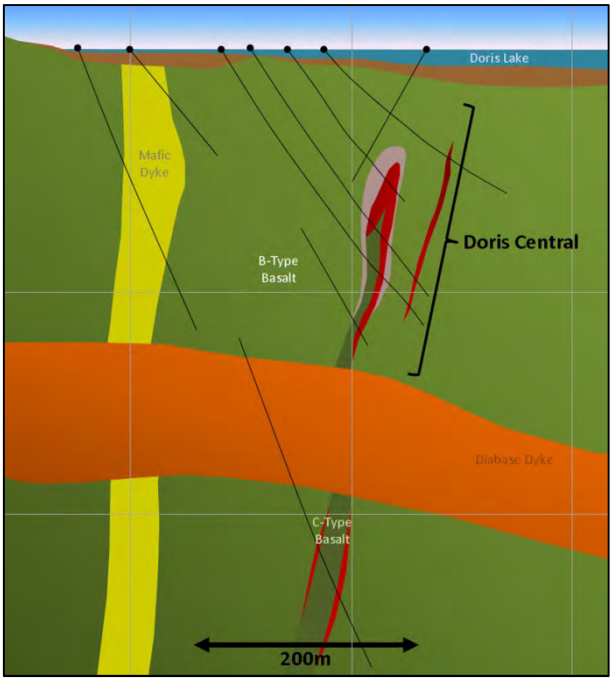

Figure 3.1-4. Doris Central Cross-section

3.2 GEOCHEMISTRY

HBML, and more recently, TMAC have undertaken a comprehensive geochemical characterization program of Quarry I and mine waste at the Doris Deposit and a number of other gold deposits in the Hope Bay Belt. The reports at Appendices 6 and 8 provide an assessment of the acid rock drainage and metal leaching (ARD/ML) potential of quarry rock and waste rock and ore that would be produced as part of the proposed mining activities. Appendix 7 provides an assessment of the metal leaching rates of waste rock and ore.

In summer 2010, a geochemical characterization program was conducted for Quarry I, location of the proposed Doris Central vent raise. The report summarizing the results of these investigations is attached at Appendix 6. Using a backpack-type drill, the program consisted of obtaining shallow drill core samples across the strike of the geology, with the objective of examining geochemical variability according to lithology and/or sample location. A total of five samples were analysed for elemental analysis by aqua regia digestion with ICP finish and acid-base accounting (ABA) parameters, including paste pH, total sulphur, sulphate sulphur, total inorganic carbon (TIC), and modified neutralizing potential (NP). The mapping indicated the geology was consistent across strike. Accordingly, the samples were representative of the Quarry I materials. Based on the geochemical characterization program, the material from Quarry I was considered to have a low potential for acid rock drainage (ARD) generation based on NP/AP and TIC/AP ratios and low sulphur content. Accordingly, materials from this quarry are considered suitable to be used for construction.

The report in Appendix 8 provides an assessment of the acid rock drainage and metal leaching (ARD/ML) potential of waste rock and ore that would be produced as part of the proposed additional underground mining activities at Doris Central and Connector. The findings are based on a compilation of static (e.g., ABA) and mineralogy data (XRD, X-Ray Diffraction) obtained from various sources, including previous studies, samples recently characterized by SRK, and data generated internally by HBML and, more recently, TMAC. The different testing campaigns used different analytical and data interpretation methods. A comparison of data was made to reconcile the different analytical methods and to select surrogate parameters for the assessment of ARD. Data analysis was performed according to deposit, deposit zone and rock type. Rock types were assigned to each sample using standardized lithology codes. Key results from the static testing program are summarized as follows:

- From an ARD/ML perspective, the most significant finding from the mineralogy data is that carbonate minerals are abundant in most rock types. Ferroan dolomite ($[Ca,Mg,Fe]CO_3$) was the dominant carbonate mineral, although calcite ($CaCO_3$) and to a lesser degree, siderite ($FeCO_3$) were also present. Pyrite was the only sulphide mineral detected using XRD methods.
- The static testing results show that, in general, samples from Doris are characterized by high levels of NP and TIC. As a result, most samples were characterized as not-potentially acid-generating (non-PAG; i.e., ratios of NP to acid potential [AP] or TIC/AP greater than 3). That said, the potential for localized ARD cannot be eliminated because a small proportion of samples was classified as potentially acid-generating (PAG; [NP or TIC]/AP < 1).
- A comparison of the 90th percentile levels of solid-phase elemental data with five times the average crustal abundance for basalt (Price 1997) indicated that a number of elements that could be mobile under neutral and alkaline pH conditions were present at elevated concentrations in the solid phase. These parameters include arsenic, boron, cadmium, molybdenum, antimony and selenium. Some samples contained relatively high concentrations of sulphur in the form of sulphide minerals, suggesting that metal leaching under neutral to alkaline pH conditions may be a concern with respect to water quality.

Kinetic test work has been carried out to assess metal leaching rates. A report on the findings is provided at Appendix 7. The kinetic test program for Doris included 21 humidity cell tests and five barrel tests. Four humidity cell tests were operated by Rescan (2001), and the remaining 17 samples were from more recent geochemical characterization programs by SRK in collaboration with HBML. Sample selection was based on lithology, economic classification (ore or waste), and ABA characteristics. Samples representing material with typical and higher than average sulphide concentrations were selected for testing. Trace elements (e.g., arsenic) were also considered during sample selection, but were a secondary consideration to ABA. Detailed mineralogical testing was also completed on the more recent samples selected for humidity cell testing. Key findings from the kinetic testing program are summarized as follows:

- The leachates from all samples were neutral to alkaline. Stable sulphate release rates were low and ranged between the limit of analytical detection (0.4 mg/kg/week) to 6 mg/kg/week. Samples with higher sulphide contents tended to exhibit higher stable sulphate release rates.
- Overall, metal concentrations were low for all of the humidity cell tests. Late gabbro samples with elevated sulphur levels had higher levels of antimony, arsenic and cobalt as compared to the other Doris waste rock samples. Mafic volcanics with elevated sulphur, and mafic volcanics combined with quartz vein also had elevated levels of cobalt relative to the other samples. All samples were predicted to be non-PAG on the basis of AP and NP depletion times and/or low stable sulphate release rates (less than 6 mg/kg/week).
- For the barrel tests, leachate concentrations were comparable to the humidity cells, however loadings were one to two orders of magnitude lower (e.g., sulphate was 0.007 to 0.2 mg/kg/week). The lower release rates for the barrel tests reflect the lower operating temperatures and the larger grain size of the test material.
- The more detailed mineralogical characterization has shown that pyrite is the most dominant sulphide mineral. However trace amounts of cobaltite (CoAsS), chalcopyrite ($CuFeS_2$), galena (PbS), gersdorffite ((Fe,Co,Ni)AsS), pyrrhotite (FeS), sphalerite (ZnS), and tetrahedrite (Cu_3SbS) were found in some samples.

The data from the kinetic test program have been used to validate inputs used for water quality predictions from the waste rock and ore. As noted in the preceding section, all waste rock will be managed according to the protocols outlined in the Doris North Waste Rock and Ore Management Plan (SRK 2010) and as revised from time to time with approval of the Nunavut Water Board. The more mineralized rock, including any PAG rock, will be segregated and stored in a separate mineralized waste rock pile until it can be used as backfill in the underground mine. At closure, the backfilled rock will be flooded and inundated by permafrost, and is not expected to result in any long-term closure issues. The waste rock that will remain on surface will be non-PAG rock with limited potential for metal leaching and/or ARD issues, and will be reclaimed in place.

4. Description of Proposed Doris North Mine Changes

4. Description of Proposed Doris North Mine Changes

The following section provides a detailed overview of the proposed changes to Phase 1 Doris North Mine. The footprint of these changes is illustrated in Appendix 24.

4.1 EXTENDED MINE LIFE

TMAC now plans to access all accessible mineralized zones via the Doris North Portal, not just Doris North. Originally, Miramar anticipated these resources would be accessed via additional underground portals or by open pits. This change to the Doris North Mine Plan will potentially result in a 2 to 4 year extension of the Mine life while minimizing the potential effects by using to a large extent existing infrastructure augmented only where necessary.

4.2 INCREASE TO MINING AND MILLING RATE

In this application, TMAC anticipates an initial mining rate of up to 1,000 tpd (yearly average ore mining rate) and that ore from these deposits will be processed by the existing mill at up to 800 tpd (yearly average). These rates may grade up to a 1,800 tpd milling average and a mining rate of up to 2,000 tpd if further exploration proves up additional deposits.

4.3 CYANIDE TREATED TAILINGS TO TAILINGS IMPOUNDMENT AREA

In the original application for the Type A Water Licence, it was stated that the cyanide destructed slurry would be filtered and trucked to the underground stope for final deposition and the flotation tails would be pumped to the TIA for subaqueous deposition. TMAC now proposes that the cyanide destructed slurry will be pumped to the flotation tailings pump box where it will be blended with flotation tailings prior to discharging in the TIA.

The proposed co-disposal of combined cyanide destructed tails with flotation tails in an engineered TIA has been practiced at numerous gold mines across Canada and around the world. Co-disposal of tailings offers several advantages over the previous proposal, including:

- reduced potential for contamination of groundwater during operations that could result from ARD and/or metals released from the cyanide destructed tailings;
- disposal of all tailings in an engineered facility; and
- the high neutralization potential of flotation tails will provide sufficient neutralization to the sulphide-rich cyanide destructed tails and prevent the formation of ARD.

Cyanide destruction will be performed using the SO_2-Air Process, a process that has been successfully tested. Testwork confirmed previous findings that the concentration of Weak Acid Dissociable (WAD) cyanide could be reduced to less than 0.5 mg/L prior to mixing with the flotation tails for co-disposal in the TIA. At a concentration of less than 0.5 mg/L, both the tailing delivery system and the TIA will not be classified as Cyanide Facilities by the International Cyanide Management Institute (ICMI). It will also meet all Canadian requirements, including those set out in the Metal Mining Effluent Regulations.

4.4 CHANGES TO TIA WATER MANAGEMENT

4.4.1 Overview of Change to TIA Water Management Strategy

Currently, the Type A Water Licence indicates that TIA water is initially to be discharged into Doris Creek, which in turn discharges to Roberts Bay.

TMAC is proposing to amend its tailings water management strategy. As previously permitted, the mine water will report to the TIA. However, the revised strategy will have a single discharge from the TIA to the marine environment in Roberts Bay. The TIA water will be treated as needed and then discharged as necessary to meet Metal Mining Effluent Regulations thresholds within the pipeline and then via a subsea pipeline and diffuser to Roberts Bay. TMAC proposes to monitor water quality near the diffuser to confirm that Canadian Council of Ministers of the Environment (CCME) thresholds are met within Roberts Bay.

Compliant TIA water will be discharged to Roberts Bay year round and discharge works will be sized accordingly. The compliant TIA water is expected to disperse throughout Roberts Bay in the winter months and flush completely into Melville Sound water during the summer open water season.

As well, more groundwater will be encountered than originally anticipated by Miramar. Deep groundwater below permafrost in Doris North Lower and talik water under lakes will be encountered during underground mining of the Doris Central and Connector deposits. Groundwater will report to the TIA. Due to its potential salinity, this water could be detrimental to freshwater ecosystems if discharged from the TIA into Doris Creek (as currently permitted). This water is similar in composition to seawater, and as such, a more environmentally appropriate initial receiving environment is Roberts Bay.

To provide further detail on the changes to mine water management, the various supporting appendices relating to the revised TIA water management strategy are shown below in sequential order of water flow:

- Appendix 9: Groundwater Inflows and Inflow Water Quality Used for the Revised Doris North Project Amendment Package No. 03 to Water Licence No. 2AM-DOH0713 (SRK, November 2011);
- Appendix 10: Water Quality Model, Hope Bay Project, Nunavut, Canada (SRK, November 2011);
- Appendix 11: Tailings Impoundment Area – Excess Water Transfer System (Hatch, September 2011);
- Appendix 4: Doris North Gold Mine Project: Roberts Bay Report - A Supporting Document for the Project Certificate and Type A Water Licence Amendment Package (Rescan, November 2013);
- Appendix 5: Doris North Gold Mine Project No Net Loss Plan for the Roberts Bay Subsea Pipeline and Diffuser (Rescan, November 2013); and
- Appendix 12: Design Drawings of Proposed Outfall (Subsea Pipeline and Diffuser) and Associated Infrastructure, Doris North Project (PND Engineers, November 2013).

4.4.2 Changes to Inputs to TIA and Water Transfer System

As previously permitted, inputs to the TIA will include mill effluent, mine water, surface runoff water, ground water, and natural flows. Additionally, talik and deep ground water in more significant volumes than previously estimated will now be directed to the TIA as it is encountered during underground mining. Some treatment of effluent to the TIA will occur in order to ensure regulatory parameters and monitoring criteria are met. Decant from the TIA will accommodate all inflows in a manner that will maintain sufficient water cover over deposited tailings solids taking into account the effects of wind or

ice scouring. Excess water will be pumped from the TIA to a treatment plant located at the Doris Camp site and then pumped via a pipeline along existing corridors to the subsea pipeline and diffuser system in Roberts Bay.

The mine water transfer system has five components:

1. tailings slurry pre-treatment in the process plant to remove zinc;
2. a pipeline through which treated tailings slurry is pumped from the process plant to the TIA;
3. a pipeline through which excess water is pumped from the TIA to a treatment plant located beside the process plant;
4. a treatment plant that removes suspended solids from the excess TIA water; and
5. a pipeline through which compliant TIA water is discharged to a subsea diffuser located in Roberts Bay.

These five components were based on a site water management plan that has taken into consideration all aspects of site water management. The plan incorporates water recycle, fresh water make up, proper effluent disposal, and energy conservation to minimize the impact to the local environment (Appendix 4).

The plan is supported by a water balance model that predicts TIA discharge water quality (Appendix 10). Metallurgical testing has been completed on representative samples from each of these deposits, and the solids and process waters have been subjected to detailed geochemical characterization testing, including acid base accounting, kinetic testing, characterization of process waters, and aging tests on tailings slurries. The geochemical characteristics of the new ore zones are similar to that of Doris North. Tailings will be stored in the TIA, where they will be flooded. Underwater tailings disposal limits the potential for oxidation of sulphide minerals, and therefore the release of sulphate and metals from the tailings solids. The potential effects of the tailings process water on pond and therefore, discharge water quality were assessed using a water and load balance model (Appendix 10). The results of the model were used to establish water management requirements for the Mine.

All efforts will be made to recycle as much of the process water from inside the milling, grinding and gold recovery areas of the plant as possible. A portion of the process water will leave with the tailings as a slurry to be deposited in the TIA.

The water and overall mass balance will be managed inside the process facility using recycle water through the use of thickeners etc. to reduce the amount of water being pumped from the mill to the TIA. All efforts will be made to select the optimum balance between recycle, process effluent treatment and fresh water make up to balance metals and other contaminants within the plant. Make up water from Doris Lake will continue to be used to offset the water consumed in the process.

4.4.3 Water Treatment

The proposed discharge criteria for the water from the TIA are listed in Tables 4-1 and 4-2 of the water quality modelling report prepared by SRK (Appendix 10). These criteria will ensure that the discharges meet the current MMER limits, and that CCME guidelines for the protection of marine aquatic life will be met within Roberts Bay. The water quality modelling results presented in Appendix 10 show that the TIA discharge water quality would be in compliance with these criteria under a wide range of conditions. For most parameters, the mill effluent or process water was the dominant source of loading to the TIA.

The chemistry of the mill effluent was established through a combination of metallurgical testing and modelling results. Additionally, it was assumed that some pre-treatment of the mill effluent would be required to reduce concentrations of zinc. Zinc is the main metal which is anticipated to be elevated because it is used as a dosing agent in the Merrill-Crowe gold recovery process.

4.4.4 Pipeline and Flows to Roberts Bay

The mill processing plant waste streams will be combined into a tailing thickener where the overflow water will be reused in the process and the underflow will be transferred to a tails box and pumped to the TIA through a pipeline. The pipeline will be equipped with heat tracing, insulation and low point drains. The pressure required to overcome the friction and head requires that the initial 1.1 km section of the line be rubber lined carbon steel. After 1.1 km, the piping material will be changed to HDPE.

The piping will be routed the most convenient way across the plant-site and then follow the tailings road to the TIA. The pipeline route has been designed to minimize low points. Two low point drainage points have been designed to accommodate the pipeline contents in the event of an emergency. The low point drains will be used to recover the pipeline contents. All piping will be above ground and easily accessible for visual inspection and if needed, repair.

Excess water cover will be removed from the TIA through a single point of discharge. Based on modelling, it is expected that a nominal flow rate of 120 L/s will be discharged from the TIA to the ocean. To ensure that the effluent treatment plant is sized adequately for the operation, the maximum rate is designed to operate throughout the year. In years requiring lower volumes of discharge the discharge pumps may simply be shut down for periods of time. The HDPE pipeline from the TIA to the discharge treatment plant will also be heat-traced and insulated.

4.4.5 Jetty/Subsea Outfall/Diffuser System

The proposed subsea outfall system consists of an overland HDPE pipe from the effluent filter plant to Roberts Bay, then connecting to a subsea pipeline and diffuser installed on the sea floor within Roberts Bay (Appendix 4). It is expected that the transition from the overland pipe to the subsea pipe will be achieved within the jetty's structure.

The installation of the overland/subsea pipe will be installed when jetty modifications are carried out and thereby minimizing the environmental impacts and maximizing constructability.

The existing jetty at the south end of Roberts Bay was originally constructed in 2007 for use during barge loading and off-loading. Since then, the structure has slowly eroded at its deepwater end due to wave and ice forces. It required substantial yearly maintenance. In May 2010, Fisheries and Ocean Canada (DFO) granted authorization (DFO File No: NU-10-0028) to carry out the required repairs to the jetty to rebuild sections that had eroded and to improve the design and stability for longer-term use by minimizing future erosion and loss of material due to ice scour and wave action. The new design was for the installation of rock-filled sheet pile cells along the face and a wider approach ramp, to allow vessels to more efficiently and safely dock and transfer cargo, and the addition of an apron along the existing jetty to protect the slope against wind-driven waves and boat wakes.

Reconstruction was started in 2011 when the old face of the jetty was drawn back to make room for construction planned for later that year. A slow down of the Hope Bay project resulted in delay of the construction of open cells. As a result, temporary reconstruction was done in 2011/2012 to re-establish a shorter version of the original jetty design. Storm damage in July of 2013 required repair work to be carried out to rebuild eroded sections to allow unloading of the 2013 sealift. To date,

modification work on the jetty has still not been completed. As detailed project design and engineering proceeds, should the modified jetty design differ from those initially proposed in the fisheries authorization application, DFO will be contacted and the required steps to amend the information will be undertaken.

A critical component of the outfall involves the crossing of the riparian zone adjacent to Roberts Bay to a point below the expected depth of freezing (approximately the 3 m isobath). The pipeline will thus consist of both entrenched and exposed sections, and will be installed along the modified jetty in Roberts Bay, emerging at the toe of the jetty. Entrenchment of the pipeline section until the 6 m isobath is required to protect it from ice damage and to provide sufficient clearance for vessels approaching the jetty. The pipeline will run approximately 2.4 km along the bottom of Roberts Bay, to a multipart diffuser located at the 40 m isobaths.

Accidents that could potentially cause damage to the subsea pipeline or diffuser will be limited to ice and/or anchor impacts. The subsea pipeline and diffuser have been sited to avoid such impacts by ensuring that is is buried within the jetty to a depth of 6 m and an alignment that avoids active anchorages.

Ballasting will be used to stabilize the pipeline and diffuser against wave forces projected to occur less frequently than once in 100 years.

The system will operate at relatively low pressures. Leakage from normal operating modes is therefore highly unlikely. In the event that the outfall/diffuser system does sustain damage, flow through the pipe can be turned off and subsea repairs can be conducted. In the worst case, these might entail replacement of a pipe section with a premeasured spool piece fitted into the damaged section and connected to the undamaged section by clamps. Spare pipe sections can be stored on site to expedite such repairs. Nonetheless, in the event of a leakage, the discharge flowing through the pipeline will have been treated according to MMER guidelines, allowing for CCME guidelines to be met within Roberts Bay.

4.5 REDUCTION OF WATER COVER IN TAILINGS IMPOUNDMENT AREA

Tailings for this Project will continue to be sub-aqueously deposited in Tail Lake, which will continue to be contained with the construction of two dams (north and south dams) assessed as part of the Miramar FEIS in 2006.

SRK previously completed a design of the minimum water cover needed at closure to prevent re-suspension of tailings with subsequent effects to water quality (SRK 2005). That analysis concluded that the minimum water cover should be 2.42 m, a number which was defined by winter ice thickness. At the time the maximum amount of tailings planned for deposition in Tail Lake was about 458,200 t, and based on bathymetric surveys, this left a final water cover of 4 m, a number that well exceeds the minimum water cover required to protect tailings. Given the volumes of tailings anticipated at that time, it was not necessary to consider the issue of maximum tailings capacity in great detail.

As TMAC now plans to maximize use of the TIA by depositing more tailings from the Doris Mine than originally estimated, SRK has re-evaluated the design of the water cover, taking into consideration additional baseline data obtained since 2005, as well as re-evaluating some of the assumptions in the previous assessment. Appendix 14 provides further details regarding this re-analysis and confirms that a final water cover of 2.3 m is adequate to prevent re-suspension of tailings under all conditions, and thus more volume of tailings can be deposited while maintaining the current closure plan.

4.6 DORIS VENT RAISES

Under the proposed Project revisions a vent raise pad will be constructed within Quarry I east of the Doris-Windy all-weather road, south of Doris Camp and north of Windy Camp. The Doris Central Access Road will be constructed to provide access to the Doris Central Vent Raise Pad from the Doris-Windy all-weather road. The Doris Central vent raise site is generally illustrated in Appendix 16.

This Doris Central Vent Raise Pad will cover an approximate total area of 13,252 m^2 and will house a fuel transfer station, diesel generator, vent raise infrastructure and an emergency shelter. Rock blasted from Quarry I during development of the pad footprint will be used to construct the pad and will subsequently be covered with at least a 0.15 m-thick layer of crushed surfacing material. As noted in Section 3 of this document, geochemistry of the rock from this quarry has been characterized and shown to have a negligible potential for metal leaching and ARD. The pad will be constructed to be free draining away from Doris Lake and the surfacing material specified will likely be a 1 ¼" crushed rock.

The design criteria for the vent raise pad are as follows:

- the Vent Raise Pad will be constructed on a drilled and blasted bedrock surface;
- the proposed drilling and blasting zone will not be breached and will be housed entirely within the proposed Quarry I limits;
- a surfacing layer will be required for infrastructure and will be placed on the pad as a levelling course.

The Doris Central Access Road is an extension of the existing Doris Windy all-weather road and provides access to the Doris Central Vent Raise. The 675 m long access road will not be paved and will have one turn-out location. The road will also connect to a sedimentation control berm (approximately 240 m long) that will be located east of the overburden storage area. This road is not designed to meet the requirements of a mine haul road or a public road. Dual lane traffic is only allowed for pick-up truck type vehicles with an overall outside width of 2.3 m and smaller.

Except for reduced-speed zones, the maximum design speed for any vehicle is 50 km/h. The road design requirements are similar to those used for the Doris-Windy all-weather road. The Doris Central Access Road will also provide access to a designated Overburden Storage Area that will be located approximately 100 m west of the Doris Central Vent Raise Pad.

As detailed project planning and engineering proceeds, a second vent raise may be constructed south of Doris Camp to supply Doris Connector (Figure 4.6-1). This vent raise would be of a similar design to the Doris Central vent raise and would be connected to the main Doris Road by a spur road of the same design as the Doris Central vent raise.

4.7 INCREASED WASTEWATER TREATMENT CAPACITY

TMAC is requesting an expansion of the wastewater treatment plant to meet the increase in required staffing of the Doris Camp to a total of 360 people. In 2010, NWB authorized HBML to install the second WWTP as a backup to allow HBML to bring the system down for maintenance, but the throughput capacity was maintained at 180 persons as per the existing licence. Following the amendment, TMAC would use this second WWTP to meet the demands of the increased camp personnel capacity.

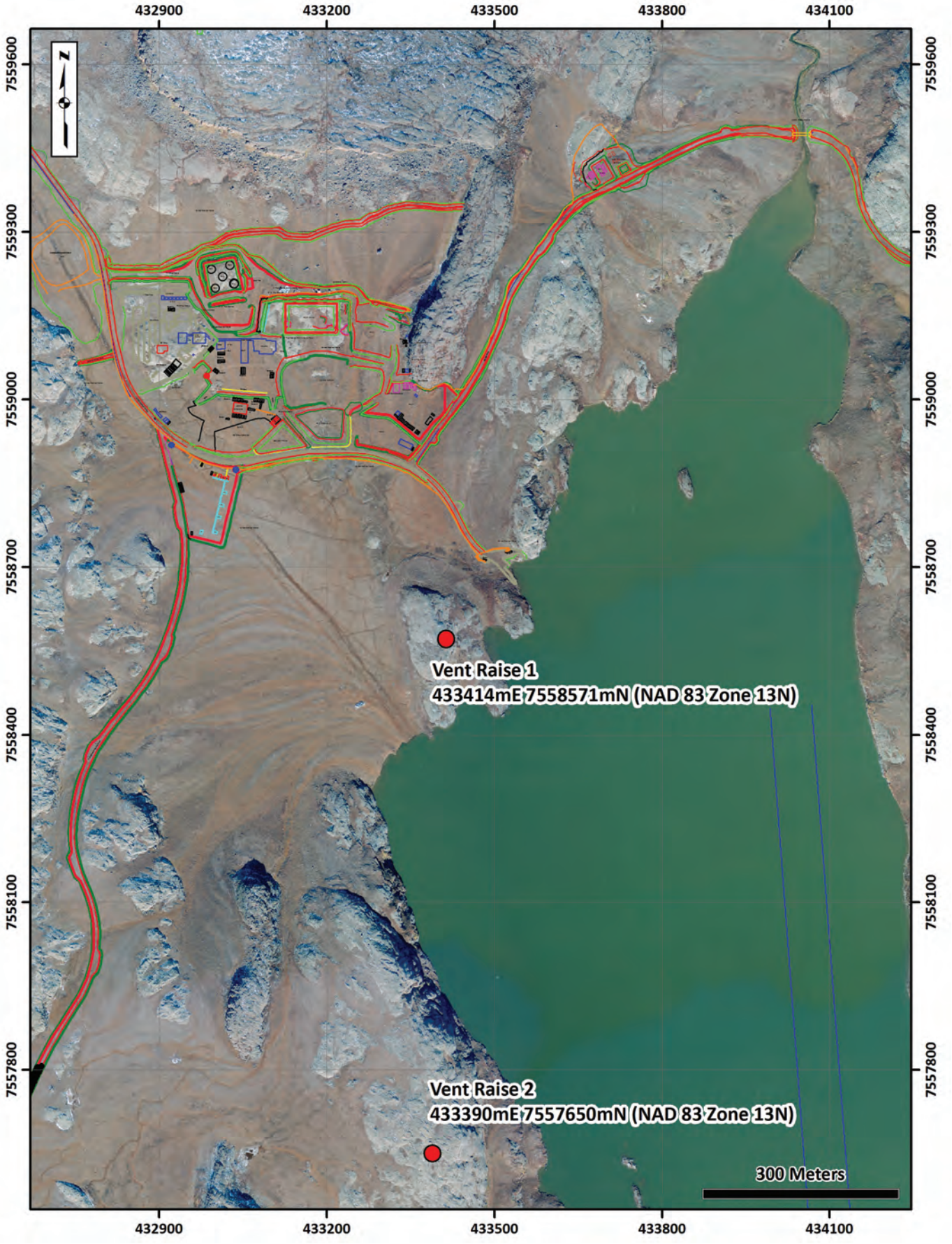

Figure 4.6-1

Potential Doris Mine Vent Raise Locations

TMAC RESOURCES

Rescan an ERM company

4.8 INCREASED POTABLE WATER USE FROM WINDY LAKE

The existing Type A Water Licence (2AM-DOH1323) and Type B Water Licence (2BE-HOP1222) already allows for the withdrawal of water from Windy Lake for Doris Camp domestic use. With the proposed increase in camp capacity, more water for domestic use will be required for the total number of people in camp (increase from 180 to 360 person capacity). The withdrawal of water from Windy Lake for Doris Camp potable water usage will slightly reduce the water level in the lake and is not anticipated to affect fish habitat. Appendix 3 provides the details on the estimated changes in lake water level, lake volume, and lake surface area for Windy Lake that would result from the proposed increased potable water use.

4.9 ROBERTS BAY: LAYDOWN, ACCOMMODATION BARGES, AND WINTER FUEL BARGES

As part of the proposed Project changes, three new laydown areas will be constructed at Roberts Bay. The three laydown areas (designated as Roberts Bay Expanded Laydown Areas West, Southwest, and Southeast) will provide up to an additional 4 ha of general laydown area. The West Laydown Area will be located adjacent to the south perimeter of the existing Beach Laydown Area. The Southwest and Southeast Laydown areas will be located adjacent to the Primary Road, south and east of the existing Roberts Bay Tank Farm.

Descriptions of the design criteria for the Roberts Bay Laydown Expansion, in addition to the associated detail design drawings are provided in the design brief prepared by SRK (Appendix 17).

TMAC may from time to time use accommodation barges that were previously on Roberts Bay and operated in full compliance with applicable laws.

During 2010-2011, HBML temporarily stored fuel in an Arctic class double hull ship frozen into the ice in Roberts Bay, as there was not enough available tankage on site to store it all. This activity was carried out in compliance with Transport Canada regulatory requirements and industry best practices. TMAC plans to maintain the option of bringing in additional fuel in vessels and/or barges in the future to allow flexibility. If this option is utilized, TMAC will continue to ensure that any vessel or barge that is retained is fit for this purpose and that this activity occurs in full compliance with all applicable regulatory requirements.

4.10 EXPANDED PAD T

As part of the proposed Project changes a new general laydown facility and ore storage area will be developed adjacent to Pad R, Pad D, and Pad Q. The new area, designated as Pad T (which may consist of up to three pads, Pad T1, Pad T2, and Pad T3), and can accommodate both temporary storage of additional ore, or use as a general laydown area during operations. The component pads will be constructed from run-of-quarry (ROQ) fill overlain by surfacing material or from underground rock if approved by the NWB, as allowed under the Water Licence. The surface of Pad T will be graded to direct surface runoff and infiltration towards the infrastructure pads adjacent to the south perimeter of Pad T which will ultimately report to the Pollution Control Pond located down-gradient of these infrastructure pads.

Descriptions of the design criteria for Pad T, in addition to the associated detail design drawings, are provided in the design brief prepared by SRK (Appendix 18).

4.11 EXPANDED PAD U

Construction of the full extent of Pad U allows for permanent, above-ground storage of up to 900,000 tof waste rock in this location. Waste rock from the underground mine is anticipated to be primarily non-acid generating (Appendices 7 and 8). The waste rock will continue to be managed as described in the Waste Rock and Ore Management Plan (SRK 2010), with segregation and preferential backfilling of any mineralized rock such that the rock remaining on the pad at closure would be non-acid generating, with a relatively low sulphide concentration and low potential for long-term metal leaching. Waste rock placed on these pads will be characterized as not having potential for generating ARD and will therefore not necessitate installation of a cover system or long-term collection and treatment of runoff or seepage from the pile. It is noted that the revised water and load balance includes the additional loadings that could originate from increased amounts of waste rock storage.

The expanded waste rock storage area is located approximately 100 m east of the original waste rock storage facility location indicated in the 2012 Mine Closure and Reclamation Plan (SRK 2012). Consistent with the original design intent, runoff from the Waste Rock Pile Storage Area will be directed towards a designed lined Pollution Control Pond located south of the expanded pad.

Descriptions of the design criteria for the expanded Waste Rock Pile Storage Area in addition to the associated detail design drawings are provided in the design brief prepared by SRK (Appendix 19).

4.12 USE ROCK FROM QUARRIES A, B, D, AND I AT DORIS NORTH

TMAC plans to use rock from the existing Quarries A, B, and D (currently permitted by KIA Land Use Licences and Type B Water Licence 2BE-HOP1222) as well as new Quarry I for construction and maintenance of Doris North Mine facilities. Geochemically acceptable waste rock may also be selectively used for construction purposes, as approved by the NWB.

5. Overview of Regulatory Requirements

5. Overview of Regulatory Requirements

Some of the proposed changes to the Mine will require amendments to TMAC's existing Project Certificate and Type A Water Licence, as outlined in Sections 5.1 and 5.2 below. All work would proceed in accordance with applicable DFO Operational Statements and any other applicable authorizations.

The discharge will take place in compliance with the criteria set out in the Fisheries Act and Metal Mine Effluent Regulations ("MMER"). Under section 4, the MMER permits a mine to deposit an effluent that contains a "deleterious substance" (as defined in the MMER) in waters frequented by fish if the following criteria are met: (a) the concentration of the deleterious substance in the effluent does not exceed the authorized limits set out in Schedule 4; (b) the pH of the effluent is equal to or greater than 6.0 but is not greater than 9.5; (c) the deleterious substance is not acutely lethal effluent. In addition to meeting these criteria, TMAC will also continue to comply with the testing and reporting requirements set out in sections 6 to 27 of the MMER. The Mine will continue to operate in compliance with the Arctic Waters Pollution Prevention Act. As confirmed in the supporting appendices, water released to Roberts Bay will not cause negative impacts.

5.1 PROPOSED AMENDMENTS TO NIRB PROJECT CERTIFICATE NO. 003

TMAC has identified the following amendments to the NIRB Project Certificate that will be required in order to implement the proposed changes to the Mine:

- Section 2.1: Update description of Project to reflect project changes.
- Section 4.9: Remove requirement to fund and install an on-site laboratory for continuous monitoring of water quality. The revisions that TMAC is requesting to the TIA, in particular the addition of water treatment, will ensure that discharge meets required criteria and as such, the on-site laboratory previously proposed by Miramar and described in the Project Certificate is no longer necessary.
- Section 4.10: Revise monitoring requirement as appropriate to reflect discharge to Roberts Bay rather than Doris Creek.
- Section 4.15: Revise as appropriate to reflect discharge to Roberts Bay rather than Doris Creek.
- Clarify applicability of requirements to each project phase (construction, operation, care and maintenance and closure)
- Appendix A:
  - Revise reference to mine surface footprint area (see page 3 of 28 of Appendix A).
  - Revise commitment relating to use of chemical dust suppressants to indicate such substances may be used provided the proponent does so in accordance with relevant Northern and Nunavut policy (see page 3 of 28).
  - Remove reference to release of TIA decant water into Doris Outflow. TMAC proposes to revise this commitment to refer to Roberts Bay (see page 11 of 28).
  - Remove obligation to monitor water quality at discharge release into the Doris Outflow and downstream of the waterfall. TMAC proposes to move the monitoring point to correspond with the new proposed point of ocean deposition in Roberts Bay (see page 12 of 28).

5.2 PROPOSED AMENDMENTS TO TYPE A WATER LICENCE NO. 2AM-DOH1323

TMAC has identified the following amendments to the current Type A Water Licence that will be required in order to implement the proposed changes to the Mine:

- A transitional period of not less than 2 years upon commencement of construction activities to implement the proposed changes requested in this amendment.
- The installation of a new pipeline to divert water from the tailings impoundment area to Roberts Bay is a diversion of surface waters which requires amendment to the Licence.
- Scope: Update description of Project to reflect approved project changes.
- Generally, to consider any amendments that would support resolution of issues relating to overbonding on Inuit Owned Lands.
- Part G26(l): Since TMAC is proposing to place filtered cyanide leach residue into the TIA, TMAC requests removal of the licence requirement to place filtered cyanide leach residue underground.
- Part G26(m): TMAC will no longer be discharging to Doris Creek so requests removal of the requirement to provide notice to discharge to Doris Creek.
- Part G28: The TIA discharge parameters were set with regard to MMER parameters as well as Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life. These parameters should be revised as appropriate for the marine receiving environment.
- Part G29, 30, Part J4: This section of the licence refers to monitoring stations for Doris Creek. Given that the discharge will no longer be directed to Doris Creek, TMAC proposes the monitoring stations be moved to Roberts Bay. The water licence compliance point for discharge will be moved to a point prior to the discharge to the marine environment.
- Part G31: TMAC proposes to reduce the required water cover from 4 m to 2.3 m, in order to ensure a protective cover while providing for maximum capacity of tailings within the existing footprint of the TIA.
- Part G32, J2: TMAC no longer plans to discharge to Doris Creek so it proposes this clause should be removed.
- Part J8(a): Revise clause to permit testing for Acute Lethality to Rainbow Trout, Oncorhynchus mykiss or such other aquatic species acceptable to Environment Canada (in accordance with Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/13). This change clarifies TMAC's ability to carry out lethality tests on species as appropriate to the salinity of discharge waters.
- Part J8(b): Revise clause to permit testing for Acute lethality to the crustacean, Daphnia magna or such other aquatic species acceptable to Environment Canada (in accordance with Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/14). This change clarifies TMAC's ability to carry out lethality tests on species as appropriate to the salinity of discharge waters.
- Part J11: TMAC proposes this clause should be removed because TMAC will be installing water treatment processes.
- Schedule G: As above, revise as appropriate to reflect marine receiving environment.

TMAC noted that the following definitions set out in Schedule A will need to be updated to reflect the new facility designs:

- Beach Laydown Area;
- Ore Stockpile;
- Quarry;
- Tailings Water Management Strategy; and
- Temporary Waste Rock Pad.

TMAC has also reviewed the most recently issued Type A Water Licence terms and would like to request the Board consider the following provisions:

- Part B4-7: TMAC wishes the Board to clarify timelines for consideration of plans and to consider a provision which provides for deemed approval of plans once a 60-day time period has passed.
- Part C2: TMAC wishes to add the phrase "or as otherwise approved by the Board" to the requirement that, "Should the Project be in Care and Maintenance, an updated estimate of total mine closure restoration liability shall be submitted, as above, at least every three years from the issuance of the Licence."
- Part D22: Currently states, "The Licensee shall use fill material for construction only from approved sources that have been demonstrated by appropriate geochemical analyses to not produce Acid Rock Drainage and to by [sic] Metal Leaching properties." TMAC wishes the Board to consider adding the words "except as otherwise approved by the Board" to this sentence, as there may be situations where it is safe to encapsulate such materials.

6. Public Consultation

6. Public Consultation

Previously, HBML and TMAC undertook a range of consultation and communication activities with local communities, regulators, and resource managers over the past several years, including proposed changes to the Mine described in this document. These activities are described below in chronological order.

6.1 2010

In August 2010 when HBML conducted a community tour, proposed amendments planned at that time were presented and discussed with meeting attendees. These included the camp expansion and mine life extension. Environmental baseline studies conducted in the Doris North area were also presented and discussed. Communities visited during the August 2010 meetings included Cambridge Bay, Gjoa Haven, Kugaaruk, Kugluktuk, and Taloyoak, with the overall attendance totalling approximately 121 attendees and the largest attendance being in Gjoa Haven. Community Elders were in attendance at Gjoa Haven, Taloyoak, and Kugaaruk. No specific questions were asked regarding the proposed changes to the Doris North Mine. For the three communities where Elders were present, the following topics were discussed:

Gjoa Haven

- Discussion topics included opportunities for work, employment requirements, scheduling, and activities in the Windy Lake area.

Taloyoak

- Discussion topics included climate change, possible site visits for local residents, mine abandonment, training and opportunities for youth, helicopter use and wildlife, and potential effects on human health.

Kugaaruk

- Questions were primarily on training and employment opportunities and applications.

Additionally, a community newsletter was published and distributed in October 2010. The newsletter presented information pertaining to the 2010 sealift, summer field work, and employment information. It was hoped that this publication would reach a larger audience, including those who may not be able to attend the community meetings or site visits.

6.2 2011

In order to specifically address the proposed Mine changes, a round of community meetings were held in June 2011. The results of the June 2011 consultation are summarized below.

HBML visited five communities in early June 2011: Cambridge Bay, Gjoa Haven, Kugaaruk, Kugluktuk, and Taloyoak. Specific information pertaining to this amendment application was presented. Table 6.2-1 summarizes the communities that were visited and the estimated number of attendees.

Comments and feedback pertaining to the information presented were documented and, where practicable, responses were provided by HBML staff in attendance. The overall attendance totalled 52 individuals, with the largest attendance being in Taloyoak. Meeting attendance was lower than anticipated in Kuglukuk as many residents were away fishing. Elders were present at the meetings in Kugaaruk and Taloyoak.

Table 6.2-1. Public Meeting Dates and Attendance, June 2011

Date	Community	Attendance*
Monday, June 6, 2011	Kugluktuk	5
Tuesday, June 7, 2011	Cambridge Bay	13
Wednesday, June 8, 2011	Kugaaruk	15
Thursday, June 9, 2011	Taloyoak	19
Friday, June 10, 2011	Gjoa Haven	Postponed due to weather

**Attendance numbers estimated from draw prize entries and visual counts.*

Comments, questions, and responses pertaining specifically to the proposed Mine changes were discussed in Cambridge Bay, Kugaaruk, and Taloyoak and have been summarized here.

Cambridge Bay

- A question was asked regarding the limited bed capacity at camp, being approximately 180 beds plus those on the floating barge, and if camp expansion was tied to the amendment. This was confirmed by HBML staff.

Kugaaruk

- Concerns were raised by an Elder about the salt and water being diverted from Tail Lake into Roberts Bay and whether the water will impact fish or fish habitat. An explanation was given that water will pass through a treatment system in the process plant which will remove metals such as zinc and copper and the discharge water from the TIA will pass through a second treatment plant that will filter out total suspended solids from the water before being diffused into Roberts Bay.

Taloyoak

- A meeting attendee wanted to know if the tailings and water in Tail Lake were dangerous. An explanation was made by HBML staff explaining that tailings are not dangerous but that they do contain metals and sediment. It is also likely that the water will have some salt content which is expected to be close to that of seawater.
- A meeting attendee wanted to know if a fence will be erected around Tail Lake to keep wildlife out. No fence is currently planned; however, the facility will include a road running down one side along the east side so that the pond can be patrolled.
- An Elder wanted to know if the Nunavut Water Board did routine inspections. It was explained that the Nunavut Water Board does not have inspectors but inspections are conducted by Aboriginal Affairs and Northern Development Canada (AANDC; previously known as Indian and Northern Affairs Canada [INAC]), Environment Canada, Department of Fisheries and Oceans, and by the KIA.
- An Elder asked if fish in the area were regularly inspected and tested. Fish sampling is conducted each year as well as sampling and testing of small aquatic organisms on a periodic basis.

Other general comments and questions discussed at the meetings pertained to employment opportunities, training, mine production timelines, Inuit benefits, environmental testing, and potential effects on human health and social issues. This feedback will be incorporated into future discussions and considered during on-going Project planning.

Also in July 2011, 24 KIA staff were provided a Site tour, including Community Liaison Officers. The tour was intended to familiarize KIA staff with the Hope Bay Project such that accurate information regarding the project could be provided to Beneficiaries through KIA representatives. In August 2011, two Cambridge Bay Elders participated in archeological field studies.

6.3 2012

In February 2012, a decision was made by HBML to place the Hope Bay project in Care and Maintenance, including the cessation of all development construction. Public consultation and communication for the rest of the year focussed on an explanation of project status, employee transitioning and lay-offs, steps being taken to demobilize the project site, Care and Maintenance management planning, and the impact of project status on existing licences and permits.

In May 2012, a regional community consultation tour was conducted throughout the Kitikmeot region. Public feedback during this tour centered on concerns for laid off workers and loss of contracting for local business, the duration and extent of Care and Maintenance, and environmental monitoring during the shut down period. In September 2012, a presentation was made to Kitikmeot Mayors and municipal staff in Cambridge Bay. Again, presentation materials and feedback centered on Project status and the economic impacts of shutting the Hope Bay project down.

6.4 2013

In March 2013, TMAC acquired the Hope Bay project from Newmont Mining Corporation. In the following month, a regional community consultation tour was conducted throughout the Kitikmeot region, including face to face meetings with Hamlet Councils when possible. Consultation and communications focussed on project history, background information on project acquisition, introductions to the TMAC Executive, and announcing 2013 project plans, including the re-initation of a water licence amendment application primarily to allow for the alternative discharge of Tail Lake water to the ocean that is the subject of this document. Specific comments related to mine plan changes were:

- A Taloyoak Elder requested more information or clarification of the drainage plan for Tail Lake. A graphic of the proposed pipeline from Tail Lake to the ocean was shown, and the general discharge strategy explained.
- Another Taloyoak Elder requested information or clarification on what environmental and wildlife monitoring programs were in place. The number of monitoring programs required under the existing Water Licence and Project Certificate were referenced.

In April 2013, during the Nunavut Mining Symposium, representatives of TMAC met with AANDC, NWB, and NIRB staff in part to brief each organization about contemplated Doris North Mine modifications that could be the subject of a future permitting submission.

7. Environmental Effects Assessment

7. Environmental Effects Assessment

HBML and, more recently, TMAC retained Rescan Environmental Services Ltd. ("Rescan") to prepare four reports which consider the potential for environmental effects arising from the proposed changes to the Phase 1 Doris North Mine:

- The Doris North Project Mine Infrastructure Changes Supporting Memo (the "Water Licence Support Memo"), which considers the potential for changes to environmental effects and cumulative effects predicted in the Doris North Project Final Environmental Impact Statement (FEIS) arising from the remaining proposed changes to the Mine (attached as Appendix 3). The memo presents information that was identified in the Supplementary Information Guidelines prepared by the Nunavut Water Board. This memo addresses all of the proposed operational and facilities changes, with the exception of the proposed subsea pipeline system and the proposed discharge of compliant TIA water to Roberts Bay.
- The Doris North Mine Project Roberts Bay Report (the "Roberts Bay Report"; attached as Appendix 4) which provides a detailed overview of the proposed subsea pipeline and diffuser system, potential environmental effects, mitigation measures, and proposed monitoring programs.
- The Doris North Mine Project No Net Loss Plan for the Roberts Bay Subsea Pipeline and Diffuser (Appendix 5), which provides a fish habitat compensation plan for fish habitat along the seafloor that may be altered or lost as a result of installing the subsea pipeline and diffuser.
- The Screening of Socio-Economic Effects for Proposed Doris North Infrastructure Changes (Appendix 23) which provides: 1) information on recent socio-economic baseline conditions and description on changes that have occurred since the 2005 Doris North Final EIS submission (Miramar 2005); 2) information on the expected direct employment and expenditures by the Project; 3) review of the 2005 Doris North Final EIS mitigation and effects assessment conclusions; and 4) a screening of the effects of the proposed changes in the Project in relation to the identified mitigation and effects assessment conclusions.

HBML and more recently TMAC also retained Points West Heritage Consulting Ltd. to specifically consider potential for impacts on heritage resources (Appendix 13).

As concluded in these reports:

- The proposed activities that result in expanded footprint do not change the predicted environmental impacts as originally assessed in the Doris North Project FEIS.
- The footprint disturbances associated with the TIA water management, the vent raise pads and access roads, the expanded Doris Camp, the expanded Pad U and T, and the Roberts Bay laydown area expansion are not expected to cause archaeological conflicts.
- The potential relocation of waste management facilities has potential for indirect effects on heritage resources, but the chances of direct impacts are reduced by waste management facilities being on the other side of the road. As well, the potential for impact could be mitigated by installation of fencing along the east side of the road.
- The existing Doris North Mine management and monitoring programs include the geographical area and activities associated with the proposed amendments in this package.

- The proposed ore storage pads lie directly north of Doris Camp. There was no surface water in this area and therefore no fish or fish habitat present.
- The proposed waste rock and ore storage pad extensions will be placed in an area of Eriophorum Tussock Meadow. The Eriophorum Tussock Meadow ecosystem is the most common ecosystem in the study area, and is not preferentially used by wildlife because the sedges offer poor nutrition compared to other vegetation types.
- The expansion of the Roberts Bay laydown area will cover an additional 4.0 ha. This area is composed primarily of lowland vegetation types (68%) and upland vegetation (31%) with a small component of marine and beach communities (1%). Each of these communities is relatively common within the local and regional study areas. These areas were mapped using Terrestrial Ecosystem Mapping from aerial photos and field studies during 1998 and 2010. The majority of the footprint expansion is composed of Wet Meadow (56%) and Dryas Herb Mat (29%). These two ecosystem types are the most common types in the coastal area near Roberts Bay. Wet Meadow is also the third most common vegetation type in the Local Study Area, while Dryas Herb Mat is the fourth most common. None of the landforms represent rare ecosystems, and no rare plants were observed during field studies to support vegetation mapping. Given the small area of relatively common ecosystem affected, no additional impacts associated with these expansions are anticipated.
- The proposed expansion to the Roberts Bay laydown area involves two sections, one to the east, near the airstrip and another, smaller area to the west near the jetty. There are no water bodies or fish habitat in the western section. There is a single stream in the eastern Roberts Bay laydown area, flowing from the high ground near the airstrip north into Roberts Bay. Fish were found in the lower reaches of this stream, about 700 m from the proposed expansion area. However, the stream flows subsurface to the north of the laydown expansion area and fish do not appear to access the upper reaches near the proposed expansion area.
- Any additional potable water use withdrawal from Windy Lake will be within the normal variation of Windy Lake's storage capacity, will continue meet DFO Operational Statements for Water Withdrawals, and is not expected to cause any significant downstream effects.
- The Mine has been designed such that the water quality in Roberts Bay will meet CCME guidelines for the protection of marine and estuarine aquatic life for the duration of the operation of the TIA.
- An evaluation of the potential effects of discharging compliant TIA water into Roberts Bay resulted in no expected significant adverse effects on water quality, sediment quality, marine fish, marine fish habitat, marine wildlife, or caribou.
- For employment and economy, the proposed amendment to extend the mine life does change the predicted socio-economic impacts of the undertaking in that the total benefits are predicted to increase. There does remain the potential for there to be an adverse effect on other community employers, such as local government, if the labour demands of the Project result in a shortage of skilled workers resulting in an inability to fill certain positions; however, the effect is predicted to remain minor and be increasingly alleviated over the longer term. The mitigation measures in place for the Doris North Project remain appropriate to address adverse effects and enhance the positive effects on employment and income, education and training, and business opportunities. The residual effects assessment conclusions remain valid.
- With respect to community services and infrastructure, minimal adverse effects are predicted on health care services, community well-being and delivery of social services, and public safety and protection services. The mitigation measures in place for the Doris North Project are

appropriate to address the predicted adverse effects on health services, social services, and safety and protection services. The residual effects assessment conclusions remain valid.

- It is predicted that the adverse socio-economic effects based on the revised Project plan, as addressed in the amendment package, will be able to be managed with the mitigation and monitoring as previously identified (Miramar 2005). The extension of the mine life and mining rate are predicted to increase the socio-economic benefits of the project because of the increase in employment, income, and business activity.

8. Reclamation and Closure

8. Reclamation and Closure

The amendment will result in changes to site infrastructure which in turn will have an influence on the estimated cost of reclamation and closure. Appendix 15 provides further details on these changes which are summarized below.

The following are the key changes to the site infrastructure components that will have implications on the reclamation and closure cost:

- Doris Central Vent Raise Pad and Access Road (and a similar installation for Dorris Connector, if needed);
- Pad U Waste Rock Expansion Area;
- Pad T Ore Storage Expansion Area;
- Roberts Bay Laydown Expansions; and
- Post-operations water management at the Doris North site (including decommissioning of ocean discharge pipeline).

In addition, water management changes are required during the post-closure period at the Doris North site to enable water quality in the TIA to meet target closure criteria. This includes:

- Pumping of groundwater from the underground mine workings to the TIA for the first 6 months of the post-operations period.
- Routing of accumulated runoff from the Pad U Pollution Pond into the Pollution Control Pond south of Pad I, and from there to the TIA. It is anticipated that this routing will remain until required target closure criteria for the Pollution Control Pond has been achieved at which point both the Pad U pond and the Pollution Control Pond will be breached to allow natural return of runoff from this area into Doris Lake.
- Annual pumping of approximately 480,000 m3 of water from Doris Lake into the TIA during the winter period (November and December). Current water balance modelling predictions suggest that target water quality closure criteria can be met after 7 years of flushing the TIA with annual water inflows of the indicated volume from Doris Lake.
- Pumping of water from the TIA via a pipeline to a diffuser located on the floor of Roberts Bay. It is anticipated that water will be pumped for the duration of the post-closure period (approximately 9 years) at a rate of 120 L/s during the annual open water season (June to October). Once target water quality closure criteria for the TIA have been achieved, the North Dam of the TIA will be breached to allow natural outflow of water from the impoundment area into the Doris Creek catchment.

The additional cost of reclamation and closure above and beyond that for the currently permitted Doris North Mine as a result of the proposed Amendment is estimated at $4.23 million at the end of commercial operations (i.e., peak liability).

The approved 2012 Closure and Reclamation Plan (SRK 2012) included an estimate of the closure and reclamation cost for the Doris North Mine in its current state. This Plan is currently being updated by

TMAC, as required by the current licence and will present a schedule of estimated costs of closure and reclamation over time as mining progresses.

TMAC currently posts reclamation security with AANDC (pursuant to the Type A Water Licence), KIA (pursuant to the Commercial Lease) and DFO (pursuant to the Authorizations issued pursuant to the Fisheries Act). Collectively, the financial security posted with these groups exceeds the value of the closure and reclamation cost estimated contained in the approved 2012 Closure and Reclamation Plan. As part of the amendment process, TMAC wishes to discuss with KIA and the NWB options to address concerns this overbonding of the Doris North Project. In TMAC's view, resolution of this issue is essential to project development.

9. Monitoring and Management Plans

9. Monitoring and Management Plans

The Mine has numerous existing management and monitoring plans that will encompass the proposed amendment activities. The following paragraphs provide an overview of the plans that will apply to the changes, or require revision in order to proceed with the proposed changes. Where updates to existing plans are triggered by the changes, TMAC proposes to submit updated plans within 60 days in advance of execution of any approved activities.

An updated Waste Rock Ore Management Plan will be prepared and submitted to the Nunavut Water Board before TMAC proceeds with the new Mine plan. TMAC also anticipates some changes to the monitoring of process water inputs (to assess model validity and anticipate changes), groundwater flow and chemistry inputs. The construction of the waste rock storage, ore storage, and Roberts Bay laydown areas may result in additional monitoring locations. Any new monitoring locations will be part of the site seepage/runoff monitoring program, which will be updated. Monitoring locations will be identified in consultation with the AANDC inspector.

TMAC is proposing to expand the Aquatic Effects Monitoring Program (AEMP) in the marine environment to include the geographical area of the proposed diffuser and potential area of influence of the compliant TIA water in Roberts Bay. TMAC proposes to add some radial CTD (an oceanographic instrument that measures conductivity, temperature, and depth) stations. An additional marine reference site is also proposed. There are currently two AEMP monitoring stations in Roberts Bay, and a marine reference site in Reference Bay. The proposed new AEMP monitoring locations are adjacent to the proposed diffuser location (100 m) and about 2 km seaward of the proposed diffuser location, halfway between the southern shoreline of Roberts Bay and Melville Sound. The final marine AEMP sites will be determined in consultation with Environment Canada.

The AEMP monitoring will determine whether the water quality in Roberts Bay is remaining below marine CCME guidelines, whether dissolved oxygen concentrations remain above marine CCME guidelines, whether phytoplankton biomass levels are being influenced by nutrient input, whether sediment quality or benthic communities are being influenced by the TIA water, and whether the discharge of TIA water is causing any changes in marine bivalve metal concentrations. If results from the AEMP show that adverse environmental changes are occurring, TMAC can implement adaptive management measures that could potentially change the quality, quantity, or timing of the compliant TIA discharge to Roberts Bay. Examples of potential adaptive management measures are set out in Appendix 4.

With respect to fish habitat, as part of ensuring that there is no net loss of productive fish habitat associated with the presence of the subsea pipeline in Roberts Bay, it is proposed TMAC will conduct a pipeline/ballast utilization monitoring program to confirm the utility of the concrete ballast weights and the constructed compensation shoals in providing fish habitat. The monitoring of the concrete ballast weights will occur 1 year following installation of the pipe, and again 3 years post-installation. Monitoring of the compensation shoals (and control area) will occur 1 year following their construction, and again 2, 3 and 5 years post-installation. If the monitoring shows that the ballasts/shoals are not being colonized and used as fish habitat, TMAC could adapt by discussing results with DFO and determining whether the monitoring program could be modified, and/or additional mitigation measures should be considered. Appendix 5 provides further details on the No Net Loss monitoring program.

The Hydrology Monitoring Program in the area includes locations within the Doris Watershed, Windy Watershed, Roberts Watershed, and reference watersheds. Hydrometric monitoring has included two locations within the Windy Watershed; one station at the outlet of Windy Lake, and one station at the outlet of Glenn Lake. The continued monitoring of Windy Outflow can be used to ensure that there are no significant water level decreases that could affect fish habitat in Windy Outflow during dry years.

Reports have been filed with NIRB under the Wildlife Mitigation and Monitoring Program (WMMP) since 2007. This program has undergone refinements in recent years based on discussions between HBML, NIRB, the Canadian Wildlife Service (CWS), and the Government of Nunavut, Department of Environment. The geographical areas associated with the proposed amendments are included in the monitoring area covered in the WMMP. The WMMP includes the monitoring of caribou, breeding birds, raptors, waterfowl, seabirds, grizzly bears, and wolverine. Monitoring evaluates the population and breeding success of wildlife populations adjacent to the mine site and at a greater distance (i.e., in reference areas). Mitigation for wildlife will include preferentially scheduling construction activities during the least risk work timing windows. Wildlife monitoring activities will occur during construction activities that have the potential to cause negative impacts on wildlife or their habitat. Pre-construction surveys will also be required in the nesting season to ensure that no incidental wildlife or nests were present.

The Noise Abatement Plan is closely associated with the WMMP, as it includes the noise abatement mitigation measures to reduce or eliminate the potential effects of noise on wildlife. Again, this plan encompasses all of the current Doris North Mine activities, and the activities associated with the proposed amendments will be covered in the existing Noise Abatement Plan.

The Socio-economic Monitoring Program for the Doris North Mine defines a number of indicators that have been selected based on the impact predictions and mitigation measures in the FEIS. For each social and economic indicator, specific measures, data requirements, and data sources have been identified, and data collection and reporting is on-going. The Socio-economic Monitoring Program allows for both early detection of adverse effects on valued socio-economic components (VSECs) and reporting of impact and benefit objectives for the Project. The Socio-economic Monitoring Committee (SEMC), which includes members from key government and stakeholder agencies, provides additional oversight to help ensure that on an on-going basis the monitoring program meets its objectives.

Extension of the Doris North Mine life is not expected to result in the need to change the monitoring program given that there are no material differences in the nature of the predicted residual effects.

The expansion of the wastewater treatment plant (WWTP) to accomodate additional workers will not require any additional monitoring sites. Monitoring sites are already in place for the area where treated effluent is currently being discharged.

In addition to the above programs and plans, the following plans are also in place for the Doris North Mine:

- Oil Pollution Prevention Plan/Oil Pollution Emergency Plan;
- Emergency Response Plan;
- Hazardous Waste Management Plan;
- Incinerator Management Plan;
- Doris North Landfarm Management and Monitoring Plan;

- Spill Contingency Plan;
- Quality Assurance and Quality Control Plan;
- Hope Bay Quarry Monitoring Plan; and
- Doris North Infrastructure Project Management Plan.

Although some of these will require revision in order to reflect site layout changes, it is not anticipated that significant changes to these are required as a result of the proposed changes to the mine.

References

References

HBML 2011. *Phase 2 Hope Bay Belt Project Proposal: Madrid, Patch, Boston Mining Districts*. Hope Bay Mining Ltd. December 2011.

Kleepsies, P., and B. Mercer. 2001. *Naartok core – zone recognition*. Memorandum prepared for Adrian Fleming, Dean McDonald, Ted Mahoney and Rob McLeod of the Hope Bay Joint Venture. July 19, 2001.

Miramar 2005. Final Environmental Impact Statement. *Doris North Project, Nunavut, Canada*. Miramar Hope Bay Ltd. October 28, 2005.

Price, W.A. 1997. *Guidelines and recommended methods for the prediction of metal leaching and acid rock drainage at minesites in British Columbia,* DRAFT. British Columbia Ministry of Employment and Investment, Victoria, BC. April 1997.

Rescan. 2001. 2000 *Supplemental environmental baseline data report, Hope Bay Belt Project, Nunavut, Canada*. Report prepared for Hope Bay Joint Venture by Rescan Environmental Services Ltd., Vancouver, BC. March 2001.

SRK. 2005. *Water cover design for Tail Lake*. Technical memorandum prepared for Miramar Hope Bay Ltd. by SRK Consulting (Canada) Inc., Vancouver, BC. September 2005.

SRK. 2010. *Hope Bay Project: Doris North waste rock and ore management plan*. Technical report prepared for Hope Bay Mining Ltd. by SRK Consultants (Canada) Inc., Vancouver, BC. December 2010.

SRK. 2012. *Doris North Closure and Reclamation Plan, Doris North Project, Hope Bay, Nunavut*. August 2012.