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FISHERIES AND OCEANS CANADA

Final Written Submission to the Nunavut Water Board (NWB)

Doris North Gold Mine Project

Water Licence 2AM-DOH1323 Amendment Application

August 2, 2016
DFO File No.: 02-HCAA-CA7-00117

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EXECUTIVE SUMMARY

Fisheries and Oceans Canada (DFO) has reviewed TMAC Resources Inc.'s (TMAC) Doris North Gold Mine Project (Project) Water Licence 2AM-DOH1323 Amendment Application pursuant to the *Fisheries Act*. DFO's Fisheries Protection Program will determine what aspects of the proposal could impact fish and fish habitat, and work with the Proponent to avoid, mitigate and offset impacts.

DFO's comments are based on our departmental mandate under the *Fisheries Act,* specifically the management and protection of fish, marine mammals and their habitat. DFO's primary focus in reviewing proposed developments in and around fisheries waters is to ensure that works, undertakings and activities are conducted in such a way that the proponents are in compliance with the applicable provisions of the *Fisheries Act.*

The fisheries protection provisions of the *Fisheries Act (2013),* specifically subsection 35(1), state that "*No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery or to fish that support such a fishery*." However, under paragraph 35(2)(b) of the *Fisheries Act*, the Minister of Fisheries and Oceans may issue an Authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in *serious harm to fish*. *Serious harm to fish* is defined in section 2 of this Act as the death of fish, or permanent alteration to or destruction of fish habitat.

DFO is providing the following Final Written Submission in response to the Nunavut Water Board (NWB) correspondence dated July 7, 2016.

In summary the major issues identified were:

<u>Impacts to the Aquatic Environment</u>

Proposed infrastructure and Project works, undertakings and activities, including a discharge pipeline into Roberts Bay, water loss from Doris Lake as a result of underground mining operations and the installation of water crossings over fish-bearing streams have the potential to cause *serious harm to fish* as defined by the *Fisheries Act.* DFO has determined that *serious harm to fish* is not expected to be associated with most of these Project components as currently proposed based on Project design, implementation of mitigation, and monitoring to ensure adaptive management is implemented. TMAC has committed to monitoring of water and ice levels in Doris Lake as part of the Aquatic Effects Monitoring Program. Additional fish baseline information is needed before the extent of *serious harm to fish* in watercourses downstream of Doris Lake can be evaluated, and a determination of authorization requirements and required offsetting is determined. TMAC has committed to providing this information to DFO during the regulatory phase of the Project in 2016.

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ᐃᓕᖅᑎᐅᑕᓪᓗᓵᒃᑯᑦ ᑲᓇᑕᒥ (DFO) ᖃᑎᖅᑭᓯᒪᔪᑦ TMAC Resources Inc.'s (TMAC) Doris North ᔫᓗᓂᑦ ᐅᓴᖅᓂᐊᓂᖅ ᐱᓕᓚᐊᖅ (ᐱᓕᓚᐊᖅ) ᐃᒥᖏᑦ ᓪᐃᓴᖅᓯ 2AM-DOH1323 ᐊᖅᑭᑎᐊᖅᑕᒃᐅᓂᖓᓚᒃ ᐱᔪᒪᓴᑎᐅᔪᖅ ᒪᓕᓪᑐᔫ *ᐃᖃᓗᓕᓚᓂᖏᑦ ᒪᓕᓚᓴᖅ.* ᐃᒪᖅᑎᐅᑕᓪᓗᓵᒃᑯᓯᐃᖃᓗᓕᓚᓂᖏᑦ ᓴᐳᓴᓂᖏᑦ ᐱᓕᓚᐊᖅ ᓇᓗᓇᐃᖅᑯᓂᐊᖅᑐᑦ ᖃᐅᔨᐃᑐᑦ ᑐᓴᐃᓂᑐᑦ ᑐᓵᐃᓂᖃᑭᓇᖅᓯᒪᓂᒃ ᐃᖃᓗᓐᓂᑦ ᐊᒻᒪ ᐃᖃᓗᐃᑦ ᓇᔪᖃᑦᑕᖅᑕᖓᓂᑦ, ᐊᒻᒪ ᐃᖃᒃᑯᓇᐃᓴᖓᓂᐊᖅᑐᖅ <ᕿᓚᓴᑦᑕᐅᖓᓪᓕᖅᑐᓂ, ᐊᖏᑕᓗᐊᖅᑎᑕᐅᖓᓪᓕᖅᑐᓂᑦ ᐊᒻᒪ ᐊᑭᓱᓴᖅᑎᓪᓗᑎᑦ ᑐᓴᐃᓂᑦᑐᖅᓯᒪᔪᑦ.

ᐃᓕᖅᑎᐅᑕᓪᓗᓵᒃᑯᑦ ᐅᖃᖅᓱᖏᑦ ᑐᓂᓯᔪᑦ ᐱᓕᓚᖏᑕ ᑲᒪᒋᔭᖏᑕ ᐱᖓᓱᓚᐊᖅᑕᖏᖅᑐᓂᒃ ᓴᖅᑭᑕᐅᓱᒪᔪᑦ ᐊᒋᔪᑦ *ᐃᖃᓗᓕᓚᓂᓕᔪᑦ ᐱᖃᓐᓇᖅ,* ᐱᓗᐊᖅᑐᑎᓪᓗ ᐊᐅᓚᑕᐅᓂᖏᑦ ᓴᐳᒥᖅᐅᓂᖏᑦᓗ ᐃᖃᓗᓐᓂᑦ, ᐳᐃᓴᑦ ᓇᔪᖃᑦᑕᖏᑦᓗ ᐃᒪᓕᐃᑦ. Ċᐅᓯᐊ ᐃᓕᖅᑎᐅᑕᓪᓗᓵᒃᑯᑦ ᐄᖏᓪᓛᑎᓗᓚᖏᖅᓯ ᖃᑎᖅᑭᐃᓂᒥᒃᑲ ᐊᑐᐅᑕᓂᐅᕐᓚᓂᒃ ᖃᐅᔨᒪᔭᑦ ᐃᓗᐊᔪᓪᓗ ᐃᖃᓗᖃᖅᑐᑦ ᐃᓕᖅᑕᖏᑦ ᐅᓴᖅᑲᒪᓗᑦ ᐃᓕᓴᐅᑎᓪᓗ ᐃᓕᖅᑕᖏᑦ ᐊᑐᐅᑕᓂᐅᕐᓚᓂᒃ ᐊᑐᖅᑐᑦ

AULAPKAIYINI NAITTUQ

Iqaluliriyit Taryumiutaliriyit Kanatami (DFO) qimilruqhimayangit TMAC Resources Inc. (TMAC) Doris Nuat Kulu Uyaraqtarvik Havaariyakhaat (Havaanga) Imaup Laisikhaat 2AM-DOH1323 Akunanngat allannguqtiqtaaqhimayuq Atuqtakhait malikhimayangit *Iqaluliqiniq Maligaq*. DFO'p Imarmiutaliriniq Hapummiyangit Piliriakhaq ihumaliuqtakhait qanuq pivangniarumik haffumani tukhiutauhimayangit aktuumilaaqhimayangit iqalungnut iqalut nayuqpauhingillu, havaqatigilaaqhugu Havaakhaqhiuqtunut hiamittailinahuariangat, ingattaqhittaililunilu ilaginahuaqtaililgulu akturningit.

DFO-kut titiraqhimayangit piliurhimayuq havakvipta maliganganit titiraqhimayumi *Iqalukhiuqtut Maliganganit* ukuatluat munarininnga hukhaungiqtailininngitlu Iqaluit, imarmiutat nayugangitlu. DFO-kut ihumagilluaqtaat ihivriuriami piliurumayanginnit iqalukhiurvikmi hanianillu imangit taimaa naunairiami havaktuq, piyangit hulilukaarutingitlu havaktauyut taimaa uyarakhiurviunahuanit maliktaa maliktakhanginni *Iqalukhiuqtut Maligangani*.

Hamna imarmiuttaliqiniq hapummiyait ilaliutauyut haffumani *Imarmiuttaliqiniq Maligaq (2013),* hamna ilainnaatigut 35(1), kiuhimayaat hamna "*Inuit havaktukhaunngittut, huliyakhaunngittullu taimaa aanniqtailiyakhangillu iqalungnut ilagiyangit maniliurahuaqtut, hulinahuaqtunullu Nunaqaqaaqhimayut imarmiuttat iqalungnut ikayuqhimayait imarmiuttaliqinikkut."* Kihimi, Titiraqhimayumi 35(2)(b) *Iqalukhiurniqmut Maligangani*, Ministauyuq Imarmiutaliriyiinut tunittaaqtuq angiqtumik maliktakhaqarluni qanuriliuqtaaqtumiklu pitjutauyuq havaakhanut, havaarigiami hulilukaarutigiamiluuniit pipkaitjutiniaruknaqhiyuq *hukhaungiqtirutiyuq iqaluknut*. *Aanniaqhimaryuaqtangit iqalungnut* tukiqaqhuni uvani ilainnaa 2 haffumani Maligarmi tuqutiqhimayut iqalungnut, taimaa aallannguqtiqtaunnirumiluuniit ahiruqtiqtaugumik uumani iqaluk nayuqpauhingnit.

DFO ilaliutigiyait hamna titiraqhimayut Kinguani Titirariiqhimayuq Turaarvikhaat kiuyauhimayuq ukunanngat Nunavut Imaliqiniq Katimayiit (NWB) titiqqait atiliuqhimayuq Taaqhivalirvik 7, 2016 mi.

Uvani nainaaqhimayangit akihautilluaqaqtumik naunaiyaiyangit:

<u>Aktuqtaunikkut ukunanngat Imarmiuttat Avatingit</u>

Tukhiutauhimayut igluliurahuarutikhanut Havaariyangillu havaat, amirivlugillu hulidjutikhait, ilaliutauvlunilu ahivaiyaiyut tuqhualik iluani Roberts Bay mi, imaiyaqtauyuq hamanngat Doris Tahianit taimailinniqtuq nunaup iluani uyaraqtarviuyuq aulatittiyauvluni unalu illiriyauhimayuq imarmik ikaaqhimaynit iqalungnirmit qurluarnirmi taimaa *hivuuranaqhivlutik iqalungnut* naunaiyaqhimayut ukunanngat *Iqalungnut Maligaq.* DFO ihumaliuqhimayangit taamna *ulurianaqtumik iqalungnut hivuuralattiyut* naaguhiyaunngittuni ilagiyangit amihuuyut hapkunani Havaangit ilagiyait tadja tukhiutauhimayait tiliugaitigut Havaanut, pilimmakhainirnit ingattaqhittailiyait, amiqhaivlugillu aallannguqtaulaaqtumik amiqhaiyangit pilimmakhaqtaaqhimayuq. TMAC angiqhimayangit amiqhiyakhaat imaup hikut uuktuutait iluani Doris Tahianit ilagiyangit Imarmiuttat Atuliqtaunikkut Amiriyauhimayut Piliriakhait. Ilagiyauyut iqalut pigiarniani qanurinninga naunaitkutaa piyumayaukpat aktuqtautinnagu imaatut *hivuuralattigumik iqalungnut* iluani imaup ikirahait taununga kuugarnut uvani Doris Tahia ihivriuqtaulaaqhutik, ihumaliurnaqhunilu aulattitinirnut kiuvikhait unalu kiugialik avvariirialik ihumaliuqhimayait. TMAC angiqhimayangit ikayuqhugit ilittuqhainikhat DFO nut maliguarutiunahuarumik ilangani Havaanut uvani 2016 mi.

1.0 INTRODUCTION

This technical review submission summarizes Fisheries and Oceans Canada's (DFO) assessment and recommendations concerning the proposed Water Licence Amendment Application for the Doris North Gold Mine project (Project). The purpose of this submission is to provide expert advice to the Nunavut Water Board (NWB) to assist in their assessment of potential environmental impacts associated with the Project.

As directed by the NWB in their letter dated July 7, 2016, this submission focuses on major issues that each Party intends to address at the Public Hearing, including whether Parties agree/disagree with the conclusions presented in the Application, whether conclusions in the Application are supported by the analysis, an assessment of the quality and the presentation of the information presented in the Application including methodology and proposed monitoring measures, and also recommendations to the Nunavut Impact Review Board (NIRB) regarding each issue.

2.0 MANDATE, RELEVANT LEGISLATION AND POLICY

The *Constitution Act* (1982) provides the federal government with exclusive authority for coastal and inland fisheries within Canada's territorial boundaries. DFO exercises this power through, the administration of the *Fisheries Act* and some aspects of the *Species at Risk Act* (SARA). Under the *Fisheries Act*, DFO is responsible for the management, protection and conservation of fish (which include marine mammals as defined by the *Fisheries Act*) and their habitats. The Minister of Fisheries and Oceans is one of the competent ministers under the SARA.

In general, the Fisheries Protection Program of DFO undertakes the review of proposed developments in and around fisheries waters to ensure that works, undertakings and activities are conducted in such a way that the proponents are in compliance with the applicable provisions of the *Fisheries Act.*

The mandate of the Fisheries Protection Program is to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. Subsection 35 (1) of the fisheries protection provisions of the *Fisheries Act* states that "No person shall carry on any work, undertaking or activity that results in *serious harm to fish* that are part of a commercial, recreational, or Aboriginal fishery or to fish that support such a fishery."

Fisheries and Oceans Canada interprets *serious harm to fish* as:

-the **death of fish**;

-a **permanent alteration** to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes;

-the **destruction of fish habitat** of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes.

However, under paragraph 35(2)(b) of the *Fisheries Act*, the Minister of Fisheries and Oceans may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in *serious harm to fish*, subject to the consideration of the four factors in Section 6 of the *Fisheries Act*:

1. The contribution of the relevant fish to the ongoing productivity of commercial, recreational or Aboriginal fisheries;
2. Fisheries management objectives;
3. Whether there are measures and standards to avoid, mitigate or offset *serious harm to fish* that are part of a commercial, recreational or Aboriginal fishery, or that support such a fishery; and
4. The public interest.

The Fisheries Protection Program is guided by the "Fisheries Protection Policy Statement" (October 2013), the intent of which is to provide guidance to Canadians to ensure that they are complying with the *Fisheries Act*. It strengthens the Government's ability to address key threats to the productivity and sustainability of our fisheries, through standards and guidelines to avoid, mitigate and offset impacts to fisheries and to ensure compliance with these requirements.

The "Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting" (November 2013) provides guidance on undertaking effective measures to offset *serious harm to fish* that are part of or that support a commercial, recreational or Aboriginal fishery, consistent with the fisheries protection provisions of the *Fisheries Act*. The objective of offsetting is to counterbalance unavoidable residual *serious harm to fish* and the loss of fisheries productivity resulting from a project.

The *Species at Risk Act* is intended to prevent Canadian indigenous species, subspecies and distinct populations of wildlife from being extirpated or becoming extinct; to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity; and to manage species of special concern to prevent them from becoming endangered or threatened. The Minister of Fisheries and Oceans is the competent minister for listed aquatic species that are fish (as defined in section 2 of the *Fisheries Act*) or marine plants (as defined in section 47 of the *Fisheries Act*).

Environment Canada (EC) is responsible for the administration and enforcement of the pollution prevention provisions of the *Fisheries Act* on behalf of DFO (section 34 and sections (36-42)).

For more information, see: http://www.dfo-mpo.gc.ca/pnw-ppe/pol/index-eng.html

3.0 TECHNICAL REVIEW COMMENTS

3.1 Mitigation Measures

Review Comment No.	***3.1.1 Doris Lake and Outflow Water Levels***
Subject/Topic	**Reduction in Water Levels in Doris Lake**
References	Package 2: Project Description (June 2015): p. v Package 4: Identification of Potential Environmental Effects and Proposed Mitigation (June 2015): various pages as indicated below Proponent Responses to Technical Comments, Nunavut Impact Review Board (p. 6, 14; Appendix B: DFO 3.2.1-1, p. 14, 25). Table provided to DFO during Nunavut Impact Review Board Technical Meeting (January 27, 2016). 2AM-DOH1323 Commitments List, Nunavut Water Board, Updated June 27, 2016 DFO Final Written Submission (Project Certificate Reconsideration, Nunavut Impact Review Board, March 14, 2016) TMAC Resources Hope Bay Project: Doris Aquatic Effects Monitoring Plan (June 2016) DFO Review of Aquatic Effects Monitoring Plan, submitted to the Nunavut Water Board (June 10, 2016)
Summary	The proposed amendments to the Project will result in additional water losses from Doris Lake. TMAC notes that "the maximum groundwater inflow encountered at full mine development under Doris Lake is expected to be 3,000 m^3/day. The modelling indicates a risk that some of the water entering the mine will originate from Doris Lake, and could infiltrate at a rate that could cause reductions in Doris Lake water levels. Based on modelling and review of baseline data, the changes to Doris Lake are considered to be mostly within the natural variation of flows in the system. Should changes occur outside of natural variation, TMAC will offset for any negative effects to fisheries." (Package 2, p. v)
Importance of issue to impact assessment	DFO has reviewed the information provided by the Proponent in the Amendment Application, responses to Technical Comments and the

	Table provided during the Technical Meeting and determined that there is unlikely to be negative impacts to fish and fish habitat in Doris Lake as a result of changes in lake water levels. DFO noted in the Technical Comments submitted to the Nunavut Impact Review Board on January 8, 2016, and at the Technical Meeting, January 26-27, 2016, that it will be important to monitor the extent to which water loss occurs in Doris Lake as a result of the Project, to verify that there are no negative impacts to fish and fish habitat during the operational phase of the Project, and that this monitoring could occur within the Aquatic Monitoring Framework.
Detailed Review Comment	**Gap/Issue**: TMAC has stated that the modelling predictions for the volumes lost from Doris Lake into the underground mine may be more than double the volumes allocated for withdrawal from Doris Lake under its Water Licence: "Annual withdrawal of 480,000 m^3 from Doris Lake is currently permitted (Type A Water Licence 2AM-DOH1323). … [it is] estimated that in addition, loss of water from Doris Lake into the underground workings could be up to 610,000 m^3/year at its peak." (Package 4, p 2-20) In earlier Technical Comments, DFO previously noted that total annual withdrawals, assuming maximum withdrawal under the Water Licence and including the additional losses from Doris Lake, come to approximately 4% of the total lake volume. "Doris Lake…has a surface area of 337.8 ha, a volume of 27,275,094 m^3, an average depth of 8.1 m." (Package 4, p. 2-11). Between 2004 and 2014, the mean water level fluctuation for Doris Lake was 0.54 m, with a minimum of 0.29 m and a maximum of 0.74 m over various time periods (Package 4, Table 2.3-2). The Proponent has provided additional information evaluating the potential impacts of water loss in Doris Lake (a decrease in depth of up to 0.23 m) in responses to DFO's Technical Comments, received in January 2016. "The results demonstrate that the mine drawdown outside of the natural range of variability, up to the maximum predicted levels is unlikely to affect lake trout or white fish" (Response to Technical Comments, p. 6). This was attributed to the presence of "extensive good-quality spawning habitats for Lake Trout and Lake Whitefish)" at depths between 4 and 10 m, beyond which oxygen concentrations are expected to be limiting (Response to Technical Comments, Appendix B, p. 14, 25). More specifically, in a table provided to DFO at the Nunavut Impact Review Board Technical Meeting (January 26-27, 2016; Commitments List, No. 15), the dewatered area of Doris Lake under maximum

	predicted water level reduction (i.e., 0.23 m below the natural range of variation, to a depth of 2.97 m) will expose approximately 49 m^2 of Lake Trout spawning habitat, 53 m^2 of Lake Whitefish spawning habitat, and 237 m^2 of Cisco spawning habitat due to ice and/or desiccation. Although the quantity of spawning habitat at all depths of Doris Lake could not be computed with available data, the total estimated area of shallow water (1—4 m depth) with potential low- and high-quality spawning habitat in Doris Lake exceeds 213,000 m^2 for Lake Trout, 260,000 m^2 for Lake Whitefish and 983,467 m^2 for Cisco. **Position and Reasons**: DFO has determined that water loss within Doris Lake up to the maximum predicted levels is not expected to result in localized effects to the fish populations that would require authorization under the *Fisheries Act*. DFO recommended in the Final Written Submission to the Nunavut Impact Review Board (March 14, 2016) and the Public Hearing for the reconsideration of Project Certificate 003 (April 12-14, 2016) that TMAC should revise the Aquatic Monitoring Framework to include monitoring of water levels in Doris Lake and outflows, as well as thresholds beyond which localized effects on fish populations and fish habitat may occur and must be evaluated. TMAC committed to this recommendation (Commitments List, No. 16). DFO participated in Working Group meetings for the Aquatic Monitoring Framework and the Aquatic Effects Monitoring Plan (AEMP) associated with the Doris North Project on March 15 and June 6, 2016. DFO noted to the Nunavut Water Board in a review of the AEMP (June 10, 2016), that the Plan fully addressed DFO's recommendations.
Recommendation/Request	**3.1.1.1** This issue has been resolved. DFO will continue to participate in working groups and reviews associated with the Doris North Aquatic Monitoring Framework and Aquatic Effects Monitoring Plan to ensure that impacts to fish and fish habitat as a result of a reduction of water levels in Doris Lake and outflows are monitored as recommended, and that appropriate actions to avoid and mitigate *serious harm to fish* are taken by the proponent.

Review Comment No.	***3.1.2 Doris Lake and Outflow Water Levels***
Subject/Topic	**Reduction in Water Levels Downstream of Doris Lake**
References	Package 4: Identification of Potential Environmental Effects and Proposed Mitigation (June 2015): various pages as indicated below Proponent Responses to Technical Comments, Nunavut Impact Review

	Board (p. 6, 14; Appendix B: DFO 3.2.1-1, p. 14, 25; DFO 3.2.4-1, p. 13, 16). 2AM-DOH1323 Commitments List, Nunavut Water Board, Updated June 27, 2016
Summary	The proposed amendments to the Project will result in additional water losses from Doris Lake that will affect discharge rates, timing and flow duration in watercourses downstream of Doris Lake.
Importance of issue to impact assessment	It is important to understand the impacts on fish and fish habitat which may result from the reductions in water levels in the watercourses and water bodies downstream of Doris Lake.
Detailed Review Comment	**Gap/Issue**: TMAC notes that that water loss will decrease outflow from Doris Lake by an average 13.7 % (Package 4, p. 2-24). "As a result of the winter water withdrawal, onset of Doris Lake outflow will be delayed by 10 days compared to baseline conditions." (Package 4, p. 2-21 and Table 2.5-1). Furthermore, "the total number of flow days in Doris Lake Outflow and Creek will decrease by 15 days (baseline flow days = 131, project = 116." (p. 2-26). TMAC notes that water reduction in Doris Lake will reduce available rearing habitat in water courses downstream (Doris Outflow and Creek), used by Arctic Char, Lake Trout and Ninespine Stickleback by 11% (on average years) and up to a maximum of 18% (for dry years) for the six years during which the water loss during mining may persist." (Package 4, p. 2-27) "Effects of water loss from Doris Lake are diminished downstream of Little Roberts Lake" (Table 2.5-2)… "This represents a potential reduction in fish passage… and access to habitats… by Arctic Char, Lake Trout by less than 1% (on average) and up to a maximum of 5% (for dry years) for the six years during which the water loss during mining may persist." (Package 4, p. 2-28). Hydrological modeling has indicated that flow reductions in Doris Creek are expected to be largest during freshet, but outside of freshet, will be within 5% of baseline values in most circumstances (Response to Technical Comments, Appendix B, 3.2.4-1, p. 13). Flow reductions in Little Roberts Outflow are estimated to be small, and within 5% of baseline values (Response to Technical Comments, Appendix B, 3.2.4-1, p. 16).

	Position and Reasons: TMAC noted in the Application that more information was needed and would be obtained. "To quantify the amount of serious harm required to be offset (i.e., up to 18% reduction in flow days and a 27.9% reduction in mean annual discharge), additional modeling and characterization of Doris Lake Outflow and Doris Creek are required." (Package 4, p. 2-27). Hydrological modeling was provided in Response to Technical Comments, Appendix B, 3.2.4-1. TMAC has however noted that "the fisheries component of the Doris Creek and Little Roberts Outflow Fisheries Assessment could not be completed in 2015 due to unseasonably high stream discharge levels. This program component has been rescheduled to summer 2016" (Response to Technical Comments, Appendix B, 3.2.1-1, p. 29). DFO agrees with TMAC that additional studies are needed to determine whether there will be localized impacts to fish populations and fish habitat in watercourses downstream of Doris Lake that must be Authorized and offset. TMAC has committed to this action, with a report to be submitted by Q4 of 2016 (Commitments List, No. 17).
Recommendation/Request	**3.1.2.1** This issue has been resolved. DFO recommends that TMAC conduct the planned baseline studies. This information will be needed to determine if there will be localized effects on fish populations and fish habitat as a result of the proposed Project that cannot be avoided or mitigated, and must be Authorized and offset according to the applicable provisions of the *Fisheries Act*. These may be provided to DFO during the regulatory phase of the proposed Project.

Review Comment No.	***3.1.3 Roads and Water Crossings***
Subject/Topic	**Roads – Water Crossings**
References	Package 2: Project Description (June 2015): p. v Package 4: Identification of Potential Environmental Effects and Proposed Mitigation (June 2015): p. 2-24 Proponent Responses to Technical Comments, Nunavut Impact Review Board (p. 23; Appendix B: DFO 3.4.1-1, p. 15).
Summary	"An additional 550 m of road and pipe length will extend to the northwest of the existing jetty and laydown area." (Package 2, p. v)

	Three new roads are included in the proposed Project, including the Doris Connector Vent Raise Access Road, the Doris Central Vent Raise Access Road, and the Roberts Bay Discharge Access Road; two of these involve water crossings over fish-bearing streams that required detailed assessments in 2015 (Package 4, p. 2-24).
Importance of issue to impact assessment	If appropriate avoidance and mitigation practices are not employed in water crossing design, construction and maintenance there may be negative impacts to fish and fish habitat. .
Detailed Review Comment	**Gap/Issue**: Baseline studies and data indicate there are no defined water bodies along the Doris Central Vent Raise Access Road (Response to Technical Comments, Appendix B: DFO 3.4.1-1, p. 15). Doris Connector Vent Raise Access Road crosses a stream where Ninespine Stickleback have only been observed in areas downstream of the proposed water crossing location. Roberts Bay Discharge Access Road crosses a stream where Ninespine Stickleback have also only been observed downstream of the proposed water crossing location. In both cases, TMAC describes the presence of natural barriers to fish passage, such as dense vegetation and poorly defined channels that are suspected to limit fish movement to the locations where the water crossings are proposed (Response to Technical Comments, Appendix B: DFO 3.4.1-1, p. 15). TMAC has also stated that they will provide detailed construction and design plans to DFO for review prior to construction (Response to Technical Comments, p. 23). To this end, TMAC submitted a Request for Review to DFO (Roberts Bay Tributary Stream Crossing) for regulatory consideration on April 12, 2016. **Position and Reasons**: DFO recognizes that TMAC has committed to implement all available and feasible best management practices to avoid and mitigate negative impacts to fish and fish habitat as a result of water crossing construction, operation and decommissioning for fish-bearing streams. This includes non-fish-bearing water bodies that are upstream of fish-bearing water bodies (Response to Technical Comments, p. 23).
Recommendation/Request	**3.1.3.1** This issue has been resolved. DFO will review plans of all water crossings during the regulatory phase of the Project prior to construction, including the type and size of crossing, all mitigation measures and best management practices to be employed, timing of construction and measures taken to ensure water flow and fish passage is maintained at both high and low flows. DFO will continue to work

	with TMAC to ensure impacts to fish and fish habitat that occur as a result of the water crossings are appropriately avoided and mitigated so that *serious harm to fish* does not result from the Project.

4.0 SUMMARY OF RECOMMENDATIONS

Mitigation Measures - Doris Lake and Outflow Water Levels	
Reduction in Water Levels in Doris Lake	
1	**3.1.1.1** This issue has been resolved. DFO will continue to participate in working groups and reviews associated with the Doris North Aquatic Monitoring Framework and Aquatic Effects Monitoring Plan to ensure that impacts to fish and fish habitat as a result of a reduction of water levels in Doris Lake and outflows are monitored as recommended, and that appropriate actions to avoid and mitigate *serious harm to fish* are taken by the proponent.
Reduction in Water Levels Downstream of Doris Lake	
2	**3.1.2.1** This issue has been resolved. DFO recommends that TMAC conduct the planned baseline studies. This information will be needed to determine if there will be localized effects on fish populations and fish habitat as a result of the proposed Project that cannot be avoided or mitigated, and must be Authorized and offset according to the applicable provisions of the *Fisheries Act*. These may be provided to DFO during the regulatory phase of the proposed Project.
Roads and Water Crossings	
3	**3.13.1.** This issue has been resolved. DFO will review plans of all water crossings during the regulatory phase of the Project prior to construction, including the type and size of crossing, all mitigation measures and best management practices to be employed, timing of construction and measures taken to ensure water flow and fish passage is maintained at both high and low flows. DFO will continue to work with TMAC to ensure impacts to fish and fish habitat that occur as a result of the water crossings are appropriately avoided and mitigated so that *serious harm to fish* does not result from the Project.