Fisheries and Oceans Canada | Pêches et Océans Canada

# FISHERIES AND OCEANS CANADA
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# IQALLIQINIRNUT TARYURMIUTTAT KANATA
# PÊCHES ET OCÉANS CANADA

## TECHNICAL REVIEW COMMENTS

**TMAC Resources Inc.**
**Phase 2 Hope Bay Belt Project**
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TMAC Resources Havakvinga
Ilangani 2 Hope Bay Nunanga Havauhikhaq
Phase 2 de la ceinture minérale du projet de Hope Bay

**Submitted to:**
Nunavut Water Board
March 28, 2018
NWB File No.: 2AM-DOH 1323 & 2AM-BOS----
DFO File: 02-HCAA-CA7-00117

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# Executive Summary

The Hope Bay Greenstone Belt Phase 2 Boston-Madrid Project (the Project) is located east of Bathurst Inlet, approximately 150 km southwest of Cambridge Bay within the western Kitikmeot Region of Nunavut, and 700 km northeast of Yellowknife. TMAC Resources Inc. (the Proponent) is the prime holder of the mineral claims, leases, and one Inuit Mineral Exploration Agreement that comprises the 20x80 km property. Phase 2 of the proposed project focuses on mining of the Madrid North, Madrid South, and Boston gold deposits.

Fisheries and Oceans Canada (DFO) – Fisheries Protection Program (FPP) reviewed the Final Environmental Impact Statement (FEIS) for the Project in regards to departmental mandate under the *Fisheries Act,* specifically the management and protection of fish, marine mammals, and their habitat. The primary focus of the review is to ensure that works, undertakings and activities of proposed developments are conducted in such a way that the proponents are in compliance with the applicable provisions of the *Fisheries Act.*

The *Fisheries Act*, Sub-Section 35(1) of the provisions states: "*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, Oceans and the Canadian Coast Guard 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) as the death of fish, or permanent alteration to or destruction of fish habitat.

DFO-FPP is providing the following written technical submission to the Nunavut Water Board (NWB) for their consideration.

<u>Freshwater Environment</u>

The proposed project works, undertakings and/or activities below have the potential to negatively impact freshwater fish and fish habitat before the consideration of mitigation and offsetting measures:

a) Crossings of fish-bearing streams – areas under culverts or bridge support structures; impacts to fish passage.
b) Water withdrawal – reduced water flow in outflow streams and reduction of water level in lakes; and
c) Location of water intakes structures and discharge pipelines below the high water mark

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# Aulapkaiyini Naittuq

Taamna Hope Bay Greenstone Nunanga Ilangani 2 Havauhikhat Boston-Madrid-mi (Havauhikhaq) ittuq kivataani Qingaukmit, 150 km hivuravyaani uataanit Iqaluktuutiami talvani uataani Kitikmeonmi Nunavunmit, 700 km tununngavyaani kivataanit Yalunaimit. TMAC Resources Havakvinga (Ikayuqtiuyuq) pihimalluaqtait ukuninnga uyaqqanik pilaarutingit, atuqtitangit, atauhiqlu Inuit Uyaqqanik Qinirhiayuq Angirutinga piliuqtaa 20 x 80 km nanminiriyangit. Ilangani 2 uumannga piumayanginnik havauhikhaq ihumagilluaqtait uyarakhiurniqmut uumani Madrid Tununngani, Madrid Hivuraani, uumanilu Boston gold-mik piliuqtanginnik.

Iqalliqinirnut Taryurmiuttat Kanata (DFO) – Iqalukhiuqtut Hapummiutingit Pinahuarut (FPP) ihivriuqtait tamna Iniqhimaliqtut Avatiliriniqmut Pilaqutauyut Naunaitkutaq (FEIS) Havauhikhamut piyuq havakvium pitquyangani titiraqhimayumi uumani *Iqalukhiuqtut Maliganga,* unalluaq munarininnga nungulaittailininnganik iqaluknik, tariuqmiutat huradjat, nayugangillu. Ihumagilluaqtaat ihivriuqniq naunaiyariami havaktut, qanuriliurutingit hulilukaarutingillu piumayanginnik pivallianit havaktait qanuqtut Ikayuqtiuyut maliktait pidjutigiyauyunut una *Iqalukhiuqtut Maliganga*.

Taamna *Iqalliqiyit Maligait,* Ilainnaat 35(1) titiraannginnit uqaqtuq taimaa: *“Kitkut inuit havalimaittut, havaarilimaitaik hulilukaalimaittutlu hukhaungiqtiriyuq iqaluknut maniliurutauyunik, aliahuktumik nunaqaqqaarhimayulluuniit iqalukhiurutigamitku iqalukhiuriamiluuniit ikayuutauyuq iqalukhiurniqmut”.* Kihimi, titiraqhimayumi Ilangani 35(2)(b) uumannga *Iqalukhiuqtut Maliganga*, Ministauyuq Iqalukhiuqtunut, Tariunganut unalu Kaanatami Hikuiyarutauyut pittaaqtut angirutimik atuqtauvaktunut qanurittaakhainganinginnullu piyuq uumunnga piumayanginnik havaanganut, aullaqtitauyuq unaluuniit Hulilukaarniq pipkaidjutiniaqtuq uumunnga *hivituyumik ayurhaqtipkaiyut* iqalungnut. *Hivituyumik ayurhaqtipkaiyut* iqalungnut naunairhimayuq uumani Titiraqhimaninngani (2) iqaluk tuqutpat, tamaat ihuarhiningit ahiruqtirininnganik iqalut nayuganganik.

DFO-FPP tunihiyut titiraqhimayunik talvunga Nunavunmi Avatiliqiyit Katimayiit (NWB) ihumagiyaghait. Uqauhiit hapkunani titiraangit aviktuqtauhimayut talvuuna Imariktumiut Avatiit Taryumiutallu Avatiit aviktuqhimaniinit.

Kuukkap Avatinga

Tughirautauyut havaaghat, havaangit/hulilukaaqtaillu ataani ihuiqutaulaaqtut imariktumiunut iqalungnut nayugainullu ihumaliuqtautinnagu ihuaqhaqtauyughat himmiqtuqtautinnagillu:

a) Ikaaqviit iqalulgit kuukkanit – nayugaita tuqhutjat iluani tunmiqqanillu; ihuilutauyut iqaluit ikaaqviinut.
b) Imaiyaqtuq – ikikliyuumiqhimayuq imaq kuugalaaqtuq taununnga kuugalaami ikikliyuumiqtuqlu imaup aktikkulaanga tahiqmi; unalu
c) Nayugaita immat hanguviit anialattiviillu ataani imaukaqviat

# Sommaire

La phase 2 du projet Boston-Madrid de la ceinture minérale verte de Hope Bay (le Projet) se trouve à l'est de Bathurst Inlet, à environ 150 km au sud-ouest de Cambridge Bay, dans la partie ouest de Kitikmeot au Nunavut et à 700 km au nord-est de Yellowknife. La firme TMAC Resources Inc. (le Promoteur) est le titulaire principal des concessions minières, des baux, et d'une entente d'exploration minière avec les Inuit qui incorpore une propriété de 20 x 80 km. La phase 2 du projet proposé porte principalement sur l'exploitation des gisements d'or de Madrid-Nord, Madrid-Sud et Boston.

Le Programme de protection des pêches (PPP) de Pêches et Océans Canada (MPO) a examiné l'Étude finale des incidences environnementales du Projet du point de vue du mandat ministériel en vertu de la *Loi sur les pêches* et en particulier quant à la gestion et la protection des poissons, des mammifères marins et de leur habitat. L'examen avait comme principal objectif de veiller à ce que les ouvrages, les entreprises et les activités des développements proposés se déroulent de manière à ce que les promoteurs respectent les dispositions applicables de la *Loi sur les pêches.*

Le paragraphe 35 (1) des dispositions de la Loi sur les pêches stipule ce qui suit : *Il est interdit d'exploiter un ouvrage ou une entreprise ou d'exercer une activité entraînant des dommages sérieux à tout poisson visé par une pêche commerciale, récréative ou autochtone, ou à tout poisson dont dépend une telle pêche.* Toutefois, l'alinéa 35 (2b) de la *Loi sur les pêches* stipule que le ministre de Pêches et Océans et la Garde côtière canadienne peuvent émettre une autorisation accompagnée de conditions quant à l'exploitation de l'ouvrage ou de l'entreprise ou l'exercice de l'activité pouvant entraîner des *dommages sérieux* au poisson. En vertu de l'article (2), la mort de tout poisson ou la modification permanente ou la destruction de son habitat sont considérées comme des *dommages sérieux*.

Le PPP du MPO soumet donc les observations écrites suivantes à la Commission du Nunavut chargée de l'examen des répercussions (CNEF) aux fins d'étude. Les observations formulées sont classées en deux catégories à savoir, « environnement d'eau douce » et « environnement marin ».

<u>Environnement d'eau douce</u>

Les ouvrages, entreprises ou activités proposés ci-après peuvent avoir une incidence négative sur le poisson d'eau douce et son habitat préalablement à la prise en considération des mesures d'atténuation et de compensation.

a) Passage de zones ou de cours d'eau poissonneux sous des structures servant à soutenir un ponceau ou un pont; incidence sur le passage du poisson.

b) Prélèvement de l'eau provoquant un débit réduit des décharges et une réduction du niveau d'eau des lacs.
c) Emplacement des prises d'eau et des conduites d'évacuation sous la ligne des hautes eaux.

# 1.0 Introduction

DFO-FPP has participated in the Water Licence review process to date by performing a completeness check which commenced on January 17, 2018. The technical review of the Water Licence followed the completeness check, commencing on February 23, 2018. DFO-FPP continues to participate in the Water Licence process through this technical review comments submission to the NWB.

This technical report summarizes DFO-FPP's review of the water licence applications concerning the proposed Phase 2 Hope Bay Belt Project (the Project). The purpose of this submission is to provide expert advice to the Nunavut Review Board (NWB) regarding the identification of potential environmental impacts according to our mandate that are associated with the proposed project.

As directed by the NWB in the letter dated February 23, 2018, this submission focuses on a thorough technical assessment of the application for the new Type "A" Water Licence No. 2AM-BOS----and amendment to the Type A Water Licence No. 2AM-DOH 1323. The objective is to assess the information presented by the Proponent in support of the Project proposal.

# 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*. 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, Oceans and the Canadian Coast Guard is one of the competent ministers under the *Species at Risk Act* (SARA).

In general, DFO-FPP undertakes the review of a proposed project in and around fisheries waters to ensure that works, activities and undertakings are conducted in such a way that the proponents are in compliance with the applicable provisions of the *Fisheries Act* and *Species at Risk Act.*

The mandate of Fisheries and Oceans Canada is to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. Sub-section 35 (1) 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 these life processes.

However, under Paragraph 35 (2) (b) of the *Fisheries Act*, the Minister of Fisheries, Oceans and the Canadian Coast Guard 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.

DFO-FPP is directed by the "Fisheries Protection Policy Statement (2013)", which is intended to provide guidance to Canadians and ensure compliance with the *Fisheries Act*. The *Fisheries Protection Policy Statement* strengthens the Federal 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.

The "Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting (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 *serious harm to fish* and the loss of fisheries productivity resulting from a project. For more information, see: http://www.dfo-mpo.gc.ca/pnw-ppe/pol/index-eng.html

The *Species at Risk Act* (SARA) is intended to prevent Canadian indigenous species, subspecies and distinct populations of wildlife from being extirpated or becoming extinct. SARA facilitates the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and manage species of special concern (to prevent them from becoming endangered or threatened). The Minister of Fisheries, Oceans and the Canadian Coast Guard is

the competent minister for listed aquatic species that are fish as defined in the *Fisheries Act* Section (2) and for marine plants as defined in the *Fisheries Act*, Section 47.

Environmental and Climate Change Canada (ECCC) is responsible for the administration and enforcement of the pollution prevention provisions of the *Fisheries Act*, Sections 34 and 36-42.

# 3.0 Technical Review Comments

## 3.1 Freshwater Environment

| Review Comment Number | 3.1.1 Water Crossings |
|---|---|
| Subject / Topic | Avoidance and Mitigation of Effects to Fish and Fish Habitat |
| References | • FEIS Volume 5, Section 6.5.4.1 – Loss or Alteration of Fish Habitat, Table 6.5-4.<br>• FEIS Volume 5, Appendix V5-6Y – Freshwater Fish Community and Habitat Survey Sites, 1993-2017.<br>• Package 5-14 Hope Bay Cargo Dock Access Road, 3.3.1 Design Criteria P. 6<br>• *HOPE BAY PROJECT: Proponent's Response to Technical Comments on the Draft Environmental Impact Statement for the Madrid-Boston (Phase 2) Proposal,* ID#DFO-3.1.2-102.7, p.317.<br>• Volume 1, Annex V1-7 & P5-14 Hope Bay Cargo Dock Access Road, p. 16-17<br>• FEIS Volume 5, Section 6.5.4.1 – Loss or Alteration of Fish Habitat, p. 6 – 154<br>• FEIS Volume 5, Section 6.5.3.2 – Best Management Practices, p. 6 - 141-143. |
| Summary | A total of 21 water crossings are associated with the proposed all-weather roads as part of the Madrid-Boston Project. Based on the fish and fish habitat surveys conducted from 1993-2017 (FEIS, Vol. 5, Appendix V5-6Y, p. 1-16), the Proponent concluded that four of the streams are non-fish-bearing and the remaining streams are fish-bearing (FEIS Vol. 5, Table 6.5-4, p. 6-149). Four types of crossings are proposed to be used based on the watercourse characteristics: culverts in non-fish bearing water courses, culverts within fish-bearing watercourses, span bridges with pile foundations, and bridges with frozen abutment foundations (P5-14 Hope Bay Cargo Dock Access Road, 3.3.1 Design Criteria, p.6). |

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| | The Proponent provided conceptual water crossing designs (Vol. 1 Annex V1-7 & P5-14 Hope Bay Cargo Dock Access Road, p.16-17) and states that: "*Final design plans will be used to refine proposed mitigation measures as required, and the information will be provided to DFO during submission of Request for Review applications for individual crossings as deemed necessary prior to construction*" (HOPE BAY PROJECT: Proponent's Response to Technical Comments on the Draft Environmental Impact Statement for the Madrid-Boston (Phase 2) Proposal, Responses to ID# DFO-3.1.2-DFO-FPP comments 102.7 , p.317).<br><br>DFO notes that the Proponent has also provided a list of general best management practices during the construction phase that include DFO's Measure to Avoid Causing Harm to Fish and Fish Habitat' (FEIS, Vol. 5, Section 6.5.3.2, p. 6-141-143).<br><br>The Proponent identified the potential for water crossing structures to require inspection and maintenance to ensure barriers to water and fish passage do not form over time (Vol. 5, Section 6.5.4.1, p. 6-154). In (*HOPE BAY PROJECT: Proponent's Response to Technical Comments on the Draft Environmental Impact Statement for the Madrid-Boston (Phase 2) Proposal*, Responses to ID# DFO-3.1.2-DFO-FPP comments 102.7, p. 317, the proponent agreed to use an appropriate water crossing maintenance and a monitoring plan: "*During the authorization process, DFO will outline requirements for monitoring and will be in a position to monitor activities and as built infrastructure as they deem appropriate.*" |
| **Importance of Issue to Impact Assessment** | Watercourse crossings have the potential to impact fish, fish habitat and fish passage if they are not designed, sized, installed and maintained properly. |
| **Detailed Review Comment** | DFO-FPP acknowledges that the Proponent highlighted the use of 'DFO Measures to Avoid Causing Harm to Fish and Fish Habitat' design criteria for enabling fish passage and that water |

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| | crossings require a maintenance and a monitoring program to avoid negative impacts to fish and fish habitat. DFO-FPP also acknowledges that the Proponent has provided general engineering preliminary drawings of 'bridges and culverts designs' in DEIS, Vol. 3, Appendix V3-3I, p.33-34.<br><br>DFO-FPP notes that the provided design criteria, watercourse crossing engineer drawings, and the mitigation and monitoring plan that includes mention of 'DFO Measures to Avoid Causing Harm to Fish and Fish Habitat', are conceptual and general in nature. As such, it is unclear at this time, in the absence of detailed engineering designs, what the full suite of measures are that the Proponent intends to implement to avoid, mitigate or offset *serious harm to fish* as defined in the *Fisheries Act* as a result of water crossings proposed for the Hope Bay Phase 2 Project.<br><br>Details of a site-specific, best-practices management plan during the construction, including a maintenance plan and monitoring program will be required from the Proponent to DFO-FPP during the regulatory phase.<br><br>For fish bearing streams, DFO-FPP will require site-specific detailed design plans during the regulatory phase to determine the full extent of the potential impacts below the high-water mark (HWM). |
| **Recommendation/ Request** | 1. DFO-FPP recommends that the Proponent provide Fisheries and Oceans Canada with detailed watercourse and site specific engineering plans for all water course crossings, supported by measured or modeled stream flow data. This information is to be provided prior to construction, during the regulatory phase, should the project be approved to proceed.<br>2. DFO-FPP recommends that the Proponent work with Fisheries and Oceans Canada and the affected community members including the Kitikmeot Inuit Association to develop a site-specific construction work |

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| | plan during the regulatory phase, should the project be approved to proceed. This construction plan should include but not be limited to, the full suite of mitigation measures that will be implemented to reduce the impact on fish and fish habitat during the construction phase.<br>3. DFO-FPP recommends that an appropriate water crossing maintenance and monitoring plan be developed to ensure that barriers to fish passage do not form over time. |

| **Review Comment Number** | **3.1.2 Water and Load Balance and predicted fish productivity loss** |
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| **Subject / Topic** | Potential impacts on Freshwater Fish from Change in Water Flow and Water Volume |
| **Reference** | • DEIS, Volume 1, Annex V1-7, Type "A" Water Licence Application, Package P5-4 – Madrid-Boston Project water and Load Balance, Hope Bay Project.<br>• FEIS, Volume 5, Appendix V56AA – Conceptual Fresh Water Fisheries Offsetting Approach, p. 24, 29.<br>• FEIS, Volume 5, Section 6.5.3.3 – Proposed Monitoring Plans and Adaptive Management, p. 6 – 143-144.<br>• DEIS, Volume 1, Annex V1-7, Type A Water Licence Application, Package P4-18 – Hope Bay Project Madrid-Boston Aquatic Effect Monitoring Plan, p.3-4. |
| **Summary** | The effects assessment of the Madrid-Boston Project concludes that residual effects will remain after mitigation measures and that fish habitat will be altered through stream flow and lake water level alteration. Those effects have been predicted by the proponent based on simulated results from the water balance model described in DEIS, Vol. 1, Annex V1-7, Package P5-4.<br><br>Impacts on fish and fish habitat resulting from the Project and not predicted to be mitigatable are anticipated in the following watercourses (FEIS Vol. 5, Appendix V5-6AA, p.24 &29):<br>1. Little Roberts Outflow |

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| | 2. Doris Outflow<br>3. Ogama Inflow/Outflow<br>4. P.O. Outflow<br>5. Patch Outflow<br>6. Inmiagut Outflow<br>7. Stickleback Outflow<br>8. Wolverine Outflow<br>9. Imniagut Outflow/Lake<br><br>In the FEIS Vol. 5, Section 6, p.143-144 and P4-18, the proponent provides details of an Aquatic Effects Monitoring Program (AEMP) that will be carried out during all phases of the Project. The AEMP proposed water level monitoring stations only at locations where water withdrawal will occur or where water surface can be affected by underground mine. |
| **Importance of Issue to Impact Assessment** | It is important to monitor water levels and flows in watercourses that will be impacted, to ensure that unauthorized affects to fish and fish habitat are avoided. |
| **Detailed Review Comment** | DFO-FPP notes that uncertainty exists with models based on estimates and estimated data variables. With respect to cumulative surface hydrology impacts and the potential impacts on the fish bearing watercourses, uncertainty with estimated models could result in surface flows that are lower or higher than predicted. As such, DFO-FPP notes that a robust monitoring plan should be implemented. This plan needs to identify variation from the predicted ranges in advance of unauthorized serious harm to fish. It should include low action levels which trigger the need for additional mitigation measures.<br><br>DFO-FPP recognizes that the Proponent has proposed a conceptual AEMP that acknowledges the potential for surface water quantities to be affected by the Project. DFO-FPP notes that the AEMP proposes to monitor potential effects of water withdrawal and groundwater removal on the surface water by monitoring water level in Wolverine, Patch, Doris, Windy and |

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| | Aimaokatalok lakes (DEIS, Vol. 1, Annex V1-7, Package P4-18, p. 3-4).<br><br>DFO-FPP notes that it is unclear whether the Proponent intends to monitor the water flow and quantities within the fish bearing watercourses where the possible impacts are predicted by the water balance model. Without an appropriate monitoring program in place, it will be difficult to detect the potential variations in the water levels and stream flow prior to unauthorized impacts to fish and fish habitat occurring. |
| **Recommendations/Requests** | 1. DFO-FPP recommends the Proponent include monitoring stations to monitor water levels and stream flows in the AEMP for all fish bearing lakes and streams that are predicted to be potentially impacted by the Project. |

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| **Review Comment Number** | **3.1.3 Water Intake and Discharge Pipes** |
| **Subject / Topic** | Avoidance and Mitigation of Effects to Fish and Fish Habitat resulting from Water Intake and Discharge Pipes |
| **Reference** | • FEIS Volume 5, Section 6.5.4.1 – Loss or Alteration of Fish Habitat, p. 6 - 154-156.<br>• FEIS Volume 5, Section 6.5.3.2 – Best Management Practices, p. 6 - 141-143. |
| **Summary** | Two water intake pipelines and one discharge pipe are proposed for the Madrid-Boston Project. The intake pipelines will be 0.15 m diameter and will be laid along access roads, transitioning from shoreline to lake bed. Pipelines will extend to 5 m depth in the lake (40 m total length in Windy Lake and 420 m total length in Aimaokatalok Lake). Effluent from the Boston water treatment plant will be discharged into Aimaokatalok Lake through a 0.25 diameter pipeline that will run from the treatment plant to the access roads and from shoreline to lake bed. The discharge pipeline will also extend to 5 m depth in the lake (800 m total length) (FEIS, Vol. 5, Section |

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| | 6.5.4.1, p. 6-154-156). To reduce impacts to fish and fish habitat during the construction phase, the Proponent refers to the general best management practices list in the FEIS, Vol. 5, Section 6.5.3.2, p. 6-141-143. |
| **Importance of Issue to Impact Assessment** | In water Pipeline infrastructure has the potential to impact fish and fish habitat. |
| **Detailed Review Comment** | In the FEIS, Vol. 5, Section 6.5.3.2, p. 6-141-143, the Proponent refers to a broad list of best management practices to be implemented during the Madrid-Boston Project that include, but are not limited to *DFO's Measures to Avoid Causing Harm to Fish and Fish habitat* (DFO 2013). DFO-FPP understands that the proposed management practices aim to avoid unnecessary impacts to freshwater fish and fish habitat but are conceptual and not site-specific. Therefore, DFO-FPP requires a detailed site-specific plan of the full suite of mitigation measures that will be implemented during the construction of the pipelines (e.g. site isolation during the construction of the rock berms, design of the fish screens, and a sediment and erosion control plan). |
| **Recommendations/Requests** | 1. DFO-FPP recommends that the Proponent work with DFO-FPP and the potentially affected community members including the Kitikmeot Inuit Association, to develop a site-specific construction work plan during the regulatory phase, should the project be approved to proceed. This plan should include but not be limited to, the full suite of mitigation measures that will be implemented to reduce the impacts on fish and fish habitat during construction. |

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| **Review Comment Number** | **3.1.4 Timing Assessment associated with fish habitat loss** |

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| **Subject / Topic** | Potential impacts to Freshwater Fish productivity from changes in water flow and water volume |
| **References** | • DEIS Volume 5, Section 1.5.5.3 – Characterization of Residual Effect for Surface Hydrology VEC, Streamflow alteration in Doris Watershed p. 1-69.<br>• FEIS Volume 5, Section 1.5.5.3 – Characterization of Residual Effect for Surface Hydrology VEC, Streamflow alteration in Doris Watershed p. 1-71 |
| **Summary** | In DEIS Vol. 6 Section 6.5.4.2, the Proponent identified that water quantity impacts may have timing issues that require additional assessment. Specifically, the Proponent states in DEIS Vol. 6 Section 6.5.4.2 that:<br><br>*"Therefore, effects on fish habitat due to a reduction in stream flow are considered negligible based on the application of a 10% variation from baseline threshold. However, effects due to changes in the timing of flows (e.g., later onset of freshet if lake volume is reduced and does not begin flowing in streams) and decrease in the number of days stream habitat is accessible (i.e., later freshet and/or earlier freeze up) are not assessed. The resolution of the simulated monthly data from the water balance report does not allow for detailed assessment for these variables and effects on fish habitat due to a change in the timing of flows may require additional assessment to ensure that effects on access to habitat do not occur. These analyses will be refined prior to submission of the final EIS."*<br><br>DFO-FPP notes that the corresponding FEIS Vol. 5, Section 6.5.4.2 eliminates all text following the first sentence above. The revised text is as follows:<br><br>*'Therefore, effects on fish habitat due to a reduction in stream flow are considered negligible based on the application of a 10% variation from baseline threshold. '* |
| **Importance of Issue to Impact Assessment** | Affecting stream flows at certain times may delay fish in accessing spawning areas and result in fish productivity loss. |
| **Detailed Review Comment** | Reduced flow associated with timing may impact fish productivity by impeding fish access to important habitats associated with their biological processes such as spawning, feeding or rearing sites during critical periods of their life cycle. |

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| | DFO-FPP is unclear as to whether the predicted changes in timing resulting from a reduction of stream flow as predicted as follows in the DEIS: "*However, effects due to changes in the timing of flows (e.g., later onset of freshet if lake volume is reduced and does not begin flowing in streams) and decrease in the number of days stream habitat is accessible (i.e., later freshet and/or earlier freeze up) are not assessed. The resolution of the simulated monthly data from the water balance report does not allow for detailed assessment for these variables and effects on fish habitat due to a change in the timing of flows may require additional assessment to ensure that effects on access to habitat do not occur. These analyses will be refined prior to submission of the final EIS."* were assessed and accounted for in the FEIS.<br><br>It is unclear to DFO-FPP if the FEIS resolved expectations established in the DEIS for analysis of water quantity timing impacts on fish habitat access. |
| **Recommendation/ Request** | 1. DFO-FPP requests that the Proponent clarify whether water quantity impacts that may have timing issues were accounted for in the impact assessment.<br><br>2. DFO-FPP recommends that Proponent conduct an analysis of water quantity timing impacts on fish access to key habitats. |

## 4.0 Summary of Requests

| **Freshwater Environment – Water Crossings** | | |
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| **1** | Ref. 3.1.1 | 1. DFO-FPP recommends that the Proponent provide Fisheries and Oceans Canada with detailed watercourse and site specific engineering plans for all water course crossings, supported by measured or modeled stream flow data, for review prior to construction during the regulatory phase should the project be approved to proceed.<br>2. DFO-FPP recommends that the Proponent work with DFO-FPP and the potentially affected community members including the Kitikmeot Inuit Association, to develop a site-specific construction work plan during the regulatory phase, should the project be approved to proceed. This plan |

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| | | should include but not be limited to, the full suite of mitigation measures that will be implemented to reduce the impacts on fish and fish habitat during construction.<br>3. DFO-FPP recommends that an appropriate water crossing maintenance and monitoring plan be developed to ensure that barriers to fish passage do not form over time. |
| **Freshwater Environment – Water and Load Balance** | | |
| **2** | Ref. 3.1.2 | 1. DFO-FPP recommends the Proponent include monitoring stations to monitor water levels and stream flows in the AEMP for all fish bearing lakes and streams that are predicted to be impacted by the Project. |
| **Freshwater Environment – Water Intake and Discharge Pipes** | | |
| **3** | Ref. 3.1.3 | 1. DFO-FPP recommends that the Proponent work with DFO-FPP and the potentially affected community members including the Kitikmeot Inuit Association, to develop a site-specific construction work plan during the regulatory phase, should the project be approved to proceed. This plan should include but not be limited to, the full suite of mitigation measures that will be implemented to reduce the impacts on fish and fish habitat during construction. |
| **Freshwater Environment – Timing Assessment** | | |
| **4** | Ref. 3.1.4 | 1. DFO-FPP requests that the Proponent clarify whether water quantity impacts that may have timing issues were accounted for in the impact assessment.<br>2. DFO-FPP recommends that Proponent conduct an analysis of water quantity timing impacts on fish habitat access to key habitats. |