ᓄᓇᕗᑦ ᐊᕐᕌᒍᓯᒪᔪᑦ ᑲᑎᒪᔨᖏᑦ ᑲᑎᒪᔨᓂᖅ

NUNAVUT IMPACT REVIEW BOARD

NUNAVUMI AVATILIKIYIN KATIMAYIN

Demande de la CNER faisant l'objet d'un examen préalable #125101

Pond Inlet Marine Infrastructure

Type de demande :	New
Type de projet:	Infrastructure
Date de la demande :	3/29/2017 1:02:19 PM
Period of operation:	from 2018-07-01 to 2019-10-31
Autorisations proposées:	from 2017-03-29 to 2019-10-31
Promoteur du projet:	Paul Mulak Government of Nunavut PO Box 1000, Stn 620 Iqaluit Nunavut X0A 0H0 Canada Téléphone :: 8679755414, Télécopieur :: 8679755457

DÉTAILS

Description non technique de la proposition de projet

Anglais: The Government of Nunavut (GN), through Community and Government Services (CGS) on behalf of the Department of Economic Development and Transportation (EDT), plans to construct a new small craft harbour (SCH) in the Hamlet of Pond Inlet (the Project). The development of a SCH has been studied since the 1990s. Funding for the Project is now available through the new Canada Build Fund and the GN. The Hamlet is a community overlooking Eclipse Sound and the mountains of Bylot Island. The closest communities are Arctic Bay (238 km west), Clyde River (401 km southeast) and Grise Fiord (438 km north). The economy of the Hamlet is generally based on traditional subsistence activities mixed with wage activities. Hunting is essential to life and the harvesting of ringed seal, Arctic char, narwhal, and caribou are of importance. The proposed location for the SCH is the beach that has been used for decades by the community. There is a small existing boat launching ramp and sealift area that is accessible by existing Hamlet roads. The Project includes the construction and operation of a SCH, consisting of two rock breakwaters protecting a 2.5 hectare inward-facing harbour, a sealift ramp and a laydown area, two strings of floating docks that will accommodate up to 80 small boats, and a fixed wharf with a dredge berth pocket and an approach channel to provide larger boats with access to the wharf. The Project will also include the use of a rock quarry about 5 km from the Hamlet to produce about 200,000 tonnes of rock. The haul route to transport the rocks to the site will either follow the existing roads through the Hamlet or a purpose-built alternate haul route that bypasses the main part of the Hamlet. Discussions are ongoing with the Hamlet regarding the preferred route and the future use and management of the alternate haul route, if constructed and the development and operation of the quarry, which may be led by the Hamlet. Alternative locations and designs have been evaluated. The proposed location is supported by the community, has excellent access and is already extensively used by boat owners. Four alternatives for the layout of the SCH were presented to the community for feedback. The Project will improve existing boat access and the overall safety of marine activities in the community by providing a protected harbour for recreational users, hunters, fishers and cruise ship tender boats. The harbour will be protected from high winds and waves. Small boat activities will be separated from sealift operations to make sealift delivery safer and more efficient and to reduce the effects of on the small boats. Traffic and congestion will be improved by the new parking and laydown area. Sealift barges will offload at the new ramp. The fixed wharf will be able to accommodate larger boats, such as inland fishing vessels. Access by ATV or trucks on the beach within the SCH will be improved by placing a layer of gravel on the surface. Construction will start in summer 2018 with the arrival of the first sealift. Construction will continue in 2019 in late May with completion of the SCH in the fall of 2019. The installation of small craft floats and final demobilisation will occur in 2020. Potable water, sanitary waste disposal, and fuel supply are expected to be provided by the Hamlet. However, the Contractor will secure an independent fuel supply if there is not existing capacity via the Hamlet. The primary fuel required for marine and land-based equipment will be primarily diesel. Refuelling of mobile equipment

will occur in designated fuelling areas. The marine fleet will refuel at sea from bunker tanks. Approximately 20 workers will be required for construction. Non-local workers are expected to stay in an expansion module at the Sauniq Hotel. Construction equipment will arrive on the sealift and workers and consumables will arrive in the Hamlet through the airport. The equipment expected to be used for construction includes drill rigs, excavators, rock transport trucks, front end loaders, compactors, dozers and graders, cranes and forklifts and other equipment. Workboats and tugboats will also be needed. Inuit Qaujimajatuqangit (IQ) has been gathered during workshops, an elder interview and map biography exercise and was incorporated into project design and baseline information. There has been consultation with the community, including hunters, fishers, residents, Hamlet Mayor, Council and administration, HTO and key community stakeholders, since June 2016 and this will continue through construction of the Project. Meetings, interviews, workshops and open houses were used to share information about the Project both in English and in Inuktitut. Consultation with the Mayor and Council and the HTO will continue throughout the design development and construction phases of the Project.

Français: Not Applicable.

Inuktitut: ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᑦ (GN), ᓄᓇᓕᖕᓂ ᒐᕙᒪᒃᑯᓂᓪᓗ ᐱᕈᑦᓯᕋᒃᑎᒃᑯᑦ (CGS) ᑭᒻᒪᖅᑐᕐᓗᑎᒃ ᐱᕓᓪᓕᐊᔪᓕᕆᔩᒃᑯᖕᓂᑦ ᐃᖏᕐᕋᔪᓕᕆᔩᒃᑯᖕᓂᓪᓗ (EDT), ᐸᕐᓇᖅᒪᑕ ᓴᓇᔪᒪᓪᓗᑎᒃ ᓄᑖᒥᒃ ᐅᒥᐊᒃᑯᕕᒃᓴᒥᒃ (SCH) ᒥᑦᑎᒪᑕᓕᒃ HLᓕᖓᓂ (ᓴᓇᔭᒃᓴᕐᑯᑎ). ᓴᓇᔭᐅᓂᒃᓴᖓ ᐅᒥᐊᒃᑯᕕᒃᓴᐅᑉ (SCH) ᖃᐅᔨᓴᕐᐊᖅᑕᐅᓯᒪᓕᕐᒪᑦ ᑕᐅᕙᙵᓂᑦ 1990−ᖏᓐᓂᑦ. ᕿᓇᐅᔭᖅᑲᒃᑎᑦᑎᔨᑎᖏᑦ ᓴᓇᔭᒃᓴᕐᑯᑎᐅᑉ ᐊᑐᐃᓐᓇᐅᓕᕐᒪᑕ ᐅᑯᑎᒎᓇ ᓄᑖᑦ ᑲᓇᑕᒥ ᓴᓇᓂᕐᒧᑦ ᕿᓇᐅᔭᖅᑲᒃᑎᑦᑎᔨᑎᑎᒧ ᐊᒻᒪᓗ ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᑦ. HLᓕᖓ ᓄᓇᓕᑦ ᐊᓕᒃᑲᐅᒪᕗᖅ ᑕᓯᐅᔭᕐᒧᑦ ᐊᒻᒪᓗ ᐃᓐᓈᕈᖏᓐᓄᑦ ᐊᑭᐊᑕ. ᖃᓂᖓᓂᖅᐹᖅ ᓄᓇᓕᑦ ᒪᑯᐊᖑᕗᑦ ᐃᒃᐱᐊᕐᔪᒃ (238 ᑭᓛᒥᑐ ᐅᖓᓯᒃᓂᖓ ᐱᖓᓇᕐᒥ), ᖃᖏᖅᔫᐱᒃ (401 ᑭᓛᒥᑕ ᐅᖓᓯᒃᓂᖓ ᐅᖅᑯᒃᐸᓯᐊᓂ ᑲᓇᖕᓇᕐᒥ) ᐊᒻᒪᓗ ᐊᐅᔨᑦᑐᖅ (438 ᑭᓛᒥᑐ ᐅᖓᓯᒃᓂᖓ ᐊᒡᒍᐊᓂ). ᒪᕆᒪᔪᑎᖏᑦ HLᓕᖓᑕ ᑐᙵᕕᖃᓪᓗᐊᑦᑕᖅᐳᖅ ᐱᖅᑯᓯᕐᒥᒍᑦ ᒪᕆᒪᓇᓯᐊᕈᑎᖃᕐᓗᑎᒃ ᐱᓕᕆᑲᑦᑕᕐᓂᕐᒥᖕᓂᑦ ᐃᓚᖃᕐᓗᑎᒃ ᕿᓇᐅᔭᒃᓴᓗᑎᒃ ᐱᓕᕆᔪᓯᕐᓂᒃ. ᐊᖑᓇᓯᖃᑦᑕᕐᓂᖅ ᐊᑐᖅᑕᐅᔪᓇᐊᖃᓪᓚᓇᒃᐳᖅ ᐃᓅᓇᓯᐊᕐᓂᕐᒥ ᐊᒻᒪᓗ ᐊᖑᓇᓯᖃᑦᑕᕐᓂᖅ ᓇᑦᑎᕐᓂᑦ, ᐅᑭᐅᖅᑕᖅᑐᑉ ᐃᖃᓗᖏᓐᓂᑦ, ᕿᓚᓗᒃᑲᓂᒃ, ᐊᒻᒪᓗ ᑐᒃᑐᓂᑦ ᑕᒪᒃᑯᐊ ᐱᒻᒪᕆᐊᓘᖓᑕ. ᑐᒃᓯᕉᖑᓯᒪᔪᖅ ᐃᓂᒃᓴᖓ ᐅᒥᐊᒃᑯᕕᒃᓴᐅᑉ (SCH) ᑕᐅᕗᓐᓇᐅᕗᖅ ᓯᒻᔭᖅ ᐊᑐᖅᑕᐅᖏᓐᓇᐅᔭᖅᓯᒪᔪᖅ ᖁᓕᒐᓴᖕᓂᑦ ᐊᕐᕿᒍᒐᓴᖕᓂᒃ ᓄᓇᓕᖕᓂᑦ. ᐱᑦᖃᒃᑑᒐᓗᐊᖅ ᒥᑭᔪᕆᖏᑦ ᐊᑐᖅᑕᐅᔪᒥᑦ ᐅᒥᐊᓄᑦ ᓵᕙᐱᐅᔫᒥᑦ ᐊᒻᒪᓗ ᓂᐅᕋᐃᕕᐅᓯᒪᖕᒍᓪᓗᓂ ᐅᐸᒐᒃᓴᐅᔪᖅ ᐊᑐᖅᑕᐅᓯᒃᑯᑦ HLᓕᒃᑯᑦ ᐊᖅᑯᑎᕐᑯᑎᖓᒍᑦ. ᓴᓇᔭᒃᓴᕐᑯᑎ ᐱᖃᓯᐅᔾᔨᕗᖅ ᓴᓇᔭᐅᓂᖓᓂᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑕᐅᓂᖓᓂᑦ ᐅᒥᐊᒃᑯᕕᐅᑉ (SCH), ᒪᑯᐊᖑᓗᑎᒃ ᒪᕐᕉᖕᓂᒃ ᐅᔭᕋᓐᓂᒃ ᐅᖅᑯᐃᕕᖕᓗᓂ ᓯᕋᒃᑕᐅᔾᔭᐃᓯᓯᒪᔫᖅᓂ 2.5 ᑕᐅᓴᓐ ᑭᐸᖒᓇᒃᑐᑦ ᐆᒃᑐᑎᑯᑖᓪᓗᐊᓂᑦ ᐊᖏᓂᖅᑲᕐᓗᓂ ᐃᓗᒻᒧᖕᒫᖅ−ᓵᙳᓗᓂ ᐅᒥᐊᒃᑯᕕᒃ, ᐅᒥᐊᕐᔪᐊᒧᑦ ᐅᓯᖏᐊᕐᕕᐅᓗᓂ ᐊᒻᒪᓗ ᓂᐅᕋᒃᑕᐅᔪᓄᑦ ᐃᓕᐅᖃᐃᕕᐅᓗᓂ, ᒪᕿᓗᑎᒃ ᐅᐃᒍᓕᓅᒃ ᐳᒃᑕᓗᑎᒃ ᑐᓕᒃᐋᒃ ᐃᓂᒋᔭᐅᔪᓐᓇᕐᓗᑎᒃ ᑎᑭᐅᒪᔪᓄᑦ 80 ᐅᒥᐊᓄᑦ, ᐊᒻᒪᓗ ᐊᐅᓚᖏᑦᑐᒥᒃ ᓂᐅᕋᐃᕕᖕᓗᓂ ᒪᕋᐅᖏᓪᓗᓂ ᓯᓕᖕᓂᖓ ᑎᓯᐊᔭᐃᑯᑎᖕᓗᓂ ᐊᒻᒪᓗ ᑎᑭᐸᓪᓕᐊᓗᓂ ᐃᓯᕕᖕᓗᓂ ᐊᑐᖅᑕᐅᔪᓐᓇᕐᓗᓂ ᐊᖏᔪᓄᑦ ᐅᒥᐊᓄᑦ ᑎᑭᑕᐅᔪᓐᓇᖁᓪᓗᒍ ᓂᐅᕋᐃᕕᖓ. ᓴᓇᔭᒃᓴᕐᑯᑎ ᐱᖃᓯᐅᔾᔨᓂᐊᕈᖅ ᐅᔭᖅᑲᓂᒃ ᐅᓯᖃᑦᑕᖅᑐᖃᕐᓗᓂ ᐃᒪᓐᓇᑎᒥᐸᓗᒃ 5 ᑭᓛᒥᑐ ᐅᖓᓯᒋᓕᖏᑦ HLᓕᖓᓂᑦ ᓴᓇᔭᐅᖁᓪᓗᒍ ᐃᒪᓐᓇᑎᒥᐸᓘᒃ 200,000 ᐅᖁᒪᐃᓐᓂᕐᔪᐊᓕᖏᑦ ᐅᔭᖅᑲᓂᑦ. ᐅᓯᖃᑦᑕᕐᕕᐅᓂᐊᖅᑐᖅ ᐊᖅᑯᑎ ᐅᓯᕕᐅᖃᑦᑕᕐᓗᓂ ᐅᔭᖅᑲᓂᒃ ᐅᒥᐊᒃᑯᕕᖕᒧᑦ ᑕᒪᐅᓇᐅᑐᐃᓐᓇᓇᐊᖃᒃᐳᖅ ᐊᑐᖅᑕᐅᕙᒃᑐᒃᑯᑦ ᐊᖅᑯᑎᖓᒍᑦ HLᓕᒃᑯᑦ ᐃᓗᐊᒍᑦ ᐅᕝᕙᓗᓂᑦ ᑐᒃᓯᕌᖑᓯᒪᔪᒃᑯᑦ−ᓴᓇᔭᐅᖁᔭᐅᓪᓗᓂ ᐊᑐᖅᑕᐅᖃᖅᑲᔪᖅᑐᒃᑯᑦ ᐅᓯᕕᐅᓗᓂ ᐊᖅᑯᑎᒋᔭᐅᒐᔭᕐᓗᓂ ᐊᓯᐊᒍᖕᒐᕐᓗᓂ ᐊᑐᖅᑕᐅᓗᐊᑕᓯᐸ ᐊᖅᑯᑎᒋᔭᐅᓘᒃᑯᑦ HLᓕᒃᑯᓐᓂᑦ. ᐅᖃᖅᑎᕆᓪᓂᑦ ᐱᓕᕆᐊᖑᐃᓐᓇᖅᐳᑦ HLᓕᒃᑯᓐᓂᑦ ᐅᖃᐅᓯᖃᕐᓗᑎᒃ ᐱᔭᐅᖏᕈᓯᒪᔪᒥᑦ ᐊᖅᑯᑎᒋᔭᐅᓗᓴᖅᑐᒥᑦ ᐊᒻᒪᓗ ᓯᕗᓂᒃᓴᒥ ᐊᑐᖅᑕᐅᓕᒐᔭᖅᑐᒥᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑕᐅᓗᓂ ᐊᑐᖅᑕᐅᖑᔭᕐᓗᓂ ᐅᓯᖃᑦᑕᖅᑐᓄᑦ ᐊᖅᑯᑎᒋᔭᐅᓗᓴᖅᑐᖅ, ᓴᓇᔭᐅᓗᓴᕐᓂᖅᐸᑦ ᐊᒻᒪᓗ ᓴᓇᔭᐅᓐᓂᖅᐸᑦ ᐊᐅᓚᑕᐅᓗᓂᓗ ᐊᐃᒃᓯᕋᕐᓂᖅ, ᑕᒪᓐᓇᓗ ᐊᐅᓚᑕᐅᓂᐊᕐᒪᑦ HLᓕᒃᑯᓐᓂᑦ. ᐱᔭᐅᖑᐃᕈᓐᓇᖅᑐᖅ ᓇᒦᓐᓂᖓ ᐊᒻᒪᓗ ᓴᓇᓯᒪᓂᒃᓴᖓ ᖃᐅᔨᓴᖅᑕᐅᓯᒪᓕᖅᐸ. ᑐᒃᓯᕌᖑᓯᒪᔪᖅ ᓇᒦᓐᓂᖓ ᐃᑲᔪᖅᓯᖅᑕᐅᓯᒪᕗᖅ ᓄᓇᓕᖕᓄᑦ, ᐱᐅᔪᐊᓗᒃᑲᓗᓂᓗ ᐅᐸᒃᓴᐅᓂᖓ ᐊᒻᒪᓗ ᐊᑐᖅᑕᐅᔪᒪᓇᐅᓪᓗᓂ ᐅᒥᐊᖅᑎᐅᔪᓄᑦ. ᑎᓴᒪᑦ ᐱᔭᐅᖕᒫᕈᓐᓇᖅᑎᑕᐅᔪᑦ ᓴᓇᕕᐅᓯᒪᔪᖅᑐᒧᑦ ᐅᒥᐊᒃᑯᕕᖕᒧᑦ (SCH) ᑕᑯᔭᐅᑎᑕᐅᓯᒪᕗᑦ ᓄᓇᓕᖕᓄᑦ ᐅᖃᐅᓯᒃᓴᖃᕐᕕᐅᒪᖕᒫᑕ. ᓴᓇᔭᒃᓴᕐᑯᑎ ᐱᐅᓂᖅᓴᐅᓕᖅᑎᑦᑎᓯᒪᔪᖅᐳᖅ ᐊᑐᖅᑕᐅᔪᒥᑦ ᐅᒥᐊᓄᑦ ᑐᓕᒃᑕᕐᕕᖕᒥᑦ ᐊᒻᒪᓗ ᐃᓅᓐᓇᓕᒫᖏᓐᓄᑦ ᐊᑦᑕᕐᓇᖅᑕᐅᓕᒪᓂᕐᒧᑦ ᑕᓇᐅᕐᒥ ᖃᓄᐃᓅᕐᓂᐅᕙᒃᑐᓄᑦ ᓄᓇᓕᖕᓂ ᓴᐳᒻᒥᔭᐅᔪᒥᑦ ᐅᒥᐊᒃᑯᕕᒃᖃᕐᓗᑎᒃ ᕿᖃᖅᑲᓕᐃᓕᑐᓄᑦ ᐊᑐᖅᑕᐅᕙᓪᓗᓂ, ᐊᖑᓇᓯᐊᖅᑎᓄᑦ, ᐃᖃᓗᓕᔨᐊᖅᑎᓄᑦ ᐊᒻᒪᓗ ᐳᓚᕋᑎᑦ ᐊᒥᐊᕐᔪᐊᖏᓐᓄᑦ ᐱᓯᒪᒃᓯᕈᓄᑦ ᐅᒥᐊᓂᑦ. ᐅᒥᐊᒃᑯᕕᒃ ᓴᐳᒥᒃᓯᒪᔪᖅᐳᖅ ᐊᓄᕐᔪᐊᖅᑎᓪᓗᒍ ᐊᒻᒪᓗ ᒪᓕᐊᓗᖅᓂᑦ. ᐅᒥᐊᓄᑦ ᖃᓄᐃᓘᕆᑕᐅᔪᑦ ᐊᕙᑎᓯᒪᑎᑕᐅᓯᒪᔪᖅᐳᑦ ᐅᒥᐊᕐᔪᐊᒃᑰᖅᑎᑦᑎᔪᑦ ᐱᓕᕆᐊᖑᓂᖏᓐᓂᑦ ᑕᒪᓐᓇ ᐅᒥᐊᕐᔪᐊᒃᑰᖅᑎᑦᑎᓂᕐᒧᑦ ᑎᑭᐅᔾᔨᓂᖅ ᐊᑦᑕᕐᓇᖏᓐᓂᖅᓴᐅᖁᓪᓗᒍ ᐊᒻᒪᓗ ᐊᑐᑎᐊᕐᓂᖅᓴᐅᖁᓪᓗᒍ ᐊᒻᒪᓗ ᐊᒃᓯᐊᔫᖏᓐᓂᖅᓴᐅᓕᖅᑎᑦᑎᑕᐅᓗᓂ ᐊᒃᑐᖅᑕᐅᓂᖓᓄᑦ ᐅᒥᐊᖃᑐᓄᑦ. ᓇᓕᐊᖕᓄᕋᒃᑐᑦ ᐊᒻᒪᓗ ᐊᖅᑯᑎᖃᕈᓐᖃᑦᑕᕐᓂᖅ ᐊᑐᖅᑕᐅᖏᓐᓂᖅᓴᐅᓕᕋᔭᖅᑐᖅ ᓄᑖᓂᒃ ᓄᖅᑲᖓᑎᑦᑎᕕᒃᑕᓕᖅᐸᑦ ᐊᒻᒪᓗ ᕿᒪᐃᓯᒪᕕᒃᑕᓕᖅᐸᑦ ᐃᓂᒋᔭᐅᓕᖅᑐᒥᑦ. ᐅᒥᐊᕐᔪᐊᒃᑰᖅᑐᓄᑦ ᓂᐅᕋᐃᔭᑎᑦ ᐅᓯᖏᐊᖃᑦᑕᓕᒐᔭᖅᑐᑦ ᑕᐃᕙᓂ ᓄᑖᒥ ᐅᓯᖏᐊᕐᕕᖕᒥ. ᐊᐅᓚᖏᑦᑐᖅ ᓂᐅᕋᐃᕕᒃ ᐃᓂᒋᔭᐅᔪᓐᓇᕋᔭᖅᑐᖅ ᐊᖏᔪᓄᑦ ᐅᒥᐊᓄᑦ, ᓯᕐᓗ ᒪᑯᓇᖓ ᓯᒻᔭᖅᐸᓯᒃᑐᓂ ᐃᖃᓗᒐᓯᐊᕆᑎᓄᑦ ᐅᒥᐊᕐᔪᐊᓄᑦ. ᐅᐸᒃᓴᐅᓗᓂ ᓇᐅᒃᑯᐃᓐᓈᕆᑎᓄᑦ ᐅᕝᕙᓗᓂᑦ ᐅᓯᕕᓕᖅᓄᑦ ᓄᓇᓯᐅᑎᓄᑦ ᓯᒻᔭᕐᒧᑦ ᑕᒪᐅᖓ ᐅᒥᐊᒃᑯᕕᖕᒧᑦ (SCH) ᐱᐅᓯᕆᐊᖅᑎᑕᐅᓗᓴᕐᒪᑦ ᑐᐊᐸᓕᖅᓯᖅᑕᐅᓗᓂ ᑕᒪᓐᓇ ᖃᖓ. ᓴᓇᔭᐅᕆᐊᕐᓂᖓ ᐱᕆᐊᖅᑕᐅᓗᓴᕐᒪᑦ ᐊᐅᔭᖓᓂ 2018 ᑎᑭᐅᔾᔭᐅᒃᐸᑕ ᓯᕗᓪᓕᖅᐹᑦ ᐅᒥᐊᕐᔪᐊᒃᑰᖅᑎᑕᐅᔪᑦ. ᓴᓇᔭᐅᓂᖓ ᑲᔪᓯᓗᓴᕐᒪᑦ 2019−ᒥ ᑭᖑᕙᓕᖅᑎᓪᓗᒍ ᒪᐃ ᐱᔭᕇᒃᑕᐅᓗᓂᓗ ᐅᒥᐊᒃᑯᕕᒃᓴᖅ (SCH) ᐊᑭᐊᒃᔮᖓᓂ 2019. ᐋᖅᑭᒃᑕᐅᓂᖏᑦ ᐅᒥᐊᒃᑯᕕᑦ ᐳᒃᑕᔪᑦ ᐊᒻᒪᓗ ᐱᔭᕇᒃᑕᐅᓗᓂ ᐊᐅᓚᔪᓐᓃᖅᑎᑕᐅᓗᓴᕐᒪᑦ 2020-ᒥ. ᐃᒥᖅᑕᖅᑕᐅᔪᑎᑦ, ᐊᒃᑕᖅᑕᐅᔪᑎᑦ, ᐊᒻᒪᓗ ᐅᖅᓴᒃᑕᐅᔪᑎᑦ ᓂᓇᐅᒥᔭᐅᕗᑦ ᐱᔭᐅᑎᑕᐅᓗᓴᕋᓯᒥᔭᐅᓪᓗᑎᒃ HLᓕᒃᑯᓐᓂᑦ. ᑕᐃᒪᐃᒃᑲᓗᐊᖅᑎᓪᓗᒍ, ᑲᓐᑐᕌᒃᑎ ᐋᖅᑭᒃᓯᒪᔪᖅᐳᖅ ᐃᒻᒥᓂᖅᓯᖅᑐᒥᒃ ᐅᖅᓴᒃᓴᐃᕈᒥᑦ ᐱᑦᖃᖏᑉᐸᑦ ᐊᑐᖅᑕᐅᔪᓐᓇᖅᑐᒥᒃ ᐱᓕᕆᔪᓐᓇᖅᑐᑦ HLᓕᒃᑯᑎᒍ. ᐊᑐᖅᑕᐅᓪᓗᐊᑦᑕᕋᔭᖅᑐᖅ ᐅᖅᓯᒃᓴᓇᔭᐅᔭᓇᐊᓕᒃ ᑕᓇᐅᕐᒥ ᐊᒻᒪᓗ ᓄᓇᒥ−ᐊᑐᖅᑕᐅᔪᓂ ᐱᓕᕆᔪᑎᓄᑦ ᐅᖅᓯᐊᓗᒃᑐᖅᑐᓯᐅᑕᐅᓪᓗᐊᑦᑕᕋᔭᖅᐳᑦ. ᐅᖅᓴᒃᓴᐋᑦ ᓄᓇᓯᐅᑎᓄᑦ ᐱᓕᕆᔪᑎᓄᑦ ᐅᖅᓴᐅᕕᐅᑎᑕᐅᔪᒦᖃᑦᑕᖃᔭᖅᐳᑦ ᐃᓂᒋᔭᐅᑎᑕᐅᔪᒥ. ᑕᓇᐅᕐᒥ ᐱᓕᓈᑦ ᐅᖅᓴᖃᑦᑕᖃᔭᖅᐳᑦ ᑕᓇᐅᑉ ᐃᒪᖓᓂ ᐅᖅᓴᐃᔭᖅᑐᕈᑎᒥᑦ. ᐃᒪᓐᓇᑎᒥᐅᑐᐃᓐᓇᓇᐊᓕᑦ 20−ᓂᑦ ᐃᖃᓇᐃᔭᖅᑎᖃᓇᐊᖃᒃᑐᑎᒃ ᓴᓇᔭᐅᔪᒥ. ᒥᑦᑎᒪᑕᓕᖕᒥᐅᑕᐅᖏᑦᑐᑦ ᐃᖃᓇᐃᔭᖅᑏᑦ ᓂᓇᐅᒥᔭᐅᕗᑦ ᑐᔪᒥᒐᔭᕋᓯᒥᔭᐅᓪᓗᑎᒃ ᐅᐃᒍᓕᐅᑎᓯᒪᔪᒥ ᓴᐅᓂᖅ ᑐᔪᒥᕕᖓᓂ. ᓴᓇᔪᑎᒃᓴᑦ ᐱᓕᕆᔪᑏᑦ ᑎᑭᓂᐊᖅᐳᑦ ᐅᒥᐊᕐᔪᐊᒃᑯᑦ ᐊᒻᒪᓗ ᐃᖃᓇᐃᔭᖅᑏᑦ ᐊᒻᒪᓗ ᓂᕿᒥᔭᐅᓂᐊᖅᑐᑦ ᑎᑭᓐᓂᐊᕐᓇᓪᓗᑎᒃ HLᓕᒃᑯᑦ ᒥᕝᕕᖓᒍᑦ ᖃᖓᑕᓯᒃᑯᕕᒃᑯᑦ. ᐱᓕᕆᔪᑏᑦ ᓂᓇᐅᒥᔭᐅᔪᑦ ᐊᑐᖅᑕᐅᓗᓴᕋᓯᒥᔭᐅᓪᓗᑎᒃ ᓴᓇᔪᖅᑲᒃᑎᓪᓗᒍ ᐱᖃᓯᐅᔾᔨᕗᑦ ᓂᐅᖅᑐᕆᑦ, ᐸᒃᑕᑦ, ᐅᔭᖅᑲᓂᑦ ᐅᓯᔾᔪᑏᑦ ᓄᓇᓯᐅᑎᑦ, ᖃᓗᖏᐅᑎᓖᑦ, ᑎᓯᓴᐃᔪᑎᑦ, ᑯᑭᓖᑦ ᐊᒻᒪᓗ ᐊᑖᒍᑦ ᓴᓕᒎᑎᓕᑦ, ᕿᕕᒃᓯᔪᑎᑯᑖᓕᑦ ᖃᓗᓯᔪᑎᑦ ᑲᑭᐊᓕᑦ ᐊᒻᒪᓗ ᐊᓯᖏᑦ ᐱᓕᕆᔪᑏᑦ. ᐃᖃᓇᐃᔭᐅᑎᑦ ᐅᒥᐊᑦ ᐊᒻᒪᓗ ᐊᔭᐅᕆᑎᑦ ᐅᒥᐊᑦ ᐱᔭᐅᓯᒪᔭᓇᐊᖅᑲᓂᐊᕐᒥᖓᑕ. ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᑦ (IQ) ᑲᑎᖅᓱᖅᑕᐅᓯᒪᕗᑦ ᑲᑎᒪᓃᖅᑎᓪᓗᒥᑦ, ᐃᓐᓇᒪᓇᖏᑦ ᐊᐱᖅᓱᖅᑐᖃᒃᑎᓪᓗᒍ ᐊᒻᒪᓗ ᓄᓇᙳᐊᓕᓇᓂᖏ ᐃᓕᖅᑯᓯᓇᐅᔭᐅᔪᓂᑦ ᐱᓕᕆᐊᖃᒃᑎᓪᓗᒍ ᐊᒻᒪᓗ ᑲᑐᔾᔨᐅᔾᔭᐅᓚᐅᖅᓱᑎᒃ ᓴᓇᔭᒃᓴᕐᑯᑎᐸ ᓴᓇᓯᒪᓂᒃᓴᖓᓄᑦ ᐊᒻᒪᓗ ᑐᙵᕕᓪᓗᐊᑕᖓᓄᑦ ᑐᓴᐅᒪᔪᑎᒃᓴᓄᑦ. ᐊᐱᖅᓯᓂᑦᑲᐃᓐᓇᕐᒪᑦ ᓄᓇᓕᖕᓂ, ᐱᖃᓯᐅᔾᔨᓗᑎᒃ ᐊᖑᓇᓯᐊᖅᑎᓄᑦ, ᐃᖃᓗᓕᔨᐊᖅᑎᓄᑦ, ᓄᓇᓕᖕᒥᐅᑕᐃᑦ, HLᓕᒃᑯᑦ ᒥᐊᓯᖓ, ᑲᑎᒪᔨᑦ ᐊᒻᒪᓗ ᐊᓪᓚᕝᕕᖕᒥ ᐃᖃᓇᐃᔭᖅᑎᑦ, ᐊᖑᓇᓯᐊᖅᑐᓕᕆᔨᒃᑯᑦ ᐊᒻᒪᓗ ᐱᓗᐊᑕᐃᑦ ᓄᓇᓕᖕᓂ ᐱᖁᑎᐅᖃᑕᐅᔪᑦ, ᑕᐅᕙᙵᓂᑦ ᔫᓂ 2016−ᒥᓂᑦ ᐊᒻᒪᓗ ᑕᒪᓐᓇ ᑲᔪᓯᓂᐊᕐᒪᑦ ᐊᐱᖅᓱᖃᑦᑕᕐᓂᒃᑯᑦ ᓴᓇᔭᒃᓴᕐᑯᑎᒧᑦ. ᑲᑎᒪᓃᑦ, ᐊᐱᖅᓱᖃᑦᑕᕐᓃᑦ, ᑲᑎᒪᓐᓈᕐᓃᑦ ᐊᒻᒪᓗ ᐅᐸᒃᓴᐅᑎᑦᑎᓃᑦ ᐃᓗᒥᑦ ᑐᓴᖃᑎᒋᐊᐅᓯᒥᑦ ᑐᓴᐅᒪᔪᑎᒃᓴᓂᑦ ᓴᓇᔭᒃᓴᕐᑯᑎᒥᑦ ᑕᒪᒃᑭᖓᒥᑎᒍ ᖃᓪᓗᓈᑐᑦ ᐃᓄᒃᑐᓪᓗ. ᐊᐱᖅᓱᖃᑦᑕᓃᑦ ᒥᐊᔪᒥᑦ ᑲᑎᒪᔨᓂᓪᓗ ᐊᒻᒪᓗ ᐊᖑᓇᓯᐊᖅᑐᓕᕆᔩᒃᑯᖕᓂᑦ ᑲᔪᓯᓂᐊᕐᒪᑕ ᐃᓅᓐᓇᓕᒫᖓᓂ ᓴᓇᓯᒪᓂᒃᓴᖓᓂ ᓴᓇᔭᐅᕙᓪᓕᐊᓂᓕᒫᖓᓂ ᐊᒻᒪᓗ ᓴᓇᔭᐅᑎᓪᓗᒍ ᐱᓕᕆᐊᖑᕙᓪᓕᐊᓂᖏᓐᓂ ᓴᓇᔭᒃᓴᕐᑯᑎᐅᑉ.

Personnel

Personnel on site: 20

Days on site: 250

Total Person days: 5000

Period of operation: from 2018-07-01 to 2069-10-01

Proposed term of operation: from 2017-03-29 to 2019-10-31

Activités

Activités

Emplacement	Type d'activité	Statut des terres	Historique du site	Site à valeur archéologique ou paléontologique	Proximité des collectivités les plus proches et de toute zone protégée
Quarry Study Area	Quarry/Borrow pit	Municipal	None	N/A	N/A
Alternative Haul Road Study Area	Access Road	Municipal	None	N/A	N/a
Marine Study Area	Offshore Infrastructure (port, break water, dock)	Municipal	None	N/A	N/A
Marine Study Area	Marine Based Activities	Crown	None	N/A	N/A
Marine Study Area	Dredging	Crown	None	N/A	N/A

Engagement de la collectivité et avantages pour la région

Collectivité	Nom	Organisme	Date de la prise de contact
Pond Inlet		Mittimatalik Hunters and Trappers Organization (HTO)	2016-06-14
Pond Inlet		Mayor and Council, Senior Administrative Officer	2016-06-14
Pond Inlet		MLA Honourable Joe Enook	2016-06-14
Pond Inlet		Senior Administrative Officer	2016-09-09
Pond Inlet		Mayor and Council, Senior Administrative Officer, HTO	2016-09-15
Pond Inlet		Mittimatalik Hunters and Trappers Organization	2016-09-15
Pond Inlet		Mittimatalik Hunters and Trappers Organizaton	2016-09-16
Pond Inlet		Hamlet of Pond Inlet Health Centre	2016-11-25
Pond Inlet		Key Stakeholders - RCMP	2016-11-25
Pond Inlet		Key Stakeholders -Co-op	2016-11-24
Pond Inlet		Key Stakeholders - Northern Store	2016-11-24
Pond Inlet		Senior Administrative Officer	2016-10-05
Pond Inlet		Mittimatalik Hunters and Trappers Organization	2016-10-05
Pond Inlet		Ikaarvik Youth Group	2016-11-18
Pond Inlet		Mittimatalik Hunters and Trappers Organization	2016-11-24
Pond Inlet		Municipal Council, Hamlet Administration, MLA Honorable Joe Enook	2016-11-26
Pond Inlet		Shoreline Residents	2016-11-25
Pond Inlet		Mayor and Council, Senior Administrative Officer	2017-02-01
Pond Inlet		Community Members	2017-02-27
Pond Inlet		Mayor and Council, Senior Administrative Officer	2017-02-28
Pond Inlet		Active Inuit Land Users and Ikaarvik	2017-02-27
Pond Inlet		Active Inuit Land Users and Ikaarvik	2017-02-28
Pond Inlet		Active Inuit Land Users and Ikaarvik	2017-03-01
Pond Inlet		Senior Administrative Officer	2017-03-29
Pond Inlet		Mayor and Council, Senior Administrative Officer	2017-04-11
Pond Inlet		Community Members	2017-04-11
Pond Inlet		Senior Administrative Officer	2016-11-17
Pond Inlet		Governement of Nunavut, Dept. of Environment, Wildlife Officer	2016-11-24
Pond Inlet		Mayor and Council, Senior Administrative Officer, MLA Honourable Joe Enook	2016-11-24
Pond Inlet		Ikaarvik Youth Group	2016-12-20
Pond Inlet		Transarctik / Degagnes	2017-05-18
Pond Inlet		Qikitani Inuit Association	2017-05-03

Autorisations

Indiquez les zones dans lesquelles le projet est situé

North Baffin

Autorisations

Organisme de régulation	Description des autorisations	État actuel	Date de l'émission/de la demande	Date d'échéance
Pêches et Océans Canada	Request for Review. Formal review is awaiting NIRB submission. An Authorization under the Fisheries Act may be required.	Applied, Decision Pending	2017-05-03	
Transports Canada	Notice of Works/Approval	Not Yet Applied		
Government of Nunavut, Department of Culture, Language, Elders, and Youth	Class 2 Permit	Applied, Decision Pending	2017-03-31	
Autre	Public Services and Procurement Canada. Application for use of the seabed. Likely as a License to Occupy but still awaiting confirmation from PSPC.	Not Yet Applied		
Ressources naturelles Canada	Authorization of Explosives and/or Magazine Licence Application	Not Yet Applied		
Office des eaux du Nunavut	Type B Authorization (may be required if the new alternative haul road is the chosen haul road option)	Not Yet Applied		

Utilisation de matériel

Équipement à utiliser (y compris les perceuses, les pompes, les aéronefs, les véhicules, etc.)

Type d'équipement	Quantité	Taille – Dimensions	Utilisation proposée
Drills	2-3	5 tons	Quarrying
Excavators	4-5	30-40 ton	Quarrying, Handling armour stone, excavating
Rock Trucks	3-4	35 ton articulating	Hauling quarried rock
Transport trucks	1-2	Heavy duty (off-road capable) tractor and trailer, 40 tons	Moving material and equipment on site
Front end loader	2-3	966-988	Loading rock and moving cargo/equipment
Compactor	1	20 ton	Compacting road surfacing
Dozer	1	D8	Leveling placed rock and road surfaces
Grader	1	140	Road maintenance
Spud barge/derrick	1	20 m x 50 m deck w/ 150t crane	Dredging, sheet pile installation, moving/lifting materials and equipment
Material scows	1-2	500 cubic metre	Dredging and reuse within laydown area
Tugs	1	1,000 - 1,500 horsepower	Mobilization and floating equipment movement
Work boats	1-2	Varies, 50 to 500 horsepower	Flaoting equipment movement
Pickup truck	3	Crew cab, 3/4 ton	Crew and supplies movement
Mini-bus	1	15 passenger	Daily crew mob from hotel/accommodation to project site
Fuel/service truck	1	10 ton	Daily refueling and servicing of major mobile equipment, fueled from GN/PPD dispensers in Iqaluit
Water truck	1	10 ton	Construction and miscellaneous water
Telehandler/forklift	1-2	5-10 ton	Moving materials and equipment
Rough terrain crane	1	40 ton	Lifting materials

Décrivez l'utilisation du carburant et des marchandises dangereuses

Décrivez l'utilisation de carburant :	Type de carburant	Nombre de conteneurs	Capacité du conteneur	Quantité totale	Unités	Utilisation proposée
Diesel	fuel	1	2000000	2000000	Liters	Mobile equipment, remote generators and heaters
Gasoline	fuel	1	20000	20000	Liters	Small work boats, small generators and ATVs
Propane	fuel	10	110.231	1102.31	Lbs	Heaters
hazardous	hazardous	10	20	200	Liters	Maintenance of mobile equipment
hazardous	hazardous	10	200	2000	Liters	Maintenance of mobile equipment
Oxy/Acetylene	hazardous	10	140	1400	Cubic ft	Welding and Cutting of Steel
Paint	hazardous	10	1	10	Gallons	Painting wharf hardware and micesllaneous components
Explosives	hazardous	1	110231	110231	Lbs	Quarrying

Consommation d'eau

Quantité quotidienne (m3)	Méthodes de récupération de l'eau proposées	Emplacement de récupération de l'eau proposé
5	Water truck	Existing water supply infrastructure

Déchets

Gestion des déchets

Activités du projet	Type des déchets	Quantité prévue	Méthode d'élimination	Procédures de traitement supplémentaires
Offshore Infrastructure (port, break water, dock)	Déchets combustibles	5 tons	Hamlet landfill	N/A
Offshore Infrastructure (port, break water, dock)	Eaux grises	600 cubic metres	Existing Sewage Lagoon	N/A
Offshore Infrastructure (port, break water, dock)	Déchet dangereux	2000 litres	Sealed drums or lined bags	Disposed of in accordance with regulatory procedures
Offshore Infrastructure (port, break water, dock)	Déchets non combustibles	1 ton	Hamlet landfill	N/A

Quarry/Borrow pit	Mort-terrain (sol organique, déchets, résidus)	0.01 tons	Stockpiled at Quarry	N/A
Offshore Infrastructure (port, break water, dock)	Eaux usées (matières de vidange)	600 cubic metre	Existing sewage lagoon	N/A

Répercussions environnementales :

Impacts have been identified, assessed and categorized as per NIRB requirements for the Quarry and SCH and Alternate Haul Road Study Areas. Where there was an interaction between the construction activity and the environmental component, a potential environmental impact was identified. These potential environmental impacts were then assessed using the baseline data and information collected on the environmental components and experience, scientific literature and engineering documentation of the construction and operational activities. Where an impact was identified, mitigation measures were determined. Mitigation measures were implemented through changes in engineering design, construction planning and additional specific measures. Monitoring has been defined to support these mitigations. All impacts were either Positive or Negative and Mitigatable, i.e. no Negative and non-mitigatable or Unknown impacts identified. Therefore, impacts are well known and can be managed.

Détails Partie 2

Informations générales du projet

1.1.1 Project Overview The development of a protected small craft harbour (SCH) in the Hamlet of Pond Inlet (the Hamlet) has been studied since the 1990s. The Government of Nunavut (GN), through the Department of Economic Development and Transportation (EDT) is developing a new small craft harbour (the Project) in the Hamlet. The construction of the Project will be managed by Community and Government Services (CGS) on behalf of EDT. The Project is located in Eclipse Sound, on the north shore of Baffin Island and across from Bylot Island (77.98166667°, -72.6969444°). The Project will improve the existing access for boats and the overall safety of marine activities in the community by providing a protected harbour for recreational users, hunters, fishers and cruise ship tender boats. In addition, the Project will further segregate small craft activities from sealift operations. This is expected to increase the efficiency and safety of sealift activities while also reducing its effect on other activities. A schematic design has been prepared to form the basis for this application. The design accounted for the site specific environmental conditions (e.g. bathymetry, tides) and existing marine use (e.g. sealift delivery, subsistence fishing). Extensive consultation has occurred to solicit input from the community to understand their marine use, community needs pertinent to design. The permanent components of the Project include two new breakwaters, a fixed small craft wharf, a boat launch ramp, small craft floating docks, a sealift landing ramp, and a laydown area to be used for sealift storage, boat storage, and parking. Supporting Project activities during construction include the development of a quarry to source rock and fill material and potentially a new haul road to transport rock to the SCH. As the objective of the Project is to improve access for existing marine use and overall safety of marine activities in the community, an increase in shipping or any future potential commercial development using the SCH is not included in the Project scope. Construction is anticipated to be completed within two years from the start of construction in summer 2018, concluding in fall 2019. The construction phase of the project will be managed by CGS, GN. During construction, the Project will use the existing scheduled sealift deliveries and scheduled flights, with the potential for use of chartered flights when additional cargo capacity is required. Fuel, potable water, sanitary and solid waste disposal are anticipated to be supplied via existing facilities operated by the Hamlet and the GN. Work crew accommodations will be provided by local businesses. 1.1.2 Project Layout The general layout of the proposed SCH is presented in Figure 1 1. The harbour is formed by an east and a west breakwater to create a protected inner harbour. The inner harbour is located on the east side of the Project and is protected on all sides. The western breakwater, on the inward facing side of the harbour, contains a sealift ramp and laydown area, as well as a fixed wharf that includes a dredged berth pocket and approach channel. This dredged area will increase the depth of water near the fixed dock to allow larger boats to access. Two strings of floating docks are provided in the inner harbour for the mooring of small vessels. Details of the Project are presented in the Section A. The final arrangement of the SCH may change through the design development phase of the Project as CGS plans to continue consulting with the hunters and residents to refine the project design. To support of the construction of the SCH, the Project will require a rock quarry and a haul route to transport the rock to the SCH. The location of the quarry and proposed haul route alignments are presented in Figure 1 2. Details of the quarry and the haul route are presented in Section A. Although the quarry and associated construction activities are presently scoped into the Project, the Hamlet and the GN are pursuing a separate application for authorization of a number of quarries within their Pond Inlet 2017 Quarry Administrative Agreement (NIRB File 125027) (NIRB, 2017). Should the Hamlet/GN application be approved by the Minister prior to this SCH application, such that the Project can source rock from the Hamlet quarry, the quarry component and its associate assessment may be removed from this application to avoid duplication. 1.1.3 Benefits to the Hamlet The Hamlet of Pond Inlet is an isolated community which is heavily reliant on traditional subsistence activities such as hunting, fishing, trapping and gathering as well as the delivery of goods, supplies and fuel by sealift. The SCH will improve the safety and efficiency of these activities providing a significant benefit to the community. The Project will improve the existing access for boats in the community by providing a protected harbour for recreational users, hunters, fishers, sealift and cruise ship tender boats. This will increase safety for boat users who currently compete to launch or land their boats at the single metal boat ramp on the beach, where they are exposed to wind and waves. The proposed design includes an east and west breakwater to form a sheltered harbour, which will provide a safe launching and mooring areas for boats (see Figure 1 1). The entrance to the SCH has been designed to provide safe access through the orientation of the breakwaters to minimize wave activity. The SCH will also avoid the need for boaters to seek safety in the mouth of Salmon River during rough weather as it will provide the necessary protection both within and on the leeside of the SCH. The current sealift delivery interferes with hunters, fishers', boaters' and residents' access to the boat ramp, beach and the road fronting the shoreline houses. The Project will improve access for the community by providing a sealift ramp and laydown area. This will allow the sealift to offload and move goods without interfering with access to the boat launch ramp, within the SCH. When the sealift is not docked, the sealift ramp will be accessible to the community and can be used as a secondary boat launch area. When not in use for sealift deliveries, the sealift laydown area can be used by the community for boats or trailers, which will help alleviate parking and storage issues along the road and in the surrounding area. A letter of support was received from the Hamlet in March 2017 (Municipality of Pond Inlet, 2017). The letter describes the benefits the Hamlet recognises from the Project and also confirms the Hamlet's capacity to provide municipal services. 1.1.4 Project Alternatives 1.1.4.1 Location The current location was selected as the most favourable site because it has existing marine access adjacent to the community. Other factors included: The location has historically been, and continues to be, used for boat launching and for sealift activities. The location is within a developed portion of the community so there are less environmental impacts in comparison to previously undeveloped locations. The location includes space on the beach for community members to store boats and trailers. The location is accessible by existing Hamlet roads. The community supported the selection of this site. The construction of the project will not hinder winter access to ice. Locations further west, but in reasonable proximity to the community, were not considered further due to: There are no active access roads further to the west from the historically used location. Access would be limited by the proximity to a minor creek nearby. A private property limits the use of the shoreline for access and storage requirements. Locations further north and east, but in reasonable proximity to the community, were not considered further due to: The sandy beach immediately to east is too soft and therefore not suitable for driving of vehicles or sealift equipment. The shoreline is steeper to the northeast and additional grading would be required in comparison to the existing site. The location is not as accessible by Hamlet roads as the current location. Note that only a preliminary assessment of haul route alternatives has been undertaken at this point. This work is summarized in the Pond Inlet Haul Road Feasibility Study (Advisian, 2017b). 1.1.4.2 Project Design The Project design has undergone a variety of modifications during the schematic design phase through input received from the Hamlet, HTO, and the residents. Several preliminary options were provided electronically to the Hamlet and HTO in September 2016. A design workshop was held in the Hamlet in November 2016 to discuss the various options and the associated benefits and disadvantages of each option. Following the design workshop, the current SCH arrangement was presented back to the community for verification during an Open House in February 2017. Please see Section 2 and the Pond Inlet Marine Infrastructure Consultation Log (Advisian, 2017c) for further information on the input received during consultation and design workshops. 1.1.5 Project Schedule Design, consultation and permitting for the Project commenced in September 2016 with initial baseline studies for the environmental and geotechnical programs. Construction is expected to take two years beginning in the open-water season of 2018. It is expected, that the Project will be substantially complete by the end of the open-water season in 2019, with minor installations and demobilization occurring in 2020. Table 1 1 outlines the anticipated schedule.

Conformité de l'énoncé opérationnel de Pêches et Océans Canada

Transport

The majority of the materials and equipment required for the construction of the Project will arrive on the annual sealift provided by Nunavut Eastern Arctic Shipping and Nunavut Sealink and Supply. Dry sealift cargo is currently brought ashore by lightering barge and offloaded with front end loaders at the sealift beach near the Hudson's Bay Company building. From the sealift area, cargo for the Project will be trucked to the Contractor's laydown area. Figure 1 2 presents the layout of the sealift area and the proposed Contractor's laydown area. Construction personnel and miscellaneous consumables will arrive in the Hamlet through the Pond Inlet Airport (YIO). The Project is expected to rely on scheduled flights for personnel and cargo, but may need to use chartered flights if the existing service cannot support the additional throughput. A small marine fleet will be required to undertake wharf construction and dredging works. The marine fleet will be towed by the contractor at the start of construction, and towed back once the wharf construction and dredging works are complete. It is likely that the fleet will need to overwinter in the Hamlet and will be pulled ashore above high water for storage. Rock for the construction will be produced at a new quarry proposed to the east of the Hamlet, near the sewage lagoon and solid waste landfill. Rock will be transported to the SCH site either using existing roads through the Hamlet or potentially by an alternate haul route to the south of town. See Section A for information on the proposed haul route.

Site du camp

Construction personnel are anticipated to be housed in the Hamlet in existing or expanded facilities for the duration of the Project and will be shuttled to and from the work site using crew vans on a daily basis.

Équipement

The list of anticipated major equipment, including size and proposed use, required for the construction of the Project is provided in Table 1 3. Sample photos of some key equipment are provided in Photo 1 1. Equipment used at the SCH following construction is not expected to change from existing operations. All construction equipment will be demobilized.

Eau

Water for construction use will be obtained from the existing water supply infrastructure in the Hamlet. It is anticipated that water will be delivered by the Hamlet's trucked water service, a locally contracted water truck, or the Contractor's own water truck. There is no plan to draw water direct from surface water or groundwater. Estimated water use during construction is 5 m3 per day, excluding water use by construction personnel while off-site (at hotel/accommodations in the Hamlet). Water is anticipated to be needed for the following uses: Dust control to supplement other dust suppression techniques. Drinking water and sanitary facilities Earthworks (for compaction if necessary). Equipment wash-down. During operation of the SCH, water consumption by the facility users is not expected to vary significantly from the current water demands. The Hamlet has confirmed it has capacity to provide the water required for the Project (Municipality of Pond Inlet 2017).

Eaux d'égout (eaux grises, eaux usées, autre)

Excluding wastewater generated by construction personnel while off-site (at hotel/accommodations in the Hamlet), the Project's construction will not produce significant volumes of wastewater. Anticipated total wastewater production during the construction period of the Project is expected to be approximately 1,200 m3, including both sewage (human waste) from on-site sanitary facilities and grey water. Wastewater will be collected, and transported by the Hamlet's sewage truck for disposal in the existing sewage lagoon. The Hamlet has confirmed it has capacity to receive Project wastewater (Municipality of Pond Inlet 2017). During operation of the SCH, wastewater generation by the facility users is not expected to vary significantly from current operations.

Carburant

For the construction of the Project, it is anticipated that the Contractor will use existing fuel infrastructure in the Hamlet for supply and storage. Fuel will be drawn from the Hamlet's fuel storage tanks on an as-needed basis. The Hamlet has confirmed it has capacity to provide fuel for the Project (Municipality of Pond Inlet 2017). However, if there is insufficient reserve fuel capacity in the Hamlet to support the Project, the Contractor will provide additional fuel supply and storage to supplement the amount of fuel available from the Hamlet. Refuelling of mobile equipment will take place in a designated fuelling area in the Contractor's laydown area or at the mobile equipment's location at the SCH or in the quarry. The marine fleet will be refuelled from bunker tanks on the marine derrick. If necessary during the course of construction, the bunker tanks will be refuelled using a floating hose from an onshore tanker truck at high tide. Propane fuel may also be necessary for portable heaters. Propane will be delivered on the annual sealift and stored in the Contractor's laydown area, secured in metal cylinders racks in a designated storage area. Estimated fuel consumption for the construction of the SCH, including rock production in the quarry, is presented in Table 1 5. During operation of the SCH, fuel consumption and refuelling methods by facility users is not expected to vary significantly from current operations. The SCH will not include any fuel transfer facility.

Produits chimiques et marchandises dangereuses

Table 1 6 presents the anticipated chemical or hazardous materials required for the construction of the SCH. During operation of the SCH, handling of chemicals and hazardous materials by facility users is not expected to vary significantly from current operations.

Répercussions sur la main-d'œuvre et les ressources humaines et socioéconomiques

The Project does not require a large construction workforce. Approximately 20 workers will be required with work starting in the summer of 2018 and finishing in the fall of 2019. Approximately 250 work days are required to complete the Project. Construction personnel are anticipated to be housed in the Hamlet in existing or expanded facilities for the duration of the Project and will be shuttled to and from the work site using crew vans on a daily basis. As the anticipated number of personnel is 20 persons, there is no plan to establish a workers camp as the Hamlet has confirmed it has capacity within existing accommodations (Municipality of Pond Inlet 2017). The provision of food and accommodation for non-local workers during construction will likely be in a dedicated expansion module at the Sauniq Hotel. The workforce will be comprised of skilled and semi-skilled labour as follows: heavy equipment operators; crane operator; welder; marine deckhand; tug operator; mechanic; electrician; and general labourers. Work rotations are presently unknown and will be determined by the Contractor. During construction, the Project will utilize the existing scheduled sealift deliveries and use charter flights for the workforce, as required, to ensure the Project is not taking up seats on scheduled flights that the community depends on. The Project will comply fully with the newly revised GN's Nunavummi Nangminiqaqtunik Ikajuuti (NNI) Policy (April 1, 2017) (NNI, 2017) and aims to maximize participation of Inuit labour and Inuit owned businesses on the Project. The Project will also comply with all training requirements under the NNI Policy and offer necessary training. The Project has provided local Inuit with employment and training opportunities as wildlife monitors and field technicians since the initiation of the environmental and geotechnical baseline data collection and engineering design in 2016. Further, the Project hired Ikaarvik (the local research team whose aim is to match southern researchers with the community and their needs) to provide support for Project consultation with the community. Many of the Ikaarvik youth are graduates from the Arctic College Environmental Technology program. Opportunities to provide assistance with environmental and geotechnical baseline data collection and community consultation has positively contributed to their career development. The Project anticipates that the community will see further economic benefits and training opportunities with the hiring of local labour. In addition, there will be secondary economic benefits for the local workforce through the Project's expenditures in the hotels, Co-Op, and potentially the purchase of local arts and crafts.

Participation du public/savoir traditionnel

2.1 Objectives The Project developed and executed a robust consultation program based on the following objectives: Support the Project through planning and design to execution and construction. Identify all potentially affected and interested parties as early as possible. Identify mitigation measures, including input to Project design and management plan procedures. Integrate community values, interests and goals into engineering design of the marine infrastructure. Establish and maintain a positive relationship with Nunavut Inuit, residents and others based on mutual respect. Ensure local knowledge and Inuit Qaujimajatuqangit (IQ) are considered and incorporated in Project design, effects assessment, and management planning. Provide timely and relevant information pertaining to the nature and scope of the Project, permitting process and engineering design. Provide meaningful opportunities for Nunavut Inuit, Hamlet Mayor and Council, community members and stakeholders to review the proposed Project, ask questions, and provide input into its planning and design. The design and implementation of the consultation program has also been guided by the following Inuit societal values (ISV) and principles of IQ as set out by the GN (Government of Nunavut, 2013): Inuuqatigiitsiarniq (respecting others, relationships and caring forpeople); Tunnganarniq (fostering good spirit by being open, welcoming and inclusive); Pijitsirniq (serving and providing for family or community, or both); Aajiiqatigiinniq (decision making through discussion and consensus); Pilimmaksarniq or Pijariuqsarniq (development of skills through practice, effort and action); Piliriqatigiinniq or Ikajuqtigiinniq (working together for a common cause); Qanuqtuurniq (being innovative and resourceful); and Avatittinnik Kamatsiarniq (respect and care for the land, animals and the environment). 2.2 Community, Groups and Organizations The following community, groups, and organizations have been identified as potentially being affected by this Project: Mittimatalik Hunters and Trappers Organization (HTO) Hamlet of Pond Inlet – Mayor and Council and Senior Administrative Officer Hamlet of Pond Inlet Departments – Planning and Lands, Community Works, Bylaw and Recreation Residents of the Hamlet Local businesses including stores and hotels Pond Inlet Health Centre Royal Canadian Mounted Police (RCMP) Sealift companies Tourism operators (outfitters/guides and cruise ships) 2.3 Consultation Overview The consultation program was designed to ensure that hunters, fishers, residents and other key community members were consulted utilizing a variety of methods and materials. This included formal and informal meetings, semi-structured interviews, workshops, open space meetings and public open houses. The materials used included presentations, pamphlets, community notices, non-technical project summaries, engineering design drawings and maps provided in English and Inuktitut. Table 2 1, plus the Activities section, outlines the key community members, community leadership, groups or organizations engaged as well as the method and dates of engagement. 2.4 Concerns Expressed in Consultation and Strategies to Address Table 2-2 provides a summary of the concerns expressed by the community to date and a list of CGS's responses employed to address the topics raised during consultation. A detailed list of all consultation events and feedback received to date is provided in the Pond Inlet Marine Infrastructure Consultation Log supporting document as outlined in Section 7.1.4 (Advisian, 2017b). 2.5 Regulatory and Key Stakeholder Consultation The Project team has engaged with relevant regulatory authorities from the federal, territorial, and municipal governments; Inuit Boards; and the regional Inuit Association. Engagement with the regulatory authorities and key stakeholders is essential for ensuring compliance with all relevant legislation, policies and procedures. The following agencies and boards have received Project overviews and updates since the Project received funding in September 2016: QIA Hamlet of Pond Inlet Planning and Lands NTI GN Department of Environment NPC DFO NIRB INAC NWB ECCC Nunavut Research Institute (NRI) TC GN Culture and Heritage NRCan 2.6 Future Consultation CGS and EDT will continue to engage with the Hamlet Mayor and Council, Hamlet administration, community members, the QIA, and the HTO. Additionally, and as per the recommendation from QIA, CGS and EDT will engage with the CLARC as required. CGS and EDT will provide Project updates on a quarterly basis to the Hamlet Mayor and Council and continue to build on the positive and constructive relationship they have built with the community. Specifically, CGS and EDT will continue to work with the community and engage with the Hamlet, HTO, cargo and fuel operators and residents on: Engineering design. Permits, approvals and licenses. Construction schedule and sequencing of activities. Sealift operation and schedule. Safety and Contractor community relations including a grievance process. Haul road. Quarry use and operation. Contractor environmental and traffic management plans. Terms and conditions of the NIRB Screening decision report. Use of Hamlet services. Hiring and training opportunities. Operations management plan including maintenance of the floating docks and facilities. Consultation will be ongoing throughout the life of the Project. As outlined in Section 1.2, further consultation will be undertaken specific to the regulatory permitting processes. In particular, as engineering design progresses, consultation will continue throughout the DFO FAA process and associated development of a Habitat Offsetting Plan, if required. The FAA process will require further consultation with

DFO and may require further consultation with QIA, HTO and the community to identify offsetting areas for the Offsetting Plan preparation. Further, an Archaeology Impact Assessment will be conducted during the summer snow-free months and may include engagement with the community, as required by Culture and Heritage. Once the tender process is initiated for construction and the Contractor is engaged to construct the SCH, further consultation with the QIA, community, HTO, Hamlet, residents living along the shoreline adjacent to the SCH, heath centre, RCMP, outfitters, sealift operators and cruise ship operators will take place. This engagement will include timing and methodology of construction activities, traffic management, haul road upgrades or construction and quarry operations. Additionally, the Contractor will work with the community to maximize local labour force and business opportunities. 2.7 Traditional Knowledge To date, IQ (or Inuit traditional knowledge) has been gathered during: Two design workshops in the fall of 2016 with members of the HTO. One elder interview and map biography exercise in November 2016. One IQ focused workshop with five active hunters/fishers in March 2017. The first workshop in September 2016 concentrated on gaining an understanding from HTO members of the current conditions for accessing water and ice in the Hamlet and the specific needs for a SCH. With the aid of an interpreter and maps/concept drawings, an open dialogue between HTO members and the consultation team occurred during this meeting. As a result, feedback and local knowledge from the most active users of the existing SCH was obtained. IQ information was noted and marked on maps during discussions on topics such as: wind direction and strength, currents, seasonal changes to ice, water and ice access, and current boat traffic and ramp use. Concept design options were presented at the second design workshop, which was conducted in November 2016. These options had been developed using the IQ information and feedback provided in the first workshop. With the aid of an interpreter, the workshop allowed HTO members to see how their input had been directly considered in the design of the concept options and provide their feedback on a preferred option. IQ and social information was noted during discussions on topics such as: changes to ice once the harbour is built, seasonal access for hunters during construction, Project schedule, and fishing areas. An elder IQ interview was also conducted in November 2016. The elder interviewed, Matthias Kaunak, was recognized by HTO members as being especially knowledgeable about fish, marine mammals, seasonal access, and travel routes and is a current and active hunter and fisher. With the aid of an interpreter and using a questionnaire as a checklist for guidance only, a semi-structured interview was conducted, which allowed flexibility for the participant to relay information in their preferred manner. The interview was recorded and transcribed. Harvesting and use locations were marked on a map and later digitized.

SECTION A : Routes/sentiers : Informations du projet

SECTION A : Routes/sentiers : Route praticable en tout temps/chemin d'accès

3.3.1 Background As noted in the Project General Information section, a haul road is required to transport the rock for construction from the quarry to the SCH. The route will either follow the existing roads through the Hamlet or an alternate haul route which bypasses the main part of the Hamlet. The haul road is intended to be used for the transport of rock materials using large off-road articulated rock trucks (See Equipment section for anticipated construction equipment). The Project is expected to require on the order of 200,000 tonnes of rock. Based on the assumed hauling equipment, this equates to approximately 6,000 truck trips. Truck frequency is expected to be four to six trucks per hour over a 12-hour day shift only. If the alternate haul road is required, the exact route will be left at the discretion of the Contractor. Therefore an alternate haul road corridor has been defined (see Haul Road Study Area in Figure 3 2). The Contractor will be limited to designing and building the alternate haul road within that Haul Road Study Area, if it is required. A desktop feasibility study for the alternate haul road (Advisian, 2017b) has been undertaken that included the following components: Review of potential haul routes between the quarry and the SCH. Regulatory requirements review. 3.3.2 Road Design and Construction If the alternate haul route is constructed, the road alignment, design, and construction methods will be at the discretion of the Contractor but will be accordance with INAC's Northern Land Use Guidelines – Access: Roads and Trails (INAC, 2010b). This includes guidelines for construction over permafrost. Based on similar projects and discussions with Contractors, it is anticipated that the final road alignment and design will: Be within the defined Haul Road Corridor. Be determined based on the following criteria: Minimize grade and maximize turning radii to increase operational efficiency and safety Minimize stream crossings Reduce fill volumes Reduce overall length Have a width of approximately 7 m and a driving surface to allow for two-way traffic of the anticipated haul trucks. Have a maximum grade of 15%. Are constructed using materials sourced from the quarry (See Section 3.2). Be constructed in the summer of 2018 as one of the first major construction operations. Require stripping of overburden material if present and required for the road design. Require some cut-fill operations where in-situ materials are used to build the road core from nearby cuts, depending on final alignment, topography, and overburden materials. Have a surface course(s) of crushed rock as a final driving surface. Have perimeter drainage ditches, culverts, diversion berms, and erosion control structures, as necessary to control surface water. As part of the design process for the alternate haul route and road, the Contractor will be required to complete the following: Undertake all necessary field investigations to determine the final route alignment and design requirements. Complete detailed design of all components of the road including base preparation, road structure, installation methods, and water and erosion control structures. Prepare detailed plans, sections, and details of the alternate haul road. 3.3.3 Road Operations and Transfer of Control To manage interactions with the public, the Contractor will be required to develop a traffic management plan, and meet requirements outlined in the CEMP. The road will primarily be used in the summer and fall of 2018 and 2019; the Contractor is not expected to be hauling rock during the winter months (November/December to April/May). The alternate haul road is intended to be primarily a non-public access road for the sole use of the Contractor during Construction of the SCH. However, the final alignment is expected to have some overlap with existing public roads, including some use of existing roads as well as road crossings. If the Project proceeds with the alternate haul route, the road will not be decommissioned and discussions are presently ongoing with the Hamlet regarding its future use and management.

SECTION C : Puits et carrières

3.2.1 Quarry Activities The construction of the SCH will require the blasting of approximately 75,000 m3 of bedrock, over an area of approximately 10 ha. The proposed quarry area south east of the sewage lagoon and solid waste landfill is presented in Figure 3 1. The exact size and configuration of the area to be blasted may vary depending on final rock requirements, but will not exceed the plan area shown on Figure 3 1. Planned quarry activities are as follows: Vegetation clearing and overburden removal. Drilling and blasting. Sorting and stockpiling blasted rock to produce run of quarry and riprap. Crushing, screening and stockpiling of run of quarry to produce various crushed granular products. All quarry activities will be undertaken in accordance with Workers' Safety and Compensation Commission of the Northwest Territories (WSCC) and Nunavut Acts and Regulations. The Contractor will be required to develop a Quarry Development Plan prior to construction. The Quarry Development Plan will, as a minimum, include the following information: Drilling and blasting methodology and equipment. Explosive type(s), hazard class, volumes, uses, location of storage, and method of storage. Crushing methodology and equipment. Safety and security measures for the workforce and public. Flood and drainage control measures (water management). Erosion and sedimentation control measures. Spill prevention and response. Environmental monitoring and mitigation. Slump control measures. 3.2.2 Field Investigation As noted in Section 3.1.1.2, Advisian is currently undertaking a Geotechnical Field Investigation for the proposed Quarry (Advisian, In Progress). Upon completion, results of the field investigation will be provided to the appropriate regulators and will include the following components: Summary of field investigations and sample collection. Laboratory testing: Acid Rock Drainage and Metal Leaching Potential Identification of any carving stone deposits. A schematic design including footprint. Description of the type and volume of material to be extracted. Description of the depth of overburden. Description of existing and potential for thermokarst development and any thermokarst prevention measures. Description of existing or potential for flooding. Description of existing or potential for erosion. Description of existing or potential for sedimentation. Description of existing or potential for slumping. Description of the moisture content of the ground. Description of any evidence of ice lenses. Discussion of methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.

SECTION D : Infrastructure au large de la côte : Installation

3.1.1.1 Site Selection Based on community input, the proposed location for the SCH was selected as the most favourable site, as it provides marine access adjacent to the community and has been used for decades for boat launching and sealift activities. Further detail on site selection is provided in the General Project Information section. The proposed SCH is located at the sealift Area, as identified by the Pond Inlet Community Plan and Zoning By-law, along the sandy beach in front of resident houses and the existing boat access ramp (Hamlet of Pond Inlet, 2014). The harbour currently extends from the existing small, infilled breakwater to the creek at the southern edge of the beach-front homes. As noted in the General Project Information section (1.1.3), the final arrangement of the SCH is not finalized and changes may occur during the design development phase of the Project. Specifically, if funding allows, the harbour may be expanded by lengthening the east breakwater. The length of the breakwaters is determined by the seabed elevation and related water depth. The seabed in the area of the SCH is generally gently sloping from the high water mark approximately 20 to 30 m offshore to elevation -1 m Chart Datum (CD). There is a horizontal shelf at elevation -1 m CD to around 150 m offshore of the high water mark. Further offshore the seabed begins to slope at approximately 4.5 to 5% for 85 m to elevation -5 m CD. Offshore of the -5 m CD contour the seabed slopes steeply at 15 to 20% into deeper water. The intertidal zone is generally a sandy beach with cobble and boulder, and bedrock outcroppings approximately 100 m and 170 m west of the existing breakwater. See Photo 3 1 to Photo 3 3 for images of the beach along the SCH area. Construction will require the supply of a significant volume of rock. The current rock production capability in the Hamlet is limited to reclamation of borrow pit sands and gravels, south east of the community. To produce the necessary rock for the Project, a new quarry development is proposed south of the landfill and sewage lagoon. The proposed quarry and SCH locations are presented in Figure 1 2. Options for the haul route for rock from the quarry to the SCH are currently being reviewed. During the schematic design, it was noted that an alternate haul road south of the community may be required to avoid driving large equipment through the Hamlet streets. Discussions with contractors with experience in Arctic communities have confirmed that the use of off-highway equipment through residential areas may not be permitted and would likely be less productive than building a temporary, dedicated haul road. Nevertheless, the Project is currently allowing for either using existing roads through the community to transport rock to the site or building a dedicated haul road south of the community (alternate haul route). 3.1.1.2 Studies and Field Investigations The following previous studies and field investigations have been completed for a SCH in the Hamlet: Government of Northwest Territories Proposed Development Plans, Late 1990's. Pond Inlet Breakwater – Feasibility Study (ADI Limited, 2004). Nunavut Small Craft Harbours Report (DFO, 2006). Pond Inlet Harbour Development

(WorleyParsons, 2010) Multi-Purpose Marine Facilities for Cambridge Bay, Pond Inlet, and Rankin Inlet (WorleyParsons/The Rankin Group, 2012). Pond Inlet – Small Boat Harbour – Drawing Package (PND Engineering Inc., 2015a). Pond Inlet Harbour – 2015 Field Studies, Memorandum October 14 2015 (PND Engineering Inc., 2015c). Pond Inlet Summer Field Studies, Progress Update, Memorandum August 25 2015 (PND Engineering Inc., 2015b). Pond Inlet Small Boat Harbour – Fall 2015 Field Studies, September 2016 (PND Engineering Inc., 2016a). Pond Inlet Small Boat Harbour – Temperature and Ice Analysis (PND Engineering Inc., 2016b). Bathymetric and topographic information is available as follows: Canadian Hydrographic Service (CHS) field sheets 1200526, 1200527, 1200528, and 1200529 (Latest update 2004). Supplemental bathymetry from PND Engineers Canada Inc., surveyed October 8, 2015. Topography as per ADI layouts dated 2004. Advisian has undertaken or is currently undertaking the following studies and field investigations in support of the design and permitting of the Project: Geotechnical Field Investigation, including assessments for acid rock drainage and metal leaching potential within quarry Baseline Investigations (completed): 2016/2017 Baseline Studies and Assessments (Advisian, 2017a, 2017d) • Marine field studies including sediment quality, water quality and fish habitat study (completed) • Vegetation (completed) • Wildlife and marine and migratory bird habitat assessment (completed) • Archaeology (in progress – summer 2017) Marine and Coastal Engineering: Pond Inlet – Marine Facilities Schematic Design (completed) (Advisian, 2017e) Marine field studies including metocean investigations (completed) (Advisian, 2017d) Wind, wave and current modelling and assessment sediment transport modelling to assess changes in shoreline due to SCH (completed) (Advisian, 2017g) 3.1.1.4 Facility Life The SCH is expected to be a permanent facility in the Hamlet with a realistic lifespan of 100 plus years. Therefore decommissioning is not assessed. Individual components of the facilities will generally be designed on the basis of a 50-year service life, with the exception of the float strings which are is expected to have a lower design service life. It is important to note that service life does not imply that maintenance on the structure will not be required during that period. Due to the harsh conditions in the Arctic and the lack of experience with northern facilities and structures with an age approaching 50 years, considerable variability in the amount of maintenance required should be expected.

SECTION D : Infrastructure au large de la côte : Construction de l'installation

3.1.2 Facility Construction The following section provides an overview of the design layout, anticipated construction methodologies, and operations of the various Project components. The design and construction methods presented are commonly used and industry standard. No new technologies have been proposed. 3.1.2.1 Breakwaters Layout The proposed east breakwater has two sections that are linked to provide increased protection to the harbour entrance. The main east breakwater protects the inner harbour from northerly and north easterly waves. The breakwater extends from the shore at the location of the existing infilled breakwater approximately 100 m offshore and then turns to the south west. It then runs approximately parallel with the shoreline for 140 m. A secondary east breakwater extends 65 m north east off of the main breakwater at the direction change. The secondary breakwater extends into deeper water and provides increased protection to the harbour entrance from north easterly waves. The main east breakwater has an estimated top elevation of 4.5 m CD and the secondary east breakwater is lower at 3.5 m CD. The east breakwater is not intended to be accessible to vehicle or pedestrian traffic. The proposed west breakwater extends from the offshore edge of the sealift laydown area to the north for 360 m to protect the harbour from westerly and south westerly waves. It has an estimated top elevation of 5.0 m CD. There is vehicle access to the fixed wharf along a 100 m section of the proposed west breakwater. Similar to the east breakwater; the remainder of the west breakwater is not intended for vehicle or pedestrian access. The vehicle access consists of a 4 m wide driving surface intended for one way traffic between the wharf and the sealift laydown area. The layout of the breakwaters has been designed to provide a protected harbour for the community but some wave action is still expected to penetrate into the harbour through the harbour entrance. In the event that the harbour entrance is very rough in a storm, the lee side of the harbour can be used as a safe harbour for vessels returning to the Hamlet which cannot make it through the harbour entrance. In addition, floating ice may from time to time enter the harbour during break-up and freeze-up. Overtopping on the east and west breakwaters will be assessed further during the design development phase of the Project to finalize the crest elevations. Construction The breakwaters will be constructed using fill and rock sourced from the proposed quarry. The breakwaters will comprise of a core of fill material surrounded by rock armour of various size and thickness depending on the exposure and therefore protection requirements along the breakwaters. This will be determined based on the water depth and exposure to waves. The portion of the west breakwater which is accessible to vehicles will be finished with a crushed granular road surface. All breakwater construction is expected to be completed using land-based equipment during the open water season as well as during the shoulder seasons when ice is forming and breaking up. Breakwater construction being undertaken during the shoulders seasons will require ice management and ice removal using land-based equipment in the area immediately adjacent to the work to ensure ice is not buried under the breakwater construction material. Sediment Transport Changes to the shoreline (longshore drift of sediments) due to the presence of the SCH is a long term concern due to the large sediment load supplied by the Salmon River, which is approximately 4.5 km south west of the Hamlet. A previous small breakwater at the site was completely infilled due to such sediment transport. The arrangement of the breakwaters is intended to minimize infilling of the harbour by directing sediment laden water beyond the harbour entrance into deeper water. A shoreline evolution modelling study was conducted to predict the sediment accumulation and erosion along the beach after five, 10, and 25 years. The model used was MIKE 21 FMHD, developed by DHI. The results of this study, are described in the Modelling Report (Advisian, 2017g) and summarized in Sections 4.1.10 and 5.1.7 of this document. 3.1.2.2 Fixed Wharf Layout The fixed wharf is located on the inshore side of the west breakwater, approximately 80 m offshore of the sealift laydown area. The fixed wharf will accommodate larger vessels, such as fishing trawlers. The proposed fixed wharf has the following configuration: Wharf Overall Length: 50 m Depth Alongside: Minimum 3.7 m Top of deck elevation: 5 m A dredged berth pocket and approach channel is necessary to provide access for larger vessels. The approach channel and berth pocket is 30 m wide and dredged down to an elevation of -3.5 m CD. The depth alongside at Low Low Water Level (LLWL) would be 3.7 m, which is sufficient to accommodate inland fishing vessels of up to 35 m in length with minimal working of the tides. The GN's Arctic research vessel, the RV Nuliajuk, would also be accommodated at the fixed wharf during all tide levels. Previous studies have considered a water depth alongside of between 5.5 m and 6 m at the fixed wharf but, based on preliminary cost estimating, this is not achievable within the construction budget. The wharf structure and layout will however be designed for a future dredge allowance to deepen the berth pocket and approach to elevation -6 m, for a depth alongside of 6.2 m at LLWL, if and when additional funds become available. Offshore trawlers with lengths in the 50 to 70 m range could be accommodated at this depth alongside but may need to work the tides depending on the specific vessel. Construction The wharf will be a sheet pile cell structure consisting of three 14 m diameter interconnected circular cells to create a continuous fixed wharf. The construction of the fixed wharf will require the installation of approximately 350 flat web sheet piles. All pile driving is expected to be undertaken using hydraulic vibratory pile driving hammers over a period of approximately 30 days. Following the installation of the piles, the cells and an area approximately 25 m wide behind the wharf will be backfilled with a coarse crushed quarry rock. The wharf and back-up area behind the wharf will be finished with a granular road surfacing. Wharf topsides include the following: Bullrail Mooring Cleats Access Ladders The wharf configuration and type will be evaluated further during the design development phase of the Project. 3.1.2.3 Inner Harbour The inner harbour is a protected area for the moorage of small local vessels. The inner harbour is bounded by the east breakwater on its north and north east sides and the sealift laydown area and ramp on the south west side. Total area of the inner harbour at low water is approximately 2.5 ha. The inner harbour will be swept for rocks and boulders but will not be dredged. To improve vehicle access along the shoreline in the inner harbour, the sandy beach will be topped with a crushed gravel road surfacing, graded and packed. Early consultations in the Hamlet included discussions with the HTO regarding in the capacity of the inner harbour. It was agreed with the HTO that an allowance for floating dock moorage of approximately 40 vessels (80 if double rafted) will be sufficient for the inner harbour. It is expected that vessels moored within the inner harbour will be a mixture of vessels tied up to the float strings, vessels on anchor inside the harbour, and vessels pulled ashore onto the beach. Therefore the capacity of the SCH is greater than 80 vessels. The existing steel grating boat ramp will be retained in the inner harbour for ongoing use. Sand that has accumulated on the ramp will be cleared down to the steel grating surface. It is expected that the new inner harbour will decrease the number of vessels that are removed from the water on a daily basis. Given that the sealift ramp will also be available for boat launching, an additional new boat ramp is not proposed. HTO members agreed that an additional boat ramp is not required. Two float strings are provided for the moorage of vessels. Individual floats are expected to have the following configuration: 3 m wide 60 m long to accommodate 20 vessels (40 if double rafted) each Conventional foam billet flotation with treated timber deck surface Anchor chain mooring Shore to float transition span No utilities services (water, electrical, lighting) will be provided The inner harbour floats are not intended to be left in place over winter; floats will need to be removed before freeze up. They should be stored above high water, and re-deployed in the summer following break-up and clearing of the inner harbour. It is expected that the ice conditions inside the harbour will differ from current ice conditions at the site of the SCH with regard to freeze-up and break-up timing. Calm conditions within the inner harbour will promote ice growth, which will likely lead to earlier freeze-up than the surrounding area. The ice within the inner harbour may also clear later than the surrounding area because the ice will be contained by the breakwaters. 3.1.2.4 Storage/Parking Area and Sealift Ramp Layout The SCH schematic design includes a new sealift laydown area adjacent to the west breakwater. The laydown area is approximately 1 ha in size with a finished elevation of 3.5 m CD. An access ramp is provided between the laydown area and the west breakwater to allow vehicle access onto the breakwater and the fixed wharf. Relocation of the sealift area to the west side of the harbour will greatly reduce congestion near the current boat ramp during the sealift and improve access to the beach for residents. A sealift ramp is planned on the north east side of the laydown area for landing of the sealift barges for dry cargo unloading. The proposed ramp has a width of 20 m with a 15 m wide driving surface. It is sloped down to the existing seabed at a 10H:1V slope. While not in use for sealift operations it is anticipated that the sealift laydown area and ramp will be available for boat launching and parking. Construction The primary fill material for the sealift laydown area is dredged materials from the fixed wharf berth pocket and approach channel. Prior to dredging, a containment berm will be constructed along the perimeter of the sealift laydown area and the dredged materials will be placed inside the berm. A crushed granular road structure will be placed on top of the dredged sediments to provide a suitable working surface. The sealift ramp will be constructed using a run of quarry core material and finished with a course granular rock. 3.1.2.5 Dredging Dredging of an estimated 16,000 m3 of sediment is required to achieve the planned depth alongside the new fixed wharf and provide the access channel to deeper water. The dredging requirements, including lateral extent and depth, will be finalized during the design development phase of the Project. As a contractor for the works has not yet been selected, the exact dredging methodology is not yet known. Based on the volume of dredging required and the location of the work, it is expected that dredging will completed using conventional mechanical equipment such as a clamshell bucket. Material will be dredged from the seabed, raised to the surface and placed onto a sealed scow. The dredged material will be beneficially reused as fill for the sealift laydown area and no disposal at sea of dredge material will be required. The material will be moved from the scow into the containment area, which is described in Section 3.1.2.4. 3.1.2.6 Ancillary Services For the schematic design phase an electrical and lighting allowance has been carried for the following items which may be provided depending on available funding: Area lighting Maintenance and shore power plugs Provisions for future power demands (fuel manifold instrumentation and controls) 3.1.2.7 Materials and Quantities The construction of the SCH is expected to require the following construction materials. All materials will be brought in from outside of Nunavut other than the rock that will be sourced from the quarry. Rock, produced from the quarry: 75,000 m3 or 200,000 tonnes. See Section 3.3.1 for estimated number of truck trips. Steel sheet piles: 360 tonnes. Wharf hardware, including mooring cleats, ladders, and

bullrail. Pre-fabricated small craft floats, including mooring systems and ramps. Electrical components (if provided) including cables, junction boxes and enclosures, wiring devices, lights and light poles.

SECTION D : Infrastructure au large de la côte : Exploitation de l'installation

SECTION D: Offshore Infrastructure: Facility Vessel Use in Offshore Infrastructure

SECTION H : Activités marines : Élimination dans la mer

Vessels using the SCH will approach the facility from Eclipse Sound and enter the small craft harbour through the harbour entrance. Three types of vessels are expected to call at the berth: Small craft will primarily use the eastern area within the inner harbour. Small craft moored within the SCH are expected to be a mixture of vessels on anchor, moored at the small craft floats, or pulled ashore. The small craft floats will be able to accommodate between 40 and 80 vessels, depending on the final mooring arrangement. The inner harbour itself has an overall area of approximately 2.5 ha at low water. Sealift barges will be transported to the sealift ramp by small tugs where they will be offloaded using land based equipment. Sealift barges are not expected to be moored to shore at any point, tugs will be used to hold the vessels in place for loading/unloading. Fishing and other larger vessels are expected to use the fixed wharf. Vessels will berth either port side or starboard side to the wharf, as required for their operations. It is expected that vessels larger than approximately 12 to 15 m (40' to 50') length will not be able to use the floating docks and must therefore use the fixed dock. This is a restriction due to the depth at the floating docks.

Description de l'environnement existant : Environnement physique

4.1 Physical Environment 4.1.1 Designated Areas No designated areas occur within the Study Areas. However Bylot Island, on the north side of Eclipse Sound is protected both as a national park (Sirmilak National Park) and as a Migratory Bird Sanctuary (MBS, (ECCC, 2016a)). As an MBS this island is recognized for several areas with important nesting habitat, and is further considered to have several Important Bird Areas (IBAs, (IBA Canada, 2016)). Bylot Island is 20 km north from the Hamlet on the other side of Eclipse Sound. In addition to the land portion of Bylot Island, the MBS extends 3.2 km from shore (ECCC, 2016b, 2016c). Bylot Island has also been identified as a Wildlife Area of Special Interest (WASI) for its importance to polar bears (Nunami Stantec, 2012). Tamaarvik Territorial Park (campground) is located 15 km south of the Hamlet and supports tourism. The park provides recreational activities for visitors (Nunavut Parks, 2017). Marine Protected Areas (MPAs) are designated to conserve and protect marine species, habitats and ecosystems (DFO, 2016). There are no MPAs in Eclipse Sound or northern Baffin Island at this time (ECCC, 2016b), however, a proposal for the Lancaster Sound National Marine Conservation Area (NMCA) (Parks Canada, 2016b, 2016a) is under review. This NMCA would encompass Eclipse Sound and potentially waters in the SCH Study Area if it is approved. However, the community requested the exclusion of the SCH Study Area from the NCMA within the draft Land Use Plan to allow for the development of a harbour (Figure 4 2) (NPC, 2016b). DFO has identified Ecologically and Biologically Significant Areas (EBSA) one of which covers the SCH Study Area (Eclipse Sound EBSA), and another that does not (Lancaster Sound EBSA) (DFO, 2011). The primary reason for designation of the Eclipse Sound EBSA is presence of narwhals, specifically due to presence of cow-calf pairs, during the open-water season. The Lancaster Sound EBSA, has been identified for its polynyas (open water surrounded by sea ice) and sea-ice-edges (DFO, 2011, 2015). The Lancaster Sound EBSA encompasses the Baffin Bay and Lancaster Sound coast of Bylot Island, as well as the majority of the south coast of Devon Island. The Lancaster Sound EBSA is 6.5 km east of the SCH Study Area but it is important in providing context to the marine mammal baseline in the SCH Study Area. Figures showing the location of the designated areas described are provided within the Terrestrial and Human Environment Baseline Report (Advisian, 2017a). 4.1.2 Geological Site Conditions The Project components (SCH, Quarry and Haul Road) are situated over Pre-Cambrian rock of the Canadian Shield (Geological Survey of Canada, 2012). The Quarry Study Area and the eastern portion of the Alternate Haul Road Study Area are located on an upland plateau of rolling topography with a blockfield felsenmeer surface, created by frost weathering. Elevation contours show the plateau ranging from 140 to 150 m. Bedrock observed during site visits to the Quarry Study Area identified massive, to finely foliated and thinly banded gneiss and migmatite. Zones of folded bedrock were also identified in bedrock exposures. Thickness of overburden in this area is expected to be relatively thin and shallow, and will be confirmed during the intrusive geotechnical investigations planned for April 2017. Based on consultation information, there is no indication of carving stone occurring within the Study Areas. Testing for Acid Rock Drainage and Metal Leaching potential is ongoing. Two geotechnical boreholes were advanced within the footprint of the proposed quarry, ranging from 9.3 to 15.0 meters below existing ground surface. Select rock samples were chosen for ARD testing and processed in the field as per standard procedure (i.e. documented and photographed). The samples will be tested for their static geochemical compositions and properties. Analysis will include Acid Base Accounting (ABA), ultra-trace metal analysis, shake flask extraction (SFE) tests and X-Ray diffraction (XRD). At the time of this report, the samples are being shipped to Maxxam Analytics laboratory in Burnaby, BC and therefore results are still pending. Detailed methods and results will be available from the laboratory in June/July 2017. Based on visual observations of the rock samples during the survey, there appears to be little or no sulphide minerals, which indicates a very low risk of ARD. 4.1.3 Surface Features The majority of the site of the SCH Study Area is underlain by gently sloping silty and sandy intertidal sediments. Regional information shows that in the shoreline areas of Eclipse Sound, the till is often silty and partly derived from marine sediments (Hodgson and Haselton, 1974). The shoreline at the SCH Study Area is comprised of a gently sloping beach with a small zone of exposed bedrock outcrop at the shoreline backed by shallow bluff slopes. Exposed rock and postglacial nearshore sediments are found at the SCH Study Area while, slightly inland, isolated quaternary till deposits were identified at the base of slopes. These mixed textured deposits may also be influenced by solifluction (gradual movement of wet soil on slopes relating to freeze-thaw activity) and cryoturbation (mixing of soil horizons due to freeze-thaw activity). Solifluction may occur on slopes as low as 3 degrees and surficial sediments are particularly mobile in permafrost regions as the active layer is saturated with moisture, due to the low permeability of the underlying ice-rich permafrost (Ferrians et al., 1970). Several channel and gulley features occur in the parts of the Quarry Study Area which have steep blocky colluvial slopes. Of note was the prominent north east/south west trending gully that has measured slopes of up to 40 degrees; with an elevation at the base of this gully of 115 m. The slopes of this gully have small to large tabular to blocky boulders which also occur in random locations along the base. Areas of this gully appear to be poorly drained, with ice at the ground surface observed. Drainage features across the plateau of the Quarry Study Area are trending mainly north west/south east approximately perpendicular to the prominent gully identified. The drainage features within the Quarry Study Area are shallower than the larger gully, also with blocky boulders at the base and may be poorly drained. The ground surface across the Alternate Haul Road Study Area is characterized by a variable pitted and hummocky surface, with drainage features running generally north to south and northwest to southeast. In between these hummocky zones and ridges are lower lying zones that appear to be poorly drained. The hummocky ridges appear to be more granular and are towards the eastern side of the Alternate Haul Road Study Area. These areas have previously been used to supply construction material and appear to be small eskers and/or kames. In the lower lying poorly drained areas are some bodies of water which appear to be shallow thaw lakes. In addition there is a possibility that there may be layers of unfrozen ground underlying these waterbodies. A review of the available aerial imagery for the Hamlet did not identify any evidence of thermokarsts or standing water in the Quarry Study Area; no features were observed in the ground surface that may be associated with polygonal ground or ice lenses such as fractures. Within the Alternate Haul Road Study Area, cracks derived from ice lenses or frost heaves were also observed on aerial imagery. These are more obvious in areas with lower ground cover and where reworking of the ground has occurred. 4.1.4 Permafrost and Ground Stability The Hamlet is located in the Continuous Cold Permafrost Zone. Permafrost is defined as ground that remains at or below 0ºC for at least two consecutive years (Tarnocai and Bockheim, 2011). In general permafrost can be found at depth of several hundred meters in the Canadian Arctic. The surface layer does thaw during the short summer months (referred to as the active layer) and this layer can be highly variable ranging from <30 cm to > 1.5 m thick. The thickness of the active layer varies greatly due to various factors, including annual air temperature and the heat conductivity of the soil. In general, there is a much deeper pocket of unfrozen ground under water bodies as the temperature of water is greater and thaws permafrost. These unfrozen pockets of sediment or rock are called talik. It is assumed that areas under water to be used for the SCH does not contain ice near the seabed surface (<20 m below seabed surface) due to the warming effect and salinity of marine water. There is limited permafrost data for the Hamlet. Robert Taylor (Geological Survey of Canada) monitored coastal process at Pond Inlet as well as frost table depths along the shoreline from 1972-2005. Based on results, the active layer ranged from approximately 0.5 m to 0.9 m below ground surface. A permafrost monitoring location was established near the airport in 2008 by the Geological Survey of Canada which recorded temperature for 2008 to 2009 (Ednie and Smith, 2010). The mean annual ground temperature is -8.5ºC at a depth of 15 m. The annual range of the ground temperature is 27.5ºC (from approximately -22ºC to 5ºC) at a depth of 0.5 m and the estimated active later thickness (top layer of soil that thaws during summer) for the Hamlet is 0.8 m (Ednie and Smith, 2010). The short summer season and cold winters support a thicker active layer in free-draining granular soils. These granular soils are characteristic of the beach deposits that will support access roads and foundations for berthing structures. The Quarry Study Area is bedrock with properties not directly affected by permafrost. Exposed rock and postglacial nearshore sediments are found at the shoreline. Isolated till deposits were identified at the base of the slope inland from the shoreline. These mixed textured deposits may also be influenced by solifluction (possible soil flow) and the stability of these slopes will be taken into consideration for the haul road design and construction. Solifluction may occur on slopes as low as 3 degrees. Surficial sediments are particularly mobile in permafrost regions as the active layer is saturated with moisture, due to the impermeability of the underlying permafrost (Ferrians et al., 1970). Anecdotal evidence from the community suggests that slope instability occurs along the slope of the existing road on the alternate haul route adjacent to the cemetery. Erosional features at these shoreline bluffs were identified in the aerial imagery and these may also contribute to its instability, with likely mechanisms being surface runoff and wave erosion. 4.1.5 Hydrology The Project is located within the Eclipse Sound Watershed. This watershed is located in the northeastern tip of Baffin Island. There are a number of waterbodies drainages/creeks and small ponds surrounding the Hamlet. There are two drainages that occur within the Alternate Haul Road Study Area (Figure 4 1). Information obtained during desktop study and qualitative descriptions during field studies indicate the watercourses do have connectivity to small waterbodies in the vicinity of the Hamlet. Both watercourses are characterized as seasonal. No watercourses occur within the SCH Study Area. There is an ephemeral drainage located on the northwest portion of the Quarry Study Area, which is fed by snowmelt and precipitation (Figure 4 1). Salmon River and Salmon Creek are located 4.5 km and 3 km south west of the SCH respectively (Figure 4 3). 4.1.6 Air Quality Air quality monitoring is sparse in the Hamlet but regional air quality monitoring was conducted for North Baffin Island as part of the Baffinland Project,

Environmental Assessment (EA, (RWDI Air Inc., 2008b)). Ambient air quality was measured in July 2007 in Mary River (150 km south west of the Hamlet). Total Suspended Particles (TSP) measurements ranged from 3.5 to 7.0 µg/m3 (RWDI Air Inc., 2008b). This is much lower than the 24-hour standard of 120 µg/m3 and annual standard of 60 µg/m3 outlined in the Nunavut Ambient Air Quality Standard (Government of Nunavut, 2011a). Due to the short duration of the measurement, the results were compared to long-term monitoring data locations in remote, northern areas operated by the Department of Environment and Natural Resources in Northwest Territories (NWT). The measured concentrations for the Baffinland Project were also lower than measurements from all comparison sites in the NWT (RWDI Air Inc., 2008b). Similarly, particulate matter 10 micrometers or less (PM10) concentrations ranged from 1.5 to 3.8 µg/m3 which was comparable to the annual average concentrations measured in NWT (RWDI Air Inc., 2008b). Note that there is no PM10 ambient air quality standard in Nunavut to compare with these measurements. The 30-day average sulphur dioxide (SO2) (≤0.262 µg/m3), nitrogen dioxide (NO2) (≤0.188 µg/m3), and ozone (O3) (range from 44.0 to 52.8 µg/m3) concentrations were well below 1-hour, 24-hour, and annual standards ((RWDI Air Inc., 2008b). Therefore based on RWDI Air Inc. (2008b) analysis, the baseline air quality in Mary River is considered pristine and typical of remote Arctic environments. Air quality monitoring conducted in Resolute and Cape Dorset in 2013 determined that waste burn, airport operations and town activities such as vehicle traffic, residential combustion and power generators contributed to nitrogen oxide (NOX) and PM2.5 pollution (Aliabadi et al., 2015). SO2 pollution was affected by airport activities and ships anchoring in position (Aliabadi et al., 2015). Resolute is a coastal community in northern Nunavut, approximately 700 km northwest of the Hamlet and air quality is expected to be similar. In the absence of ships, the measured NOX concentration was less than 1.3 µg/m3 (Aliabadi et al., 2015). This is much lower than the Nunavut standards: 400 µg/m3 (1-hour); 200 µg/m3 (24-hour); and 60 µg/m3 (annual). The maximum measured SO2 concentration was 1.05 µg/m3, which is much lower than the Nunavut standards: 450 µg/m3 (1-hour); 150 µg/m3 (24-hour); and 30 µg/m3 (annual). The PM2.5 concentration was up to 10 µg/m3, which is lower than the 24-hour standard of 30 µg/m3. 4.1.7 Noise Noise data specific to the Study Areas was not available. However, noise levels are presumed to be generally low in the Study Areas as there are no major industrial operations that result in continuous noise. Noise measurements at similar remote sites in northern Canada were conducted for baseline studies for various projects including Snap Lake (De Beers, 2002) and Diavik (Diavik, 1998). At Snap Lake, hourly equivalent sound level (Leq) was 29.9 dBA and noise levels reported for the Diavik Project ranged from 25 to 40 dBA. As part of the baseline assessment on noise during the Baffinland Project EA, noise was considered to be faint; mean 24-hour Leq ranged from 24 to 30 dBA (RWDI Air Inc., 2008a). These results are typical of remote areas with natural background noise such as wind. For the Hamlet, it is assumed noise would be generated from a number of sources including automobiles, aircrafts and all-terrain vehicles/snowmobiles that are used by the community. These sources may emit noise for short periods of time and noise effects diminish with distance from a source. For example, a jet taking-off produces an instantaneous noise level of approximately 130 dBA at 100 m distance; however when averaged into a 24-hour Leq the impact of the aircraft is minimal. 4.1.8 Climate Conditions The Hamlet is located within the Northern Arctic Ecozone and is one of the coldest and driest landscapes in Canada (Ecological Stratification Working Group, (ESWG, 1995)). Snow falls in all months of the year and persists on the ground for at least 10 months (September to June). Mean daily temperature is -14.6ºC (Standard Deviation: ±4.9ºC) over the year, but ranges from -33.7ºC in February to 6.6ºC in July. Mean daily minimum and maximum temperatures for February are -37.1ºC and -30.2ºC respectively. In July, mean daily minimum is 2.7ºC and mean daily maximum is 10.5ºC. The freezing index for the Hamlet is approximately 10,500 degree days and the thawing index is approximately 500 degree days (Boyd, 1976). Average relative humidity is 74.8% and is slightly higher during the spring, summer, and fall (May to October) than in the winter (December to March). Mean annual precipitation is 189.0 mm and mean monthly precipitation ranges from 3.8 mm in February to 38.8 mm in August. Precipitation mostly falls as snow (131.9 cm) with only 91.0 mm falling as rain. Average snow depth over the course of the year is 13 cm with the highest average depth of 26 cm in May and no snow accumulation during the summer (July and August). Wind speed is 9.0 kph and the monthly average is relatively consistent throughout the year. Wind direction is relatively stable between March and July where it predominantly blows from the northeast. In the fall and winter the wind direction is variable and changes monthly, blowing from the south west, west, east, and north. Winds during the open-water season are most frequent from the south followed by winds from the west, north east, and south west. The more severe the storms (≥ 60 kph) typically come from the north east and east sectors. The area is calm (<20 kph) 83% of the time, during the open-water season. The maximum recorded wind speed during the July through October season was 74 kph recorded on one occasion from the north east, east, and west. On average, the Hamlet has 14.84 hours of light (including civil twilight) (National Research Council of Canada, 2017). The Hamlet experiences 24 hours of light from mid-April to the end of August (National Research Council of Canada, 2017) and is in complete darkness from mid-December to the end of December (National Research Council of Canada, 2017). 4.1.9 Marine Water and Sediment Quality Metals concentrations are relatively consistent across the SCH Study Area and across the intertidal and subtidal regions (Advisian, 2017d), and are lower than in other parts of Nunavut such as Hudson Bay (Stewart and Lockhart, 2005), Grays Bay (Wolfden Resources, 2006) and Pangnirtung (Baffinland Iron Mines Corporation, 2010b). Polychlorinated biphenyl (PCBs) and polycyclic hydrocarbons (PAHs) have not been identified in the sediments within the SCH Study Area (Marine Baseline Report, (Advisian, 2017d)). There are limited sources of anthropogenic contaminants to the marine environment in Study Area and sediment analyses from baseline sampling indicate all metals, PCBs and PAHs tested are below respective Canadian Council of Ministers of the Environment (CCME) sediment quality guidelines (Marine Baseline Report, (Advisian, 2017d)). Water quality in Eclipse Sound appears to be typical of the region and is relatively consistent across the Sound and through the depth of the water column from both a physicochemical and chemical perspective. The physicochemical properties of the water column are consistent with those found in other studies throughout the region and can be characterized as neutral pH, brackish, hard and clear (NGMP, 2012; Advisian, 2017d). Dissolved metal concentrations are generally comparable to total concentrations, indicating metals are not typically bound to solids. There are no apparent trends in metal concentration with depth or location. All metals were below respective long term CCME water quality guidelines for the protection of marine species. 4.1.10 Coastal Morphology The shoreline in front of the Hamlet consists of narrow sandy beaches (with some coarser material) fronting erodible bluffs. There are occasional rock outcrops. Sediments in the SCH Study Area are comprised predominantly of sand. Sediments within the intertidal area on the beach, whilst predominantly sandy, also contain some gravel, which is absent from subtidal sediments. Aerial imagery indicates that the Salmon River, which is approximately 4.5 km south west of the Hamlet, discharges large volumes of sediment and has formed large deltaic features (large tidal flats and wide, sandy beaches). The Salmon River and the active bluff erosion along the shoreline are likely to be the primary sources of sediment along the shoreline fronting the Hamlet. The suspended sediment plume from the Salmon River is observed to flow in a north-easterly direction towards the Hamlet (ADI Limited, 2004). The shoreline along the Hamlet generally appeared to be in equilibrium with no major observed accretion or erosion processes. The existing rubble mound breakwater has been infilled with sediment over time, however, the shoreline position on either side of the breakwater appears to be stable. During high tides coinciding with storm conditions, erosion along the crest of the beach has been reported. 4.1.11 Bathymetry The Study Area is characterized by a straight coastline and gently sloping sandy shore. Depths at the seaward extent of the proposed east breakwater are approximately -5 m CD and seaward of the proposed west breakwater are approximately -11 m CD. 4.1.12 Tides The closest Canada Hydrographic Services (CHS) tide station to the Hamlet is in Pisiktarfik (Station #5795), 82 km to the south west (CHS, 2016). The tidal range at Pisiktarfik in 2016 was between 2.2 m to 2.5 m. Eclipse Sound with Bylot Island to the north, and northern Baffin Island to the south, is the waterway that encompasses the Hamlet. Sailing directions (CHS, 2014) report tidal currents to run westward when flooding and eastward when ebbing at a rate of about 1 m/s (2 knots). The data showed current speeds did not exceed 0.8 m/s (1.6 knots). Peak currents were found to align with peak north easterly winds during the open water summer season. Typically currents are below 0.5 m/s (PND Engineering Inc., 2016a).

Description de l'environnement existant : Environnement biologique

4.2.1 Vegetation (Terrestrial) Most of Nunavut, including the Study Areas is located within the Tundra Biome and the Northern Arctic Ecozone (ESWG, 1995). The Northern Arctic Ecozone is among the largest Arctic ecosystems in the world and is divided into a number of ecoregions. The Project occurs within the Ecoregion 76 - Borden Peninsula Plateau (ESWG, 1995). The Borden Peninsula Plateau includes north-central Baffin Island and the south western coast of Bylot Island. The dominant vegetation communities are herbaceous and lichen communities. Lichen communities are typical in rocky areas. Vegetative cover is greater on wetter and sheltered sites. Vegetation field surveys were conducted from September 16 to 18, 2016. An ecological land classification survey (ELC) was completed to identify the vegetation communities. The field survey focussed primarily on the Quarry Study Area; however a portion of the Alternate Haul Road Study Area was also surveyed. Field studies also included a species inventory and non-vascular plant assessment. During the ELC survey eight vegetation communities were identified as follows: Upland Dwarf Shrub (UDS) Upland Dwarf Shrub – Variant 2 (UDS-2) Upland Bedrock Outcrops (UBD) Wetland Graminoid Drainage (WGD) Wetland Ravine (WR) Wetland Hummocky (WHU) Wetland Shrubby (WSH) Disturbed (DIS) Three vegetation communities were identified from aerial photography interpretation in the portion of the Alternate Haul Road Study Area which was not surveyed in the field: Upland General (ULD) Lowland General (LGR) Wetland Open Water (WOW) The Quarry Study Area is predominantly covered by the UDS vegetation community, which is a rolling plateau of frost shattered bedrock and dwarf shrub vegetation. This plateau is interspersed with several drainages, which supports the WGD community. As these features drain towards the ocean, they form deeper ravines which support the WR vegetation community. Dwarf shrubs are common throughout all the vegetation community types. The area has a diverse lichens population, which are common on rock and soil substrates throughout the Quarry Study Area. The Alternate Haul Road Study Area consists of a mixture of upland plateau areas with several lowland drainages throughout the route. The upland areas in the east are dominated by the UDS-2 vegetation communities. The DIS community is also present throughout most of the upland area in the east, with the disturbance predominantly aggregate extraction. A dominant drainage is located centrally within the Alternate Haul Road Study Area, with drainage running from the southeast to the northwest. This drainage has a wide lowland area surrounding it, which is comprised of the WHU, WSH, and LGR vegetation communities. Several smaller drainages are situated in the west of the Alternate Haul Road Study Area between areas of upland, and are comprised of the LGR vegetation community. Dwarf shrubs are common throughout all the vegetation community types. During the field assessment a total of 62 vegetation species were observed, 36 of which were non-vascular species. Six plants identified as having traditional uses within the Hamlet area were identified during field studies. According to local Elders, an area used for food plant/berries harvesting is located within the Alternate Haul Road Study Area. However the Quarry Study Area has not been a traditional area used for harvesting (Figure 4 3). 4.2.2 Wildlife (including Habitat and Migratory Patterns) In general, habitat near the SCH Study Area is of limited value for terrestrial wildlife. The beach is developed and has structures and boats along its length. The buildings along the beach may provide cover for small mammals and the intertidal zone likely provides foraging opportunities, at low tide. However, the value of these habitats is low given the frequent human and dog activity, which reduces its attractiveness. The Alternate Haul Road Study Area contains a mixture of upland shrub and bedrock outcrops and lowland and wetland habitats. These vegetation communities are likely the most attractive to wildlife. Habitat available for wildlife in the Quarry Study Area is similarly of low quality. The majority of the terrain is comprised of bedrock; therefore it provides security, escape, and thermal cover for some small mammals. However, the area has little value for denning given the lack of soil and the sparse and low vegetation cover which reduces the attractiveness for foraging or cover habitat for species that depend on dense or tall or dense vegetation. A habitat assessment and field reconnaissance survey was undertaken with the vegetation field surveys from September 16 to 18, 2016. The survey resulted in no confirmed

observations of wildlife in the SCH or Quarry Study Areas, or the surveyed portions of the Alternate Haul Road Study Area. Surrounding these areas, lemmings (brown lemming: Lemmus trimucronatus and Peary land collared lemming: Dicrostonyx groenlandicus) are common around the Hamlet (Baffinland Iron Mines Corporation, 2010a). In the past, Peary land collared lemmings were the most abundant lemming species and three were noted under the Hudson's Bay Company building (Miller, 1955). Other species that inhabit the area surrounding the Hamlet include Arctic hare (Lepus arctos) and Arctic fox (Alopex lagopus); and dens of these species are often found to the west near Oliver Sound as well as the east coast of Baffin Island (Baffinland Iron Mines Corporation, 2010a). Red fox (Vulpes vulpes) appear to be common (Baffinland Iron Mines Corporation, 2010a). 4.2.3 Migratory and Marine Birds (including Habitat and Migratory Patterns) 4.2.3.1 Migratory Birds In general, habitat in the SCH and Quarry Study Areas is of limited value to migratory and marine birds. Given its location within the Hamlet, human development occurs to the edge of Eclipse Sound. The beach is developed and has structures and boats throughout the SCH Study Area. During field surveys, it was noted that teams of dogs were tied up along the beach. According to LePage et al. (1998), nesting birds in town frequent the sewage and garbage dumps, in addition to the seepage slopes below houses. Although 47 birds are confirmed breeders, and this represents one of the most diverse bird communities in the Canadian Arctic archipelago, the value of nesting habitat in the SCH Study Area or Quarry Study Area is low. For species that nest on bare ground and gravelly areas (e.g. snow buntings [Plectrophenax nivalis]) or are relatively tolerant of human disturbance (e.g. common raven [Corvus corax]), there may be limited nesting habitat. However, human use and dogs likely discourage nesting and use of these areas. At low tide, the intertidal zone provides foraging opportunities but only for those species tolerant of human and canine activity. Consequently, the value of these habitats is likely low given the disturbance. In contrast, the Alternate Haul Road Study Area contains a mixture of upland shrub and bedrock outcrops and lowland and wetland habitats. The wet meadow dominated by sedges and grasses and wetlands provides habitat for the highest number of species (LePage et al., 1998). According to Renaud et al. (1981) who collated records and made observations about breeding habitat in the Pond Inlet Region, well-vegetated (vascular plants, bryophytes, and lichens) lowland tundra support a rich number of nesting birds including long-tailed jaeger (Stercorarius longicaudus), American golden plover (Pluvialis dominica), Baird's sandpiper (Calidris bairdii), and Lapland longspur (Calcarius lapponicus). Similarly species-rich habitats were tussocky, graminoid tundra within wetland complexes at the mouth of Salmon River where red-throated loons (Gavia stellate), snow goose (Chen caerulescens), long-tailed duck (Clangula hyemalis), and red phalarope (Phalaropus fulicarius) nest. Similar habitat is available within the Alternate Haul Road Study Area. Seepage areas on the lee sides of hills that create abundant graminoid communities are used by nesting white-rumped sandpiper (Calidris fuscicollis) and pectoral sandpipers (C. melanotos; Renaud et al. 1981). Slightly further afield, the Salmon River itself is used by Thayer's gull (Larus thayeri), glaucous gull (Larus hyperboreus), loons and mergansers (Renaud et al., 1981). Following breakup in August and September, shorebirds and American pipits (Anthus rubescens) use the Salmon Creek and Salmon River extensively (Renaud et al., 1981). These species are also likely to occur within the Alternate Haul Road Study Area. Bird presence was sparse during the field survey. However, given the assessment occurred in late September, at a time when most birds have initiated migration (Cornell Lab of Ornithology, 2016a), few observations were expected. Common ravens and unidentified gulls (Larus spp.) were observed during vegetation mapping and habitat assessment. During the field reconnaissance, one rough-legged hawk (Buteo lagopus) was observed perched under the pilings of a building near the beach adjacent to the proposed SCH Study Area. An American pipit (Anthus rubescens) was observed foraging along the beach. IQ interviews with HTO members and elders revealed that bird nests have not been seen in the SCH or Quarry Study Area but that ravens, Arctic tern (Sterna paradisaea), snow bunting, and other little birds occur. Typically birds nest in the rocky areas south west of the airport, about 2 km from the SCH Study Area. 4.2.3.2 Marine Birds Nesting habitat for marine birds is unsuitable in the SCH Study Area as many marine birds nest in large colonies on remote, precipitous cliffs and remote islands that are inaccessible to predators (Cornell Lab of Ornithology, 2016b, 2016a). Although not for breeding purposes, 28 species of marine birds could potentially use inter-tidal and nearshore habitats in the SCH Study Area for foraging (Advisian, 2017a). The use of this habitat tends to peak between mid-July and October (Renaud et al., 1981) after break-up when the onset of the open-water season creates a productive foraging area which contributes to high bird diversity (LePage et al., 1998). Species most likely to be encountered include thick-billed murres (Uria lomvia), northern fulmars (Fulmarus glacialis), and black-legged kittwakes (Rissa tridactyla), black guillemots (Cepphus grylle), and glaucous (Larus hyperboreus), Thayer's (L. thayen), and ivory gulls (Pagophila eburnea) (Bradstreet, 1982). 4.2.4 Freshwater Fish and Habitat A desktop study was conducted on freshwater fish and habitat for the Project. The study focussed on the Alternate Haul Road Study Area as no watercourses or water bodies occur within the Quarry or Small Craft Harbour Study Areas. Arctic char (Salvelinus alpinus) was chosen as the focal species, the importance of which is described in Section 4.2.5. There is no indication that other freshwater fish species are present. Based on the desktop study, it cannot be conclusively stated that the watercourses in the Alternate Haul Road Study Area do not contain Arctic char. However, based on the life history requirements for Arctic char, neither of the watercourses is likely to support viable populations as they do not provide connectivity to large waterbodies which would be suitable to allow Arctic char to complete their life cycle. Based on the approximated size of the watercourses (<5 m channel width) as well as the duration and severity of winter in the area, it is very likely that the watercourses would freeze to bed during winter making overwintering extremely unlikely. Given the high gradient, shallow flows and impassible culverts near their confluences, it is unlikely upstream migration would be possible. In addition, IQ obtained during consultation, there is no direct evidence supporting any use of the unnamed watercourses being utilized as a fishery resource. Residents of the Hamlet stated that the watercourses do not have fish populations and are not used for subsistence fishing (Brian Koonoo (local hunter) pers. comm. April 2017; George Koonoo (Wildlife Officer) pers. comm. April 2017). 4.2.5 Marine Fish Habitat (including Marine Vegetation) Intertidal areas in the Hamlet, are characteristic of gently sloped soft sediment Arctic environments, exhibited by a barren intertidal (Ellis, 1955) that is predominantly sand, with intermixed cobble, gravel (Greenwood, 2016), and the occasional small boulder (Advisian, 2017d). This barren intertidal zone is driven by the presence of ice, which continually scours the substrate during freeze-up, iced, and break-up periods. Typically, the ice scour also influences the shallow subtidal waters, where the daily tidal fluctuations will similarly scour the substrate. A seabed survey which consisted of 15 transects within the SCH Study Area was undertaken in September 2016. The subtidal substrate was largely sand. However, areas of hard substrates (boulder beds) were observed (see Figure 4 2). In these areas, seaweed species were observed in moderate to abundant densities (30 to 100%) – most typically rockweed and kelp (broadleaf brown). The extent of the seaweed bed fronting the Hamlet is shown in Photo 4 1. The seaweed bed runs parallel to shore on the western and eastern portions of the SCH Study Area as shown in the habitat map (Figure 4 2) prepared based on the field survey. The extent of habitat that will be permanently destroyed due to construction of the SCH was calculated based on the maximum footprint of the proposed SCH. The area of moderate to abundant seaweed habitat in the SCH Study Area is estimated to be 2.286 ha. The extent to which seaweeds provide three dimensional habitat for marine organisms has not been well studied in the Arctic; however, it is an established concept in temperate and tropical environments (Cristie et al., 2003; Wikstrom and Kautsky, 2007; Warfe et al., 2008; Brown et al., 2011). Włodarska-Kowalczuk et al. (2009) hypothesize that holdfasts of larger kelps provide refuge for organisms, such as amphipods, from ice scour events. It is likely that established seaweed beds are important for a variety of life stages of marine species occurring in the coastal waters of Eclipse Sound. Furthermore, seaweed beds are significant primary producers, and thus play an important role in a short open-water season (Glud et al., 2002). In a study near Cape Hatt (Eclipse Sound, south shore), 65 km west of the SCH Study Area, Kupper et al. (2016) observed the following: Barren intertidal area, with occasional rockweed (Fucus sp) observed on the occasional boulder. Subtidal seaweeds first occurred 3 m depth CD, and included (but were not limited to) rockweed and kelp species (Laminaria solidungula, Saccharina latissima, Alaria esculenta) to a depth of approximately 10 m CD. Below 10 m CD the dominant seaweed observed was colander kelp (Agarum clathratum). Seaweeds in this area were associated with shell debris, corraline algae, marine snails, and sponges. When hard substrates were present at Cape Hatt, they were typically occupied by seaweed, where the species distribution changed with depth. In the shallow areas, rockweed was the predominant species, transitioning to kelp species with depth. Kelp species observed included: sugar wrack kelp, sieve kelp, and ribbon kelp. There were no observations of corraline algae or sponges. Seaweeds are not harvested by residents of the Hamlet, however, it is collected incidentally when the 'long stemmed seaweeds' wash ashore (IQ Workshop: March 2017: Neevee Aksarjuk). 4.2.6 Marine Fish (including Migration/Spawning) The coastal marine environment fronting the SCH Study Area is used by migratory species such as Arctic char and Arctic cod (Boreogadus saida). Arctic char are an important subsistence and commercial fishery species in Nunavut that have both a lacustrine and amphidromous life history. Amphidromous Arctic char live primarily in fresh water, and migrate to the ocean for a short summer migration (~20 to 45 days) (Klemetsen et al., 2003; Bégout Anras et al., 1999). Myers (1949) referred to this migration as amphidromous, as anadromous by definition refers to species who spend the majority of their lives in marine waters. For familiarity of terms, the term anadromous will be used, while recognizing this important distinction. The primary purpose of the seaward migration is to increase energy reserves, at which time they may double their body mass (Jørgensen et al., 1997), over a relatively short summer migration (~20 to 45 days) (Klemetsen et al., 2003; Bégout Anras et al., 1999). Stock structure of Arctic char in northern Baffin Island is poorly understood. However, it is generally accepted that anadromous Arctic char in the waters fronting the Hamlet primarily migrate from the Salmon River (approximately 4.5 km south west of the Hamlet) and to a lesser extent from Salmon Creek (approximately 3 km south west of the Hamlet). Results of a tagging study suggested that Salmon River Arctic char migrate seaward in early July and return in mid-August (Read and Roberge, 1991). Residents of the Hamlet fish for Arctic char along the southern coast of Eclipse Sound from the Salmon River to just east of the Hamlet, using up to 5 km of coastline (Figure 4 3). The majority of fishing occurs within the Salmon River estuary. The fishing gear used is primarily seine nets; however, there are several outcrops east of the Hamlet, where Arctic char fishing occurs with hook-and-line. The fishing community considers that Arctic char can be caught in numerous locations along the coast, and the fishing that occurs within the SCH Study Area is for convenience purposes, as opposed to being targeted to high density areas of Arctic char. Arctic char fisheries are managed by DFO on the assumption that each river system supports a discrete fish stock (Kristofferson et al., 1984), leading DFO to conclude there are vulnerabilities in assessing the sustainability of Arctic char in northern Baffin Island, as these stocks have not been defined. Read and Roberge (1991) conducted a tagging study and concluded that Salmon River Arctic char do not migrate far from their natal river. From other studies in Nunavut, Arctic char prefer migrating along coastlines as opposed to across water bodies (Moore, 1975; Moore et al., 2016), and are typically found within 30 km from natal rivers (Bégout Anras et al., 1999). The Arctic char fisheries to date in close proximity to the SCH Study Area are mainly for subsistence purposes based on community consultation. In 2013, an individual with the support of the HTO submitted a request to the NWMB for an exploratory commercial fishery license (NWMB, 2013), which was approved in July 2014 (NWMB, 2014a, 2014b). Exploratory fishing licenses are issued for a five year period, as this is considered the minimum time period over which DFO can make predictions on the viability of a fishery (DFO, 2017a). 2017 will be the fifth year of this exploratory fishery, after which time, DFO will assess the efficacy of the fishery from the data collected. 20 sites (NWMB, 2013) were requested in the initial application of which four have had samples collected over the past four years. The closest proposed fishing site is 20 km west of the SCH Study Area, while the locations actually fished are in and around Milne Inlet, approximately 80 km south west of the SCH Study Area (DFO, 2017b). Arctic cod (Boreogadus saida) are a pelagic marine species which are believed to be the single most important species in the trophic link between plankton, marine birds and marine mammals in the Arctic ecosystem (Welch et al., 1992). Arctic cod are harvested for subsistence purposes, although not to the same extent as Arctic char, and the degree of their importance is more variable between communities. It is not known if they are harvested for subsistence purposes in the Hamlet, as it was not mentioned in the IQ workshop, however, (Priest and Usher, 2004) indicate they are harvested in gillnets with Arctic char. This species is considered to be inferior to Arctic char as indicated by the following quote, "The cod's poor diet and high water content leads to poorer tasting meat and shorter preservation," (Hurubise, 2016; p43, pers comm July 13 2015). This species is exclusively marine, and the extent of their migratory behaviours are not fully understood, with the exception of a pre-spawning late summer migration to coastal waters (FAO, 2017). The abundance

and distribution of Arctic cod in Eclipse Sound is not known, however, given their importance to diets of marine mammals that are known to occur in the area, it is likely that abundance is high. They are known to be concentrated at the floe edge to the east of the Hamlet prior to break-up (Bradstreet, 1982). Additionally, Lancaster Sound (north shore of Bylot Island) is known as an important area for Arctic cod in all stages of their life cycle (AMAP, 2013). Benthic species, such as the truncate soft shell clam (Mya truncata), also have the potential to be present in the SCH Study Area. Little is known about the presence of this species in waters fronting the Hamlet, however, it has been observed in the coastal waters of Cape Hatt (south Eclipse Sound) (Snow et al., 1987), and northeast Eclipse Sound (south east of Bylot Island) (Thomson, 1982). There is no commercial fishery for benthic species in the Hamlet, and this species is not currently harvested for subsistence purposes. However, at one time a Hamlet resident did SCUBA dive for bivalves, an occurrence which is confirmed in Priest and Usher (2004). Over the course of the five years (1996 to 2000) for which the Nunavut Wildlife Harvest Study was conducted, clams were only harvested by one individual in one of the years (Priest and Usher, 2004). Thus, subsistence fishing for this species may be more driven by access (as they are subtidal) rather than presence (or absence). 4.2.7 Marine Mammals (including Habitat and Migratory Patterns) Eclipse Sound is within the range of 11 species of marine mammals, which have been categorized as Arctic residents, seasonal visitors, and occasional visitors. The species, as defined by these temporal categories are listed in Table 4 1. An Arctic resident is defined as a marine mammal species that resides in the Arctic year-round, however may migrate or disperse within Arctic waters. A seasonal visitor is defined as a species that predictably resides within the Arctic region for a portion of the year, and most typically during the open-water season. An occasional visitor is a marine mammal species that may have the northern limits of their distribution overlapping with the Arctic, but usually occupies other ecological habitats. This latter group encompasses species that are rarely encountered in the Arctic. The time of year that a species could occur in the SCH Study Area and the frequency of observation in Pond Inlet are provided in Table 4 1. A frequency rating of 1 is regularly and predictably present, 2 is likely to be present but the frequency is not predictable, 3 is occasionally present, and 4 is rarely observed. With the exception of two pinniped species (ringed and bearded seals) which are present year-round, marine mammals are present during the open-water season. None of the identified marine mammal species are currently listed under the Species at Risk Act (SARA). The conservation statuses designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the International Union for Conservation of Nature (IUCN) are provided in Section 4.2.7 and summarized in Table 4 2. Of the 11 marine mammal species described in the Marine Baseline Report (Advisian, 2017d), nine are considered to occur differentially as Arctic residents or seasonal visitors. Of these, narwhal, ringed seals, and bearded seals are common during the open-water season, with ringed seals being the most common seal species (IQ Workshop: March 2017). Eclipse Sound is also documented by multiple sources as being an important area for narwhal during the open-water season, with specific reference to its importance as a nursery habitat (DFO, 2015; Dietz et al., 2001; Doniol-Valcroze et al., 2015; Higdon, 2017). The Baffinland Project conducted aerial surveys during the open-water season in 2015 and determined that narwhal were most concentrated mid-August to early September, with highest concentrations in Milne Inlet, Koluktoo Bay, and Tremblay Sound (Thomas et al., 2016). Pond Inlet is the eastern entrance to Eclipse Sound, and is a necessary corridor to access these western parts of the Sound. It is one of two access points to Eclipse Sound; the second being Navy Board Inlet (to the north), which is also an important route out of Eclipse Sound prior to freeze-up. Beluga whales and bowhead whales, while occurring in lower numbers than narwhal, may also be present with cow-calf pairs and use Eclipse Sound via Pond Inlet as an access corridor to Lancaster Sound. Killer whales are also expected to be present throughout the open-water season, as they prey upon the other marine mammals of the region (e.g. narwhal and seals). The presence and detection of killer whales by prey species results in avoidance behaviours by the prey species, which differs from the usual behavioural patterns in the region. For instance, when killer whales are present, the narwhal (Priest and Usher, 2004) and seals (IQ Workshop: March 2017) move in closer to toward the beach. Ringed and bearded seals are observed in Eclipse Sound and in proximity to the SCH Study Area through-out the year. The latter part of the iced season would be considered a sensitive time period for these animals, as they are either giving birth or caring for their young. Walrus, may also be present near the SCH Study Area, however, the closest documented haul-out is at the entrance to Navy Board Inlet (Higdon, 2016), 75 km north west of the Project site. As a result of this large distance from the SCH Study Area, the risks associated with disturbance to this species from Project-related activities, are considered highly unlikely. In addition to the year-round residents, the other marine mammals presented in Table 4 1 may also occur in Eclipse Sound and near the SCH Study Area; though annual and seasonal abundances and distributions vary. Interestingly, minke whales are reported as being observed more frequently in recent years (IQ Workshop: March 2017) If these other marine mammals are present, the mitigations presented in Section 5.2.7 would serve to protect them to the same degree as those mammals with year-round or common open-water occurrences. The Pond Inlet floe edge (approximately 60 km east of the SCH Study Area) is well known as an area for numerous marine mammal species (Bradstreet, 1982; Kilabuk, 1998), including beluga whales, narwhal, bowhead whales, several seal species, and walrus (IQ Workshop: March 2017: Sheattie Tagak). During the open-water season, Eclipse Sound is likely an important corridor for migratory marine mammal species (not including occasional visitors) that are spending the season in Eclipse Sound or moving through to Lancaster Sound. During the early part of the open-water season, Pond Inlet may have a higher significance to some marine mammals that are seeking refuge from predators (killer whales) and chasing prey (Arctic cod); while during the latter part of the season, it may be more important as a corridor out of the Sound prior to freeze up. 4.2.8 Species at Risk Species assessed under the IUCN, COSEWIC and SARA are discussed in this section. A summary of the vegetation, wildlife, marine and migratory birds and marine mammals that are designated are listed in Table 4 2 as well as well as the possibility of their occurrence within the SCH or Quarry Study Areas. There were no marine fish, invertebrates, or seaweed species observed within the SCH Study Area. 4.2.8.1 Vegetation There are two rare plant species – including one vascular (i.e. trees, shrubs, herbs and graminoids) species and one non-vascular plant (i.e. moss, liverworts and lichens) species – with potential to occur in the Quarry Study Area (Species at Risk Public Registry, 2016). These include: Porsild's Bryum (Haplodontium macrocarpum), which was listed as Threatened under COSEWIC and Schedule 1 under SARA. Blanket-leaved willow (Salix silicicola Raup), which was listed as Special Concern under COSEWIC, Schedule 1 under SARA (Species at Risk Public Registry, 2016). No occurrences of either species were observed during the field visit. There was no suitable habitat for these species identified within the Quarry Study Area (Advisian, 2017a, see Section 4.5.3). 4.2.8.2 Wildlife Barren-ground caribou (Rangifer tarandus groenlandicus), polar bear (Ursus maritimus), and wolverine (Gulo gulo) are all species at risk and either have historical occurrences near the Project or have ranges that overlap the SCH or Quarry Study Areas. Barren-ground caribou are listed by COSEWIC as Threatened but not yet listed under SARA (Species at Risk Public Registry, 2016). Polar bears and wolverines are listed by COSEWIC as Special Concern and are listed on Schedule 1 under SARA (Species at Risk Public Registry, 2016). Given polar bears and wolverines are listed as Special Concern and barren-ground caribou have not yet been placed on Schedule 1 of SARA, critical habitat has not yet been identified for these species. Barren-ground caribou have traditionally been observed near the Hamlet (Priest and Usher, 2004) but in recent years numbers have declined (Jenkins et al., 2012). Traditionally known to be migratory, recent IQ research has suggested there may be both resident and migratory caribou as caribou may lose their migratory tendency at low densities (Jenkins and Goorts, 2013). Recent telemetry investigations have revealed that most observations have occurred near Mary River, although some observations have been sighted south of the Hamlet within the fjords east of Admiralty Inlet (Jenkins and Goorts, 2011). Given that caribou have been absent from the Hamlet area since the 1990's, are unlikely to be migrating through the area, and the beach and quarry environments holds little forage value, the likelihood of caribou occurring in the SCH or Quarry Study Areas is low. Polar bear populations have been declining; though IQ suggests polar bears are sighted more frequently in the Hamlet (Nunavut Arctic College Media, 2016). Polar bears spend the majority of their time on sea-ice hunting ringed seals. A declining population with concurrent increased sightings is likely a result of climate change and melting sea ice. During winter, female polar bears excavate maternal dens in snow-drifts in coastal areas. Polar bears have been common along the north coast of Bylot Island and the east coast of Bylot and Baffin Islands (Miller, 1955). Important polar bear denning habitat is located immediately east of the Hamlet and extends south to Scott Inlet. Other polar bear denning habitat occurs on Bylot Island and Elwin Inlet west of Navy Board Inlet. Polar bear occurrence in the Study Areas during summer will likely depend on the availability of food resources and management of waste. Wolverine is a wide-ranging species that occurs at low densities (COSEWIC, 2003; Sale, 2006). Generally nomadic, this species covers large ground as it searches for food. In the Arctic, wolverines occur in a variety of tundra communities and habitat is likely determined more by prey availability (e.g. rodents, hare, and ungulate carcasses) rather than vegetation (COSEWIC, 2003). Maternity dens usually occur under snow-covered rocks such as talus boulders and along eskers, caves, or snow tunnels (COSEWIC, 2003; Sale, 2006). Generally, these reproductive dens are isolated. Given these features do not occur within the Study Areas and that the area is exposed to human development and activity, wolverines are unlikely to occur within the SCH and Quarry Study Areas. 4.2.8.3 Migratory and Marine Birds Seven migratory or marine bird species at risk have occurrence records near the Hamlet: red knots (islandica subspecies: special concern), ivory gulls (endangered), Ross's gulls (threatened), peregrine falcons (Special Concern) (Species at Risk Public Registry, 2016). Buff-breasted sandpipers (Special Concern), red-necked phalarope (Special Concern), and short-eared owls (Special Concern) have occurrence and breeding records on the south west coast of Bylot Island (Species at Risk Public Registry, 2016; Cornell Lab of Ornithology, 2017). For buff-breasted sandpiper, ivory gull, peregrine falcon, red knot, red-necked phalarope, Ross's gull, and short-eared owl, the Study Areas do not support breeding and nesting habitat. Buff-breasted sandpiper, red-necked phalarope, and Ross's gull are considered to be accidental or rare visitors. Although all the species at risk are unlikely to nest in the SCH or Quarry Study Areas, they could still occur. For instance, ivory gulls are likely to forage near the SCH Study Area, particularly during fall migration due to the proximity to ice edge and availability of food for scavenging. 4.2.8.4 Marine Mammals The marine mammals which have the potential to be present in Eclipse Sound and the waters fronting the SCH Study Area are discussed in Section 4.2.7 and their status is identified in Table 4 2.

Description de l'environnement existant : Environnement socio-économique

The Project is located along the shoreline of the Hamlet within the Hamlet limits. The Hamlet is an isolated community overlooking Eclipse Sound and the mountains of Bylot Island. The closest communities are Arctic Bay (238 km west), Clyde River (401 km southeast) and Grise Fiord (438 km north). The following provides a brief overview of the current socio-economic conditions in the Hamlet. More detailed information can be found in the Terrestrial and Human Environment Baseline (Advisian, 2017a, see Section 8). 4.3.1 Archaeological and Cultural Historic Sites A desktop review of existing knowledge of archaeological resources and available IQ was completed with the goal of determining archaeological resource potential within the Study Areas. A Nunavut Archaeological Site Data Licence Request was submitted on September 26, 2016 for archaeological data from the Department of Culture and Heritage, GN for information on previously recorded sites within 25 km of the Project. Available relevant archaeological reports and studies and published academic articles were also reviewed. Based on the desktop review, the Study Areas have an elevated potential for archaeological sites. Known recorded sites PeFr-1 and PeFr-5 are located in close proximity to the Study Areas. A preconstruction AIA will be conducted in the summer of 2017. The scope of the AIA will include the examination of all areas of new construction including the Quarry Study Area and any new haul routes and/or any planned upgrades to existing roads that will be used. The AIA will also assess the relationship between the Project and previously recorded sites PeFr-1 and PeFr-5. These results and recommendations are included in an AOA (Lifeways of Canada Ltd., 2017) for the Project that was submitted on March 9, 2017 to the Territorial Archaeologist at the Department of Culture and Heritage for review. A review of the database of significant palaeontological sites maintained by the Canadian Museum of Nature on behalf of the GN did not identify any previously

recorded palaeontological sites in the Study Areas. Based on a review of the geology of the Study Areas, unrecorded significant paleontological sites are not anticipated. 4.3.2 Population, Education and Employment According to Statistics Canada's recent census data, the population of the Hamlet is 1,617 people, an increase of 4.4% from the 2011 population of approximately 1,550 (Statistics Canada, 2017). The total aboriginal population (self-declared Inuit) is approximately 96.1% of the total (Statistics Canada, 2012). Inuktitut is the prevalent language in the Hamlet, reported as the mother tongue for 90.6% of residents. While Inuit culture and language remain strong in the Hamlet, they are "increasingly under threat from southern cultural influences via modern communications technologies, reduced reliance on traditional foods and economic pursuits, the continued loss of Elders and traditional language speakers, and a growing disconnection between Elders and youth," (Government of Nunavut, 2011b). Low levels of literacy and numeracy are a challenge for labour force development in the Hamlet and across Nunavut (Baffinland Iron Mines Corporation, 2012a). In 2011, of the total population aged 15 years and older, 12.9% (130 individuals) were high school graduates or equivalents; 6.9% (70 individuals) held apprenticeship or trades certificates; and, less than 4.5% (45 individuals) graduated from a University with a bachelor level degree or higher level of education (Statistics Canada, 2012). According to a GN report on adult learning in Nunavut, "the largest group of adult learners in Nunavut needs programming that focuses on literacy, life skills, completion of high school or high school equivalency, adult basic education and personal empowerment" (Government of Nunavut & Nunavut Tunngavik Incorporated, 2006). According to Statistics Canada's 2011 Census (Statistics Canada, 2012), the unemployment rate in the Hamlet was reported as 22.2%. Median income reported for the total population (15 years and over with income) was $17,189 in 2010 with 18.1% of total income attributed to Government Transfers. The largest employers in town are the Hamlet, the GN and the Co-op Store. More recently, the Baffinland Project has also had an impact on the local economy. The economy of the Hamlet is characterized by traditional subsistence activities (e.g. hunting, fishing, trapping and gathering) mixed with wage activities. The traditional economy continues to play a vital role in the Hamlet and is an important component of life and well-being because it provides in-kind income, country food, traditional medicines and opportunities for commercial arts and crafts activities (Government of Nunavut, 2011b; HTO Manager pers. comm. September 2016). 4.3.3 Land and Resource Use 4.3.3.1 Harvesting Residents in the Hamlet obtain food resources from harvesting, purchasing at stores, and through sealift deliveries. Hunting remains essential to life in the Hamlet. In 2006, 66% of respondents from the Hamlet reported as being hunters, 69% fished, and 79% gathered wild plants in the 12 months prior to the census (Government of Nunavut & Nunavut Tunngavik Incorporated, 2006). The harvesting of ringed seal, Arctic char, narwhal, and caribou are of particular importance. The availability of traditionally harvested foods (country food) is crucial in that it lowers the demand for imported food which is very costly and most often less nutritious. Additionally, the harvesting, preparation, and distribution of meat and skins offer important opportunities to maintain and enhance Inuit culture. Harvesting activities (hunting, fishing, gathering, and trapping) are limited within the SCH and Quarry Study Areas. IQ obtained during the workshop indicated that in and around the SCH Study Area, residents fish mostly at Salmon Creek, near Salmon River and along the hamlet coast line. Fishing nets are also placed along the western and eastern shorelines of the Hamlet. Hunting of Ptarmigan and small game occurs around the coast line near the proposed Quarry Study Area and near the Salmon River. Current plant and berry picking areas identified during the elder interview and design workshops do not fall within the two Study Areas. An HTO member remarked during a design workshop that, "There are lots of plants in the proposed quarry area, but nobody collects there because it's polluted now with the sewage lagoon," (HTO Member Design Workshop, 2016). Identified harvesting locations in and around the Study Areas are provided in Figure 4 3. 4.3.3.2 Travel Routes and Access There is only one ramp in the community to launch boats from during the open-water season. During sealift delivery, the shoreline neighbourhood becomes extremely congested and hunters are unable to access the ramp to go out to harvest. During the winter, ice access is considered very good: "We are not concerned with getting on the ice, access in the winter is easy for us, we can get on almost anywhere," (HTO Member Design Workshop, 2016) and, "We have no concerns about accessing the ice during construction of the harbour," (IQ Workshop: March 2017). There is a particularly busy travel route out of the Hamlet taken by many families in the communities, especially during the open-water season, for access to the Salmon River. The Salmon River area is an important gathering place for the community; where people come together to fish, camp, and hold special events for the community. Additionally, travel routes to access the campground and berry picking areas are also quite busy in the summer months. These identified access points and local travel routes are provided in Figure 4 3. 4.3.3.3 Tourism The Hamlet is a popular destination for arctic tourists due to the following points of interest: wildlife at the floe edge (approximately 60 km east of the Hamlet); bird cliffs on nearby Bylot Island (a migratory bird sanctuary, approximately 20 km north of Hamlet on the other side of Eclipse Sound); ice caves; several dozen glaciers; and many picturesque inlets. Additionally, the wildlife and marine mammals observed in and around Eclipse Sound include: ringed seal, seabirds, Arctic foxes, narwhals, and polar bears. It is also the gateway to one of Canada's newest and largest national parks, Sirmilik National Park. Three local outfitters operating out of the Hamlet provide tours and Inuit guides for a wide range of experiences, including: dog sledding, floe edge trips, kayaking, kite skiing, fishing, whale watching, bird watching and camping at nearby Tamaarvik Territorial Park, etc. Cruise ship visitation to the Hamlet has increased steadily since 2006 and research indicates it will continue to expand (Parks Canada, 2016b). In 2016, 12 cruise ship visitations were expected over the cruising season bringing an expected total of nearly 2,800 visitors to the Hamlet (Government of Nunavut, 2016). However, residents currently seem to have mixed feelings about cruise ships. Some welcome the economic potential from ships in to the community while it has been stated that cruise ships "do not support us financially" (NPC, 2013). The Hamlet is currently working on initiatives to provide residents and artisans with more opportunities to benefit from cruise ships. 4.3.4 Local and Regional Traffic Patterns The roads in the Hamlet are gravel surfaced with no walkways. Pedestrians, all-terrain vehicles, snow machines, cars, and trucks all share the road. The roads are quite narrow and steep in areas and often require maintenance with gravel in the winter to keep them safe. Roads leading out to the campground and to Salmon River can get busy in the summer. The Hamlet is serviced daily by scheduled commercial flights provided by First Air and Canadian North through Iqaluit and Clyde River. Sauniq Inns North Hotel, as a member of Tununiq Sauniq Co-op, offers free airport shuttle service and can arrange for vehicle rentals. The sealift is a vital link for all communities in Nunavut. Details on the sealift operations are provided in the Project General Information section. 4.3.5 Community Health and Wellness Health services are provided at a health centre built in 2005. There are five nurses that work Monday to Friday from 8:30 am to 5:00 pm with a 24-hour on-call shift. The health team includes a mix of agency nurses and casual nurses that travel to the Hamlet for six week rotation. There are also specialist services that visit the Hamlet for a week at a time such as physiotherapists, occupational therapists, speech language therapists and dentists. Emergency cases are stabilized and flown out to Iqaluit (Sherry Parks pers. comm. November 2016). The health centre is currently considered to be under-resourced based on community feedback (Sherry Parks pers. comm. November 2016). Pond Inlet Health Clinic delivers public health programs with initiatives such as the Well Woman, Well Man and Well Child Programs, Chronic Disease Clinics and Pre-Natal Clinics. The Nunavut Department of Health provides outreach services for mental health, including programs such as Suicide Prevention, One Territory Connected, and One World Connected, with a community outreach worker assigned to the Hamlet (Government of Nunavut, 2017). Community wellness is not only supported by public health programs and the medical clinic, it is also intrinsically related to a sense of familial and cultural cohesion. Inuit traditional activities of hunting, fishing, trapping, gathering plus the associated activities of drying, fermenting and preserving food and preparing skins strongly contributes to the community's sense of shared cultural values and beliefs. In addition, social activities such as sports, recreation (e.g. snowmobiling, Inuit games), storytelling, arts, crafts and the summer camp are important factors in promoting community health and personal well-being. 4.3.6 Community Infrastructure and Services The Nunavut Housing Corporation's Annual Report for 2015-2016 listed the Hamlet's housing stock at 35 to 40% of requirements indicating a critical need for housing (Nunavut Housing Corporation, 2016). Temporary accommodation in the Hamlet is limited and is currently provided by the Sauniq Hotel (20 double rooms) and the Black Point Lodge (four single queen sized rooms). The Hamlet is responsible for water, sewage and solid waste collection. Water is collected in a reservoir lake, known locally as Water Lake, from the adjacent creek located approximately 3 km south east of the Hamlet. It is treated with chlorine as it is loaded into trucks for distribution. Currently, there are three water trucks that deliver water daily to residences and commercial operations. Presently, Water Lake has sufficient capacity to service the community's water needs (Joansie Naqitarvik pers. comm. November 2016). Sewage and municipal wastewater is collected by three trucks daily, six days a week and by one truck on Sundays from residential and commercial locations. The Hamlet's sewage treatment facility is located within the Waste Disposal zone close to the Quarry Study Area and approximately 2.2 km east of the centre of the Hamlet. Solid waste is collected by Community Works three times a week. As the Hamlet has only one garbage truck, the weekly solid waste collection and any special requests for pick up occurs over several days. Electricity is provided by the Qulliq Energy Corporation through diesel generators. Heating fuel for homes and buildings is managed and delivered by the Co-op's Petroleum, Oil and Lubricants Centre (Louise England pers. comm. November 2016).

Identification des répercussions et mesures d'atténuation proposées

Please refer to attached PSIR document.

Répercussions cumulatives

6.1 Potential Cumulative Effects All Project impacts previously described are expected to be negative and mitigatable, or positive. The past, present and reasonably foreseeable projects which have the potential to interact with the Project have been identified to be included within this Cumulative Effects Assessment. The project that was considered to have the potential to interact with the construction of the SCH is the Baffinland Project. The only Baffinland Project activity that is close enough to the SCH to result in a cumulative effect is the shipping traffic that passes through Eclipse Sound during the open-water season. The only environmental component that has the potential for cumulative impacts with this shipping is marine mammals. The Baffinland Mary River Project in Milne Inlet has been operational since August 2015 (MINING.com., 2013), with a current shipping season from June to October. Baffinland predicted that, once operational, approximately 55 ships (Supramax at 55 000 Dead Weight Tonnes, Panamax at 70,000 DWT, or Post Panamax at 11,000 DWT) will transit to and from Milne Inlet during the operational season (Baffinland Iron Mines Corporation, 2013). The number of ships that transited in 2015 (the first operational season) from July to October was 17 (Baffinland Iron Mines Corporation, 2016). The planned route for the shipping traffic transiting to the Baffinland Project is provided in Figure 6 1. The distance from the seaward edge of the SCH Study Area to the closest portion of the shipping route is 17 km. Condition 103 of Baffinland's NIRB Certificate requires they compare annual shipping tracks to the expected nominal shipping route to demonstrate compliance (NIRB, 2012). Thus it is not likely that the deviation from this route in Eclipse Sound would be significant. Based on the 17 km separation, there are no construction activities that overlap. Underwater noise from the construction of the SCH will be managed within a 500 m exclusion zone and therefore the 17 km separation means there will be no cumulative effect from underwater noise on marine mammals. 6.2 Assessment of Transboundary Effects Project impacts identified in Section 5 are limited to the Study Areas and are reduced or eliminated with the mitigation measures described. Impacts of dust resulting from blasting and rock transportation activities have the largest potential geographical range if left unmitigated. However, these impacts will be limited in range to the closest sensitive receptors (the Hamlet) and will be mitigated through the implementation of the CEMP (Advisian, 2017f). The greatest spatial extent of predicted marine impact is underwater noise on marine mammals, which is predicted to be less than 500 m from the Study Area

and again there is mitigation in place to manage the potential impact. There are no plans for additional vessel traffic, which could be transboundary, to supply the construction materials and equipment of for the construction of the SCH, as delivery of cargo will occur through existing avenues. The SCH has been designed to improve existing access for boats and the overall safety of marine activities in the community by providing a protected harbour and therefore an increase in shipping during operation of the SCH, which could be transboundary, is not planned and is not part of the Project. There are therefore no anticipated transboundary impacts expected from the Project, with the closest territorial, provincial or international border to the Study Areas being the maritime boundary with Greenland 300 km to the north east.

Impacts

Identification des répercussions environnementales

	PHYSICAL	Designated environmental areas	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique or fragile landscapes	Surface and bedrock geology	Sediment and soil quality	Tidal processes and bathymetry	Air quality	Noise levels	BIOLOGICAL	Vegetation	Wildlife, including habitat and migration patterns	Birds, including habitat and migration patterns	Aquatic species, incl. habitat and migration/spawning	Wildlife protected areas	SOCIO-ECONOMIC	Archaeological and cultural historic sites	Employment	Community wellness	Community infrastructure	Human health
Construction																									
Dredging		-	-	-	-	M	-	-	-	M	-	M	M		-	M	M	M	-		M	-	-	-	-
Quarry/Borrow pit		-	-	-	-	M	-	-	-	M	-	M	M		M	M	M	-	-		M	-	-	-	-
Access Road		-	M	M	-	M	-	-	-	M	-	M	M		M	M	M	-	-		M	-	-	-	-
Offshore Infrastructure (port, break water, dock)		-	-	-	-	M	-	-	-	M	-	M	M		-	M	M	M	-		P	-	-	-	-
Marine Based Activities		-	-	-	-	M	-	-	-	M	-	M	M		-	M	M	M	-		M	-	-	-	-
Exploitation																									
Quarry/Borrow pit		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-
Access Road		-	-	-	-	-	-	-	-	-	-	M	M		M	M	M	-	-		P	-	-	-	-
Offshore Infrastructure (port, break water, dock)		-	-	-	-	-	-	-	-	-	-	-	-		-	M	M	M	-		P	-	-	-	-
Marine Based Activities		-	-	-	-	-	-	-	-	-	-	M	M		-	M	M	M	-		M	-	-	-	-
Désaffectation																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

(P = Positive, N = Négative et non gérable, M = Négative et gérable, U = Inconnue)

Project Map


-77.9534°W, 72.7019°N
Marine Baseline Study Area
-77.9817°W, 72.6939°N
Quarry Study Area
Haul Road Study Area