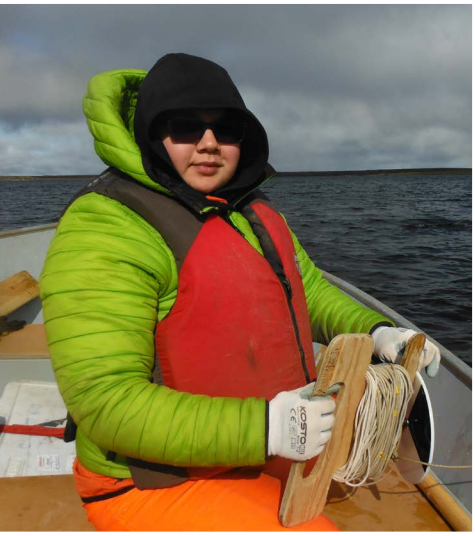
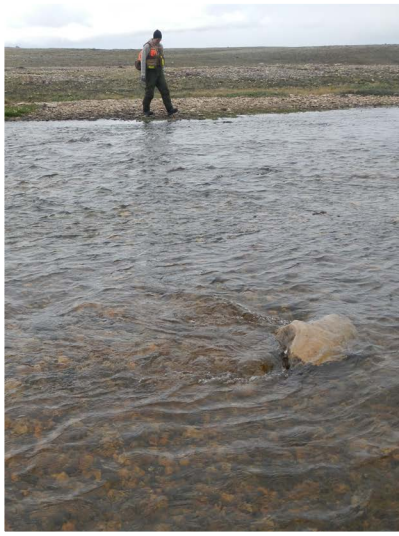
TMAC Resources Inc.

HOPE BAY PROJECT
2019 Nunavut Water Board Annual Report





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2019 Nunavut Water Board Annual Report

Prepared by
TMAC Resources Inc.
Toronto, ON

Prepared for
Nunavut Water Board

March 2020

Executive Summary – English

The Hope Bay Project is an approximately 20 km × 80 km property along the south shore of Melville Sound in Nunavut, Canada. The Belt is TMAC Resources Inc.'s (TMAC) prime holding and is its sole focus for exploration, development and mining. This report to the Nunavut Water Board (NWB) has been prepared to summarize the Project activities and monitoring conducted under TMAC Type A Water Licences 2AM-DOH1335, 2AM-BOS1835, Type B Water Licences 2BB-MAE1727, 2BB-BOS1727, and the exploration Type B Water Licence 2BE-HOP1222 for 2019.

In 2019 commercial operations continued at Doris with continued efforts to stabilize mill throughput and optimize gold recovery.

Civil construction activities included the completion of construction of the Roberts Bay Discharge System (RBDS) and installation of the associated underground mine dewatering and Tailings Impoundment Area (TIA) discharge pipelines and pumping infrastructure. The RBDS facilitates dewatering of the Doris mine and removal of excess water from the TIA to Roberts Bay. The ocean discharge pipeline with sunken diffuser and recirculation pipeline were successfully installed into Roberts Bay during the open water season. As part of this system, a Water Treatment Plant was constructed to remove Total Suspended Solids from underground mine water at Doris prior to discharge through the RBDS. No discharge occurred to Roberts Bay in 2019.

Earthworks began at the Madrid North site to support the commencement of mining of the Naartok East Crown Pillar and Madrid North underground decline. This included construction of the first kilometre of the Madrid North all-weather-road, the Madrid North Contact Water Pond, and construction of the Madrid North Waste Rock storage pad. Laydown space and access roads were constructed to support shop facilities, lunchroom/offices and wash car facilities. An overburden stockpile was established to store overburden removed during of mining of the Naartok East Crown Pillar.

Underground waste development continued at Doris in 2019 with further advancement of below the dyke (BTD) decline and necessary support infrastructure. TMAC continued ore development with long hole drilling and blasting in the Doris Connector (DCO) and BTD in Doris, and continued ore sill development in the DCO. TMAC also continued waste development of the DCO for future mining horizons. Long hole blasting continued throughout 2019, with all ore production trucked to surface and processed through the mill or added to the stockpile. Construction of the DCO Vent Raise was completed to support underground ventilation requirements. Development of the Doris Central (DCN) decline continued in 2019.

Ore development also occurred from surface in 2019 with the commencement of surface blasting and hauling of ore and waste from the Naartok East Crown Pillar Recovery (NECPR). Development of the Madrid North underground decline began in Q4 of 2019. Backfill and reclamation of the Doris Crown Pillar Trench was completed in 2019.

One dorm was added to allow an additional 48 bed spaces at Doris Camp and an additional 5 million litre fuel tank was constructed at the Roberts Bay Fuel Storage and Containment facility.

In the fall, TMAC concluded another successful sealift operation including the purchase and delivery of diesel fuel as well as explosives and reagents to support mining and milling activities. The sealift also included additional heavy equipment and supplies to support mining and construction operations.

Waste disposal, fuel usage and chemical storage stayed consistent with previous years. Fourteen spills were reported to the Nunavut Spill Line, Water Licence Inspector and KIA Major Projects office. The remaining spills that occurred during 2019 were minor in nature, occurring on camp pads and infrastructure, with quick response and clean up resulting in negligible impact to the receiving environment. Empty cargo aircraft were utilized in 2019 for waste backhaul from the Doris Camp to KBL Environmental in Yellowknife to arrange for final remediation/disposal.

Water use in 2019 was conducted in accordance with the Type A Water Licence 2AM-DOH1335 for Doris-Madrid, the Type A Water Licence 2AM-BOS1835 and the Type B Water Licences 2BB-BOS1727 for Boston, the Type B Water Licences 2BB-MAE1727 for Advanced Exploration at Madrid, and the Type B Water Licence 2BE-HOP1222 for regional exploration. The referenced water licences include provisions for sampling programs that involve recording data related to the volume of water extracted for any purpose, testing of effluents (e.g., treated sewage effluents) discharged to the environment, and monitoring water quality within specific Project areas (e.g., surface discharge downstream of construction areas, storm water from an engineered containment structure, sewage and oily water effluent, etc.). Water usage in 2019 was conducted within approved limits. In fact, TMAC was successful in recycling greater than 95% of its process water from the tailings impoundment area, greatly reducing the allowable water draw from Doris Lake. All effluent discharges to the environment in 2019 were compliant with the allowable discharge limits outlined in the water licences.

Community consultation in 2019 focused on engaging positively and effectively with communities and the Inuit Environmental Advisory Committee regarding TMAC operations, employment and contracting opportunities and consultation on TMAC's environmental monitoring and fisheries offsetting.

In 2019 the focus of TMAC's permitting and modification efforts were on component specific approvals as required for portions of Project, including waste rock handling, roads, the marine discharge pipeline, water crossings, and water and waste containing engineered structures.

As demonstrated above, TMAC strives to continually achieve compliance with the various regulatory requirements and maintain community relationships. Environmental monitoring in accordance with the existing Water Licences, Framework Agreement, Project Certificate, authorizations, management plans and environmental effects monitoring plans will continue during 2020.

ᓇᐃᓪᓕᒋᐊᕐᓯᒪᔪᑦ ᐅᖃᐅᓯᑦ - Inuktitut (North Baffin)

The Hope Bay,ᒥ ᐱᓕᕆᐊᖑᔪᖅ ᑕᑯᓂᖃᕐᑐᖅ ᓴᓂᐊᓂ 20 km × 80 km ᓇᒻᒥᓂᕆᔭᐅᔪᖅ ᓯᖕᔭᖓᓃᑦᑐᖅ ᖃᓂᒋᔭᖓᓂ Melville Sound,ᒥ ᓄᓇᕗᒻᒥ, ᑲᓇᑕᒥ. ᑖᒃᑯᐊ Belt,ᑯᑦ ᓇᒻᒥᓂᕆᖏᑦ TMAC Resources Inc.,ᑯᑦ (TMAC) ᓇᒥᓂᖃᓯᑎᒃ ᐊᒻᒪ ᑲᒪᔨᒻᒪᕆᐅᔪᑦ ᕿᓂᕐᓂᕐᒥᒃ ᑮᓇᐅᔭᓕᐅᕈᑎᒃᓴᓂᒃ, ᐱᔭᓪᓕᐊᑎᑦᓯᓂᕐᒥᒃ ᐊᒻᒪ ᐅᔭᕋᓐᓂᐊᕐᓂᕐᒥᒃ. ᐅᑯᐊ ᑐᓴᕋᒃᓴᓕᐊᖑᓯᒪᔪᑦ ᓄᓇᕗᒻᒥ ᐃᒪᓕᕆᓂᕐᒧᑦ ᑲᑎᒪᔨᓄᑦ ᐋᖅᑭᒃᓱᕐᑕᐅᓯᒪᔪᑦ ᓇᐃᓪᓕᒋᐊᕐᓯᒪᑎᓪᓗᒋᑦ ᐱᓕᕆᐊᖑᔪᑦ ᒥᒃᓵᓄᑦ ᐊᒻᒪ ᖃᐅᔨᓴᕐᓂᕕᓂᕐᒥᒃ ᒪᓕᑦᓯᒋ ᐅᑯᐊ ᑲᒪᒋᔭᑦ ᐊᑖᒎᑦ ᐅᑯᐊ TMAC Type ᐃᒪᓕᕆᔾᔪᑎ ᓚᐃᓴᓐᓯ 2AM-DOH1335, 2AM-BOS1835, Type B ᐃᒪᓕᕆᔾᔪᑎ ᒪᐃᓴᓐᓯᑦ 2BB-MAE1727, 2BB-BOS1727, ᐊᒻᒪ ᕿᓂᕐᕿᓐᓇᐅᑏᑦ Type B ᐃᒪᓕᕆᓂᕐᒧᑦ ᓚᐃᓴᓐᓯ 2BE-HOP1222 for 2019.

2019,ᒥ ᑮᓇᐅᔭᓕᐅᕋᓯᐊᕐᑐᑦ ᑲᔪᓯᙱᓐᓇᓚᐅᕐᑐᑦ Doris,ᒥ ᐊᒻᒪ ᐋᖅᑭᐅᒪᑎᑦᓯᙱᓐᓇᕋᓯᐊᕐᓯᑎᒃ ᓯᖃᓪᓕᕆᕕᒻᒥᒃ ᐊᒻᒪ ᓂᕆᐅᓐᓂᖃᕐᓯᑎᒃ ᓇᓂᓯᓂᐊᕐᑐᕆᕆᐊᖅ ᒎᓗᒥᒃ.

ᓴᓇᓂᖃᓚᐅᕐᑐᑦ ᐱᐊᓂᒃᓯᓪᓗᑎᓪᓗ Roberts Bay,ᒥ ᒪᕐᓗᑯᖃᕈᑎᓂᒃ ᐊᒻᒪ ᐋᖅᑭᒃᓯᓪᓗᑎᒃ ᐅᔭᕋᓐᓂᐊᕐᕕᐅᑉ ᐃᑭᐊᓂ ᓄᓇᒥ ᐃᒪᓕᕆᐅᑎᓂᒃ ᐊᒻᒪ ᒪᕐᓗᑯᖃᕕᒻᒥᒃ ᓱᓪᓗᑯᑖᒃᑯᑦ ᒪᕐᓗᑯᓂᒃ ᐊᒻᒪ ᑯᕕᔾᔪᑎᓂᒃ ᐋᖅᑭᒃᓯᐃᓪᓗᑎᒃ. ᐱᓕᕆᕕᐅᒻᒥ RBDS,ᖑᔪᑦ ᐃᒪᓕᕆᔾᔪᑎᐅᒻᒪᑕ Doris ᐅᔭᕋᓐᓂᐊᕐᕕᐊᓂ ᐊᒻᒪ ᐲᔭᐃᒍᑕᐅᓪᓗᑎᒃ ᐃᒪᕐᒥᒃ ᐅᔭᕋᓐᓂᐊᕐᕕᐅᔪᒥᑦ Roberts Bay,ᒧᑦ. ᑕᕆᐅᕐᒥ ᐅᕐᓯᐊᓗᒻᒧᑦ ᓱᓪᓗᑕᖃᐅᕐᑐᖅ ᑯᕕᓯᕕᓐᓂᒃ ᐃᑭᐊᓂ ᐃᒪᐅᑉ ᐊᒻᒪ ᓱᓪᓗᑯᑖᒃ ᐃᓕᔭᐅᑦᓯᐊᓚᐅᕐᑐᖅ Roberts Bay,ᒥ ᐊᐅᔭᐅᓂᐊᓂ ᐃᒪᐅᓂᐊᓂ. ᐃᓚᒋᔭᐅᑎᓪᓗᒍ ᐋᖅᑭᒃᓱᕐᑕᐅᓯᒪᓂᙱᓐᓄᑦ, ᐃᒪᕐᒧᑦ ᓴᓗᒻᒪᖓᐃᒍᑎᒃ ᐋᖅᑭᒃᑕᐅᓚᐅᕐᑐᖅ ᐲᔭᐃᒍᑕᐅᓂᐊᕐᑎᓪᓗᒍ ᑕᒪᐃᓐᓂᒃ ᓱᕈᕐᓂᒃ ᐅᔭᕋᓐᓂᐊᕐᕕᐅᑉ ᐃᖅᑲᖓᓂ ᓄᓇᒥᖓᕐᑐᑦ ᐅᔭᕋᓐᓂᐊᕐᕕᒻᒥᑦ ᑕᕝᕙᓂ Doris,ᒥ ᐱᔭᕐᑕᐅᓚᐅᕐᑎᓐᓇᒋᑦ ᓱᓕ ᐱᓕᕆᕕᒻᒥᑦ. ᑭᓈᔪᖃᕐᓯᒪᖏᑦᑐᖅ ᓱᕈᕐᓂᒃ Roberts Bay,ᒥ 2019,ᒍᑎᓪᓗᒍ.

ᑕᐃᔭᐅᔪᑦ Earthworks ᐱᓇᓱᐊᕆᐊᓕᓚᐅᕐᓯᒪᔪᑦ Madrid North,ᒥ ᐃᑲᔪᕐᓯᓪᓗᑎᒃ ᐱᒋᐊᓕᕐᑎᓪᓗᒍ ᐅᔭᕋᓐᓂᐊᕐᓂᖅ ᓈᕐᓱᒃᒥ, Naartok East Crown Pillar ᐊᒻᒪ Madrid North,ᒥ ᐃᑭᐊᓂ ᓄᖅᑲᕐᑎᑕᐅᓚᐅᕐᑐᖅ ᐃᖅᑲᖓᓂ ᐱᓕᕆᓂᖅ. ᓴᓇᓂᖃᓚᐅᕐᑐᑦ ᓯᕗᓪᓕᕐᒥ ᑭᓚᒥᑐᕐᓂ Madrid North,ᒥ ᐊᖅᑯᑎᒥᒃ ᖃᖓᓕᒫᒧᑦ, ᐊᒻᒪ Madrid North ᐃᒪᓕᕆᓪᓗᑎᒃ ᑕᓯᕐᒥ, ᐊᒻᒪ ᓴᓇᓪᓗᑎᒃ Madrid North,ᒥ ᒪᕐᓗᑯᖃᐅᑎᒥᒃ ᓯᕐᓗᐊᒥᒃ ᐅᔭᕋᓂ. ᐃᓂᒃᓴᓕᐅᓚᐅᕐᑐᑦ ᒪᓂᖅᑲᒥ ᐊᒻᒪ ᐊᖅᑯᑎᖏᑦ ᐋᖅᑭᒃᓱᓇᐊᕐᑕᐅᓪᓗᑎᒃ ᐃᑲᔪᕐᓯᒍᑕᐅᓂᐊᕐᑎᓪᓗᒋᑦ ᐱᓕᕆᕕᒃᓴᓄᑦ ᓂᐅᕕᕐᕕᓄᑦ, ᓂᕆᕕᒻᒧᑦ/ᐊᓪᓚᕕᓐᓄᑦ ᐊᒻᒪ ᐅᐊᓴᕐᕕᒧᑦ ᓄᓇᒃᑰᕈᑎᓄᑦ. ᓄᐊᓗᐊᓕᕐᑐᓄᑦ ᒪᕐᓗᑯᓄᑦ ᐃᓂᒃᓴᓕᐅᓚᐅᕐᑐᑦ ᐅᔭᕋᓐᓂᐊᕐᕕᒻᒥᑦ ᓴᖅᑭᑕᐅᔭᓪᓕᐊᔪᓂᒃ ᑕᑉᕙᓂ Naartok East Crown Pillar,ᒥ ᐅᔭᕋᓐᓂᐊᕐᕕᒻᒥ.

ᐃᒪᐅᑉ ᐃᖅᑲᖓᓂ ᐱᓕᕆᓂᖓ ᑲᔪᓯᙱᓐᓇᓚᐅᕐᑐᖅ Doris,ᒥ 2019,ᖑᑎᓪᓗᒍ ᐊᒻᒪ ᐱᓕᕆᐊᓪᓚᑦᓯᑎᒃ ᓄᓇᐃᑦ ᓇᕿᓐᓂᙱᓐᓂ ᐊᒻᒪ ᓴᓇᓪᓗᑎᒃ ᐱᓕᕆᔾᔪᑎᓄᑦ ᐃᑲᔪᒃᑲᓐᓂᕈᑎᒃᓴᓂᒃ. TMAC,ᑯᑦ ᓱᓕ ᓴᕕᕋᔭᒃᓴᓂᐊᕐᑐᑦ ᓂᐅᕐᑐᕐᓂᒃᑯᑦ ᑕᑭᔪᒥᒃ ᐊᒻᒪ ᖃᕐᑎᓇᓂᒃᑯᑦ Doris,ᒥ ᐅᑯᓂᖓ Connector (DCO) ᐊᒻᒪ BTD,ᓂᒃ Doris,ᒥ, ᐊᒻᒪ ᓴᕕᕋᔭᒃᓴᓂᐊᕐᓯᑎᒃ ᓱᓕ ᑕᕝᕙᓂ DCO,ᒥ. TMAC,ᑯᑦ ᓱᓕ ᐋᖅᑭᒃᓯᐃᕙᓪᓕᐊᔪᖅ ᒪᕐᓗᑯᓕᕆᔾᔪᑎᓂᒃ ᑕᕝᕙᓂ DCO,ᒥ ᐊᑐᕐᑕᐅᒐᔭᕐᑐᓂᒃ ᓯᕗᓂᒃᓴᒥ ᐅᔭᕋᓐᓂᐊᓂᐅᔭᕐᑐᓄᑦ. ᓱᓕ ᓄᓇᒥ ᖃᕐᑎᕆᑲᑕᓚᐅᕐᑐᑦ 2019,ᒥ, ᐊᒻᒪ ᓴᖅᑭᑎᕆᓪᓗᑎᒃ ᓴᕕᕋᔭᒃᓴᓂᒃ ᐊᔾᔭᕐᑐᕐᑕᐅᑎᓪᓗᒋᑦ ᐊᕙᑎᒧᑦ ᐅᓯᑲᑕᐅᑎᒃᑯᑦ ᓄᓇᒃᑰᕈᑎᒃᑯᑦ ᐊᒻᒪ ᐃᓕᐅᖅᑲᕐᑕᐅᓪᓗᑎᒃ ᓯᖃᓪᓕᕐᕕᓪᒧᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐃᓕᐅᖅᑲᕐᑕᐅᓪᓗᑎᒃ ᑲᑎᕐᓱᕐᓯᒪᔪᓄᑦ. ᓴᓇᔭᐅᓂᖓ ᐅᖅᑰᓴᐅᑏᑦ ᐱᐊᓂᒃᑕᐅᓚᐅᕐᑐᖅ ᐊᑐᕋᔭᕐᑎᓪᓗᒋᑦ ᓄᓇᐅᑉ ᐃᑭᐊᓄᑦ ᐃᒪᕐᒥᓗ ᐊᓂᕐᓂᖃᕈᑎᓄᑦ. ᓴᓇᔭᐅᒐᔭᕐᓂᐊ ᓄᖅᑲᕐᑎᑕᐅᓚᐅᕐᑐᖅ Doris Central,ᒥ ᑲᔪᓯᙱᓐᓇᕋᓂ 2019,ᒥ.

ᓴᕕᕋᔭᒃᓴᓂᐊᕐᓂᖅ ᑲᔪᓯᓚᐅᕐᓯᒪᔪᖅ ᐱᒋᐊᕐᓯᑎᒃ 2019,ᒥ ᐱᒋᐊᖅᑳᕈᑎᖃᕐᓯᑎᒃ ᖄᕐᑎᕆᓂᕐᒥᒃ ᐊᒻᒪ ᐊᔾᔭᕐᑐᐃᓂᕐᒥᒃ ᓴᕕᕋᔭᒃᓴᓂᒃ ᐊᒻᒪ ᓱᕈᕐᓂᒃ ᒪᕐᓗᑯᓂᒃ ᑕᑦᑕᖓᑦ ᓈᕐᑑᕐᒥᑦ, Naartok East Crown Pillar Recovery (NECPR),ᒥᑦ. ᐱᕙᓪᓕᐊᕕᐅᓚᐅᕆᑦᑐᖅ Madrid North,ᒥ ᓄᖅᑲᕐᑎᑕᐅᓚᐅᕐᒪᑦ ᐱᒋᐊᕐᓯᑎᒃ Q4 2019,ᒍᑎᓪᓗᒍ. ᒪᕐᓗᑯᐃᑦ ᐊᒻᒪ ᓇᒻᒥᓂᖃᕆᐊᓪᓚᓐᓂᖓ Doris Crown Pillar Trench ᐱᐊᓂᒃᑕᐅᓚᐅᕐᑐᖅ 2019,ᒥ.

ᐃᓪᓗᐊᕈᓯᓕᐅᓚᐅᕐᑎᑦ ᐊᑕᐅᓯᕐᒥᒃ ᐃᓚᒋᐅᑎᓂᐊᕐᑐᒥᒃ 48,ᓄᑦ ᐃᓪᓕᕐᓄᑦ ᑕᕗᓂ Doris,ᒥ ᐅᔾᕋᓐᓂᐊᕐᕕᒻᒥ ᐊᒻᒪ ᐋᕿᒃᓯᒋᐊᓪᓚᑦᓯᑎᒃ 5 ᒥᓕᐊᓂᒃ ᓕᑐᕐ ᐅᕐᓱᐊᓗᖃᐅᑎᒥ ᓴᓇᔭᐅᓪᓗᓂᓗ Roberts Bay,ᒥ ᐅᕐᓱᐊᓗᒻᒧᑦ ᓯᕐᓗᐊᖑᓂᐊᕐᑎᓪᓗᒍ ᐊᒻᒪ ᓯᐊᕐᓗᐊᖑᓂᐊᕐᓗᓂ.

ᐅᑭᐊᒃᓵᒥ, ᑖᒃᑯᐊ TMAC,ᑯᑦ ᑲᔪᓯᑎᑦᓯᓯᐊᓚᐅᕐᑐᑦ ᐅᓯᒍᔾᔭᐅᓂᕐᒥᒃ ᐅᒥᐊᕐᔪᐊᒃᑯᑦ, ᐊᒻᒪ ᓂᐅᕕᕐᓂᒃᑯᑦ ᐊᒻᒪ ᐊᔾᔭᕐᓯᓂᒃᑯᑦ ᐅᕐᓱᐊᓗᒻᒥᒃ ᐊᒻᒪ ᖃᕐ ᑕᔩᓂᒃ ᐊᒻᒪ ᐊᑐᐃᓐᓇᕈᕐᑎᑦᓯᓪᓗᑎᒃ ᐃᑲᔪᕈᑎᒃᓴᓂᒃ ᐅᔾᕋᓐᓂᐊᕐᕕᒻᒥ ᐊᒻᒪ ᓯᖃᓪᓕᓇᓇᕕᒻᒥ. ᐅᒥᐊᕐᔪᐊᒃᑯᑦ ᐊᔾᔭᕐᑐᐃᓚᐅᕐᑎᑦ ᐅᕐᑯᒪᐃᑦᑑᑎᐊᓗᓐᓂᒃ ᓄᓇᒃᑰᕈᑎᓂᒃ ᐊᒻᒪ ᓱᓇᕐᕈᑎᒃᑲᓂᕐᓂᒃ ᐅᔾᕋᓐᓂᐊᓂᕐᓂᒧᑦ ᐊᒻᒪ ᓴᓇᓂᕐᒧᑦ ᐊᐅᓚᒍᑕᐅᔪᓂᒃ.

ᒪᕐᓗᑯᓕᖏᓐᓂᖅ, ᐅᕐᓱᐊᓗᒻᒥᒃ ᓴᓂᕐᕗᐃᓯᒪᓂᖅ ᐊᒻᒪ ᐅᕐᓱᐊᓗᒻᒥᒃ ᐊᑐᕐᓂᖅ ᐊᒻᒪ ᐊᑦᑕᓇᕐᑐᓄᑦ ᓯᕐᓗᐊᓕᖏᓐᓂᖅ ᑕᐃᒪᐃᑦᓴᐃᓇᕐᑐᑦ ᐊᕐᕌᒍᕋᑖᕐᓯᒪᔪᑎᑐᑦ. 14 ᖃᐅᔾᔭᐅᓯᒪᓚᐅᕐᑐᑦ ᐅᕐᓱᐊᓗᒻᒥᒃ ᑯᕕᕋᒃᓂᑯᐃᑦ ᓄᓇᕗᒻᒥ ᐅᖃᓚᐅᒃᑯᑦ, ᐃᒪᓕᖏᓐᓂᕐᒧᑦ ᓚᐃᓴᓐᓯᓕᖏᓐᓂᕐᒧᑦ ᖃᐅᔾᔨᕐᑎᒧᑦ ᐊᒻᒪ ᕿᑭᕐᑖᓗᒻᒥ ᐃᓄᐃᑦ ᑲᑐᔾᔾᔭᖃᑎᒌᖕᒋᑕ ᐱᓕᕆᐊᖑᔪᓂᒃ ᐊᖏᔫᑎᓂᒃ ᐱᓕᕆᔾᔪᐊᓄᑦ. ᐅᕐᓱᐊᓗᒻᒥᒃ ᑯᕕᓂᑯᐃᑦ 2019,ᒥ ᐊᖏᔫᓐᓂᖏᒻᒪᑕ, ᐊᒻᒪ ᐊᑐᕐᑕᐅᓪᓗᑎᒃ ᐱᓕᕆᕝᕕᒻᒥ ᐊᒻᒪ ᓴᓇᕕᐅᔪᓂ, ᐊᒻᒪ ᑲᒪᒋᔭᐅᖅᓴᐅᑎᒋᓚᐅᕐᑐᑦ ᐊᒻᒪ ᓴᓗᒻᒪᖅᓴᕐᑕᐅᓪᓗᑎᒃ ᑲᒪᑦᓯᐊᖏᓐᓂᕕᓂᕐᒧᑦ ᐊᕙᑎᒥᒃ. ᐅᓯᔭᒃᓴᖅᖏᑐᐊᕐᒪᑕ ᖃᖓᑕᓲᑦ ᐊᑐᕐᑕᐅᖃᑦᑕᓚᐅᕐᑐᑦ 2019,ᒥ ᒪᕐᓗᑯᓂᒃ ᐅᓯᓂᕐᒧᑦ ᑕᕝᕙᖓᑦ Doris Camp,ᒥᑦ ᐊᕙᑎᓕᖕᓂᕐᒧᑦ ᖃᐅᔨᓴᕐᕕᒻᒧᑦ ᔨᐊᓗᓇᐃᒧᑦ ᑭᖑᓪᓕᕐᐹᒥ ᖃᐅᔨᓴᕐᑕᐅᓂᐊᕐᑎᓪᓗᑎᑦ ᐋᕿᒃᓯᒋᐊᓪᓚᑦᑕᐅᓗᑎᒃ/ᐃᒋᑕᐅᓗᑎᓪᓗ.

ᐃᒪᕐᒥᒃ ᐊᑐᓚᐅᕐᓂᖅ 2019,ᒥ ᑲᔪᓯᑕᐅᓚᐅᕐᑐᖅ ᒪᓕᑦᓯᑎᒃ Type A,ᒥ ᐃᒪᓕᖏᓐᓂᕐᒧᑦ ᓚᐃᓴᓐᓯᒥᒃ, Licence 2AM-DOH1335 ᐊᑐᕐᑐᓂ ᐅᕙᖓ Doris-Madrid, ᐊᒻᒪ Type A ᐃᒪᓕᖏᓐᓂᕐᒧᑦ ᓚᐃᓴᓐᓯ. Licence 2AM-BOS1835 ᐊᒻᒪ Type B ᐃᒪᓕᖏᓐᓂᕐᒧᑦ ᓚᐃᓴᓐᓰᑦ 2BB-BOS1727 ᐊᑐᕐᑐᑦ ᐅᕙᖓ Boston, ᐊᒻᒪ Type B ᐃᒪᓕᖏᓐᓂᕐᒧᑦ ᓚᐃᓴᓐᓰᑦ 2BB-MAE1727 ᕿᓂᕐᓂᕐᒧᑦ ᐱᓕᕆᐊᒃᓴᓂᒃ ᐅᕙᓂ Madrid, ᐊᒻᒪ Type B ᐃᒪᓕᖏᓐᓂᕐᒧᑦ ᓚᐃᓴᓐᓯ 2BE-HOP1222 ᐊᕕᑦᑐᕐᓯᒪᓂᒃᑯᑦ ᕿᓂᕐᓂᕐᒧᑦ ᑮᓇᐅᔭᓕᐅᕈᑎᒃᓴᓂᒃ. ᐅᖃᐅᓯᐅᓯᒪᔪᑦ ᐃᒪᓕᖏᓐᓂᕐᒧᑦ ᓚᐃᓴᓐᓰᑦ ᐱᖃᓯᐅᑎᔪᑦ ᒪᓕᒐᕐᓂᒃ ᖃᐅᔨᓴᕆᐊᖃᕐᓂᕐᒧᑦ ᐱᓕᕆᐊᓂᒃ ᐱᖃᓯᐅᑎᓗᒋᑦ ᓂᐱᓕᐅᕆᓂᖅ ᐱᔾᔪᑎᖃᕐᑐᓂᒃ ᖃᓄᐃᓪᓗᐊᕐᑐᒥᒃ ᐃᒪᕐᒥᒃ ᐊᑐᕐᓂᕐᒥᒃ, ᖃᐅᔨᓴᕈᑎᖃᕐᓂᕐᒧᑦ (ᓲᕐᓗ, ᓴᓗᒻᒪᖅᓴᐃᓂᕐᒧᑦ ᓱᕈᕐᓂᒃ) ᐃᒋᑦᓯᓂᖅ ᐊᕙᑎᒧᑦ, ᐊᒻᒪ ᖃᐅᔨᓴᕆᐊᖃᕐᓂᖅ ᐃᒪᕐᒥᒃ ᐱᓕᕆᓂᒃᑯᑦ (ᓲᕐᓗ ᐊᕙᑎᒥᑦᑐᓂᒃ, ᐊᒻᒪ ᖃᐅᔨᓴᕐᓂᖅ ᐃᒪᖓᓂᒃ ᐱᓕᕆᕕᐅᔪᓂ (ᓲᕐᓗ, ᐊᕙᑎᒥᑦ ᑰᓐᓂᑦ ᓴᓇᕕᐅᔪᓂᑦ, ᐊᓄᓇᒧᑦ ᐃᒪᐅᑉ ᐊᑲᐅᖏᓕᐅᑎᖏᓐᓂᒃ ᓱᕈᕐᑕᐅᓗᑎᒃ ᓱᕈᕐᓄᑦ, ᖁᕐᕕᓐᓄᑦ ᐊᒻᒪ ᐅᕐᓱᒥᑎᑦᓯᒪᔪᓄᑦ, ᓲᕐᓗ). ᐃᒪᕐᒥᒃ ᐊᑐᕐᓂᖅ 2019,ᒥ ᐋᕿᒃᑕᐅᓯᒪᓚᐅᕐᑐᑦ ᐊᖏᕐᑕᐅᓯᒪᔪᑎᒍᑦ ᖃᓄᖅ ᐊᖏᑎᒋᔪᒥᒃ ᐊᑐᕈᓐᓇᕐᓂᕐᒧᑦ. ᐊᓪᓛᑦ, ᑖᒃᑯᐊ TMAC ᑲᔪᓯᑦᓯᐊᕐᓂᖃᓚᐅᕐᑐᑦ ᑲᒪᒋᐊᖅ ᐊᑐᒃᑲᓐᓂᕈᓐᓇᕐᑐᓂᒃ ᒪᕐᓗᑯᓂᒃ ᐅᓄᕐᓂᖅᓴᐅᒃᐸᑕ 95% ᐃᒪᕐᒥᒃ ᐊᑐᕐᑐᒥᒃ ᒪᕐᓗᑯᓄᑦ ᐱᓕᕆᕕᒻᒥ, ᐊᑐᖏᓐᓂᖅᓴᐅᓕᕐᓯᑎᒃ ᐃᒪᕐᒥᒃ ᑕᕗᖓᑦ Doris Lake,ᒥᑦ. ᒪᕐᓗᑯᐃᑦ ᐊᓂᐊᔪᑦ ᐊᕙᑎᒧᑦ 2019,ᒥ ᒪᓕᒍᑕᐅᓯᒪᔪᑦ ᐊᖏᓂᖏᓐᓂᒃ ᒪᕐᓗᑯᐃᑦ ᐅᖃᐅᓯᐅᓯᒪᓪᓗᑎᓪᓗ ᐃᒪᓕᖏᓐᓂᕐᒧᑦ ᓚᐃᓴᓐᓯᓂ.

ᓄᓇᓖᑦ ᑲᑎᒪᑎᑕᐅᓯᒪᔪᑦ 2019, ᐱᔾᔪᑎᖃᕐᓯᑎᒃ ᐊᑲᐅᓈᕐᑐᓂᒃ ᐊᒻᒪ ᐊᒃᑐᕐᑕᐅᓂᓇᒐᔾᔨᑕᖏᑕ ᓄᓇᓖᑦ ᒥᒃᓵᓄᑦ ᐊᒻᒪ ᐃᓄᐃᑦ ᐊᕙᑎᓕᖕᓂᕐᒧᑦ ᑲᑎᒪᔩᖏᑕ ᐃᓯᒫᓗᒋᔭᖏᓐᓂᒃ ᐅᖃᐅᓯᖃᕐᓯᑎᒃ ᐱᔾᔪᑎᓕᓐᓂᒃ TMAC,ᑯᑦ ᐊᐅᓚᑦᓯᖏᓐᓂᒃ, ᐃᖅᑲᓇᐃᔭᕐᑎᖃᕐᐸᓐᓂᖏᓐᓂᒃ ᐊᒻᒪ ᐅᖃᖃᑎᖃᕐᓂᐊᖃᕐᓂᕐᒥᒃ TMAC,ᑯᑦ ᐊᕙᑎᓕᖕᓂᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᐊᖃᕐᓂᖏᓐᓂᒃ ᐊᒻᒪ ᐃᖃᓗᓐᓂᒃ ᖃᐅᔨᓴᖃᕐᓯᐅᑎᓂᒃᑯᑦ ᐊᒃᑐᕐᑕᐅᓂᖏᓐᓂᒃ.

2019,ᒥ ᐃᒃᐱᒋᔭᖃᓗᐊᓚᐅᕐᑐᑦ TMAC,ᑯᑦ ᐱᔪᓇᐅᑎᖏᓐᓂᒃ ᐊᒻᒪ ᐋᕿᒃᓯᐃᒋᐊᓪᓚᒋᐊᖃᕐᓂᕐᒥᒃ ᐊᖏᕐᑕᐅᒋᐊᖃᕐᑎᓪᓗᒋᑦ ᑐᕌᖓᔪᑦ ᐱᓕᕆᐊᖑᔪᒧᑦ, ᐱᖃᓯᐅᑎᓪᓗᒋᑦ ᐅᔾᕋᓕᕆᓂᒃᑯᑦ ᓯᖃᓪᓕᕐᓂᑯᓂᒃ ᑲᒪᓂᖅ, ᐊᖅᑯᑎᓕᕆᓂᖅ, ᐃᒪᕐᒥ ᐅᓪᓗᑯᑖᒥᑦ ᐅᑭᓕᕆᓂᖅ, ᐃᒪᓕᕆᓂᖅ ᑐᕌᕐᑐᓂᒃ ᐊᔾᔨᒌᖏᑦᑐᓄᑦ, ᐊᒻᒪ ᐃᒪᓕᕆᓂᖅ ᐊᒻᒪ ᐅᑭᓕᕆᓂᖅ ᐱᔾᔪᑕᐅᓗᓂ ᐱᓕᕆᐅᓯᖏᓐᓂᒃ.

ᐅᖃᐅᓯᐅᓯᒪᒻᒪᑕ ᖁᑯᓂ, TMAC,ᑯᑦ ᐱᓂᐊᕐᓂᖃᕐᑐᑦ ᑲᔪᓯᑦᓯᓯᐊᕐᓂᕐᒥᒃ ᐊᔾᔨᕌᖏᑦᑐᓂᒃ ᒪᓕᒋᐅᒥᐊᓕᓐᓂᒃ ᐊᒻᒪ ᐋᕿᐅᒪᑎᑦᓯᓯᐊᕐᓂᒃᑯᑦ ᓄᓇᓕᓐᓂᒃ ᐱᓕᖃᑎᖃᑦᓯᐊᕐᑐᒃᓴᐅᓂᕐᒧᑦ. ᐊᕙᑎᒥᒃ ᖃᐅᔨᓴᕐᓂᖅ ᒪᓕᒍᑕᐅᓪᓗᓂ ᐅᓪᓗᒥ ᐊᑐᕐᑕᐅᔪᓄᑦ ᐃᒪᓕᖏᓐᓂᕐᒧᑦ ᓚᐃᓴᓐᓯᓂᒃ, ᐊᖏᖃᑎᒌᒍᑕᐅᓯᒪᔪᓂᒃ, ᐱᓕᕆᐊᒍᓪᓗ ᓇᓗᓇᐃᒃᑯᑕᖃᕈᑕᐅᓗᓂ, ᒥᐊᓂᕐᓯᓂᒃᑯᑦ ᐸᕐᓇᒃᑕᐅᓯᒪᓗᓂ ᐊᒻᒪ ᐊᕙᑎᒥᒃ ᖃᐅᔨᓴᕐᓂᐊᖃᕐᓂᕐᒧᑦ ᐸᕐᓴᒃᓯᒪᓗᑎᒃ ᐊᕐᕌᒍᒥ 2020.

Atanguyup Titikgakgaikhimayunik Havakhautit – Inuinnaqtun

Talvani Kapihiliktuk Havakhautit nunat nallautakgutauvaktuk 20 km x 80 km nungumangaah nunat hingnikgiyanik Mellville Kangikhuakyauni Nunavutmi, Kanatami. Tamna Uyagukhiukvik TMAC Havakvik Havakvit (TMAC) ilingaitunik nangmingnikgiyainiklu pivaktunik havakviuluakpaktunik ammigiplugit uyagukhiukviuvaktunik kinikhiayauvaktunik, aullaktikgutikhanik imalu uyagukhiukvitlu. Una uniklutinik tahapkununga Nunavut Katimayit Imalikiyit Katimayit (NWB) pivaktunik havagiplugit upalungaiyakhugit piyauyukhanik havakhiktauyukhanik titikgakgaikhimayunik Havakhautikhanik hulilukakgutauyukhanik imalu havagiyauyukhanik ataniktuktauhimayunik havagiyauyunik talvunakukhimayunik TMAC Kanukgitunik A Naunaitkutak Atuktauvaktunik Atugakhanut Nungudjutilingnik Ubluanganit Atuknianut Imaktigut 2AMDOH1335, 2-BSI835, Kanukgitunik B Naunaitkutak Atuktauvaktunik Atugakhanut Nungudjutilingnik Ulbuanganit Atuknianut Imaktigut 2BB-MAE1727, 2BB-BOS1727, havagiyauvaktunik uyagukhiukviuvaktunik kinikhiayauvaktunik Kanukgitunik B Naunaitkutak Atuktauvaktunik Atugakhanut Nungudjutilingnik Ubluanganit Atuknianut Imaktigut 2BE-HOP1222 uvani 2019.

Uvani 2019 nangminilingnik havakvit havakviuvaktunik havakhimakpaktunik talvani Doris pilingnik pinnahuaknikmun pihimakhutik havakviuyukhamik uyaguktakvikhamik talvanilu naahugidjutiplugit goldingnik ilingaiknikmun.

Nayugainik havakviuyukhanik hulilukakgutauvaktunik ilauhimayuniklu iniktikgutikhanik havakviuyukhanik talvani Roberts Kangikhuani Kuvikgakvikhak Atugakhak (RBDS) talvanilu ilikgiyauyukhaniklu atadjutivaktunik nunaap atangnungaktukhanik uyaguktakvinik imaiyainikmun imaktuktunik ingilgavikhainik talvanilu Atukhimayunik Imakluk Kuvikgakvik Nayuganik (TIA) kuvikgakvik tuukhualiukhimayunik imakluknik talvanilu imaktuktunik milukakvit hungnayauhimayunik. Talvani RBDS havakviuvaktunik imaiyainikmun imaktuktunik ingilgavikhainik talvani Doris uyagukhiukvikmi talvanilu imaiyainikmunlu imaklukakniinik talvani TIA talvunga Roberts Kangikhuani. Talvanilu taryumi kuvikgakvikhamik tuukhualiukhimayunik pilingnik havakhikhimayunik atani taryumi kuvikgakvikhanik pilingnik ingilgaavikhanik tuukhualiukhimayunit pihimayut iniktauvaktunik talvunga Roberts Kangikhuani havagiyauvakhimayuk auyami hila malikhugu. Pihimayunik ilauhimayunik atugakhainiklu, aah Imaktuktunik Halumakhitinik Havakvikhamik hungnayauhimayunik piyukhanik nutiktauyanginik Tamakpianganik Havagiyauvaktunik Uyaguktakvinit talvanga havakhikhimayunit nunaap atanit imaktukpaktunitlu talvani Doris hivuagutlu kuvikgakvikhanik talvanilu RBDS. Pihimangitut havangitpaktunik takungnaitut talvani Roberts Kangikhuakyukmi uvani 2019.

Hilani havakviuvaktuk havalikhimayunik talvani Madridmi Tunungani nayuganik piyukhanik ikayutauyukhanik havakviuyukhanik uyagukhiukviuvaktunik talvani Naartuk Kivatani Uyaguktakvit Havakvit talvanilu Madrid Tunungani nunaap atangingnik ilingakpaktunik. Talvanilu ilauhimayunik havakviuyukhak havagilgaklugu nungumagiyanik talvani Madridmi Tunungani hila-maliklugu-apkuutikhak, talvanilu Madridmi Tunungani Kuvikgakvik Imakluknik Nayugakhak, talvanilu havakvikhak talvani Madrid Tunungani Ikakungukpaktunik Uyaguktakgaikhimayunik tuutkumavik nayugakgiyanik. Tamayakakvik nayugaat talvanilu atuktautaktuk apkuutat havakhikhimayunik piyukhanik ikayutauyukhanik hungnavinik havakviuvaktunik, nirgivik/havakvit talvanilu wuakhivit akhaalutinik havakvik. Aah ihuumalutiggingnaitumiklu pihimayut tutkuktuivaktunik havagiyauyakgaikhimayunik pidjutauyanginik tutkumayaakgaikhimayunik pidjutinaitumik ihuumalutigginaitumik nutikgiakakgumik uyaguktakvinit talvani Naartok Kivatani Uyaguktakvit Havakvit.

Atani nunaap kugluakviuvaktunik havakhikhimayunik havagiyauvaktunik huli talvanilu Doris uvani 2019 pilingnik hivunikgiktunik ilingaitkiyauyunik atani ulguktakvinit (BTD) ilingakpaktunik nakukgutauvaktuniklu ikayutauyukhanik havagiyauvaktunik. TMAC havagivakgait huli uyaguktakhutik pilingnik takiyunik

ikuutakhutik imalu kaaguktakhutik talvani Doris Atadjutigikpaktunik (DCO) talvanilu BTD talvani Dorismi, talvanitauk havakviuvaktumik huli uyaguktakviuvaktuk uvani DCO. TMAC pivakhimayut havagiplugit uyaguktakhimakhutik talvani DCO pidjutiyukhanik hivunikgiktukhanik uyaguktaknikmun ilingaituniklu. Takiyunik ikuutakhutik kaaguktakhutik havagiyauhimakpaktunik 2019, pilingnik uyaguktakhimayunit havagiyauhimayunik uyaktauvaktunik akhaalutikut atanit nunaap pivakgait nunaap kangungnungautivakgait piyauyukhanik havagiyauyukhanik uyaguktakviuyukhanik naliak ilauyukhanik talvunga kalikgiktiktauvaktunik uyaguktakgaikhimayunit tutkuktauvaktunik. Hungnayauvaktunik talvani DCO Kingaliukhimayuk Kulvaktiktauhimayuk hungnayauvaktuk piyangani ikayutauyukhanik nunaap atani havakvit kingakhainik havakhikariakaktuniklu. Havagiyauvaktunik talvani Dorismi Kitikgiyanik (DCN) ilingakpaliavaktunik uvani 2019.

Uyaguktakvit havagiyauvaktunik takungnakhimayunik nunaap kangani uvani 2019 pilingnik havagiyauvaktunik nunaap kangani kugaaktaktunik imalu uyaktakhugit uyaguktakhimayunik imalu kalikgiktiktauvaktunik uyaguktakhimayunik talvani Naartok Kivatani Uyaguktakvit Ilingaikgutauvaktunik (NECPR). Havagiyauvaktunik talvani Madrid Tunungani nunaap atani havakvit ilingakpaliktunik pidjutihimayunik uvani Q4 talvuna 2019. Ulguktakgianginik ilidjuhikgingukfaakniaklugu talvanilu ilidjuhikgingukfaakniaklugulu talvani Doris Uyaguktakviani Kalikgiktiktauvaktunik Havakviat pihimayaat iniktauvakhimayuk uvani 2019.

Atauhikmiklu havakvikhamik ilauhimayuk havakvikhamik hingniktakvikhamik 48 nik igluyakakvikhamik inikhainik talvani Doris Ingnituklianik talvanilu ilauhimayunik havakhikpakhimayunik 5 millianmik imakuktuutilanganik ukhuukluit kataakyukhanik imakakvikhamik hungnayauvaktuk talvani Roberts Kangukhuani Ukhuukluit Tuutkumavikhak talvanilu Tamaayakakvik havakvik.

Uvani ukiakhami, TMAC havagivakhimayainik alauyunik ungniguutivakhimayunik taryumi havakvinik ilauhimayunik niuyauvakhimayunik akkuiktuanguyunik talvunalu akyaktauvaktunik ukhuukluknik pihimayuniklu havagivakgainiklu kaaguktautinik atugakhaniklu ikayutauvaktunik uyaguktakvit imalu havakvit uyaguktakvit kikhuktuivit hulilukakvit. Talvanilu taryumi uygaktauvaktunik tamayukhanik ilauhimayunik havagiplugit akhaalutikyuanik ulguktautikhanik imalu atugakhaniklu ikayutauyukhanik uyagukhiuknikmun talvanilu hungnayauvaktunik havakviuvaktuniklu.

Ikakungukpaktunik ikakuktauvaktunik, ukhuukluknik atukhimayunik imalu tukungnalingniklu tutkumavik pihimayuk kangnukgilihimangituniklu pivakhimayunit aipangungniknitanitlu. Ammigaituniklu kuvihivaktunit havakhiktauvaktunik unikluktauhimayunik tahapkununga Nunavut Kuvihigumik Imakluknik Tuhaktitauyukhut, Imaktigut Naunaitkutak Atuktauvaktunik Atugakhanut Nungudjutilingnik Ulbuanganit Atuknianut Imaktgut Ihiviukhiyiit tahapkuatlu KIA Hivitunikhainiklu Havakhautit havakvit. Talvanilu aulahimayunitlu kuvigaktauvaktunit takungnakhimayunik talvuna 2019 pihimayut kayakutaungitunik ilingaktikgutaulimaituniklu hilamiutanut, takungnakhimayunik ingnituklinik nayugainik imalu hungnayauhimayunik, pilingnik kilamiukgutauvaktunik kiudjutauhainikpaktuniklu imalu halumakhiktauhainakpaktunik naunaitunik pihimayunik ilingaktikgutinaitumik talvani nunaap kanganungakpaktuniklu. Atukhutik uhitunik tingmitinik uvani 2019 atugakhanik uyaktakgianginik talvanga Doris Ingnitukliat talvungalu KBL Nunagiyanut Yalunaimut piyukhanik havakhiktauyukhanik inikgutauvaktunik halumaktikginikmun/ikakungukpaktuniklu.

Imaktigut atuktauvaknik uvani 2019 pihimayait havagiyauvaktunik malikhugit pilingnik Kanukgitunik A Imaktigut Naunaitkutak Atuktauvaktunik Atugakhanut Nungudjutilingnik Ulbuanganit Atuknianut 2AM-BOS1835 taimaituniklu Kanukgitunik Imaktigut Naunaitkutak Atuktauvaktunik Atugakhanut Nungudjutilingnik Ulbuanganit Atuknianut 2BB-BOS1727 talvani Bostonmi, tamnalu B Imaktigut Naunaitkutak Atuktauvaktunik Atugakhanut Nungudjutilingnik Ulbuanganit Atuknianut 2BB-MAE1727 havakhiktukhanik Ilingaitunik Uyagukhiukvit Kinikhianikmun talvanilu Madridmi, talvunalu Kanukgitunik B Imaktigut Naunaitkutak Atuktauvaktunik Atugakhanut Nungudjutilingnik Ulbuanganit Atuknianut 2BE-HOP1222 havagiyauyukhanik nunatutukanik uyagukhiukvit kinikhianikmunlu. Tahapkununa

havakhiktauyukhanik imaktigut naunaitkutak atuktauvaktunik atugakhanut nungudjutilingnik ulbuanganit atuknianut ilauhimayunik hivunikgiyakhainiklu ihiviukhinikmun havakhautikhaniklu pihimayunik havakhautikhanik ilauvaktunik uniklutinik naunaitkutanik atadjutauvaktunik talvani nallautakgutauvaktunik imak kugluaktitauvaktuk nalikmut kanukgilidjutivaktunik, ihiviukhinikmunlu kugluaktitauvaktunik (uvunalu., halumakhiktauvaktunik imakluknik atukhimayuniklu) kugluaktitauvaktunik talvunga nunaani, imalu munakgiyauyukhanik imaktigut kanukgitakhaniklu talvani nalikmiklu Havakhautinik nayugainiklu (uvunalu., nunaap kangani kugluaktitauvaktunik ungmuut havakvinilu nayugainik, hilaap taimailipkakpagainik imakaknit talvani havakviuvaktunik nayugainik havakvit, imakluknik atukhimayunik imalu ukhuuklukaktuniklu imakmi atuktauvaktunik, kanuklu.). Imak atuktauvaktuk uvani 2019 pihimayunik havagiyauvaktunik angiutauvaktunik nungumalingnik kangiktaulimaitunik. Imalu kanukgitunik, TMAC pihimayut ungniguutivaktuniklu atukhimakhugu atuktauvaktunit ima 95% mik atuktauvaktunit imak talvunga kuvikgakvit imakluknik nayuganik, ilingaktikgutinaitumiklu atuktauvaktunik imak talvanga Doris Tahik. Tamakpianginik atuktauvaktunik kugluaktitauvaktunik talvunga nunaap kanganut uvani 2019 pihimayunik adjikikhimavaktunik havakhikhimayunit havagiyautaktunik kugluaktitautaktunik nungumalingnik kangiktaulimaitunik naunaitkutalingnik havakhikpaktunik imaktigut naunaitkutak atuktauvaktunik atugakhanut nungudjutilingnik ulbuanganit atuknianut.

Nunalingni malikgaliukgutauvaktunik uvani 2019 ammigiyauyukhanik atadjutigiknikmunlu havakatigiktiaknikmun talvanitunik nunalingni tahapkunanilu Inuit Nunalikiyit Tutkikhaiyit Katimayit kauhimayauvaktunik TMAC havakvit, havakhakhiukpaktuniklu imalu havaktitauvaktunik havakhautikhanik uvunalu ataniktutauvaktunik talvani TMAC nunalikiyit munakgiyauyukhanik imalu ikalukhiuktit havagivakgainiklu.

Uvani 2019 tahapkunani ammigiyauyukhanik TMAC atugakhanik naunaitkutakhamik atukufuukpaktunik atugakhanik atuknianut imalu tutkikhainikmun pinnahuaknikmun pihimayunik akkitautivaktunik nalikmut angiutauvaktuniklu havakhikariakaktuniklu ilanginik Havakautikhanik, ilauhimayuniklu ikakungukpaktunik uyaguktakhimayuni, apkuutinik, talvanilu taryumi kugluaktitauvaktunik tuukhualiukhimayuniklu, imakaknit ikaktakvit, imalu imakaknit talvanilu ikakungukpaktunik pilingnik havakviuvaktunik havakvit.

Pihimayunik havagiyauvaktunik kulani uma, TMAC hivunikgingnikmunlu havagihimakhugit ungnigutivaktunik malikhugit pilingnik nalikmut kauhimayauvaktunik havakhikariakaktunik pihimakhutik havagihimakhugit nunalingnilu havakatigiktiaknikmunlu. Nunaap ilidjuhianik munakgiyauvaktuk malikhugit havakhikhimayunik atuktauvaktunik Imaktigut Naunaitkutak Atuktauvaktunik Atugakhanut Nungudjutilingnik Ulbuanganit Atuknianut, Havakhautikhanik Angiutauvaktunik, Havakhautit Naunaitkutak angiutauvaktunik, munakgiyauyukhanik pangnattauyunik imalu nunaap atuknianut havaginiakhugit munakgiyauyukhanik pangnattauyunik pilugit havagiyauhimaktukhanik talvuna 2020.

HOPE BAY BELT PROJECT
2019 Nunavut Water Board Annual Report

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Acronyms and Abbreviations

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

AEMP	Aquatic Effects Monitoring Program
DNSEMC	Doris North Project Specific Committee
KitSEMC	Kitikmeot Socio-Economic Monitoring Committee
m	Metre
NEF	Nunavut Economic Forum
NWB	Nunavut Water Board
RBDS	Roberts Bay Discharge System
SDS	Safety Data Sheets
t	Tonnes
TDGA	*Transportation of Dangerous Goods Act*
TIA	Tailings Impoundment Area
TMAC	TMAC Resources Inc.
WRIA	Waste rock influenced area
WWTF	Wastewater treatment facility

1. Introduction

This report to the Nunavut Water Board (NWB) has been prepared to summarize the Project activities and monitoring conducted under TMAC Resources Inc. (TMAC) Type A Water Licence(s) 2AM-DOH1335, 2AM-BOS1835, Type B Water Licence(s) 2BB-MAE1727, 2BB-BOS1727 and the exploration Type B Water Licence 2BE-HOP1222. Concordance tables referencing where in this report the requirements of the reporting outlined in each of the referenced water licences has been met are presented in Appendix A.

The referenced water licences include provisions for sampling programs that involve recording data related to the volume of water extracted for any purpose, testing of effluents (e.g., treated sewage effluents) discharged to the environment, and monitoring water quality within specific Project areas (e.g., surface discharge downstream of construction areas, storm water from an engineered containment structure, sewage and oily water effluent, etc.). These data are summarized and referenced on the completed NWB Annual Report Forms, included as Appendix B and all monitoring data is provided in Appendix D of this report.

2. Regulatory Framework and Legal Matters

The key regulatory and legal documents that relates to this report are the Project Type A and B Water Licence(s), however this report is presented in context of other applicable regulatory authorizations and schedules. TMAC holds, or will soon hold, the permits and authorizations required to carry out the future work scope. A listing of the key regulatory instruments that allowed for work to be completed in 2019 is provided in Table 2-1.

Table 2-1. Key TMAC Permits/Licences and Approvals

Name	Approval No.	Scope / Purpose	Term / Duration	Expiration Date
NIRB Project Certificate	009	Authorization for Madrid-Boston to proceed, provided certain conditions and requirements are incorporated in the various regulatory permits and authorizations issued by the regulatory agencies with permitting authority for the Hope Bay Project. The Project includes the construction of all required surface Infrastructure and operation of three new mines at Hope Bay: Madrid North, Madrid South and Boston.	Life of Doris Project	None
NIRB Project Certificate	003	Authorization for Doris to proceed provided certain conditions and requirements are incorporated in the various regulatory permits and authorizations issued by the regulatory agencies with permitting authority for the Hope Bay Project.	Life of Doris Project	None
NWB Type A Water Licence Amendment No.2	2AM-DOH1335	Water Licence for Doris and Madrid project that authorizes the construction, operation and reclamation of the Doris, Madrid and the all- weather road of the Hope Bay Project. Licence scope includes Amendment No.1.	22 years	March 2035
NWB Type A Water Licence Amendment No.1	2AM-DOH1323	Water Licence for Doris with a 10-year term that authorizes the construction, operation and reclamation of the Doris Project. Licence was renewed (with certain amendments) in November 2016. – Superseded by Amendment No. 2 2AM-DOH1835.	10 years	August 2023
NWB Type A Water Licence Amendment	2AM-BOS1835	Water Licence for the Phase 2 Boston Site that authorizes the construction, operation and reclamation of the Boston Project.	17 years	March 2035
Type B Water Licence for the HBVB including a camp at Windy Lake	2BE-HOP1222	Water Licence that allows for the use of water and disposal of waste associated with regional exploration program including drilling and camp operations.	10 years	June 2022

(continued)

Table 2-1. Key TMAC Permits/Licences and Approvals (continued)

Name	Approval No.	Scope / Purpose	Term / Duration	Expiration Date
Type B Water Licence for bulk sample exploration at Boston	2BB-BOS1727	Water licence that allows for the use of water and the disposal of waste for the Boston Advanced Exploration Project. Licence was renewed in July 2017, was formerly 2BB-BOS1217.	10 years	July 2027
Type B Water Licence for Madrid Advanced Exploration Amendment No.2	2BB-MAE1727	Water licence that allows for the use of water and the disposal of waste for an undertaking classified as Mining and Milling as per Schedule II of the Regulations for the Madrid Advanced Exploration Project (Amended in 2018).	10 years	May 2027
Framework Agreement		Framework Agreement provides comprehensive land tenure governing the issuance of surface exploration licences, advanced exploration leases, commercial leases, and compensation associated with tenure. Framework Agreement includes a belt-wide Land Use Licence, an Inuit Impact and Benefits Agreement (IIBA) and a Water and Wildlife Agreement. Framework Agreement was signed in March 2015 for belt-wide land tenure.	20 years	March 2035
Water and Wildlife Agreement		Included as a Schedule to the Framework Agreement, this Agreement details compensation to be provided to the KIA and Inuit beneficiaries for negative effects that may occur to wildlife harvesting and water as a result of mining related activities across the Belt.	20 years	March 2035
Amended and Restated Inuit Owned Lands Commercial Lease	KTCL 313D001	Commercial Lease for use of designated lands associated with the Hope Bay Volcanic Belt (HBVB) area. Currently, lands have been designated that encompass Doris. Expansion to include other areas of the HBVB is administrative in nature. Original Commercial Lease was amended and restated in March 2015 as a means to obtain surety of belt-wide land tenure.	20 years	March 2035
Inuit Impact and Benefits Agreement		Included as a Schedule to the Framework Agreement, this Agreement details the benefits to be provided to the KIA and Inuit beneficiaries from the Hope Bay Project, including compensation, employment and contracting opportunities. The IIBA originally signed in association with Doris was revised in March 2015 and expanded in scope to encompass belt-wide activities.	20 years	March 2035

(continued)

Table 2-1. Key TMAC Permits/Licences and Approvals (completed)

Name	Approval No.	Scope / Purpose	Term / Duration	Expiration Date
KIA Advanced Exploration Agreements	KTAEL15C001 KTAEL15C002	Two agreements as per the terms of the Framework Agreement enabling quarry operations at designated locations in the Hope Bay Belt and advanced exploration at Boston.	5 year renewable annually thereafter for up to 20 years	March 2020
KIA Land Use Licences		Enables exploration activities across the Hope Bay Belt as per the terms of the Framework Agreement.	1 year automatic renewable for 20 years	March 2016
DFO authorization	NU-02-0117.2	Construction of the jetty in Roberts Bay.		December 2009
DFO authorization	NU-1000-0028	Changes to the Doris jetty.		July 2012
DFO authorizations	NU-02-01117.3	Construction of the Doris Tailings Impoundment Area (TIA) north dam.	Life of Mine	None
Navigable Waters Permit	8200-02-6565	Installation of the jetty in Roberts Bay.	N/A	N/A
Navigable Waters Permit	2018-600028	Approval for Jetty in Roberts Bay	N/A	N/A
Navigable Waters Permit	2018-600006	Approval for Marine Outfall Berm	N/A	N/A
Jetty Lease	77A3-1-2	Foreshore lease from the Crown for construction and operation of the Roberts Bay Jetty.	30 years	June 2047
Marine Outfall Berm	77A/3-3-2	Lease from Crown for construction and operation of Roberts Bay Marine Outfall Berm.	30 years	July 2048
Amendment to Schedule 2 of the Metal Mining Effluent Regulations (MMER)	Registration SOR/2008-216	Designation of Tail Lake as a tailings impoundment.	Life of Mine	None

3. Summary of Project Activities for 2019

3.1 CONSTRUCTION AND OPERATIONS

In 2019 commercial operations continued at Doris with continued efforts to stabilize mill throughput and optimize gold recovery. In 2019 the mill processed 592,932 tonnes (t) of ore and poured 137,140 ounces of gold, and successfully treated 48,709 t of cyanide solutions. The installation of the gravity concentrators was completed in 2019 which improved gold recovery. Projects such as the installation of scavenger columns and improved resin circuits began in the mill to further improve gold recovery.

Civil construction activities included the completion of construction of the Roberts Bay Discharge System (RBDS) and installation of the associated underground mine dewatering and Tailings Impoundment Area (TIA) discharge pipelines and pumping infrastructure. The RBDS allows dewatering of the Doris mine and removal of excess water from the TIA to Roberts Bay. The ocean discharge pipeline with sunken diffuser and recirculation pipeline were successfully installed into Roberts Bay during the open water season. As part of this system, a Water Treatment Plant was constructed to remove Total Suspended Solids from underground mine water prior to discharge through the RBDS. No discharge occurred to Roberts Bay in 2019.

Earthworks began at the Madrid North site to support the commencement of mining of the Naartok East Crown Pillar and Madrid North underground decline. This included construction of the first kilometre of the Madrid North all-weather-road, the Madrid North Contact Water Pond, and construction of the Madrid North Waste Rock storage pad. Laydown space and access roads were constructed to support shop facilities, lunchroom/offices and wash car facilities. An overburden stockpile was established to store overburden removed during mining of the Naartok East Crown Pillar. A laydown was constructed adjacent to the Madrid North underground portal location, which included a lined area for ore/waste rock re-handling, shop facilities, power generator and sea can storage area.

Underground waste development continued at Doris in 2019 with further advancement of below the dyke (BTD) decline and necessary support infrastructure. TMAC continued ore development with long hole drilling and blasting in the Doris Connector (DCO) and BTD in Doris, and continued ore sill development in the DCO. TMAC also continued waste development of the DCO for future mining horizons. Long hole blasting continued throughout 2019, with all ore production trucked to surface and processed through the mill or added to the stockpile. Construction of the DCO Vent Raise was completed to support underground ventilation requirements. Development of the Doris Central (DCN) decline continued in 2019.

Ore development also occurred from surface in 2019 with the commencement of surface blasting and hauling of ore and waste from the Naartok East Crown Pillar Trench (NECPT). Development of the Madrid North underground decline began in Q4 of 2019.

Backfill and reclamation of the Doris Crown Pillar Trench was completed in 2019.

One dorm was added to allow an additional 48 bed spaces at Doris Camp. To accommodate increased fuel storage required for future project activities, an additional 5 million litre fuel tank was constructed at the Roberts Bay Fuel Storage and Containment facility.

In the fall of 2019, TMAC concluded another successful sealift operation including the purchase and delivery of 23,000,000 L of diesel fuel as well as explosives and reagents to support mining and milling

activities. The sealift also included additional heavy equipment and supplies to support mining and construction operations.

Site layouts and aerial photos for the Belt are provided in Appendix C of this report and provide details of the existing camps, infrastructure and equipment at site.

3.2 EXPLORATION

The 2019 Exploration and Geoscience program at Hope Bay consisted of both underground and surface diamond drilling, regional prospecting, gold in till sampling and a lake-bottom sediment sampling program on Doris and Patch Lake. The 2019 exploration program at Doris included drilling high-grade targets in the BTD extension for mineral resource expansion and drilling in the DCO and DCN to support mine development. Priorities for the 2019 regional exploration program focussed on prospective targets near established or planned infrastructure where successful exploration would influence future economic development on the belt.

Exploration activities operated throughout the year on the Hope Bay belt. An ice drilling program was conducted at the Madrid deposit on Patch Lake from January to April and included an ice portage program at the Madrid pit from January to February 2019. In May 2019, exploration began a regional drill program in areas proximal to the Doris deposit. Once complete at Doris, regional exploration transitioned to mid-belt targets, in preparation for drilling to operate out of Boston camp. In June, all exploration personnel moved to Boston camp once the site was operational. Operations at Boston included camp support personnel, contractors and TMAC employees. Exploration activities were heli-supported from June until November and included diamond drilling, regional prospecting and till sampling programs. Boston camp was decommissioned for season from December, 2019 to January, 2020.

A total of 75,849 metres in 469 diamond drill holes, 135 regional prospecting samples, 1,267 glacial gold in till samples and 97 lake sediment samples were obtained in 2019.

3.2.1 Drilling

Underground diamond drilling at Doris operated continuously throughout 2019. The diamond drilling program focused on expansion drilling in the high-grade zones within the Doris BTD and infill drilling within the DCO, DNO and DCN to support detailed mine planning. A total of 375 underground diamond drill holes, totalling 43,860 metres was completed in 2019.

TMAC contracted Geotech Drilling Services Ltd. to complete the diamond drilling on the Hope Bay Belt for both underground and surface operations in 2019. On surface, no drill setup or associated items were placed within 31 metres of any waterbody during the open water season and no spills were reported into water bodies. Water quality monitoring was performed on runoff from drill sites and water used for drilling to ensure the respective Water License Criteria were met. Drill cuttings and mud were contained within a recirculation system and were transported and stored in approved containment areas including the TIA at Doris.

Surface diamond drilling activities for the 2019 Exploration and Geoscience program occurred between January and November within the Hope Bay Belt. Diamond drilling focused on regional targets proximal to the Doris, Madrid and Boston deposits. Regional targets drilled outside of these deposits were planned along proposed infrastructure routes to promote potential economic development of near infrastructure. A winter drilling program was conducted between January and April 2019, with drill rigs positioned on Patch Lake as well as on land within the Madrid pit area. Ice portages were built when necessary and rigs were pulled with a D6 dozer and telescopic handler. During the summer/fall season between May and

November, drill rigs were situated in heli-portable shacks and positioned with the support of helicopters. All drill sites on surface were reclaimed following the decommissioning of drills. A total of 94 surface diamond drill holes, totalling 31,989 metres was completed in 2019.

3.2.2 Regional Prospecting Program

A regional prospecting program was completed on the Hope Bay belt in 2019. Prospecting and reconnaissance involved structural and geochemical mapping in conjunction with grab sampling in various areas. The purpose of this program was to follow-up on historical showings and mineral occurrences within the Belt and better understand the geology and geochemical signature of current and potential drill targets.

In relation to ground disturbance, prospecting is a very low impact exploration method. Grab samples are collected with the use of a standard geologist hammer on outcrops or boulders of interest. Sample sizes ranged between 0.5 and 3 kilograms and were submitted for analysis. A method of non-destructive testing was implemented for use in the field programs during the 2019 field season. Use of a portable x-ray fluorescent machine (pXRF) for on-site and live geochemical analysis eliminates the need for geologists to take samples from sites.

A total of 135 regional prospecting samples were collected during the 2019 regional prospecting program as grabs and channels.

3.2.3 Till Sampling Program

The 2019 till sampling program was completed during snow-free months from June to September while tundra and outcrops were exposed. These programs focused on exploration outside of the main deposit areas, in effort to test the potential for additional mineralization. The sampling program was designed to test for down-ice flow anomalies within the glacial material transported during the last glaciation. This type of systematic sampling enabled for testing of covered valleys for potential mineralization. This program did not involve the use of heavy equipment and therefore had a minimal impact on the tundra or outcrops.

The samples were collected from a geomorphologic feature that is referred to as a frost boil. This feature represents a zone of frost related movement that transports the basal till material back to the surface of the tundra. The sampling protocols involved the collection of approximately 10kg of till material from the frost boil. A hole was dug to remove the till, which was then sieved to remove over sized grains from the sample. Once the material was collected, the remaining silt/sand/gravel was returned to the hole and contoured to minimize impact. Typically, a hole dug for till sampling is approximately 30 to 50 centimetres in diameter and 50 centimetres deep.

A total of 1,267 samples were collected during the 2019 TMAC till sampling program.

3.2.4 Lake Sediment Sampling Program

A lake sediment sampling program was conducted for two weeks in February, 2019 on Doris and Patch Lake. A two-person crew was contracted through Aurora Geosciences to complete the survey out of the Doris camp when ice thicknesses were ideal. The crew travelled every day to the field using snowmobiles with minimal disturbance to the tundra and environment.

An electric ice auger was used to bore holes through the ice. Samples were retrieved from the lake bottom using a torpedo-style sediment sampler. The sampling instrument was released at the surface of the lake and allowed to drip to the bottom and plunge through the sediment. If frozen, a butterfly vale

would engage and keep the material in the barrel of the sampler. A minimum of 50 grams of lake bottom material was recovered at each station and submitted for assay and analysis.

A total of 97 samples were collected from the 2019 TMAC lake sediment sampling program; 79 samples from Doris Lake and 18 from Patch Lake. On twelve occasions in shallow areas, the lake bottom was frozen and no material was recovered.

3.2.5 Channel Sampling Program

A regional channel sampling program was completed on the Hope Bay belt in 2019. The purpose of this program was to follow-up on highly prospective drill targets to better understand the geology, structure and mineralization of veins sets. Channels were taken at the Too and Domani target areas.

Channel samples involve cutting a 1 to 2 inch by approximately 3 to 7 metre long transect into exposed and clean outcrop. Outcrop is washed with debris removed. Channels were geologically and structurally mapped and sampled for analysis. Areas of exposed outcrop were preferred for channel sampling and the tundra disturbance not required. As material is removed for sampling, a small aluminum tag and flagging tape marker are left to denote sample sites.

A total of 40 channels were sampled in 2019; 12 and Domani and 28 at Too. A length of 140.5 metres of rock was sampled for a total of 90 samples.

4. Summary of Project Plans for 2020

4.1 CONSTUCTION AND OPERATIONAL WORK PLANS FOR FUTURE YEAR (2020)

The following activities are planned for the Doris site and associated permitted infrastructure for 2020:

4.1.1 Doris

- Construction of waste oil storage berm to temporarily store waste oil for backhaul;
- Construction of Millwright/Electrical shop on current Doris footprint;
- Expansion of glycol heat loop system to maintenance shops, warehouse and arctic corridor to reduce fuel consumption;
- Construction of surface wash bay facility;
- Construction of DCN Vent Raise;
- Expansion of the Doris accommodation complex;
- Construction of additional dry facilities at Doris Camp;
- Engineering of a waste management area (including landfill) in Quarry 2;
- Installation of additional contact water sumps in proximity to the Doris camp pad as per TMAC water management system; and
- Repair of tailings catch basin located west of Doris Creek.

4.1.2 Madrid

- Development of Madrid Infrastructure, access/winter roads and pads approved under the Type 2AM-DOH1335;
- Installation of fuel tank and construction of secondary containment berm to support Madrid activities;
- Madrid North underground development;
- Installation of Madrid underground fresh air raise;
- Installation of water management sumps at Madrid North Waste Rock Pad; and
- Naartok East Crown Pillar Recovery.

4.1.3 Boston

- It is anticipated that the Boston Camp will be opened for exploration work in the summer of 2020 and kept open during the winter of 2020/2021; and
- No development is planned for Boston other than maintenance of infrastructure to support exploration and camp use.

4.2 EXPLORATION WORK PLANS FOR FUTURE YEAR (2020)

Exploration activities for 2020 will include surface and underground diamond drilling, a gold in glacial till sampling program along with regional mapping and prospecting programs. A limited regional program will be completed, however, the focus for 2020 will be on areas which have potential to impact near to mid-term production at both Doris and Madrid.

Surface diamond drilling planned for 2020 will consist of approximately 10,000 metres of regional surface exploration drilling and 12,000 metres of definition drilling on the Madrid North Naartok West zone. Regional drilling will focus on the Doris Valley area, north of the Doris deposit, and will follow-up on positive results from 2019. Surface drilling on the Naartok West zone will focus on stope definition in advance of production scheduled in 2021. Approximately 50,000 metres of underground drilling at Doris has been planned with the following three objectives: (1) continued definition drilling in the Connector, Central and BTD extension zones, (2) infill and expansion drilling to upgrade confidence and expand the BTD Extension, and (3) initial expansion drilling in the Connector BTD area. Initial drilling at Boston in 2019 returned positive results, however, the decision was made not to proceed with a 2020 Boston surface program.

5. Water Use and Waste Disposal

During 2019, water management at Hope Bay Project Site was in line with the authorized Type A Water Licence for Doris and Madrid 2AM-DOH1335, the Type B Regional Exploration Licence 2BE-HOP1222, and the Type B Water Licence for Boston 2BB-BOS1727. No activities occurred under the Type A Water Licence 2AM-BOS1835 for Boston or the Type B Water Licence 2BB-MAE1727 for Madrid, therefore no water was used or waste produced from activities associated with these licences.

An overview of the sampling programs for each of the sites (Doris, Windy, Madrid and Boston) including site photographs showing the locations of monitoring sites as well as annual water sampling programs for the Hope Bay Project are provided in Appendix D of this report.

5.1 DORIS-MADRID

A summary of monitoring conducted for Doris and Madrid under the Type A Water Licence 2AM-DOH1335 is presented in Appendix D.1 of this report as outlined in Schedule I.

Water for domestic use at Doris is obtained from Windy Lake. Water is drawn from the lake at the freshwater intake and trucked to Doris Camp. The Doris Lake pumphouse was not supplying domestic water to Doris Camp in 2019.

Sewage and greywater produced onsite is processed in the sewage treatment plant at Doris in line with Part F Item 5 of the Type A Water Licence 2AM-DOH1335. Sludge produced by the treatment plant is disposed of within the TIA as outlined in the existing Hope Bay Project Domestic Waste Water Treatment Management Plan.

All containment berm water is sampled for water quality against the discharge criteria of the licence. Water that meets the standards for discharge is released in accordance with the licence following a notification to the Inspector; water that does not meet the licence criteria is treated onsite until it is remediated to acceptable levels for discharge to the tundra, is discharged to the TIA, and/or is managed as approved by the Inspector.

Runoff and contact seepage at site is managed in accordance with the approved Quarry Management and Monitoring Plan and Water Management Plan for the Doris Site.

During 2019, TMAC collected data from the following active or seasonally active monitoring stations: TL-1, TL-2, TL-5, TL-6, TL-7a, TL-7b, TL-9, TL-11, TL-12, ST-1, ST-2, ST-4, ST-5, ST-6a, ST-6b, ST-7, ST-7a/MMS-4b, ST-8, ST-9, ST-10, ST-11, ST-12, MMS-1 and MMS-9.

Monitoring at stations ST-3 (Landfill Sump), ST-13 (Doris Contact Water Pond Pad U), MMS-4a (Freshwater intake at Windy Lake North), MMS-6 (Brine Mixing Facility) and MMS-8 (Madrid North Fuel Storage Facility) did not occur, as these facilities were not constructed as of 2019.

The Madrid North Concentrator was not constructed in 2019, therefore no effluent was discharged to the TIA from this facility and no monitoring occurred at station MMS-7. No monitoring at station MMS-10 (Madrid Mine Water Discharge) occurred as no mine water was pumped from Madrid underground workings in 2019.

No activities occurred at Madrid South in 2019. Therefore monitoring at stations MMS-2 (Madrid South Primary Contact Water Pond), MMS-3 (Madrid South Secondary Contact Water Pond) and MMS-5 (Madrid South Fuel Storage Facility) did not occur as these facilities were not constructed as of 2019.

Monitoring of the TIA was undertaken at monitoring station TL-1. Monitoring of the tailings deposited into the TIA continued at monitoring stations TL-5 and TL-6 in 2019. Monitoring of detoxified tailings backfilled underground was completed at monitoring stations TL-7a, TL-7b and TL-11. As described in the Hope Bay Water Management Plan, the sedimentation pond (ST-1) was used as a collection pond for the water that accumulated in the pollution control pond (ST-2) and the three underflow sumps (ST2-S1, ST2-S2 and ST2-S3). The water collected in ST-1 was then transferred to the TIA by pipeline. The sedimentation pond was also used to transfer water from the landfarm (ST-4) and fuel storage facility berms (ST-5, ST-6a and ST-6b) to the TIA. Water from the Doris underground workings (TL-12), Naartok East Crown Pillar Trench (NECPT) and Madrid North Contact Water Pond (MMS-1) was also transferred to the TIA through the sedimentation pond. Dewatering of the TIA did not occur in 2019.

All monitoring was conducted in accordance with the Hope Bay Project Quality Assurance and Quality Control Plan (2019).

TMAC uses external certified laboratories to carry out all analyses reported in the monthly and annual reports. The QA/QC data produced by ALS Canada Ltd. and Bureau Veritas Laboratories Inc. (formerly Maxxam Analytics) are used to determine the accuracy and precision of results in these reports.

Analytical results for all monitoring stations can be found in Appendix D.1.

5.1.1 Water Balance and Water Quality Model

In 2019 commercial operations continued at Doris and monitoring continued at the associated SNP stations. Water quality source terms, climate data, mine water dewatering rates, processing rates and TIA storage curves were reviewed and/or updated in the water and load balance model, with 2017 to 2019 data, to compare against the predicted TIA water quality and water elevation. Results of the Water and Load Balance Assessment, including relevant supporting data, internal modelling results and adaptive management strategies, have been summarized in the Doris Mine Annual Water and Load Balance Assessment found in Appendix E.

5.1.2 Tailings Impoundment Area

The North Dam which ensures containment of reclaim water in the TIA was completed in 2012. The South Dam which ensures containment of tailings solids was completed in 2018. The total tonnage of tailings solids deposited in 2019 was 0.58 Mt. As of December 2019, 49% of the licensed 2.5 Mt TIA tailings capacity has been utilized (1.23 Mt). The water level at the end of December 2019 was 31.9 masl. The full supply level of the TIA is 33.5 masl. This equates to approximately 1.72 Mm3 of additional water storage capacity available in the reclaim pond. Approximately 18,831 tonnes of detoxified tailings were placed underground as backfill.

5.2 WINDY – 2BE-HOP1222

The Type B Water Licence No. 2BE-HOP1222 issued to TMAC by the NWB details the sampling and analysis requirements for the SNP program. Windy Camp and the Patch Lake Laydown facility were not in use in 2019; therefore, sampling stations associated with camp operations and fuel storage facility are not being used or monitored. Tables in Appendix D.2 of this report summarize the results of sampling undertaken as part of the monitoring program detailed in Part J of 2BE-HOP1222.

Water is obtained from Windy Lake (ST-7a/MMS-4b) for use at Doris Camp under 2AM-DOH1335 and as allowed under 2BE-HOP1222. Water is taken up through a screened intake and sunken heat-traced line by a permanent pump house, which is used as needed to fill a water truck that transports the water to Doris Camp for use.

The camp water treatment and wastewater treatment facility (WWTF) permitted under this licence was not operational in 2019, therefore no sampling was conducted at monitoring stations HOP-1 (freshwater intake), HOP-2 (WWTF discharge), or HOP-3 (point of entry of WWTF discharge to Windy Lake). Water was utilized from Windy Lake for domestic consumption at Doris Camp and the monitoring station ST-7a/MMS-4b (HOP-1) was sampled for the monitoring criteria under the Doris Water Licence 2AM-DOH1335. For the ST-7a/MMS-4b results see the 2AM-DOH1335 Appendix D.1 The Landfarm at Windy Camp (HOP-4) has been dismantled, so no sampling was conducted at this monitoring station.

The bulk fuel storage tanks at Windy Camp were moved to Doris Camp in winter 2009 for use there, and the bulk fuel storage berm (HOP-5) was dismantled in 2012. The bulk fuel storage berm at Patch Lake laydown (HOP-6) was also dismantled in 2012. No sampling was conducted at either of these monitoring stations.

No sampling occurred at monitoring stations HOP-7A HOP-7B, or HOP-7D (located in Quarries A, B, and D, respectively) during 2019 as no discharge of water was required from these areas during the year.

On-ice exploration drilling was conducted in the licence area in 2019 on Patch Lake. Water quality samples were collected to establish water quality prior to, and upon completion of, this on-ice drilling program as outlined in Part F Item 7 and Part J Item 7 of the licence. On-land exploration drilling was also conducted in the licence area in 2019.

Water used for exploration drilling was taken from the closest lake to each drill in accordance with Part C Item 1 of the 2BE-HOP1222 Licence. For drill locations accessible by road or winter ice road, water is hauled by truck from Windy Lake or compliant berm effluent from Doris is recycled through the drills to lessen freshwater lake use. Water is supplied to a water tank at the drill, and recirculation to cool equipment occurs through this tank. For drill locations inaccessible by road, water is drawn directly from the lake with a screened intake hose line or flown by helicopter using a bambi bucket.

A summary of monitoring activities conducted under this licence is provided in Appendix D.2.

No additional details on water use or waste disposal were requested by the Board in 2019 related to the Project. No artesian flow occurrences were encountered in 2019.

5.3 MADRID – 2BB-MAE1727

The Type B Water Licence No. 2BB-MAE1727 issued to TMAC by the NWB details the sampling and analysis requirements for the SNP program. No activities were conducted under this licence in 2019. Activities conducted at Madrid North in 2019 were monitored under the Type A Water Licence 2AM-DOH1335. A summary of monitoring activities conducted under this licence is provided in Appendix D.3.

No additional details on water use or waste disposal were requested by the Board in 2019 related to the Project. No artesian flow occurrences were encountered in 2019.

5.4 BOSTON – 2BB-BOS1727

The Type B Water Licence No.2BB-BOS1727 details the sampling and analysis requirements for the SNP program. The Boston Camp was operational from June to December 2019 to support a regional surface exploration drilling program.

Water was used from Aimaokatalok (Spyder) Lake (BOS-1a) for domestic use at Boston Camp and samples were collected from monitoring station BOS-1a during periods of pumping. No water was used from Stickleback Lake (BOS-1b) and no samples were collected at this monitoring station in 2019.

The Sewage Treatment Facility (BOS-3) was active in 2019 and compliant effluent was discharged to tundra from this facility as outlined in Part D Item 14 and 15 of the licence. Notification of this discharge was provided to the Inspector in May 2019. Monitoring was conducted of this discharge prior to treated effluent entering into Aimaokatalok (Spyder) Lake (BOS-4), however all effluent had been effectively absorbed into the tundra prior to this point and no samples were collected under this monitoring station.

Water management occurred at the Containment Pond (BOS-2), the Bulk Fuel Storage Facility (BOS-5) and the Portal Decline (BOS-9) in 2019. Water quality sampling was completed at these facilities prior to discharge to the environment to confirm effluent quality. Notification of discharges from these facilities was provided to the Inspector in May 2019 and approval was granted prior to any dewatering activities.

Dewatering of the Landfarm Treatment Area (LTA; BOS-6) was not required in 2019. In 2017, TMAC commenced reclamation of the LTA at Boston with excavation of contaminated soils from the LTA into mega-bags for final disposal. The LTA was decommissioned in 2019 and no water quality sampling was conducted for this facility. Contaminated soils were transported to Doris Camp and backfilled in the Doris underground mine as outlined in the Hope Bay Project Hazardous Waste Management Plan.

Water quality sampling of seepage/runoff from the ore stockpiles and camp pad to the tundra (BOS-8) was conducted in 2019.

A summary of water quality monitoring for the Boston Site under this licence 2BB-BOS1727 is provided in Appendix D.4.

No additional details on water use or waste disposal were requested by the Board in 2019 related to the Project. No artesian flow occurrences were encountered in 2019.

5.5 BOSTON – 2AM-BOS1835

The Type A Water Licence No. 2AM-BOS1835 issued to TMAC by the NWB details the sampling and analysis requirements for the SNP program. No activities were conducted under this licence in 2019. Activities conducted at Boston Camp in 2019 were monitored under the Type B Water Licence 2BB-BOS1727. A summary of monitoring activities conducted under this licence is provided in Appendix D.5.

6. Solid Waste Disposal

At present Waste Management for the Hope Bay Project is currently divided into the following management areas which address:

- Non-hazardous Waste Management;
- Landfarm Management; and
- Hazardous Waste Management

6.1 NON-HAZARDOUS WASTE MANAGEMENT

TMAC has an existing Non-hazardous Waste Management Plan (2017) which covers information pertaining to management of non-hazardous waste generated at Doris, Madrid, Boston and the regional exploration leases in the Hope Bay Greenstone Belt. The Hope Bay Project Non-hazardous Waste Management Plan has been developed to ensure that proper documentation, tracking and handling strategies are in place to monitor compliance and take corrective actions as necessary. In general, non-hazardous waste is generated by the camp(s), the kitchen and various on-site facilities and contracting groups. Management of non-hazardous waste includes recycling, treatment, and disposal of waste streams based on their specific characteristics. Incineration is used as a volume reduction treatment on-site for most non-hazardous domestic waste streams.

In 2019, waste produced at site was collected and consolidated at the Doris Waste Management area by the waste management department (includes waste produced during activities at Boston). TMAC is authorized to dispose of all non-hazardous solid waste in a landfill on site under the existing Type A Water Licence; however to date a landfill has not been built. Therefore in 2019, all non-hazardous solid waste that could not be incinerated on site was stored on site for later landfilling or back haul to an approved facility off site.

6.1.1 Camp Incinerators

TMAC's Type A Water Licence 2AM-DOH1335, Type B Water Licence 2BE-HOP1222 and Type B Water Licence 2BB-BOS1727 issued by the NWB allows for the incineration of approved waste streams.

Two incinerators for Doris located at the Roberts Bay waste management facility were used from January to August 2019 for waste incineration. Both incinerator units are CY-2050-A-FA models with a capacity of burning 75 kg of waste per hour. In August 2019, a new CY-100-CA incinerator located in Quarry 2 was commissioned for use. This new incinerator has the capacity to burn three 150-185kg batches per day and was used for waste incineration from August until December 2019. The two smaller incinerators located at the Roberts Bay waste management facility were decommissioned once the new incinerator was operational.

There was no incinerator operated at the Windy Camp and no domestic waste produced at Windy Camp in 2019.

Boston Camp was opened from June to December 2019 to support a seasonal surface exploration program. A CY-2020-FA-D model incinerator located at Boston Camp was used for waste incineration and has a capacity of burning 50kg of waste per hour.

Food waste and paper is incinerated as per Incinerator Management Plan (2019) for the Hope Bay Project. This plan outlines TMAC's approach to domestic waste stream segregation and incinerator management as it pertains to all the Hope Bay Project developments. The objective of the plan is to enable the operation of domestic waste incinerators to be undertaken in a safe, efficient and environmentally compliant manner. The Incinerator Management Plan strives to ensure that:

- Only appropriate burnable material enters the incinerator waste stream;
- Animal attractants are promptly incinerated;
- The incinerator is operated in a manner that reduces harmful emissions;
- Residual ash is handled and disposed of properly; and
- Compliance monitoring and reporting associated with incinerator operations are undertaken.

As recommended by the Nunavut Environmental Guideline for the Burning and Incinerations of Solid Waste, written records are kept of date and volume of burnt waste.

As per Schedule B, Item 12 of Type A Water Licence 2AM-DOH1335, TMAC is required to report the results of Incinerator Stack Testing when available compared to the Canada-wide Standards (CWS) for Dioxins and Furans and the CWS for Mercury.

As per Schedule B, Item 11 of Type A Water Licence 2AM-DOH1335, TMAC is required to report the results of Incinerator Stack Testing when available compared to the Canada-wide Standards (CWS) for Dioxins and Furans and the CWS for Mercury. Due to the exceedances observed in the last stack test, TMAC purchased a new incinerator (Westland Model CY-100-CA-D) from the Ketek Group Inc. Installation and commissioning of the incinerator occurred in August 2019. In September 2019, TMAC retained Nunami Stantec Limited Partnership (Nunami Stantec) to conduct dioxins and furans and mercury source emissions testing on the new waste incinerator. The source emission testing was conducted during the period of September 15 to September 18, 2019.

In late 2019, TMAC received results that indicated the average concentration of mercury for the three tests was 0.26 µg/Rm^3, which is below the CWS/Nunavut stack limit of 20 µg/Rm^3, corrected to 11% oxygen. The average stack concentrations of dioxins and furans was 1.27 ng TEQ/m^3 which is above the CWS/Nunavut stack limit of 0.08 ng TEQ/Rm^3 (dry, reference conditions of 25°C and 1 atm, corrected to 11% oxygen).

TMAC is investigating the cause of the dioxins and furans testing exceedances. Investigation includes reviewing the incinerator emissions performance with the manufacturer, ensuring manufacturer recommended operational procedures for the incinerator have been implemented and all operators are adequately trained and, and reviewing TMAC's waste segregation practices. Based on the outcome of the investigation TMAC will evaluate if source control or 'end-of-pipe- pollution control technologies is the preferred approach to address exceedances. TMAC will continue to maintain good combustion practices in parallel with improved waste sorting practices to reduce the formation of hazardous compounds during incineration in interim. See Appendix I for additional details.

6.1.2 Open Burning

The disposal method for untreated wood, cardboard and paper products generated on-site is open burning. This method reduces the volume of inert waste disposed of in the landfill. The landfill has yet to be constructed at the Doris Site.

A total of 977 m^3 of clean wood and 934 m^3 of cardboard was open burned in 2019.

All other waste is sorted and stored in sea cans at the Waste Management facility and is either backhauled for disposal or stored until the Landfill is constructed.

6.2 LANDFARM MANAGEMENT

TMAC is permitted to operate a landfarm facility at the Doris and Boston sites to treat hydrocarbon contaminated materials. TMAC's Hydrocarbon Contaminated Material Management and Monitoring Plan (2017) describes the Doris and Boston facility design as it relates to storage and management of hydrocarbon contaminated materials, including soils and water generated at the site and associated facilities. This plan presents the management and monitoring obligations for each facility as modules A and B, respectively.

Hydrocarbon contaminated water and snow is either stored on-site for shipment off-site to an approved facility or treated with the use of an oil separation (absorbent) treatment system (if required) on site and then verified through laboratory analysis to meet discharge criteria prior to discharge the environment. Hydrocarbon contaminated soils (including waste rock and ore) are treated in the Doris Landfarm or placed in the Doris underground mine for permanent storage.

The Doris Landfarm Facility is located on previously disturbed area approximately 0.6 km north of the existing Doris Camp Area, at approximately 432,573 Easting and 7,559,542 Northing (UTM NAD 83, Zone 13). The Facility is located in a restricted area of the site and is situated between the existing all-weather road and Quarry 2.

Hydrocarbon contaminated water, snow and soils (including waste rock and ore) can be treated using on-site facilities at Doris or can be relocated off site to an appropriate remediation/disposal facility.

Only material containing the following hydrocarbons is farmed at the Doris Landfarm facility:

- Diesel fuel;
- Jet fuels (Jet A, Jet A-1); and
- Gasoline.

All other materials are deemed inappropriate for landfarming and will ultimately be placed in the Doris Mine for permanent storage in accordance with the approved Hope Bay Project Hazardous Waste Management Plan or packaged for offsite disposal at a licensed remediation/disposal facility.

The Boston Landfarm facility or Land Treatment Area (LTA), is located at the Boston Camp Site, south west of the tank farm. In 2017, TMAC commenced reclamation of the LTA at Boston with the excavation and stockpiling of contaminated materials into mega-bags for future treatment or shipment offsite to an approved facility. In March 2019, TMAC backhauled 130 m^3 of contaminated soil from the LTA to Doris Camp via a winter track and disposed of this material underground in the Doris Mine as approved in the Hope Bay Project Hazardous Waste Management Plan. The Boston LTA was decommissioned in 2019 and no additional materials will be placed in this facility. Hydrocarbon contaminated materials generated from future activities conducted at Boston will be packaged for backhaul to Doris until a new LTA facility is constructed.

6.3 HAZARDOUS MATERIAL MANAGEMENT

TMAC has a Hazardous Waste Management Plan aimed at ensuring that hazardous waste collection, segregation, handling, storage, transport and disposal procedures are promptly and efficiently carried out, thus minimizing the risk to the site workforce and the environment, as well as reducing the financial cost to the Project. A copy of the updated Hazardous Waste Management Plan is being provided with this Annual Report.

The Hazardous Waste Management Plan requires in general that all hazardous materials will be shipped offsite for disposal at an approved site. The Hazardous Waste Management Plan describes the purpose-designed hazardous waste management facility. Based on the principles of reduction, reuse and recycling, the plan addresses hazardous waste streams in terms of their risks, storage and labelling, transportation, and disposal, including:

- waste glycol (antifreeze);
- waste solvents;
- waste batteries;
- fluorescent tubes;
- penetrable wastes (sharps);
- waste lubricating oils;
- waste aerosols;
- medical wastes and sewage treatment plant sludge;
- applicable incinerator and wood ash;
- contaminated rags, absorbents and soil;
- residue last contained ammonium nitrate packaging; and
- explosives products and explosives residue containers.

6.3.1 Waste Back-haul

Waste materials back-hauled off site are regulated by the *Transportation of Dangerous Goods Act* (TDGA). In 2019, empty cargo aircraft were utilized for waste backhaul from the Doris Camp throughout the year. The table below summarizes the type and volume of hazardous wastes that were transported to KBL Environmental in Yellowknife to arrange for final remediation/disposal in 2019.

Hazardous Waste Type	Volume (m^3)
Used Oil	109
Used Glycol	34
Used Oil/Glycol Mix	11
Used Oil and Water	5
Waste Leachate Mix	5
Water contaminated with hydrocarbons	49
Burn Pan Ash – Contaminated with Arsenic and Chromium	1
Incinerator Ash – Contaminated with Chromium	0.2
Cutting fluid	0.2
Kitchen Grease mixed with water	2
Kitchen Grease	36

6.4 LANDFILL

TMAC is authorized to dispose of all non-hazardous solid waste in a landfill on site as per Type A Water Licences 2AM-DOH1335 and 2AM-BOS1835. To date, a landfill has not been constructed. All waste that cannot be incinerated on site is backhauled to an approved facility for disposal or is stored on site for future landfilling. Because a landfill has not been constructed, no landfill management report has been prepared. TMAC will continue to manage solid waste produced in Hope Bay according to three waste management plans:

- Non-Hazardous Waste Management Plan;
- Hazardous Waste Management Plan; and
- Incinerator Management Plan.

These plans describe how various streams of waste are managed.

7. Aquatic Effects Monitoring Program

The Hope Bay Project (the Project) is a gold mining development owned by TMAC Resources Inc. (TMAC) in the West Kitikmeot region of mainland Nunavut. The Project property is approximately 153 km southwest of Cambridge Bay on the southern shore of Melville Sound and contains a greenstone belt (the Belt) that runs 80 km in a north-south direction varying in width between 7 km and 20 km.

The Project consists of three developments: Doris, Madrid, and Boston. Construction of the Doris Mine and associated infrastructure began in 2010, and commercial operations began in 2017. Construction of mining infrastructure at the Madrid North development began in April 2019, followed by a transition to operations in August 2019 with mining of the Naartok East Crown Pillar trench. As of December 2019, construction had not begun at the Madrid South or Boston developments.

This report presents the results of the 2019 Aquatic Effects Monitoring Program (AEMP), the first year of implementation of the approved Belt-wide Hope Bay Project: Aquatic Effects Monitoring Plan (the Plan; TMAC 2018). The primary goals of the AEMP are to evaluate potential Project effects on the surrounding freshwater environment during the construction and operation of the Project, verify predictions from the Madrid-Boston Final Environmental Impact Statement (FEIS; TMAC 2017b), support current and future Fisheries Authorizations, and provide a mechanism to respond to potential Project effects in the freshwater environment through the Response Framework. This framework sets environmental thresholds that, if exceeded, would trigger further investigation and/or mitigation.

The 2019 AEMP includes lakes adjacent to proposed infrastructure that have the greatest potential to receive non-point-source inputs such as runoff or dust (e.g., Doris and Patch lakes) and lakes that could be affected by water loss due to permitted water withdrawal and groundwater seepage into the mines through underground workings (e.g., Doris, Little Roberts, Patch, Glenn, and Windy lakes). Aquatic components evaluated in 2019 included the following: water level and ice thickness, under-ice dissolved oxygen concentration, water temperature, water and sediment quality, phytoplankton biomass, and benthic invertebrates. Statistical and/or graphical analyses were undertaken to determine whether there were any apparent effects of Project activities on these aquatic components in the monitored lakes.

Table 7-1 presents a summary of the overall findings of the evaluation of effects for the 2019 AEMP, as well as the corresponding section in this report in which to find the discussion of the evaluation of effects for each monitoring component. No adverse Project-related effects to under-ice water level, under-ice dissolved oxygen concentrations, water temperature, sediment quality, phytoplankton biomass, or benthic invertebrate community indicators were detected in the exposure lakes (i.e., lakes with the potential to be influenced by the Project). The evaluation of effects concluded that there were potential Project-related effects to under-ice total ammonia and under-ice total molybdenum concentrations in the water column of Doris Lake, as both water quality variables increased relative to baseline levels and increasing trends were not apparent in the reference lake. Concentrations of these variables remained below CCME guidelines for the protection of freshwater aquatic life, indicating that concentrations of total ammonia and total molybdenum remain protective of aquatic life in Doris Lake. Low action level responses under the Response Framework were not triggered for these variables.

There were no Project-related effects identified in Patch Lake; therefore, the spill incident that occurred in June 2019 did not result in any residual adverse changes to water quality, sediment quality, or to the biological communities (sampled two months after the spill in August 2019) in this lake.

Table 7-1. Summary of Evaluation of Effects for 2019 AEMP

Variable	Exposure Lakes Included in Evaluation of Effects	Conclusion of Effect	Low Action Level Triggered?	Report Section
Water Level and Ice Thickness	Windy Lake, Glenn Lake, Patch Lake, Doris Lake, Little Roberts Lake	No Effect	No	3.1
Physical Limnology (Dissolved Oxygen and Temperature)	Windy Lake, Patch Lake, Doris Lake	No Effect	No	3.2
Water Quality	Windy Lake, Patch Lake, Doris Lake	Possible Effect on Under-ice Total Ammonia and Under-ice Total Molybdenum Concentrations in Doris Lake	No	3.3
Sediment Quality	Patch Lake, Doris Lake	No Effect	No	3.4
Phytoplankton Biomass (as Chlorophyll a)	Windy Lake, Patch Lake, Doris Lake	No Effect	No	3.5
Benthic Invertebrates	Patch Lake, Doris Lake	No Effect	No	3.6

8. Geochemical Studies

8.1 DORIS AND MADRID MINES

This section summarizes the operational geochemical monitoring results for Doris Mine, including waste rock from the Doris Mine, flotation tailings slurry and detoxified tailing solids from the Doris Mill, quarry rock used for infrastructure and road construction and seepage monitoring programs of waste rock, construction rock and underground mine backfill (detoxified tailings).

8.1.1 Waste Rock

In 2019, TMAC transitioned from the waste rock monitoring program outlined in TMAC (2016) to the program outlined in *Waste Rock, Ore and Mine Backfill Management Plan* (TMAC 2019), the latter which is a part of Licence 2AM-DOH1335 Amendment No. 2. The major difference between the two waste rock management programs is that samples are collected from the underground in TMAC (2016) whereas for the TMAC (2019) program, samples are collected from the surface waste rock stockpile on Pad T.

In 2019, waste rock was produced from the underground mine, placed on Pad T and managed as mineralized rock. Mining of the Doris CPRT was completed in 2018 with waste rock placed in a separate stockpile on Pad T.

8.1.1.1 Underground Doris Mine

In 2019, approximately 430,000 t of waste rock were produced from mining in the Doris underground. Approximately 265,000 t was placed directly as backfill in underground stopes with the balance (165,000 t) transferred and placed in a stockpile on Pad T. As per the Waste Rock and Ore Management Plan (2016), all waste rock was designated as mineralized waste rock that will be eventually placed as backfill in the underground mine. In 2019, 90,000 t of waste rock from surface stockpiles was placed as backfill in underground stopes in the Doris underground mine and 178,000 t was placed as backfill (and cover) in the Doris CPRT.

As part of the TMAC (2016) monitoring program conducted from January to April, TMAC collected 19 underground waste rock samples. According to TMAC geologists, in 2019 the majority of waste rock intersected by the Doris underground workings was primarily (95%) mafic metavolcanic flow (1a); and lesser (2%) altered mafic metavolcanics (1as) and (2%) quartz-carbonate veins, with rare (1%) diabase or felsic dykes. The samples collected were geologically identified as either altered mafic metavolcanics (1as; n=3) or mafic metavolcanics (1a; n=16). Geological inspections were conducted by TMAC site geologists when monitoring samples were collected. Where possible, both the working face and the muck pile were inspected to identify the rock type, quantity of sulphide and carbonate minerals. The data were recorded in geological inspection logs. Samples were analyzed for total sulphur (S) and total inorganic carbon (TIC) with a subset also analyzed for paste pH, Modified NP and trace elemental content.

For mafic metavolcanics samples (1a), total sulphur content was uniformly low, ranging from 0.02 to 0.33% and median level of 0.12%. TIC and Modified NP content was high (25th to 75th percentile levels ranging from 190 to 310 kg $CaCO_3$ eq/tonne and 150 to 160 kg $CaCO_3$ eq/tonne, respectively). All samples were classified as non-PAG on the basis of TIC/AP and NP/AP. For mafic altered metavolcanics samples (1as), total sulphur content was low (ranging from 0.12 to 1.1% and median levels of 0.21%). TIC and Modified NP content was high, ranging from 190 to 320 kg $CaCO_3$ eq/tonne and 140 to 150 kg $CaCO_3$ eq/tonne, respectively. All samples were classified as non-PAG on the basis of TIC/AP and NP/AP.

In terms of trace metals, one sample of altered mafic metavolcanics (1as) contained elevated levels of arsenic and sulphur compared to ten times the average crustal abundance for basalt. This sample was described as mineralized and from the alteration zone with 2% sulphides. Total metal concentrations for all other samples were less than ten times the average crustal abundance for basalt indicating no appreciable enrichment.

As part of the TMAC (2019) waste rock monitoring program, SRK collected ten samples in August 2019 (four of mafic metavolcanics (1a), five of altered mafic metavolcanics (1as), and one of quartz vein (12q)) from Pad T. Samples were analyzed for ABA and total metals, and a finer fraction for rinse tests and shake flask extraction tests.

For mafic metavolcanics samples (1a), total sulphur content was uniformly low, ranging from 0.12 to 0.25% and median levels of 0.16%. TIC and Modified NP content was high (25th to 75th percentile levels ranging from 230 to 270 kg $CaCO_3$ eq/tonne and 160 to 170 kg $CaCO_3$ eq/tonne, respectively). All samples were classified as non-PAG on the basis of TIC/AP and NP/AP. For altered mafic metavolcanics samples (1as), total sulphur content was higher than the mafic metavolcanics (1a) samples, ranging from 0.19 to 0.82% and median levels of 0.23%. TIC and Modified NP content was high (25th to 75th percentile levels ranging from 270 to 290 kg $CaCO_3$ eq/tonne and 150 to 180 kg $CaCO_3$ eq/tonne, respectively). All samples were classified as non-PAG on the basis of TIC/AP and NP/AP. The one sample of quartz veins (12q) had a total sulphur content of 0.98%. TIC and Modified NP content was 220 and 160 kg $CaCO_3$ eq/tonne, respectively. The sample was classified as non-PAG on the basis of TIC/AP and NP/AP.

Trace element content was below the screening criteria for all samples with the exception of arsenic and sulphur for three samples of 1as and one sample each of 12q and 1a. Total metal concentrations for all other samples were less than ten times the average crustal abundance for basalt indicating no appreciable enrichment.

8.1.1.2 Doris CPRT

Mining of the Doris CPRT was initiated in November 2018 with completion in December 2018. All waste rock from the CPRT was placed on Pad T, of which 212,500 t was placed in the existing waste rock stockpile on the east side of Pad T and 51,000 t in a separate stockpile on the western extend of Pad. In 2019, 38,000 t of CPRT waste rock was placed as backfill and cover in the CPRT and the remaining 13,000 t was moved to the existing waster rock stockpile on the east side of Pad T.

In 2019, TMAC collected an additional 24 samples from the CPR waste rock stockpile to supplement the six samples collected in 2018 with the objective of demonstrating the suitability of using CPR waste rock as construction rock. The sampling program included all waste rock types intersected during mining of the Doris CPRT. Samples were analyzed for ABA, elemental analysis and SFE tests on a subset of samples.

CPR waste rock samples collected in the stockpile were described as primarily unaltered (1a) grey or green mafic metavolcanics (basalt) with minor sericitic alteration and altered mafic metavolcanics (1as) with moderate sericitic alteration. Trace disseminated to fine-grained pyrite (≤1%) was observed in the majority of samples with trace quartz and carbonate veins.

The results indicate that all 24 of the 2019 samples collected from the CPR waste rock stockpile had values of TIC/AP and NP/AP > 3 and 21 out of 24 samples fulfilled the accompanying sulphur criterion (<0.5%). The results indicate that on balance waste rock from the CPR meets the criteria. Confirmatory samples collected from the as-built cover meet the criteria TIC/AP, NP/AP and sulphur criteria (SRK 2020b).

The geochemical behaviour of the waste rock used as construction rock is monitored as part of the construction rock monitoring program, including the annual seep survey and geochemical monitoring of as-built infrastructure.

8.1.1.3 Underground Madrid North Mine

Mining of the underground Madrid North mine was initiated in December 2019. In 2019, 11,000 t of waste rock was produced from the decline and placed on the Madrid North waste rock pile (WRP) pad. Based on TMAC's geological inspections of the underground, the majority (99%) of waste rock was geologically logged as mafic metavolcanics (1) with minimal sericitic alteration with the balance (1%) logged as quartz-carbonate veining. Sample collection of waste rock for the purposes of geochemical monitoring commenced in January 2020. Results will be reported as part of the 2020 geochemical monitoring activities.

8.1.1.4 Naartok East CPR

Mining of the Naartok East CPR (NE CPR) was initiated in month 2019 with waste rock production starting in month. Using Classification of Waste Rock in Support of Segregating Construction Rock from Naartok East Crown Pillar Recovery, Madrid North, Hope Bay (SRK 2019b), TMAC developed and executed a program of waste rock geochemical monitoring and segregation to identify NE CPR waste rock that was geochemically suitable for construction. SRK (2019b) outlines criteria and field-based methodology using portable XRF (pXRF) to classify waste rock samples as having a low risk of metal leaching and/or acid rock drainage (ML/ARD).

In summary, TMAC executed the geochemical construction monitoring program of waste rock by sampling drill cuttings from each blast round, analyzing the samples by pXRF coupled with geological inspection and classifying samples according the criteria in SRK (2019b). Based on the geochemical classifications of the drill cutting samples, TMAC classified waste rock from each blast round as either suitable for construction (e.g. low risk of ML/ARD) or not suitable for construction (e.g. risk of ML/ARD) followed by segregation and management of waste rock according to the risk classifications.

TMAC's execution of SRK (2019b) included geological logging and pXRF analysis of 1,899 samples of drill cuttings representing 78 blast rounds. Based on the geological inspection of drill cutting samples, waste rock lithologies were predominantly (75%) mafic metavolcanics (1a), 19% mafic metavolcanics with sediments (1aj), 4% quartz-carbonate veins (12q), 2% sedimentary units (5) and <1% late mafic intrusions (10a). Based on the geological inspection and pXRF analysis of drill cuttings, TMAC classified 39% of samples as low risk of ML/ARD and 61% as having risk of ML/ARD. These results were interpolated by TMAC to a field scale, e.g. blast round basis, resulting in 37% of waste rock being classified as geochemically suitable for construction and 63% as not suitable for construction.

In 2019, a total of 170,085 t of waste rock was produced from NE CPR, of which 123,655 t was placed on the Madrid North WRP. Of waste rock placed on the WRP, 16,200 t was determined to be suitable for construction but was not required for construction at the time of hauling and accordingly was placed on the WRP. In 2019, a total of 53,430 t of waste rock was used for construction of the following infrastructure and access roads at Madrid North: NE CPR for in-pit ramps and access roads; Madrid North underground mine portal pad; Madrid North WRP perimeter roads and berms; Madrid North shop laydown pad; and Overburden Dump access roads and cladding (within stockpile area). All waste rock used for construction was determined to have a low risk of ML/ARD except 7,650 t of waste rock that was strategically placed in areas where waste rock seepage will be managed, specifically in pit of NE CPR (7,300 t) and a lined area adjacent to the Madrid North portal (350 t).

As part of the construction verification program in TMAC (2019), TMAC collected four composite samples of waste rock that was used for construction rock and shipped the samples for ABA analysis at an offsite commercial laboratory. Results indicated that the samples were non-PAG with arsenic levels below the screening criteria.

The geochemical behaviour of the waste rock used as construction rock is monitored as part of the construction rock monitoring program, including the annual seep survey and geochemical monitoring of as-built infrastructure. Waste rock placed on the Madrid North WRP will also be subject to annual geochemical monitoring including geological inspection, geochemical sampling, seepage monitoring at the downstream toe of the stockpile and routine collection of the water in the Madrid North contact water pond (CWP).

8.1.2 Tailings

8.1.2.1 Effluent from Process Plant Tailings (TL-5)

Samples of effluent from the Process Plant (TL-5) were collected from January to December 2019. These results are presented in Appendix D of this report. Figures depicting time series of constituent loads from the process plant tailing water discharge (TL-5) to the TIA are presented in Appendix F - 2019 Waste Rock, Quarry and Tailings Monitoring Report, Doris Mine, Hope Bay Project (see Attachment D of Appendix D - 2019 Geochemical Monitoring of Flotation Tailings Slurry and Detoxified Tailings, Doris Mill). The geochemistry of the 2019 process plant tailings discharge (TL-5) is summarized as follows:

- pH was slightly alkaline ranging from 8.0 to 8.4 s.u for all months except August which reported a pH of 6.2 s.u.
- Sulphate loadings were initially stable with the range equivalent to 2018 but showed an increasing trend during the second half of 2019.
- Trends for major ions and trace elements were stable in 2019 with ranges equivalent to 2018. Exceptions included magnesium, molybdenum, antimony and selenium all of which exhibited increasing trends in 2019. Arsenic loadings have been stable since mid-2018. Selenium showed elevated loadings between August and November, relative to other months in 2019.

8.1.2.2 Flotation Tailings (TL-6)

Flotation tailings deposition in the Doris TIA commenced on January 20, 2017. A total of 573,868 t (dry weight) of flotation tailings were deposited in the TIA in 2018. Monitoring details are provided in Appendix D.1.

For flotation tailings solids (TL-6) sulphur concentrations ranged between 0.09 and 0.53%. Median total sulphur content has increased from 0.1% in 2018 to 0.24% in 2019. TIC content ranged between 97 and 220 kg $CaCO_3$/t. All flotation tailings samples were classified as non-PAG, which in consistent with 2017 and 2018 operational tailings monitoring (SRK 2019) and metallurgical tailings samples (SRK 2015).

Trace element content was compared to ten times the average crustal abundance for basalt (Price 1997) as an indicator of enrichment. Trace element content was elevated compared to screening criteria for arsenic, sulphur, gold and one high bismuth sample. All other parameters were below the screening criteria indicating no appreciable enrichment.

8.1.2.3 Detoxified Tailings Solids (TL-7a)

In 2018, a total of 18,831 t (dry weight) of detoxified tailings were placed as backfill in Doris Mine underground stopes. Details are provided in Appendix D.1 of this report.

Sulphur concentrations ranged between 9.6 and 25 % in 2019 and were highest between the months of July and December (21 to 25%). TIC results for 2019 ranged between 64 and 170 kg $CaCO_3$/t. All of the detoxified tailings samples were classified as PAG, which is consistent with 2017 and 2018 operational tailings monitoring and metallurgical tailings samples (SRK 2015).

All detoxified tailings samples were elevated compared to the screening criteria for arsenic, bismuth, copper, selenium, gold, silver and sulphur. More than half of samples elevated in cadmium, lead and zinc. The range of concentrations for bismuth, cadmium, copper, selenium, silver and zinc in 2019 was within the range of 2017 and 2018 samples. Arsenic concentrations where slightly higher (9.2 mg/kg median concentration in 2018, compared to 15 mg/kg in 2019). All other parameters were below the screening criteria indicating no appreciable enrichment.

8.1.2.4 Detoxified Tailings Filtrate (TL-7b)

For the detoxified tailings filtrate (TL-7b) pH conditions ranged from 8.5 to 8.8 s.u. Concentrations of sulphate (a by-product of milling of sulphide rich ore) ranged from 12,000 mg/L to 28,000 mg/L. Total cyanide concentrations ranged from 0.38 to 2.1 mg/L. Concentrations of free and WAD cyanide ranged from <0.005 to 0.015 mg/L and 0.063 to 0.48 mg/L, respectively.

Thiocyanate and cyanate concentrations ranged from 12 mg/L to 490 mg/L and 10 mg/L to 670 mg/L, respectively. Ammonia concentrations ranged from 180 to 290 mg/L. These parameters are produced as by-products of the cyanide detoxification process. Milling of the sulphide rich ore results in high concentrations of total metals, including arsenic, antimony, cadmium, cobalt, copper, iron, manganese, molybdenum, nickel, selenium, and silver.

8.1.3 Quarry Rock

8.1.3.1 Quarry Monitoring

Infrastructure at Doris and Madrid North were constructed using rock from Quarry 2 and Quarry D, respectively. Infrastructure constructed at Doris between 2018 and 2019 included the access road to the vent raise; access road to the Doris crown pillar recovery (CPR), cover for the Doris CPR, and access road and jetty at Roberts Bay to the effluent discharge point. Infrastructure constructed at Madrid North included the access road to the Naartok East CPR; Madrid North contact water pond (CWP); access road to the Madrid North CWP; and Naartok East overburden pad berm.

In 2019, TMAC conducted geological inspections in Quarry 2 between May and August and Quarry D in May, July and September For Quarry 2, geological inspections of all active quarry faces indicated that quarry rock was predominantly mafic metavolcanics (1a) containing trace amounts of disseminated pyrite (<1%) with occasional quartz and carbonate veinlets except for the August inspection. In August, a 3 to 4 m thick band argillite (5a) within mafic metavolcanics was observed in one active face in the western extent of the quarry. All inspections noted the absence of fibrous actinolite. For Quarry D, geological inspections of all active quarry faces indicated that quarry rock was predominantly mafic metavolcanics (1a) containing trace amounts of disseminated pyrite (<1%) with occasional quartz and carbonate veinlets. All inspections noted the absence of fibrous actinolite. Samples of run-of-quarry rock were collected for geochemical characterization as per the Quarry Management and Monitoring plan (TMAC 2017).

Geochemical monitoring of Quarry 2 ROQ rock indicated all samples of mafic metavolcanics (1a) were non-PAG according to values of NP/AP and TIC/AP. The argillite (5a) sample was classified as having an uncertain potential for ARD owing to higher levels of total sulphur. Elemental analyses indicated enrichment compared to average crustal abundance for sulphur and arsenic in argillite and in the fine fraction of mafic metavolcanics. All other parameters indicated no appreciable enrichment. Results from the SFE tests for mafic metavolcanics (1a) indicated non-acidic pH and metal concentrations below the screening criteria indicating the risk of ML/ARD from Quarry 2 metavolcanics (1a) is low. SFE test results for argillite (5a) indicated non-acidic pH with sulphate concentrations (780 mg/L) suggestive of sulphide oxidation.

Geochemical monitoring of Quarry D ROQ rock indicated that the monitoring samples were non-PAG for all mafic metavolcanics (1a) according to values of NP/AP and TIC/AP. Total sulphur content ranged between 0.09 and 0.26% and Modified NP and TIC content ranged between 100 and 210 kg $CaCO_3$/t and 87 and 180 kg $CaCO_3$/t, respectively. Elemental analyses indicated no appreciable enrichment compared to the screening criteria. SFE test results indicated that all test leachates were non-acidic and that all parameters were below the screening criteria indicating the risk of ML/ARD from Quarry D ROQ rock is low.

8.1.3.2 Construction Monitoring Doris and Madrid

In August 2019, SRK conducted a geological inspection of infrastructure and roads at Doris and Madrid constructed between August 2018 and August 2019 and collected a total of 12 samples. At each sampling site -1 cm and -2 mm sieved splits were collected separately. Field contact rinse tests were conducted on the -2 mm samples. All -1 cm samples were analyzed for total sulphur with a subset analyzed for full ABA and trace element content. A subset were also analyzed for shake flask extractions to assess the soluble component of the samples.

At Doris, SRK conducted a geological inspection of as-built construction that confirmed construction materials for the access road to the Doris crown pillar recovery (CPR) and jetty at Roberts Bay were characteristic of Quarry 2: grey-green mafic metavolcanics (1a) containing few carbonate and quartz veinlets with trace (<1%) to no visible sulphides (very fine grained cubic pyrite that were disseminated or associated with veining). The geological inspection of the Doris CPR identified CPR waste rock along with ROQ rock from Quarry 2. The geology of construction material used for the access road to the Doris vent raise was characteristic of Quarry 2, except for a 120 m segment that contained a minor amount (~5-10%) of black intermixed fragments of argillite (5a) mixed with mafic metavolcanics (1a). Six surface rock samples were collected for geochemical characterization from as-built infrastructure and roads, including two samples of waste rock from the CPR cover and one sample from the access road to the vent raise containing argillite (5a).

Total sulphur ranged between 0.18% and 0.45% with the highest sulphur value from the sample containing a mixture of mafic metavolcanics (1a) and 5 to 10% argillite (5a). For all samples, Modified NP and TIC levels ranged from 140 to 210 kg $CaCO_3$/t and 110 to 250 kg $CaCO_3$/t, respectively. Modified NP content was greater than TIC for mafic metavolcanics (1a) indicating the occurrence of silicates measured by the NP method, whereas TIC was greater than NP for rock types argillite (5a) and altered and foliated mafic metavolcanics (1as/ay) indicating the presence of iron carbonates that do not have buffering capacity. All samples were classified as non-PAG on the basis of both NP/AP and TIC/AP.

SFE test results indicated that all test leachates were alkaline and that the potential for metal leaching from these samples is low. A sample from the CPR cover indicated higher chloride and nitrate levels that suggest waste rock from the underground may be present in the CPR cover material. TMAC notes that the cover design specified that underground waste rock be placed below the active layer and CPR waste rock to be placed as the cover.

At Madrid North, SRK conducted a geological inspection of the access road to the Naartok East CPR, Madrid North CWP, access road to the Madrid North CWP, and Naartok East overburden pad berm. The inspection confirmed that the construction materials were characteristic of Quarry D: grey-green mafic metavolcanics (1a) containing few carbonate and quartz veinlets with trace (<1%) to no visible sulphides (very fine grained cubic pyrite that were disseminated or associated with veining). Six surface rock samples were collected for geochemical characterization from as-built infrastructure and roads.

Total sulphur content ranged between 0.07% and 0.22%. Modified NP and TIC levels ranged from 120 to 170 kg $CaCO_3$/t and 130 to 200 kg $CaCO_3$/t, respectively. All samples were classified as non-PAG on the basis of both NP/AP and TIC/AP. In terms of elemental content, concentrations of all parameters were below the screening criteria, suggesting no appreciable enrichment. SFE test results indicated that the potential for metal leaching from these samples is low but that chloride levels are higher for samples SRK19-CR07 and SRK19-CR08 compared to other construction rock samples.

8.2 BOSTON CAMP

Currently there is no monitoring under the Type A at Boston. This section summarizes monitoring in support of the Boston Camp closure plan under Type B.

8.2.1 Waste Rock and Ore

The Boston ore/waste rock management plan (SRK 2017) includes a commitment to monitor the oxidation of the ore by carrying out a survey of rinse pH and conductivity every ten years. This monitoring was conducted in 2018 and was not a requirement in 2019.

9. Geochemical Seepage Surveys

9.1 DORIS AND MADRID MINES

This section summarizes the seepage surveys conducted at Doris and Madrid Mines as part of the geochemical operational monitoring programs.

9.1.1 Construction (Quarry) Rock and Waste Rock Seepage Survey

The seep survey was carried out between June 19 and June 24, 2019 by TMAC in the Doris North and Madrid areas. The construction seepage monitoring program included visual inspection and opportunistic sampling of seepage downstream of the areas constructed between summer 2018 and summer 2019. Infrastructure surveyed at Doris included the TIA south dam, Marine Outfall Berm (MOFB) access road at Robert's Bay, access road to the Doris Central vent raise, access road to the Doris CPR and Doris CPR cover. Construction rock at Doris was sourced from Quarry 2 except for the Doris CPR cover, which was constructed primarily of Doris CPR waste rock and some quarry rock. Infrastructure surveyed at Madrid North included the access road to Naartok East CPR, overburden pad berm, Madrid North contact water pond (CWP), and access road to the Madrid North CWP. Construction rock at Madrid was sourced from Quarry D. Seepage was observed and samples collected representing construction rock from all aforementioned areas except the Doris CPR cover. As par to the waste rock monitoring program, the toe of the waste rock stockpile and the downstream areas of the waste rock storage area were surveyed. This area is referred to the waste rock influenced area (WRIA). There were no stockpiles of waste rock from Madrid North (Naartok East CPR) at the time of the survey. In addition, three references sites were sampled. Samples were collected from each seepage site observed and submitted to ALS Environmental for geochemical analysis.

A summary of the field measurements is presented in Table 9.1-1. The samples collected within the WRIA had the highest levels of field EC (ranging from 2000 to 3500 µS/cm) compared to other site areas. Field pH ranged from 7.5 to 8.1. Field data were not collected at the three reference stations.

Table 9.1-1. Median Values for Field Conductivity and pH Measurements

Mine Area	Material Source	Site Area	No. of Samples	Conductivity (µS/cm)	pH
Reference	-	Reference (Windy Road)	3	-	-
Doris	Waste Rock	WRIA	6	2300	8.1
	Quarry 2	South Dam	1	300	7.9
		Access Road to Doris CPR	2	270	8.0
		MOFB Access Road	13	190	7.7
Madrid	Quarry D	Access Road to Madrid North CWP	11	79	7.5

The results of the 2019 sampling program indicate that there are no major issues with respect to metal leaching and acid rock drainage in seepage associated with infrastructure at Hope Bay. Compared with seeps from infrastructure areas, and consistent with previous years, seepage from areas impacted by

waste rock had elevated levels of chloride, nitrate and ammonia. Chloride levels are attributed to flushing of drilling brines and nitrate and ammonia levels to blasting residues from the waste rock.

In terms of metal leaching from waste rock, concentrations of sulphate, copper and cobalt that have exhibited increasing trends since TMAC initiated ore placement in stockpile on top of Newmont's waste rock stockpile in 2015. This stockpile is immediately upstream of the waste rock seepage sample sites. Increased concentrations of sulphate, cobalt, and copper may be attributed to the presence of ore, which has higher sulphide content than waste rock. Concentrations of iron for the 2019 waste rock seepage samples were increasing for samples collected from the berm of the PCP; however, this was attributed to the presence of particulate material less than 0.45 µm that are not truly dissolved species. All waste rock seepage is intercepted, managed and pumped to the TIA.

9.1.2 Underground Backfilled Stopes (TL-11) Seepage Survey

Seepage samples were collected in 2019 from the underground backfilled stopes (TL-11). TMAC completed underground seepage inspections of backfilled stopes in May and December 2019. Fifteen locations were surveyed in May and sixteen locations were surveyed in December. No flowing seeps were identified in the May survey but samples were collected from pools of water located at the base of backfilled stopes to provide additional characterization of water underground near backfilled materials. In December, TMAC collected two seepage samples during the underground survey. Additional details of seepage monitoring can be found in Appendix D.1 of this report.

Seepage sampled from the December survey were interpreted to be contact water of waste rock and tailings backfill. For these samples the pH is slightly alkaline with both seeps reporting a pH of 8.0. Major anion chemistry was dominated by chloride and to a lesser degree sulphate. The major cation chemistry was dominated by sodium with lesser magnesium followed by calcium. Potential sources of the major ions include residues on waste rock from drilling brines (calcium and chloride), process reagents (sodium), and sulphide oxidation with resulting carbonate dissolution from waste rock and detoxified tailings (sulphate, calcium and magnesium). Levels of ammonia (10 to 17 mg/L), nitrate (14 to 16 mg/L) and nitrite (0.6 to 0.72 mg/L) were lower than the 5th percentile concentrations from the historical sample set. Cadmium, copper, nickel, selenium and silver were noted as parameters of potential concern based on the humidity cell test (HCT) program for Doris detoxified tailings (SRK 2015). The exception to this was zinc, which reported elevated concentrations in the survey but was not noted as a parameter of potential concern in the HCT program.

9.2 BOSTON CAMP

This section summarizes the geochemical monitoring results at Boston. The seepage and ephemeral streams monitoring programs are conducted annually in the context of the waste rock and ore management and Boston closure plans. The objective of the seepage monitoring is to provide an indication of water quality from the waste rock (camp pad) and ore stockpiles. The seepage samples are collected at the toe of the camp pad. The two objectives of the ephemeral streams program are to monitor drainage from the Boston ore stockpiles and camp pad before entering Aimaokatalok Lake and the natural attenuation of the tundra.

9.2.1 Seepage Monitoring

There are two opportunistic seepage monitoring programs, seepage monitoring at station BOS8 as indicated by Boston water licence 2BB-BOS1727 and a freshet seepage survey along the north and east sides of the camp pad, and the southern end of the airstrip as specified in the Boston Water and Ore/Waste Rock Management Plan (SRK 2017).

In 2019, a total of three opportunistic seepage samples were collected: two from the northeast side of the camp pad, and one along the road to the airstrip. No seepage was observed along the northern extent of the pad or along the airstrip.

All seepage samples were pH neutral to slightly alkaline (7.8 to 8.0). Sulphate concentrations for the two samples from the NE Pad (19-BOS-01 and BOS-8A) were within the range of historical concentrations and ranged from 400 to 630 mg/L. Chloride and nitrate at 19-BOS-01 (220 and 4 mg/L, respectively) were similarly equivalent to previous measurements.

The seep located at the toe of the road (19-BOS-02) had nitrate, chloride, dissolved arsenic, nickel, and selenium concentrations one to two orders of magnitude lower than the seep samples located at the NE camp pad. Sulphate concentrations at the access road were four to six times lower than the NE Pad and dissolved copper and iron concentrations were roughly equivalent at the two location. In general, metal concentrations in samples collected in 2019 are within the historical range of observed concentrations and no long-term trend was identified.

9.2.2 Ephemeral Streams Monitoring

As outlined in the Water and Ore/Waste Rock Management Plan for the Boston Site, Hope Bay Project, Nunavut (2017), five ephemeral streams (A to E) within the catchments of the Boston camp pad are monitored during spring freshet. The objectives of the program are to monitor drainage from the Boston ore stockpiles and camp pad before entering Aimaokatalok Lake and the natural attenuation of the tundra. TMAC inspected ephemeral streams A2 to E2 for flow on June 29, 2019. Flow was observed in ephemeral streams A2, D2 and E2 and samples collected for laboratory analysis.

The pH of ephemeral streams A2, D2 and E2 were neutral to slightly alkaline (7.7 to 8.0 s.u.). Sulphate values have oscillated for A2 and D2 whereas E2 has increased slightly since 2009. Chloride concentrations for ephemeral streams exhibit a decreasing trend. Nickel and arsenic values have oscillated for A2 and D2 whereas E2 has remained stable since the start of monitoring. Nitrate, copper, iron and selenium have stable trends. The analysis of the water quality data for ephemeral streams A2, D2 and E2 indicated that concentrations were either decreasing or consistent with historical data except for sulphate at E2 which is increasing. For sulphate concentrations at D2 and E2, values were greater than the maximum predicted value but a loading assessment indicated that concentration is related to dilution from surface waters. Future monitoring will establish any trends. Sulphate and chloride levels are not attenuated by the tundra and the concentrations measured in 2019 validate the Boston 2009 water and load balance. Overall, the water quality of the ephemeral streams is stable and results validate the findings of the water and load balance and that there are therefore no projected impacts to the receiving environment.

10. Fuel Storage

Bulk fuel storage at the Hope Bay Project site is accomplished in compliance with relevant regulations and authorizations. Bulk fuel is stored in steel tanks or manufactured fuel bladders which are housed in a "tank farm" that is lined with an impermeable membrane and surrounded with a berm with sufficient capacity to meet containment criteria (i.e., 110% of the largest tank in the farm). This minimizes the potential of fuel entering the environment from a spill. Chemical storage at the Hope Bay Project site is accomplished in compliance with handling and storage instructions detailed in the respective manufactures Safety Data Sheets (SDS).

TMAC maintains a Hope Bay Project Spill Contingency Plan (most recently revised in 2020), available in Appendix H of this report, which is utilized to safeguard against accidental spills of harmful substances that may negatively affect the environment. Implementation of spill prevention systems are critical to avoid such accidents, followed by a response system that is timely and efficient if spills do occur, and contains and mitigates the negative environmental consequences. The Hope Bay Project Spill Contingency Plan was developed in accordance with the Spill Contingency Planning and Reporting Regulations developed under Section 34 the Government of Nunavut's *Environmental Protection Act* (RSNWT Nu1988), and was developed specifically to address the requirements of the Framework Agreement; NWB Water Licences: 2AM-DOH1335, 2AM-BOS1835, 2BE-HOP1222, 2BB-MAE1727 and 2BB-BOS1727; and NIRB Project Certificates: Number 003 and Number 009; including all amendments. The Hope Bay Project Spill Contingency Plan provides a consistent spill response framework that is available to all site personnel so they can effectively and efficiently respond to a spill of petroleum products and/or hazardous materials regardless of where on the Hope Bay site they are encountered.

The Hope Bay Project Spill Contingency Plan contains detailed inventories and measurable quantities of all on-site hazardous materials and provides layouts indicating locations of all spill response equipment at site. A list of spill containment systems used are summarized below:

- Gravel/HDPE lined containment facilities (e.g., Roberts Bay and Doris Tank Farms);
- HDPE/wood containments (e.g., Jet-A storage at Heli-pad);
- Concrete berms (day-tanks at the Powerhouse);
- Double-walled steel tanks at location of use;
- Steel spill containment (e.g., beneath tanks at incinerator);
- Insta-berms; and
- Plastic spill pallets.

Spill response resources are also described in detail in the existing management plan together with their routine maintenance and inspection. The availability and organization of the human resources deemed required to respond to spill events is described in the Hope Bay Project Spill Contingency Plan, along with the responsibilities of specified personnel and response teams clearly defined. External notification and communication in the event of spill events are addressed and there is also a specified and comprehensive system of internal reporting. The Hope Bay Project Spill Contingency Plan considers the requirements of the Environmental Emergency Regulations (SOR/2019-51). The Plan is subject to annual review and an update to this plan is being provided with this Annual Report in Appendix H.

11. Spill Reports

During 2019, fourteen spills were reported to the Nunavut Spill Line, Water Licence Inspector and KIA Major Projects. No spills were reported to Environment and Climate Change Canada. These fourteen spills met the reporting threshold as outlined in the Nunavut Spill Contingency Planning and Reporting Regulations. In addition to the required Spill Line report, a more detailed follow-up report was filed within thirty days of each reported spill that included a description of the event together with the immediate cause, corrective and preventative action. The fourteen reportable spill events are summarized in Table 11-1 below.

The remaining spills that occurred during 2019 were minor in nature, occurring on land, with quick response and clean up resulting in negligible impact to the receiving environment. TMAC tracks all unauthorized discharges and spills on site, regardless if they are externally reportable or not, and identifies any observable trends. Based on those results, root cause analysis and corrective actions are recorded, tracked and implemented. Inspectors have the opportunity to review the information on demand or when at site conducting inspections.

Table 11-1. Summary of Reportable Spills in 2019

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
9-Feb-19	19-048	10-Feb-18	Glycol 50-60 liters	On February 9, 2019 an operator was loading ore using a 988 loader on the mill ore stockpile to transport to the mill crusher. The operator had scooped up the load and turned to begin backing up when he identified a trail of fluid originating from under the loader. The operator stopped the equipment immediately and called for assistance. Mechanics reported to the scene and found that a coolant hose line had failed allowing the radiator of the loader to drain onto the ground. A total of 50-60L of ethylene glycol 60-40 coolant was released to the snow covered crush pad. Mechanics determined that extreme cold temperatures occurring at the time of the spill, combined with normal wear and tear of the equipment had caused the failure. Spill pads were placed beneath the leak to reduce the amount of spill contacting the ground surface. The loader was then taken to the mechanical shop to replace the hose line. Contaminated materials were removed from the surface of the pad (spill pads, snow and crush) and taken to the waste management facility to be stored for offsite disposal. The loader operator had conducted a pre-operational check of the equipment prior to beginning the task and had not noted any issues or leaks with the coolant hose lines. Preventative maintenance is conducted on this piece of equipment after every 500 operating hours and includes checks of all hose lines. Worn hose lines are replaced if integrity issues are identified. The preventative maintenance had been conducted within the recommended schedule for this equipment at the time of the spill. TMAC internally reviewed the incident and identified the following corrective actions in order to reduce the likelihood of a reoccurrence: • Continue performing pre-operational checks on all equipment prior to use to identify potential issues prior to using the equipment; and • Continue performing preventative maintenance programs on all equipment at the recommended interval (every 500 operating hours).	5-Mar-19
10-Mar-19	19-101	10-Mar-19	Glycol 10-20 liters	At 7:30 am on March 10, 2019, the powerhouse operator identified ethylene glycol coolant on the ground beneath one of the powerhouse generator modules while conducting the daily morning inspection. Glycol was found to be leaking out of the radiator cap on the top of the cooling system. The fluid leaked onto the roof of the generator module and some of the coolant flowed over the side of the building onto the crush pad and concrete foundation below. The follow up investigation identified that failed head gaskets on two of the cylinders had	03-Apr-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				caused oil to pressurize the glycol cooling system. Pressure and volume increased until glycol leaked out of the radiator cap at the top of the system. The generator was immediately shut down to prevent further release. Absorbent pads were used to clean glycol off the generator module to reduce the amount of spill contacting the ground surface. Contaminated materials were removed from the surface of the pad (spill pads, snow and crush) and taken to the waste management facility to be stored for offsite disposal. Clean-up efforts included hand excavation of contaminated snow from the camp pad and spill pads were used to remove fluid from side of the building and the concrete foundation. A small amount of coolant (estimated to be less than 1L) was inaccessible to the clean-up efforts. This material was located under a sheet of stainless steel that was buried under snow and ice. Preventative maintenance is conducted on this generator after every 500 operating hours. The preventative maintenance had been conducted on March 4th, 2019, within the recommended schedule for this equipment at the time of the spill. TMAC internally reviewed the incident and identified the following preventative actions in order to reduce the likelihood of a reoccurrence: • Continue performing walk around checks twice daily on all generator components to identify potential issues; and • Continue performing preventative maintenance programs on all generators at the recommended interval (every 500 operating hours). Additionally, TMAC will ensure proper housekeeping around the powerhouse pad so that all foreign objects are cleared from the area once the summer thaw permits.	
11-Mar-19	19-103	11-Mar-19	Tailings/Process Water 500-600 liters	On March 11, 2019, while driving along the Tailings Impoundment Area (TIA) access road, the Environmental Technician identified a build-up of discoloured ice along the TIA reclaim pipeline. Mill Maintenance and Site Services personnel were notified and upon inspecting the area, determined that a leak was occurring from a flange in the reclaim pipeline used to transport reclaim water from the TIA to the Process Plant. An estimated 500-600 L of reclaim water was released to surrounding tundra. No material was released to any waterbody. Upon investigation, it was determined that the bolts on a flange connecting two sections of pipe together had become loose. This allowed the two sections of pipe to separate slightly causing the release. The Environmental Supervisor, Mill Maintenance and Site Services personnel were immediately notified. Snow and ice covering the line was removed to	3-Apr-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				expose the pipe and flange. The loose bolts on the flange were tightened stopping the leak. A sample of the reclaim water was collected at the time of the release and was below the discharge criteria outlined in Schedule 4 of the Metal and Diamond Mining Effluent Regulations. As the sample results met this criteria, no additional efforts were made to excavate frozen reclaim water from the surface of the tundra. Excavation would result in damage to tundra and introduce a risk of future permafrost degradation in the area. Contaminated snow and ice that was hand excavated to expose the reclaim pipeline was disposed of in the Tailings Impoundment Area. TMAC internally reviewed the incident and identified the following corrective actions in order to reduce the likelihood of a reoccurrence: • Implement routine preventative maintenance program for reclaim water pipeline, including checks of flange bolts and pipe connections; and • Place delineators at flange locations along reclaim pipeline in summer of 2019 to identify flange locations during winter months and allow effective snow removal at these locations to facilitate inspections.	
26-Mar-19	19-132	26-Mar-19	Glycol 50 liters	At 6:30 am on March 26, 2019, the powerhouse operator responded to an alarm within the powerhouse. It was discovered that generator #5 engine had experienced a catastrophic failure and released oil and glycol on to the deck of the generator module. The ethylene glycol coolant was dripping from the deck of the module and onto the crush pad and concrete foundation below the module. Absorbent pads were used to contain and absorb the dripping and pooling glycol underneath the module. Contaminated materials were removed from the surface of the pad (spill pads, snow and crush) and taken to the waste management facility to be stored for offsite disposal. Preventative maintenance is conducted on this generator after every 500 operating hours. The preventative maintenance had been conducted on March 5th, 2019, and the unit was within the recommended schedule at the time of the spill. TMAC internally reviewed the incident and identified the following preventative actions in order to reduce the likelihood of a reoccurrence: • Continue performing walk around checks twice daily on all generator components to identify potential issues; • Continue performing preventative maintenance programs on all generators at the recommended interval (every 500 operating hours);	19-Apr-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				• Prior to placement of a replacement generator, the floor of the module will be inspected and any holes caused by the incident will be repaired; and • A solution to seal the seams of each generator module enclosure is being investigated in order to contain any spills inside the module from reaching the crush pad and concrete foundation.	
21-Apr-19	19-165	22-Apr-19	Cement 375 kilograms	On April 21, 2019, an employee was attempting to remove a mega-bag of cement mix out of a sea-can with the telehandler. While removing the mega-bag, it caught a sharp edge on the inside of the sea-can. As a result, approximately 375kg of the mega-bag spilled onto the ground in front of the sea-can. The majority of the contents remained contained within the mega-bag. The cement bag was placed into another sea-can while the hole was being repaired and the area being was cleared. Contaminated snow was removed with shovels and a Bobcat, placed into another mega-bag, and taken to the Tailings Storage Facility for disposal. TMAC internally reviewed the incident and identified the following preventative actions in order to reduce the likelihood of a reoccurrence: • A spotter must be used for accessing and replacing material in sea-cans; • Spotter and operator will properly assess challenges of area prior to making pick. During this time, they will also discuss the signal language to be used that will allow them to best support the move.	21-May-19
26-Apr-19	19-177	26-Apr-19	Glycol 950 liters	On April 26, 2019, an employee was attempting to remove a plastic tote of ethylene glycol 60-40 coolant from a sea-can with a telehandler. While loading the tote, the forks of the telehandler shifted and punctured the tote. Approximately 950L of coolant was released into the sea-can and onto the camp pad in front of the sea-can doors. In the investigation of this incident, it was found that a spotter was not used. A spotter may have been able to identify a shift in the telehandler forks before a puncture, and assist with any potential issues that may arise when moving material. The operator immediately reported the spill to the supervisor, who contacted the Environmental department. Spill pads were placed to absorb spilled coolant. Contaminated snow was removed by hand and with equipment. This included material that migrated beneath the sea-cans. To do so, the sea-cans were moved and the contaminated material was excavated from the camp pad surface. Contaminated material was placed into drums and taken to the waste management facility to be stored for offsite disposal.	22-May-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				TMAC internally reviewed the incident and identified the following preventative actions in order to reduce the likelihood of a reoccurrence: • A spotter must be used for accessing and replacing material in sea-cans; • Spotter and operator will agree on a signal language to be used during pick; • Spotter and operator will assess the material and the location for potential challenges associated with the pick. Challenges will be properly mitigated; and • The procedure for the unloading of totes will be thoroughly reviewed and gone over with the team members.	
10-May-19	19-200	11-May-19	Glycol 15 liters	On May 10, 2019, an employee was clearing snow from a laydown area at the Roberts Bay Waste Management facility when a leak of ethylene glycol coolant was identified. The leak was traced to a sea-can container located on the third level of a stack of sea-cans used to store waste materials. The sea-can was brought down for an immediate inspection. An overturned lined mega-bag of clean plastic was identified as the source of the leak. It was found that a 20-liter pail of waste ethylene glycol coolant had been mixed in with the clean plastic waste. The coolant had drained from the pail onto the floor of the sea-can, leached under the doors and ran down the sea-can stack. Approximately 10-15 liters spilled to the camp pad. The sea-can container was brought down from the stack, opened and cleaned. Sea-cans stacked below were also removed. Contaminated snow and crush was removed from the camp pad surface with a skid-steer loader and placed into drums for disposal. TMAC internally reviewed the incident and identified the following preventative actions in order to reduce the likelihood of a reoccurrence: • Thoroughly inspect materials being brought to Waste Management, and log violations for follow-up. • Ensure that mega-bags are placed into sea-cans upright and secure, to reduce movement during handling of sea-cans.	02-Jun-19
15-Jun-19	19-240	15-Jun-19	Turbid Water Unknown Volume	On June 15, 2019, while stripping a surface layer of overburden for the development of the Naartok East - Crown Pillar Recovery Trench at Madrid North, surface runoff containing sediment within the footprint of the stripping area migrated overland through the active layer of tundra to the shoreline of Patch Lake. This release was noted during a daily construction inspection, at approximately 17:15. The runoff bypassed sediment control installations and entered Patch Lake approximately 100m downstream from the disturbed area. Two separate overland flows, exhibiting visible turbidity, were observed flowing	15-Jul-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				towards and to the shoreline of Patch Lake. The ice had not yet fully melted along the shoreline of the lake, and the sediment was confined to a pool above the ice between the two overland flows. An incident investigation was conducted soon after the incident to determine the root cause. The investigation concluded with the following root causes: • Failure of sediment controls installed between stripping footprint and Patch Lake due to uncertainty of site drainage locations prior to work and under estimation of the volume and rate of water that would be released from the area; and • Failure to select the appropriate sedimentation control measures for the specific terrain and conditions. On June 16, two turbidity curtains were installed in areas where sediment was observed on the shoreline of Patch Lake. The installation of these curtains ensured that sediment was contained close to the shore, minimizing the potential migration into Patch Lake after the lake ice had melted. This additional measure was observed to be effective in containing much of the sediment between the curtain and the shore. On June 17, a newly constructed rock berm was initiated around the perimeter of the stripping area to divert water around the work area and to keep water contained within the footprint prior to resuming stripping activities to reduce the likelihood of a reoccurrence. In addition to the corrective actions, water samples were collected for acute lethality testing and water quality characterization. The incident investigation concluded with the following preventative actions for future overburden stripping in order to reduce the likelihood of a reoccurrence: • Assessment of sedimentation installations prior to commencing overburden stripping activities; • Additional training for personnel on sedimentation control installations; • Conduct thorough assessment of drainage locations (based on historic photos if necessary) to identify flow paths and areas of risk; • Preinstall turbidity curtains where practical; and • Installation of rock berms in high-risk areas prior to stripping of overburden. Representative samples of both flows were collected at the shore where turbidity was observed to be entering Patch Lake. The samples were collected approximately four hours after the event was initially observed, and for two subsequent days after. This was done to quantify the impact of the mitigation measures and potential impacts to Patch Lake. Representative samples were	

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				also collected on the day the release was observed for acute lethality testing. A review of the analytical results showed both streams entering Patch Lake to be non-acutely lethal with a 100% survival rate for both Rainbow trout (96-hour LC50 test) and Daphnia magna (48-hour LC50 test). Water quality results were compared to the MDMER Schedule 4 – Authorized Limits of Deleterious Substances. All parameters were below both the Maximum Authorized Monthly Mean Concentration and the Maximum Authorized Concentration in a Grab Sample with the exception of Total Suspended Solids (TSS). TSS results for NE-C were 93.7, 17.1, and 4.3 mg/L on June 15, 16 and 17 respectively. TSS results for NE-D were 29.3, 8.9, and 3.5 mg/L on June 15, 16 and 17 respectively. Water quality results and photos of the location were appended to the 30-day follow-up report.	
23-Jun-19	19-252	24-Jun-19	Sewage 100 liters	On June 23, 2019, while conducting an inspection of the camp lift station and pipeline facilities at the Boston Camp, an employee identified that the pipe support of the main kitchen grey water line to the camp lift station had failed resulting in the pipe dropping approximately 1ft. While the grey water line was being repaired, two sections of the pipeline separated resulting in approximately 100L of grey water being released to the tundra below. Upon investigation, it was found that a 2” HDPE pipeline had been glued to an ABS pipeline. The additional strain resulting from the pipeline dropping caused the glue to separate at this location. The pipe support was also found to be weathered and no longer adequate to support the weight of the pipe. The pipeline was temporarily shored with new wood materials to realign the pipeline and release strain from the connection. The pipe support materials along the length of this pipeline will be replaced once the area can be accessed by equipment with minimal risk of damage to the tundra. The pipe sections were reconnected and insulated; a Victaulic clamp appropriate for the pipeline materials (HDPE to ABS connection) has been ordered and was installed at this location to reduce the risk of a reoccurrence. Grey water released from the pipeline had soaked into the tundra and could not be recovered. Post-incident water quality sampling was conducted at the shoreline of Aimaokatalok Lake located approximately 80 m downstream of the spill location and compared to a sample collected on June 17, 2019 (BOS-1) prior to the incident. Results of this sampling were provided in the 30-day follow-up report.	23-Jul-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				TMAC internally reviewed the incident and identified the following preventative actions in order to reduce the likelihood of a reoccurrence: • Use Victaulic fittings for pipe connections that are appropriate for the pipe material; • Conduct assessment of pipe connections along entire length of the grey water pipeline at Boston Camp and replace if necessary; and • Replace current pipe support with robust materials that are less susceptible to weathering and failure.	
28-Jul-19	19-301	28-Jul-19	Sewage 7 cubic metres	On July 28, 2019, a sewage spill was discovered at the north-west corner of the Boston Camp complex. Sewage and grey water from the north section of the camp was released to the camp pad beneath the building and onto the tundra north-west of the building. This section of the camp had been opened on July 20th and was occupied between July 20th and 28th when the spill was discovered. An estimated 7000L of sewage/grey water was released during this time. Upon investigation, it was discovered that a Fernco fitting on the main sewage line had disconnected at some point prior to occupying this section of the camp. It is believed that this fitting had been installed incorrectly and that freeze/thaw conditions over time contributed to the failure. It was also identified that the cribbing under this pipeline is in poor condition and may have contributed to the failure of the fitting. Due to snow drifts around the buildings when Boston Camp was opened in June 2019, this section of the camp was not accessible to conduct an inspection of this infrastructure and a miscommunication between cross-shifts resulted in pre-use inspections of this infrastructure to be overlooked prior to occupying this section of the camp in July 2019. A small pump was used to recover pooled material under the building and on the tundra into plastic totes for treatment in the Sewage Treatment Plant and lime was placed on the crush pad beneath the building to neutralize odours and bacteria. The failed Fernco fitting was replaced to reconnect the pipes and prevent further release of materials. To reduce the risk of failure resulting from freeze/thaw conditions, an expansion joint was ordered and installed on the pipe to replace the Fernco fitting. TMAC internally reviewed the incident and identified the following preventative actions in order to reduce the likelihood of a reoccurrence: • Conduct pre-operational inspections of all sewage and greywater infrastructure during camp commissioning prior to occupying camp, including testing of all infrastructure with fresh water to identify leaks, and document these inspections;	22-Aug-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				• Conduct daily operational inspections of all sewage and greywater infrastructure while camp is occupied and document these inspections; • Use of expansion joint fittings for pipe connections where appropriate to reduce risk of failure due to freeze/thaw conditions; • Conduct full assessment of all connections of sewage and grey water pipelines at Boston Camp and replace as necessary; and • Conduct full assessment of support and cribbing infrastructure for all pipelines at Boston Camp and replace as necessary.	
29-Oct-19	19-445	29-Oct-19	Treated Effluent 1 cubic metre	On October 29, 2019, an operator was completing commissioning work in a water treatment facility at the Doris camp. During this work, the operator inadvertently caused damage to a PVC valve on the treated effluent line. Treated effluent from the damaged valve spilled out of the door and onto the crushed aggregate pad the facility sits on. This is an unauthorized discharge point. An incident investigation was conducted soon after the incident occurred to determine the root cause. The investigation concluded with the following root causes: • Unsupported and un-guarded PVC drain valves located 1” above floor; • Flaw in design of spill containment capacity of building. Although the mine site was not currently discharging the effluent being treated into to the environment, commissioning of the water treatment facility was on-going and samples of the treated effluent were collected at a regular basis to evaluate treatment performance. Based on samples taken at the time of the spill, results were below the Maximum Authorized Monthly Mean Concentration for a deleterious substance as outlined in Schedule 4 of the Metal and Diamond Mining Effluent Regulations (MDMER). Analytical results for the released effluent were provided in the 30-day follow-up report. The operator immediately isolated the line to prevent further spillage. Contaminated snow, ice, and crush was excavated and removed for disposal in the Tailings Impoundment Area. In order to reduce the likelihood of a reoccurrence, the incident investigation concluded with the following preventative actions for future work at this water treatment facility: • Sump and sump pump will be relocated to more adequately capture any released effluent; • Sump pump line will be insulated and/or heat traced to prevent freezing in winter months; and • Supports or protective guards will be placed on all PVC drain values located on or near floor level.	19-Nov-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
30-Oct-19	19-448	30-Oct-19	Untreated Mine Effluent 12 cubic metres	At the time of the spill event, TMAC was in the process of commissioning components of the Robert's Bay Discharge System (RBDS). The RBDS is designed to transport a single compliant effluent stream consisting of effluent from the Tailings Impoundment Area (TIA) and the underground mine workings. Underground workings at the Doris-Madrid Project are dewatered to allow for continued mining activities. In this process, effluent is pumped from an underground sump to a tank in a water treatment pump house (Tank-001). Prior to the incident, a sump pump underground was replaced, resulting in an increase in effluent reporting to Tank-001 than previously observed. This additional effluent, and increased flow, exceeded the capacity of the pump that conveys effluent from Tank-001 to the TIA. Due to this exceedance in pumping capacity, the effluent level in Tank-001 increased above its holding capacity, and effluent began to flow through an overflow pipe on the tank to a sump on the facility floor. Concurrently to the overflow of Tank-001, an electrical fault caused the pump for the sump receiving the overflow to fail, and as a result, untreated mine effluent overflowed the floor sump and eventually over the doorsills and spilled onto the crushed aggregate pad outside of the pump house. An incident investigation was conducted soon after the incident occurred to determine the root cause. The investigation concluded with the following root causes: • Inadequate communication between work groups; • Failure to monitor the pump house building continually during commissioning; • Undersized breaker for sump pump was not identified during dry-commissioning; and • Inadequate warning systems in place prior to wet-commissioning. Upon discovery, the underground effluent pumping was ceased, stopping the active spill. Contaminated snow, ice, and crush was excavated and removed for disposal in the TIA. A larger capacity electrical breaker was also installed to ensure that this particular pump functions as required. In order to reduce the likelihood of a reoccurrence, the incident investigation concluded with the following preventative actions for future work between these work groups, and for future work in the pump house facility: • When conditions change underground, or when pumping activities are altered, notifications will be provided to Mill personnel;	25-Nov-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				• Continual physical monitoring of the pump house facility will occur until cameras and automatic controls are installed in the Mill Control Room; and • A high-level alarm for Tank-001 has been installed to notify the control Mill Control Room in advance of a potential overflow situation.	
5-Nov-19	19-453	5-Nov-19	Untreated Mine Effluent 45 cubic metres	TMAC is in the process of commissioning components of the Roberts Bay Discharge System (RBDS). The RBDS is designed to transport a single compliant effluent stream consisting of effluent from the Tailings Impoundment Area (TIA) and the underground mine workings. Underground workings at the Doris-Madrid Project are dewatered to allow for continued mining activities. In this process, effluent is pumped intermittently from an underground sump to a tank (Tank-001) located in a water treatment pump house. Tank-001 is drained by Pump-001. At the time of the incident (approx. 02:10am), Pump-001 had shut down as no water was being pumped from the underground workings and the level of Tank-001 was low. When pumping from underground recommenced and filled Tank-001, Pump-001 failed to restart. Effluent began to overflow from Tank-001 onto the floor which activated the sump pump. A high level alarm for Tank-001 had been installed to notify the Mill Control Room in advance of a potential overflow situation, however this alarm failed to initiate during this event. The sump pump directed the effluent into an alternate storage tank in the water treatment pump house (Tank-140). As a result of the heightened load, the level in Tank-140 also increased beyond capacity and effluent began to overflow from this tank onto the floor of the facility. Effluent seeped into the Motor Control Centre (MCC) room and triggered an electrical fault, causing power in the facility to be lost. No alarm was activated when the facility lost power, and the status of the building was not discovered until the next control room rounds at 06:00am. Untreated mine effluent overtopped the doorsills of the building and spilled onto the crush aggregate pad outside the pumphouse. Effluent froze to the surface of the camp pad and no effluent was released to the surrounding environment. An incident investigation was conducted soon after the incident occurred to determine the root cause. The investigation concluded with the following root causes: • Inadequate communications between hardware, software and process when the high level alarm failed to communicate to the Mill control room of the potential overflow situation when Pump-001 did not restart; • Inadequate warning systems as no alarm was in place to alert the Mill control room that power was lost in the facility (loss of communications alarm); and • Inadequate barriers in place to prevent water from entering MCC room.	05-Dec-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				The following corrective/preventative actions were identified to reduce the likelihood of a reoccurrence: • Review of control programming and field verification of all alarms. Ensure new alarms are tested prior to recommencing operations; • New alarm will be installed to notify the Mill Control Room if a loss of communications/power has occurred within the facility; • Construct concrete berm at the MCC doorway; • Install an emergency drainage pipe system from the pump house building to the Sedimentation Control Pond to manage overflow in the event the sump pump system is overwhelmed within the facility.	
18-Nov-19	19-465	18-Nov-19	Sewage 100 liters	While performing daily inspections, the Sewage Treatment Plant operator identified that the main lift station in Doris Camp had begun to overflow. An estimated 100L of untreated sewage was released to the gravel floor inside the lift station building. No material was released to the camp pad surrounding the building. At the time of the incident, maintenance was being performed in this section of the camp and a planned power shut down of this area had been conducted. Power to the main lift station had been cut to allow this maintenance to proceed resulting in shutdown of the pump from the main lift station to the Sewage Treatment Plant. Secondary lift stations from other sections of the camp continued to feed into the main camp lift station sump resulting in the overflow. An incident investigation was conducted soon after the incident occurred to determine the root cause. The investigation concluded with the following root causes: • Failure to identify risk of overflow within the system when initiating the power shutdown; and • Inadequate procedures related to shutdown of facilities in this section of the camp which would identify the need to provide backup power to the main lift station pump. Upon discovery, a vacuum truck was used to remove material from within the lift station for transfer to the Sewage Treatment Plant to prevent further overflow until the maintenance was completed and power was restored. Contaminated crush was hand excavated from around the lift station sump and lime was placed on the impacted area to prevent the development of odors or pathogens.	11-Dec-19

Date of Occurrence	Spill Number	Date of Notification to an Inspector	Spilled Material and Volume	Details of Spill Event and Follow up Activities	Date Follow-up Report Provided to an Inspector
				The following corrective/preventative actions were identified to reduce the likelihood of a reoccurrence: • Improved task planning to be completed by Supervisor prior to initiating planned electrical shutdowns; and • Identify all infrastructure affected during planned maintenance, the potential risks to that infrastructure and develop mitigation measures to minimize those risks prior to starting a task.	

12. Management Plans

The Table 12-1 below provides and overview of all Management Plans for the Hope Bay Project.

Table 12-1. Hope Bay Project Management Plans

Topic	Management Plans	Revision Date
Environmental Management System	Hope Bay Project Environmental Management System	Dec-17
Management Plans		
Emergency Response	Hope Bay Project Emergency Response Plan*	Mar-20
Spill Contingency	Hope Bay Project Spill Contingency Plan*	Mar-20
Hazardous Waste Management Plan	Hope Bay Project Hazardous Waste Management Plan*	Mar-20
Incinerator Management Plan	Hope Bay Project Incinerator Management Plan	Mar-19
De-icing Management	Hope Bay Project Aircraft De-icing Management Plan	Mar-19
QA/QC	Hope Bay Project Quality Assurance Quality Control Plan*	Mar-20
Water Management	Hope Bay Project Doris-Madrid Water Management Plan*	Mar-20
	Hope Bay Project Boston Water Management Plan	Dec-17
	Hope Bay Project Water and Ore/Waste Rock Management Plan for Boston Site	Jan-17
Waste Rock Management Plan	Hope Bay Project Waste Rock, Ore and Mine Backfill Management Plan	Mar-19
	Hope Bay Project Water and Ore/Waste Rock Management Plan for Boston Site	Jan-17
Landfarm Management	Hope Bay Project Hydrocarbon Contaminated Material Management Plan	Dec-17
Air Quality	Air Quality Management Plan, Hope Bay Project	Dec-17
Domestic Waste Water Management	Hope Bay Project Domestic Wastewater Treatment Management Plan	Dec-17
	Boston Sewage Treatment Operations and Maintenance Management Plan	Sep-17
WWMP	Doris North Project Wildlife Mitigation and Monitoring Plan	Dec-16
	Wildlife Mitigation and Monitoring Plan	Dec-19
AMEP	Hope Bay Project Aquatic Effects Monitoring Plan	Apr-18
Ground Water Management Plan	Hope Bay Project Ground Water Management Plan	Apr-18
Tailing Management Plan	Hope Bay Project, Phase2 Doris Tailings Impoundment Area – Operations, Maintenance, and Surveillance Manual	Dec-17
	Hope Bay Project Boston Tailings Management Area - Operations, Maintenance, and Surveillance Manual	Dec-17

(continued)

Table 12-1. Hope Bay Project Management Plans (completed)

Topic	Management Plans	Revision Date
Non-Hazardous Waste	Hope Bay Project Non-hazardous Waste Management Plan	Dec-17
Quarry Management	Hope Bay Project Quarry Management and Monitoring Plan	Dec-17
Closure	Hope Bay Project Doris-Madrid Closure and Reclamation Plan	Nov-17
	Hope Bay Project Boston Conceptual Closure and Reclamation Plan	Nov-17
	Hope Bay Project Windy Camp and Patch Lake Facility Updated Closure Plan (SRK)	May-14
	Hope Bay Project: Madrid Advanced Exploration Program: Conceptual Closure and Reclamation Plan (SRK)	Oct-14
Explosives	Hope Bay Project Explosives Management Plan	Nov-17
OPEP	Oil Pollution and Emergency Preparedness Plan	Aug-19
Socio-economic Management Plans		
Health and Safety	Hope Bay Health and Safety Management Plan	Dec-17
Human Resources	Hope Bay Project Human Resources Plan	Sep-16
Community Involvement	Hope Bay Project Community Involvement Plan	Dec-16
Cultural Heritage	Cultural Heritage and Natural Resources Management Plan	Dec-17

** Indicates plan has been updated and is being provided to the NWB in March 2020.*

13. Closure and Reclamation

13.1 PROGRESSIVE RECLAMATION

13.1.1 Operation Areas

In 2019, TMAC conducted progressive reclamation was conducted on the Doris Crown Pillar Recovery Trench. Reclamation of the Doris Crown Pillar Recovery Trench commenced mid-January of 2019, shortly after mining activities were completed. Backfill and final reclamation activities were completed in May 2019.

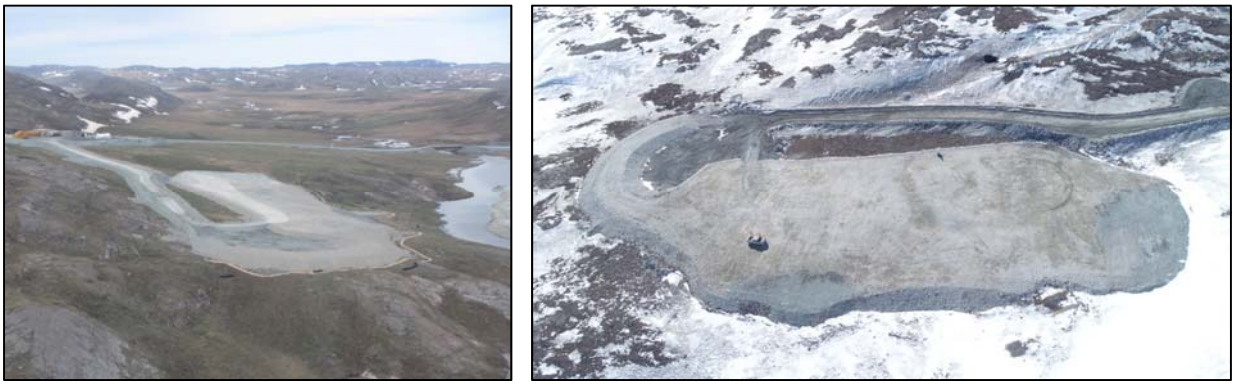
Thermal modelling was conducted by SRK to identify the minimum placement requirements (quantities) to achieve optimal thermal stability of the surrounding overburden, and also identify the maximum allowable elevation of mineralized rock placement within the trench.

Once backfilled, a 1-metre cap of geochemically stable rock was placed. The final cap was designed to promote surface and subsurface flows (contact water) to drain to the underground mine to reduce the extent of surface flows to the environment. The cap was also designed to provide an adequate thermal layer to prevent retrogressive thaw and slumping of the surrounding permafrost.

All sedimentation controls surrounding the Crown Pillar Recovery Trench were removed prior to the onset of winter in 2019.

For aerial photos of the Doris Crown Pillar Recovery Trench post-reclamation activities see Figure 13-1.

Figure 13-1. Doris Crown Pillar Recovery Trench Post-Reclamation Activities



13.1.2 Exploration Areas

Following surface diamond drilling operations, a reclamation process is conducted. Once drill equipment is demobbed from site, all cuttings and drill casings are removed, and the land is leveled with bentonite and capped with peat moss. Following drilling operations on ice, equipment and soiled and/or oily snow and ice are removed from the surface of the lake and deposited in active sumps. Once drilling operations are complete at a drill site, a site closure inspection report is completed by TMAC, reviewed by the site Drilling Supervisor and approved by the TMAC Environment Superintendent. Generalized items inspected in closure review include: water management, drill collar sites and adjacent vegetation inspections and housekeeping. All site closures are photographed with records filed and maintained by TMAC.

No historical drill site reclamation was completed in 2019.

13.2 COST ESTIMATE

The reclamation work for the Hope Bay Project will be done in accordance to approved Closure and Reclamation Plans for the Project. Reclamation progress is monitored through site inspections and annual reporting to the KIA, INAC and NWB, and is documented in updates of the Project Closure and Reclamation Plan and financial security costs estimates. As part of the Type A Water Licence approval process for Boston-Madrid (Phase 2) Project in 2018, financial security costs estimates were updated and approved by the NWB, KIA and CIRNAC which consider all existing infrastructure, proposed Phase 2 infrastructure, and any new information available since the last revision. The resulting financial security estimates and their associated Closure and Reclamation Plans, which are applicable to each site, are outlined in the subsections below.

13.2.1 Doris and Madrid

TMAC maintains Hope Bay Project Doris-Madrid Closure and Reclamation Plan (November 2017) which describes the activities, requirements, and monitoring necessary for the closure and reclamation of the Doris site.

As part of the Type A Water Licence approval process for Boston-Madrid (Phase 2) Project in 2018, TMAC provided to the NWB an updated and final Closure and Reclamation cost estimate, which constituted an agreement between TMAC, KIA and CIRNAC on the financial security parties agreed was required for Doris and Madrid sites. Details of this process can be found on the NWB public registry and resulted in a requirement in Type A Water Licence 2AM-DOH1335 for $62,058,577 to be posted for the Doris-Madrid portion of the Project; $51,659,822 to KIA, $10,398,755 to the Crown. This security is to be posted across nine (9) installments or tranches based on distinct project components.

In addition to the financial security required to be posted for Doris and Madrid under Type A Water Licence 2AM-DOH1335 described above, TMAC also has rights to conduct the Madrid Advanced Exploration Program in accordance with Water Licence No. 2BB-MAE1727 Amendment No.2. In the event TMAC proceeds the Madrid Advanced Exploration Program, and does not commence activities under Type A Water Licence 2AM-DOH1335, TMAC's Conceptual Madrid Closure and Reclamation Plan (2017) will dictate the activities, requirements, and monitoring necessary for the closure and reclamation of the Madrid site(s). In this scenario, TMAC is required to maintain reclamation security in the amount of $7,131,000 for the work at Madrid. As per the amended licence, this amount is split between activities at Madrid North ($4,042,000), Madrid South ($3,072,000) and Madrid North to South All Weather Road (AWR) ($17,000).

13.2.2 Windy

TMAC has an approved Hope Bay Project, Windy Camp and Patch Lake Facility Updated Closure Plan (SRK 2014). This document presents the closure obligations and the plan for closing both facilities, and demonstrates how the closure obligations can be met. A copy of this plan can be found on the NWB public registry.

13.2.3 Boston

For current Boston infrastructure, TMAC has an approved Boston Camp Interim Closure Plan (2014) which was submitted to the NWB May 26, 2014. The plan includes a current closure cost estimate of $5,988,000. This amount includes cost escalation, management of mineralized rock, reclaiming drill sites and other

areas of permafrost degradation, remediation of hydrocarbon contaminated soils, indirect costs, and a contingency. A copy of this plan can be found on the NWB public registry.

For planned Boston infrastructure under the Boston-Madrid (Phase 2) Project, TMAC provided to the NWB an updated and final Closure and Reclamation cost estimate as part of the Type A Water Licence approval process. The updated and final Closure and Reclamation cost estimate provided constituted an agreement between TMAC, KIA and CIRNAC on the financial security parties agreed was required for the Bostin site. Details of this process can be found on the NWB public registry and resulted in a requirement in Type A Water Licence 2AM-BOS1835 for $37,458,491 total to be posted; $9,963,564 to KIA and $27,494,927 to the Crown. This security is to be posted across nine (6) installments or tranches based on distinct project components.

14. Community Consultation

TMAC is committed to engaging positively and effectively with local communities in a manner that emphasizes respect, integrity and demonstrates a willingness to learn from experience and embrace necessary change. TMAC recognizes that maintaining engagement and community involvement is necessary throughout the mining cycle, and critical to continuous improvement. TMAC bases its approach to community involvement on the following principles:

1. Identify all Stakeholders in our operations;
2. Effectively engage Stakeholders and establish a dialogue;
3. Provide Stakeholders with means to respond to us as well as generate responses; and
4. Report to Stakeholders and regulators on our Engagements.

TMAC operates within Nunavut, and on Inuit Owned Lands. The KIA, representing the Inuit of the Kitikmeot region, advised TMAC during the IIBA negotiation process that all Kitikmeot communities are considered affected by Hope Bay. As a result, TMAC considers every Kitikmeot Inuk, and their representative organizations including the KIA to be Stakeholders in the Belt. For the purposes of local community engagement, communities involved in the Belt include Kugaaruk, Taloyoak, Gjoa Haven, Cambridge Bay, Umingmaktok, Kingaok, and Kugluktuk, comprising the Kitikmeot region of Nunavut.

In order to effectively engage, establish and maintain a dialogue with TMAC's various local communities, TMAC has implemented a number of steps and activities designed to support two-way communication. These efforts and activities are described in the subsections below.

14.1 CAMBRIDGE BAY OFFICE

TMAC maintains an office in Cambridge Bay, which is the closest, occupied, affected community to the Belt. The office is centrally located in the community, furnished with bilingual signage, and accessible by the public during regular business hours. The primary purpose of this office is to facilitate community engagement. The Cambridge Bay office supports TMAC's engagement of government, regulators, intervenors, interested members of the public, employees, those seeking employment at Hope Bay and other interested parties.

Staff of the Cambridge Bay office are available to communicate directly with local Stakeholders and participate in a number of regional and territorial events that regularly occur in Cambridge Bay, thereby informing communities of TMAC operations, and actively soliciting feedback. The Cambridge Bay office is staffed with a Vice President of Corporate Social Responsibility, a TMAC Liaison and an HR/SR Coordinator. They engage regularly with the public using two-way communications for a variety of activities including:

- Employee and public relations;
- Annual community awareness meetings;
- Regular meetings with individual Inuit job seekers;
- Recruiting and onboarding Inuit personnel;
- Regular communications with Community Liaison Officers in the Kitikmeot;

- Annual meetings between KIA and TMAC Presidents;
- Annual updating of KIA Board by TMAC Executive;
- Attendance at the KIA Annual General Meeting;
- Quarterly participation in the IIBA Implementation Committee;
- Presentation of the IIBA Annual Evaluation Report to the KIA Board;
- At a minimum, semi-annual meetings of the Inuit Environmental Advisory Committee ("IEAC") in order to review environmental management and monitoring plans, discuss project related environmental issues, and obtain advice from knowledgeable Inuit on these matters;
- Meetings between TMAC staff and Kitikmeot Qualified Businesses;
- Regular meetings with relevant KIA Lands, Employment and Training and Executive staff; and
- Annual visits of the KIA Board, IIBA Implementation Committee, IEAC, and individual harvesters at Hope Bay.

14.2 ENGAGEMENT WITH INUIT THROUGH THE IIBA

In accordance with the IIBA, TMAC regularly engages Inuit on a range of matters directly as well as through the KIA. The IIBA includes the following schedules which contain specific provisions of adaptive socio-economic effect mitigation measures aimed at Kitikmeot Inuit:

- Schedule D – Training and Education Opportunities: whereby Inuit are provided support and training for opportunities at the Hope Bay Project;
- Schedule E – Employment: whereby measures and supports are provided to maximize Inuit participation in the Hope Bay Project;
- Schedule F – Business and Contracting Opportunities: whereby Inuit are provided business and contracting opportunities; and
- Schedule I – Inuit Environmental Advisory Committee: whereby Inuit have the opportunity to receive and consider information, provide advice and attempt to resolve community concerns relative to the environment and wildlife for the Hope Bay Project.

14.3 COMMUNITY AWARENESS: KITIKMEOT COMMUNITY MEETINGS

TMAC undertakes regional consultation tours of the Kitikmeot region. The tours consist of visits to each Kitikmeot community by TMAC community relations staff and relevant subject matter experts. TMAC endeavours to schedule the tour for a time of year that promotes participation and provides at least two weeks advanced notice for each Kitikmeot community. During the public meeting, TMAC delivers a presentation that provides the public information on the socio-economic and environmental performance of the Company. TMAC supports public meeting proceedings with simultaneous translation consistent with the dialect of Inuktun used in each community. TMAC logs meeting participants for future reference. In the meetings, community members have an opportunity to make comments, ask questions, and raise any concerns they may have regarding TMAC operations. TMAC documents the proceedings of public meetings in order to track issues and follow up on any concerns.

During the regional consultation tours of the Kitikmeot region, TMAC also endeavours to schedule meetings in each community with specific Stakeholder groups such as Kitikmeot Hamlet Councils and/or

senior management, local Nunavut Arctic College and High School classes as specific Stakeholders that may have an interest in employment and training at TMAC.

In 2017, TMAC hosted community meetings in Kugluktuk, Cambridge Bay, Kugaaruk, Taloyoak, and Gjoa Haven from October 18 to November 2, 2017 with the purpose of sharing a Hope Bay Project update and seeking public input on the proposed Madrid-Boston Project.

14.4 COMMUNITY AWARENESS: KITIKMEOT CAREER AWARENESS SESSIONS

TMAC host community and information and career awareness sessions in all Kitikmeot communities regularly in order to maximize Inuit employment opportunities at Hope Bay. The purpose of these sessions is to provide information on:

- expected labour needs of Hope Bay;
- the skills, behaviours and qualifications required for employment and advancement at Hope Bay;
- the training opportunities and educational support programs available to prepare for employment at Hope Bay; and
- career opportunities in related fields such as science, technology, mathematics or professional services.

14.5 SOCIAL MEDIA

TMAC maintains a company Facebook ™ page to both share operational information with communities and increase awareness of mining. TMAC uses its Facebook ™ page to augment information distributed through TMAC's website. TMAC also makes use of Kitikmeot community Facebook ™ pages to advertise job postings, meeting notices, and any other news that may be of interest to Nunavut Stakeholders (http://www.facebook.com/tmacresources/).

Comments, questions or concerns received via social media are addressed promptly in a manner consistent with public meetings.

14.6 ELECTRONIC MAIL

TMAC maintains and periodically updates a listing of electronic mail addresses of Stakeholders, including select community members. This listing includes, but is not restricted to the following:

- Public elected officials;
- Inuit elected officials;
- Relevant federal and territorial regulator employees;
- Relevant Inuit Organization employees;
- Relevant municipal officials; and
- Relevant training and employment agency employees.

When necessary, TMAC distributes electronic mail messages to this listing to inform them of TMAC related events, news and happenings. This engagement activity is conducted to ensure that Stakeholders and communities are well informed and if willing, able to plan participation in any future TMAC engagement.

14.7 NUNAVUT EVENT PARTICIPATION

TMAC ensures it is well informed of key events that occur on an annual basis in Nunavut that represent opportunities for community involvement and dialogue. TMAC makes staff available to attend these events in order to foster communication. These events included the following:

- Kitikmeot Mayor's Meeting;
- Kitikmeot Trade Show; and
- Nunavut Mining Symposium.

14.8 STAKEHOLDER REPRESENTATIVE ORGANIZATIONS

TMAC recognizes that one of the most effective means of engagement and dialogue with Stakeholders and communities is joining with them in an organization of mutual benefit. Towards this aim, TMAC is a member of established organizations involving numerous community members. TMAC's participation in these groups provides members with information on TMAC's activities and, allows them to discuss matters of mutual concern, and undertake initiatives of mutual benefit. These organizations include the following:

- NWT/Nunavut Chamber of Mines;
- Nunavut Mine Training Roundtable; and
- Kitikmeot ASETS Stakeholder Working Group.

14.9 COMMUNITY RELATIONS SUMMARY FOR 2019

TMAC's Corporate Social Responsibility (CSR) group in responsible for leading community relations on behalf of TMAC. TMAC conducts its activities in accordance with the *Community Involvement Plan*, and in compliance with the *Hope Bay Inuit Impact and Benefit Agreement*.

TMAC Corporate Social Responsibility supports the implementation of a number of TMAC Policies and Procedures including:

- Code of Ethical Business Conduct ;
- Respectful Workplace;
- Whistleblower Policy;
- Corrective Action Policy;
- Community Complaints Procedure; and
- Employee and Family Assistance Program.

Also in 2019, work was completed towards a new TMAC Sustainable Development Policy that reinforces social commitments by the company.

During 2019, Julia Micks EVP of Human Resources for TMAC continued to head the community involvement team. Alex Buchan, VP of Corporate Social Responsibility, based in Cambridge Bay is primarily responsible for delivering community involvement activities. The Community Relations team in Cambridge Bay includes Ikey Evalik, Inuit Impact and Benefit Agreement Coordinator, and Sandra Eyegetok, the HR/SR Coordinator.

Communications in 2019 focused on the progression of Doris gold production, and operational expansion into Madrid North. Deliberations of the Inuit Environmental Advisory Committee pursuant to Schedule I of the 2015 Hope Bay IIBA, focused on preparatory research into Phase II Fisheries Offsetting, and expansion of the Hope Bay Wildlife Mitigation and Monitoring Plan to include additional studies required for Phase II development.

TMAC changed office locations in Cambridge Bay in 2019 due to a change in ownership of leased space. TMAC moved from the 2nd floor of the Kitikmeot Center to #6 Kingmik Street. Despite the move, TMAC remains in the downtown area of Cambridge Bay and the new office location remains readily accessible to public walk in traffic.

TMAC continued to participate in territorial, regional and community organizations and groups aligned to support community relations and consultation efforts. These groups include the NWT/Nunavut Chamber of Mines, the Nunavut Mining Symposium Society, the Nunavut Mine Training Roundtable, the KIA regional ASETS Stakeholder group, Kitikmeot Socio-Economic Monitoring Committee and the Cambridge Bay Canadian High Arctic Research Station Committee.

During the course of community engagement activities, TMAC continues to experience a measured degree of support for our mining and exploration operations, and a strong and growing interest in permanent employment and training opportunities related to mine production. Over 700 Kitikmeot residents have applied for work at Hope Bay through our Cambridge Bay office to date. This represents the majority of persons in the Kitikmeot Regional Labour Force that are actively looking for work.

14.9.1 Cambridge Bay Logistics Hub

Cambridge Bay continues to be the logistics hub for TMAC in the Kitikmeot. In 2019, TMAC operated weekly Northern Crew Change Flights from Cambridge Bay into Doris Mine. In alternating weeks, this crew change flight also took in either Kugluktuk (West) and Gjoa Haven, Taloyoak and Kugaaruk (East) workers. TMAC, similar to previous years, utilizes a twin engine 14 seat aircraft for these crew change flights. During 2019, several times due to increases in the size of the Kitikmeot workforce, it was necessary to make multiple flights into Doris mine in order to complete a crew change. If this trend continues, it may be necessary to utilize a larger aircraft in order to perform this logistical operation.

14.9.2 Other Communications in 2019

TMAC continues the use of a project/company Facebook page to provide information on Hope Bay primarily to northern stakeholders. Content of this page includes permitting information, meeting notices, job advertisements, and pictures of site activities linked to Kitikmeot community news pages. Feedback from TMAC information from this social media source is growing and it may be surmised that many younger Kitikmeot residents make better use of this information source than Elders or others more typically reliant on information received during public meetings. The page can be viewed at the following link: https://www.facebook.com/tmacresources.

14.9.3 Corporate Social Responsibility Activities in 2019 by Month

<u>January</u>

- CSR assisting in obtaining letters of support from Kitikmeot leaders and groups for Tuglik Energy Hope Bay alternative energy NRCan funding proposal
- Selection of two Nunavut Mining Symposium Youth Ambassadors initiated.

- IIBA IC meeting held to discuss GN MOU, feedback provided to GN on proposed agreement, vetted by KIA.
- TMAC is a premier sponsor of the Kitikmeot Trade Show: https://kitikmeottradeshow.ca/
- Two site-based contract managers scheduled to attend with SR staff to promote Inuit contracting.
- Coordinated IEAC scheduled for February 26-27 in Cambridge Bay with topics to include Fisheries Offsetting and Aquatic Effects Monitoring.
- Group email activity summary sent to northern stakeholders.

February

- KIA Board Site visit not be completed due to weather – a teleconference meeting was held instead involving Board Member and President.
- Two letters of support obtained or Wind Turbine funding proposal.
- Analysis and preparation conducted for first IIBA Implementation Committee scheduled for March.
- Inuit Employment and Training Targets to be set.
- Discussions held with Government of Nunavut on draft Memorandum of Understanding.
- Group email activity summary sent to northern stakeholders.

March

- CSR staff participated in the 2019 PDAC conference, which included meetings with contractors to discuss Inuit employment and training, and also a Hope Bay IIBA meeting with KIA.
- 2019 Inuit Employment Target set again at 70 Inuit FTEs.
- KIA and TMAC met with Government of Nunavut Economic Development officials to further talks aimed at producing a draft MOU between the parties.
- Presentation delivered to Kitikmeot Contractors workshop in Cambridge Bay, to provide advice and direction on Hope Bay contracting including instructions on how to register as a Kitikmeot Qualified Business.
- CSR attended Canadian High Arctic Research Station Steering Committee meeting in Cambridge Bay to provide briefing on TMAC compliance studies.
- Introductory meeting with new Cambridge Bay based federal Water Inspector to provide orientation to Hope Bay.

April

- CSR participated in the 2019 Nunavut Mining Symposium which included participation in the sponsored Youth Ambassador Program. Other engagements during this event included:
  - Donation to Auction Night;
  - Talk during Reception;
  - KIA Supper (Meeting of Presidents);
  - Several engagements with potential suppliers;
  - Panel discussions on Inuit Employment and Training;

- GN-DOE Wildlife Monitoring meeting;
- Nunavut Mine Training Roundtable; and
- GN-ED&T and KIA meeting on a MOU between the parties.

- Delivered 2018 Hope Bay Socio-Economic Monitoring Report to Hope Bay Socio-Economic Working Group and Kitikmeot Socio-Economic Monitoring Committee during meetings held in Cambridge Bay.
- Physical office move completed to new Office location with some facility deficiencies outstanding at month end (Fire Alarm Panel and other electrical).
- Group email activity summary sent to northern stakeholders.

May

- CSR conducted an open house event at the Cambridge Bay office May 15th. 25 members of the public attended. Many of the visitors had never attended a TMAC public meetings in the past. Based on this, the open house event is considered a success.
- A teleconference meeting of the Hope Bay Socio-Economic Monitoring Working Group was held this month in order to complete the review of the 2018 Hope Bay Socio-Economic Monitoring Report. This report was approved by the Parties and subsequently submitted to the Nunavut Impact Review Board.
- CSR staff delivered two IIBA Orientation presentations to TMAC main office staff. Further follow up presentations are planned for site-based staff.
- CSR continued to support the Environment Department in its engagement with the Department of Fisheries and Oceans with the intent of developing a Phase II Fisheries Offsetting Plan.
- Group email activity summary sent to northern stakeholders.

June

- CSR staff Supported TMAC participation in an Andrew Scheer visit to Iqaluit including a meeting with economic leaders of the territory to discuss northern industrial priorities.
- 2019 TMAC High School Achievement Award recipients identified and planning initiated for summer site visit.
- Liaised between Search and Rescue officials and site staff twice this month in order to offer TMAC resources to community search efforts. In both cases missing harvesters were found prior to Hope Bay helicopters entering the search effort.

July

- CSR undertook preparations for the 2019 TMAC High School Student Achievement Awards this month by ordering Plaques and Cheques, scheduling a mine site visit, and beginning to secure parental permission for same.
- CSR staff worked with regulators in reference to a grizzly bear deterrent matter at Doris Mine this month, to ensuring information flow.
- CSR staff delivered a Hope Bay update presentation to the Kitikmeot Inuit Association Board of Directors in Kugluktuk this month. Two questions by Board members were responded to, results shared with TMAC Executive.

- CSR staff assisted ERM contract biologists continue their Freshwater Creek fisheries offsetting research this month including marshalling equipment and securing a field assistant.
- CSR staff facilitated a dialogue between Kitikmeot Corporation (KC) and Site staff over the disposition of core box materials stored at a KC facility in Cambridge Bay.
- Group email activity summary sent to northern stakeholders.

August

- CSR staff, in support of site staff, conducted the 2019 TMAC High School Student Achievement Awards Site visit this month. A total of 11 students participated, including several that were too young to attend in 2018. The visit can be considered successful as students provided overwhelmingly positive feedback and several requested information on TMAC careers.
- CSR staff assisted ERM contract biologists continue their Freshwater Creek fisheries offsetting research in August. This included field work as the Hunters and Trappers Organization contracted field assistant was unavailable for several days.

September

- CSR staff engaged with GN ED&T staff to move the MOU negotiation process forward this month; affected GN departments are now reviewing a final draft of the MOU.
- CSR staff continued preparations for the 2019 Career Awareness tour this month, planned for the first week in October.
- CSR staff assisted Finance and Operations staff in preparing for the renewal of the camp service contract at the end of 2019 in accordance with Schedule F of the Hope Bay IIBA.
- CSR staff provided input into the Hamlet of Taloyoak Community Economic Development planning process, providing advice on how this community could increase Hope Bay employment.
- CST staff assisted ERM contract biologists continue their Freshwater Creek fisheries offsetting research in August. This included field work as the Hunters and Trappers Organization contracted field assistant was unavailable for several days.

October

- CSR staff attended a workshop in Cambridge Bay conducted by Makigiaqta Corporation looking at improvements to the Nunavut Education system in support of Inuit employment and training. The importance of trades related high school coursework and addressing non-attendance was emphasized.
- CSR staff continued preparations for upcoming events such as site based federal voting supports for employees, the 2019 Career Awareness Session Tour and a workshop to be held in Cambridge Bay related to icebreaker regulation.
- CSR staff lead efforts to divest 5 seacans full of drill core box material, sufficient to build 9,500 core boxes, stored in Cambridge Bay remaining from a Newmont local construction pilot project.

November

- CSR Staff attended a Nunavut Planning Commission public hearing in Cambridge Bay this month focused on details of the 2016 Draft Nunavut Land Use Plan. Discussion included a review of instituting large caribou special management areas. A case was made, supported by the local

Hunters and Trappers Organization to instead require mobile caribou protection measures similar to what is in place within the Hope Bay Wildlife Mitigation and Monitoring Plan.

- CSR staff attended the 2019 Yellowknife Geoscience Forum which included the Annual General Meeting of the Nunavut and NWT Chamber of Mines. A side meeting was held with senior officials of the Government of Nunavut to promote investor confidence in the territory. Items discussed included the Mary River environmental review and potential uses of Nunavut carbon tax revenue. A case was made to use these funds to financially support mine alternative energy projects.
- The Sustainability Policy was finalized and distributed to the executive team.

December

- CSR Staff arranged for a matching donation to Kitikmeot community Christmas events and activities based on an invitation to do so from the Kitikmeot Inuit Association.
- CSR staff attended an informal meeting with the KIA to discuss IIBA matters as a quorum for an Implementation Committee meeting was not possible. The KIA was briefed on Hope Bay Inuit employment, training and contracting matters. An updated Kitikmeot Qualified Business Registry list was shared by the KIA.
- CSR provided input into drafting a letter to Environment and Climate Change Canada demanding they revise their press release related to their enforcement action at Hope Bay.

15. Annual Inspection Activities

In 2019 TMAC hosted regulatory inspections for CIRNAC, NIRB, KIA, and WSCC. Details of when those visits occurred and a summary of the reports and follow up from those visits are detailed in Table 15-1.

Table 15-1. Summary of Annual Inspection Activities

Date	Agency	Summary	Follow up	Response
May 7-8-2019	Crown-Indigenous Relations and Northern Affairs Canada	Inspection to verify compliance with the Type A water license, 2AM DOH1335. The inspection focus was on fuel storage, waste and water management, site infrastructure as well as drilling and mining activities. Inspection of Crown Lease 77A/3-1-2 was also conducted.	The inspector noted multiple snow piles within the Single Tank Farm at Roberts Bay. Inspector wants TMAC Resources to stop pushing snow into the berm at the Bulk Fuel Storage at the Single Tanks Farm.	TMAC would like to clarify that snow is not pushed into any of the secondary containment berms on site. Snow within the secondary containment berms are routinely consolidated into piles to be removed from the secondary containment berms in order to maintain a 110% volumetric storage capacity of the fuel tank in the event of a tank failure.
June 18-20, 2018	Kitikmeot Inuit Association	On June 18-20 the KIA inspected the Doris Commercial Lease area and infrastructure including Roberts Bay, the Jetty, Doris Site and Area, the North Dam and Tailings Impoundment Area infrastructure, and the Doris Windy All-Weather Road. Windy Camp and Boston were also toured.	Roads throughout camp show signs of wear and tear, especially areas with heavy traffic. All roads should be resurfaced to fix potholes. The Roberts Bay tank farm containment area will be adding another 5mL tank that is currently being built. The rock face wall behind is not reinforced; this is a big safety concern. There is a lot of debris all around the crushing and milling plant that is currently being cleaned and put into C-cans. The berm is cracking at the Tank Farm in main camp, which needs to be repaired.	Roads with heavy traffic often require resurfacing after spring thaw. Road maintenance is a regularly occurring task. Spring clean-up of the site was underway during the time of the inspection. All areas identified will continue to be monitored by TMAC.
July 16-18, 2019	Worker's Safety and Compensation Commission	Inspection to verify compliance with Mines Health & Safety Regulations. The inspection focused on exploration activities, underground mining as well as surface infrastructure including the camp facility and warehouse. The inspector issued 2 orders for action.	Order issues.	Compliance report was submitted from TMAC within 30 days.
August 13-15, 2019	Crown-Indigenous Relations and Northern Affairs Canada	Inspection to verify compliance with water licenses 2AM DOH1335, 2BB-BOS1727 and 2BE-HOP1222. The inspection focus was on fuel storage, waste and water management, site infrastructure as well as drilling and mining activities. Inspection of Crown Leases 77A/3-1-7 and 77A/3-3-2 were also conducted.	No follow up items identified.	
August 13-15, 2019	Kitikmeot Inuit Association	On August 13-15 the KIA inspected the Doris Commercial Lease area and infrastructure including Roberts Bay, the Jetty, Doris Site and Area, the North Dam and Tailings Impoundment Area infrastructure, and the Doris Windy All-Weather Road. Windy Camp and Boston were also toured.	Roads throughout camp show signs of wear and tear, especially areas with heavy traffic. All roads should be resurfaced to fix potholes. The Roberts Bay tank farm containment area will be adding another 5mL tank that is currently being built. The rock face wall behind is not reinforced; this is a big safety concern. The Explosive Magazine has a C-can that does not have a lock on it. Sarah and I were able to access the explosives because the C-can doesn't have a lock. This is a Very big security concern, if we were able to access the explosives without security clearance, others can as well.	The explosives magazine gate was secured immediately upon recognizing the security lock was missing. All areas identified will continue to be monitored by TMAC.
November 12-14, 2019	Crown-Indigenous Relations and Northern Affairs Canada	Inspection to verify compliance with water licenses 2AM DOH1335. The inspection focus was on fuel storage, waste and water management, site infrastructure as well as drilling and mining activities. Inspection of Crown Leases 77A/3-1-7 and 77A/3-3-2 were also conducted.	During the inspection of this facility the inspector noted silt screen was still on this berm. The Inspector requested this material be removed from the Marine outfall berm to prevent the material from freezing to the surface of the berm. No further concerns were identified during the inspection.	TMAC removed the silt fence from the berm immediately.
December 10-11, 2019	Worker's Safety and Compensation Commission	Inspection to verify compliance with Mines Health & Safety Regulations. The inspection focused on exploration activities, underground mining as well as surface infrastructure including the camp facility and warehouse. The inspector issued 13 orders for action.	Order issues.	Compliance report was submitted from TMAC within 30 days.

References

SRK Consulting (Canada) Inc. 2009. *Water and Ore/Waste Rock Management Plan for the Boston Site Hope Bay Project, Nunavut*. Report 1CH008.022 for Hope Bay Mining Ltd. July 2009.

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ERM. 2016. *Doris North Project: 2015 Aquatic Effects Monitoring Program Report*. Prepared for TMAC Resources Inc. by ERM Consultants Canada Ltd.: Yellowknife, NT.