NANISIVIK MINE RECLAMATION PROJECT COMPLETION REPORT

PROJECT NUMBER: 0255-017-05
DATE: JANUARY 30, 2009

Submitted to:

BREAKWATER RESOURCES LTD

Submitted by:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

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NANISIVIK MINE RECLAMATION

PROJECT COMPLETION REPORT

FINAL

PROJECT NO.: 0255-017-05
DATE: January 30, 2009

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Project No. 0255-017-05
January 30, 2009

Mr. Bob Carreau
Vice President, CSR and Sustainability
Breakwater Resources Ltd.
Suite 950, 95 Wellington Street West
Toronto, ON
M5J 2N7

RE: NANISIVIK MINE RECLAMATION – PROJECT COMPLETION REPORT

Dear Bob:

Please find attached our above referenced report dated January 30, 2009. The report has been finalized to reflect your review comments.

Should you have any questions or comments, please do not hesitate to contact me at the number listed above.

Yours truly,
BGC ENGINEERING INC.
per:

[Original Signed By]

Geoff Claypool, P.Eng.
Geological Engineer

encl. Final Report

GKC/gkc

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LIMITATIONS OF THE REPORT

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1.0 INTRODUCTION

Nanisivik Mine is wholly owned by CanZinco Limited ("CanZinco"), which is a division of Breakwater Resources Limited ("Breakwater"). The Nanisivik Mine is located on the Borden Peninsula on northern Baffin Island in the Canadian Arctic at approximately 73º north latitude (see Figure A1-1). The mine site is located on the south shore of Strathcona Sound, approximately 30 kilometres from Admiralty Inlet.

The Nanisivik Mine began production of zinc and lead concentrates in 1976. The current owner of the mine, CanZinco Ltd. (CanZinco), has been in possession of the mine since 1996. Prior to mid-2002, the Nanisivik Mine was scheduled to operate until the depletion of economic ore reserves in 2004 or 2005. However, depressed international base-metal prices necessitated a re-evaluation of the mine production plan in mid-2002. This assessment resulted in a reduction of economic ore reserves such that these reserves were depleted in September 2002. Mining operations were permanently ceased at that time.

The Final Closure and Reclamation Plan (FCRP) for the Nanisivik Mine was submitted to the Nunavut Water Board (NWB) by CanZinco in March 2004. Included in the appendix of the FCRP were the following reports:

A. *Engineering Design of Reclamation Surface Covers*, BGC Engineering Inc., February 2004
B. *Assessment of Surface Cell and Test Cell Taliks,* BGC Engineering Inc., February 6, 2004
C. *Quarry Development and Reclamation Plan,* BGC Engineering Inc., February 6, 2004
D. *West Twin Disposal Area Surface Cell Spillway Design,* Golder Associates Limited, March 2004
E. *Nanisivik Mine Rock Piles and Open Pits Closure Plan,* Gartner Lee Limited, February 2004
F. *Nanisivik Mine Reclamation and Closure Monitoring Plan,* Gartner Lee Limited, February 2004
G. *2002 Phase II Environmental Site Assessment, Nanisivik Mine Nunavut*, Gartner Lee Limited, January 2003
H. *2003 Phase 3 Environmental Site Assessment, Nanisivik Mine Nunavut,* Gartner Lee Limited, February 2004
I. *Nanisivik Mine Human health and Ecological Risk Assessment,* Jacques Whitford Environment Ltd., October 2003
J. *West Twin Disposal Area Closure Plan,* BGC Engineering Inc., Gartner Lee Ltd., GOlder Associates Ltd. March 2004
K. *Nanisivik Mine Waste Disposal Plan,* CanZinco Ltd., March 2004
L. *Nanisivik Mine Landfill Closure Plan,* Gartner Lee Limited, February 2004
M. *Memorandum, Nanisivik Mine, Predicted Volumes of Contaminated Soil,* Gartner Lee Limited, February 2004

The regulatory review process included a technical meeting in Yellowknife in May 2004 and a public hearing in Arctic Bay in June 2004. The NWB conveyed its approval of the FCRP for Nanisivik Mine in a letter to Breakwater dated July 6, 2004.

This report is intended to provide a concise summary of all reclamation activities undertaken at the Nanisivik Mine site since the approval of the FCRP in 2004. The report also provides a comprehensive list of references related to the Nanisivik reclamation project including all design and as-built/ confirmatory documentation. For specific details concerning each of the reclamation measures undertaken at site, the specific references included throughout this report should be consulted. For comparison purposes, the document is written using a similar structure as Section 7 of the FCRP, “Proposed Reclamation Activities”.

2.0 RECLAMATION OVERVIEW

As stated in CanZinco (2004), the general objectives of the Nanisivik Mine Closure and Reclamation Plan include the following:

- Meet the closure and remediation requirements of the Water License and Land Leases;
- To return the site to a condition of similar environmental productivity and land use that existed prior to development of the mine facilities; and
- To eliminate the requirements for long term post-closure care and maintenance.

In order to achieve the objectives of the closure plan, various reclamation activities were undertaken between 2004 and 2008. The reclamation work involved the following general activities:

- Construction of permafrost aggradation (thermal) covers over mine wastes (tailings and waste rock) and the landfill.
- Remediation of hydrocarbon and metals contaminated soils.
- Demolition, dismantling and/or salvaging of mine infrastructure and relocation of this infrastructure to the underground mine workings or transportation of the materials off site.
- Permanent closure of all openings to the underground mine workings.
- Restoration of the natural drainage paths at various locations around the mine site.

The work was managed on site by representatives of Breakwater, with on-site technical support from geotechnical and geo-environmental consultants, provided by BGC Engineering Inc. (BGC) and Gartner Lee Ltd. (GLL), respectively. Quality Control measures for the construction of reclamation covers were documented in BGC (2004c). Quality control measures undertaken during reclamation of contaminated soils were documented in GLL (2008b) and SRK (2009). The completion of the reclamation work is documented in detail in the following reports:

A. BGC Engineering Inc. 2008a. Surface Reclamation Covers As-Built Report. Submitted to Breakwater Resources Ltd., April 2008.

B. BGC Engineering Inc. 2008b. Reclamation of Mine Openings As-Built Report. Submitted to Breakwater Resources Ltd., April 2008.

C. BGC Engineering Inc. 2008c. Hydraulic Structures As-Built Report. Submitted to Breakwater Resources Ltd., April 2008.

D. BGC Engineering Inc. 2008d. Closure of Lower Adit and 09 South Portals, Nanisivik Mine, NU. Submitted to Breakwater Resources Ltd., November 21, 2008.

E. BGC Engineering 2008e. Reclamation of West Open Pit and Industrial Complex, Nanisivik Mine, NU. Submitted to Breakwater Resources Ltd., December 4, 2008.

F. Gartner Lee Ltd. 2008a. Nanisivik Mine, Summary of Contaminated Soil Remediation Interim Close Out Report: Dock Area. Submitted to CanZinco Ltd. April, 2008.

G. Gartner Lee Ltd. 2008b. Nanisivik Mine, Summary of Contaminated Soil Remediation Progress – December 31, 2007. Submitted to CanZinco Ltd. November, 2008.

H. SRK Consulting (Canada) Inc. 2009. Nanisivik Mine, Summary of Contaminated Soil Remediation Progress – September 10, 2008. Submitted to CanZinco Ltd. January, 2009.

Section 3 provides a summary of the reclamation activities undertaken at site since 2004. The references noted above should be consulted for detailed descriptions of reclamation activities.

3.0 RECLAMATION ACTIVITIES

3.1 West Twin Disposal Area and Associated Tailings Facilities

Pre-Reclamation Conditions

The West Twin Disposal Area (WTDA) is comprised of the following elements:

- Surface Cell;
- Test Cell;
- Test Cell Dike;
- Toe of Test Cell Dike;
- West Twin Dike;
- Toe of West Twin Dike;
- Baffle Dike;
- Reservoir Pond;
- Polishing Pond;
- Polishing Pond Outlet Control Structure;
- East Twin Lake Access Road Causeway;
- East Twin Lake Pump Station;
- East Twin Creek Diversion Channel;
- Emergency Dump Ponds; and
- West Twin Piping Facilities

Prior to reclamation operations, the Surface Cell was comprised of a combination of aerially exposed tailings and sub-aqueous confined tailings. The average water cover over the sub-aqueous tailings in the Surface Cell, immediately prior to reclamation, was approximately 2 m. At that time, sub-aqueous confined tailings comprised approximately 40% of the aerial extent of the Surface Cell. It should be noted that the aerial extent of water cover in the Surface Cell was typically greater during mining operations.

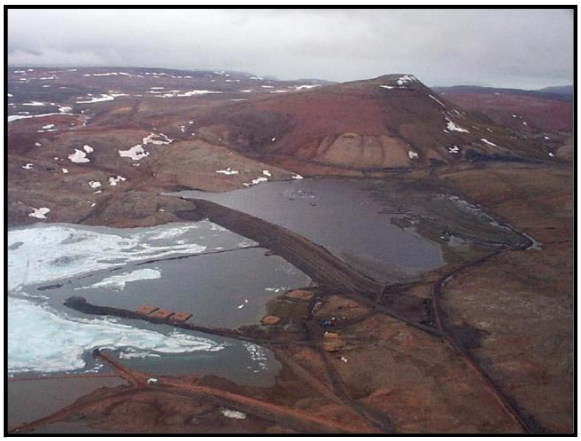

Figure 1 – Pre-reclamation Conditions WTDA (2000)

Prior to reclamation, the Test Cell was comprised primarily of sub-aqueous confined tailings. The average water cover over the sub-aqueous tailings in the Test Cell was approximately 1.5 m. Immediately prior to reclamation, sub-aqueous confined tailings comprised approximately 50% of the aerial extent of the Test Cell.

The Test Cell Dike was a shale rockfill dike constructed in 2001 and 2002 to provide additional storage capacity for tailings solids at the WTDA during the later stages of mining operations. Prior to reclamation activities, the Test Cell Dike was approximately 4 m high and was comprised on two shale rockfill benches, each approximately 2 m high. The crest of the dike was approximately 4 m wide and 700 m long. The upstream and downstream faces of the dike were sloped at approximately the angle of repose. A tailings beach was situated along the Reservoir side of the dike that was periodically exposed during periods of low water levels in the Reservoir. Thus, the aerial extent of the tailings beach along the toe of the Test Cell Dike was observed to be variable, depending on the elevation of the water in the Reservoir.

The West Twin Dike was an upstream constructed, frozen core, rockfill dike constructed on a foundation of frozen tailings. The dike was constructed between 1990 and 1998 to provide additional storage capacity for tailings at the WTDA. The dike was approximately 17 m high and the general slope of the downstream face of the dike was approximately 15°. The crest of the dike was approximately 10 m wide and 500 m long. The downstream face of the dike was benched until 2000 when the majority of the face was graded to form a uniform slope of approximately 15°. One section of the downstream face of the dike, approximately 100 m long, remained benched. The upstream face of the dike was buttressed with tailings to within approximately 1 m of the crest of the dike. A tailings beach was situated at the downstream toe of the West Twin Dike, separating the toe of the dike and the Reservoir. This tailings beach had a thin (approximately 5 to 15 cm thick) cover of shale constructed on top of it for dust suppression purposes. Immediately prior to reclamation, the aerial extent of the tailings beach was approximately 13,000 m^2, but was observed to range greatly depending on the elevation of the water level in the Reservoir.

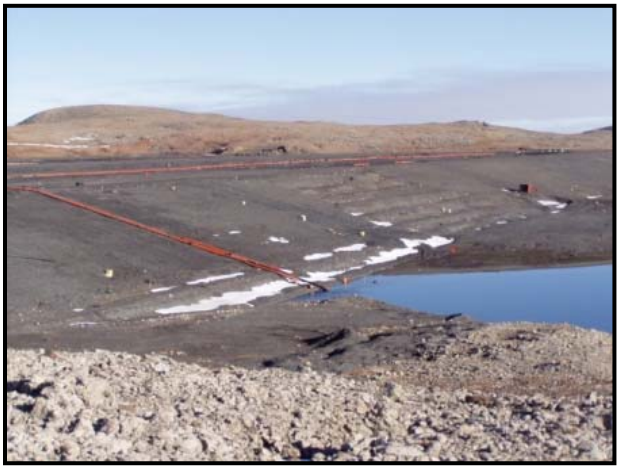

Figure 2 – West Twin Dike Pre-reclamation (2002)

The Reservoir Pond contained sub-aqueous confined tailings. The Polishing Pond is located immediately downstream of the Reservoir Pond, and is separated from the Reservoir Pond by the East Twin Lake access road causeway. The Reservoir Pond and the Polishing Pond were hydraulically connected via culverts in the East Twin Lake access road causeway. A primary decant structure equipped with stop logs was located upstream of the culverts into the Reservoir

Pond to provide for additional treatment of water in the Polishing Pond, if required. The water level in the Polishing Pond was controlled manually at the Polishing Pond outlet, using either a stop log or valve control structure.

Figure 3 – WTDA during reclamation (Google Earth Image 2005)

A baffle dike is located immediately upstream of the Polishing Pond inlet, constructed of end-dumped rock fill. The baffle was constructed to act as a flow through structure that would enhance retention and improve water quality. This was constructed prior to 1990 to address marginal water quality issues, but became redundant after the construction of the Surface Cell and was breached.

A fresh water pumping station was located at East Twin Lake. The station was used to provide fresh water for domestic and industrial use.

The outlet from East Twin Lake is directed to the east of the Polishing Pond via the East Twin Creek Diversion Channel/Dike, which was constructed prior to mine start-up in 1975. This diversion channel prevents the East Twin Lake outflow from following its natural flow path

through the northeast corner of the Polishing Pond. The flow from the diversion channel combines with the flow from the Reservoir downstream of the West Twin Outlet Channel. The diversion dike is approximately 2 m above the adjacent ground level and is comprised of sand, gravel and cobbles derived from the nearby Twin Lakes sand and gravel deposit.

The West Twin piping system consisted of two pipelines: one transferred tailings from the mill to the disposal area; and the other transferred reclaim water to the mill from the Reservoir. The reclaim water and tailings pipelines were approximately 3,150 and 4,000 m in length, respectively. A 4 m wide gravel right-of-way was constructed along the complete length of the pipeline.

Figure 4 – Tailings Pipeline (2007)

The tailings disposal system included two emergency dump ponds: the Lower Dump Pond, located below the mill near Twin Lakes Creek; and the Upper Dump Pond, located east of the town site along the pipeline right-of-way. The dump ponds were utilized to drain sections of the tailings line during emergency shutdowns and maintenance operations. The ponds were each about 10 m by 30 m in area, with perimeter containment berms about 1.5 to 2.0 m high and each pond was lined with HDPE.

Figure 5 – Lower Dump Pond Pre-reclamation (2005)

Reclamation Plan

The reclamation plan for the WTDA was documented in CanZinco (2004), BGC (2004a) and BGC et al. (2004). Within those reports, the following directions were provided for reclamation of the WTDA and associated tailings facilities:

1. Re-grade topographic high points of the tailings in the Surface Cell and Test Cell to reduce the eventual volume of shale required to achieve desired surface grades during cover construction.

2. Construct the surface reclamation cover over the Surface Cell such that the tailings are covered by a minimum cover thickness of 1.25 m (1.0 m shale and 0.25 m of armour rock) and any surface water is transferred to the spillway inlet at the south end of the Surface Cell by a series of drainage swales.
3. Construct a spillway at the south end of the Surface Cell to passively transfer water from the Surface Cell to the Reservoir Pond.
4. Construct the surface reclamation cover over the Test Cell such that that the tailings are covered by a minimum cover thickness of 1.25 m (1.0 m shale and 0.25 m of armour rock) and the surface water is transferred to the Reservoir by a central drainage swale.
5. Complete the regrading of the face of the West Twin Dike and apply a 0.25 m thick layer of armour rock to the surface of the dike.
6. Construct the surface reclamation cover over the tailings at the toe of the Test Cell Dike and at the toe of the West Twin Dike to an elevation of 369.2 m.
7. Place riprap on top of the cover along the Reservoir shoreline to a maximum elevation of 370.8 m.
8. Relocate tailings along the remaining perimeter of the Reservoir further into the Reservoir to greater than 1 m below the normal water level (Elevation 370.2 m).
9. Relocate tailings high spots within the Reservoir to 1 m below the normal water level in the Reservoir.
10. Breach the baffle dike to 0.5 m below the normal water level.
11. Breach the East Twin Access Road Causeway to 0.5 m below the normal water level to allow unimpeded flow between the Reservoir and Polishing ponds.
12. The control structure at the outlet of the Polishing Pond was to be replaced with an armoured channel and concrete weir to provide passive control of the water level in the Reservoir.
13. The East Twin Lake pumping equipment (pumps, pipelines, power installations and pumphouse) were to be removed.
14. The portion of the East Twin Creek Diversion Dike where erosion was observed to have occurred was to be regraded and armoured. The slope was to be regraded to a slope of 3(H):1(V) and a 0.45 m thick layer of riprap (D_{50} = 300 mm) was to be selectively placed along the regraded face of the berm to provide long term stability.
15. The tailings and reclaim water pipelines and associated equipment were to be removed and sold or placed underground, as per the Waste Disposal Plan (CanZinco 2003).
16. Built-up portions of the pipeline right-of-way were to be scarified and contoured, or breached to return natural drainage patterns.
17. The tailings and liners contained within the Emergency Dump Ponds were to be excavated and relocated underground, as per the Waste Disposal Plan (CanZinco 2003). The gravel perimeter berms surrounding the emergency dump pond were to be graded and contoured to prevent ponding.
18. Install monitoring instrumentation as per the Closure and Reclamation Monitoring Program (GLL 2004c) and the Instrument Installation and Contingency Plan (BGC 2004d).

Reclamation Summary

The as-built information for the surface reclamation covers and hydraulic structures constructed at the WTDA is provided in detail in BGC (2008a,c). The main as-built features of the reclamation of the WTDA are summarized by the following points:

- Surface reclamation covers consisting of a minimum 1 m thickness of granular shale fill and a minimum thickness of 0.25 m of armour material were constructed over the tailings in the Surface Cell and Test Cell, and over the tailings beaches at the toe of the Surface Cell and Test Dell dikes.

Figure 6 – WTDA Post-reclamation (2006)

- The granular shale fill material was derived from the Mt. Fuji, West Twin, East Twin and Area 14 shale deposits and the armour material was sourced from the Twin Lakes Delta deposit.
- A layer of riprap was applied to the surface of the cover along the Reservoir shoreline to prevent erosion of the cover materials due to wave action. The riprap was sourced from the spillway excavation and from the dolostone outcrop near the south end of the West Twin Dike.
- The Surface Cell cover was graded such that surface water is directed to the inlet of the West Twin Dike Spillway located at the south end of the Surface Cell. The Test Cell cover was graded such that surface water is directed into the Reservoir via a central drainage swale.

Figure 7 – West Twin Dike Spillway (2006)

- A spillway was constructed at the southeast corner of the Surface Cell to convey surface water from the Surface Cell to the Reservoir.
- The tailings highpoints in the Reservoir were relocated into deeper water cover to ensure the 1 m minimum water cover thickness was achieved throughout the Reservoir.
- The sediments along the east shoreline of the Reservoir were relocated into the Reservoir, below 1 m of water.
- The rockfill baffle and East Twin Lake Access road were breached to create a fully flow-through hydraulic system between the Reservoir and the Polishing Pond.

- The control structure at the Polishing Pond outlet was replaced with the West Twin Outlet Channel, an armoured channel and concrete weir, to provide passive elevation control of the water level in the Reservoir.
- The East Twin Lake pumping equipment was removed during the salvaging operations and either transported off-site or stored in the underground mine workings, depending on its condition.

Figure 8 – West Twin Outlet Channel (2006)

- The face of the East Twin Creek Diversion Dike where erosion was observed was regraded to an approximate slope of 3(H):1(V). Rip rap derived from the West Twin Dike Spillway excavation was transported to the East Twin Diversion dike and placed along the regraded portion of the slope.
- The majority of the tailings and reclaim water pipelines were salvaged and transported off site with other salvaged mine site infrastructure. Any pipelines not salvaged were disposed of in the underground mine workings. The built-up berm along the pipeline right-of-way was breached in any area where natural drainage was impeded.
- The tailings and liner in the Lower Dump Pond were removed and relocated to the underground mine workings. The perimeter berms surrounding the Lower Dump Pond were graded such that the base of the cell is free draining and no ponding can occur.
- The Upper Dump Pond was not excavated as per the original reclamation plan due to concerns related to contamination during transportation of the tailings (the volume of tailings contained in the Upper Dump Pond was significantly greater than the volume of tailings contained within the Lower Dump Pond, which was minimal). A thermal cover consisting of 1.95 m of granular shale and 0.25 m of armour rock was constructed over the tailings in the Upper Dump Pond. The perimeter berms were graded and covered with armour rock to blend into surrounding conditions.

Figure 9 – Upper Dump Pond Post-reclamation (2006)

- Several frost gauges and thermistors were installed to monitor the geothermal performance of the cover and freeze-back of the underlying tailings. Several vibrating wire piezometers and water quality monitoring wells were installed to monitor the effects

of talik freeze-back on the pore pressures and pore water quality within the talik in both the Surface Cell and the Test Cell. Additionally, water quality monitoring stations have been identified in Twin Lakes Creek downstream of the WTDA, extending to Strathcona Sound.

3.2 Landfill Facility

Pre-Reclamation Conditions

The Nanisivik Landfill is located approximately 1 km west of the town site. The Landfill contains waste materials from the town, the mine and the airport (GLL 2004b). The facility was operated from 1975 to 2005. During operations, waste volume was reduced by burning and crushing prior to being pushed over the advancing (northwards) crest and buried with shale fill (GLL 2004b). Prior to reclamation, a surficial layer of shale was present along the surface of the landfill. During operation of the landfill, a seepage collection berm was constructed at the toe of the landfill and a surface water deflection berm was constructed upslope of the landfill area. Additionally, a land farm for remediation of hydrocarbon contaminated soils was constructed adjacent to the landfill area.

Figure 10 – Nanisivik Landfill Pre-reclamation (2004)

Reclamation Plan

The proposed reclamation activities for the Nanisivik Landfill were documented in CanZinco (2004) and GLL (2004b) and are summarized as follows:

1. Relocate soil in the landfarm cell that exceeds the remedial objectives for petroleum hydrocarbons to the underground mine workings;
2. Grade the existing surface of the Landfill according to the design drawings to prepare a reclamation surface no steeper than a 3(H):1(V) slope;
3. Construct a thermal barrier cover over the surface of the Landfill such that:
    a) The maximum slope angle of the cover does not exceed 3(H):1(V);
    b) The minimum total cover thickness is 2.20 m (including a 1.95 m thick layer of shale fill and 0.25 m thick layer of surface armour material);
4. Install monitoring instrumentation as per the Closure and Reclamation Monitoring Program (GLL 2004c) and the Instrument Installation and Contingency Plan BGC (2004e). In addition, a water quality monitoring station has been set up down-gradient of the landfill.

Reclamation Summary

The as-built information for the thermal cover constructed over the landfill facility is provided in detail in BGC (2008a). Information regarding the reclamation of the hydrocarbon contaminated soils in the landfarm area is documented in GLL (2008b). The main as-built features of the surface reclamation cover constructed at the Nanisivik Landfill include the following:

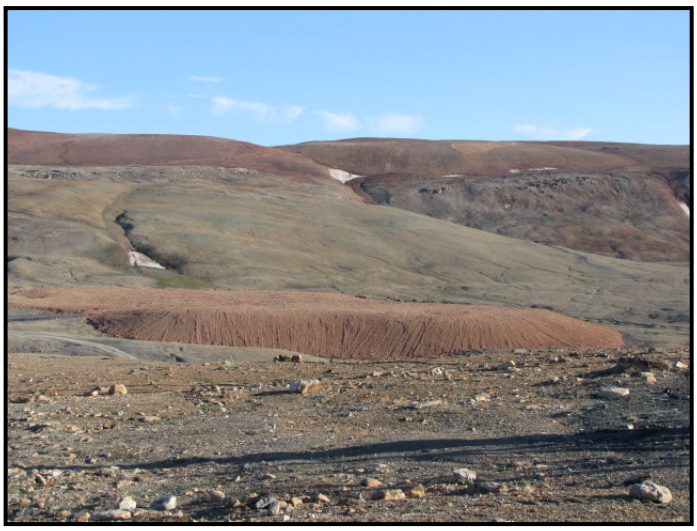

Figure 11 – Nanisivik Landfill Post-reclamation (2007)

- Approximately 1710 m^3 of hydrocarbon contaminated soil in the landfarm cell that exceeded the remediation objectives was excavated and relocated to the underground mine workings (SRK 2009). The remnant area was surficially covered with approximately 0.3 m of shale and 0.25 m of armour material.
- A thermal cover consisting of a 2 m thick layer of granular shale overlain by a 0.25 m thick layer of armour material was constructed over the landfill area. The cover was constructed such that the surface grade provides positive drainage and is sloped no steeper than 3(H):1(V). It should be noted that shale thickness along the exposed sloping face of the landfill were overbuilt by 3 to 5 m in some areas to achieve the desired surface grades.
- One frost gauge and one thermistor were installed to monitor the geothermal performance of the cover and to confirm the frozen nature of the underlying landfill debris.

3.3 Rock Piles and Open Pits

3.3.1 West Adit Area

Pre-Reclamation Conditions

The West Adit Area encompasses all of the developments from the Industrial Complex to the 09S rock pile. Specifically, this includes the following:

- the West Open Pit;
- the 00 and 01 Portals;
- the previous temporary storage area for rejects from the Dense Media Separation (DMS) plant;
- the 02S rock pile;
- the 09S rock pile; and
- the road from the Industrial Complex to the 09 portal.

The West Open Pit is located approximately 1 km east of the Industrial Complex. The pit was actively mined from 1980 to 1995. The open pit covered an aerial extent of approximately 15,000 m^2 (75 by 200 m). The pit was developed largely as a shallow hole with a ramp providing access from the west side. The pit contained the 00 and 01 Portals, which provided access and ventilation, respectively, to the underground mine workings.

Figure 12 – West Open Pit Pre-reclamation (2004)

The 00 and 01 Portals were located at the western end of the mine. The 00 Portal was the principal access at the western extremity of the mine. The 01 Portal housed the main ventilation fans during mining operations which were mounted in a plate steel bulkhead.

A temporary stockpile of coarse “rejects” from the Dense Media Separation (DMS) plant was operated immediately east of the West Adit area in 2001 and 2002. The material was roughly gravel sized and would have been composed of various types of waste rock, including a small portion of mineralized rock. This material was routinely relocated into the underground mine workings from 2001 to 2003 such that only a small remnant volume of material remained at surface.

The 02S rock pile was located outside of, and adjacent to, the West Open Pit at the West Adit site. The 02S rock pile was in use from approximately 1976 to 1979 for the storage of development rock excavated during the initial development of the ore body. From 1995 to 2002, a large portion of the waste rock that had been stored in this rock pile was relocated back into the underground mine. The residual volume of waste rock remaining in 2003 was estimated at 15,590 m^3 (GLL 2004a).

The 09S rock pile was located outside of, and adjacent to, the 09S Portal entrance. The 09S rock pile was in use from approximately 1977 to 1980 for the storage of waste rock from proximal mining areas. From 1995 to 2002, a large portion of the waste rock that had been stored in this rock pile was relocated back into the underground mine. The residual volume of waste rock remaining in 2003 was estimated at 7,571 m^3 (GLL 2004a).

Reclamation Plan

The proposed reclamation activities for the West Adit area were documented in CanZinco (2004), GLL (2004a) and BGC (2005) and are summarized as follows:

1. Relocate all remaining waste rock from the 09S rock pile plus a sufficient volume of inert demolition debris from the tear down of buildings and equipment into the deepest portions of the West Open Pit to fill it approximately to the elevation of the general area;
2. Map the geology of the north pit wall to locate and delineate the sulphide exposures;
3. Conduct a geochemical assessment of the road fill from the Industrial Complex to the West Open Pit and from the West Open Pit to the 09 Portal and determine whether remedial measures are necessary for these areas based on the criteria described below;
4. Strategically place all safely retrievable waste rock from the 02S rock pile plus inert demolition debris from the tear down of buildings and equipment at the toe of the north wall of the West Open Pit such that the backfill provides for safe covering of all identified sulphide exposures at a maximum slope angle of 3(H):1(V);
5. Backfill the 00 and 01 portals to a maximum of 5 m from the portal entrance to achieve the following:
    a) prevent any access to the underground workings;
    b) provide some support for the portal crown pillars;
    c) cover sulphide exposures on highwalls adjacent to the portals to mitigate the potential for metal leaching and acid generation; and
    d) provide a surface environment that blends into natural conditions.
5. Construct a thermal barrier cover from north wall of the West Open pit to the crest of the slope overlooking Twin lakes Creek such that:
    a) The maximum slope angle of the cover does not exceed 3(H):1(V);
    b) The minimum total cover thickness is 2.20 m (including a 1.95 m thick layer of shale fill and 0.25 m thick layer of surface armour material);
    c) All sulphide exposures in the highwall are covered by the minimum cover thickness.
6. Complete any necessary mitigation work that may be determined necessary from the geochemical assessment of the road fill materials; and
7. Integrate a light vehicle access road into the final surface that allows light vehicle access through the area but that does not compromise the thickness of the cover.
8. Install monitoring instrumentation as per the Closure and Reclamation Monitoring Program (GLL 2004c) and the Instrumentation Installation and Contingency Plan (BGC (2004e).

Reclamation Summary

The as-built information for the backfilling of the West Open Pit and the construction of the permafrost aggradation cover over the pit backfill materials is provided in detail in BGC (2008e). The main aspects of the reclamation of the West Adit area are summarized by the following:

- A geochemical assessment of the road fill from the Industrial Complex to the 09S Portal was conducted (GLL 2004e). The results indicated that, with the exception of a few isolated zones, the majority of the road fill was not expected to be acid generating. Based on the results, GLL recommended the placement of additional fill at various locations along the road.

Figure 13 – Reclaiming 09S Waste Rock Pile (2005)

- The waste rock from the 09S and 02S waste rock piles were excavated and placed, along with a minor amount of demolition debris, in the West Open Pit as backfill materials.
- Sulphide exposures in the south wall of the West Open Pit were mapped during backfilling. The pit backfill was placed such that all sulphide exposures in the pit walls were covered.
- A thermal cover consisting of a 2 m thick layer of granular shale overlain by a 0.35 m thick layer of armour material was constructed over the pit backfill. The cover was constructed such that the surface grade provides positive drainage and is sloped no steeper than 3(H):1(V).

Figure 14 – West Open Pit Post-reclamation (2007)

- One thermistor is planned for installation at the West Open Pit in 2009 to monitor the geothermal performance of the cover and to confirm the frozen nature of the underlying pit backfill materials debris. In addition, water quality monitoring stations have been established in Twin Lakes Creek both upstream and downstream of the West Open Pit.

3.3.2 East Adit Area

Pre-Reclamation Conditions

The East Adit Area includes the following elements:

- the East Open Pit (EOP);
- 39S and 88 Portals;
- the East Trench; and
- the 39N/S rock pile.

Figure 15 – East Adit Area Pre-reclamation (2002)

The East Open Pit is located approximately 4 km east of the Industrial Complex. The pit was actively mined between 1987 and 2001. The dimensions of the East Open Pit are approximately 100 by 200 m and, prior to reclamation, the highest pit wall was approximately 20 m high (GLL 2004a). The pit was largely developed as a side hill cut, day-lighting towards the mine access road. In 2002, the brow of the 39N adit was blasted down, blocking the adit with rock. The blast, locally known as the horseshoe blast, increased the thickness of the crown pillar over the opening. In addition, the crest of the highwall was trim blasted, in October 2004, to remove loose rock fragments and provide a stable configuration.

Figure 16 – East Trench Pre-reclamation (2002)

The East Trench was a relatively small surface excavation located to the east of the East Open Pit. The trench was mined in 2000 and 2001. The dimensions of the trench were approximately 10 m wide, by 50 m long by 15 m deep (GLL 2004a). Approximately 10 m of underground excavation was also completed into the south wall of the East Trench. This excavation did not connect to the main underground workings.

The 88 Portal was an entrance at the east end of the lower lenses of the mine. This portal was used as the main access at the east end of the mine during the later portion of the mine life.

The 39 Portal was the main access into the east end of the Main Ore Zone for much of the mine life. During the final stages of mining, a portion of the rib pillar between the 39 Portal and the East Open Pit was removed, resulting in an opening over 50 m wide by 12 to 15 m high. In 2002, the crown pillar between the 39 portal and the East Open pit was blasted down in order to block access to the underground and increase the thickness of the remnant crown pillar. This blast effectively removed the 39 Portal, but left an opening into the adjacent 38-11 stope. This opening was temporarily blocked using muck from the blast to prevent access to the underground.

Figure 17 – 39S Portal Area Pre-reclamation (2002)

The 39N/S waste rock pile was located outside of the East Open Pit. The rock pile was created during the original development of the East Adit area in the late 1960's. Additional material was added to it a decade later, when it was decided to enlarge the old east end workings and tunnel towards the main underground mine. From 1995 to 2002, a large portion of the waste rock that had been stored in the rock pile was relocated back into the underground mine and used as backfill in the East Open Pit. The volume of waste rock remaining in 2003 was estimated to be approximately 36,180 m^3 (GLL (2004a).

Reclamation Plan

The proposed reclamation activities for the East Adit area were documented in CanZinco (2004), GLL (2004a) and BGC (2005) and are summarized as follows:

1. Backfill the East Trench with a sufficient amount of waste rock from the 39N/S waste rock pile to recreate the original surface contours;
2. Relocate waste rock from the K-Baseline area and the remainder of the 39N/S waste rock pile to the East Open Pit to create a smooth surface up to 3(H):1(V) grade;
3. Backfill the 88 and 39S portals to a maximum of 5 m from the portal entrance to achieve the following:
    a) prevent any access to the underground workings;
    b) provide some support for the portal crown pillars;
    c) cover sulphide exposures on highwalls adjacent to the portals to mitigate the potential for metal leaching and acid generation; and
    d) provide a surface environment that blends into natural conditions.

4. Construct a thermal barrier over the backfill in the East Open Pit and the East Trench such that:
    a) The maximum slope angle of the cover does not exceed 3(H):1(V);
    b) The minimum total cover thickness is 2.20 m (including a 1.95 m thick layer of shale fill and 0.25 m thick layer of surface armour material);
    c) All sulphide exposures in the highwall are covered by the minimum cover thickness.
5. Provide for continued use of the East Adit roadway for through traffic of light vehicles (Kuhulu Lake access);
6. Install monitoring instrumentation as per the Closure and Reclamation Monitoring Program (GLL 2004c) and the Instrumentation Installation and Contingency Plan (BGC (2004e). Additional instrumentation recommendations were provided in GLL (2005) following NWB approval of the placement of hydrocarbon contaminated soils as backfill in the East Open Pit (NWB 2005).

Reclamation Summary

The as-built information for the backfilling of the East Open Pit and East Trench and the construction of the thermal cover over the pit backfill materials is provided in detail in BGC (2008a). The main aspects of the reclamation of the East Adit area are summarized by the following:

- The waste rock from the 39N/S waste rock pile was excavated and placed, in the East Open Pit and East Trench as backfill materials. The pit backfill was placed such that all sulphide exposures in the pit walls were covered.
- A minor amount (<10,000 m^3) of hydrocarbon contaminated soil from the K-Baseline area was incorporated, at depth, within the East Open Pit backfill.
- The 88 and 39S portals were backfilled and subsequently incorporated into the East Open Pit thermal cover.
- A thermal cover consisting of a 2 m thick layer of granular shale overlain by a 0.35 m thick layer of armour material was constructed over the pit backfill. The cover was constructed such that the surface grade provides positive drainage and is sloped no steeper than 3(H):1(V).
- An access road was integrated into the final cover configuration to allow future light vehicle traffic through the East Adit area, if required.
- Two thermistors and two frost gauges were installed at the East Open Pit in 2005 to monitor the geothermal performance of the cover and the freeze-back of the underlying pit backfill materials. In addition, water

Figure 18 – East Adit Area Post-reclamation (2007)

quality monitoring stations are established in Chris Creek upstream and downstream of the remediated area.

3.3.3 Oceanview

Pre-Reclamation Conditions

The Oceanview area includes the following elements:

- The Oceanview Open pit;
- The Oceanview rock pile; and
- The Oceanview portal site.

Figure 19 – Oceanview Open Pit Pre-reclamation

The Oceanview Open Pit is located approximately 5 km east of the Industrial Complex. Surface mining activities occurred in this area between 2000 and 2002. The Oceanview Open Pit was excavated as a side hill cut, day-lighting on the north side with dimensions of approximately 75 by 100 m and up to 10 m deep (GLL 2004a). During mining activities, the pit contained two benches along the south highwall and a trench excavated into the floor of the pit.

The Oceanview rock pile is located at the Oceanview Open Pit. Subsequent to the completion of mining in this area in 2002, all of the waste rock was relocated back into the small pit such that a rock pile external to the pit no longer exists except for a small “remnant” quantity. A temporary rockpile was also utilized outside the Oceanview portal as a transfer point for mined ore which also contains also contains some residual mineralized material. Underground mining took place at Oceanview between 1990 and 1996. Waste rock that was stored on surface during the initial development of this zone was relocated to the underground stopes when the underground mining was completed.

The Oceanview Portal was a bare rock entrance into the north side of the Oceanview underground workings. Prior to 2004, the portal had been backfilled by mine staff with waste rock and covered over with overburden strippings from the Oceanview pit.

Reclamation Plan

The proposed reclamation activities for the Oceanview area were documented in CanZinco (2004), GLL (2004a) and BGC (2005) and are summarized as follows:

1. Reclaim the remnant waste rock from the rock pile into the pit;
2. Consolidate residual mineral contaminated soil at the portal site into one discreet area;

3. Construct a thermal barrier over the backfill in the Oceanview Open Pit and the consolidated mineral soil at the Oceanview Portal such that:
    a. The maximum slope angle of the cover does not exceed 3(H):1(V);
    b. The minimum total cover thickness is 2.20 m (including a 1.95 m thick layer of shale fill and 0.25 m thick layer of surface armour material);
    c. All sulphide exposures in the highwall are covered by the minimum cover thickness.
4. Install monitoring instrumentation as per the Closure and Reclamation Monitoring Program (GLL 2004c) and the Instrumentation Installation and Contingency Plan (BGC 2004d).

Reclamation Summary

The as-built information for the backfilling of the Oceanview Open Pit and the construction of the thermal cover over the pit backfill materials is provided in detail in BGC (2008a). The as-built information regarding the reclamation of the Oceanview Portal is provided in detail in BGC (2008b). The main aspects of the reclamation of the Oceanview area are summarized by the following:

- The waste rock from the Oceanview waste rock pile was excavated and placed, in the Oceanview Open Pit as backfill materials.
- A thermal cover consisting of a 2 m thick layer of granular shale overlain by a 0.35 m thick layer of armour material was constructed over the pit backfill, portal backfill and consolidated mineral soil at the former ore storage pad adjacent to the portal area. The covers were constructed such that the surface grade provides positive drainage and is sloped no steeper than 3(H):1(V).
- One thermistor and one frost gauge were installed at the Oceanview Open Pit in 2005 to monitor the geothermal performance of the cover and the freeze-back of the underlying pit backfill materials.

Figure 20 – Applying armour rock layer at Oceanview Open Pit (2005)

3.3.4 K-Baseline

Pre-reclamation Conditions

The K-Baseline area consists of the following elements:

- K-Baseline Portal;
- K-Baseline waste rock pile; and
- K-Baseline Fuel Tank Area.

The K-Baseline portal was a culverted entry used to access the K-Baseline orebody. The portal had been inactive for a period of nearly 10 years and ice had completely filled the access to a point 20 m inside the culvert. The portal entrance was blocked with rockfill after mining operations ceased in September 2002. In October 2004, the top of the culvert was removed and the inside was backfilled with waste rock by mine staff.

Figure 21 - K-Baseline Portal Pre-reclamation (2002)

The majority of the waste rock and other residual mineralized materials (ore) that were previously located at the K-Baseline site were relocated underground prior to closure of the portal. However, a relatively small volume (est. 4,000 m^3) remains at the site as identified through the ESA program (GLL 2004d).

The ESA investigations (GLL 2004d) also identified an estimated 7,400 m^3 of hydrocarbon contaminated soil at the previous K-Baseline fuel tank area.

Reclamation Plan

The proposed reclamation activities for the K-Baseline area were documented in CanZinco (2004), GLL (2004a) and BGC (2005) and are summarized as follows:

1. The remnant waste rock was to be excavated and transported to the East Open Pit where it was to be used as pit backfill and subsequently covered with a thermal cover.
2. The hydrocarbon contaminated soil was to be relocated into the underground mine via the East Portal.
3. Construct a thermal barrier over the backfilled K-Baseline Portal such that:
    a. The maximum slope angle of the cover does not exceed 3(H):1(V);
    b. The minimum total cover thickness is 2.20 m (including a 1.95 m thick layer of shale fill and 0.25 m thick layer of surface armour material);
    c. All sulphide exposures in the highwall are covered by the minimum cover thickness.

Reclamation Summary

The information regarding the construction of the thermal cover over the K-Baseline portal plug is provided in BGC (2008b). The information regarding the remediation of the K-Baseline hydrocarbon contaminated soil is provided in GLL (2008b). The main aspects of the reclamation of the K-Baseline area are summarized by the following:

- The remnant waste rock from the K-baseline waste rock pile was excavated and placed, in the East Open Pit as backfill materials.

- The hydrocarbon contaminated soil was transported to the East Open Pit and incorporated within the pit backfill materials. This was a deviation from the original reclamation plan to transport this material to the underground workings which could not be completed due to the inaccessibility of the underground workings from the East Adit area. The deviation was conveyed to the NWB and their approval was conveyed in their letter dated June 10, 2005 (NWB 2005).
- The waste rock that had been used to backfill the K-Baseline portal area was covered with a thermal cover consisting of a 2 m thick layer of granular shale overlain by a 0.35 m thick layer of armour material. The cover was constructed such that the surface grade provides positive drainage and is sloped no steeper than 3(H):1(V).

Figure 22 – K-Baseline Area Post-reclamation (2006)

3.3.5 Area 14

Pre-reclamation Conditions

The Area 14 area consists of the following elements:

- Area 14 Portal;
- Area 14 Raise; and
- Area 14 waste rock pile.

The Area 14 Portal was a bare rock portal that provided access to the Area 14 underground workings. Mining ceased in this area around 1987 and the portal was backfilled with waste rock. The waste rock was covered and contoured with shale in 1987 and 1988.

The Area 14 Raise was located approximately 100 m north of the Area 14 Portal. After mining ceased in this area around 1987 and the raise was completely backfilled to the floor of the underground workings. Backfilling was completed with waste rock and the surface was then covered and contoured with shale in the summers of 1987 and 1988.

The Area 14 waste rock pile is located near the former access to the Area 14 underground development. Subsequent to the completion of mining in this area, a large portion of the rock dump was covered with a 2 m thick layer of shale as a test program to assess the thermal performance of the shale as a covering material over waste rock. The residual, uncovered volume of waste rock remaining in 2003 was estimated to be 10,300 m^3.

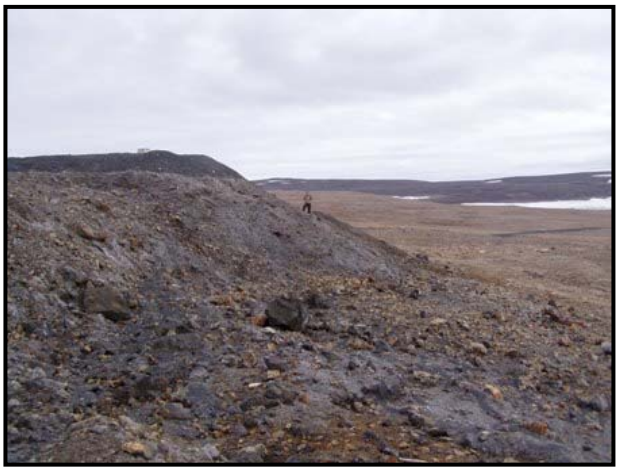

Figure 23 – Area 14 Waste Rock Pile Pre-reclamation (2004)

The ESA (GLL 2004d) identified an additional 1,440 m^3 of loose, mineralized material in the immediate area of the portal and an estimated 300 m^3 of hydrocarbon contaminated soil associated with a former fuelling station at Area 14.

Reclamation Plan

The proposed reclamation activities for the Oceanview area were documented in CanZinco (2004), GLL (2004a) and BGC (2005) and are summarized as follows:

1. The additional, mineralized soil was to be consolidated into a pile abutting the existing waste rock pile at a grade not steeper than 3(H):1(V).
2. Construct a thermal barrier over the exposed portion of the Area 14 waste rock pile and the consolidated mineral materials at Area 14 such that:
    a) The maximum slope angle of the cover does not exceed 3(H):1(V);
    b) The minimum total cover thickness is 2.20 m (including a 1.95 m thick layer of shale fill and 0.25 m thick layer of surface armour material);
3. A 0.25 m thick layer of armour rock was to be applied to the surface of the existing shale cover and the existing shale surface in the Area 14 Portal.
4. The hydrocarbon contaminated soil was to be relocated into the underground mine workings.
5. Install monitoring instrumentation as per the Closure and Reclamation Monitoring Program (GLL 2004c) and the Instrumentation Installation and Contingency Plan (BGC 2004e).

Reclamation Summary

The as-built information regarding the reclamation of the Area 14 waste rock cover and the Area 14 Portal is provided in BGC (2008a) and BGC (2008b), respectively. The information regarding the remediation of the Area 14 hydrocarbon contaminated soil is provided in GLL (2008b). The main aspects of the reclamation of the Area 14 area are summarized by the following:

Figure 24 – Area 14 Waste Rock Pile Post-reclamation (2007)

- The additional mineralized soil and waste rock was consolidated along the exposed face of the Area 14 waste rock pile.
- The hydrocarbon contaminated soil was relocated to the underground mine workings via the 09S portal.
- A thermal cover consisting of a 2 m thick layer of granular shale overlain by a 0.35 m thick layer of armour material was constructed over the exposed portion of the Area 14 waste rock pile. The cover was constructed such that the surface grade provides positive drainage and is sloped no steeper than 3(H):1(V).
- One frost gauge was installed at the Area 14 waste rock cover in 2005 to monitor the geothermal performance of the cover.

3.4 Borrow Areas

Pre-reclamation Conditions

Historically, CanZinco had worked a number of borrow areas on both Territorial lands, administered by the Government of Nunavut's Community Government and Transportation Department and, on crown land, administered by the Department of Indian and Northern Development. These areas provided construction material, mainly shale, for building foundation backfill, road beds, stockpile pads, and earthen dams including the West Twin Dike. The borrow areas included the road quarry, the landfill/ townsite quarry, Shale Hill, Mt. Fuji, Area 14, West Twin, East Twin for shale materials and the Twin Lakes delta for sand and gravel materials. In addition, a number of these borrow areas were more recently used to source material used in construction of the various reclamation covers around the Nanisivik Mine site.

Figure 25 – Shale Hill Shale Borrow Area (2005)

Reclamation Plan

The development and reclamation plan for the borrow areas used during construction of the reclamation covers was documented in BGC (2004b) and CanZinco (2004). The reclamation measures proposed for these areas are summarized by the following:

1. The areas were to be cleaned of debris, garbage, wire, and unused explosives upon closure.
2. Temporary water control berms were to be removed.
3. Unused quarried material was to be flattened, and used to re-grade uneven surfaces within the quarry.
4. The quarry floors were to have a minimum slope of 1% to allow for adequate drainage.
5. All the rock slopes were to have a final slope of 33^{o} (1.5H:1V),
6. All soil slopes were to have a final slope of 18^{o} (3(H):1(V)).

Reclamation Summary

The reclamation activities undertaken at the borrow areas are summarized by the following:

- All borrow areas used prior to and during reclamation activities were cleaned of debris, garbage, wire and unused explosives.
- All water control berms constructed during quarry development were removed.
- Unused quarry materials were flattened.
- Quarry floors were graded such that positive drainage was achieved.
- Rock and soil slopes were regraded as per the reclamation plan, with the exception of the Mt. Fuji quarry. At Mt. Fuji, the benches were left in place due to practical construction considerations associated with regrading the slopes. However, the benches were designed such that, as each individual bench face ravels onto the adjacent bench below, a uniform and stable slope is created as the in-situ materials assume their natural angle of repose.

3.5 Industrial Structures

3.5.1 Industrial Complex

Pre-Reclamation Conditions

The Industrial Complex contained the concentrator, DMS circuit, power plant, maintenance shops, warehouse, administration and technical offices, and associated facilities. It was steel framed with metal exterior cladding and cement block interior dividing walls. It was built on a bedrock and reinforced concrete foundation.

Figure 26 – Nanisivik Mine Industrial Complex Pre-reclamation (2002)

Reclamation Plan

The reclamation plan for the Industrial Complex was documented in CanZinco (2004) and is summarised as follows:

1. The Industrial Complex building, and all fixed internal equipment, which had been purchased by Wolfden Resources, were to be dismantled and shipped off site.
2. The DMS plant was also to be dismantled and shipped off site.
3. The warm and cold storage buildings and the compressor house (from which salvageable equipment was to be removed) was to be dismantled and relocated to the underground mine workings.
4. Office equipment and warehouse supplies with salvage value, including electric power generators, tailings pumps, shop machinery, tools, computers and similar items, will be to be sold, or shipped to other Breakwater properties.
5. Any remaining equipment and materials were to be dismantled and relocated to the underground mine workings.
6. Concrete foundations were to be swept clean and remain in place.
7. All concrete footwalls which were deemed to interfere with final grading of the surface covers were to be collapsed.
8. Consolidate metals contaminated soils from the Industrial complex yard into the footprint of the Industrial Complex.
9. The Industrial Complex foundation was then to be covered with a thermal cover such that:
    a. The maximum slope angle of the cover does not exceed 3(H):1(V);
    b. The minimum total cover thickness is 2.20 m (including a 1.95 m thick layer of shale fill and 0.25 m thick layer of surface armour material);
10. Install monitoring instrumentation as per the Closure and Reclamation Monitoring Program (GLL 2004c) and the Instrumentation Installation and Contingency Plan (BGC 2004e).

Reclamation Summary

The as-built information regarding the construction of the thermal cover over the Industrial Complex is documented in BGC (2008e). Information regarding the remediation of contaminated soils was documented in SRK (2009). The main aspects of the reclamation of the Industrial Complex area are summarized by the following:

Figure 27 – Dismantling Industrial Complex (2006)

- The Industrial Complex was shipped off-site for further use elsewhere. All salvageable processing equipment and inventory were also shipped off-site, while any derelict equipment was hauled into the underground mine workings for final disposal.

- The concrete floors of the Industrial Complex foundation were visually inspected and found to be generally intact (BGC 2006).
- The footprint of the Industrial Complex foundation was backfilled with metals contaminated soil from the Industrial Complex Yard, the area surrounding the Concentrate Storage Shed and the Polishing Pond.
- Hydrocarbon contaminated soil was excavated and hauled into the underground mine workings.
- A thermal cover consisting of a 2 m thick layer of granular shale overlain by a 0.35 m thick layer of armour material was constructed over the Industrial Complex backfill. The cover was constructed such that the surface grade provides positive drainage and is sloped no steeper than 3(H):1(V).
- One thermistor is planned for installation at the Industrial Complex in 2009 to monitor the geothermal performance of the cover and the freeze-back of the underlying backfill materials. In addition, water quality monitoring stations are established in Twin Lakes Creek upstream and downstream of the Industrial Complex.

Figure 28 – Industrial Complex Post-reclamation (2008)

3.5.2 ANFO Facility

Pre-reclamation Conditions

The ANFO facility, located approximately 100 m east of the West Adit Area, stored materials required for blasting during mining activities. The facility consists of two concrete block buildings and a 1,000 litre fuel tank.

Reclamation Plan

The reclamation plan for the ANFO facility was documented in CanZinco (2004). As per the reclamation plan, the concrete buildings and the fuel tank were to be dismantled, decontaminated and relocated to the underground mine workings. The hydrocarbon contaminated soils surrounding the fuel tank that were identified during the ESA (GLL 2004d) were to be excavated and disposed of in the underground mine workings.

Reclamation Summary

Information regarding the reclamation of the hydrocarbon contaminated soils in the ANFO facility are documented in GLL (2008b). The main aspects of the reclamation of the ANFO facility are summarized by the following:

- The concrete buildings and fuel tank were dismantled, decontaminated and relocated to

the underground mine workings.

- Approximately 5160 m^3 of hydrocarbon contaminated soils were excavated and relocated to the underground mine workings (SRK 2009).

3.5.3 Concentrate Storage Building

Pre-Reclamation Conditions

The concentrate storage building, located in the dock area along the coast of Strathcona Sound approximately 4 km north of the Townsite, included a truck weigh scale, several conveyors and the ship loader which was used to transfer concentrates from the storage building to the ships.

Figure 29 – Dismantling Concentrate Storage Shed (2006)

Reclamation Plan

The reclamation plan for the Concentrate Storage Building was documented in CanZinco (2004) and is summarised as follows:

1. The Concentrate Storage Building, shiploading equipment, feed conveyors and all associated equipment were to be dismantled and shipped off site.
2. The concrete floor was to be swept clean such that the SQRO's were met.
3. The concrete floor was to be covered with 0.5 m of shale and contoured to be similar to the natural surroundings and to provide positive drainage.

Reclamation Summary

The main aspects of the reclamation of the Concentrate Storage Building are summarized by the following:

- The Concentrate Storage Building, shiploading equipment, feed conveyors and all associated equipment were dismantled and shipped off site.
- The concrete floor of the Concentrate Storage Building was visually inspected and generally found to be generally intact (BGC 2004d). The soil beneath the concrete floor was sampled and generally found to meet the SQRO's for metals contaminated soils (BGC 2004d and GLL 2004f).

Figure 30 – Covered Floor of Concentrate Storage Shed (2007)

- The concrete pony walls were collapsed and the concrete debris was relocated to the underground mine workings.
- The concrete floor was cleaned using a mobile power sweeper.
- The concrete floor was covered with approximately 0.5 m of locally derived materials and contoured to be similar to the natural surroundings and to provide positive drainage.

3.6 Townsite

Pre-Reclamation Conditions

Features which made up the town site included the houses, bunkhouse, Pamo building, ice rink, church, Dome, carpenter shop/food storage building, town site generating station, NorthwesTel equipment trailers, government garage, and central government buildings/recreation centre.

Figure 31 – Nanisivik Townsite Pre-reclamation (2002)

Reclamation Plan

The reclamation plan for the townsite was documented in CanZinco (2004) and the main elements are summarized as follows:

1. The government garage and central government building belong to the Government of Nunavut (GN), along with the potable water system, utilidor and sewage systems, and 5 of the original 56 housing units. Reclamation of these structures was the responsibility of the GN.
2. The bunkhouse, Pamo building, and the housing units (single and multi-occupancy) belonging to CanZinco were to be dismantled, reduced by burning, and hauled underground when no longer needed.
3. The carpenter shop/food storage building and the town site emergency power plant are steel construction. They were to be dismantled and sold or disposed underground. Useful electric generating equipment, shop tools, freezer containers, and materials and supplies were to be removed.
4. The Dome and the ice rink were prefabricated structures. They were to be dismantled, burnt and/or disposed of underground.
5. The church was a small wood building, which was to be dismantled and removed.
6. The ESA investigations (GLL 2004d) identified hydrocarbon contaminated soils (7,500 m^3) in the town area, primarily related to the home heating oil storage tanks. The contaminated soil was to be excavated and relocated to the underground mine workings.
7. The town area was to be scarified and natural drainage channels through the area restored.

Reclamation Summary

The main aspects of the reclamation of the Townsite area are summarized by the following:

- With the exception of the government garage, the infrastructure belonging to the GN was dismantled and relocated to the underground mine workings by CanZinco, at the request of the GN.
- The bunkhouse, Pamo building, and the housing units belonging to CanZinco were dismantled and relocated to the underground mine workings.
- The carpenter shop/food storage building and the town site emergency power plant were dismantled and relocated to the underground mine workings.
- The Dome and the ice rink were dismantled and relocated to the underground mine workings.
- The church was relocated to the community of Arctic Bay.
- The hydrocarbon contaminated soils identified during the ESA were excavated and relocated to the underground mine workings (GLL 2008b and SRK 2009).
- The town area was scarified, regraded with additional shale fill and natural drainage channels through the area were restored.

Figure 32 – Nanisivik Townsite Post-reclamation (2008)

3.7 Hydrocarbon Storage and Dispensing Facilities

3.7.1 Tank Farm, Dock Area

Pre-reclamation Conditions

The tank farm is located near the dock area approximately 4 km north of the Nanisivik Townsite. The tank farm comprises 15 steel tanks of various sizes located in a lined and diked enclosure, which is adjacent to the concentrate storage shed. There is sufficient storage for 13.9 million L of P60 diesel, 1.1 million L of Jet A1, 0.6 million L of gasoline and a waste products tank for motor oil, glycol, etc.

Figure 33 – Nanisivik Tank Farm (2007)

Reclamation Plan

The reclamation plan for the Tank Farm is documented in CanZinco (2004) and is summarized by the following:

1. The 7,500 m^3 of hydrocarbon contaminated soil identified during the ESA (GLL 2004d) was to be excavated and relocated to the underground mine workings.
2. It was anticipated that ownership of the facility would be transferred to a third party such that it will not be dismantled and remediated as part of this reclamation plan.
3. If this transfer of ownership did not develop, the tanks and associated infrastructure were to be cleaned, purged and dismantled. Any free phase waste products produced in the decontamination process were to be shipped for refining/disposal at an approved facility in southern Canada.
4. The containment berm liner was to be removed and disposed of in the underground mine workings.

Reclamation Summary

The reclamation of the hydrocarbon contaminated soils in the dock area is documented in GLL (2008a and SRK 2009). The main elements of the reclamation of the Tank Farm, Dock Area are summarized by the following:

- The hydrocarbon contaminated soil outside of the containment cell footprint was excavated and relocated to the underground mine workings.
- The tank farm remains in place while discussions continue with the DND over the potential transfer of this infrastructure. The Government of Canada has identified Nanisivik as the deep water port and fuelling site for the Eastern Arctic.

3.7.2 Intermediate Day Tanks and Fuelling Station

Pre-Reclamation Conditions

The Intermediate Day Tanks consisted of two 105,000 L diesel tanks and one 47,000 L gasoline tank located in a diked and lined enclosure adjacent to the Industrial Complex. Diesel and Gasoline were pumped from the Day Tanks to the Fuelling Station where it was subsequently dispensed to vehicles.

Figure 34 – Day Tank Farm Pre-reclamation (2006)

Reclamation Plan

The reclamation plan for the Intermediate Day Tanks and Fuelling Station was documented in CanZinco (2004). As per the reclamation plan, the fuel tanks and associated supply pipelines were to be removed, decontaminated and taken underground for disposal, or shipped off-site for use elsewhere.

Reclamation Summary

As per the reclamation plan, the fuel tanks and associated supply pipelines were removed, decontaminated and taken underground for disposal. Hydrocarbon contaminated soils associated with the facility were excavated and relocated to the underground mine workings, as documented in SRK (2009).

3.7.3 End User Tanks

Pre-Reclamation Conditions

Numerous end user tanks were located around the mine site for a variety of purposes. All satellite tanks of more than 1,000 litres capacity had secondary containment.

End user tanks were located at the following locations:

- Adjacent to the West Open Pit (fueling station);
- WTDA near tailings shack (fueling station);
- ANFO facility;
- A portable tank was moved between Oceanview and East Adit depending on where mining activities were taking place;
- Refuge stations, tailings shack and each building/residence in the town site have small independent tanks (900 litre) for heating purposes;
- Dome, transient centre, Pamo building, and carpenter shop (larger tanks for heating);
- Stol Port (occasionally, jet fuel was delivered from the tank farm to the small tanks at the Stol Port for chartered aircraft); and
- The Area 14 mining area.

Petroleum storage tanks located at the Nanisivik Airport, government garage, and government buildings are not the responsibility of CanZinco.

Reclamation Plan

The reclamation plan for the end user tanks was documented in CanZinco (2004) and is summarized by the following:

1. All of the tanks were to be emptied, removed and sold or decontaminated and disposed of in the underground mine workings.
2. Any secondary containment structures that are equipped with liners were to have the liner removed and disposed of in the underground mine workings
3. The reclaimed areas were to be contoured to prevent accumulation of water.
4. The ESA investigations (GLL 2004d) identified hydrocarbon contaminated soils at some of these locations. The hydrocarbon contaminated soils were to be excavated and relocated to the underground mine workings.
5. Any excavations associated with the removal of contaminated soil were to be backfilled with local materials and contoured to prevent ponding of water.

Reclamation Summary

The reclamation of the hydrocarbon contaminated soils located at the various end user tank locations is documented in detail in GLL (2008b) and SRK (2009). The reclamation of the end user tank areas is summarized by the following:

Figure 35 – Reclamation of Hydrocarbon Contaminated Soils, Nanisivik Townsite (2005)

- All tanks were emptied of any free phase product and subsequently relocated to the underground mine workings.
- All secondary containment structures were removed and the liners were relocated to the underground mine workings.
- Any hydrocarbon contaminated soils encountered at each location were excavated and relocated to the underground mine workings.
- All excavations associated with reclamation of the end user tanks were backfilled and/or recontoured to provide positive drainage and prevent ponding of surface water.

3.8 Industrial Complex Yard Area

Pre-Reclamation Conditions

The Industrial Complex yard area includes all of the developed area in the immediate vicinity of the Industrial Complex, including the bone yard, the cold and warm storage buildings and the outdoor warehouse yard.

Figure 36 – Industrial Complex Yard Pre-reclamation (2006)

Reclamation Plan

The reclamation plan for the Industrial Complex Bone Yard was documented in CanZinco (2004), and is summarized by the following:

1. The ESA investigations (GLL 2004d) identified soil contaminated with both hydrocarbon and metals (est. 24,150 m^3) in this area which was to be relocated to the underground mine workings.
2. The ESA investigations also identified soil contaminated with metals (est. 7,150 m^3) in this area. This soil was to be excavated and consolidated into the area occupied by the concrete slab floors of the Industrial Complex, prior to construction of a thermal cover

over the Industrial Complex foundation footprint.

3. All remaining equipment in the bone yard was to be decontaminated (if required) and disposed of into the underground mine workings.
4. A roadway capable of providing safe passage of vehicular traffic through the Industrial Complex area was to be preserved.

Reclamation Summary

The reclamation of the hydrocarbon and metals contaminated soils in the Industrial Complex Yard Area is documented in SRK (2009). The main elements of the reclamation of the Industrial Complex Yard Area are summarized by the following:

- The hydrocarbon contaminated soils excavated from the Industrial Complex Yard Area were excavated and relocated to the underground mine workings.
- The metals contaminated soils from the Industrial Complex Yard Area were excavated and relocated within the footprint of the Industrial Complex foundation. The metals contaminated soils were subsequently covered with a thermal cover as previously documented in Section 3.6.

Figure 37 – Industrial Complex Yard during Reclamation (2007)

- All remaining equipment in the bone yard was decontaminated and either transported off site or disposed of into the underground mine workings.
- A roadway capable of providing safe passage of vehicular traffic through the Industrial Complex area was preserved.
- Water quality monitoring stations are established in Twin Lakes Creek both up and downstream of the area.

3.9 Other Areas

3.9.1 Stol Port

Pre-reclamation Conditions

The Stol Port was used during the construction phase of the project and more recently during exploration activities as an airstrip for small aircraft. Little remained of the original installations other than the runway strip and a number of runway light posts. Telecommunications equipment was installed adjacent to the old Stol Port airstrip. The equipment comprises satellite dish antennas, small electrical equipment buildings, and radio antennas, which belong to NorthwesTel.

Reclamation Plan

The reclamation plan for the Stol Port area was documented in CanZinco (2004) and is summarized by the following:

1. The ESA program (GLL 2004d) identified small quantities of hydrocarbon (est. 2,250 m^3) and metal (est. 450 m^3) contaminated soil at the Stol Port. These soils were to be excavated and relocated to the underground mine workings.
2. The posts that formerly housed the runway lights were to be removed.
3. NorthwesTel was responsible for removal of all their equipment and structures and to complete adequate reclamation of these areas.

Reclamation Summary

The reclamation of the hydrocarbon and metals contaminated soils in the Stol Port area is documented in GLL (2008b). The main elements of the reclamation of the Stol Port area are summarized by the following:

- The hydrocarbon and metals contaminated soil were excavated and relocated to the underground mine workings.
- The runway lighting system was removed and disposed of in the underground mine workings.
- NorthwesTel has yet to remove their infrastructure in this area.

3.9.2 Nanisivik Dock Facility

Pre-Reclamation Conditions

The dock at Nanisivik consists of three loading cells. All other infrastructure in the dock area, such as the loading conveyor and the tank farm, was discussed in previous sections. The dock facility at Nanisivik was constructed by the mine, under contract for the Federal Government. Ownership of the dock structure remains with the Federal Government and is not included in this report.

Figure 38 – Nanisivik Dock Facility Pre-reclamation (2000)

Reclamation Plan

As documented in CanZinco (2004), the ESA program (GLL 2004d) identified hydrocarbon (est. 10,300 m^3) and metal (est. 9,000 m^3) contaminated soil in the dock area, primarily in the centre loading cell. This contaminated soil was considered to be the responsibility of CanZinco to remediate. The contaminated soil was to be excavated and relocated into the underground mine workings.

Reclamation Summary

Reclamation of the contaminated soil at the Nanisivik dock facility is documented in GLL (2008a) and SRK (2009) and is summarized by the following:

- The hydrocarbon and metals contaminated soil from the centre dock cell was excavated and relocated into the underground mine workings.

Figure 39 – Excavation of Hydrocarbon Contaminated Soils in Centre Dock Cell (2006)

3.9.3 Roadbeds

Pre-Reclamation Conditions

The various roads associated with the Nanisivik Mine site fall under two jurisdictions. The roads servicing the dock, airport, East Twin Lake, and the town site belong to the GN. Service roads in the mine area and at the West Twin Disposal Area are the responsibility of the Mine.

Reclamation Plan

The reclamation plan for the road beds is documented in CanZinco (2004) and is summarized by the following:

1. The ESA program (GLL 2004d) identified metal contaminated soil (est. 15,750 m^3) on the road surface between the Industrial Complex and the dock area. This soil was to be excavated and relocated into the foundation of the Industrial Complex or the underground mine workings.
2. The service roads in the mine area were investigated as part of the ESA program (GLL 2004d) and, except for small discreet areas near mining areas, were found to be free of mineralized rock. These discreet areas were to be excavated and incorporated as backfill in one of the open pits prior to construction of a thermal cover.
3. A roadway capable of providing safe passage of heavy equipment and fuel haulage trucks to the dock area was to be preserved.
4. Any section of a roadbed that causes an interruption to natural drainage was to be breached and contoured and all culverts were to be removed. This was to be done in

such a manner as to provide safe light vehicle access to each of the mining areas for environmental monitoring purposes.

Reclamation Summary

Reclamation of the mineralized soil identified in the road beds is documented in SRK (2009). The main elements of the reclamation of the road beds are summarized by the following:

- The metals contaminated soils identified on the road surface between the Industrial Complex and the dock area were excavated and relocated into foundation of the Industrial Complex, prior to construction of a thermal cover over the backfill materials.
- The service roads in the mine area were investigated as part of the ESA program and, except for small discreet areas near mining areas, were found to be free of mineralized rock. These discreet areas were excavated and incorporated as backfill in one of the open pits prior to construction of a thermal cover.
- A roadway capable of providing safe passage of heavy equipment and fuel haulage trucks to the dock area was preserved.
- Sections of service road beds that were deemed to cause an interruption to natural drainage were breached and contoured. This includes significant breaches of roadbed fills at Chris Creek and Area 14, West Twin Lake and Twin Lakes Creek near 09S portal.
- All culverts that had been placed in road bed fills were removed.

Figure 40 – Breached Road Bed at Chris Creek (2007)

Where the service roads have been breached, this has been done in such a way as to provide access for environmental monitoring via light vehicle wherever possible.

3.9.4 Underground Openings

Pre-reclamation Conditions

Several openings to both the main underground mine and satellite mining areas existed throughout the life of the mine in the form of both portals and raises. Openings to the main underground mine workings included the Lower Adit, the 00 and 01 Portals at the West Adit Area, the 09S Portal, the 17N Portal, the 39S and 88 Portals in the East Adit area and the Shale Hill raise. Openings to the satellite mining areas included the Area 14 portal and raise, the K-Baseline portal and the portal and two raises at Oceanview. The pre-reclamation condition of each of these openings is further described in detail in BGC (2005).

Figure 41 – 17N Portal Pre-reclamation (2005)

Reclamation Plan

The reclamation plan for each of the openings to the underground mine workings was documented in BGC (2005). In general the reclamation of each of the openings was to achieve the following objectives:

a) prevent any access to the underground workings;
b) provide some support for the portal crown pillars;
c) cover sulphide exposures on highwalls adjacent to the portals to mitigate the potential for metal leaching and acid generation; and
d) provide a surface environment that blends into natural conditions.

In order to achieve the reclamation objectives for the portals, the following specific reclamation activities were to be undertaken:

1. Portals directly encased in rock were to be backfilled with waste rock or shale as far back into the portal as practically and safely as possible, to a maximum portal depth of 5 m.
2. The portal plug was to extend out of the portal opening and the face of the plug was to be contoured to an appropriate grade (no steeper than 3(H):1(V)).
3. If the portal plug was comprised of waste rock, a thermal cover comprised of a 1.95 m thick layer of shale fill and 0.25 m thick layer of surface armour material was to be applied to the surface of the backfill
4. If the portal plug was comprised of shale rockfill, a minimum thickness of 0.25 m of armour material was to be applied to the shale surface to prevent erosion.
5. Raises were to be backfilled and a mound of material was to be left at surface as a contingency should the raise plugs settle.

Reclamation Summary

The as-built information pertaining to the reclamation of the various mine openings is documented in detail in BGC (2008b). The main elements of the reclamation of the mine openings are summarized by the following:

- All portals were sealed as per the reclamation plan documented in BGC (2005), preventing access to the underground mine workings and providing some support for the portal crown pillars.
- All raises were backfilled preventing access to the underground mine workings.

Figure 42 – 17N Portal Post Reclamation (2007)

3.9.5 East Adit Treatment Facility

Pre-Reclamation Conditions

The East Adit Treatment Facility (EATF) was located approximately 3 km east of the Industrial Complex, downslope from the East Adit area. The facility was comprised of a Treatment Pond and a Retention Pond, both of which employed earthen dikes to retain surface water flowing through the East Adit area.

Reclamation Plan

The reclamation plan for the EATF was documented in CanZinco (2004) and is summarized by the following:

1. The EATF contains residual metals contaminated soil related to the lime treatment of runoff water. A soil volume of 600 m^3 was identified in the ESA investigations (GLL 2004d). This soil was to be excavated and relocated into the underground mine workings.
2. The two dikes that form the treatment ponds were to be breached such that natural drainage patterns are restored to the area.

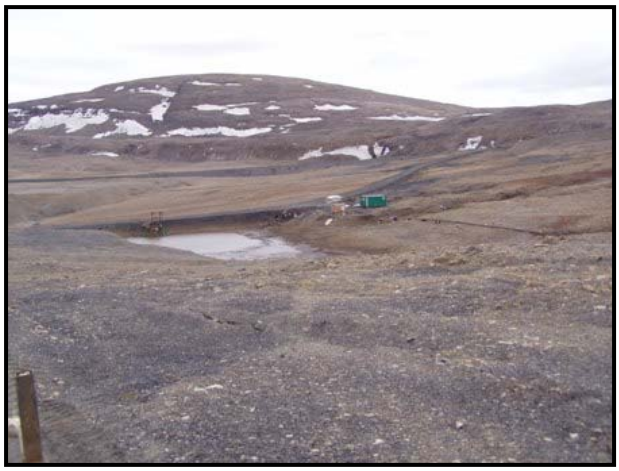

Figure 43 – EATF Pre-reclamation (2004)

Reclamation Summary

The reclamation of the metals contaminated soils in the EATF is documented in SRK (2009). The reclamation of the EATF is summarized by the following:

Figure 44 – EATF Post-Reclamation (2007)

- According to site staff, some of the sediments retained in the bottom of the Treatment Pond were removed prior to 2004 as part of progressive mine reclamation activities. In 2006, the remnant sediments retained in the bottom of the EATF ponds were sampled to provide additional geochemical characterization. Following the sampling program, it was determined that sediments met the SQRO's for metals contaminated soils, as such no further reclamation activities were considered necessary (SRK 2009).
- The dikes were breached, restoring natural drainage patterns to the area.

4.0 CLOSURE AND RECLAMATION MONITORING

As per the Nanisivik Mine Reclamation and Closure Monitoring Plan (GLL 2004c), a monitoring program has been implemented during both the reclamation construction and post-reclamation time periods, to assess the effectiveness and physical stability of various reclamation works. The monitoring program consists of the following three elements:

- Visual inspection of the reclamation works by a qualified geotechnical engineer.
- Monitoring of instrumentation (thermistors, thermocouples, piezometers, frost gauges and monitoring wells) installed in various reclamation works.
- Collection of surface water samples from various locations around the mine site for subsequent water quality analysis.

The reclamation works are inspected annually by a qualified geotechnical engineer, typically in July or August, to assess the physical integrity of the various reclamation structures. The monitoring instruments (thermistors, thermocouples, frost gauges, piezometers ad monitoring wells), installed are typically monitored on a bi-weekly basis between May and October with additional quarterly readings obtained typically in April and December. Water samples are collected during periods of surface water flow typically between June and September of each year. The results of the monitoring program are submitted annually by Breakwater to the Nunavut Water Board within their Annual Environmental Report. An updated monitoring schedule, outlining the proposed monitoring program through 2012, has recently been submitted by Breakwater to the NWB as part of their Water License renewal application.

5.0 LIMITATIONS

Information included within this report has been taken from reports completed by BGC and others, as referenced. The reports completed by others, and the information contained within them, are assumed to be accurate and correct. The original reports referenced throughout this current report should be consulted for specific details regarding the reclamation of each individual area.

6.0 CLOSURE

We trust that this report meets your needs at this current time. Should you have any questions or comments concerning the information provided within this report, please contact the undersigned.

BGC ENGINEERING INC.
Per:

[Original Signed By] ***[Original Signed By]***

Geoff Claypool, M.Eng., P.Eng.
Geological Engineer

Holger Hartmaier, M.Eng., P.Eng.
Senior Geotechnical Engineer

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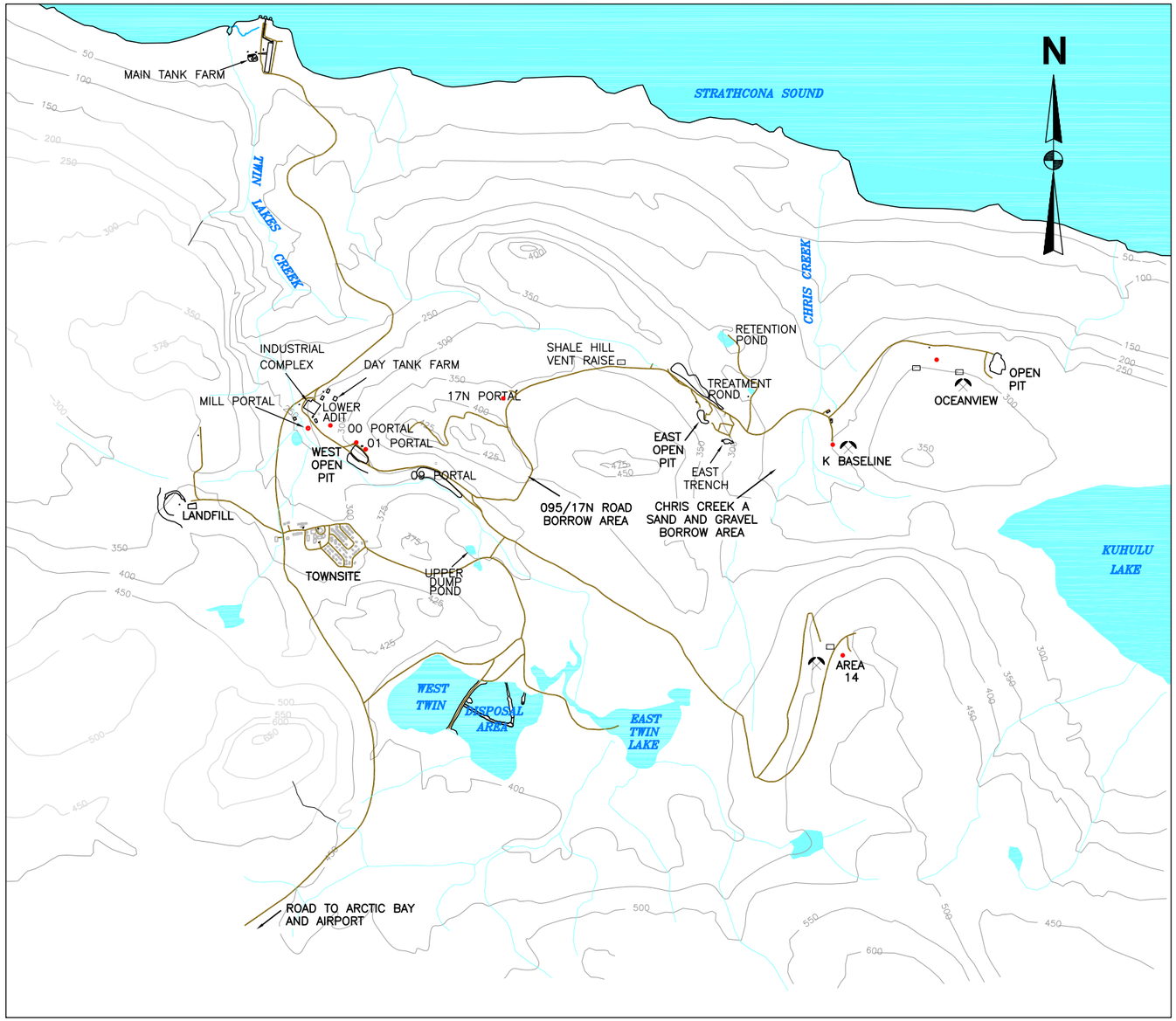
APPENDIX 1
SITE LOCATION MAP



LEGEND

- ROAD
- GROUND CONTOUR (50 m INTERVAL)
- CREEKS, DRAINAGE, STREAMS, SHORELINE
- RAISE
- PORTAL

Scale 1:40000

800 0 800 1600 2400

metres

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JAN 2009
DRAWN:	JL
DESIGNED:	GKC
CHECKED:	GKC
APPROVED:	GKC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: BREAKWATER RESOURCES LTD

PROJECT: NANISIVIK MINE
PROJECT COMPLETION REPORT

TITLE: SITE LOCATION PLAN

PROJECT No.:	FIGURE	REV.:
0255-017-05	A1-1	

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