DOCK AND CONCENTRATE SHED
CHEMICAL AND FUEL STORAGE
STRATHCONA SOUND
N
WAREHOUSE YARD
BONEYARD
MILL
LOWER ADIT
WEST ADIT
CON1P
STOLPORT
DUMP POND
00 PORTAL
01 PORTAL
09 SOUTH PORTAL
02 SOUTH DUMP
09 SOUTH DUMP
LANDFILL SITE
POTABLE WATER TANK
DUMP POND
NANISIVIK TOWNSITE
17N PORTAL
SHALE HILL RAISE
39 NORTH DUMPS
39 PORTAL
88 PORTAL
EAST ADIT
RETENTION POND
EAST ADIT TREATMENT FACILITY
TREATMENT POND
SHOP
K BASELINE
OCEANVIEW
OCEANVIEW RAISE
KUHULU LAKE
AREA 14
WEST TWIN LAKE
EAST TWIN LAKE
ROAD TO ARCTIC BAY AND AIRPORT
TO CON2P
0
1,500
Scale = 1:30,000
metres

LEGEND:
- MINE OPENING
- RAISES AND PORTALS
- DUMPS / LANDFILLS
- PIPE LINES
- CONTOURS
- CREEKS, DRAINAGE, PONDS
- ROADS

Figure 2
Nanisivik Mine
Detailed Location Plan
Fig-2-Site.dwg

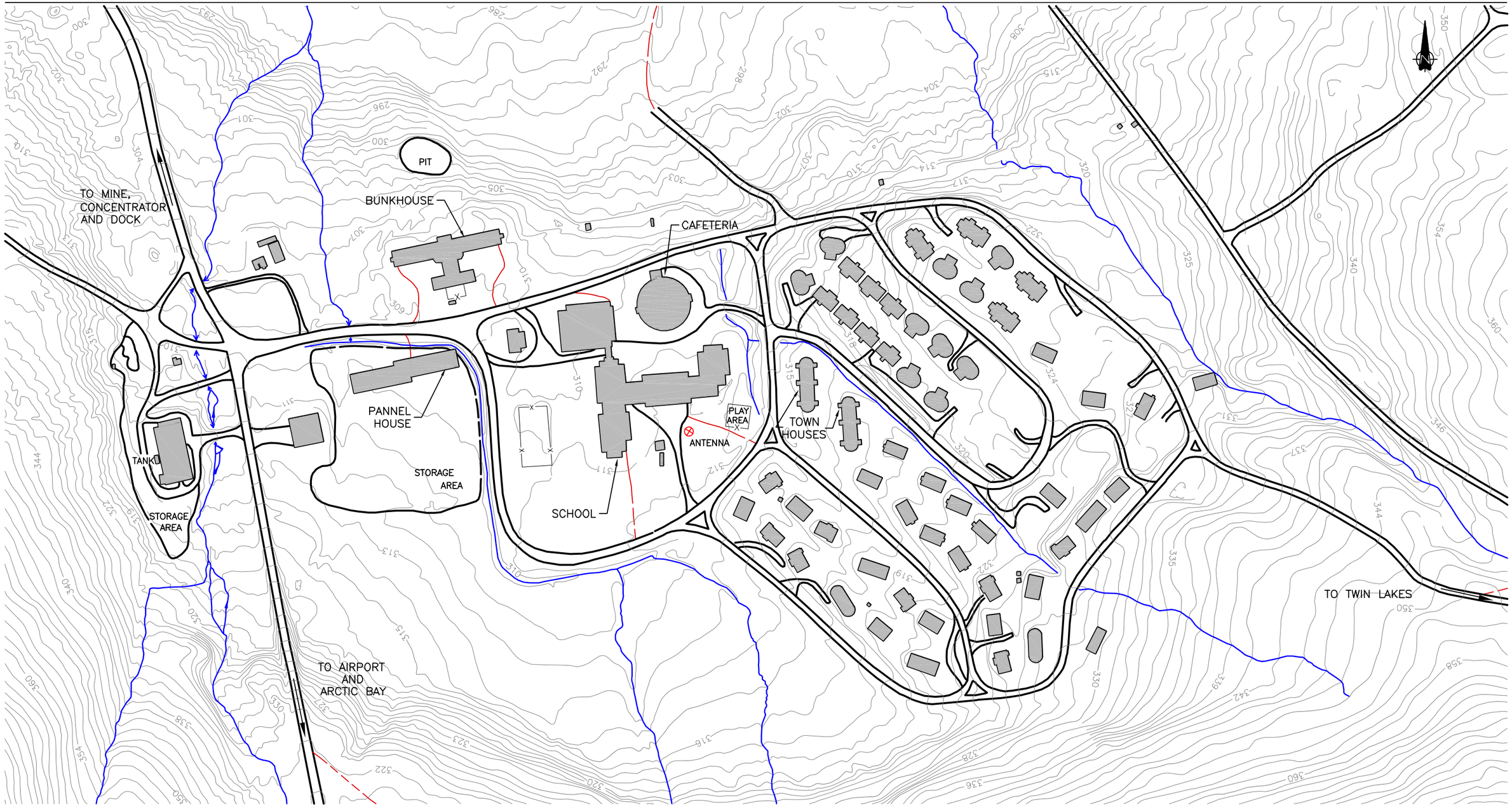

Figure 3
Nanisivik Town Site
Overall Site Plan

FIG3-Town.dwg

storage facility located seven kilometres from the Sound. A concentrate storage shed, ship loading facility, dock, fuel, fuel tank farm, and reagent storage are situated along the shore of the Sound. The dock is used by the Canadian Coast Guard as a storage facility for marine environmental emergency response equipment and as a fuelling station. A detailed location map is presented as Figure 2.

The mine is primarily an underground operation with smaller contributions of ore from four open pits. Underground mining has been primarily room and pillar method. The underground mine is dry due to permafrost conditions to the extent where specialized dust collection apparatus is installed on drilling equipment. Ground temperatures in the underground mine are constantly below freezing (typically -13^0C) and permafrost conditions are known to extend to at least 600 metres below surface. The underground workings extend in an approximate east-west alignment and daylight on either side of topographic ridge (approximately 3 km long X 100 metres wide X 10 metres thick). Vehicle access into the underground mine is via several adits that allow passage of both heavy and light equipment. There is one ventilation raise to surface from the primary underground workings.

The processing plant involves dense media separation and conventional grinding, floatation, and dewatering circuits. Zinc and lead metal concentrates are produced that are transported in open gravel trucks from the mill to the concentrate storage shed, which is located at the dock. Mineral concentrates are loaded into ocean going ships during the ice-free season. The ship loading conveyor system was enclosed in the early 1980's. The mine has produced on average 790,000 tonnes/year of ore containing 8 to 14% zinc, producing 110,000 tonnes/year of mineral concentrates.

Process tailings are pumped approximately four kilometres from the mill to the tailings storage facility, West Twin Disposal Area (WTDA), formerly known as West Twin Lake (Figure 2). The WTDA storage capacity was increased in 1990 with construction of an internal dyke across the lake that created upper and lower storage areas. The upper portion of the lake became a surface tailings deposition area and has been the primary storage area since 1990. The lower portion of the lake has remained a subaqueous tailings storage cell and reservoir for water decanted from the upper area via a series of syphon and pipes. A large portion of the water in the WTDA is returned to the mill via an overland pump/piping system for reuse in the concentrator. Surplus water is released seasonally through a polishing/retention system.

Mine employees live in the Nanisivik townsite, constructed approximately one kilometre from the mine/mill area. The town includes a church, recreation centre, school, housing, post office, store, diesel electric power plant and other amenities to provide comfortable living for employees and their families. Construction of the town was partially funded by the Government of the Northwest Territories. The Government of Nunavut currently owns the land on which the town facilities are located. This block of land is referred to as the Block Transfer and covers an area larger than the existing town site. An overall townsite plan is presented as Figure 3.

The townsite is located at 73°02'N, 84°33'W with topographical elevations of the area varying from 639.5 m at the airstrip to sea level at the harbour. Very steep cliffs and bluffs composed of sedimentary rock border the townsite. Average annual precipitation consists of 5.8 cm rainfall, 83.7 cm snowfall, with a 14.4 cm total precipitation. The July mean temperature high is 10.1 °C, with a low of 2.1 °C. The January mean high temperature is -25.8 °C, with a low of -33.5 °C. Winds are predominantly from the N-NW at 24 km/h, but gusts of up to 125 km/h can occur.

The town site was constructed on an engineered pad reported[1] to vary in thickness from 1.5 to 3.0 metres comprised of shale fill of an undetermined thickness. The fill is reported to have been placed on bedrock outcrops. The source of the shale is reported to be the road cut on the road to the airport near the townsite, and a nearby quarry. The areal extent of this pad is approximately 125,000 square metres (500 metres by 250 metres). Grain sizes of the fill material ranged up to approximately 0.010 to 0.035 metres, based on observations noted during this program.

3.2 Geology

The accepted geological model is that the Nanisivik deposits are Mississippi Valley Type (MVT), which are by definition post depositional, carbonate hosted deposits. The various massive sulphide deposits at the site contain more than 50 million tonnes of which barren massive pyrite bodies occupy most of the area and contain the largest sulphide tonnages. Zones containing sphalerite are present within the massive pyrite bodies, but are confined to a restricted vertical interval.

The Nanisivik sulphide deposits are hosted in carbonate rocks within a Proterozoic sedimentary sequence. This sequence developed as a Neohelikian intracratonic basin, the Borden Basin, on a preplaned gneiss complex of Archean-Aphbian age on the geological time scale.

The present Borden Basin sequence consists of generally shallow water clastic and carbonate sediments up to 6100 metres thick, referred to as the Bylot Supergroup. The Supergroup is divided into three groups, a lower clastic group (the Eqaluik Group), a middle carbonate group (the Uluksan Group), and an upper clastic group (the Nunatsiaq Group). The Uluksan Group is comprised of the lower Society Cliffs Formation and the Upper Victor Bay Formation. All of the economic mineralization at the Nanisivik Mine lies within the Society Cliffs Formation. A generalized geological map is presented as Figure 4.

The natural occurrence of lead and zinc mineralization in the Nanisivik environment will have resulted in elevated levels of these metals within the natural environment due to weathering processes. These metal levels would be at concentrations that would be

[1] This information is based on a personal communication with John McConnell, a former mine manager.