



Minto North Access Design

September 3, 2014

1 Introduction

This document presents an updated plan for creating an access road to the Minto North pit. It shows the main road, which connects to the internal pit ramp, as well as the accesses required for the first two benches.

2 Design Parameters

The haul road is designed to a width of 30m and at grades no greater than 10%. Temporary accesses perpendicular to the main haul road will be necessary to access the upper four waste benches.

2.1 Road Width

As stipulated by Yukon OHS Regulation (15.43):

A haulage road shall be designed, constructed and maintained to provide

(a) a travel width

i. not less than three times the widest haulage vehicle used where dual lane traffic exists

Additionally, Yukon OHS Regulation (15.43) states that:

A haulage road shall be designed, constructed and maintained to provide

(b) a shoulder barrier or berm

i. at least three quarters of the height of the largest tire on any vehicle hauling on road

The haul road is designed for dual-lane traffic using CAT 777F trucks, which have widths of 6.5m and tires measuring 2.70m high. The following table calculates the minimum required road width:

Truck width	6.49 m
Road surface width	19.5 m
Tire height	2.70 m
Berm height	2.0 m
Berm width	4.1 m
Total road width, against highwall or slope (one berm)	23.6 m
Total road width, two berms	27.7 m

The haul road is designed at a width of 30m, exceeding the minimums specified in YWCHSB regulations. Once the road enters the pit, its width is reduced to 27.0m; this value still exceeds the 23.6m required for a road adjacent to a highwall and also provides width for water conveyance ditching and piping where required.

2.2 Grade

The maximum ramp grade is 10%. This is consistent with past practices at Minto and has been shown to suit the capabilities of the Cat 777D / Cat 777F haul truck fleet.

2.3 Runaway Lanes

Two runaway lanes are provided on the access road, and one in the pit, after the major road sections steeper than 5.0%, as per Yukon OHS Regulation 15.43 (3):

Clearly marked emergency runaway lanes or retardation barriers shall be provided and maintained at suitable locations and be capable of safely bringing a runaway vehicle to a stop, where the road grade exceeds 5%.

Each runaway lane will end in a large berm of loose rock, designed to act as an impact barrier. Runaway lanes are 12m in width.

2.4 Access to Upper Benches

The top of the Minto North pit is comprised entirely of waste and will be mined in four 12.0 meter high benches. The accesses for the first two benches require additional road construction and are therefore shown in Figure 1; accesses to the next two will be contained within the pit footprint and are not shown.

2.5 Reclamation

Prior to road construction, the topsoil will be removed and stockpiled separately in part of the Reclamation Overburden Dump designated for this purpose.

Once the pit is complete and access is no longer required, the haul roads will be contoured to blend in with the original slope and then covered with soil overburden and stockpiled topsoil.

3 Construction Sequence

The road is designed as a combination of cut and fill sections. After stripping topsoil and tree cover along the road footprint, a dozer will cut the slope where required. Where the cut material cannot be practically used for fill, it will be supplemented with rockfill meeting construction-spec requirements (Cu < 0.10%, paste pH > 5.0, NP/AP > 3, sulfide sulfur < 0.3%).

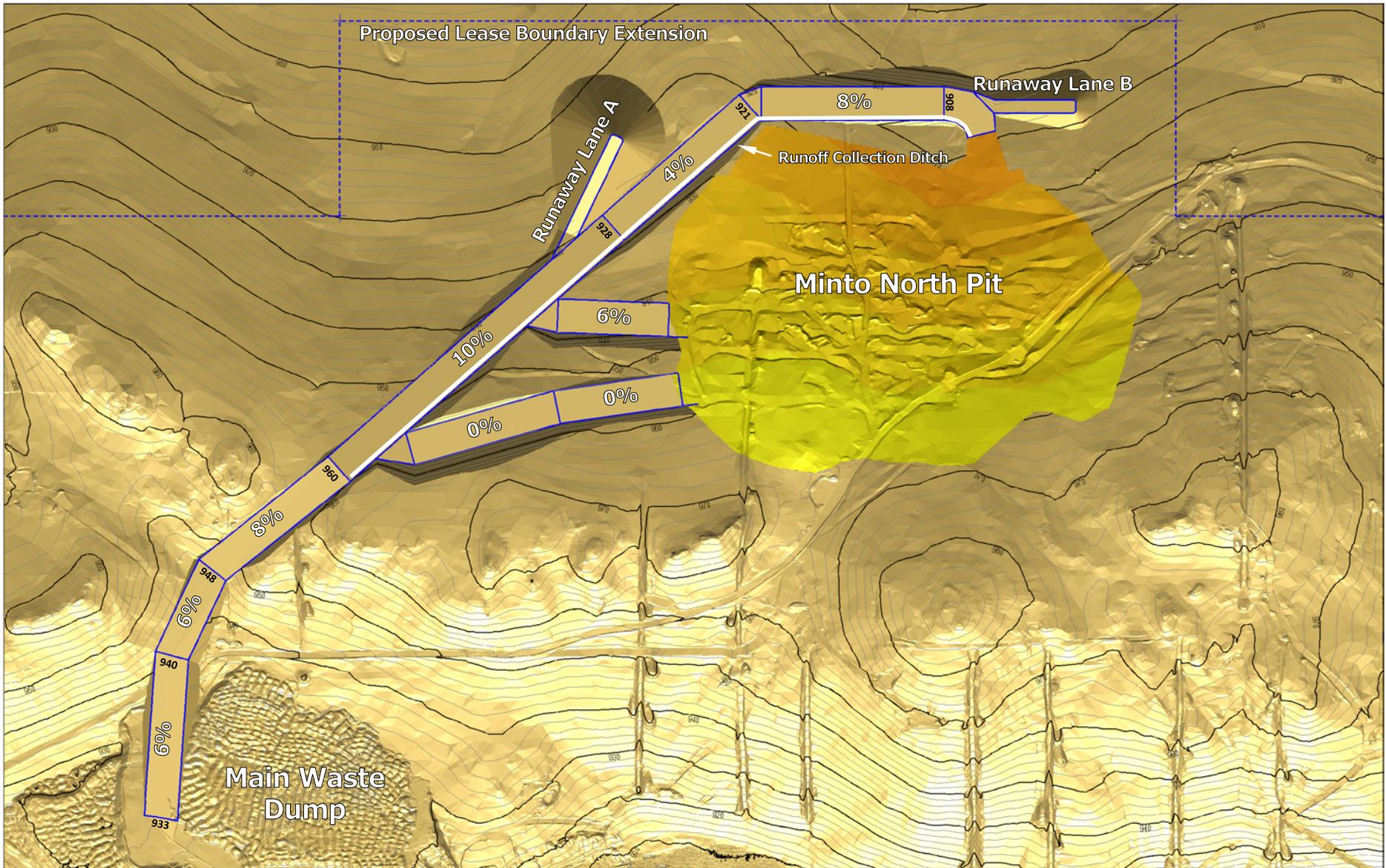
The portion of the road required to access the first bench will be built before mining of the pit can commence. The remainder of the road will be built as required to access each subsequent bench; the entire road will be completed when the pit is mined down to the 908 elevation, where it will connect to the pit's internal hard-ramp.

4 Water Management and Erosion Control

Consistent with Minto's Phase V/VI Water Management Plan, impacted water from the Minto North pit will be captured and pumped to the Minto Creek catchment.

A ditch will be cut into the south edge of the road to capture water from the road surface, as well as water from the small catchment area above the road. The road itself will be given a 2% cross-slope, which will allow snowmelt and rainwater to report to the ditch. The ditch will lead into the Minto North pit, which will serve as the water collection point for surface runoff. Water captured in Minto North will be sent to the Main pit via a pipeline used for operational dewatering.

The road will be built between September 2014 and January 2015 (i.e. it will be completed before freshet); winter conditions obviate the need for a complete water management system during road construction and the mining of the pit's upper benches, which are expected to produce no groundwater.



	DESCRIPTION:	Minto North access road design.		
		10m index contours.		
	DATE PLOTTED:	2014/09/03		
	X-SCALE:	1mm : 5000mm		
	Y-SCALE:	1mm : 5000mm		

Figure 1: Minto North access road configuration.

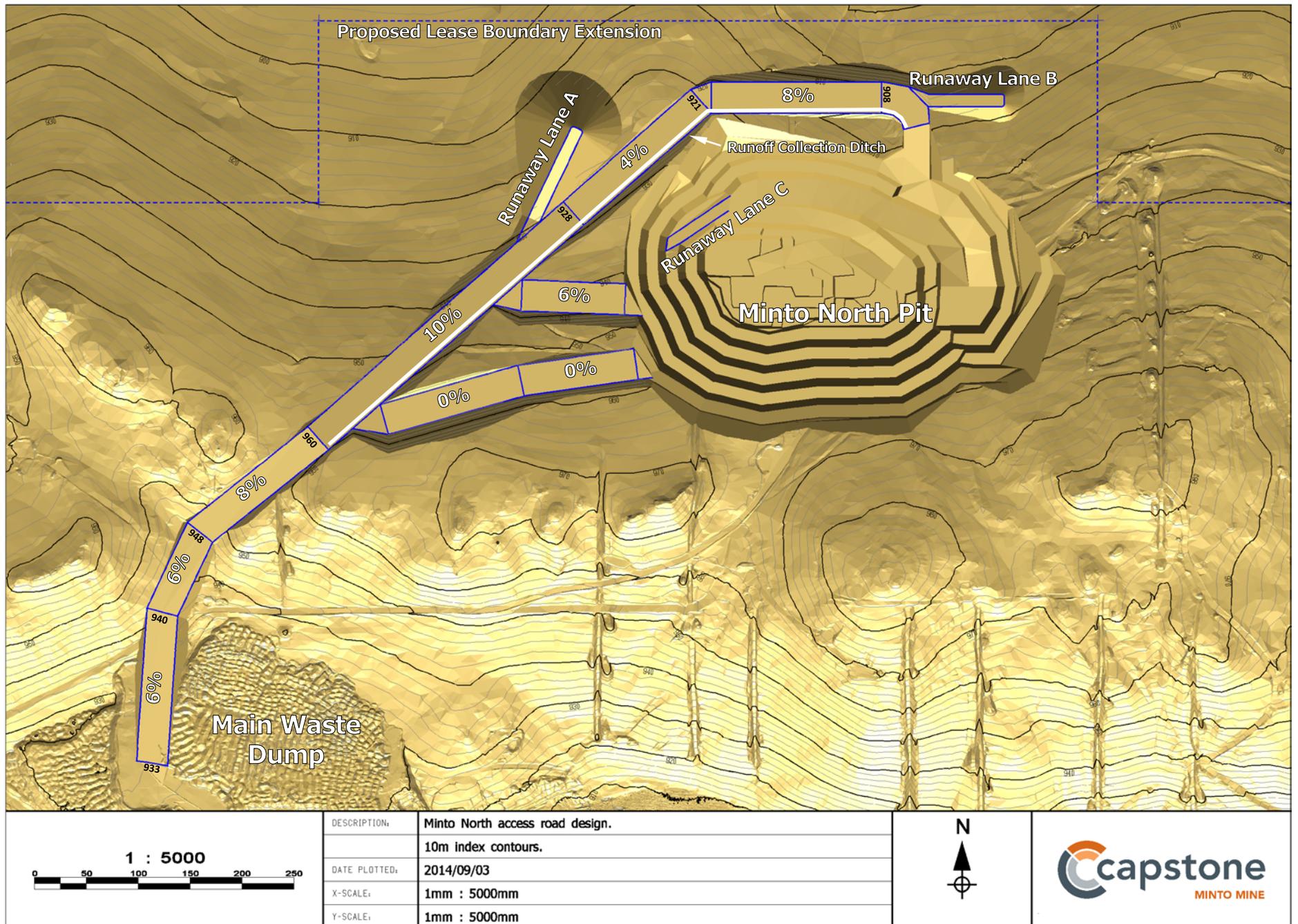


Figure 2: Minto North access road configuration and internal pit ramp.

