Maintaining a safe track structure is a priority on CP Rail System. The integrity of the structure requires that we use quality rail, ties, fasteners and rock ballast.

Track ballast is the crushed rock which supports and restrains the track and provides effective drainage.

Some of the qualities looked for in the rock selected for ballast are its resistance to abrasion which occurs when trains pass, and its ability to resist breakdown from environmental factors.

Detailed investigation has been undertaken of a site known as Swansea Ridge. The location of Swansea Ridge is shown on figure 1.

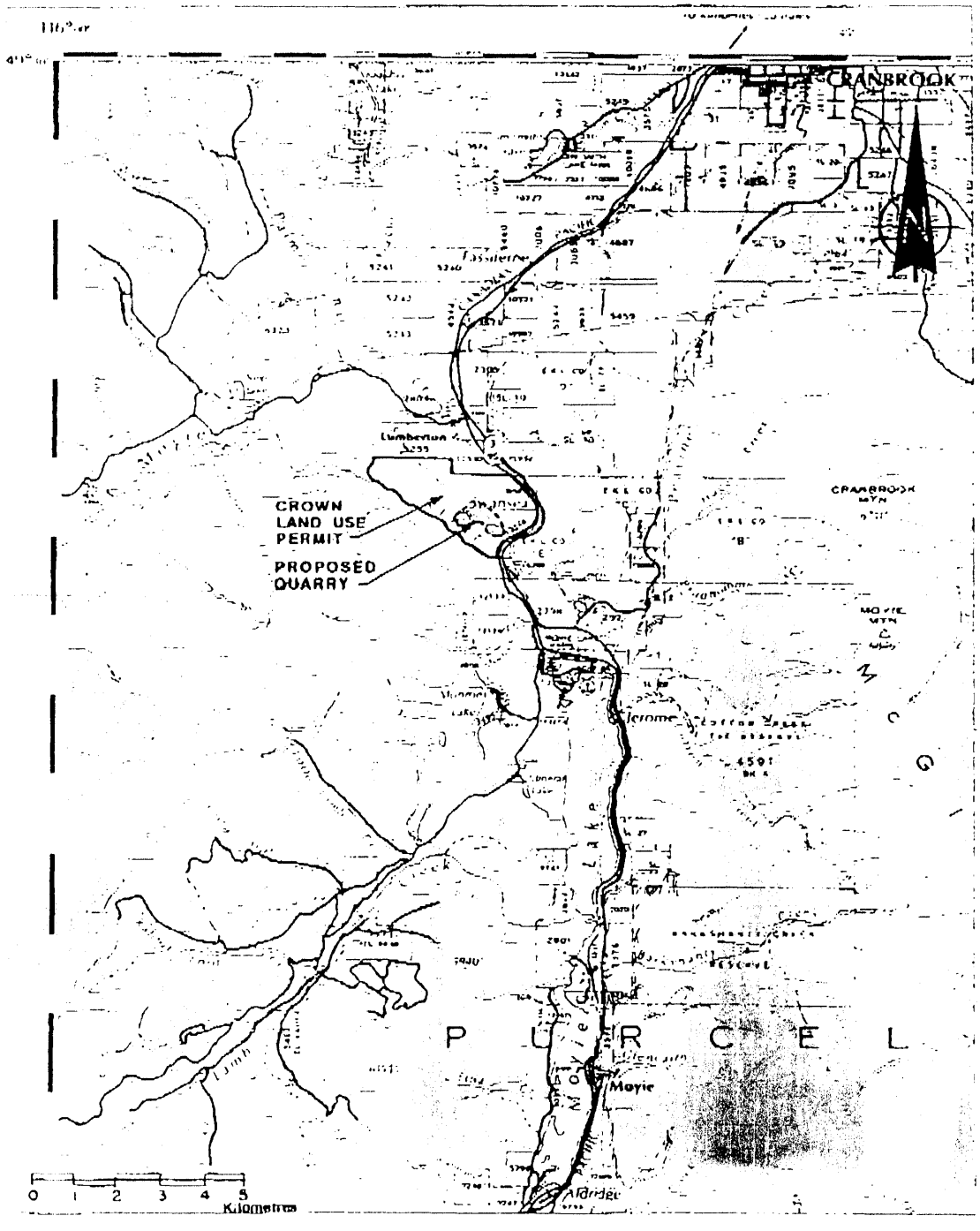

Figure 1

Location Plan (Clifton Associates Ltd.)

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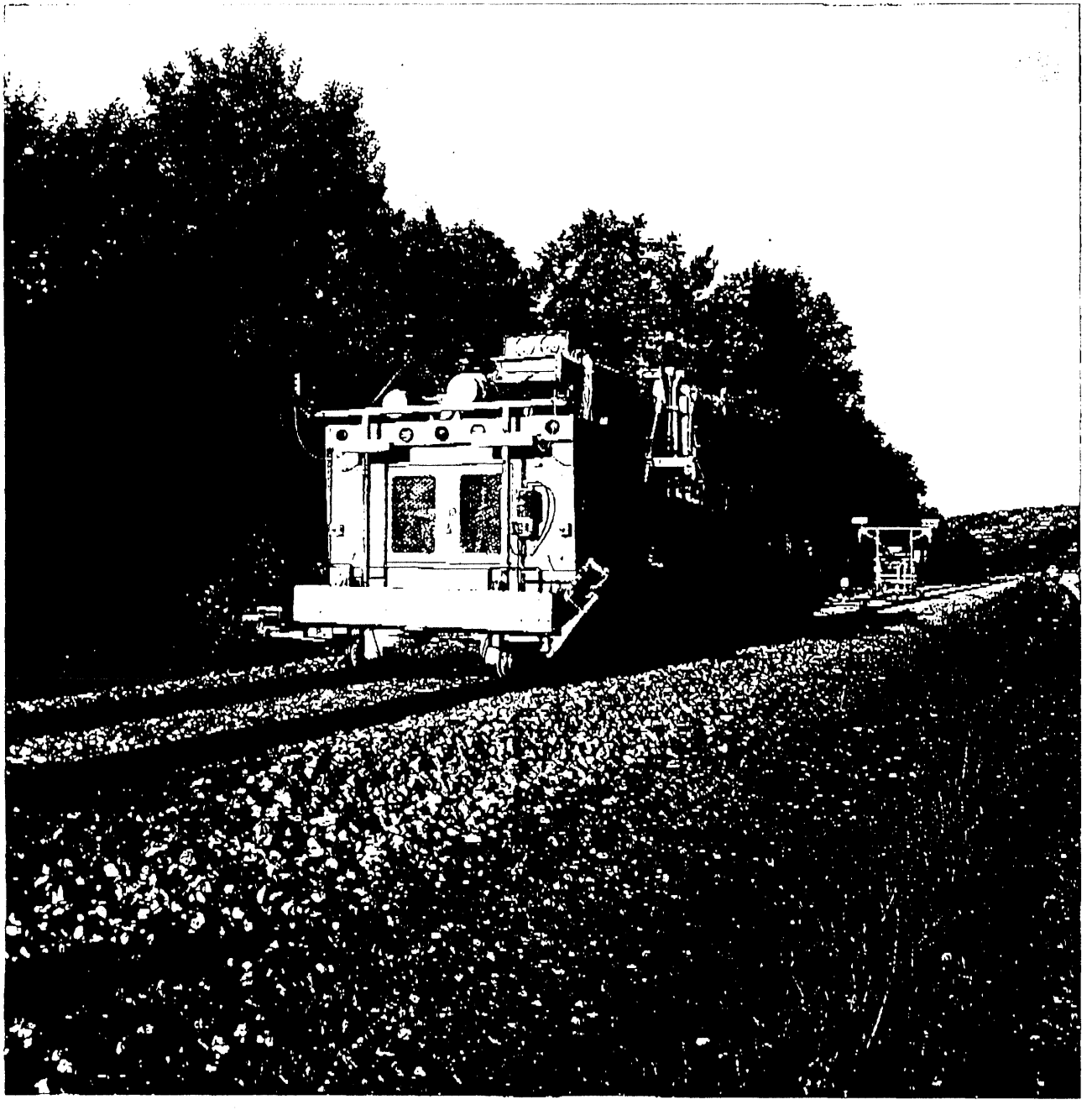
Overview of CP Rail System Swansea Ballast Operation



The Swansea Ridge site offers superior rock quality, acceptable geology, minimal impact on the environment, space for development and its location close to the railway's track.

Based on an estimated annual requirement of 400,000 tons of ballast, Swansea Ridge will supply ballast to CP Rail System in eastern British Columbia, southern Alberta and parts of Saskatchewan for about 50 years.

Preparation of the site is scheduled for 1995. A site layout is shown in Figure 2.

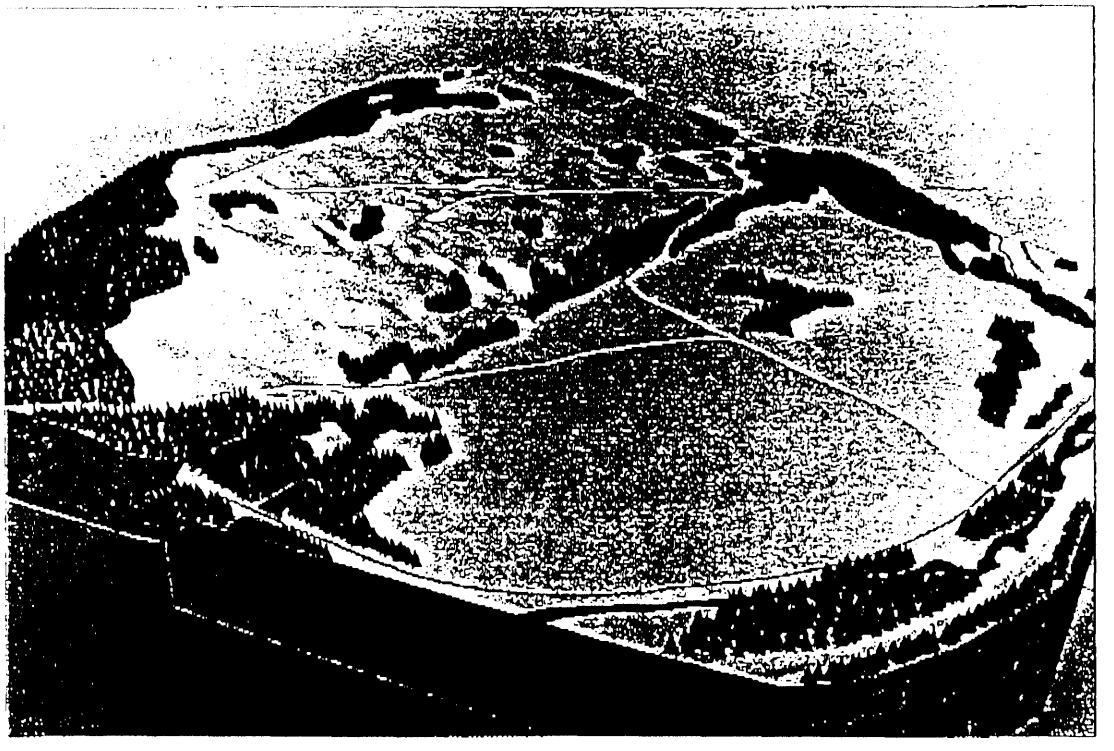


Figure 2

Three dimensional view of the existing topography, logging roads and forest cover on Swansea Ridge looking northwestward

The proposed quarry will consist of four main operations:

- mining rock
- crushing rock to produce ballast
- stockpiling ballast
- loading ballast into rail cars

MINING consists of removing the top soil overburden for later reuse, then drilling and detonating and hauling the loosened rock to the crusher.

CRUSHING rock involves crushing and screening the rock to the needed sizes suitable for ballast.

STOCKPILING will involve fine rock unsuitable for ballast, topsoil and overburden that will be used for reclamation of the quarry. Surface disturbance in the quarry area will occur in stages. The fine rock, top soil and overburden reclamation stockpiles will cover approximately 30 hectares.

The ballast produced will be transported to stockpile areas adjacent to the loading railway tracks.

LOADING of ballast from the stockpile into railway cars will take place at the lower levels.

Ballast production will begin in early fall 1995 using a contractor experienced in quarrying and crushing rock. Production will generally be between March and November with ballast loading from the stockpile occuring during the same period. This should serve to minimize disturbance of a winter elk habitat at the top of Swansea Ridge.

Reclamation of the site is to be done progressively. As an area becomes inactive it will be reclaimed. The reclamation program involves backfilling excavated areas with the fine material saved from the crushing of the rock. Then top soil and overburden is spread over the slopes and a mixture of grasses and clover is planted to generate a root system to prevent soil erosion. A reforestation program with trees native to the area follows so as to return disturbed areas to their natural state. The reclaimed site is shown in figure 3.

While the quarry will not be visible on the northwest side of Swansea Ridge, it will be visible on the southeast side to westbound traffic on Highway 3 in those areas where there is a break in the treed buffer along Palmer Bar Creek between the railway tracks and the highway.

Earth berms will be built and trees planted between the highway and the quarry to lessen the visual impact. As the trees along the berms reach maturity, the upper portions of the ridge will be less visible from Highway 3.

Figure 4

Three dimensional view of quarry development and final reclamation, end of Phase III. Access roads, rail sidings, ballast stockpiles, maintenance area and siltation pond are reclaimed. Fine reject stockpile developed to capacity and reclaimed.

Construction and operation of the quarry will result in a small increase in rail traffic through the area, averaging one to four trains per week between April and November.

Ballast production will be managed in a manner that minimizes operational impacts from dust, noise, silt and aesthetics. Detonations will be monitored through noise detection equipment to ensure levels do not exceed British Columbia government standards. The noise from detonation will be moderately loud lasting approximately two seconds. They will happen at preset times and not more than once a day.

The economic impact will be increased activity for local contractors, equipment dealers and parts suppliers. During start-up, establishment of power and water supply, septic services and communications will be performed by local contractors and government service personnel. During operation the quarry will employ 15 to 20 workers while one to three part-time jobs will be created on CP Rail System.

When the quarry is permanently closed, all facilities will be removed and the final stages of reclamation will be completed.

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5.0 PHYSICAL ENVIRONMENT

5.1 Geology

Site geology has been compiled and interpreted from test pit data, diamond drill hole data and surface exposures. Table 5.1 summarizes the results of the diamond drilling. Four structural units were recognized. From top to bottom they are:

- Overburden.
- Cap rock consisting of bedded metaquartzite and metaargillite.
- Diabase sill.
- Lower sequence of bedded quartzite and argillite.

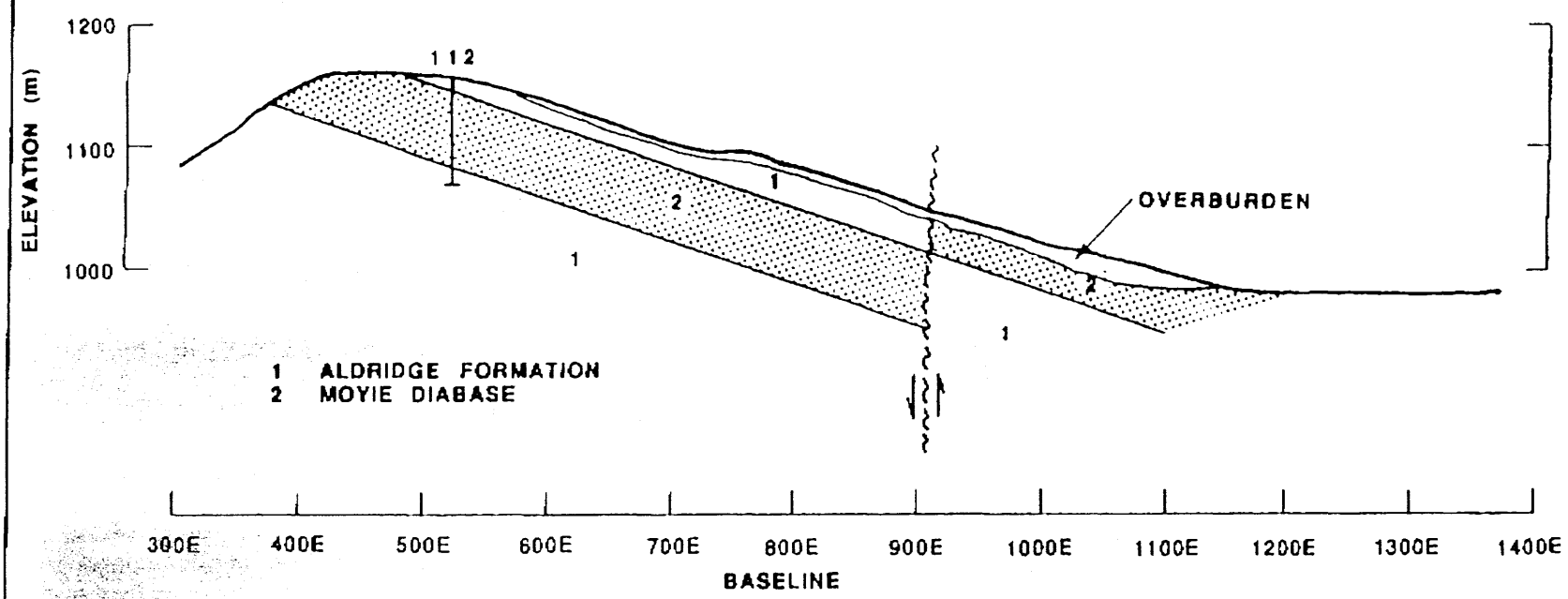
Bedrock geology is shown in Figure 5.1. A typical geological cross section is presented in Figure 5.2. Overburden consists of unsorted till deposits which are described in Section 5.2. Detailed geology is presented in a separate report which can be provided upon request.

The metasedimentary cap rock which overlies the sill and the metasediments underlying the sill belongs to the Middle Proterozoic aged Aldridge Formation. These rocks are predominantly composed of bedded quartzite, biotitic quartzite and argillite. The rocks generally strike along the length of Swansea Ridge and dip roughly parallel to its northeast facing slope. The thickness of cap rock across the length of the ridge is variable. It reaches its greatest thickness on lower slopes on the northern portion of the ridge, where in excess of 60 m overlies the sill. On the southern portion of the ridge, it has been completely eroded. Cap rock has also been completely eroded along the crest of the ridge.

A Moyie diabase sill has intruded the Aldridge Formation and lies concordant with bedding. The rock is comprised of interlocking grains of unaltered plagioclase feldspar and hornblende. Two phases are recognized; a coarser grained phase at the top of the formation and a medium grained phase in the middle and lower sections. The thickness of the sill is consistent across the length of the ridge and averages approximately 60 m (true thickness).

CLIFTON ASSOCIATES LTD.

TYPICAL GEOLOGICAL CROSS SECTION 795N



SECTION 795 N
CROSS SECTION ORIENTED ALONG
BASELINE LOOKING NORTHWEST

FIGURE 5.2