Deloitte & Touche

Additional Borrow Studies 2004/05 Task 11a

Prepared for

Deloitte & Touche Inc.

On behalf of

Faro Mine Closure Planning Office

Prepared by

SRK Consulting
Engineers and Scientists

Project Reference Number:
SRK 1CD003.064

March 2006

Additional Borrow Studies
Anvil Range Mining Complex, Yukon

2004/05 Task 11a

Deloitte & Touche Inc.

On behalf of

Faro Mine Closure Planning Office

SRK Consulting (Canada) Inc.
Suite 800, 1066 West Hastings Street
Vancouver, B.C. V6E 3X2

Tel: 604.681.4196 Fax: 604.687.5532
E-mail: vancouver@srk.com Web site: www.srk.com

SRK Project Number 1CD003.064

March 2006

Author
Lowell Wade, E.I.T.

Reviewed by
Cam Scott, P.Eng.

Table of Contents

List of Figures

1 Introduction

In October 2004, Aurora Geosciences Ltd. (AGL) of Whitehorse mobilized a geophysical crew to the Anvil Range Mining Complex (ARMC) to undertake geophysical surveys in conjunction with a variety of studies being performed to assist in the development of the site closure plan. One of these studies addressed three potential borrow areas which had been identified following two stages of borrow studies undertaken at the ARMC in 2002 and 2003. AGL subsequently prepared a report, included on the attached CD, with the detailed results of the geophysical investigations at these and other sites.

This report has been prepared as part of the ongoing technical evaluation for the closure planning of the Faro Mine and provides context for the geophysical studies that were undertaken in 2004 at the three potential borrow areas. In addition, it summarizes the program objectives, provides a brief overview of the field investigation and its results, provides recommendations related to further studies that may be appropriate, depending on the details of the final closure plan. Aspects of this report may have been superceded by subsequent technical studies.

2 Site Selection and Objectives of the Geophysical Studies

The three potential borrow areas, all of which are located in the Vangorda - Grum area (Figure 1), are situated near the following site features:

- Upper Vangorda Creek (potential glaciofluvial deposit),
- East of Grum Pit (potential till blanket), and
- East of Vangorda Pit (potential till blanket).

The three sites were selected on the basis of the following criteria:

- The selected sites were readily accessible and required only minor amounts of line cutting in order for the geophysical surveys to proceed;
- The sites appeared to be promising as potential borrow sources based on the existing surficial geology maps;
- There were exposures in local steep slopes at one site that, in the absence of local drilling data, should provide some stratigraphic information for potential correlation with the geophysical data;
- The sites were judged to be well suited for evaluating whether geophysical methods are useful for characterizing potential borrow materials in this geologic setting.

The primary objective of the geophysical studies was to provide preliminary stratigraphic information at three potential borrow areas in the Vangorda - Grum area. The secondary objective was to demonstrate the effectiveness and/or limitations of the geophysical methods used in order to assist in the potential development of a more detailed geophysical program next year.

3 Geophysical Field Investigation

3.1 General

From October 7 to 18, 2004, the geophysical crew conducted ground penetrating radar (GPR) and seismic refraction surveys at the three potential borrow areas. A total of 1751.6 m of GPR, run at two frequencies (25 and 50 MHz), and 690.1 m of seismic refraction were completed. A differential GPS receiver was used for survey control.

The GPR and seismic refraction survey results are summarized below. Further details are provided in AGL's report (see attached CD).

3.2 Results

3.2.1 Upper Vangorda Creek (Potential Glaciofluvial Deposit)

One GPR line (GPR-1), about 250 m long, was completed with an east-west orientation along the western terrace above Vangorda Creek. Previous mapping suggests that this terrace may consist of glacial outwash, i.e. sand and/or gravel.

Interpreted bedrock reflections were selected based on the relationship to events above and below; limited amplitude standout; as well as the shape of the reflection. However, both the 25 MHz and 50 MHz survey lines produced very poor reflections, which made it difficult to distinguish between bedrock and overburden. No continuous bedrock reflection was evident in either radargram.

3.2.2 East of Grum Pit (Potential Till Blanket)

Two GPR lines (GPR-2 and GPR-3) and one seismic line (SL-1) were completed across a north-east trending ridge that is partly accessible by road. The intention was to provide information about a till blanket extending to the north and east of Grum Pit. GPR-2 runs along the ridge for approximately 500 m from southwest to northeast, with access from the road. GPR-3 extends about 750 m along a road that runs west to east below the ridge. SL-1 was completed along the ridge for 200 m in the same cut-line as GPR-2.

Line GPR-2 produced very poor reflections for both 25 MHz and 50 MHz surveys. Again it was difficult to distinguish between bedrock and overburden as continuous bedrock reflection was evident in both radargrams. SL-1 distinguished three layers along the same path (Figure 2):

- Layer 1: Unconsolidated, dry overburden (probably till). The interpreted thickness is 0 to 6 m.
- Layer 2: Compact overburden (probably till) below the water table which may include weathered bedrock. The interpreted thickness is about 5 to 18 m.
- Layer 3: The lower layer was interpreted as fresh bedrock with a velocity of about 5,200 m/s, which is consistent with values recorded on other lines on the property. Interpreted depth to bedrock ranges from about 9 to 18 m.

The 50 MHz profile of Line GPR-3 contains the best reflection profile. This profile runs parallel to GPR-2 and SL-1, but is located to the south these two lines by about 50 m. A series of reflections between 8 to 12 m depth indicate the presence of bedrock. Although there is no seismic or drill hole data to confirm these results, the proximity to the other two survey lines indicates that the inferred depth to bedrock is reasonable.

3.2.3 East of Vangorda Pit (Potential Till Blanket)

Two GPR lines (GPR-4 and GPR-5) and one seismic line (SL-2) were completed across a till blanket extending to the east of Vangorda Pit. GPR-4 ran along a cut-line that runs from southwest to northeast for approximately 750 m. GPR-5 ran along a cut-line that runs from northwest to southeast

for approximately 750 m and is orthogonal to GPR-4. SL-2 runs for 200 m along the same cut-line as GPR-5.

For GPR-4, both the 25 and 50 MHz results show west-plunging reflections at depths of between 6 to 20 m. These have been interpreted as bedrock. The intersection of this survey line with GPR-5 and SL-2 indicates a depth to bedrock of 20m. SL-2 shows a similar profile to SL-1 (Figure 3). Similar to SL-1, three layers were identified at SL-2:

- Layer 1: Unconsolidated, unsaturated overburden (probably till). The interpreted thickness is 1 to 9 m.
- Layer 2: Compact overburden (probably till) below the water table. The interpreted thickness is 0 to about 24 m.
- Layer 3: The lower layer was interpreted as fresh bedrock with a velocity of about 4,880 m/s, which is consistent with values recorded on other lines on the property. Interpreted depth to bedrock ranges from 6 to 25m.

3.3 Comments on the Results

3.3.1 System Accuracy and Errors

Station position accuracy was determined to be +/- 1 m on the horizontal. There was no mention of vertical accuracy.

Based on the inversion scattergrams of the seismic data from SL-1 and SL-2, the depth to bedrock determination is accurate to +/- 3 m. Error determination in the GPR data was not mentioned in the AGL report.

3.3.2 GPR Results

As noted in the AGL report, *"the GPR survey failed to conclusively map bedrock at most sites because of signal attenuation and scattering and the absence of a strong bedrock reflection."* Bound water within clays can persist below 0°C, so strong reflections which can mask the bedrock surface can occur in overburden at ground temperatures approaching -30°C. AGL noted that the GPR results cannot be properly evaluated without drill testing.

3.3.3 Seismic Refraction Results

Seismic refraction interpretation was difficult due to the high velocity returns of the second stratigraphic unit which was interpreted as compacted till and weathered bedrock. It was not mentioned in AGL's report if the GPR and seismic refraction survey results were correlated with exposures in local steep slopes at one site that would provide some stratigraphic information in the absence of drilling. Water table elevations and/or discontinuous permafrost, which are known to be present in the Vangorda - Grum area, were not mentioned in the AGL report.

4 Conclusions

4.1 Borrow Information

4.1.1 Upper Vangorda Creek (Potential Glaciofluvial Deposit)

Very little useful information was provided regarding the glaciofluvial terrace adjacent to Vangorda Creek, so no conclusions can be made regarding the thickness of granular material that might be present at this location.

4.1.2 East of Grum Pit (Potential Till Blanket)

The area east of the Grum Pit appears to have a thickness of unsaturated till which typically ranges from 3 to 5 m. It is unclear if the till below the water table will be too wet to use for borrow. Furthermore, it is unclear where the base of this till is located.

4.1.3 East of Vangorda Pit (Potential Till Blanket)

The dry till blanket east of Vangorda pit is similar in thickness to the till at Grum Pit. However, the uncertainties regarding the till below the water table at Vangorda Pit are similar to the uncertainties at Grum Pit.

4.2 GPR

The GPR survey failed to conclusively map bedrock at most sites because of signal attenuation and scattering. It has been concluded that the rocks at this site may be electrically anisotropic and GPR surveys may have to be conducted in a preferential direction to develop strong reflections. This was apparent from surveys conducted across the strike of the foliation (GPR-5 and SL-2). These generate stronger reflections than those conducted parallel to the foliation.

4.3 Seismic Refraction

The seismic refraction interpretation produced more definitive results, but the interpretation was complicated by the high velocity of Layer 2. The AGL interpretation of this layer indicated that it may contain dense till and weathered bedrock.

5 Recommendations

In terms of future work, AGL recommended that, where possible, GPR surveys should be run across the strike of the dominant foliation or, in areas with no subsurface control, surveys should be run in two orthogonal directions.

AGL recommended that GPR and seismic refraction surveys should be used in conjunction with a drill program to:

1) Permit visual stratigraphic collaboration with GPR and seismic reflection surveys;

2) Confirm the presence / absence of extensive permafrost; and

3) Allow cross-hole tomography.

Although it is not mentioned in the AGL report, the assessment of the materials in the terrace at Vangorda Creek would likely benefit from detailed field reconnaissance.

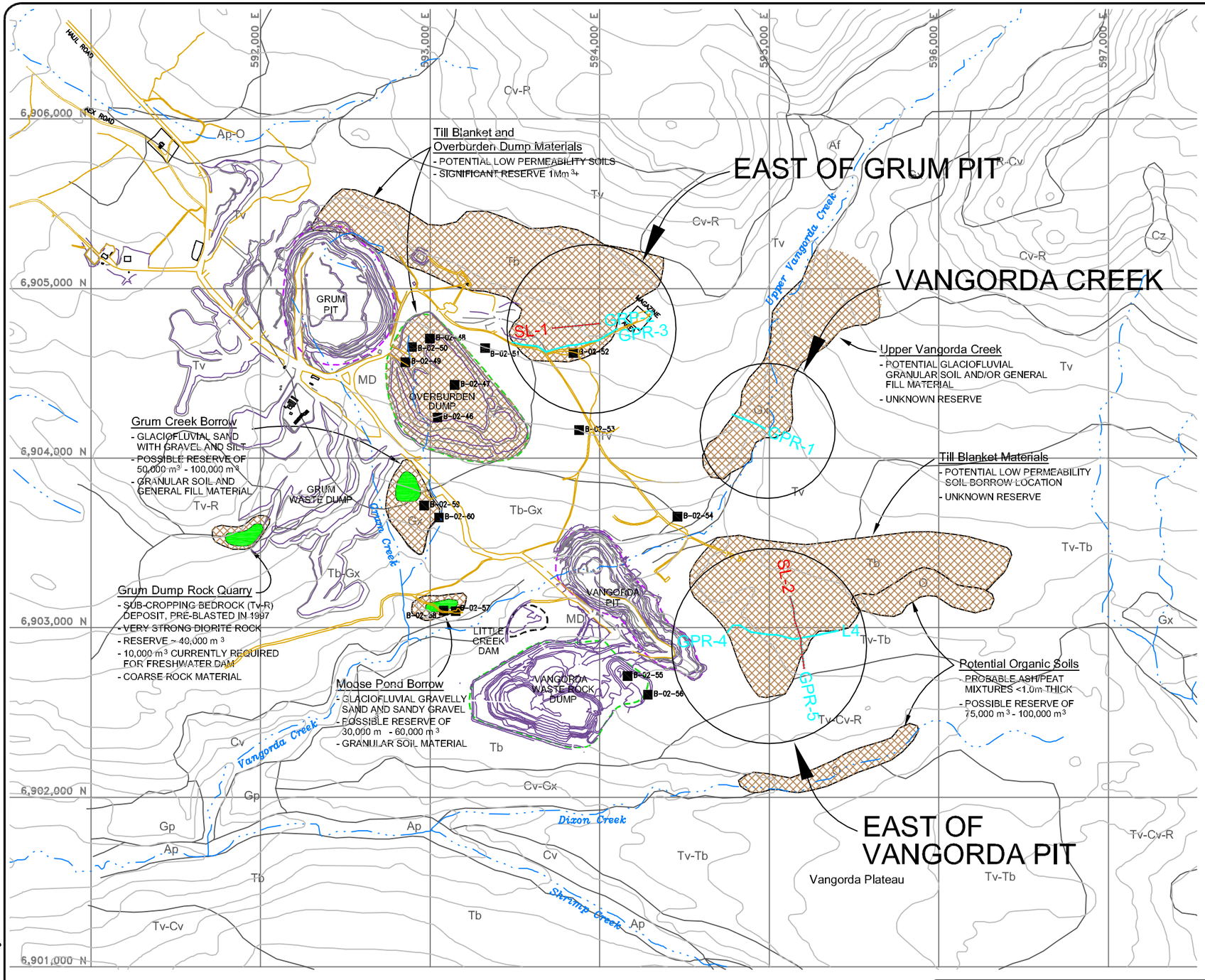
This report **"Additional Borrow Studies, Anvil Range Mining Complex, Yukon – 2004/05 Task 11a"**, has been prepared by SRK Consulting (Canada) Inc.

Lowell Wade, E.I.T.

Reviewed by

Cam Scott, P.Eng.

Figures



LEGEND (from Bond, 1999)

QUATERNARY

HOLOCENE

MINE DISTURBANCE

MD- mine disturbance; consisting of an open-pit and stripped till and bedrock accumulations. Bedrock and surficial sediments exposed in open-pit.

MINE TAILINGS

MT - mine tailings; consisting of sand, silt and some clay.

ORGANIC DEPOSITS

O - organics; consisting of woody sedge peat, variable thickness. White River ash accumulations are commonly associated with poorly drained peaty areas.

ALLUVIAL DEPOSITS

Ap - alluvial plain; silt, sand and pebbles with reworked cobbles and boulders occurring as bars, overbank floodplain deposits, 0 - 10 m thick; floodplain subject to periodic floods. Small valley alluvial plains may not be mapped at this scale.

Ap (active) - alluvial plain; area of Pelly River floodplain that has been recently active.

At - alluvial terrace; silt, sand, and pebbles with reworked cobbles and boulders occurring as low terrace deposits, 0 - 10 m thick.

Af - alluvial fan; coarse sand, pebbles, cobbles and mudflow deposits, up to or >10 m thick. Appear as vegetated, often peat covered, landforms developed during post-glacial sedimentation.

Ax - complexes of Ap and Af undivided. Common when a stream is unconfined and also in narrow valleys where side-entry alluvial fans cannot be differentiated from an alluvial plain.

PLEISTOCENE AND HOLOCENE (UNDIVIDED)

COLLUVIAL DEPOSITS

Cv - colluvium veneer; conforms to bedrock topography, <1 m thick.

Ca - colluvium apron; coalescing colluvial fans at the base of a slope, >1 m thick.

Cz - mass wasting; includes slumping, debris slides and rockfalls. Slumping and rockfalls are Common on Mt. Mye.

LATE PLEISTOCENE (WISCONSINAN) - McCONNELL GLACIATION

GLACIOLACUSTRINE DEPOSITS

Lb - glaciolacustrine blanket; 1- 40 m thick.

GLACIOFLUVIAL DEPOSITS

Gp - glaciofluvial plain; 3 - 10 m thick.

Gt - glaciofluvial terrace; <10 m thick.

Gx - glaciofluvial complex; 1 - 30 m thick, composed of deposits of outwash, glaciolacustrine and minor till deposited in an ice contact environment. Hummocky topography is associated with this depositional setting. Crevasse fillings were mapped in the upper part of Vangorda Creek valley.

GLACIAL DEPOSITS

Tv - till veneer; conforms to underlying topography, <1 m thick.

Tb - till blanket; gently to moderately sloping plain controlled by bedrock or underlying surficial deposits, >1 m thick.

Tx - till complex; till blanket or veneer composed of meltout till and minor ice contact glaciofluvial deposits.

LOWER CAMBRIAN TO CRETACEOUS

BEDROCK

R - bedrock; common on plateau summits and ridges on Mt. Mye and Sheep Mountain.

- EXISTING QUARRY OR BORROW
- POTENTIAL QUARRY OR BORROW
- MINE INFRASTRUCTURE
- EXISTING ACCESS ROAD
- PHASE 2 BORROW TEST PIT B-02-40
- GPR SURVEY LINE
- SEISMIC REFRACTION SURVEY LINE

N

0 500 1000

SCALE IN METERS
1:25,000

REFERENCE

BOND, J.D. (OPEN FILE 1999-7)
SURFICIAL GEOLOGY MAP AND TILL GEOCHEMISTRY OF MOUNT MYE AND FARO (105K/3&6 E), CENTRAL YUKON TERRITORY

SRK Consulting
Engineers and Scientists

PROJECT NO.	DATE	REVISION
1CD003.64	06/05	A

FIGURE 1

Location of 2005 Geophysical Surveys at Vangorda-Grum Area

Geophysical_Survey_05.dwg

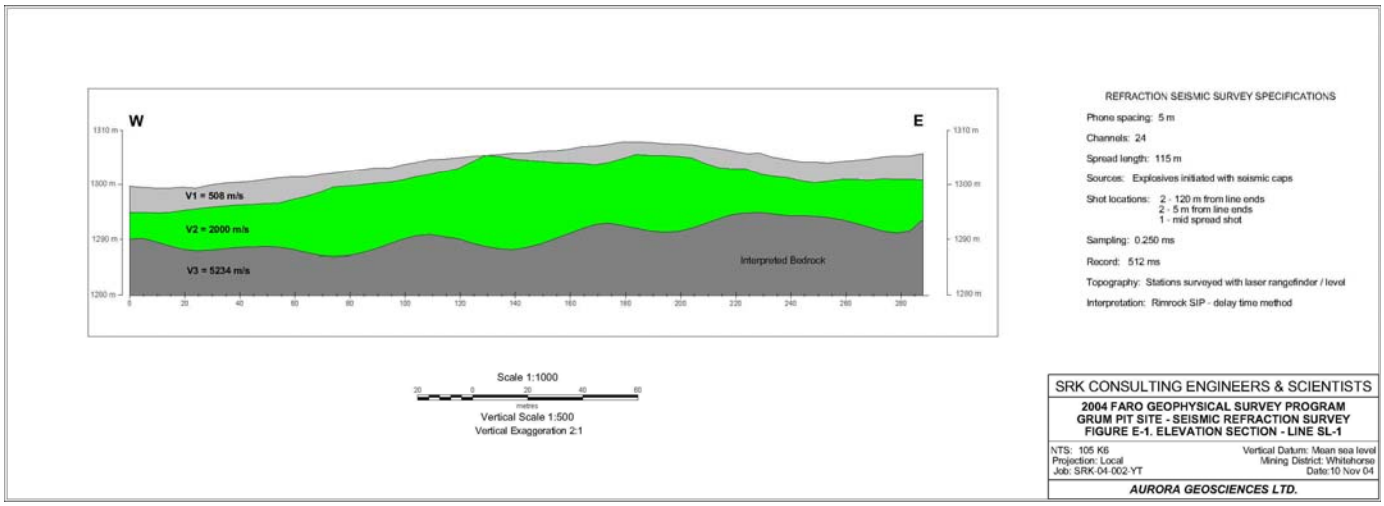


Figure 2: Section from Line SL-1, East of the Grum Pit

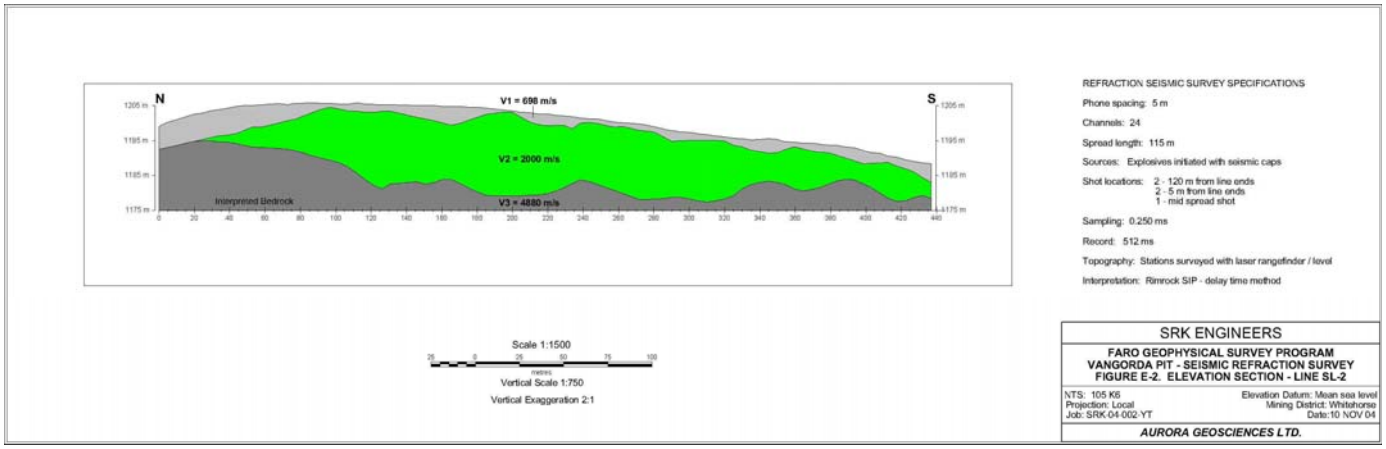


Figure 3: Section from Line SL-2, East of the Vangorda Pit