



February 5, 2013

Mr. Leonard Avery, P.Eng.

Heritage Gas

200-238 Brownlow Avenue

Dartmouth, NS B3B 1Y2

Dear Mr. Avery,

**Re: Geotechnical Investigation, Phase 2 – New Glasgow Pipeline
Pictou County, Nova Scotia**

This is our report on the geotechnical investigation conducted for Phase 2 (Boreholes 1, 8C, 9, 10, and 12) for the proposed Natural Gas Pipeline in Pictou County, Nova Scotia.

The subsurface conditions in the boreholes consisted of rootmat over compact to dense sandy clay till then bedrock (mudstone / sandstone). Bedrock was encountered at each borehole. Groundwater was encountered in Boreholes 1, 8C, and 9 at the time of drilling. The presence of bedrock at most borehole locations will complicate the proposed directional drilling.

Table A: Summary of Findings

| Borehole | Thickness of Rootmat/Topsoil (m) | Thickness of Till (m) | Bedrock Depth (m) | Groundwater Depth* (m) |
|----------|----------------------------------|-----------------------|-------------------|-----------------------------|
| BH 1 | 0.2 | 2.8 | 3.0 | encountered at 4.3 m |
| BH 8C | 0.2 | 2.2 | 2.4 | encountered at 5.8 m |
| BH 9 | 0.2 | 3.5 | 3.7 | encountered at 4.3 m |
| BH 10 | 0.2 | 5.6 | 5.8 | groundwater not encountered |
| BH 12 | 0.2 | 1.7 | 3.0 | groundwater not encountered |

* encountered at the time of drilling. Actual groundwater depth may vary.

Please contact us if you require additional information.

Thank you,

Glenn Graham, P.Eng.

Geotechnical Engineer

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Project No. 533-002

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1.0 INTRODUCTION

We have conducted Phase 2 of the Geotechnical Investigation for the proposed natural gas pipeline in Pictou County, NS at the request of Heritage Gas. The purpose of this investigation was to evaluate the subsurface conditions on the site, and to provide a factual report of our findings.

2.0 SITE DESCRIPTION AND GEOLOGY

Borehole 1 is located along the power transmission line right of way near West River East Side Road in Alma, NS. Boreholes 8C, 9, and 10 are located along the TransCanada 106 right of way. Borehole 12 is located off Abercrombie Road, near TC106, Exit 2. Figure A shows an aerial view of Borehole 1. Figure B shows an aerial view of Borehole 8C. Figure C shows an aerial view of boreholes 9 through 12.

The borehole location along the power transmission line right of way (BH1) is predominantly cleared with some overgrown brush (alders) present. The borehole locations along TransCanada 106 and Abercrombie Road were predominantly wooded (alders/small trees).

The principal soil type is glacial till over bedrock (mudstone / sandstone) which is part of the Middle River Formation.



Figures A to C: Borehole locations

3.0 SUBSURFACE CONDITIONS

The field program consisted of five boreholes (BH1, BH8C, BH9, BH10, and BH12) completed on January 21 to January 23, 2013. The borehole locations are shown in Figures A to C (Figure 1 in the appendix is a complete location plan).

The boreholes were drilled using a track mounted drill rig. Representative samples were taken during the field work and the conditions at the boreholes were logged in detail. The soil and groundwater conditions encountered at the site are described in detail on the appended Borehole Records and summarized in the following paragraphs and Table A.

The subsurface conditions in the boreholes consisted of rootmat over compact to dense sandy clay till then bedrock (mudstone / sandstone). Bedrock was encountered at each borehole. Groundwater was encountered in Boreholes 1, 8C, and 9 at the time of drilling. Table A below lists the depths for each layer encountered.

Grainsize analysis of two samples from Borehole 10 showed an average of 11% gravel, 21% sand, and 68% fines. One sample from Borehole 8C showed 4% gravel, 13% sand, and 83% fines. Moisture content analysis from Borehole 10 ranged from 10% to 12%. Moisture content analysis from Borehole 8C was 15%. Atterberg Limits of two samples tested showed the fines portion of the grainsize analysis to be clay.

Bedrock consists of a weak mudstone (easily augered) or medium strong sandstone. Compressive strength analysis of the bedrock for six samples tested from Borehole 8C ranged from 18.1 MPa, to 104.1 MPa, with an average of 43.4 MPa.

Table A: Summary of Findings

| Borehole | Thickness of Rootmat/Topsoil (m) | Thickness of Till (m) | Bedrock Depth (m) | Groundwater Depth* (m) |
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| BH 1 | 0.2 | 2.8 | 3.0 | encountered at 4.3 m |
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| BH 10 | 0.2 | 5.6 | 5.8 | groundwater not encountered |
| BH 12 | 0.3 | 1.7 | 3.0 | groundwater not encountered |

* encountered at the time of drilling. Actual groundwater depth may vary.

4.0 CLOSURE

If there are changes to the proposed work we require that we be notified to allow for review of our recommendations.

A field investigation is a limited sampling of a site. Some variation between sampling locations should be expected. If the conditions encountered are significantly different than described in this report, we request that we be notified immediately.

This report was completed for the sole benefit of Heritage Gas. Any other person or entity may not rely on this report without the express written consent of Conquest Engineering Ltd. This report was written by Glenn Graham, P.Eng. and reviewed by Bruce MacNeil, P.Eng.

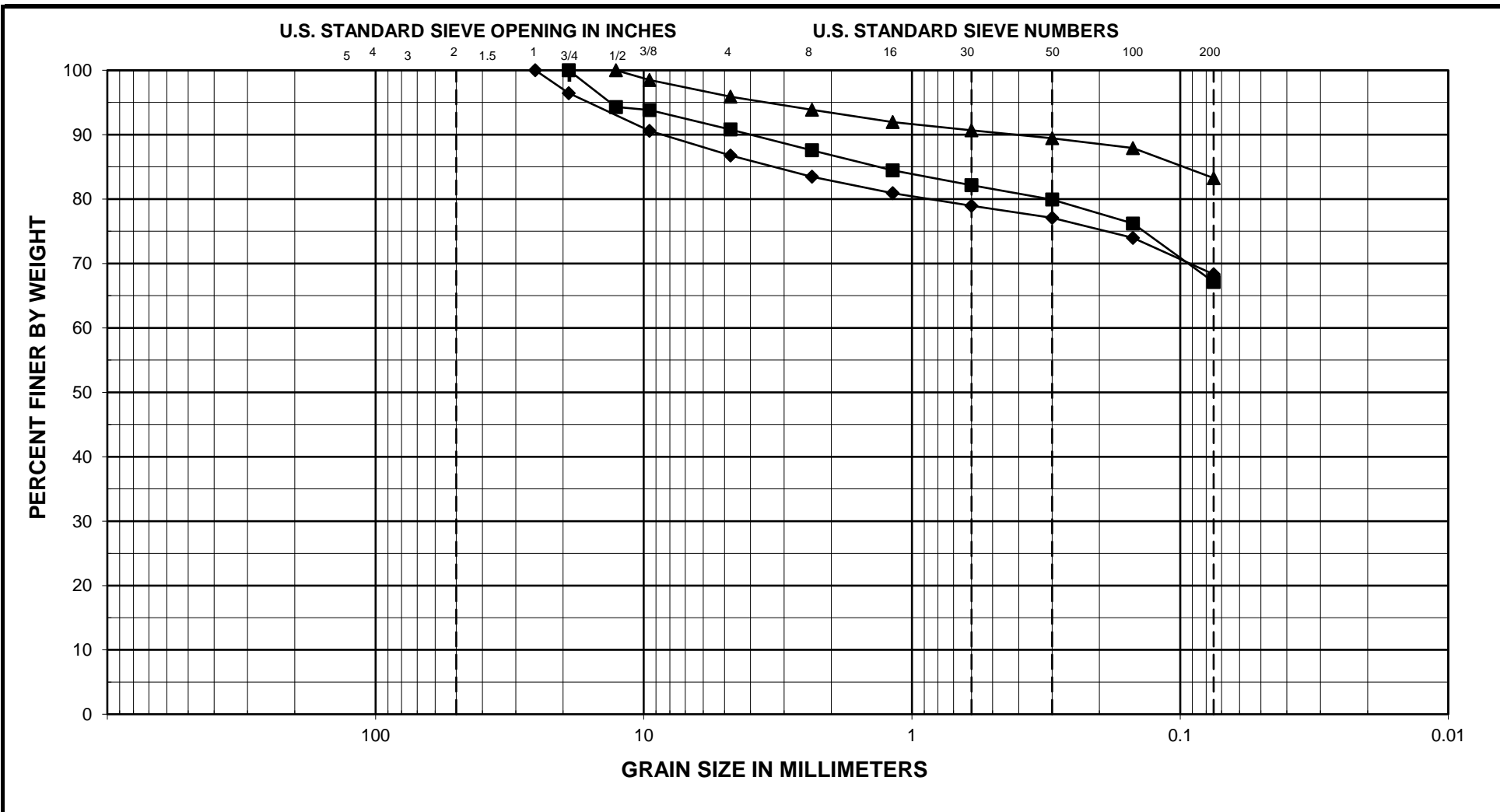


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APPENDIX A



| | Sample No. | Depth | Classification | w% | Cu | Cc | % Gravel | % Sand | % Silt and Clay |
|---|-------------|-------|----------------|-----|----|----|----------|--------|-----------------|
| ◆ | BH-10, Sa.2 | 0 | Sandy CLAY | 12% | NA | NA | 13.2 | 18.6 | 68.2% |
| ■ | BH-10 Sa.1 | 0 | Sandy CLAY | 10% | NA | NA | 9.2 | 24.1 | 66.8% |
| ▲ | BH 8C Sa. 1 | 0 | CLAY with sand | 15% | NA | NA | 4.1 | 13.0 | 82.9% |
| ● | | | | | | | | | |
| ○ | | | | | | | | | |



Project: Pipeline Phase 2 New Glasgow N.S.

Job No.: 533-001

Location: Borehole Locations

Date: 1-Feb-13

Notes:

SIEVE ANALYSIS



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Client Name: Heritage Gas

Job No.: 533-002

Project Name: New Glasgow Pipeline Phase 1

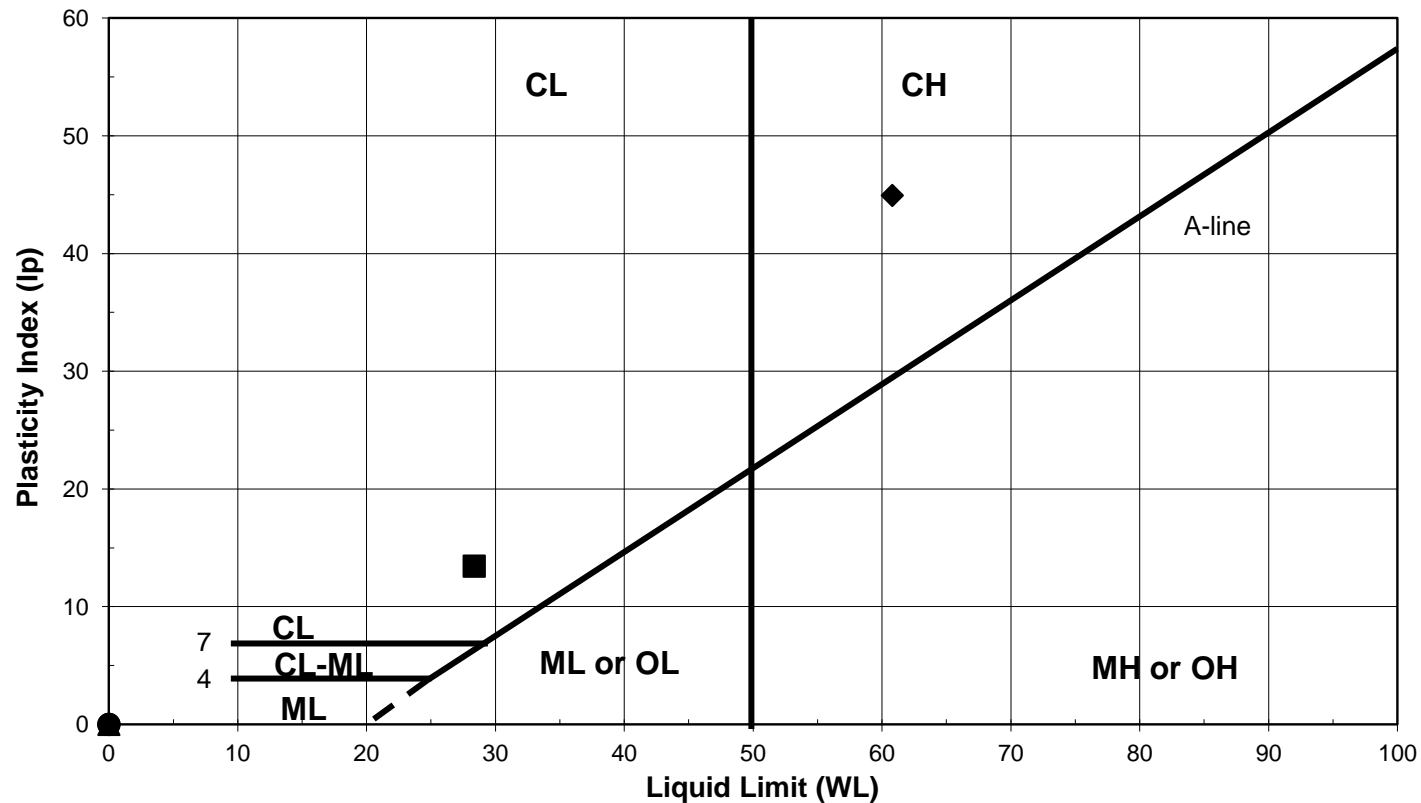
Date: 1-Feb-13

Material Tested: BH 10 Sa. 3

Tested by: HB

Site Sampled: Proposed Pipeline Route

Plasticity Chart



| | Borehole | Depth | Classification | USCS Symbol | Liquid Limit | Plasticity Index |
|---|----------|-----------|----------------|-------------|--------------|------------------|
| ◆ | BH1, Sa3 | 4.6 - 5.2 | Fat CLAY | CH | 61 | 45 |
| ■ | BH9, Sa1 | 1.5 - 2.2 | Lean CLAY | CL | 28 | 13 |
| ▲ | | | | | | |
| ● | | | | | | |
| ○ | | | | | | |

LEGEND

EXISTING M&NP STEEL PIPELINE

BOREHOLE REQUIRED

| | | | | | | |
|-----|-------------------|----------|-----|------|-----|-----|
| NO. | ISSUED FOR REVIEW | 12/12/10 | TLM | DATE | DWM | APP |
| 1 | ISSUED FOR REVIEW | 12/12/10 | TLM | DATE | DWM | APP |

**NEW GLASGOW
PICTOU CO., N.S.**

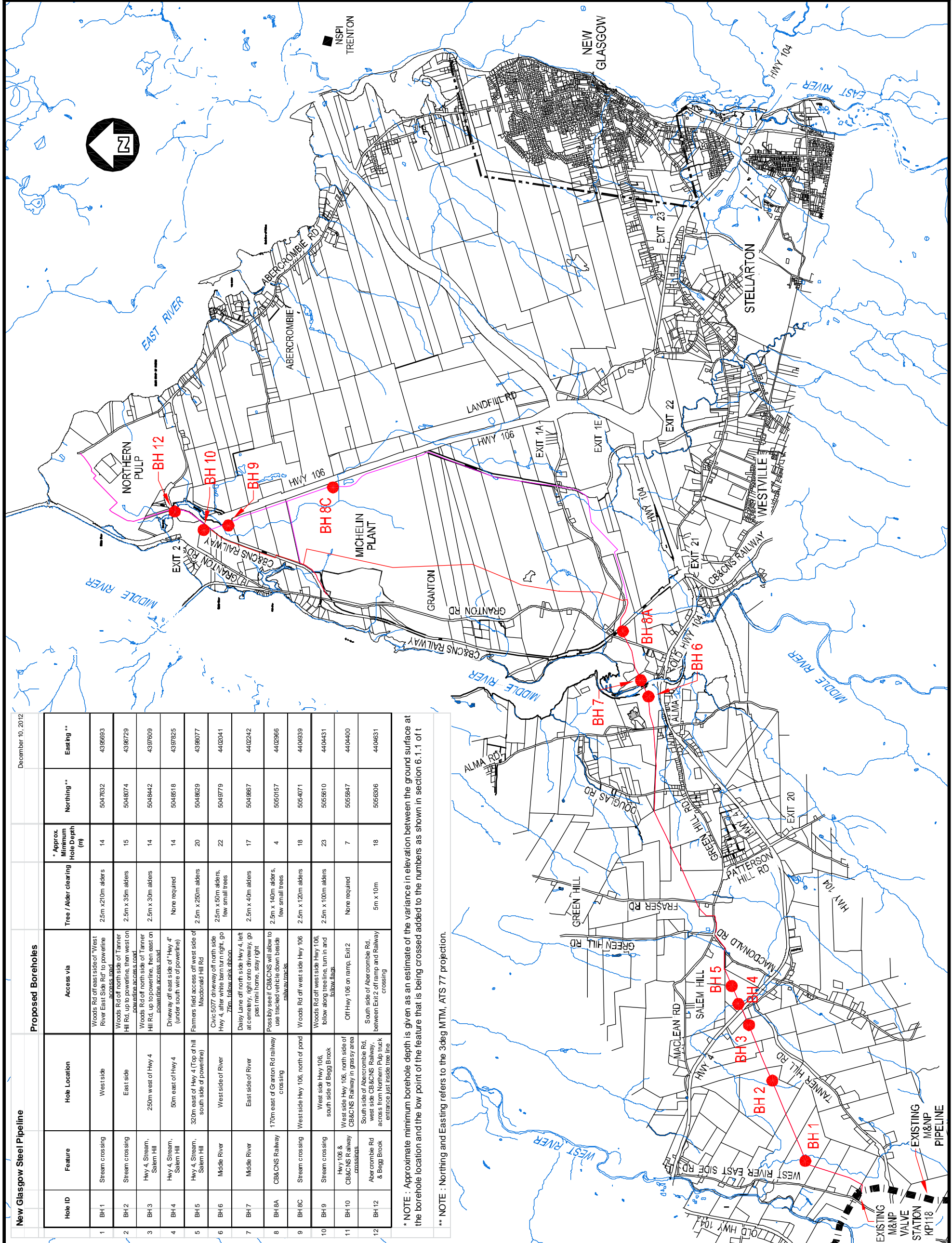
**NATURAL GAS
DISTRIBUTION SYSTEM
NEW GLASGOW PIPELINE**

PROPOSED BOREHOLES

DWG NO: 111101 - 264

DESIGN: T.L.M. SCALE: 0 500 1000m

DRAWN: T.L.M. **FIGURE 1**



| New Glasgow Steel Pipeline | | Proposed Boreholes | | December 10, 2012 | | | |
|----------------------------|-----------------------------|---|---|-------------------------------------|----------------------------------|-------------|------------|
| Hole ID | Feature | Hole Location | Access via | Tree / Alder clearing | * Approx. Minimum Hole Depth (m) | Northing ** | Easting ** |
| 1 | Stream crossing | West side | Woods Rd off east side of "West River East Side Rd" to powerline access road | 2.5m x 210m alders | 14 | 5047632 | 4396693 |
| 2 | Stream crossing | East side | Woods Rd off north side of Tanner Hill Rd. up to powerline, then west on powerline access road | 2.5m x 35m alders | 15 | 5048074 | 4397629 |
| 3 | Hwy 4, Stream, Salem Hill | 250m west of Hwy 4 | Woods Rd off north side of Tanner Hill Rd. up to powerline, then east on powerline access road | 2.5m x 30m alders | 14 | 5048442 | 4397609 |
| 4 | Hwy 4, Stream, Salem Hill | 50m east of Hwy 4 | Driveway off east side of "Hwy 4" (under south wire of powerline) | None required | 14 | 5048518 | 4397825 |
| 5 | Hwy 4, Stream, Salem Hill | 320m east of Hwy 4 (Top of hill south side of powerline) | Farmers field access off west side of Macdonald Hill Rd | 2.5m x 250m alders | 20 | 5048629 | 4398077 |
| 6 | Middle River | West side of River | Civic 5077 driveway off north side Hwy 4, after write barn turn right, go down driveway about | 2.5m x 50m alders, few small trees | 22 | 5048779 | 4402041 |
| 7 | Middle River | East side of River | Daisy Lane off north side Hwy 4, left at cemetery, right onto driveway, go past mini home, stay right | 2.5m x 40m alders | 17 | 5049867 | 4402242 |
| 8 | CB&CN Railway | 170m east of Granton Rd railway crossing | Possibly steel CB&CN will allow to use track bed when the down beside rail tracks | 2.5m x 140m alders, few small trees | 4 | 5050157 | 4402866 |
| 9 | Stream crossing | West side Hwy 106, north of pond | Woods Rd off west side Hwy 106 | 2.5m x 120m alders | 18 | 5054071 | 4404839 |
| 10 | Stream crossing | West side Hwy 106, south side of Begg Brook | Woods Rd off west side Hwy 106, follow along tree line, turn in and follow flags | 2.5m x 100m alders | 23 | 5055610 | 4404431 |
| 11 | Hwy 106 & CB&CN Railway | West side Hwy 106, north side of CB&CN Railway in grassy area | Off Hwy 106 on ramp, Exit 2 | None required | 7 | 5055847 | 4404400 |
| 12 | Abercrombie Rd & Begg Brook | South side of Abercrombie Rd, west side CB&CN Railway, access from Northern Pulp truck entrance just inside tree line | South side of Abercrombie Rd, west side CB&CN Railway, between Exit 2 off ramp and Railway crossing | 5m x 10m | 18 | 5056306 | 4404631 |

* NOTE : Approximate minimum borehole depth is given as an estimate of the variance in elevation between the ground surface at the borehole location and the low point of the feature that is being crossed added to the numbers as shown in section 6.1.1 of 1

** NOTE : Northing and Easting refers to the 3deg MTM, ATS 77 projection.