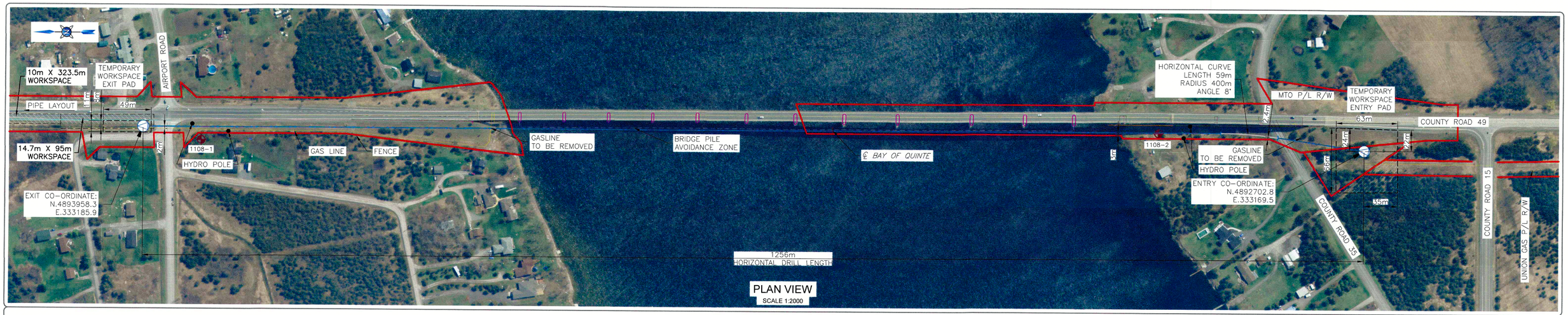
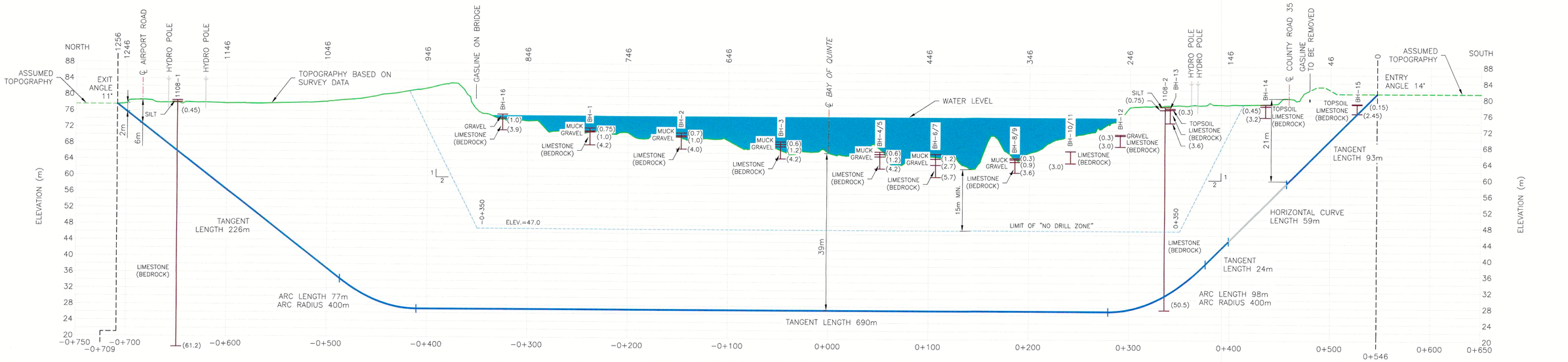


PLAN VIEW
SCALE 1:2000



PROFILE ALONG CENTRELINE OF PIPELINE R/W
SCALE 1:2000 HORIZONTAL
SCALE 1:500 VERTICAL

TOTAL DRILL LENGTH 1267m

CONSTRUCTION

1. All dimensions are in metres unless specified otherwise.
2. All drill path lengths are rounded to the nearest metre and angles are rounded to the nearest degree unless otherwise specified.
3. All dimensions are to the centerline of borehole unless otherwise specified. The HDD Contractor shall verify all topographical survey information represented on this drawing in the field prior to construction.
4. This drawing is based on the information provided from various sources. Consulting company does not take responsibility for the accuracy of information provided by others.
5. The design drill path and existing utilities being crossed shall have a minimum separation of 2m.
6. Contractor shall supply and use an approved annular pressure tool with an appropriate pressure model.
7. The crossing shall be constructed in accordance with CSA Z662-11.
8. HDD contractor shall take specific precautions in protecting the existing utilities at the entry and exit site. Entry/exit pits excavated below existing pipelines, casing to protect pipelines, ramping/matting, and special drilling precautions during exit shall be used to ensure a safe distance from the adjacent pipelines and utilities.
9. Contractor shall assess the need for temporary casing. If required, casing shall be sized to accommodate the final ream pass. The contractor shall supply a casing plan with the tender.
10. The theoretical pull force (including safety factor) for this HDD crossing is 79,000lbs without buoyancy control.
11. The pilot hole shall be installed along the design drill path with the designated design radius of curvature shown in the drawing and the entire drill path shall be within a ±2m radial distance of the design drill path.
12. The design radius for this crossing is 400m. The pilot hole shall adhere to the following tolerances:
    The 10m radius shall not be less than 150m
    The 30m radius shall not be less than 200m
    The 100m radius shall not be less than 360m
13. Equipment shall adhere to the following minimum requirements:
    a. Drilling Equipment:
    - Drilling Rig with a minimum pull force of 330,000lbs;
    - A device shall be supplied to provide tension on the drilling string on exit side (excavator, winch or second drill rig);
    - Drill Pipe 5 1/2" (inspected as per the HDD specification);
    - New Drill Bit – 12 1/4" in diameter or larger (provide details and supplier);
    - New 8" Mud Motor or larger (shall be able to run within the maximum load range) (provide details and supplier);
    - Annular Pressure (0 to 3500kPa range);
    - New Reamers designed for the formation (provide manufacturer's operating specifications and supplier);
    - Para-Track or equivalent steering system;
    - EDR equipment (supplier and specifications);
    - Casing expected to be used in the event it is required (specifications and details).

    b. Recycling Equipment:
    - Pump Capacity (Operable rate – 1.5m³ per minute);
    - Shakers (Operable rate – 1.5m³ per minute);
    - Centrifuge (Minimum Capacity of 1m³ per minute).

    c. Drilling Fluid:
    - Drilling Fluid is maintained at a maximum of 1200kg/m³ and 1.0% sand content;
    - Engineered Drilling Fluid Plan must be able to be implemented in the field with the proposed equipment.

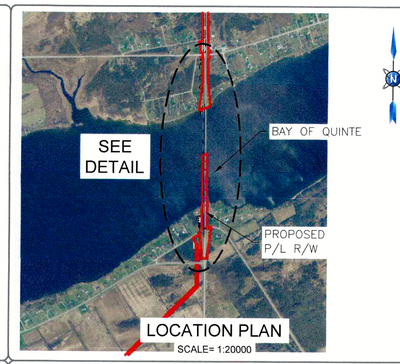
    d. All equipment shall be supplied in good working order maintained, fueled, and serviced. Any equipment not operational or fulfilling the requirements outlined in this contract shall be repaired or replaced at the Contractor's cost. Cost of equipment repair or replacement and standby of equipment and personnel during downtime due to unsuitable or inoperable equipment shall be solely borne by Contractor.
14. Minimum final borehole size is 12 1/4" (311.15mm).

ENVIRONMENTAL

15. Disposal of drilling fluids and cuttings shall be in accordance with the Environmental Protection Act and Regulation 347.
16. Water diversion for makeup water is required for drilling. Diversion location sites shall be further investigated so as to comply with environmental water withdrawal approvals.
17. Emergency response spill kits are required, as per the Environmental Protection Act and as recommended DFO's Operational Statements.
18. Terrestrial "frac walks" shall be initiated every 4 hrs (at a minimum), or immediately following a loss of fluid event.
19. The Contractor shall ensure that the following documentation is on-site and readily available at all times (at a minimum):
    a. All applicable Ontario environment notifications;
    b. Riparian Zone Assessments (if required);
    c. Permit to Take Water (if required);
    d. Emergency Response Procedure (ERP);
    e. Transport Canada Navigable Waters approval (if applicable);
    f. MSDS for all site material.

GEOTECHNICAL

20. Subsurface conditions are believed to be suitable for the construction of the proposed directionally drilled crossing based on the data available.
21. Soil and bedrock stratigraphy shown is based on interpretation of data from two (2) boreholes, drilled at the locations shown, a review of relevant water well drilling reports, hydrogeological reports, bridge construction data and CCI's understanding of the local geology.
22. Due to spacing of boreholes natural variations in bedrock conditions encountered along the length of the bore could be in variance, locally, with those noted on the borehole logs.
23. The recommended "No Drill Zone" incorporates preliminary entry and exit paths along a 2H:1V alignment. It also provides 29 m of vertical cover beneath the surveyed water surface elevation and maintains the bore at or below elevation 47 m, geodetic datum, between Stations -0+350 and 0+350.
24. The "No Drill Zone" shown may not reflect the length and/or configuration of the drill path selected by the designer/contractor, as these depend upon, among other things, the overall site geometry and fluid loss considerations. However, it is recommended that the bore be designed so as to remain outside the "No Drill Zone" shown.
25. It is also recommended that the directional drilling contractor independently evaluate the feasibility of drilling the crossing, with due consideration given to the suitability of his proposed equipment and construction procedures.



LOCATION PLAN
SCALE= 1:20000

REFERENCE DOCUMENT NO.	DATE
1. BAY OF QUINTE REPLACEMENT .....FIELD SURVEY	08-08-14
2. 1108-BAYOFQUINTESTRESS-02	15-01-15
3. 1108-EG-01-AP-G	06-12-14

CCI

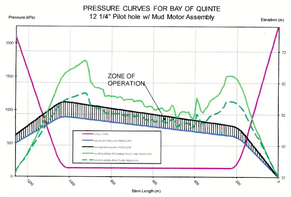
ENGINEER AND PERMIT STAMPS

LICENSED PROFESSIONAL ENGINEER
B. K. GOERZ
100155626
PROVINCE OF ONTARIO
23-01-2015

PIPELINE SPECIFICATIONS

	NPS 8
OUTSIDE DIAMETER (OD)(mm)	219.1
WALL THICKNESS (WT)(mm)	8.2
GRADE	359
PRODUCT	NATURAL GAS
MATERIAL	STEEL
SPECIFICATIONS	CSA Z245.1
INTERNAL COATING	N/A
OUTER COATING	ARO
MAX. OPER. PRESSURE (kPa)	6,896
MIN. TEST PRESSURE (kPa)	SEE SPECS
MAX. OPER. TEMP. (°C)	16

ANNULAR PRESSURE CHART



Separate Chart and Table can be available upon request

STEERING TOLERANCES

	10m	30m	100m
MINIMUM RADIUS (m)	150	200	360

PULL FORCE / RIG SIZE / STRESS

PULL FORCE (W/O BUOYANCY):	79,000 lbs (w/sf)
MINIMUM RECOMMENDED RIG SIZE:	330,000 lbs
COMBINED STRESS UNITY CHECK:	0.34
OPERATING STRESS:	52.0 %

DRAWING STATUS	DATE	DRN	CHK	DES	APR	CR
ISSUED FOR CONSRTUCTION	23-01-15	AP	ML	SW	JT	CL

uniongas
A Spectra Energy Company

BAY OF QUINTE PIPELINE PROJECT
BAY OF QUINTE HDD CROSSING
LOT 5, CON 1 WEST OF GREENPOINT SOPHIASBURGH

SCALE	DWG. #	REVISION	SHEET
AS SHOWN	1108-EG-01	0	1 OF 2