



October 16, 2017

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
2300 Yonge Street, 27th Floor  
Toronto, ON M4P 1E4

COURIER & RESS

Dear Ms. Walli:

**Re: South Bruce Expansion Applications, Board File Nos. EB-2016-0137/0138/0139–  
Union Gas Ltd. CIP Proposal**

Consistent with the direction noted in the Ontario Energy Board's (the "Board") Decision on Preliminary Issues and Procedural Order No. 8 (dated August 22, 2017), attached is Union's Common Infrastructure Plan ("CIP") Proposal to serve the area covered by the above-noted applications.

Union has filed its CIP Proposal on the RESS however as noted on p.13 of the Board's Decision on Preliminary Issues and Procedural Order No. 8, *"to ensure fairness as between the two proponents, the submissions will be received in confidence and will be made publicly available on the next business day."*

If you have any questions with respect to this submission please contact me at 519-436-5473.

Yours truly,

*(Original signed by)*

Karen Hockin  
Manager, Regulatory Initiatives

Cc: Charles Keizer, Torys  
Mark Kitchen, Union

1  
2 **COMMON INFRASTRUCTURE PLAN**  
3 **SOUTH BRUCE NATURAL GAS EXPANSION PROJECT**  
4 **UNION GAS PROPOSAL**  
5

6 The Ontario Energy Board (“the Board”) issued its Decision on Preliminary Issues and  
7 Procedural Order No. 8 on August 22, 2017, which directed that the proponents, Union Gas  
8 Limited (“Union”) and EPCOR Southern Bruce Gas Inc. (“EPCOR”), submit their proposals on  
9 the Common Infrastructure Plan (“CIP”) on October 16, 2017. The following is Union’s  
10 competitive CIP proposal for the South Bruce natural gas expansion project (“the Project”).  
11

12 Union’s proposal is structured to align with the details listed in the Board’s Procedural Order No.  
13 8<sup>1</sup>, as follows:

- 14 1. Introduction
- 15 2. Communities To Be Served
- 16 3. Comparison Criteria
- 17 4. Infrastructure Specifications
- 18 5. Construction Schedule
- 19 6. Customer Attachment Forecast
- 20 7. Volume Forecast
- 21 8. Depreciation Rates
- 22 9. Capital Structure

---

<sup>1</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.9

- 1 10. Tax Costs
- 2 11. Inflation Rate
- 3 12. Service Levels
- 4 13. Interest During Construction
- 5 14. Royalty Payments
- 6 15. Other
- 7 16. Conclusion

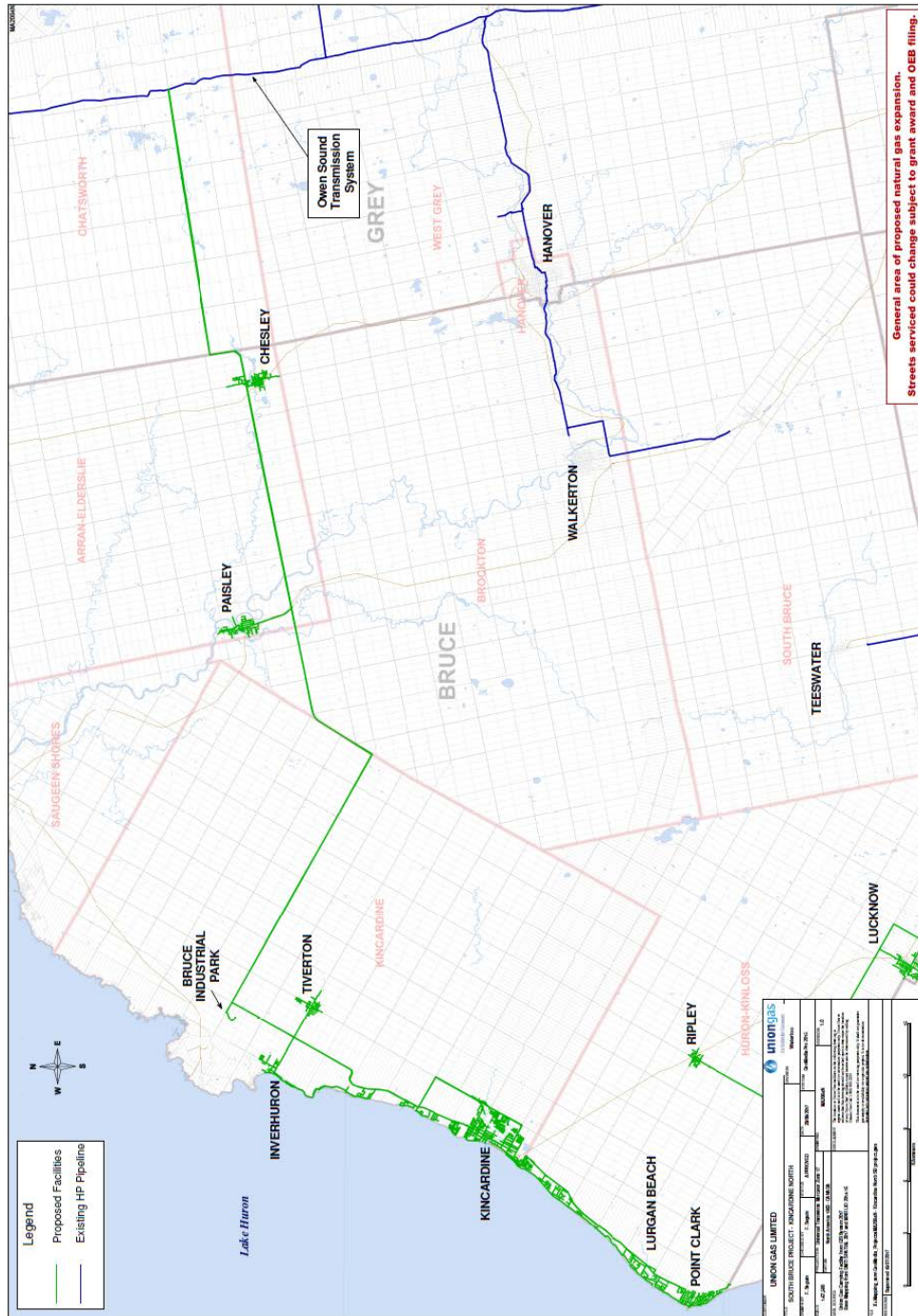
8

9 **1) INTRODUCTION**

10 Union's system design for the Project is based on supplying seven communities along with the  
11 Bruce Energy Centre Industrial Park with natural gas from a supply point on Union's existing  
12 Owen Sound natural gas transmission system north west of Dornoch, Ontario, and supplying a  
13 further two communities with natural gas from a supply point on Union's existing Forest-  
14 Hensall-Goderich ("FHG") natural gas transmission system near Wingham, Ontario. Maps of the  
15 two components of the Project are attached; Figure 1 for communities supplied from the Owen  
16 Sound Line supply point, and Figure 2 for communities supplied from the FHG supply point.

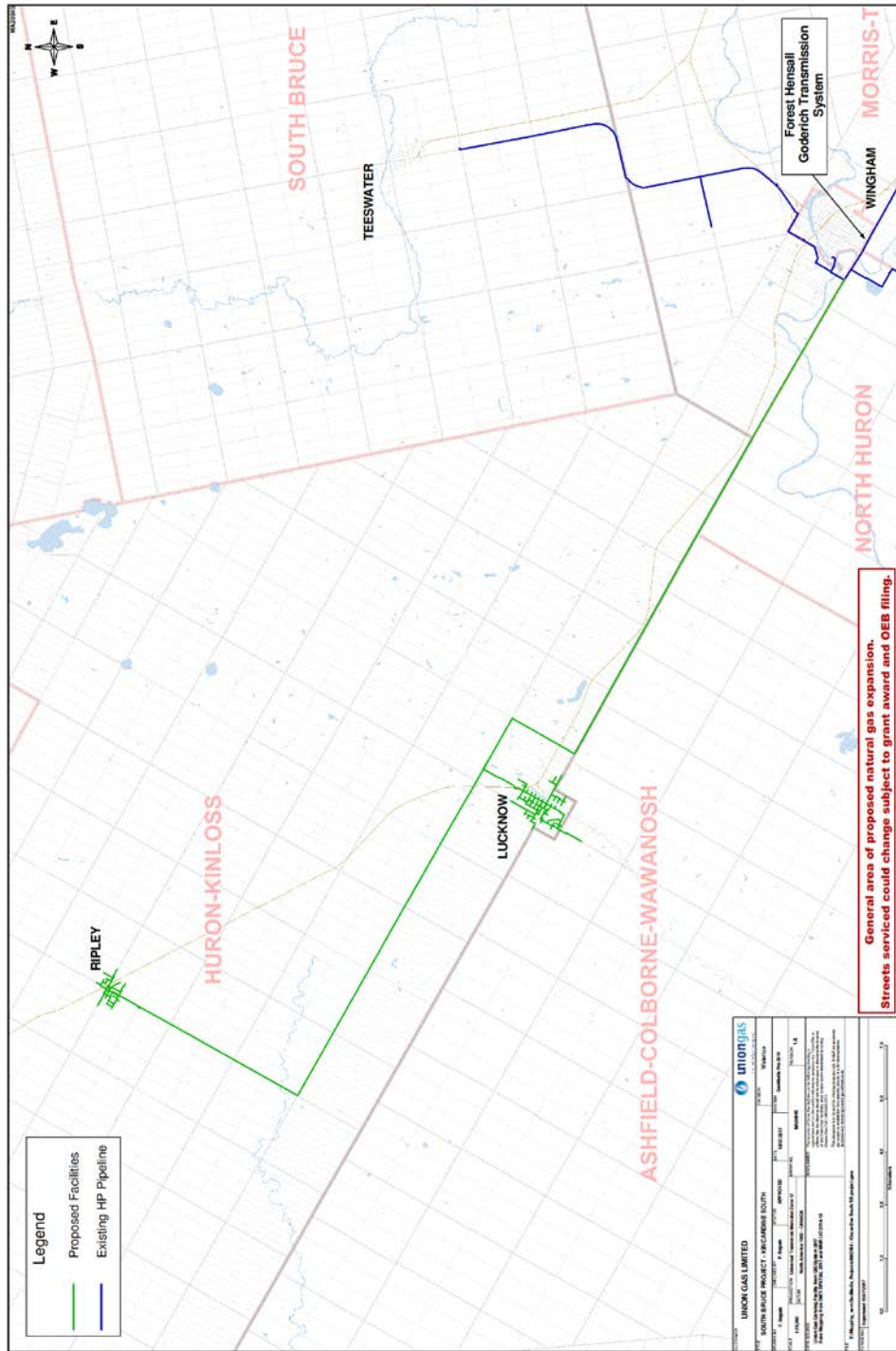
1

**Figure 1: Communities Served from Owen Sound Line Supply Point**



1

Figure 2: Communities Serviced from FHG Supply Point



1 **2) COMMUNITIES TO BE SERVED**

2 Union is proposing to serve the following communities as part of the Project:

- 3 • Chesley
- 4 • Paisley
- 5 • Bruce Energy Centre Industrial Park
- 6 • Tiverton
- 7 • Inverhuron
- 8 • Kincardine
- 9 • Lurgan Beach
- 10 • Point Clark
- 11 • Ripley
- 12 • Lucknow

13

14 **3) COMPARISON CRITERIA**

15 The Board indicated that the comparative criteria to be evaluated in review of the CIP proposals  
16 from the two proponents would include three metrics<sup>2</sup>. The following are results for each of the  
17 three metrics resulting from Union's CIP proposal.

Cumulative 10 year revenue requirement per unit of volume: \$0.2223/m<sup>3</sup>

Customer years: 54,171

Cumulative 10 year volume: 315.403 million m<sup>3</sup>

---

<sup>2</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.4.

1 Table 1 provides a summary of the comparison measures established by the Board for Union's  
2 South Bruce CIP proposal in each year of the 10 year rate stability period. The table provides the  
3 annual revenue requirement, the cumulative annual revenue requirement, the cumulative volume  
4 of natural gas, and the cumulative revenue requirement per m<sup>3</sup> of volume for each year. Detail on  
5 forecasted customer connections is provided in Section 6, and detail on annual volumes is  
6 provided in Section 7.

7 **Table 1: CIP Comparison Criteria**

Year	Annual Revenue Requirement (\$000's)	Cumulative Annual Revenue Requirement (\$000's)	Cumulative Volume (10 <sup>3</sup> m <sup>3</sup> )	Cumulative Revenue Requirement (\$/m <sup>3</sup> )
1	471	471	19,124	0.0246
2	5,234	5,705	44,617	0.1279
3	7,361	13,066	73,936	0.1767
4	7,801	20,866	105,620	0.1976
5	8,030	28,896	138,729	0.2083
6	8,143	37,038	172,602	0.2146
7	8,205	45,243	208,176	0.2173
8	8,252	53,495	243,649	0.2196
9	8,293	61,788	279,249	0.2213
10	8,327	70,114	315,403	0.2223

8  
9 The present value of the 10 year revenue requirement for Union's proposal is \$55.3 million,  
10 based on an annual discount rate of 4%. This discount rate has been agreed upon with EPCOR  
11 as noted in the joint letter from Union and EPCOR filed with the Board on October 2, 2017,  
12 because it is commonly used as a proxy for a "real" discount rate in Demand Side Management  
13 ("DSM") and Conservation and Demand Management ("CDM") Cost Effectiveness Tests<sup>3</sup>.

<sup>3</sup> EB-2014-0134 Filing Guidelines to the Demand Side Management Framework for Natural Gas Distributors (2015-2020), p. 35, dated December 22, 2014.

1 Union's CIP proposal costing assumes that Board approval of a Leave to Construct ("LTC") and  
2 Rates application would be provided no later than August 2018<sup>4</sup> such that construction would  
3 begin in the Spring of 2019, with all mains installed by the end of 2020. Further detail on the  
4 construction schedule is provided in Section 5.

5  
6 The Board has indicated that "the successful proponent will be held to the comparative criteria  
7 agreed to when filing its rates application"<sup>5</sup>. However, the revenue requirements provided in  
8 Table 1 exclude the costs for connection to Union's upstream system and any necessary  
9 upstream reinforcement or advancement of future reinforcement of that system<sup>6</sup>, as well as costs  
10 for DSM offerings and carbon emissions. The above revenue requirement will be updated in any  
11 subsequent LTC and Rates application to reflect (i) the inclusion of these costs in the revenue  
12 requirement, and (ii) a reduction in revenue requirement to account for Aid-to-Construction and  
13 annual funding provided by the municipalities. The revenue requirements shown in Table 1 also  
14 exclude natural gas commodity costs.

15  
16 Table 2 provides the forecasted customer years for Union's CIP proposal. As noted in the Board  
17 Staff progress update to the Board<sup>7</sup>, customer years are based on the number of customers  
18 connected multiplied by the number of years each customer is connected during the initial 10  
19 year service period. For this reason the customer years do not reflect any proration for the period

---

<sup>4</sup> OEB Staff Progress Update: South Bruce Expansion Applications, dated July 20, 2017, p.6.

<sup>5</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.4.

<sup>6</sup> EB-2016-0004 Decision with Reasons, p. 20, dated November 17, 2016

<sup>7</sup> OEB Staff Progress Update: South Bruce Expansion Applications, dated July 20, 2017.



1 within the year in which each customer connects. For example, a customer who connects mid-  
2 year in year one would result in a full 10 customer years in the CIP customer year calculation.

3 **Table 2: Forecasted Customer Years**

<b>Year</b>	<b>Forecasted Customer Attachments</b>	<b>Cumulative Customer Attachments</b>	<b>Cumulative Customer Years</b>
1	1,615	1,615	16,150
2	1,830	3,445	32,620
3	1,471	4,916	44,388
4	742	5,658	49,582
5	330	5,988	51,562
6	177	6,165	52,447
7	171	6,336	53,131
8	174	6,510	53,653
9	172	6,682	53,997
10	174	6,856	54,171

4

5 **4) INFRASTRUCTURE SPECIFICATIONS**

6 Union confirms that its CIP proposal will provide natural gas service to the communities  
7 specified in the Board's Procedural Order No. 8<sup>8</sup>. These include Chesley, Inverhuron, Paisley,  
8 Tiverton, Kincardine, Lucknow, Lurgan Beach, Point Clark, Ripley, and the Bruce Energy  
9 Centre Industrial Park. Union's proposal will also provide service to homes, businesses and  
10 agricultural operations along the route of the natural gas supply lines, and indirectly, to a large  
11 electric power producer via a large industrial customer.

12

13 Table 3 provides detail on the communities to be served. The communities are listed in their  
14 order of occurrence along the new pipeline system from the natural gas supply point to the  
15 termination point. Because the new communities are to be part of a pipeline system, most

---

<sup>8</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.4.

1 communities cannot be served independently from others without a significant impact on the  
 2 revenue requirements. The dependencies are denoted in the last column of Table 3. For example,  
 3 Kincardine, the largest community, cannot be supplied with natural gas unless the supply  
 4 pipeline is first extended to all the communities above it in the Table. Likewise, Ripley cannot be  
 5 supplied unless the supply pipeline is first constructed to Lucknow. The Owen Sound Line  
 6 supplied portion of the Project is independent of the Forest-Hensall-Goderich supplied portion of  
 7 the project.

8 **Table 3: Proposed Communities**

<b>Natural Gas Supply Point</b>	<b>Municipality</b>	<b>Community (Population Centre)</b>	<b>Area Contingent on Natural Gas Supply Line to:</b>
Owen Sound Line	Chatsworth Township	None	None
	Municipality of Arran-Elderslie	Chesley	Chatsworth Twp.
		Paisley	Chelsey
	Municipality of Brockton	None (rural)	Paisley
	Municipality of Kincardine	Bruce Ind. Park	Brockton Twp.
		Tiverton	Bruce Ind. Pk.
		Inverhuron	Bruce Ind. Pk.
		Kincardine	Tiverton
	Huron-Kinloss Township	Lurgan Beach	Kincardine
		Point Clark	Lurgan Beach
Ashfield-Colborne-Wawanosh Twp.	None (rural)	Pt. Clark	
<b>TOTAL</b>	<b>8 Communities (incl. Ind. Park)</b>		
Forest-Hensall-Goderich system	Morris-Turnberry Twp.	None (rural)	None
	Ashfield-Colborne-Wawanosh Twp.	None (rural)	Morris-Turnberry
	Huron Kinloss Township	Lucknow	ACW
		Ripley	Lucknow
<b>TOTAL</b>	<b>2 Communities</b>		
<b>TOTAL PROJECT</b>	<b>10 Communities (incl. Ind. Park)</b>		

9  
 10 This section of Union's CIP proposal describes the infrastructure Union proposes to construct to  
 11 serve the communities located within the Project area. Also included in this section are maps

1 showing the location of the proposed pipelines. Union's standard construction and  
2 environmental practices are also described at a high level.

3  
4 The high pressure steel supply lateral to serve Chesley, Paisley, Bruce Energy Centre Industrial  
5 Park, Tiverton, Inverhuron, Kincardine, Lurgan Beach and Point Clark would take gas from a  
6 tie-in on the Union Gas Owen Sound System at Concession 2 Lot 24 of Sullivan Township in  
7 Grey County, north west of Dornoch. A valve site will be constructed to obtain gas from the  
8 Owen Sound Transmission Pipeline. The pipeline would exit the valve site and travel along  
9 Sideroad 8 until the Grey-Bruce Line where it would turn south and then west along Bruce Road  
10 10 to access Chesley. Through Chesley it would follow the road allowance along Concession 2  
11 Elderslie Road to where it meets the intersection of Bruce Road 1 and Bruce Road 20, then  
12 turning west along the road allowance until going south on Bruce Road 23. It would follow  
13 Bruce Road 23 until Concession Road 5, and then turn east to Highway 21 where it would turn  
14 south along the road allowance and end in the vicinity of Highway 21 and Sutton Street in  
15 Kincardine.

16  
17 Using polyethylene pipe, the community of Paisley would be accessed via Bruce Road 3.  
18 Inverhuron and Tiverton would be accessed via Bruce Road 15. Kincardine would be accessed  
19 via Highway 21 and Kincardine Avenue. Lurgan Beach and Point Clark would be accessed via  
20 Lake Range Drive.

21

1 The high pressure steel supply lateral to serve Lucknow and Ripley would take gas from a tie-in  
2 on the Forest-Hensall-Goderich System on Amberly Road (Highway 86) southwest of Wingham  
3 and follow the Bruce Road 86 road allowance to Torrence Street east of Lucknow. The pipeline  
4 would turn north on Torrence Street to South Kinloss Avenue, turning west to follow the road  
5 allowance to Bruce Road 7 where it would turn north to access Ripley.

6

7 A map showing the supply laterals to serve these communities is attached as Schedule 1. The  
8 supply laterals are proposed to be constructed almost entirely on road allowance, which is  
9 common for these types of projects. Due to the competitive nature of this project, Union has been  
10 unable to engage all relevant municipalities to gain approval on the proposed running lines for  
11 the supply laterals, but will do so as required prior to construction.

12

13 Union is proposing to construct the Project in two phases. The first phase will start construction  
14 in 2019 and will serve Chesley, Paisley, Bruce Energy Centre Industrial Park, Tiverton,  
15 Inverhuron, Kincardine, Lurgan Beach and Point Clark. The second phase will be constructed in  
16 2020 and will serve Lucknow and Ripley.

17

18 Union evaluated a number of options to serve the Project area. These options included a single  
19 feed from the Owen Sound System or a single feed from the FHG System, as well as separate  
20 feeds from various locations on these systems to serve different portions of the Project area.

21

1 Union's preferred alternative is to serve the Project area from both the Owen Sound and FHG  
2 system. The preferred alternative provides service to the 10 year forecast of customer  
3 attachments at Union's least cost and minimizes the amount of upstream reinforcement required.

4  
5 The approximate length and size of the supply laterals required to serve the South Bruce  
6 communities are shown in Table 4:

7 **Table 4: Supply Laterals**

<b>Supply Point</b>	<b>Pipe Type</b>	<b>Diameter</b>	<b>Length (km)</b>
Owen Sound Line	Steel Pipe	NPS 6	43.4
	Steel Pipe	NPS 8	32.8
Forest-Hensall-Goderich System	Steel Pipe	NPS 6	35.0

8  
9 Within the South Bruce communities Union proposes to provide natural gas service to the  
10 locations identified on the maps attached as Schedule 2. Please note the numbers included in the  
11 boxes shown on Schedule 1 correspond to the specific page number of the location maps  
12 included in Schedule 2.

13  
14 The approximate length and size of the distribution pipelines required to serve the communities  
15 in the Project area are shown in Table 5:

16 **Table 5: Distribution Pipelines**

<b>Supply Point</b>	<b>Pipe Type</b>	<b>Diameter</b>	<b>Length (km)</b>
Owen Sound Line	Polyethylene Pipe	NPS 2	144.0
	Polyethylene Pipe	NPS 4	20.2
	Polyethylene Pipe	NPS 6	24.5
Forest-Hensall-Goderich System	Polyethylene Pipe	NPS 2	18.8
	Polyethylene Pipe	NPS 4	3.0

1 Pipeline Design

2 The design and pipe specifications are outlined in Schedule 3. All the design specifications are  
3 in accordance with the *Ontario Regulations 210/01* under the *Technical Standards and Safety*  
4 *Act 2000, Oil and Gas Pipeline Systems*. This is the regulation governing the installation of  
5 pipelines in the Province of Ontario.

6  
7 The Ontario regulations include a classification system on land use and population density to  
8 determine the appropriate design factors. A class location unit is defined as the area that extends  
9 200 metres on either side of the centreline of any continuous 1.6 kilometre length of pipeline.

10

11 Class Location Designations will be in accordance with Table 4.1 of CSA Z662-15.

12

13 Based on preliminary analysis the existing class location designations along the steel pipeline are  
14 Class 1 and 2 and could be as high as 3. The steel pipeline has been designed to exceed the  
15 requirements of *CSA Z662-15*. The proposed steel pipeline will be designed for distribution  
16 service, which exceeds the location factor requirements for a Class 3 location.

17

18 The steel pipe will be manufactured in accordance with *Canadian Standards Association Z245.1-*  
19 *14 Steel Pipe*. The pipe specifications are designed to provide the maximum operating pressure  
20 of 3450 kPa for the portion of the Project served by the Forest-Hensall-Goderich System and  
21 4670 kPa for the portion of the Project served by the Owen Sound System. The steel pipeline  
22 will be tested in accordance with the requirements of the Ontario Regulation 210/01.

1 For the steel pipe, Table 6 shows the hoop stress at maximum operating pressure, expressed as a  
2 percentage of the specified minimum yield strength ("SMYS"):

3 **Table 6: Steel Pipe Hoop Stress**

Supply Point	Pipe	Wall Thickness [mm]	Grade [MPa]	% SMYS
Owen Sound System	NPS 6	4.8	359	22.8%
	NPS 8	5.6	359	25.4%
Forest-Hensall-Goderich System	NPS 6	4.8	290	20.9%

4  
5 The steel pipeline design is in accordance with the *Technical Standards and Safety Authority*  
6 *Guidelines for Locating new oil and gas pipeline facilities*. Since the design hoop stress is less  
7 than 40% of the SMYS, the minimum setback distances required by the guidelines do not apply.

8  
9 All polyethylene pipe and fittings will be manufactured and certified in accordance with the  
10 most current and updated version of the *Canadian Standards Association B137.4 Polyethylene*  
11 *(PE) piping systems for gas services* at the time of construction. The pipe specifications are  
12 designed to provide the maximum operating pressure of 550 kPa. The pipeline will be tested in  
13 accordance with the requirements of the Ontario Regulation 210/01.

14  
15 The minimum depth of cover to the top of the pipe and pipe appurtenances will be in accordance  
16 with the requirements of *Clause 12.4.7 and 12.4.8 of the CSA Z662-15* for polyethylene piping  
17 and steel piping.

18

1 Pipeline Construction

2 The Project will be constructed using Union's standard practices and procedures and will be in  
3 compliance with the mitigation measures identified in the Environmental Protection Plan  
4 ["EPP"]. Schedule 4 provides a summary of Union's standard construction methods. Union's  
5 construction procedures are continually reviewed and refined where appropriate to minimize  
6 potential impacts to the lands and the public.

7

8 Material is readily available for the Project. Union is part of an Alliance Partnership and a  
9 contractor is available to complete the proposed construction. Union has an existing Alliance  
10 Partner contract with two experienced pipeline companies, NPL Canada and Aecon. Union has  
11 been in this partnership since 1999 and it covers the construction of new pipelines (distribution  
12 and transmission) as well as the replacement of existing pipelines as required through Union's  
13 asset management program and municipal requests. Union's Alliance Partnership represents a  
14 leading edge relationship that is unique in the natural gas industry. It has allowed for the  
15 integration of systems and procedures, supports a strong safety culture and enables financial  
16 transparency. The partnership also strengthens Union's ability to develop resources and ensure  
17 retention of skilled workers in Ontario to effectively manage infrastructure booms as the  
18 pipeline construction labour market tightens.

19

20 Approvals are required and will be sought from the Municipalities, Ministry of Transportation,  
21 and local Conservation Authorities once the project has been awarded.

22



1 Environmental

2 Union retained the services of Azimuth Environmental Consulting Inc. to complete an  
3 environmental review for the Project. The EPP completed for the Project meets the intent of the  
4 OEB's environmental guidelines.

5

6 The EPP concluded that construction of the proposed facilities will have no adverse impact on  
7 the environment, land use, and the community provided the appropriate mitigation measures are  
8 adhered to and appropriate approvals are acquired from the relevant agencies.

9 Union is committed to follow the mitigation measures identified by Azimuth while obtaining and  
10 following all environmental approvals.

11

12 Lands

13 Union is proposing to construct all of the supply laterals within road allowance following the  
14 conditions set out in the various franchise agreements, with the exception of one property near  
15 Chesley where Union will obtain an easement agreement.

16

17 Union will offer the landowner the form of easement previously approved by the Board in the  
18 EB-2016-0186 proceeding<sup>9</sup>.

19

20 Union will require the purchase of seven fee simple properties for the stations which are required  
21 along the project route and these costs have been accounted for in the project cost estimate.

---

<sup>9</sup> Panhandle Reinforcement Project OEB Decision (dated February 23, 2017), p.19

1 Union will require temporary land rights adjacent to the road allowances to facilitate pipeline  
2 construction. These rights would be voluntary in nature and be for a period of two years. The  
3 temporary land use agreements will be in the form used by Union on past similar pipeline  
4 projects. These agreements are for a period of two years beginning in the year of construction  
5 and continuing to the year after construction to allow Union to return to the site to perform  
6 further clean-up activities. In any case where a landowner was not willing to grant Union  
7 temporary rights, Union would limit construction to the road allowance only.

8

#### 9 **5) CONSTRUCTION SCHEDULE**

10 Union is proposing to construct the supply laterals in two phases. The first phase tied into the  
11 Owen Sound Line will serve Chesley, Paisley, Bruce Energy Centre Industrial Park, Tiverton,  
12 Inverhuron, and Kincardine and would be constructed in 2019. This supply lateral would also  
13 provide natural gas through the distribution system constructed in 2020 to Lurgan Beach and  
14 Point Clark. The second phase which is tied into the Forest-Hensall-Goderich System will serve  
15 Ripley and Lucknow and would be constructed in 2020. A project schedule, which includes the  
16 preliminary construction timelines for the supply laterals, can be found at Schedule 5.

17

18 Union is also proposing to construct the distribution pipelines over two years. In 2019, Union  
19 proposes to serve Chesley, Paisley, Bruce Energy Centre Industrial Park, Tiverton, Inverhuron,  
20 and a portion of Kincardine. In 2020, Union proposes to construct distribution pipelines to serve  
21 the remainder of Kincardine, Lurgan Beach, and Point Clark. Distribution pipelines will also be

1 constructed to serve Ripley, and Lucknow in 2020. A project schedule, which includes the  
2 preliminary construction timelines for the distribution pipelines, can be found at Schedule 5.

3

4 **6) CUSTOMER ATTACHMENT FORECAST**

5 Union confirms that its attachment forecast spans a 10 year attachment horizon, as specified in  
6 Procedural Order No. 8<sup>10</sup>. Table 7 provides details of Union's attachment forecast.

7

8

**Table 7: Customer Attachment Forecast**

<b>Year</b>	<b>Residential</b>	<b>Commercial</b>	<b>Industrial</b>	<b>Total</b>
1	1,507	105	3	1,615
2	1,700	130	-	1,830
3	1,400	71	-	1,471
4	700	42	-	742
5	300	30	-	330
6	150	27	-	177
7	150	21	-	171
8	150	24	-	174
9	150	22	-	172
10	150	24	-	174
<b>Total</b>	<b>6,357</b>	<b>496</b>	<b>3</b>	<b>6,856</b>

9 Residential attachments in Table 7 include both existing buildings and forecasted new home  
10 construction activity. Commercial attachments in Table 7 include Institutional and Agricultural  
11 sub-segments.

---

<sup>10</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.5.

1 **7) VOLUME FORECAST**

2 Union confirms that its volume forecast spans a 10 year customer attachment horizon, as  
3 specified in Procedural Order No. 8<sup>11</sup>. Table 8 provides details of Union's volume forecast. With  
4 the exception of Industrial and Agricultural grain dryer or large poultry or swine farm loads,  
5 volumes from new customer additions in each specific year are based on connection to the  
6 system in mid-year, as indicated in the Staff progress update to the Board<sup>12</sup>.

7

8

**Table 8: Volume Forecast (10<sup>3</sup>m<sup>3</sup>)**

<b>Year</b>	<b>Residential</b>	<b>Commercial</b>	<b>Industrial</b>	<b>Total</b>
1	1,618	910	16,596	19,124
2	5,061	2,644	17,787	25,493
3	8,390	3,818	17,112	29,319
4	10,643	4,379	16,662	31,684
5	11,715	4,733	16,662	33,109
6	12,195	5,016	16,662	33,873
7	12,515	5,273	17,787	35,574
8	12,834	5,527	17,112	35,473
9	13,154	5,784	16,662	35,600
10	13,473	6,019	16,662	36,154
<b>Total</b>	101,597	44,104	169,701	315,403

9

10 Mass market customer volumes are based on annual average consumption per customer figures  
11 provided in Table 9. The average consumption values in this Table will be common values for  
12 both proponents and have been agreed upon with EPCOR as noted in the joint letter filed with  
13 the Board by Union and EPCOR on October 2, 2017.

---

<sup>11</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.5.

<sup>12</sup> OEB Staff progress Update: South Bruce Expansion Application, dated July 20, 2017, p.5.

1

**Table 9: Average Consumption by Customer Type**

Customer Type		Average Annual Consumption (m <sup>3</sup> )
Residential	Existing Homes	2,149
	New Homes	2,066
Commercial	Small (0-15,000 m <sup>3</sup> )	4,693
	Medium (15,001-50,000 m <sup>3</sup> )	26,933
	Large (>50,000 m <sup>3</sup> )	75,685
Agricultural	Cash Crop Farm	4,720
	Other	4,720

2

3 Industrial and agricultural grain dryer and large poultry or swine farm volumes are based on  
4 Union's assessment of the needs of the specific customers.

5

6 Union has consulted extensively with the largest industrial customer to be served by the Project.

7 As a result, Union has entered into a contractual arrangement for a term of 15 years with this

8 customer. Related volumes represent approximately 50% of the total Project volumes over ten

9 years. Facilities of a large electric power producer will also be serviced indirectly through this

10 customer. The contract is conditional on Board approval of the Project and associated rates.

11

12 Inclusion of this significant contracted volume results in a reduction to the Revenue Requirement

13 per m<sup>3</sup> relative to the same load being excluded. This reduction will benefit the general service

14 customers in the project area.

15

16 **8) DEPRECIATION RATES**

17 Union's CIP revenue requirement calculations include asset depreciation costs based on Union's

1 Board approved depreciation rates as filed in EB-2011-0210<sup>13</sup>. The Board decision on  
 2 preliminary issues indicated that these values are to be common for both proponents<sup>14</sup>. For ease  
 3 of reference the common depreciation rates used are provided in Table 10. Book depreciation is  
 4 based on straight line depreciation with half year applied to year of addition.

5

6

**Table 10: Depreciation Parameters**

<b>Plant Grouping Code</b>	<b>Description</b>	<b>Book Depreciation Rate</b>
<b>TRANSMISSION PLANT</b>		
46100	Land Rights	1.76%
46200	Structures and Improvements Buildings (Including systems to run buildings)	2.03%
46501	Mains - Metallic	1.98%
46600	Compressor Equipment	3.23%
46700	Measuring and Regulating Equipment	2.60%
<b>DISTRIBUTION PLANT- SOUTHERN OPERATIONS</b>		
47100	Land Rights	1.65%
47200	Structures and Improvements Buildings (Including systems to run buildings)	2.22%
47301	Services - Metallic	2.81%
47302	Services - Plastic	2.51%
47400	Regulators	5.00%
47401	Regulator and Meter Installations	2.80%
47501	Mains - Metallic	2.83%
47502	Mains - Plastic	2.31%
47700	Measuring and Regulating Equipment	3.66%
47800	Meters	3.82%

7

<sup>13</sup> Depreciation Rates from EB-2011-0210 Exhibit D3, Tab 4, Schedule 1,

<sup>14</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.5.

1 **9) CAPITAL STRUCTURE**

2 Union confirms that its CIP revenue requirement as identified in this proposal is based on  
3 Union's Board approved deemed debt/equity ratio of 64% debt and 36% equity<sup>15</sup>. The Board  
4 decision on preliminary issues indicated that these values are to be common for both  
5 proponents<sup>16</sup>.

6

7 **10) TAX RATES**

8 The Board Decision on preliminary issues indicated that tax rates are to be common for both  
9 proponents and that both proponents would exclude any property tax holiday from the  
10 municipalities<sup>17</sup>. Tax rates include income taxes, capital cost allowances, and pipeline  
11 assessment and related municipal property tax rates.

12

13 Corporate Income Tax:

14 Income taxes included for recovery in Union's CIP proposal are based on a corporate rate of  
15 26.5%.

16

17 Capital Cost Allowance (CCA):

18 Table 11 provides CCA rates for asset classes included in Union's CIP proposal. CCA is based  
19 on declining balance with half year applied to year of addition.

20

---

<sup>15</sup> EB-2011-0210 Decision and Order pp. 48-50, dated October 25, 2012.

<sup>16</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.5.

<sup>17</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.6.

1

**Table 11: CCA Rates**

Plant Grouping Codes	Description	Capital Cost Allowances (CCA)	
		CCA Class	CCA Rate (%)
<b>TRANSMISSION PLANT</b>			
46501	Mains - Metallic	49	8%
<b>DISTRIBUTION PLANT- SOUTHERN OPERATIONS</b>			
47100	Land Rights	14.1	5%
47200	Structures and Improvements		
	Buildings (Including systems to run buildings)	1	6%
47301	Services - Metallic	51	6%
47302	Services - Plastic	51	6%
47400	Regulators	51	6%
47401	Regulator and Meter Installations	51	6%
47501	Mains - Metallic	51	6%
47502	Mains - Plastic	51	6%
47700	Measuring and Regulating Equipment	51	6%
47800	Meters	51	6%

2

3 Property Taxes:

4 Property tax costs have been determined by applying the current Pipeline Assessment Rates as  
 5 enacted through Ontario Regulation 282/98, and as amended by the Ministry of Finance. The  
 6 pipeline assessment rates<sup>18</sup> apply universally across the Province<sup>18</sup>.

7

8 The pipeline assessment is developed by multiplying the diameter of pipeline used in the  
 9 Project, by the provincially established assessment rate for that diameter, and then by the length  
 10 of the pipeline. Union then multiplied the assessed value by the Pipeline Tax (“PT”) Rate (as

---

<sup>18</sup> The Ministry of Finance assessment rates are provincially enacted through Regulation (O. Reg. 282/98) and are used universally across the Province; the assessed value of the pipeline would be identical no matter where in the Province the plant is being installed. The variable in property taxes paid is the tax rate (mill rate) as tax rates can vary greatly between municipalities.



1 published by that Municipality) to arrive at the estimated annual property tax. The Customer  
2 Connection assessment is calculated by multiplying the number of potential customers by the  
3 applicable assessment rate as established by regulation.

4  
5 Property tax costs included in Union's CIP proposal are based on assessment rates and tax rates  
6 applicable in 2017.

7  
8 The Municipality of Kincardine does not currently have a PT class (pipeline) or PT tax rate. The  
9 municipality is restricted to setting a tax rate for that property class that falls within the range of  
10 tax ratios (Ranges of Fairness) as prescribed in provincial tax policy. A 'tax ratio' represents the  
11 relationship between the residential class tax rate and the rates applicable to other tax classes.

12 Under provincial policy the ranges of fairness for the tax ratio on the PT property class is 0.6 to  
13 0.7 of the Residential Rate. Union has used the higher limit (70%) in estimating property taxes  
14 for the Municipality of Kincardine. This Range of Fairness only applies to the Municipal portion  
15 of the PT Rate.

16  
17 Union confirms that any property tax holiday from the municipalities has been excluded from its  
18 CIP proposal.

## 19 **11) INFLATION COSTS**

20 Union's CIP revenue requirement for the Project includes inflation applied to capital costs and  
21 OM&A costs each year. The Board decision on preliminary issues indicated that the inflation

1 rate applied should be common for both proponents. The inflation rate is based on the most  
2 recent four quarter average GDP IPI FDD<sup>19</sup> methodology as accepted by the Board<sup>20</sup>. The most  
3 recent four quarter average inflation rate applied in determining annual revenue requirements is  
4 1.27%<sup>21</sup>.

5

## 6 **12) SERVICE LEVELS**

7 The Board has a long-standing service quality framework in place that allows it to monitor a  
8 utility's overall service quality performance, both on a short and long-term basis.<sup>22</sup> As per this  
9 Framework, Union is required to not only meet but report to the Board on established practices  
10 and performance standards related to a customer's ability to access to gas distribution services.  
11 These are referred to as SQIs.

12

13 The results of these performance metrics are reported to the Board and other stakeholders on an  
14 annual basis. More specifically, Union communicates the results of these metrics as part of its  
15 annual stakeholder meeting, a requirement established during its existing incentive regulation  
16 ("IRM") Framework<sup>23</sup>; annual deferral disposition and earnings sharing proceedings; and, as part  
17 of the Board's Natural Gas Reporting and Record Keeping Requirements ("RRRs").

18

19 Union consistently meets or exceeds a number of important SQI's. Table 12 shows the results for  
20 the 2016 calendar year:

---

<sup>19</sup> Gross Domestic Product Implicit Price Index- Final Domestic Demand

<sup>20</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.8.

<sup>21</sup> 2017 Q2 / 2016 Q2 x 100: Figures from <http://www5.statcan.gc.ca/cansim/a47>

<sup>22</sup> Gas Distribution Access Rule ("GDAR"), Section 7

<sup>23</sup> EB-2013-0202

1

**Table 12: 2016 SQI Performance Metrics**

<b>Metric</b>	<b>OEB-Approved Standards</b>	<b>2016 Performance</b>
Call Answering Service Level (CASL) (%)	Yearly performance 75%; minimum monthly standard 40%	<b>80.1%</b>
Abandon Rate (AR) (%)	Yearly performance shall not exceed 10%	<b>3.6%</b>
Meter Reading Performance Measurement (MRPM) (%)	Yearly measurement not to exceed 0.5%	<b>0.10%</b>
Number of Days to Provide a Written Response (NDPAWR) (%)	Minimum standard is 80% of customers have written responses within 10 days of distributor receiving complaint	<b>100%</b>
Billing Performance - Total Number of Manual Checks Done When Meter Reads Show Excessively High Usage (as per QAP Criteria)	None specified	<b>118,411</b>
Billing Performance - Total Number of Manual Checks Done When Meter Reads Show Excessively Low Usage (as per QAP Criteria)	None specified	<b>20,365</b>
Percentage of Emergency Calls Responded Within One Hour (ECRWOH) (%)	90% of customers have received responses within 60 minutes of their calling and reaching a live person. Calculated on an annual basis	<b>98.80%</b>
Number Of Days to Reconnect A Customer (NDTRAC) (%)	85% of customers are reconnected within 2 business days of bringing their accounts into good standing. Tracked on a monthly basis	<b>86.20%</b>
Appointments Met Within the Designated Time Period (AMWDTP) (%)	Minimum performance is 85% averaged over a year	<b>98.90%</b>
Time To Reschedule a Missed Appointment (TRMA) (%)	Minimum performance shall be 100% who will receive a call from the utility offering to reschedule within 2 hours of end of original appointment	<b>99.80%</b>

1 Union is committed to maintaining the same high level of service for the South Bruce area as for  
2 its other service areas.

3

### 4 **13) INTEREST DURING CONSTRUCTION**

5 Union's policy on treatment of Interest During Construction ("IDC") was filed with the Board in  
6 EB-2011-0210<sup>24</sup>. IDC is capitalized on all qualifying projects from the date that costs are  
7 continuously incurred. Qualifying projects are projects that have a budget or plan that exceeds  
8 \$1,000,000 and construction is expected to take more than twelve months to complete. Project  
9 cost, prior to the consideration of aid, is used to determine whether the project qualifies for IDC,  
10 unless the aid is received in advance of construction.

11

12 Since part of the Owen Sound System supplied portion of the project<sup>25</sup> will be constructed over  
13 a period in excess of 12 months, from September 2018 (procurement of material) to December  
14 2019, that portion of the project will attract IDC<sup>26</sup>. The second part of the Owen Sound System  
15 supplied portion of the project will be constructed within a 12 month period, January to  
16 December 2020, and will not attract IDC. The Forest-Hensall-Goderich supplied portion of the  
17 project will be constructed within a 12 month period of time (January to December, 2020), and  
18 will not attract IDC. Consequently, in accordance with Union's policy, Union's revenue  
19 requirement for the CIP includes the capital cost for Construction Work in Progress ("CWIP")

---

<sup>24</sup> EB-2011-0210- Exhibit B1, Tab 2, Appendix A.

<sup>25</sup> The high pressure supply line and distribution systems serving Chesley, Paisley, Tiverton, Inverhuron, and part of Kincardine will enter service in late 2019.

<sup>26</sup> This portion includes the high pressure supply line and distribution systems serving Chesley, Paisley, The Bruce Industrial Park, Tiverton, Inverhuron, and part of Kincardine.

1 (also known as IDC) on part of the Owen Sound System supplied portion of the CIP, at a rate of  
2 2.99% per year<sup>27</sup>, for 18 months. The Board decision on preliminary issues indicated that this  
3 rate is to be common for both proponents<sup>28</sup>.

#### 4 **14) ROYALTY PAYMENTS**

5 Union's CIP proposal for the Project does not include making any royalty payments to the  
6 municipalities, and consequently no royalty payments are required to be recovered from  
7 ratepayers, or included in the revenue requirement for its CIP proposal.

#### 9 **15) OTHER**

10 Union feels it is important to note that certain assumptions, many of which are required to meet  
11 utility requirements including operational, compliance and/or financial, are excluded as CIP  
12 parameters. While these are to be excluded for purposes of CIP comparisons, Union wishes to  
13 reiterate that costs specific to these exclusions such as DSM, Cap-and-Trade, upstream  
14 reinforcement, municipal tax relief and low-income emergency financial assistance (i.e. LEAP  
15 funding) are real and will need to be considered for rate setting purposes later in this process.  
16 The following addresses other factors the Board may wish to consider when comparing CIP  
17 proposals.

18

19

---

<sup>27</sup> OEB CWIP account prescribed interest rate, Q3 2017: <https://www.oeb.ca/industry/rules-codes-and-requirements/prescribed-interest-rates>

<sup>28</sup> EB-2016-0137/138/139 Decision on Preliminary Issues and Procedural Order No. 8, p.7.

1 Natural Gas Distribution Project Development Experience:

2 Union has a long history of successfully developing, constructing and operating natural gas  
3 distribution projects similar in nature to the South Bruce expansion project. For example,  
4 Union's most recent large community expansion project to service the Red Lake area entered  
5 service in 2012, and 99.3% of forecasted attachments occurred by the end of 2016.

6

7 Customer Equipment Financing Support:

8 Union is presently negotiating an agreement with a major financial institution to develop a  
9 unique consumer financing program for this project area. The agreement is expected to provide a  
10 consumer loan offering to support natural gas conversion costs, subject to the institution's typical  
11 credit adjudication criteria. The offering will be based on a fixed rate per annum which will  
12 represent a discount of up to 300bps (3%) off regular rates. The offering will be made available  
13 to local consumers and to local heating, ventilation and air conditioning ("HVAC") dealers as  
14 part of planned market outreach activities after commencement of construction. Availability of  
15 this offering is expected to support the customer attachment forecast since it addresses the barrier  
16 for some customers of requiring up-front payment for equipment being replaced, and can provide  
17 for payments over the life of the loan to be offset by ongoing energy cost savings.

18

19 HVAC Partnerships:

20 Due to the mere size and scope of the Project, the engagement of a significant number of HVAC  
21 dealers and contractors is required to either replace or convert existing equipment in homes and  
22 businesses to natural gas. Union has longstanding relationships with HVAC organizations across

1 the South Bruce community expansion service area. Union regularly communicates with  
2 contractors through periodic face-to-face meetings as well as a quarterly newsletter which  
3 provides key information and updates to HVAC Contractors/Dealers.

4  
5 There are approximately 100 HVAC contractors/dealers serving the regional area surrounding  
6 the South Bruce expansion communities. In 2017, Union conducted four HVAC Information  
7 Sessions in the region, with over 100 representatives from 73 HVAC organizations attending the  
8 sessions. At each session a portion of the agenda was devoted to Community Expansion updates.  
9 Union has also been an active member of the Grey Bruce Heating, Refrigeration and Air  
10 Conditioning Institute of Canada (“HRAI”) Chapter for a number of years. Community  
11 expansion updates have been provided on a regular basis, including at their meetings held on  
12 February 21, 2017 and June 22, 2017.

13  
14 Union is also planning joint sessions with distributors/wholesalers to coordinate communication  
15 for HVACs that service the Project communities. Additional HVAC outreach is planned to  
16 explore incentives these channels may be willing to offer at the time of conversion when natural  
17 gas becomes available in the South Bruce area. Examples may include extension of service  
18 warranties, installation rebates or equipment upgrades. Union is also planning outreach to  
19 equipment manufacturers to explore additional incentives in the form of a rebate at the time of  
20 conversion. These initiatives could potentially accelerate conversion paybacks and provide  
21 additional customer benefits.

22

1 Emergency Response:

2 Union operates in rural, remote, and urban communities across the Province, and has a  
3 comprehensive Emergency Preparedness and Response Program which includes refined  
4 processes and well trained employees on call to respond to emergencies 24 hours per day, 365  
5 days per year. Union's Owen Sound area utility services team will manage the safe and reliable  
6 operations for the Project area. In 2016, Union's employees in this area responded on site to  
7 emergencies 96.1% of the time within 60 minutes with an average response time of 33 minutes.  
8 Across its franchise area in 2016, Union responded to 13,506 emergencies and was on site within  
9 60 minutes 98.8 % of the time, with an average response time of 29 minutes.

10

11 Union employs over 400 skilled and experienced front line technical field employees. For large  
12 scale emergencies Union is able to marshal these resources from across Ontario for support. This  
13 was evident, for example, when Union supported the Town of Goderich for 12 days following  
14 the 2011 tornado that devastated the community. During the initial response period Union  
15 reassigned significant response resources from other geographic areas to support local response  
16 activities. The number of employees reassigned averaged 22 employees per day and peaked at a  
17 high of 52 per day.

18

19 Customer Satisfaction:

20 Union has a long history of satisfying its customers. Union is a major natural gas storage,  
21 transmission and distribution company with over 100 years of experience and service to  
22 customers. Union's distribution business serves approximately 1.5 million residential,



1 commercial and industrial customers in more than 400 communities across northern,  
2 southwestern and eastern Ontario.

3

4 Key metrics and ratings from Union's 2016 residential customer satisfaction measurement  
5 program are as follows:

- 6 • 95% rated Union 8, 9 or 10 on a 10 point scale for **reliability** in providing their home with  
7 natural gas,
- 8 • 89% rated Union 8, 9 or 10 on a 10 point scale for **providing safe and worry free service**,
- 9 • 82% rated Union 8, 9 or 10 on a 10 point scale for being **easy to do business with**,
- 10 • 93% rated Union 8, 9 or 10 on a 10 on a 10 point scale for their **experience** when one of  
11 Union's utility service reps visit their homes, and
- 12 • 88% of customers indicated their **concern was resolved with one call** when calling Union's  
13 call centre

14

15 First Nation and Métis Consultation:

16 Union is committed to building long-term productive relationships with members of the First  
17 Nation and Métis communities based on mutual respect and economic opportunity. Union  
18 maintains an extensive data base and knowledge of First Nations and Métis organizations in  
19 Ontario. Union also consults with the Tribal organizations and the data bases of the Ministry of  
20 Natural Resources and the Ministry of Energy and Aboriginal Affairs and Indigenous and  
21 Northern Affairs Canada to ensure consultation is carried out with the most appropriate groups.  
22 Union has a long standing practice of consulting with First Nation and Métis organizations and

1 has engaged with local groups as part of the development of this Project. Union has held  
2 discussions about the South Bruce expansion project with the Saugeen Ojibway Nation (“SON”),  
3 the Region 7 Métis Nation of Ontario and, the Historic Saugeen Métis. Union has an established  
4 working relationship based on fairness and respect with each of these organizations. To date, no  
5 concerns on the Project have been raised.

6

7 Union has specific programs in place whereby it works with First Nation and Métis  
8 organizations to ensure they are not only aware of Union’s projects but have the opportunity to  
9 participate in both the planning and construction phases of a project. This includes monitors  
10 accompanying Union’s consultants during archaeological and environmental studies, and  
11 providing employment opportunities, where possible, to First Nation and Métis groups during  
12 construction

13

14 Damage Prevention:

15 Union has an industry leading damage prevention program, and was instrumental in creating  
16 Ontario One Call, the Ontario Regional Common Ground Alliance, the Locate Alliance  
17 Consortium, and the first mandatory One Call system in Canada. The goal of all these  
18 organizations is to protect the public by reducing the number of third party damages to Union’s  
19 underground network of pipelines and services.

20

21 Union is a member in good standing with Ontario One Call and has multi-year contracts, through  
22 the Locate Alliance Consortium, with multiple service providers to cost-effectively complete

1 locates. Union will leverage these relationships to provide line locate services for the  
2 underground network proposed for South Bruce.

3

4 Leak Survey:

5 Union has a comprehensive leak survey program which includes a long-term contract with a  
6 service provider. On an annual basis, Union completes leak surveys on approximately 10,000 km  
7 of pipe and 250,000 services. The same comprehensive program can be implemented for the  
8 Project area.

9

10 Meter Accreditation:

11 Union operates and maintains a Measurement Program that is accredited by Measurement  
12 Canada. Qualified Union employees perform the duties of a Quality Assurance Inspector to  
13 ensure that Union provides its customers with accurate, safe, and reliable measuring devices  
14 which meet or exceed all applicable regulatory requirements. In 2016, Union sealed  
15 approximately 80,000 meters and will be able to extend these services for measurement  
16 equipment for customers in the South Bruce communities.

17

18 Energy Conservation and Carbon Emissions:

19 Although both Cap-and-Trade and DSM are excluded from the CIP revenue requirement  
20 calculations, there is a legislative requirement for Ontario natural gas utilities to have a Cap-and-  
21 Trade compliance program in place. With respect to DSM, since the 1990's Union has had  
22 significant success in implementing DSM programs to assist customers in reducing their natural

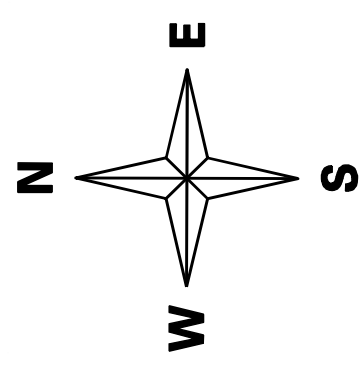
1 gas consumption and related greenhouse gas (“GHG”) emissions. Union submits that both its  
2 comprehensive Cap-and-Trade and DSM programs can be leveraged or extended to South Bruce  
3 Project area consumers.

4

## 5 **16) CONCLUSION**

6 As noted earlier in this submission, Union’s CIP proposal to serve the Project area is fully  
7 aligned with the details cited in the Board’s August 22<sup>nd</sup> Decision on Preliminary Issues and  
8 Procedural Order No. 8. As a long standing natural gas distribution company, Union maintains  
9 the expansion of natural gas infrastructure to the Project area will create economic benefits both  
10 from an individual customer and community-wide perspective. Having access to natural gas as a  
11 reliable, affordable and stable energy source will help support growth and development within  
12 the Project area. Union can attest to this through the vast experience it has gained in providing  
13 safe, reliable natural gas service to approximately 1.5 million customers in over 400  
14 communities across Ontario.

# Southern Bruce County Expansion Proposal (Schedule 1 – Supply Laterals)



Bruce Industrial Park

Inverhuron

Lake Huron

Tiverton

Kincardine

7

Lurgan Beach  
Point Clark

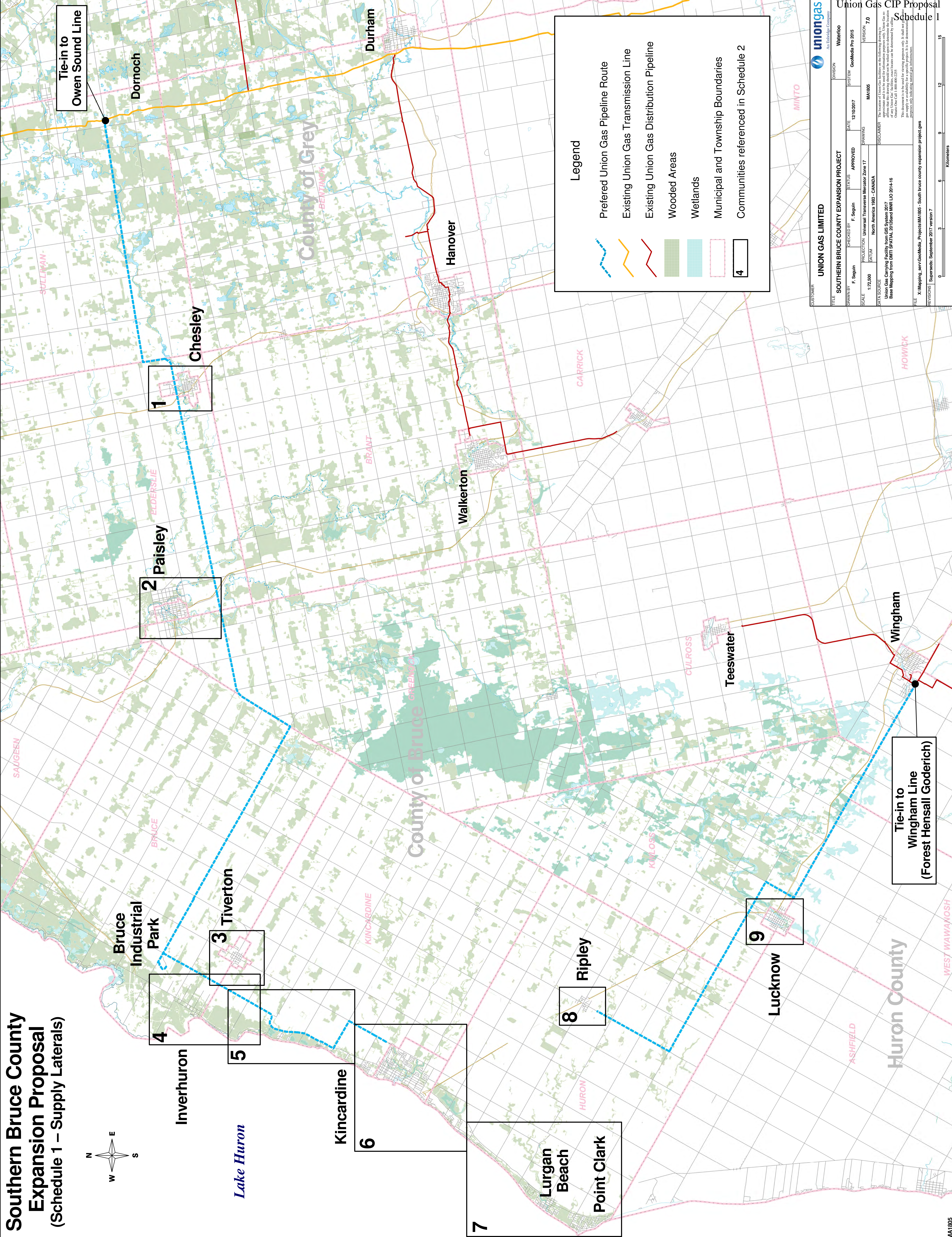
8  
Ripley

9  
Lucknow

Teeswater

Huron County

Tie-in to  
Wingham Line  
(Forest Hensall Goderich)



**Legend**

- Preferred Union Gas Pipeline Route
- Existing Union Gas Transmission Line
- Existing Union Gas Distribution Pipeline
- Wooded Areas
- Wetlands
- Municipal and Township Boundaries
- Communities referenced in Schedule 2

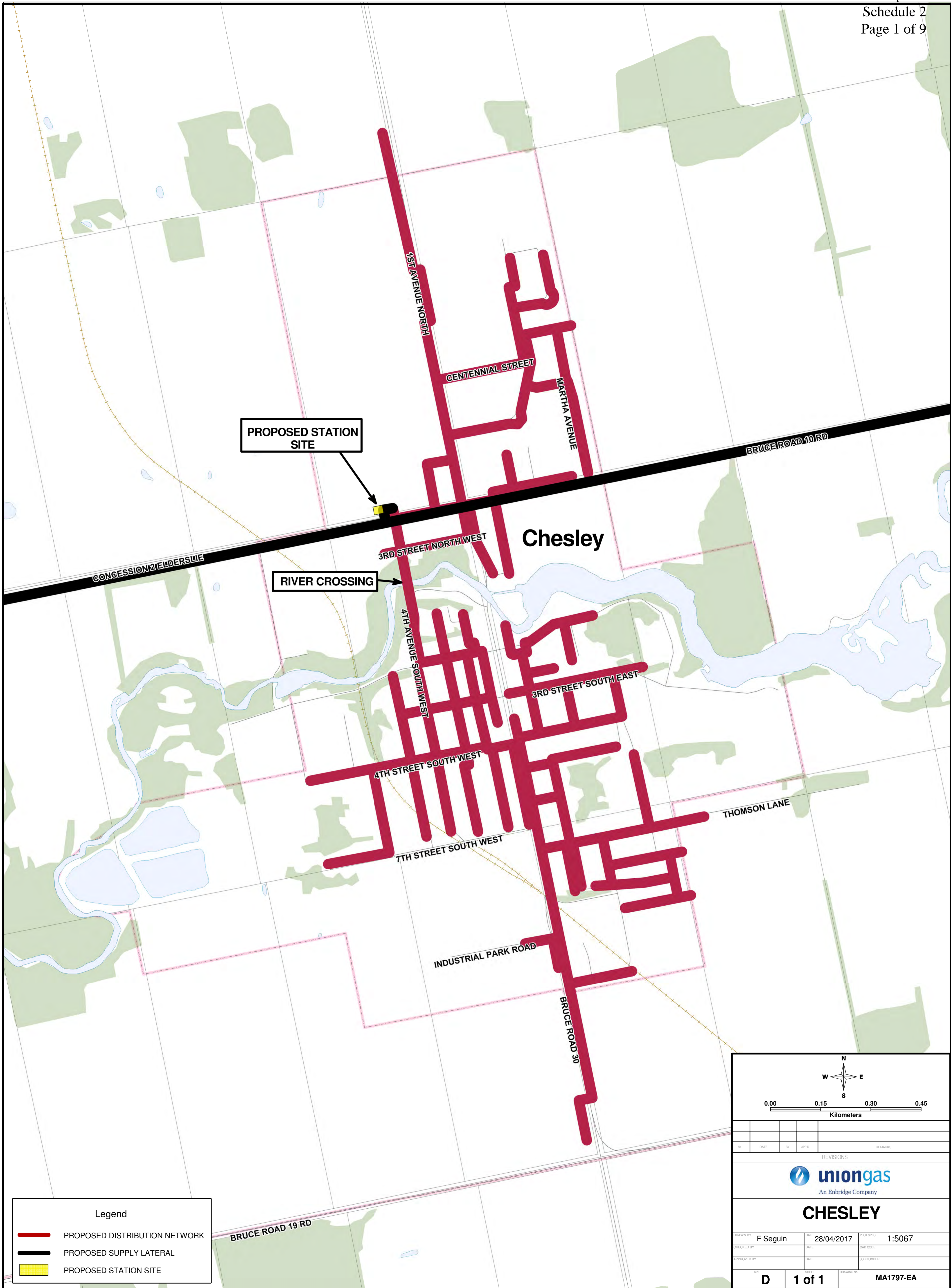
**UNION GAS LIMITED**  
All Rights Reserved

**UNION GAS**  
All Rights Reserved

**UNION GAS CIP Proposal Schedule 1**

CUSTOMER	UNION GAS LIMITED	DIVISION	Waterloo
TITLE	SOUTHERN BRUCE COUNTY EXPANSION PROJECT		
DRAWN BY	F. Seguin	STATUS	APPROVED
DATE	12/10/2017	SYSTEM	GeoMedia Pro 2015
SCALE	1:72,500	DRAWING	MA1805
PROJECTION	Universal Transverse Mercator Zone 17	VERSION	7.0
DATUM	North America 1983 - CANADA	<p><small>The location of Union Gas facilities on the following drawing is approximate and is not to be used for reference purposes only. Union Gas reserves the right to change the location of any facility without notice. The location of any Union Gas facility, exact location can be determined by contacting Union Gas at 1-800-405-2225. Union Gas does not warrant the accuracy of the information provided on this drawing for any purpose other than the specific project. It is for information purposes only and does not constitute a contract.</small></p>	
FILE	X:\Mapping_srv\GeoMedia_Projects\MA1805 - South bruce county expansion project.gws		
REVISIONS	Supersedes: September 2017 version 7		

0 3 6 9 12 15  
Kilometers



PROPOSED STATION SITE

RIVER CROSSING

Chesley

**Legend**

- PROPOSED DISTRIBUTION NETWORK
- PROPOSED SUPPLY LATERAL
- PROPOSED STATION SITE

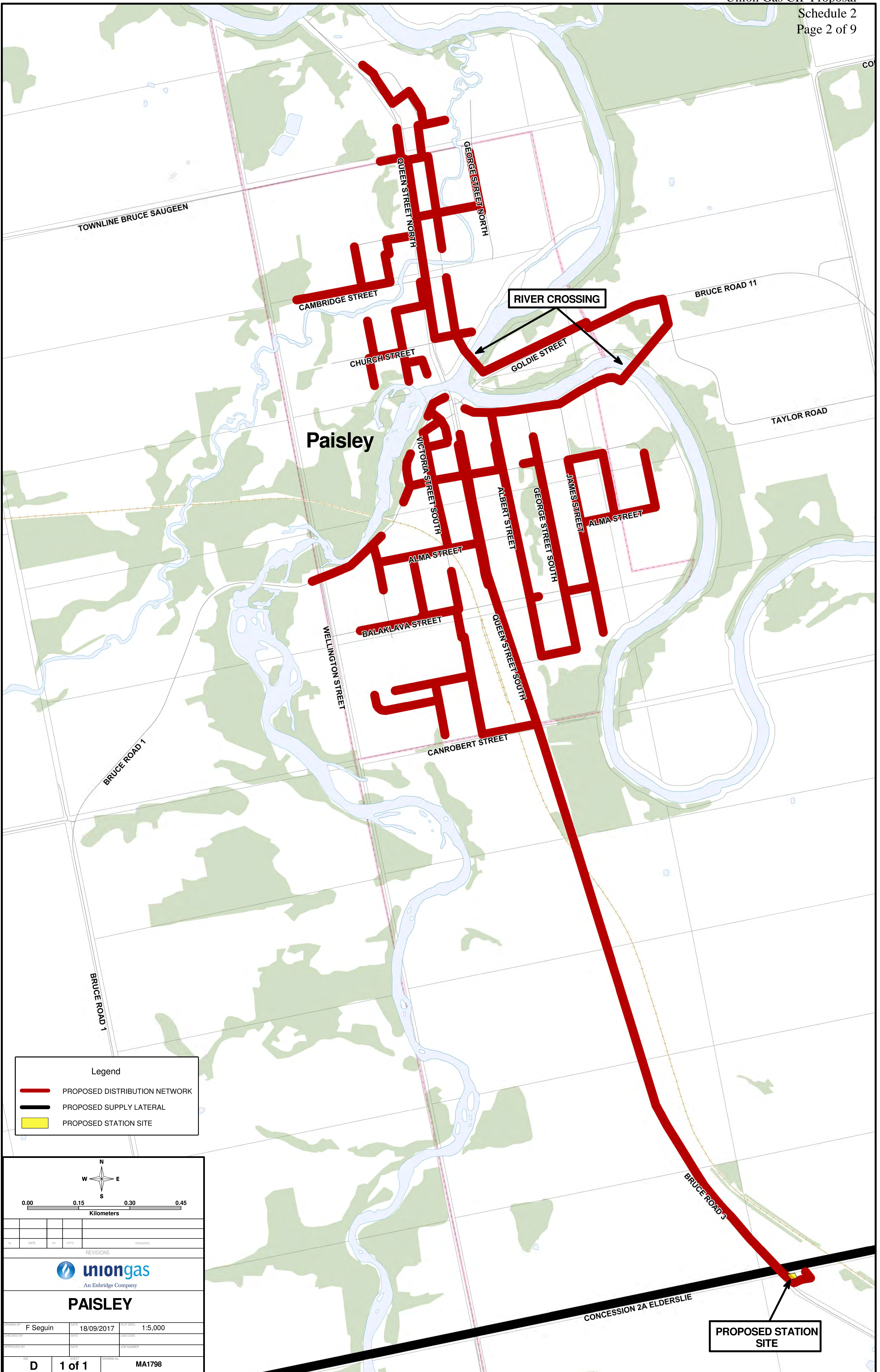
0.00 0.15 0.30 0.45  
Kilometers

No.	DATE	BY	APPD	REVISIONS	REMARKS

**CHESLEY**

DRAWN BY: F Seguin	DATE: 28/04/2017	PLT SPEC: 1:5067
CHECKED BY:	DATE:	CAJ CODE:
APPROVED BY:	DATE:	CS NUMBER:

<b>D</b>	<b>1 of 1</b>	DRAWING NO. <b>MA1797-EA</b>
----------	---------------	------------------------------



**Legend**

- PROPOSED DISTRIBUTION NETWORK
- PROPOSED SUPPLY LATERAL
- PROPOSED STATION SITE

0.00    0.15    0.30    0.45  
 Kilometers

No.	DATE	BY	CHG	REVISIONS	REMARKS

**uniongas**  
 An Enbridge Company

## PAISLEY

DRAWN BY: F Seguin	DATE: 18/09/2017	PLOT SCALE: 1:5,000
CHECKED BY:	DATE:	CD CODE:
APPROVED BY:	DATE:	JOB NUMBER:
<b>D</b>	<b>1 of 1</b>	DRAWING NO. MA1798

**PROPOSED STATION SITE**

0.00 0.15 0.30  
Kilometers

**uniongas**  
An Enbridge Company

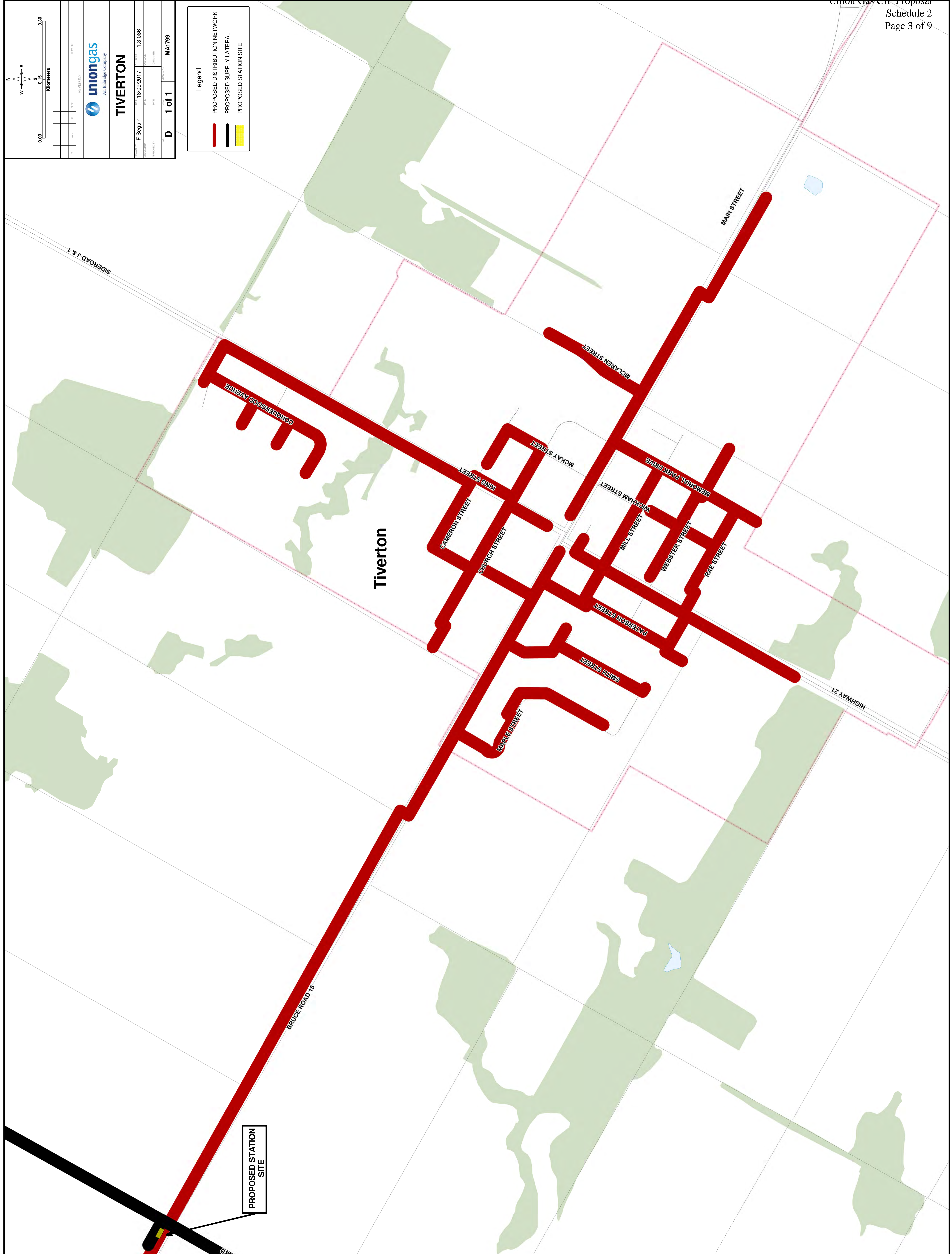
**TIVERTON**

PROJECT	F Seguin	DATE	18/09/2017	SCALE	1:3,086
DRAWN		CHECKED		APPROVED	
DATE		DATE		DATE	
NO.		NO.		NO.	

**D 1 of 1**      **MAT799**

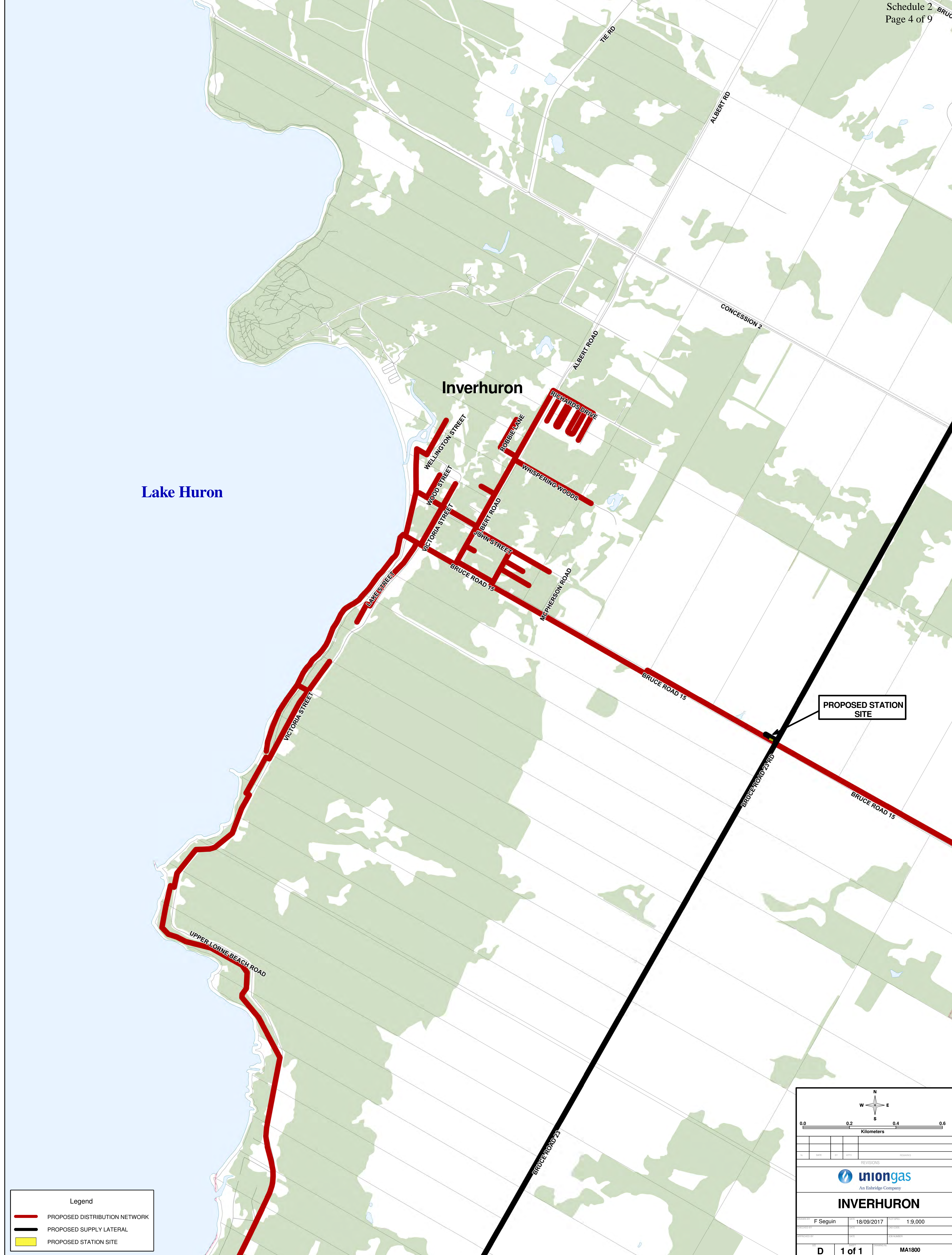
**Legend**

- PROPOSED DISTRIBUTION NETWORK
- PROPOSED SUPPLY LATERAL
- PROPOSED STATION SITE



PROPOSED STATION SITE





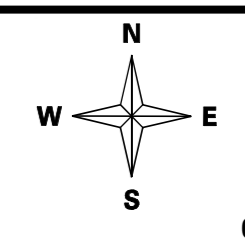
Lake Huron

Inverhuron

PROPOSED STATION SITE

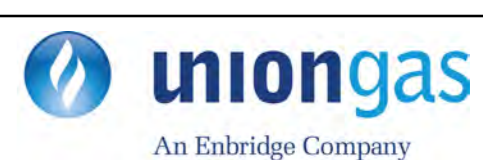
**Legend**

- PROPOSED DISTRIBUTION NETWORK
- PROPOSED SUPPLY LATERAL
- PROPOSED STATION SITE



0.0 0.2 0.4 0.6  
Kilometers

REVISIONS			
NO.	DATE	BY	REVISION



**INVERHURON**

DESIGNED BY F Seguin	DATE 18/09/2017	SCALE 1:9,000
DRAWN BY	CHECKED BY	APPROVED BY

D	1 of 1	MA1800
---	--------	--------

0.0 0.3 0.6 0.9  
Kilometers

NO.	DATE	BY	REVISIONS

REVISIONS

**uniongas**  
An Enbridge Company

**KINCARDINE NORTH**

PROJECT BY	F Seguin	DATE	18/09/2017	SCALE	1:9,000
DESIGNED BY		DATE			
CHECKED BY		DATE			

**D** 1 of 1 MA1796A

Legend

- PROPOSED DISTRIBUTION NETWORK
- PROPOSED SUPPLY LATERAL
- PROPOSED STATION SITE





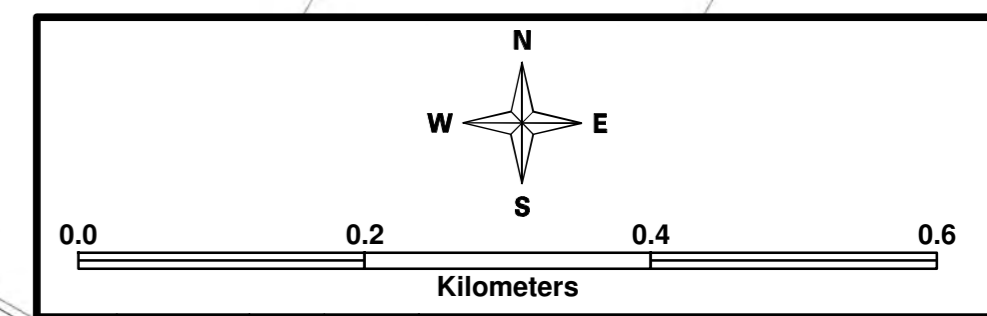
Lake Huron

PROPOSED STATION SITE

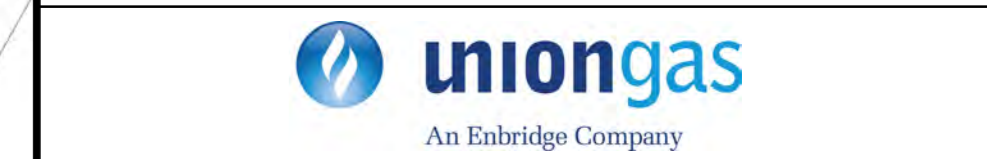
Kincardine

**Legend**

- PROPOSED DISTRIBUTION NETWORK
- PROPOSED SUPPLY LATERAL
- PROPOSED STATION SITE



NO.	DATE	BY	APP'D	REVISIONS



**KINCARDINE**

DESIGNED BY	F Seguin	DATE	18/09/2017	SCALE	1:9,000
DRAWN BY		DATE			
CHECKED BY		DATE			

Lake Huron

Lurgan Beach

Point Clark

Legend

- PROPOSED DISTRIBUTION NETWORK
- PROPOSED SUPPLY LATERAL
- PROPOSED STATION SITE

0.0 0.3 0.6 0.9  
Kilometers

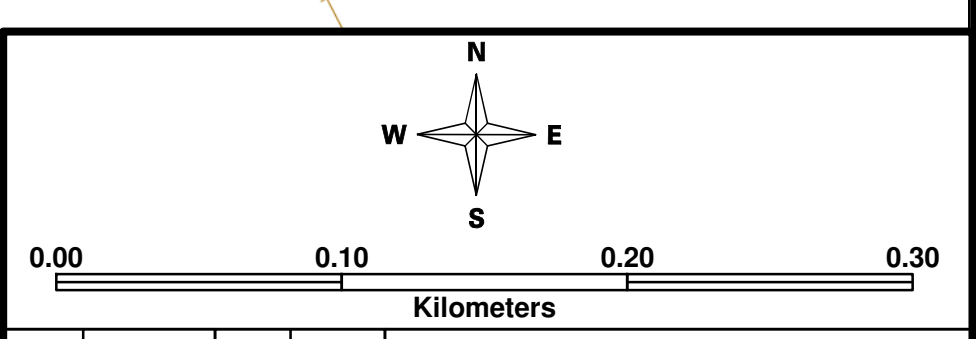
REVISIONS		
uniongas An Enbridge Company		
<b>POINT CLARK AND LURGAN BEACH</b>		
F Seguin	21/09/2017	1:9,000
D	1 of 1	MA1801



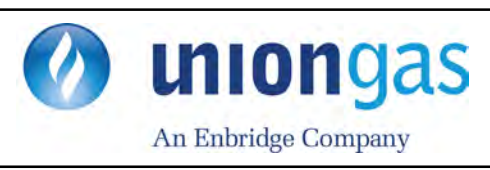
PROPOSED STATION SITE

**Legend**

- PROPOSED DISTRIBUTION NETWORK
- PROPOSED SUPPLY LATERAL
- PROPOSED STATION SITE



REVISIONS				
NO.	DATE	BY	APPD.	REMARKS

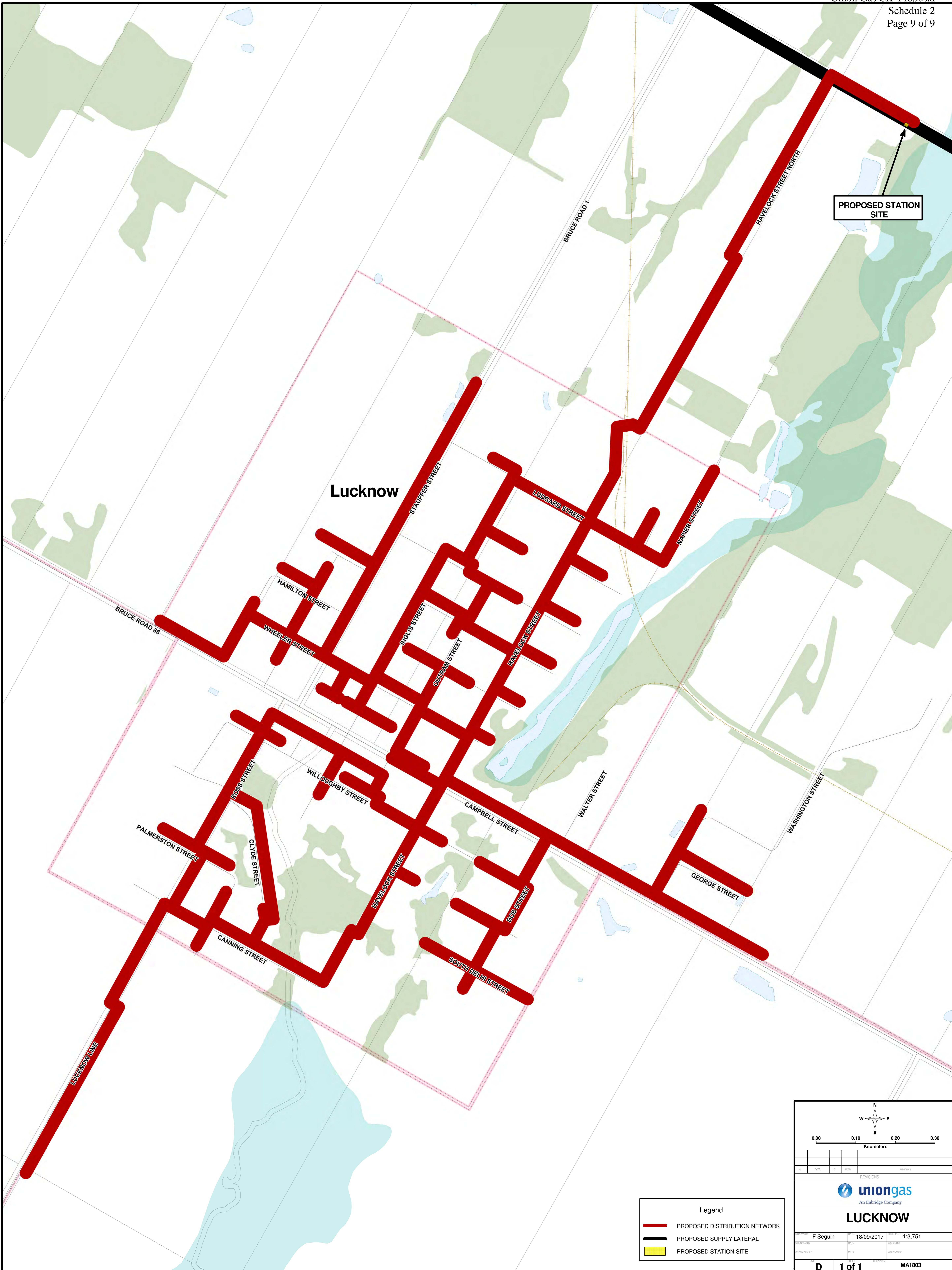


An Enbridge Company

## RIPLEY

DRAWN BY	F Seguin	DATE	18/09/2017	CAD SCALE	1:2,645
CHECKED BY		DATE		CAD CODE	
APPROVED BY		DATE		ECO NUMBER	

SIZE	SHEET	DRAWING NO.
D	1 of 1	MA1802



PROPOSED STATION SITE

Lucknow

**Legend**

- PROPOSED DISTRIBUTION NETWORK
- PROPOSED SUPPLY LATERAL
- PROPOSED STATION SITE

DATE	BY	APP'D	REVISIONS

**LUCKNOW**

DESIGNED BY: F Seguin	DATE: 18/09/2017	SCALE: 1:3,751
APPROVED BY:	DATE:	DATE:

<b>D</b>	<b>1 of 1</b>	MA1803
----------	---------------	--------

**SOUTHERN BRUCE DESIGN AND PIPE SPECIFICATIONS**  
**STEEL AND POLYETHYLENE PIPING**

---

**Steel Design Specifications**

Design Factor	- 0.8
Design Class Location	- N/A - Distribution
Design Location Factor	- 0.375
Joint Factor	- 1.00
Design Temperature	- M5C (below grade) M30C (above-grade)
Maximum Operating Pressure	- 4670 kPa (Project Served from Owen Sound Line) - 3450 kPa (Project Served from FHG)
Test Medium	- Air, Nitrogen, or Water
Minimum Test Pressure	- 6540 kPa (Project Served from Owen Sound Line) - 4830 kPa (Project Served from FHG)
Minimum Depth of Cover (General)	- 0.6 m
Minimum Depth of Cover (Road Crossings)	- 0.6 m
Minimum Depth of Cover (Water Crossings)	- 1.2 m
Minimum Depth of Cover (Rail Crossings)	- 2.0 m

**Steel Pipe Specifications**

Size	- NPS 6
Outside Diameter	- 168.3 mm
Nominal Wall Thickness	- 4.8 mm
Grade	- 359 MPa (Project Served from Owen Sound Line) - 290 MPa (Project Served from FHG)
Type	- Electric Resistance Weld or Submerged Arc Weld
Description	- C.S.A. Z245.1-14 or API 5L
Category	- Cat I
Coating	- Yellow Jacket, FBE or ARO
%SMYS	- 22.8% (Project Served from Owen Sound Line) - 20.9% (Project Served from FHG)

Size	- NPS 8
Outside Diameter	- 219.1 mm
Nominal Wall Thickness	- 5.6 mm
Grade	- 359 MPa
Type	- Electric Resistance Weld or Submerged Arc Weld
Description	- C.S.A. Z245.1-14 or API 5L
Category	- Cat I
Coating	- Yellow Jacket, FBE or ARO
%SMYS	- 25.4% (Project Served from Owen Sound Line)

### **Polyethylene Pipe Design Specifications**

Design Factor	- 0.40
Maximum Operating Pressure	- 550 kPa
Test Medium	- Air or Nitrogen
Minimum Test Pressure	- 770 kPa
Minimum Depth of Cover (General)	- 0.6 m
Minimum Depth of Cover (Road Crossings)	- 0.6 m
Minimum Depth of Cover (Water Crossings)	- 1.2 m

### **Polyethylene Pipe Specifications**

Size	- NPS 6
Outside Diameter	- 168.3 mm
SDR	- 11
Minimum Grade	- PE2406
Description	- C.S.A. B137.4-13

Size	- NPS 4
Outside Diameter	- 114.3 mm
SDR	- 11
Minimum Grade	- PE2406
Description	- C.S.A. B137.4-13

Size	- NPS 2
Outside Diameter	- 60.3 mm
SDR	- 11
Minimum Grade	- PE2406
Description	- C.S.A. B137.4-13



## GENERAL TECHNIQUES AND METHODS OF CONSTRUCTION

---

1. Union Gas Limited (“Union”) will provide its own inspection staff to enforce Union’s construction specifications and *Ontario Regulation 210/01 under the Technical Standards and Safety Act 2000, Oil and Gas Pipeline Systems*.
2. Pipeline construction is divided into several crews that create a mobile assembly line. Each crew performs a different function, with a finished product left behind when the last crew has completed its work.
3. Union’s contract specifications require the contractor to erect safety barricades, fences, signs or flashers, or to use flag persons as may be appropriate, around any excavation across or along a road.
4. It is Union’s policy to restore the areas affected by the construction of the pipeline to “as close to original condition” as possible. When the clean-up is completed, the approval of the landowner or appropriate government authority is obtained.
5. Construction of the pipeline includes the following activities:

### **Locating Running Line**

6. Union establishes the location where the pipeline is to be installed (“the running line”). For pipelines within road allowances, the adjacent property lines are identified and the running line is set at a specified distance from the property line.

### **Stringing**

7. The pipe is strung adjacent to the running line. The joints of pipe are laid end-to-end on supports that keep the pipe off the ground to prevent damage to the pipe coating.

### **Welding**

8. The pipe is welded/fused into manageable lengths. The welds in steel pipe are radiographically inspected, if required, and the welds are coated.

### **Burying**

9. Pipe may be buried using either the trench method or the trenchless method. All utilities that will be crossed or paralleled by the pipeline are located by the appropriate utility prior to installing the pipeline. Prior to trenching, all such utilities will be hand-located or hydro vacuumed.

**Trench Method:** Trenching is done by using a trenching machine or hoe excavator depending upon the ground conditions. Provisions are made to allow residents access to their property, as required. All drainage tiles that are cut during the trench excavation are flagged to signify that a repair is required. Next, the pipe is lowered into the trench. For steel pipe, the pipe coating is tested using a high voltage electrical tester as the pipe is lowered into the trench. All defects in the coating are repaired before the pipe is lowered in. Next, if the soil that was excavated from the trench is suitable for backfill, it is backfilled. If the soil is not suitable for backfill (such as rock), it is hauled away and the trench is backfilled with suitable material such as sand. After the trench is backfilled, drainage tile is repaired.

**Trenchless Method:** Trenchless methods are alternate methods used to install pipelines under railways, roads, sidewalks, trees and lawns. There are two trenchless methods that could be used for the proposed pipeline, depending on the soil conditions, and the length and size of the installation. These methods are boring (auguring) and directional drilling.

### **Tie-Ins**

10. The sections of pipelines that have been buried using either the trench or trenchless method are joined together (tied-in).

### **Cleaning and Testing**

11. To complete the construction, the pipeline is cleaned and tested in accordance with Union's specifications.

### **Restoration**

12. The final activity is the restoration. The work area is leveled, the sod is replaced in lawn areas and other grassed areas are re-seeded. Where required, concrete, asphalt and gravel are replaced to return the areas to as close to the original conditions as possible.

## Southern Bruce Expansion Preliminary Pipeline Construction Schedule

Task Name	2017												2018												2019												2020											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Environmental Assessments and Approvals	█												█												█												█											
Engineering	█												█												█												█											
Pre-Construction Survey	█												█												█												█											
File CIP	█												█												█												█											
CIP Approval	█												█												█												█											
Material Acquisition	█												█												█												█											
File LTC, Franchise, Certificate, Rates, Applications	█												█												█												█											
OEB Approval of Applications	█												█												█												█											
Construction Survey	█												█												█												█											
Steel Main (HP) Construction and Testing of Pipeline to Serve Paisley, Chesley, Bruce Energy Centre, Inverhuron, Tiverton and Kincardine	█												█												█												█											
Distribution PE Main (550kp) Paisley, Chesley, Bruce Energy Centre, Inverhuron, Tiverton and Kincardine	█												█												█												█											
2019 In-Service	█												█												█												█											
Distribution PE Main (550kp) Southern part of Kincardine, Lurgan Beach & Point Clark	█												█												█												█											
Steel Main (HP) Construction and Testing of Pipeline to Serve Ripley and Lucknow	█												█												█												█											
Distribution PE Main (550kp) Ripley & Lucknow	█												█												█												█											
2020 In-Service	█												█												█												█											
Clean-Up	█												█												█												█											