



**ALTERNATE ROUTE FOUNDATION ASSESSMENT REPORT
(FORMER MEMORANDUM NO. 09TF007A-1)**

for

**HIGHWAY 11/17, KAKABEKA FALLS WESTERLY 40 KM TO
SHABAQUA CORNERS
DISTRICT 61, THUNDER BAY, ONTARIO
G.W.P. NO. 6054-03-00**

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May 17, 2011

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Dear Mr. Cooke

**Alternate Route Foundation Assessment
(Former Memorandum No. 09TF007A-1)
Highway 11/17, Kakabeka Falls Westerly 40 km to Shabaqua Corners
District 61, Thunder Bay, Ontario
G.W.P. No. 6054-03-00**

1. INTRODUCTION

This Alternate Route Foundation Assessment Report (former memorandum No. 09TF007A-1) presents a summary of the alternate route foundation assessments recently carried out for the above mentioned project. The study was conducted for the Ministry of Transportation of Ontario (MTO) on behalf of Stantec Consulting Ltd. (Stantec).

The study corridor extends from Kakabeka Falls (about 4 km east of Highway 11/17 at Pole Line Road) westerly for about 40 km to Shabaqua Corners (about 1.9 km north of the Highway 11 and Highway 17 intersection). The study area is located in the District of Thunder Bay.

The study involves the route planning of the future four-laning of Highway 11/17, comprising the construction of new embankments and major river and railway crossing structures. Upon review of the preliminary alternate route foundation assessment memorandum dated January 25, 2010, Stantec selected three alternate routes for consideration from Shabaqua Corners to a common node west of the existing intersection of Highway 11/17 and Highway 102, and four alternate routes from this point to the intersection of Pole Line Road and Pebblestone Road, east of Kakabeka Falls. All alternate routes are shown on the attached Key Map (Drawing A1) and described below.

- Alternate Route AB1 – Northerly Route (Blue on Key Map)
- Alternate Route AB2 – Twinning Route (Green on Key Map)
- Alternate Route AB3 – South Side Route (Red on Key Map)
- Alternate Route BCD1 – South Westerly (Orange on Key Map)
- Alternate Route BCD2- Twinning & South (Purple on Key Map)
- Alternate Route BCD3 – Twinning & North (Dark Green on Key Map)
- Alternate Route BCD4 – Northerly Route (Red on Key Map)



Additionally, this current study included the foundation assessment of three proposed alternatives to connect the above-noted alternate routes to the existing Highway 102 at Sistonen's Corners.

Stantec provided site plans and profiles for the study corridor illustrating all of the new alternate routes. The purpose of this foundation assessment was to evaluate four foundation parameters such as swamps, structures, high fills and deep cuts along the alternate routes.

The current foundation assessment is based on the study corridor plan and profile drawings received from Stantec on September 17, 2010. The initial assessment and memorandum was based on October 19, 2009 drawings.

2. SITE DESCRIPTION

The study area is located in the District of Thunder Bay about 30 km west of the City of Thunder Bay. The study section encompasses a number small towns and rural residential areas such as Kakabeka Falls, Mokomon, Sistonen's Corners, Sunshine and Shabaqua Corners within the geographic Townships of Oliver, Paipoonge, Conmee, Dawson Road Lots and Goldie. A Project Location Map (Figure 1) is enclosed for reference.

Land uses in the vicinity of the existing highway corridor within the study limits include commercial and residential properties in the Kakabeka Falls area and farming land and scattered gravel extraction sites along Highway 11/17 to Shabaqua Corners. The Kakabeka Falls Provincial Park is located at Kakabeka Falls at the Kaministiquia (Kam) River Crossing. A power dam is situated to the west of Kakabeka Falls. Scattered residential properties are located along Highway 11/17. The MTO Shabaqua Patrol Yard is located at the southeast corner of Highway 11/17 and Goldie Road.

Two major hydro corridors exist within in the study area, located north and south of the existing Highway 11/17 alignment. The northern hydro corridor crosses Highway 17 at about 0.5 km north of Shabaqua Corners not crossing any of the alternate routes thereafter. The southern hydro corridor crosses Highway 11/17 near Kakabeka Falls and the intersection of Hunt Road, continuing to the east about 1 km parallel and north of Pole Line Road.

The CNR and CPR corridors are also situated north and south of the existing Highway 11/17 near Sunshine, Sistonen's Corners and along the west and east sides of the Kam River. The CNR corridor crosses the existing Highway 11/17 about 150 m north of Highway 102.



Currently, Highway 11/17 at-grade intersections and structures along the study corridor include the following:

AT-GRADE INTERSECTION	STATION	STRUCTURE	STATION
Township of Paipooonge			
Pole Line Road	10+000/13+120	N/A	N/A
Township of Oliver			
Oliver Road (north side)	12+750	Kam River Bridge at Highway 11/17 (Site 48W-044)	10+920
Marian Street	12+450		
Rupert Street	12+340		
Florence Street	12+220		
Porter Street	12+110		
Clearque Street	12+040		
Highway 590 (south side)	10+770		
Township of Conmee			
Rydholm Road (east side)	23+100	Arnolds Creek Culvert at Highway 11/17	22+250
Pifer Road (west side)	22+980	Brule Creek Culvert at Highway 11/17	15+350
Hunt Road (west side)	22+300		
Hume Road	21+600		
Spruce Grove Lane (west side)	20+600		
Holland Road	19+900		
Briggs Road (west side)	19+400		
Lundstrom Road	18+400		
Ilkka Drive (east side)	16+600		
Mokomon Road	15+300		
Ilkka Drive (east side)	14+550		
Teitto Road	14+300		
Oikenen Road (West side)	13+500		
Wijjala Drive	11+550		



AT-GRADE INTERSECTION	STATION	STRUCTURE	STATION
Township of Dawson Road Lots and Goldie			
Highway 102	30+890	Shebandowan River Bridge at Highway 11/17	28+000
CNR	30+740		
Sunshine Loop	27+900		
Finmark Road	21+220	Sunshine Creek Culvert at Highway 11/17	26+550
Bylund's Pit Road	14+860		
Old Dawson Road	11+750	Oskondaga River Bridge at Highway 11/17	10+150
Shabaqua Road	11+120		
Goldie Road	11+300		
Hwy 11/ Hwy 17	18+161/10+000		

The existing Highway 11/17 corridor topographic levels vary significantly.

The study area is located in the Canadian Shield where extensive glaciation has occurred. The typical geology of the study area includes end moraine deposits, glaciolacustrine deposits and glaciolacustrine deltaic deposits. A Site Geology map (Figure 2) showing the distribution of these deposits and a Bedrock Geology map (Figure 3) showing the bedrock types within study limit are included with this report.

3. SITE ASSESSMENT PROCEDURES

3.1 General

The foundation evaluation involved a review of the available geological, topographical and hydrogeological mapping, existing geotechnical and foundation reports, aerial photographs and Engineering Title Drawings for the existing highway. A field visual reconnaissance was carried out to verify the inferred data. Subsurface explorations, in-situ testing and sampling were not carried out in accordance with the terms of reference for the study.



3.2 Reference Documents and Literature Review

The general physiographic conditions along the corridor and the alternate routes were obtained primarily from the existing geological maps and reports from the MTO GEOCREC library. Well records which were obtained from the MOE supplemented the data.

The documents and literature reviewed in whole or in part for this study are listed in Appendix A. The list reflects the selected data that contains geotechnical content relevant to the assessment. The list of the wells considered for the project is included in Appendix B.

The delineation of swamps and water courses/bodies as well as the location of significant earth deposits and rock outcrops along the study corridor were interpreted from maps including the Ontario Base Maps and aerial photographs were obtained from the Ministry of Natural Resources.

3.3 Site Reconnaissance

Reconnaissance visits of the existing alignment and the adjacent lands within the study corridor were carried out during the period of October 26 to 30, 2009. The site reconnaissance visits consisted of a drive-by, boat-by and walk-through of selected sections of the Highway 11/17 corridor and adjacent lands. The site reconnaissance was conducted by Mr. M. Narduzzi, BEng and Mr. B.R. Gray, P.Eng.

A total of four alternate routes including five partial alternate routes were investigated during the October 2009 period. The corridor alignments were modified after the October 2009 reconnaissance visits with updated corridor drawings received from Stantec on December 13, 2009 and for the current assessment, September 17, 2010.

The ground truth checks verified the surficial geology and drainage conditions inferred from the literature and map reviews. A comprehensive commentary and notes from the site reconnaissance visits including inferred swamp, earth and rock knob/outcrop occurrences, geology and topography is presented in Appendix C.

4. INFERRED SUBSURFACE CONDITIONS

4.1 General

The site is located in the Canadian Shield where extensive glaciation has occurred. The local topography is undulating to rolling as the highway traverses areas where terrain conditions vary widely. The steep rock ridges, low-lying swampy areas and extensive and thick overburden are characteristics of the study area. These characteristics may vary dramatically within a 10 to 20 m radius in the study section. The native overburden soils generally differ in short distance between sand and gravel to clay deposits with silty to sandy till.

The alignment traverses several different geological units:

- Silty to sandy end moraine deposits over bedrock
- Glaciolacustrine deposits include varved or massive clays and silts



- Glaciolacustrine deltaic comprising sands and gravels
- Bedrock outcrops, where the bedrock is exposed or under a relatively thin soil veneer
- Sandy alluvial plain and sand and gravel outwash plains along the Kam River, Oskondaga River and Shebandowan River
- Wetland areas containing peat, silt, sand and clay deposits

The bedrock in this area consists of Precambrian rock of Proterozoic age. The predominant bedrock types are the Upper Gunflint formation of conglomerate and taconite in Kakabeka Falls area and graywackes granite gneiss at a thin strip located north of Kakabeka Falls. The remaining section of study area is mainly located within a zone of metavolcanics rocks. The local bedrock along this section of highway undulated from near or at ground surface and locally dipped to more than 30 m below the ground surface; bedrock outcroppings and cuts are present at the river beds, the existing Highway 11/17 and scattered along side roads.

4.2 Drainage

A number of rivers such as Kam River, Shebandowan River and Oskondaga River are located in the study area. The confluence of the Oskondaga River and Shebandowan River is at about 1 km southwest of Shabaqua Corners with the union of the Matawin River some 7 km downstream of this point. The Shebandowan River then flows east to north-easterly for about 22 km to join the Kam River at about 4 km east of Sistonen's Corners. The Kam River flows to the south towards Kakabeka Falls and then veers some 30 km to the east draining into Lake Superior. Surficial water runoff along the study corridor drains into streams, such as Sunshine Creek, Brule Creek, Arnold Creek and a number of unnamed creeks, swamps and scattered ponds.

5. FOUNDATION ASSESSMENT AND RANKING

5.1 Criteria Used In Assessing Alternatives

The revised terms of reference for this project identified four criteria to be considered from a foundation perspective, as follows:

- Extent of Soft Ground/Swamps
- Structure Foundations
- High Fills
- Deep Cuts

A rationale for what each criterion represents and a method for measuring and evaluating each criterion was developed. The results of the evaluation are provided in Tables S-1 to S-4 for the alternate routes. A discussion of the assessment criteria follows.



5.1.1 Extent of Soft Ground/Swamps (Table S-1)

The potential impact of soft ground and/or swamps for each alternate route was evaluated on the basis of the total length of the alternative route with inferred soft ground/swamps between 0 and 3 m deep; 3 and 10 m deep; and over 10 m deep. Each of these groups was further divided according to length of swamp crossing: less than 100 m long, 100 to 250 m long and greater than 250 m long.

For the purpose of this discussion, soft ground/swamps less than 3 m deep that may be excavated with conventional backhoe equipment were considered the most favourable. Soft and/or swamp grounds that are between 3 and 10 m deep typically require a long-stick excavator and are of intermediate favourability. The treatment of areas with soft ground/swamps over 10 m deep need special equipment such as drag lines or require non-conventional treatment (wick drains, preloading) and are the least favourable.

No swamps were found along the three Highway 102 connection alternatives and accordingly they were not included on Table S-1.

5.1.2 Structure Foundations (Table S-2)

As indicated by Stantec, road crossings will be constructed as at-grade crossings for the initial phase and therefore generally the new structural requirements were not considered as part of the foundation assessment for each alternate route. The latest profile drawings indicated some proposed structures at select road crossings. These select areas were considered.

The type of foundation required to support major river and railway crossing bridges and major culverts was employed to assess the potential impact of this criterion. Shallow foundations were considered to be the most favourable and deep foundations the least favourable. The favourability of integral abutment foundations was considered to fall between the shallow and deep type of foundations. The potential foundation type was estimated based on the inferred type and quality of founding subgrade materials for each alternate route. In addition, the length of crossing was also considered within each foundation type: less than 50 m crossing, 50 to 150 m crossing and greater than 150 m crossing.

No structures were found along the three Highway 102 connection alternatives and accordingly they were not included on Table S-1.

5.1.3 High Fills (Table S-3)

The potential impact of high fills was evaluated on the basis of the total length of high fills and the type of subgrade materials. For evaluation purposes, the high fill crossings were grouped into 5 to 10 m high; 10 to 15 m high; and more than 15 m high zones.

The most favourable condition was defined as a length over bedrock and the least favourable conditions are 15 m high fill areas with cohesive deposits.



For the Highway 102 alternatives 1, 2 and 3, the high fill crossings were grouped into 0 to 5 m high; 5 to 10 m high; and more than 10 m high zones. The criterion was modified in order to incorporate the smaller fill zones in a majority of “cut” only alternatives.

5.1.4 Deep Cuts (Table S-4)

The potential impact of deep cuts was evaluated on the basis of the total length of cut and composition of the cut material. Deep cut embankments that require little or no slope configurations were considered the most favourable (bedrock cut), followed in decreasing favourability by embankments that require significant cohesive soil cut, and those that may require slope modifications are considered the least favourable. The deep cuts were also grouped into 5 to 10 m high; 10 to 15 m high; and more than 15 m high zones.

5.2 Weighting of Evaluation Criteria for Alternate Routes (Tables S-1 to S-4)

A weighting system was developed to enable selection of the preferred alternate route. The weighting system involved two factors:

A favourability factor F to score the assessment for each of the evaluation criteria based on the foregoing discussion. The F values ranged from 10 for the most favourable to 1 for the least favourable.

An impact weight B_i to reflect the significance of each of the four criteria on the design and construction of the highway was determined. The four evaluation criteria were compared in terms of relative importance and impact and assigned an individual impact weight as presented below:

EVALUATION CRITERION	IMPACT WEIGHT, B_i
Soft Ground/Swamp	0.30
Structure Foundations	0.35
High Fills Crossings	0.20
Deep Cuts	0.15
TOTAL	1.00

The more important the individual evaluation criterion was considered for the design and/or construction of the highway, the higher the impact weight assigned.



The favourability factors, F, used in Tables S-1 to S-4, and the impact weights, Bi, used in the scoring in Table S-5 are summarized in the following table.

EVALUATION CRITERION	IMPACT WEIGHT, B _i	FAVOURABILITY FACTOR, F									TABLE
		MOST			AVERAGE			LEAST			
Soft Ground/ Swamps	0.30	Based on relative length and depth of soft ground (SG) and/or swamps (SWP):									S-1
		SG or SWP 0 to 3 m Deep			SG or SWP 3 to 10 m Deep			SG or SWP Over 10 m Deep			
		<100 m Length	100 - 250 m Length	> 250 m Length	<100 m Length	100 -250 m Length	> 250 m Length	<100 m Length	100 -250 m Length	> 250 m Length	
		F=9	F=8	F=7	F=6	F=5	F=4	F=3	F=2	F=1	
Structure Foundations	0.35	Based on estimated type of foundation requirements:									S-2
		Shallow Foundation			Integral Foundation			Deep Foundation			
		<100 m Length	100 - 250 m Length	> 250 m Length	<100 m Length	100 -250 m Length	> 250 m Length	<100 m Length	100 -250 m Length	> 250 m Length	
		F=9	F=8	F=7	F=6	F=5	F=4	F=3	F=2	F=1	
High Fills	0.20	Based on length of sections with subsoil types within three height ranges:									S-3
		5-10 m High Fill			10-15 m High Fill			>15 m High Fill			
		Bedrock	Composite	Clayey	Bedrock	Composite	Clayey	Bedrock	Composite	Clayey	
		F=9	F=8	F=7	F=6	F=5	F=4	F=3	F=2	F=1	
Deep Cuts	0.15	Based on length of sections with subsoil types within three depth ranges:									S-4
		5-10 m Deep Cut			10-15 m Deep Cut			>15 m Deep Cut			
		Bedrock	Composite	Clayey	Bedrock	Composite	Clayey	Bedrock	Composite	Clayey	
		F=9	F=8	F=7	F=6	F=5	F=4	F=3	F=2	F=1	

The computations provide Weighted Favourability Values A_i for each subsection. For example, with reference to Table S-1, Soft Ground/Swamps Evaluation Criterion, the weighted favourability value A₁ for the embankment alternative AB1 was obtained by multiplying the Favourability factor F by the length of alignment for which the condition is applicable and dividing by the total length of the soft ground or swamp in the subsection, as presented below:

DEPTH RANGE (m)	LENGTH OF CROSSING	LENGTH (m)	FAVOURABILITY FACTOR, F
0 – 3	< 100 m	120	9
	100 to 250 m	230	8
	> 250 m		7
3 – 10	< 100 m	200	6
	100 to 250 m	200	5
	> 250 m		4
>10	<100 m		3
	100 to 250 m		2
	> 250 m		1



$$A_1 = \text{Weighted Favourability Value} = \frac{(120 \times 9) + (230 \times 8) + (200 \times 6) + (200 \times 5)}{120 + 230 + 200 + 200} = 6.83$$

The weighted favourability value, A_i , computed for each subsection is provided on Tables S-1 to S-4. On all of the Tables S-1 through S-4, the weighted favourability factors were also normalized (details of normalization are discussed in section 5.3) to take into account the total length of each criteria in each alternate route. This would then reduce the weighted favourability factor based on the ratio of the alternate route with the least amount of length. An example of the normalization conducted for the AB1 (Northerly Route) alternate route is provided below:

$$A_1 = \text{Weighted Favourability Value for AB1 (Northerly Route)} = 6.83 \times \frac{\text{AB2 (Twinning Route): 740 m}}{\text{AB1 (Northerly Route): 750 m}} = 6.74$$

5.3 Scoring of Foundation Criteria for Alternate Routes (Table S-5)

For the scoring of the foundation criteria, each of the Favourability Values A_i was normalized to ratios of 1.0. The Normalized Favourability Values, N_i , shown next to each A_i on the table eliminate the effect of unrelated A_i numbers on the Scores and provide a meaningful input of the Impact Weights on the final rankings. This is achieved by dividing each Weighted Favourability Value A_i by the highest A_i amongst all Alternatives for the criterion, and thus making all Normalized Favourability Values less than 1.00.

The interchange alternatives were scored by adding the N_i for each of the evaluation criteria multiplied by the Impact Weight, B_i for the criterion. The Scores based on the N_i values (multiplied by 4 to produce values higher than 1.00 for ease of comparison) are shown on Table S-5.

An example of the computation for scoring is provided below, for reference. The example is the calculation of the Normalized Score of **2.95** for the AB1 (Northerly Route) which was obtained as follows:

EVALUATION CRITERIA	SOFT GROUND/ SWAMPS	STRUCTURE FOUNDATIONS	HIGH FILLS	DEEP CUTS	
TABLE NO.	S-1	S-2	S-3	S-4	
IMPACT WEIGHT, B_i	0.30	0.35	0.20	0.15	
AB1	A_i	6.74	3.60	3.19	4.89
	N_i	0.96	0.70	0.49	0.72
Note: For all alternate routes, the following are the highest A_i values					
Highest A_i	6.99	5.17	6.54	6.82	

Normalized Score – AB1 (Northerly Route)

$$4 \times \left[\frac{6.74}{6.99} \times 0.30 + \frac{3.60}{5.17} \times 0.35 + \frac{3.19}{6.54} \times 0.20 + \frac{4.89}{6.82} \times 0.15 \right] = 2.95$$



These Scores and Rankings of the foundation evaluation for each alternative are provided in Table S-5 and the results are summarized below:

ALTERNATE ROUTES	SCORE	RANKING
AB1 (Northerly Route) (Note 1)	2.95	3
AB2 (Twinning Route) (Note 2)	3.41	1
AB3 (South Side Route) (Note 3)	3.14	2
BCD1 (South Westerly) (Note 4)	3.70	1
BCD2 (Twinning & South) (Note 5)	3.30	3
BCD3 (Twinning & North) (Note 6)	3.16	4
BCD4 (Northerly) (Note 7)	3.33	2
Alternative 1 (connection to Hwy 102)	3.16	2
Alternative 2 (connection to Hwy 102)	3.06	3
Alternative 3 (connection to Hwy 102)	4.00	1

Note 1: The AB1 route starts at Sta. 10+000 and follows the previous Blue alignment around Sta. 13+000, it diverges off of the Blue alignment just west of Frost Road and then bends southward following a similar path as the previous Yellow South and Green alignments. The AB1 route ends at Sta. 31+640.

Note 2: The AB2 route starts at Sta. 10+000 and twins south of existing Highway 11/17, but north of the previous Yellow South alignment. The route starts to diverge off of the existing Highway 11/17 alignment around Sta. 25+000 and then follows a similar path as the Yellow South alignment to about Sta. 28+500, and the follows a similar path as the previous Green alignment. The AB2 route ends at 31+800.

Note 3: The AB3 route starts at Sta. 10+000 and stays to the west (at Shabaqua Corners) and south of the existing Highway 11/17 in a similar alignment to the previous Yellow South alignment to around Sta. 28+500 and then bends southward to follow a similar path to the previous Green alignment. The AB3 route ends at Sta. 32+080.

Note 4: The BCD1 route starts around Sta. 9+025 and continues to follow a similar path as the previous Green alignment. The route crosses the Kam River further south than the previous Red alignment and continues south and some 80 m parallel to the hydro corridor south of Oliver Road. The BCD1 route ends at Sta. 31+000.

Note 5: The BCD2 route is the same for the first 5 km as the BCD1 route. The route diverges towards the existing Highway 11/17 beyond Oikonen Road and twins west of the existing highway beyond Mokomon Road. The route diverges west off of the highway past Hume Road and then again follows the same alignment as BCD1.

Note 6: The BCD3 route is the same for the first 5 km as the BCD1 route. The route diverges towards the existing Highway 11/17 beyond Oikonen Road and twins east of the existing highway beyond Mokomon Road. The route diverges east off of the highway past Holland Road and follows a similar alignment to the previous Brown partial route but veers north of the municipal landfill off of Spence Road. The BCD3 route ends at Sta. 29+320.

Note 7: The BCD4 route is the same for the first 5 km as the BCD1 route. The route diverges towards the existing Highway 11/17 beyond Oikonen Road and follows the previous Blue and Purple alignments beyond Mokomon Road. The BCD4 route converges with the BCD3 alignment just before crossing the Kam River.

The results indicate that the AB2 (Twinning Route), BCD1 (South Westerly) and the Highway 102 Alternative 3 routes have the highest scores of 3.41, 3.70 and 4.00, respectively.



For AB series routes, the remaining alternate routes AB1 and AB3 have close scores of 2.95 and 3.14, respectively. For BCD series routes, the alternate routes BCD2 and BCD4 have the second highest and very close scores of 3.33 and 3.30, respectively. The alternate route BCD3 has the lowest score of 3.16 in BCD series routes.

Highway 102 Alternatives 1 and 2 have very close scores of 3.16 and 3.06.

Looking at the individual evaluation criteria, the AB2 alternate route had the highest weighted favorability factor in every parameter except for structure foundations. The total length of structures in AB3 alternate route as compared to the AB2 alternate route differed by 100 m.

Beyond the common node of the AB1, AB2 and AB3 alternate routes, the BCD1 alternate route had the highest weighted favorability values in the evaluation criteria of soft ground/ swamps and structure foundations. Given the impact weight assigned to these criteria, the BCD1 alternate route still has the highest score even though it scores lower in the high fill crossings and deep cut criteria.

For the connection to Highway 102 three alternatives were provided and of the three, Alternative 3 clearly surpasses the two other alternatives in terms of high fill crossings and deep cuts, which were the two evaluation criteria that were applicable to these alternatives.

The selection of the Preferred Route also depends on other parameters that are being analysed by Stantec.

6. ALTERNATE ROUTE REVIEW

6.1 General

From the embankment and structure foundations design perspective, the alternate route that incorporates the highest scoring is preferred. As indicated above the AB2 alternate route would be preferred over the remaining alternate routes (from the starting point near Shabaqua Corners to the common node near Sistonen's Corners. Beyond the common node, the alternate route BCD1 (South Westerly) would be preferred terminating east of Kakabeka Falls.

The preferred route should be selected to achieve bedrock or competent soil subgrade and avoid swamp or soft areas, while minimizing the length of new construction that would be required for the alternate routes. Embankments constructed over bedrock or competent soil subgrade will be easier to drain; will be relatively easier to construct; will perform better; and will be subjected to only minimal post-construction settlements and therefore will require less maintenance.

The AB2 and BCD1 alternate route have the lowest total length of soft ground/ swamp crossings and the anticipated depth range is lower than the corresponding alternate routes.

As indicated above the AB2 alternate route does not perform well in terms of structure foundations as the total anticipated length of structures in the AB2 alternate route is the highest and because it has one additional structure required where a deep foundation is anticipated as compared with the two other alternate routes.



The BCD alternate route series are fairly similar in type of structure foundations but differ in total length. The BCD1 alternate route has the least total length of structure foundations with the BCD2 alternate route scoring in second place with a similar foundation type distribution with slightly more total length.

High fill crossing lengths differ for the AB alternate route series as compared to the BCD alternate route series; with the BCD alternate routes total lengths being all fairly similar. The AB2 alternate route has the least total length for high fill crossings and about 80 % of the total length is within the 5 to 10 m high fill range. As indicated above the BCD1 alternate route scores in third place behind the BCD2 and BCD3 alternate routes in terms of high fill crossings. The BCD1 alternate route has the highest total length for high fill crossings but still scores better than the BCD4 alternate route because it has a similar length distribution in each of the fill height categories as compared to the BCD2 and BCD3 alternate routes. The BCD4 alternate route has a greater percentage of length in the higher height ranges.

The AB2 alternate route has the lowest total length in the deep cut evaluation category and BCD1 has the highest total length. The BCD3 alternate route gets the highest score for deep cuts as it has the lowest total length and because the distribution in each cut height category is lowest for anticipated cohesive cuts.

The selection of the Preferred Route also depends on other parameters that are being analysed by Stantec.

6.2 Assessment of Advantages and Disadvantages

The following tables present the advantages and disadvantages of the alternate routes from a foundation perspective.

ALTERNATE ROUTES	ADVANTAGES	DISADVANTAGES
AB1 (Northerly Route)	<ul style="list-style-type: none"> • The total length of soft ground/ swamp crossings are less than the AB3 route • A total of three structure crossings are identified along the AB1 with a total structure length of 300 m, less than the AB2 route • Structure foundations for the Oskondaga River crossing and CNR Rail crossing may be founded on integral abutments on a pile foundation • The Shebandowan River crossing structure foundations may be on spread footings founded on bedrock or competent soil 	<ul style="list-style-type: none"> • The total length of soft ground/ swamp crossings are similar to the AB2 route but are of greater depth • The AB1 route has the highest total length for high fill crossings and deep cuts



ALTERNATE ROUTES	ADVANTAGES	DISADVANTAGES
AB2 (Twinning Route)	<ul style="list-style-type: none"> • The lowest for total length of soft ground/ swamp crossings and crossings are shallower than AB1 and AB3 routes • The high fill crossings total length is considerably less the AB1 and AB3 routes 	<ul style="list-style-type: none"> • A total of four structure crossings are identified along the AB2 route with a total structure length of 340 m. The AB2 route has the highest total length and number for structures • Structure foundations for the Oskondaga River crossing and Goldie Road crossing and CNR Rail crossing may be founded on integral abutments on a pile foundation • The Shebandowan River crossing structure foundations may be on spread footings founded on bedrock or competent soil
AB3 (South Side Route)	<ul style="list-style-type: none"> • A total of three structure crossings are identified along the AB3 route with the lowest total structure length of 240 m • Structure foundations for the Oskondaga River crossing and CNR Rail crossing may be founded on integral abutments on a pile foundation • The Shebandowan River crossing structure foundations may be on spread footings founded on bedrock or competent soil • Lower total length of high fill crossings as compared to the AB1 route • Deep cuts do not exceed 15 m 	<ul style="list-style-type: none"> • Deeper soft ground/ swamp crossings as compared to the AB1 and AB2 routes and a total soft ground/ swamp length of 1,100 m • Deeper swamp crossings would require special treatment methods such as pre-loading/ surcharging and wick drains
BCD1 (South Westerly)	<ul style="list-style-type: none"> • The lowest for total length of soft ground/ swamp crossings and crossings are shallower than all of the other routes • A total of four structure crossings are identified along BCD1 route with a total structure length of 440 m, less than all of the other routes • Structure foundations for the Mokoman Road crossing and CPR crossing and Pole Line Road crossing may be founded on integral abutments on a pile foundation • The Highway 11/17 crossing structure foundations may be on spread footings founded on bedrock or competent soil 	<ul style="list-style-type: none"> • The BCD1 route has the highest total length for deep cuts and scores last behind the BCD4 and BCD2 routes • Scores third in terms of high fill crossings behind the BCD2 and BCD3 alternate routes



ALTERNATE ROUTES	ADVANTAGES	DISADVANTAGES
BCD2 (Twinning & South)	<ul style="list-style-type: none"> • A total of four structure crossings are identified along BCD2 route with a total structure length of 470 m, second to the BCD1 route • Structure foundations for the Mokoman Road crossing and Aqueduct Access Road crossing and Pole Line Road may be founded on integral abutments on a pile foundation • The Kam River crossing structure foundations may be on spread footings founded on bedrock or competent soil • The second highest scores in terms of high fill crossings and deep cuts 	<ul style="list-style-type: none"> • Greater total amount and deeper soft ground/ swamp crossings as compared to the BCD1 and BCD4 routes
BCD3 (Twinning & North)	<ul style="list-style-type: none"> • The highest score for high fill crossings with the lowest total length and with the high fill distribution mainly in the lower height categories 	<ul style="list-style-type: none"> • A total of four structure crossings are identified along the BCD3 route with a total structure length of 520 m. The BCD3 route has second highest total length for structures • Structure foundations for the Mokoman Road crossing and CPR crossing and Pole Line Road crossing may be founded on integral abutments on a pile foundation • The Kam River crossing structure foundations may be on spread footings founded on bedrock or competent soil • The greatest total length for soft ground/ swamp crossings



ALTERNATE ROUTES	ADVANTAGES	DISADVANTAGES
BCD4 (Northerly)	<ul style="list-style-type: none"> • Scores second to the BCD1 route in terms of soft ground and swamp crossings • Scores third to the BCD2 and BCD3 route in terms of deep cuts 	<ul style="list-style-type: none"> • A total of four structure crossings are identified along the BCD4 route with a total structure length of 590 m. The BCD4 route has the highest total length for structures • Structure foundations for the Mokoman Road crossing and Pole Line Road crossing may be founded on integral abutments on a pile foundation • The CPR Rail crossing and Kam River crossing structure foundations may be on spread footings founded on bedrock or competent soil • The lowest score in the high fill crossing evaluation not due to overall total length but due to a greater distribution in the higher fill categories and in cohesive soils

HIGHWAY 102 CONNECTION ALTERNATIVES	ADVANTAGES	DISADVANTAGES
Alternative 1	<ul style="list-style-type: none"> • Scores second to the Alternative 3 route in terms of high fill crossings and deep cuts 	
Alternative 2		<ul style="list-style-type: none"> • Has the lowest score in the high fill crossings and deep cut categories
Alternative 3	<ul style="list-style-type: none"> • Utilizes more of the existing Highway 11/17 resulting in reduced length for new road construction • The highest score for high fill crossings and deep cuts with the lowest total length in both categories 	



6.3 Preferred Alternate Route Review

Stantec indicated that the preferred alternative primarily follows alternative AB3 (Shabaqua Corners to a common node west of the existing intersection of Highway 11/17 and Highway 102) and alternative BCD4 (from the common node to the intersection of Pole Line Road and Pebblestone Road, east of Kakabeka Falls). The preferred alternative is shown on the enclosed Key Map (Drawing P1) and Drawings P1 to P5.

The Scores for the preferred alternative (alternative AB3 and alternative BCD4) from a Foundations perspective are 3.14 and 3.33. The alternatives AB3 and BCD4 have the second highest of the other alternatives.

In addition, Stantec indicated that the preferred alternative for Highway 102 connection is alternative 3. The score for the preferred alternative (alternative 3) from a Foundation perspective is 4.00. The alternative 3 has the highest score of the other alternatives.

Swamps or possible poor soil areas and major high fill crossings identified in the preferred route are summarized in Table A, attached.

A total of seven (7) structures and five (5) culverts are located in the preferred route and summarized in Table B, attached.

6.4 Additional Studies

The preliminary assessments in this report are based on literature reviews and site reconnaissance only. Additional data should be obtained by conducting preliminary investigation(s) to confirm the data inferred during these studies. In particular, the depth and extent of organic/soft/wet soils in swamps and low-lying areas should be investigated.

It is also recommended that the potential bridges, railway structures and major culvert locations be investigated along the Preferred Route. The bedrock at each location should be proven with cores to confirm that the preferred sites are adequate for the construction of the structures.

The recommended locations for foundations investigations provided in Tables A and B.



7. CLOSURE

This Alternate Route Foundation Assessment Report (Former Memorandum No. 09TF007A-1) was prepared by Mrs. N.S Balakumaran, BSc, Mr. M. Narduzzi, P.Eng. and Mr. B.R. Gray, MEng, P.Eng., MTO Designated Principal Contact, and reviewed by Mr. C.M.P. Nascimento, P. Eng., Senior Project Engineer.

Sincerely,

Peto MacCallum Ltd.

A handwritten signature in black ink that reads 'N. Balakumaran' with a long horizontal flourish extending to the right.

Nesam Balakumaran, BSc.
Engineer-in-Training



Carlos Nascimento, P.Eng.
Senior Project Engineer



Brian R. Gray, MEng, P. Eng.
MTO Designated Principal Contact

NB/CN/BRG:mi



TABLE S-1 – SOFT GROUND/SWAMPS

ALTERNATE ROUTES	Total Length (m)	SOFT GROUND/SWAMPS LENGTHS, DEPTHS AND FAVOURABILITY									WEIGHTED FAVOURABILITY VALUE(A _i)	
		Depth Range (0 - 3 m)			Depth Range (3 - 10 m)			Depth Range (>10 m)				
		Length of Swamp < 100 m (F1=9)	Length of Swamp 100-250 m (F2=8)	Length of Swamp >250 m (F3=7)	Length of Swamp < 100 m (F4=6)	Length of Swamp 100-250 m (F5=5)	Length of Swamp >250 m (F6=4)	Length of Swamp < 100 m (F7=3)	Length of Swamp 100-250 m (F8=2)	Length of Swamp >250 m (F9=1)		
AB1 (Northerly Route) (Note 1)	750	120	230	0	200	200	0	0	0	0	6.74	A ₁
AB2 (Twinning Route) (Note 2)	740	130	300	0	150	110	0	50	0	0	6.99	A ₂
AB3 (South Side Route) (Note 3)	1,100	50	200	300	180	250	0	120	0	0	4.18	A ₃
BCD1 (South Westerly) (Note 4)	770	170	400	0	0	150	0	50	0	0	7.31	A ₄
BCD2 (Twinning & South) (Note 5)	1,170	120	250	300	0	150	300	50	0	0	4.09	A ₅
BCD3 (Twinning & North) (Note 6)	1,420	120	450	300	50	150	300	50	0	0	3.51	A ₆
BCD4 (Northerly) (Note 7)	820	70	350	0	0	300	0	100	0	0	5.99	A ₇

NOTES: Enter weighted favourability value A_i in Table S-5.

Note 1: The AB1 route starts at Sta. 10+000 and follows the previous Blue alignment around Sta. 13+000, it diverges off of the Blue alignment just west of Frost Road and then bends southward following a similar path as the previous Yellow South and Green alignments. The AB1 route ends at Sta. 31+640.

Note 2: The AB2 route starts at Sta. 10+000 and twins south of existing Highway 11/17, but north of the previous Yellow South alignment. The route starts to diverge off of the existing Highway 11/17 alignment around Sta. 25+000 and then follows a similar path as the Yellow South alignment to about Sta. 28+500, and the follows a similar path as the previous Green alignment. The AB2 route ends at 31+800.

Note 3: The AB3 route starts at Sta. 10+000 and stays to the west (at Shabaqua Corners) and south of the existing Highway 11/17 in a similar alignment to the previous Yellow South alignment to around Sta. 28+500 and then bends southward to follow a similar path to the previous Green alignment. The AB3 route ends at Sta. 32+080.

Note 4: The BCD1 route starts around Sta. 9+025 and continues to follow a similar path as the previous Green alignment. The route crosses the Kam River further south than the previous Red alignment and continues south and some 80 m parallel to the hydro corridor south of Oliver Road. The BCD1 route ends at Sta. 31+000.

Note 5: The BCD2 route is the same for the first 5 km as the BCD1 route. The route diverges towards the existing Highway 11/17 beyond Oikonen Road and twins west of the existing highway beyond Mokomon Road. The route diverges west off of the highway past Hume Road and then again follows the same alignment as BCD1.

Note 6: The BCD3 route is the same for the first 5 km as the BCD1 route. The route diverges towards the existing Highway 11/17 beyond Oikonen Road and twins east of the existing highway beyond Mokomon Road. The route diverges east off of the highway past Holland Road and follows a similar alignment to the previous Brown partial route but veers north of the municipal landfill. The BCD3 route ends at Sta. 29+320.

Note 7: The BCD4 route is the same for the first 5 km as the BCD1 route. The route diverges towards the existing Highway 11/17 beyond Oikonen Road and follows the previous Blue and Purple alignments beyond Mokomon Road. The BCD4 route converges with the BCD3 alignment just before crossing the Kam River.



TABLE S-2 – STRUCTURE FOUNDATIONS

ALTERNATE ROUTES	Total Length (m)	STRUCTURE FOUNDATIONS LENGTHS, TYPE AND FAVOURABILITY									WEIGHTED FAVOURABILITY VALUE(A _i)	
		Shallow Foundation			Integral Foundation			Deep Foundation				
		Length of Crossing < 50 m (F1=9)	Length of Crossing 50 - 150 m (F2=8)	Length of Crossing > 150 m (F3=7)	Length of Crossing < 50 m (F4=6)	Length of Crossing 50 - 150 m (F5=5)	Length of Crossing > 150 m (F6=4)	Length of Crossing < 50 m (F7=3)	Length of Crossing 50 - 150 m (F8=2)	Length of Crossing > 150 m (F9=1)		
AB1 (Northerly Route) (Note 1)	300	0	90	0	0	70	0	0	140	0	3.60	A ₁
AB2 (Twinning Route) (Note 2)	340	0	100	0	40	0	0	0	200	0	2.99	A ₂
AB3 (South Side Route) (Note 3)	240	0	100	0	40	0	0	0	100	0	5.17	A ₃
BCD1 (South Westerly) (Note 4)	440	0	170	0	0	270	0	0	0	0	6.16	A ₄
BCD2 (Twinning & South) (Note 5)	470	0	230	0	0	240	0	0	0	0	6.06	A ₅
BCD3 (Twinning & North) (Note 6)	520	0	50	220	0	250	0	0	0	0	5.19	A ₆
BCD4 (Northerly) (Note 7)	590	0	280	230	0	80	0	0	0	0	5.37	A ₇

NOTES: Refer to Notes 1, 2, 3, 4, 5, 6 and 7 in Table S-1 for full description of alternatives.
 Enter weighted favourability value A_i in Table S-5.



TABLE S-3 – HIGH FILL CROSSINGS

ALTERNATE ROUTES	Total Length (m)	HIGH FILLS CROSSING LENGTH, HEIGHT AND SUBSOIL TYPE									WEIGHTED FAVOURABILITY VALUE(A _i)	
		5-10 m High Fill			10-15 m High Fill			> 15 m High Fill				
		L1	L2	L3	L4	L5	L6	L7	L8	L9		
		Bedrock (F1=9)	Composite (F2=8)	Cohesive (F3 =7)	Bedrock (F4=6)	Composite (F5=5)	Cohesive (F6 =4)	Bedrock (F7=3)	Composite (F8=2)	Cohesive (F9 =1)		
AB1 (Northerly Route) (Note 1)	5,550	100	2,030	1,240	0	1,630	300	0	0	250	3.19	A ₁
AB2 (Twinning Route) (Note 2)	2,770	250	620	1,300	0	100	250	0	50	200	6.54	A ₂
AB3 (South Side Route) (Note 3)	4,670	340	1,390	1,540	0	150	1,000	0	50	200	3.81	A ₃
BCD1 (South Westerly) (Note 4)	3,790	100	1,060	1,730	70	160	450	70	100	50	5.79	A ₄
BCD2 (Twinning & South) (Note 5)	3,480	100	1,040	1,410	80	170	450	70	100	60	6.24	A ₅
BCD3 (Twinning & North) (Note 6)	3,330	0	1,050	1,460	90	180	450	50	50	0	6.64	A ₆
BCD4 (Northerly) (Note 7)	3,350	0	690	1,040	180	470	500	50	270	150	5.66	A ₇
		0-5 m High Fill			5-10 m High Fill			> 10 m High Fill				
Alternative 1 (connection to Hwy 102)	600	90	0	440	0	0	70	0	0	0	3.36	A ₈
Alternative 2 (connection to Hwy 102)	450	20	80	0	50	0	300	0	0	0	3.32	A ₉
Alternative 3 (connection to Hwy 102)	290	20	0	270	0	0	0	0	0	0	7.14	A ₁₀

NOTES: Refer to Notes 1, 2, 3, 4, 5, 6 and 7 in Table S-1 for full description of alternatives.
 Enter weighted favourability value A_i in Table S-5.



TABLE S-4 – DEEP CUTS

ALTERNATE ROUTES	Total Length (m)	DEEP CUT LENGTH, HEIGHT AND SUBSOIL TYPE									WEIGHTED FAVOURABILITY VALUE(A _i)	
		5 - 10 m Deep Cut			10 - 15 m Deep Cut			> 15 m Deep Cut				
		L1	L2	L3	L4	L5	L6	L7	L8	L9		
		Bedrock (F1=9)	Composite (F2=8)	Cohesive (F3 =7)	Bedrock (F4=6)	Composite (F5=5)	Cohesive (F6 =4)	Bedrock (F7=3)	Composite (F8=2)	Cohesive (F9 =1)		
AB1 (Northerly Route) (Note 1)	6,830	830	2,780	1,100	620	230	150	200	170	750	4.89	A ₁
AB2 (Twinning Route) (Note 2)	5,120	1,840	1,350	530	200	50	50	450	200	450	6.82	A ₂
AB3 (South Side Route) (Note 3)	5,680	1,020	1,000	910	1,400	600	750	0	0	0	6.02	A ₃
BCD1 (South Westerly) (Note 4)	5,330	150	800	1,150	930	300	670	600	240	490	3.52	A ₄
BCD2 (Twinning & South) (Note 5)	4,530	150	750	400	1,230	500	920	400	90	90	4.33	A ₅
BCD3 (Twinning & North) (Note 6)	3,530	100	250	300	1,100	450	750	400	90	90	5.19	A ₆
BCD4 (Northerly) (Note 7)	5,180	230	1,000	1,020	930	300	520	650	240	290	3.83	A ₇
Alternative 1 (connection to Hwy 102)	950	150	0	300	0	0	0	200	100	200	1.97	A ₈
Alternative 2 (connection to Hwy 102)	1,800	200	100	200	50	0	50	900	0	300	0.93	A ₉
Alternative 3 (connection to Hwy 102)	400	50	0	150	130	0	70	0	0	0	6.40	A ₁₀

NOTES: Refer to Notes 1, 2, 3, 4, 5, 6 and 7 in Table S-1 for full description of alternatives.

Enter weighted favourability value A_i in Table S-5.



TABLE S-5 – SCORING OF FOUNDATION CRITERIA

EVALUATION CRITERIA	SOFT GROUND/ SWAMPS		STRUCTURE FOUNDATIONS		HIGH FILL CROSSINGS		DEEP CUTS		NORMALIZED SCORE	RANKING
TABLE No.	S1		S2		S3		S4			
IMPACT WEIGHT, Bi	0.30		0.35		0.20		0.15			
ALTERNATE ROUTES	Ai	Ni	Ai	Ni	Ai	Ni	Ai	Ni		
AB1 (Northerly Route) (Note 1)	6.74	0.96	3.60	0.70	3.19	0.49	4.89	0.72	2.95	3
AB2 (Twinning Route) (Note 2)	6.99	1.00	2.99	0.58	6.54	1.00	6.82	1.00	3.41	1
AB3 (South Side Route) (Note 3)	4.18	0.62	5.17	1.00	3.81	0.58	6.02	0.88	3.14	2
BCD1 (South Westerly) (Note 4)	7.31	1.00	6.16	1.00	5.79	0.87	3.52	0.68	3.70	1
BCD2 (Twinning & South) (Note 5)	4.09	0.56	6.06	0.98	6.24	0.94	4.33	0.83	3.30	3
BCD3 (Twinning & North) (Note 6)	3.51	0.48	5.19	0.84	6.64	1.00	5.19	1.00	3.16	4
BCD4 (Northerly) (Note 7)	5.99	0.82	5.37	0.87	5.66	0.85	3.83	0.74	3.33	2
Alternative 1 (connection to Hwy 102)	10	1.00	10	1.00	3.36	0.47	1.97	0.31	3.16	2
Alternative 2 (connection to Hwy 102)	10	1.00	10	1.00	3.32	0.47	0.93	0.14	3.06	3
Alternative 3 (connection to Hwy 102)	10	1.00	10	1.00	7.14	1.00	6.40	1.00	4.00	1

NOTES: Refer to Notes 1, 2, 3, 4, 5, 6 and 7 in Table S-1 for full description of alternatives.

Enter weighted favourability value Ai in Table S-5.

Ai - Weighted Favourability Value

Ni - Normalized Favourability Value



TABLE 1 – STRUCTURE SUMMARY FOR THE ALTERNATE ROUTES

STRUCTURE	ALT AB1		ALT AB2		ALT AB3		ALT BCD1		ALT BCD2		ALT BCD3		ALT BCD4	
	STATION	LENGTH (m)	STATION	LENGTH (m)	STATION	LENGTH (m)	STATION	LENGTH (m)	STATION	LENGTH (m)	STATION	LENGTH (m)	STATION	LENGTH (m)
OSKONDAGA RIVER	12+000	140	12+090	100	12+300	100								
GOLDIE ROAD			12+230	100										
SHEBANDOWAN RIVER	26+400	90	26+550	100	26+820	100								
CNR RAIL LINE	28+900	70	29+050	40	29+340	40								
MOKOMAN ROAD							15+500	130	15+550	100	15+550	120	16+650	190
HIGHWAY 11/17							23+120	100						
CPR RAIL LINE							24+380	130			23+390	100	23+500	90
KAMINISTIKWIA RIVER									23+850	160	23+650	220	23+800	230
AQUEDUCT ACCESS ROAD									24+380	130				
POLE LINE ROAD							29+620	80	29+620	80	27+880	80	28+800	80
Summary totals		300		340		240		440		470		520		590



TABLE A
RECOMMENDED LOCATIONS FOR FOUNDATION SUBSURFACE INVESTIGATION
SWAMPS AND MAJOR HIGH FILL CROSSINGS
PREFERRED ALIGNMENT

LOCATION (Note 1)	PROPOSED WORKS	INFERRED DEPTHS UNSUITABLE SOILS (Note 2)
Highway 11/17 Mainline – Township of Dawson Road Lots		
Sta. 11+700 to 11+900	Embankment fill up to 4 m, swamp	Up to 10 m
Sta. 18+220 to 18+320	Embankment fill up to 4 m, swamp	Up to 12 m
Sta. 18+760 to 18+920	Embankment fill up to 7 m, swamp	Up to 12 m
Sta. 21+720 to 21+840	Embankment fill up to 4 m, open water swamp	Up to 12 m
Sta. 25+220 to 25+340	Embankment fill up to 10 m, swamp	Up to 10 m
Sta. 27+000 to 27+427	Embankment fill up to 30 m	(Note 3)
Highway 11/17 Mainline – Township of Conmee		
Sta. 10+000 to 10+260	Embankment fill up to 30 m	(Note 3)
Sta. 12+960 to 13+160	Embankment fill up to 18 m, swamp	Up to 8 m
Sta. 17+680 to 18+200	Embankment fill up to 40 m, Brule Creek crossing	(Note 3)
Sta. 19+640 to 19+740	Embankment fill up to 15 m, swamp and creek crossing	Up to 8 m

- Notes: 1. Chainages are approximate, may vary for eastbound and westbound lanes to be confirmed / refined during detailed design.
 2. Inferred unsuitable soils depths are inferred and include peat / organic and very soft clayey soils.
 3. The preliminary investigation will involve a minimum of 2 boreholes per high fill / swamp area with a maximum borehole spacing of 100 m.



TABLE B
RECOMMENDED LOCATIONS FOR FOUNDATION SUBSURFACE INVESTIGATION
STRUCTURES AND CULVERTS
PREFERRED ALIGNMENT

LOCATION (Note 1)	PROPOSED WORKS
Highway 11/17 Mainline – Township of Dawson Road Lots	
Sta. 10+120	Oskondaga River Bridge WBL and EBL
Sta. 10+165	Goldie Road Overpass WBL and EBL
Sta. 24+500	Shebandowan River Bridge WBL and EBL
Sta. 26+800	CNR Overpass WBL and EBL
Sta. 27+080	Culvert Extension
Highway 11/17 Mainline – Township of Conmee	
Sta. 13+040	New Culvert WBL and EBL
Sta. 17+950	New Culvert WBL and EBL, Brule Creek Crossing
Sta. 19+680	New Culvert WBL and EBL
Sta. 21+800	New Culvert WBL and EBL
Sta. 24+775	CNR Overpass WBL and EBL
Sta. 25+060	Kaministiquia (Kam) River Bridge WBL and EBL
Highway 11/17 Mainline – Townships of Oliver, Paipoonge	
Sta. 11+490	Oliver Road Overpass

Note: 1. Chainages are approximate, may vary for eastbound and westbound lanes to be confirmed / refined during detailed design.

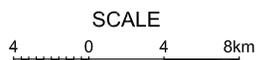


REFERENCE: THIS FIGURE WAS REPRODUCED FROM ONTARIO MAP - 2009 EDITION BY MAPART PUBLISHING CORP.

GEOGRES No.: 52A-148

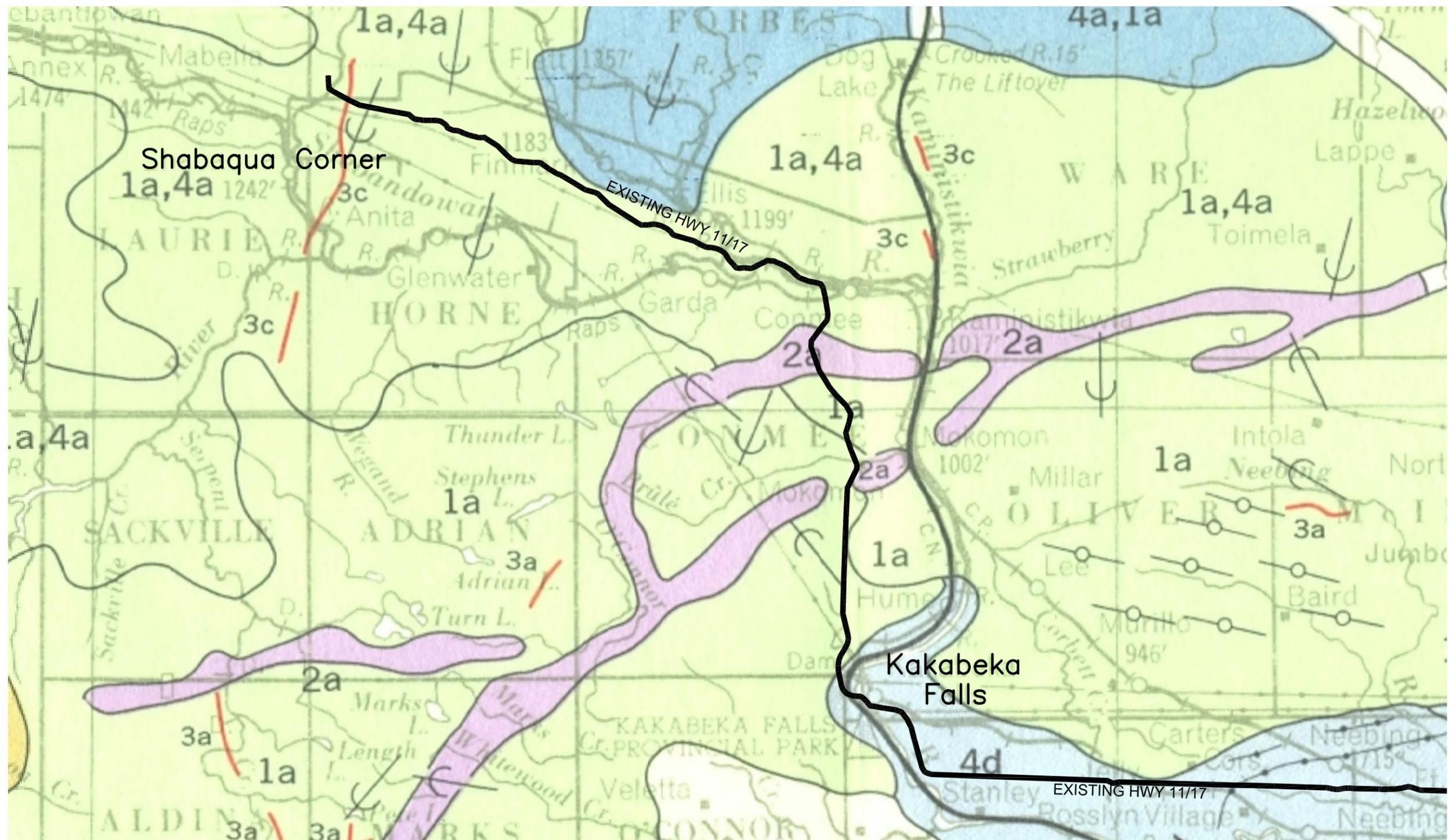
PROJECT LOCATION MAP
 HIGHWAY 11 / 17 FOUR-LANING
 FROM KAKABEKA FALLS TO SHABAQUA CORNERS

METRIC



HIGHWAY 11/17 FOUR-LANING
 Kakabeka Falls to Shabaqua Corners
 G.W.P. 6054-03-00

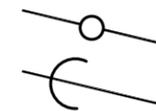
FIGURE
 1



LEGEND:

- 1 **Ground moraine:**
 - 1a Silty to sandy silt
- 2 **End moraine, interlobate moraine: sand, gravel and boulders:**
 - 2a Unmodified by overriding or by lake action

- 3 **Esker, esker complex, kame: sand, gravel and boulders:.**
 - 3a Unmodified by overriding or by lake action
 - 3c Modified by lake action; esker and delta complex
- 4 **Lacustrine deposits; varved or massive clay, silt fine sand, sand:**
 - 4a Varved or massive clay and silt
 - 4d Deltaic sand, valley train



Drumlin, drumlinoid ridge



Glacial striae: older

GEOCRES No.: 52A-148

NOTE: THIS DRAWING WAS PRODUCED FROM MAP S265 THUNDER BAY - SURFICIAL GEOLOGY, PREPARED BY ONTARIO DEPARTMENT OF LANDS AND FORESTS.

SURFICIAL GEOLOGY

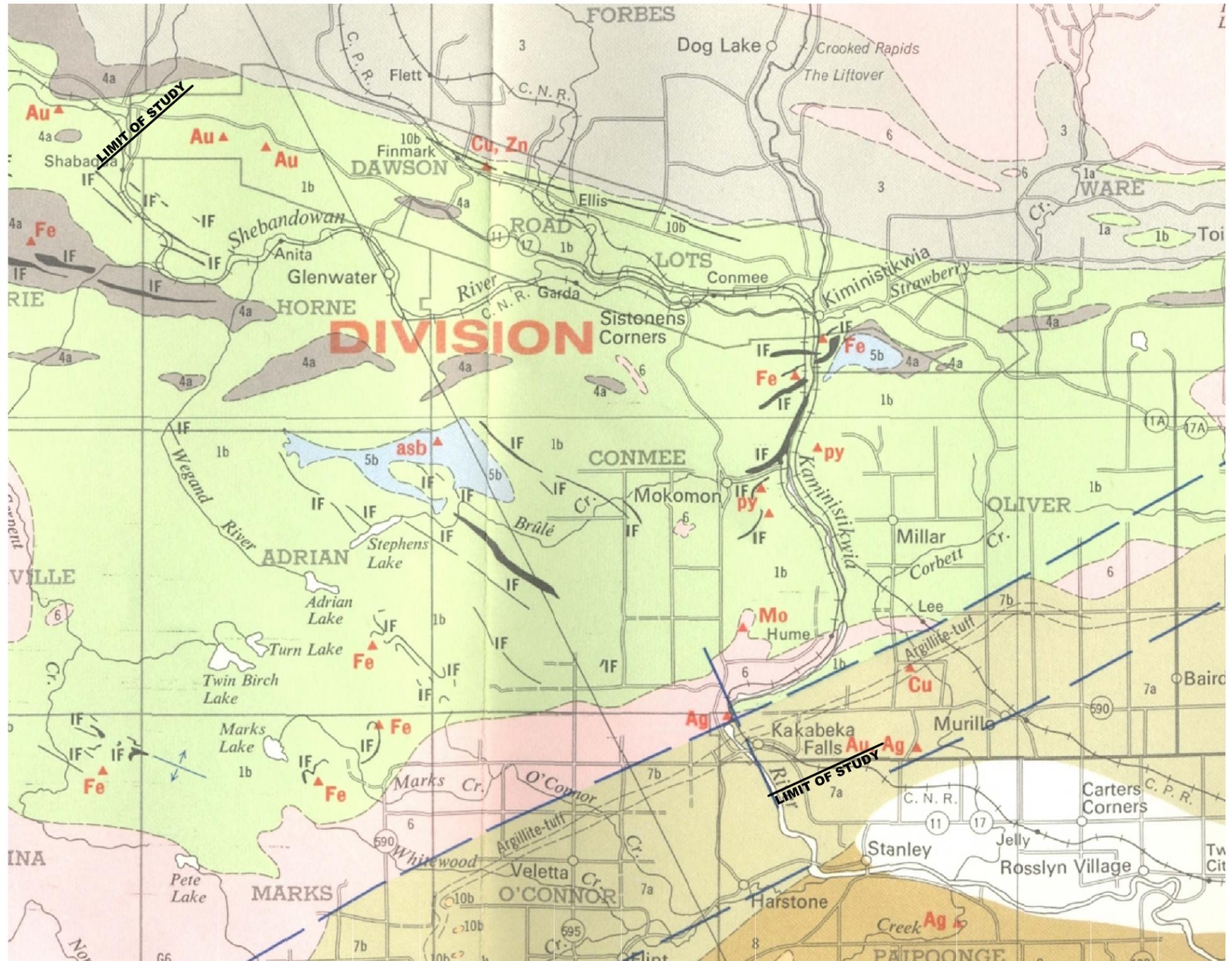
METRIC



HIGHWAY 11/17 FOUR-LANING
Kakabeka Falls to Shabaqua Corners
G.W.P. 6054-03-00



FIGURE
2



LEGEND:

- 1 **Metavolcanics.**
 - 1b Undifferentiated metavolcanic with some metasediments.
- 4 **Metasediments**
 - 4a Conglomerate, arkose, greywache, slate, limestone
 - 4b Intermixed metavolcanics and metasediments
- 5 **Basic and Ultrabasic Igneous Rocks**
 - 5b Peridotite, dunite, serpentinite
- 6 **Acid Igneous and Metamorphic Rocks.**
- 7 **Gunflint formation**
- 8 **Animikie - Rove Formation**
 - Argillite, shale, greywache, minor volcanic rocks
- 10 **Intrusive Igneous Rocks**
- IF **Iron formation**

NOTE: THIS DRAWING WAS PRODUCED FROM MAP 2065, ATIKOKAN-LAKEHEAD SHEET, GEOLOGICAL COMPILED SERIES - KENORA, RAINY RIVER AND THUNDER BAY DISTRICTS, PREPARED BY ONTARIO DEPARTMENT OF MINES.

GEOCRES No. 52A-148

BEDROCK GEOLOGY

METRIC



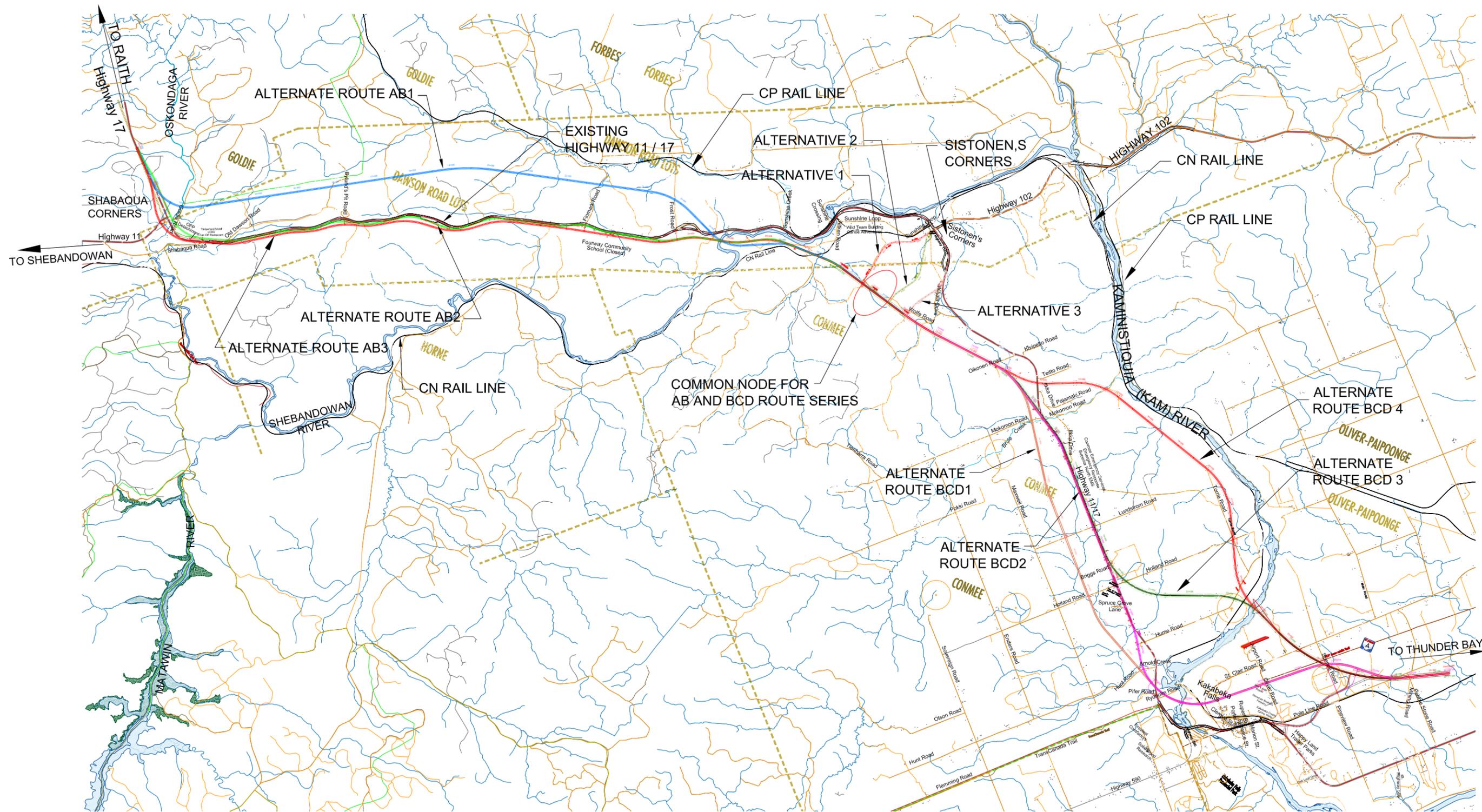
Ontario

Stantec Consulting Ltd.

Peto MacCallum Ltd.
CONSULTING ENGINEERS

HIGHWAY 11/17 FOUR-LANING
Kakabeka Falls to Shabaqua Corners
G.W.P. 6054-03-00

FIGURE
3



LEGEND:

ALTERNATE ROUTE AB1	ALTERNATE ROUTE BCD1	ALTERNATE ROUTE BCD4
ALTERNATE ROUTE AB2	ALTERNATE ROUTE BCD2	
ALTERNATE ROUTE AB3	ALTERNATE ROUTE BCD3	GEOCRES No. : 52A-148

REFERENCE: THIS DRAWING WAS PREPARED FROM STANTEC CONSULTING LIMITED DRAWING - 714_design_alternatives.dwg DRAWING 1 - DOWNLOADED FROM THEIR FTP SITE ON OCTOBER 22, 2009

KEY MAP

**HIGHWAY 11 / 17 - ALTERNATE ROUTES
ROUTE PLANNING & ENVIRONMENTAL ASSESSMENT
BETWEEN KAKABEKA FALLS AND SHABAQUA CORNERS**

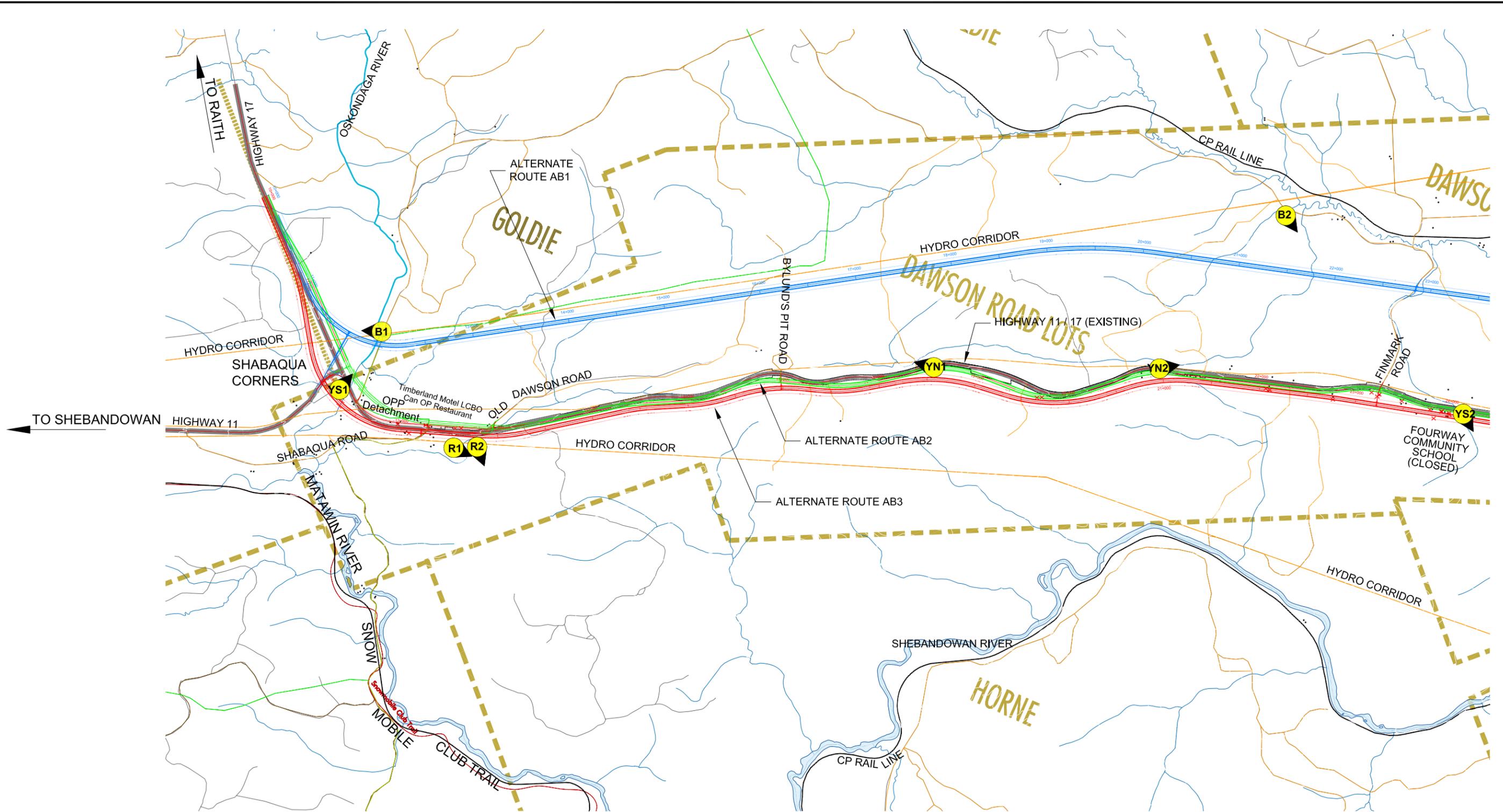
METRIC



HIGHWAY 11 / 17
GWP No. 6054-03-00
P.O. 6007-E-0018



DRAWING
A1



LEGEND:

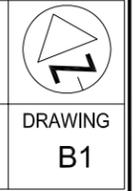
ALTERNATE ROUTE AB1		ALTERNATE ROUTE BCD1		ALTERNATE ROUTE BCD4	
ALTERNATE ROUTE AB2		ALTERNATE ROUTE BCD2		PHOTOGRAPH LOCATION AND DIRECTION	
ALTERNATE ROUTE AB3		ALTERNATE ROUTE BCD3			

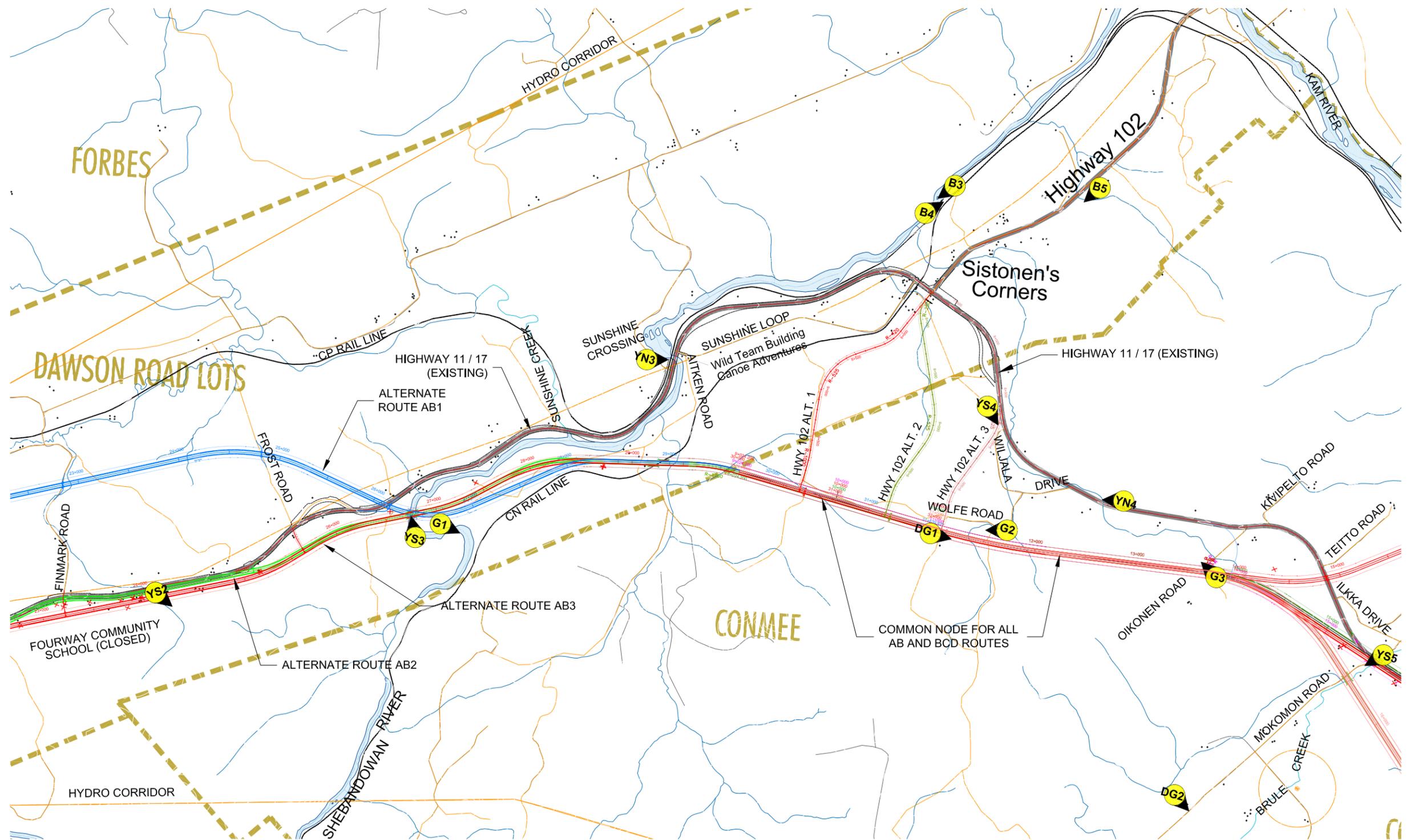
GEOGRES No. : 52A-148

REFERENCE: THIS DRAWING WAS PREPARED FROM STANTEC CONSULTING LIMITED DRAWING - 714_design_alternatives.dwg DRAWING 1 - DOWNLOADED FROM THEIR FTP SITE ON OCTOBER 22, 2009

**HIGHWAY 11 / 17 - ALTERNATE ROUTES
ROUTE PLANNING & ENVIRONMENTAL ASSESSMENT
BETWEEN KAKABEKA FALLS AND SHABAQUA CORNERS**

METRIC



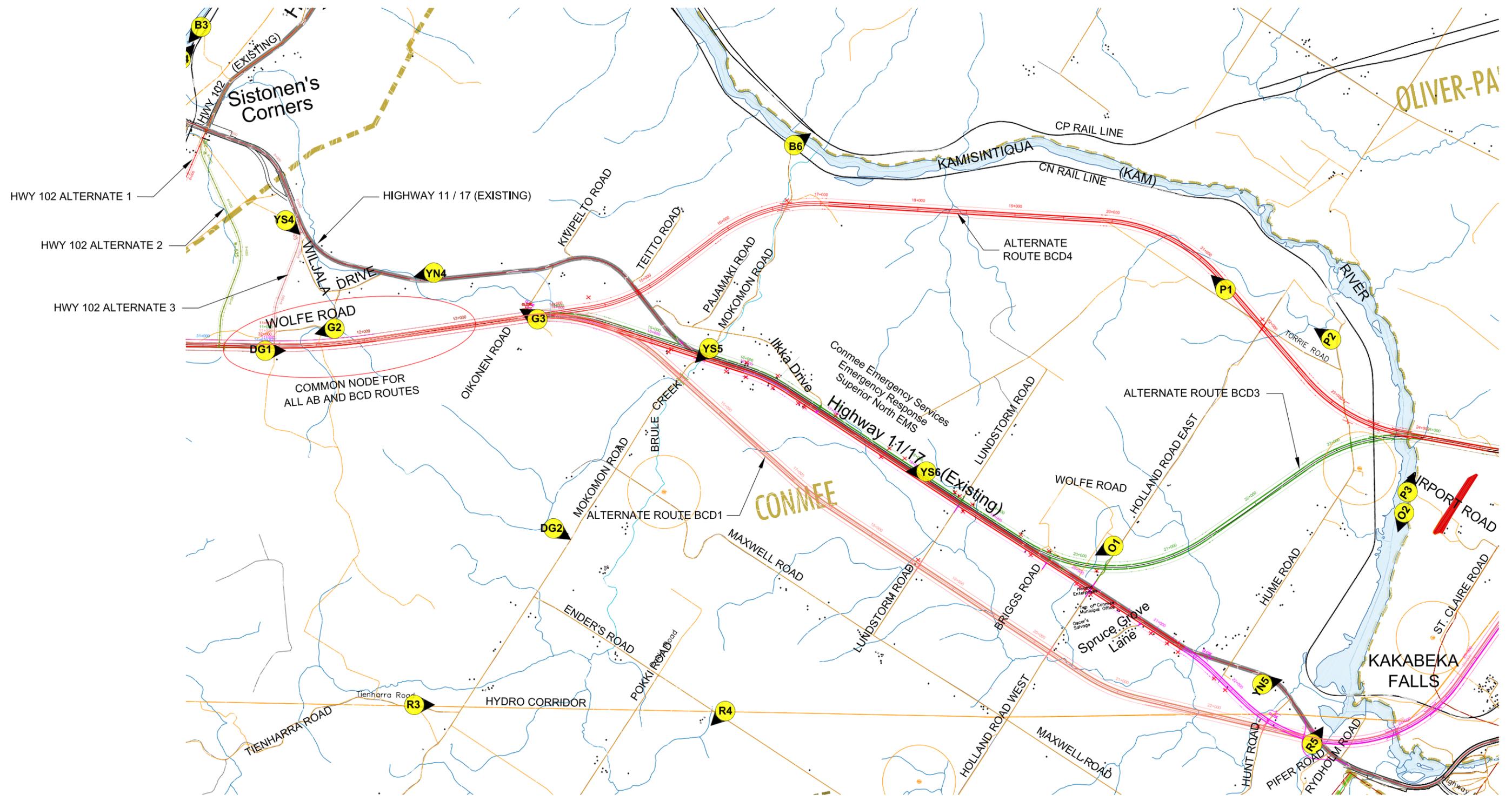


REFERENCE: THIS DRAWING WAS PREPARED FROM STANTEC CONSULTING LIMITED DRAWING - 714_design_alternatives.dwg DRAWING 1 - DOWNLOADED FROM THEIR FTP SITE ON OCTOBER 22, 2009

LEGEND:

ALTERNATE ROUTE AB1		ALTERNATE ROUTE BCD1		ALTERNATE ROUTE BCD4	
ALTERNATE ROUTE AB2		ALTERNATE ROUTE BCD2		PHOTOGRAPH LOCATION AND DIRECTION	
ALTERNATE ROUTE AB3		ALTERNATE ROUTE BCD3			

GEOGRES No. : 52A-148



LEGEND:

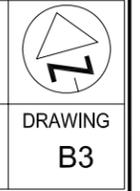
ALTERNATE ROUTE AB1	█	ALTERNATE ROUTE BCD1	█	ALTERNATE ROUTE BCD4	█
ALTERNATE ROUTE AB2	█	ALTERNATE ROUTE BCD2	█	PHOTOGRAPH LOCATION AND DIRECTION	
ALTERNATE ROUTE AB3	█	ALTERNATE ROUTE BCD3	█		

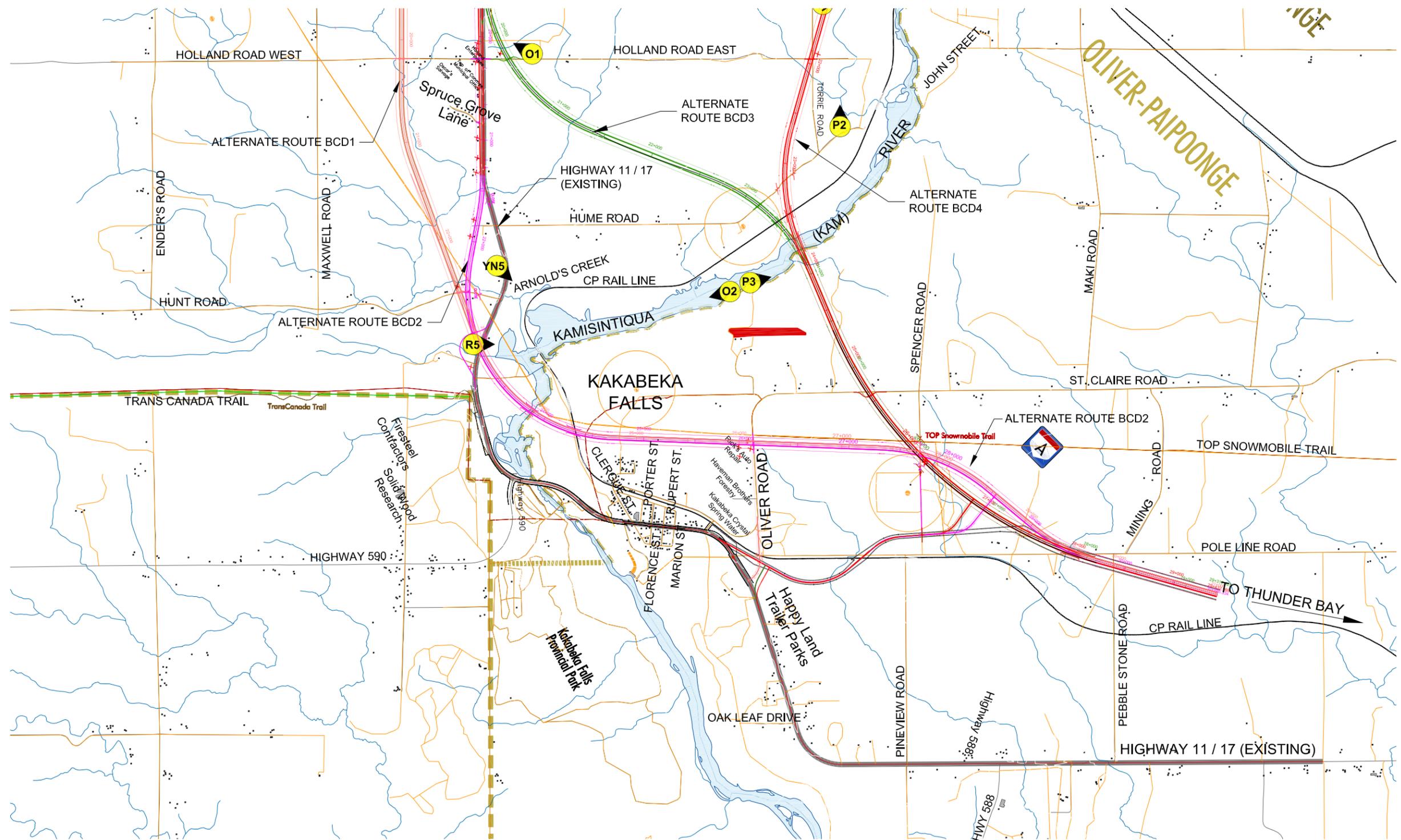
GEOCREs No. : 52A-148

REFERENCE: THIS DRAWING WAS PREPARED FROM STANTEC CONSULTING LIMITED DRAWING - 714_design_alternatives.dwg DRAWING 1 - DOWNLOADED FROM THEIR FTP SITE ON OCTOBER 22, 2009

HIGHWAY 11 / 17 - ALTERNATE ROUTES
ROUTE PLANNING & ENVIRONMENTAL ASSESSMENT
 BETWEEN KAKABEKA FALLS AND SHABAQUA CORNERS

METRIC





REFERENCE: THIS DRAWING WAS PREPARED FROM STANTEC CONSULTING LIMITED DRAWING - 714_design_alternatives.dwg DRAWING 1 - DOWNLOADED FROM THEIR FTP SITE ON OCTOBER 22, 2009

LEGEND:

ALTERNATE ROUTE AB1		ALTERNATE ROUTE BCD1		ALTERNATE ROUTE BCD4	
ALTERNATE ROUTE AB2		ALTERNATE ROUTE BCD2		PHOTOGRAPH LOCATION AND DIRECTION	
ALTERNATE ROUTE AB3		ALTERNATE ROUTE BCD3			

GEOCREs No. : 52A-148

HIGHWAY 11 / 17 - ALTERNATE ROUTES
ROUTE PLANNING & ENVIRONMENTAL ASSESSMENT
BETWEEN KAKABEKA FALLS AND SHABAQUA CORNERS

METRIC

PLAN SCALE

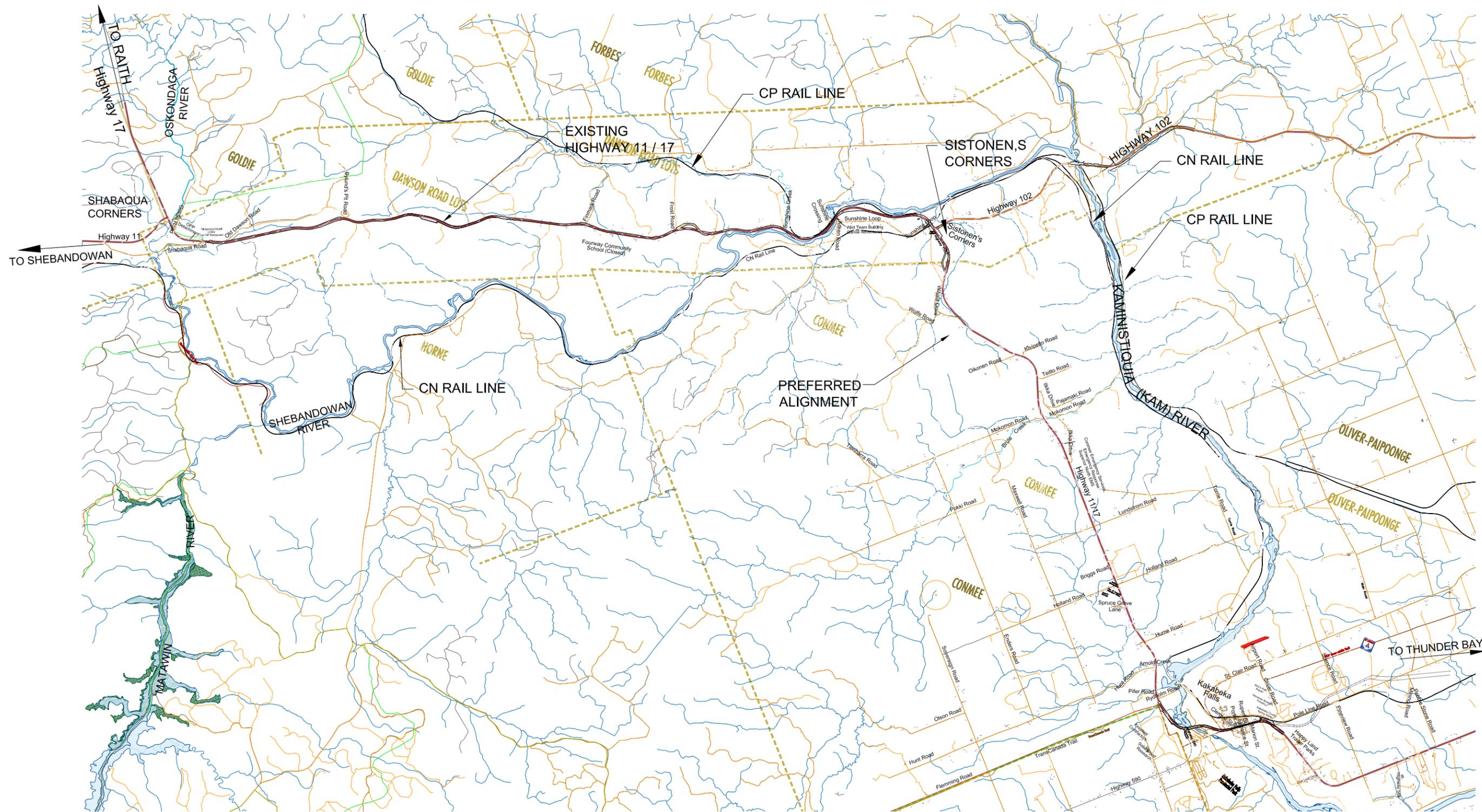
Ontario

Stantec Consulting Ltd.

Peto MacCallum Ltd.
 CONSULTING ENGINEERS

HIGHWAY 11 / 17
 GWP No. 6054-03-00
 P.O. 6007-E-0018

DRAWING
B4



GEOGRES No. : 52A-148
 LEGEND:
 PREFERRED ALIGNMENT [Red line]
 EXISTING HIGHWAY 11 / 17 [Black line]
 ULTIMATE DESIGN [Blue line]

REFERENCE: THIS DRAWING WAS PREPARED FROM STANTEC CONSULTING LIMITED DRAWING - 714_design_Preferred.dwg - RECEIVED FROM STANTEC CONSULTING LIMITED, VIA EMAIL DATED MARCH 02, 2011.

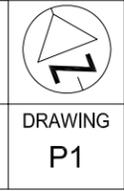
KEY MAP

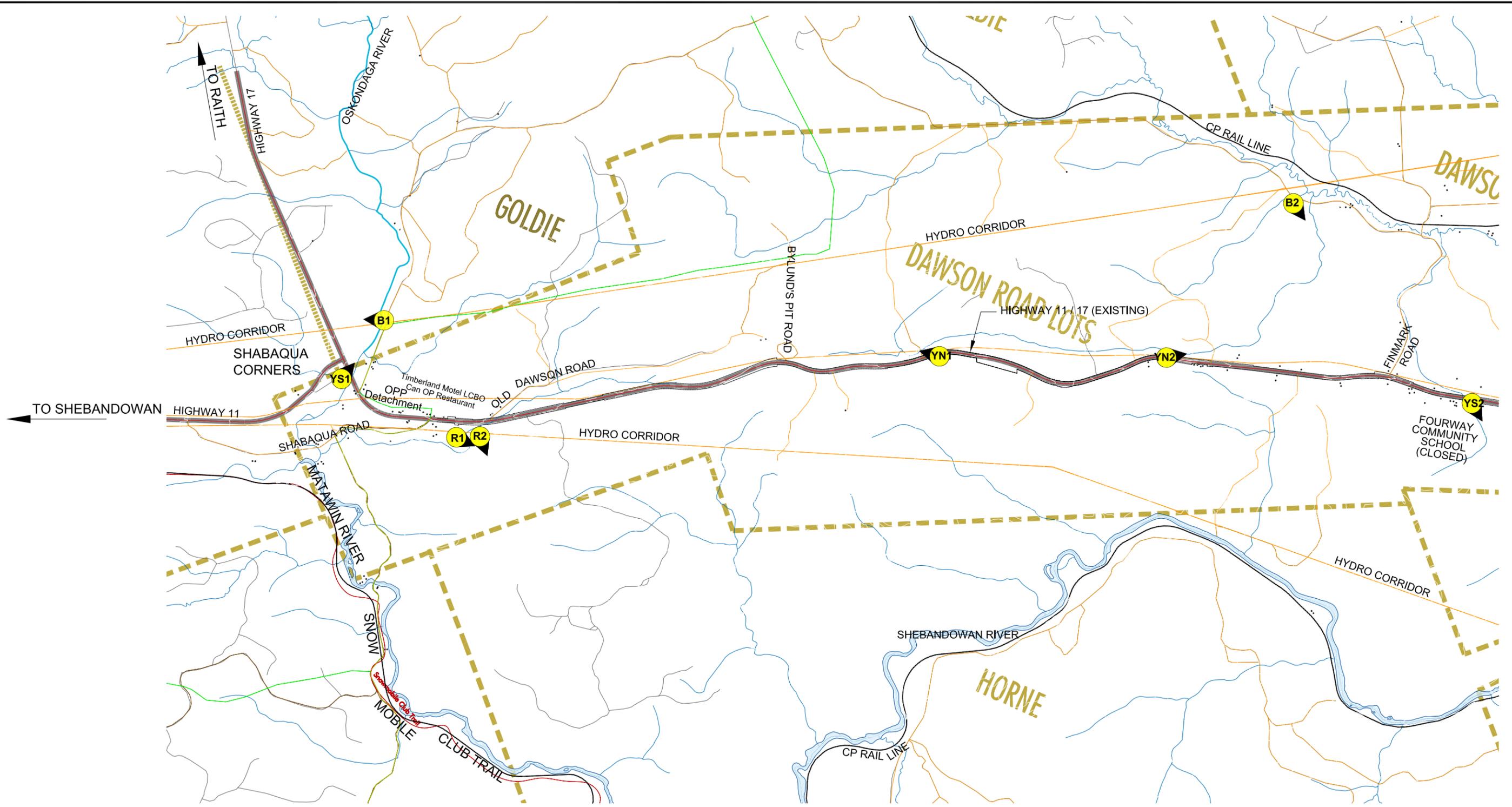
**HIGHWAY 11 / 17 - PREFERRED ALIGNMENT
 ROUTE PLANNING & ENVIRONMENTAL ASSESSMENT
 BETWEEN KAKABEKA FALLS AND SHABAQUA CORNERS**

METRIC



HIGHWAY 11 / 17
 GWP No. 6054-03-00
 P.O. 6007-E-0018





REFERENCE: THIS DRAWING WAS PREPARED FROM STANTEC CONSULTING LIMITED DRAWING - 714_design_Preferred.dwg - RECEIVED FROM STANTEC CONSULTING LIMITED, VIA EMAIL DATED MARCH 02, 2011.

GEOGRES No. : 52A-148
 LEGEND:
 PHOTOGRAPH LOCATION AND DIRECTION 
 PREFERRED ALIGNMENT 
 EXISTING HIGHWAY 11 / 17 
 ULTIMATE DESIGN 

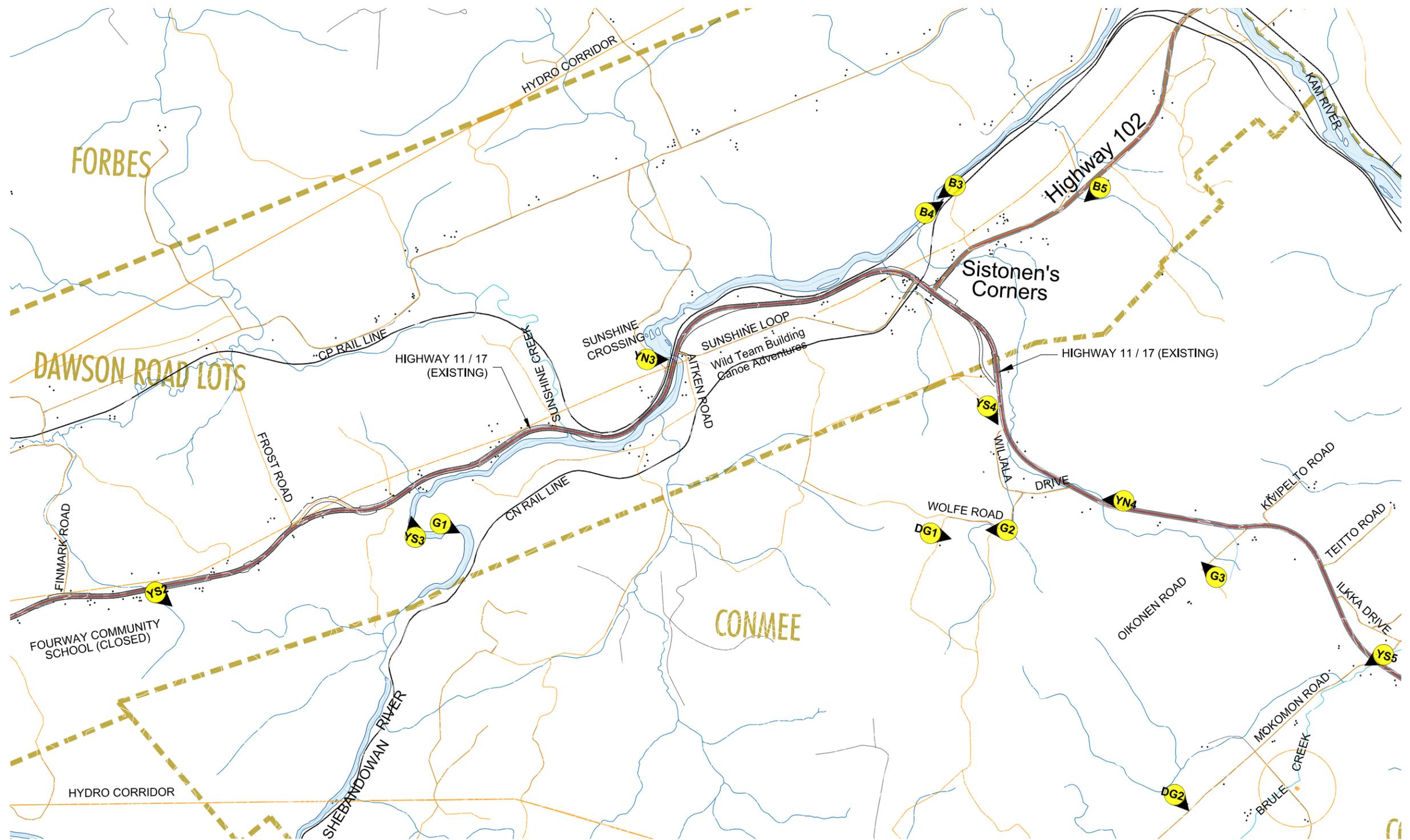
HIGHWAY 11 / 17 - PREFERRED ALIGNMENT
ROUTE PLANNING & ENVIRONMENTAL ASSESSMENT
 BETWEEN KAKABEKA FALLS AND SHABAQUA CORNERS

METRIC



HIGHWAY 11 / 17
 GWP No. 6054-03-00
 P.O. 6007-E-0018

DRAWING
 P2



GEOGRES No. : 52A-148
 LEGEND:
 PHOTOGRAPH LOCATION AND DIRECTION 
 PREFERRED ALIGNMENT 
 EXISTING HIGHWAY 11 / 17 
 ULTIMATE DESIGN 

REFERENCE: THIS DRAWING WAS PREPARED FROM STANTEC CONSULTING LIMITED DRAWING - 714_design_Preferred.dwg - RECEIVED FROM STANTEC CONSULTING LIMITED, VIA EMAIL DATED MARCH 02, 2011.

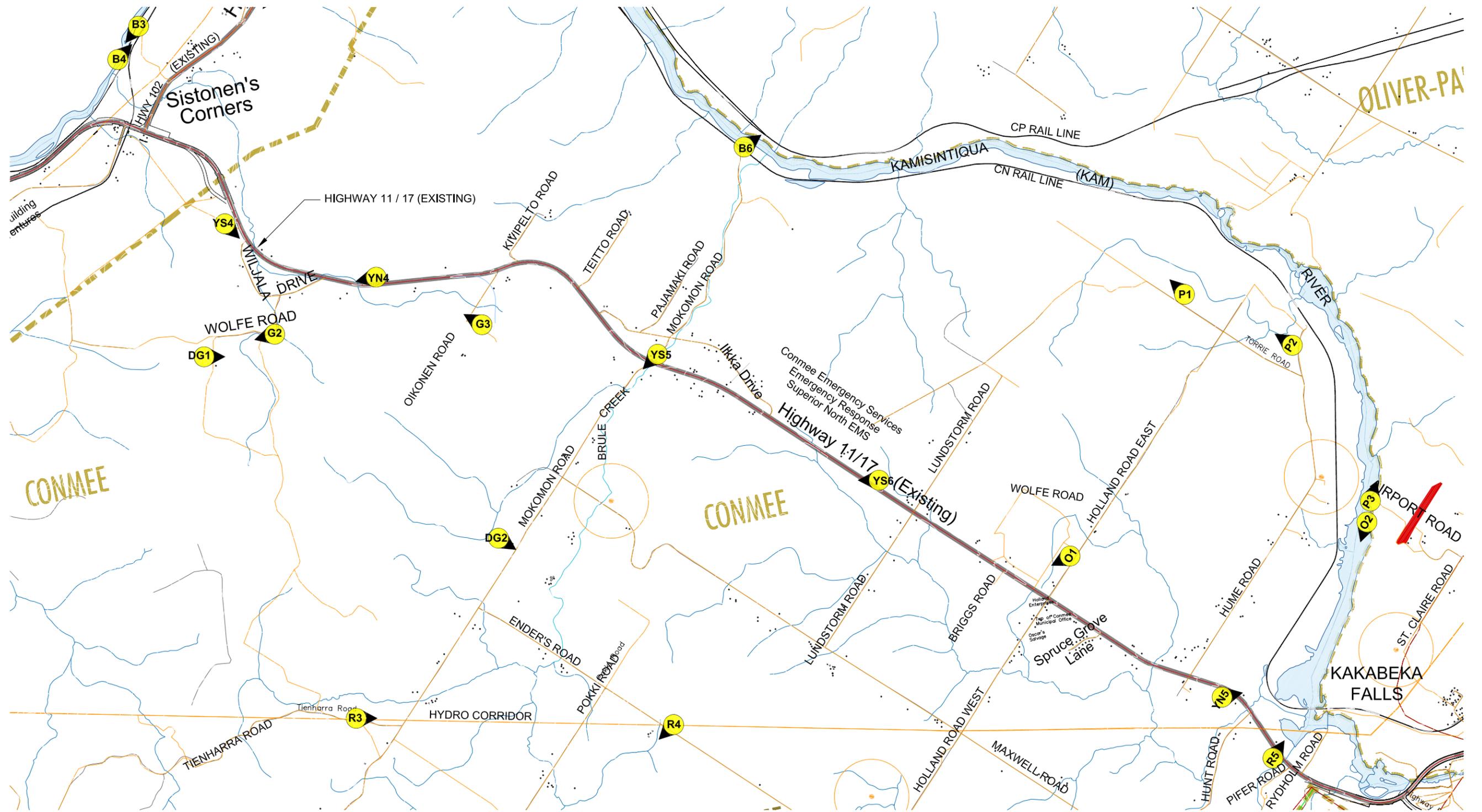
**HIGHWAY 11 / 17 - PREFERRED ALIGNMENT
 ROUTE PLANNING & ENVIRONMENTAL ASSESSMENT
 BETWEEN KAKABEKA FALLS AND SHABAQUA CORNERS**

METRIC



HIGHWAY 11 / 17
 GWP No. 6054-03-00
 P.O. 6007-E-0018

DRAWING
P3



GEOGRES No. : 52A-148

LEGEND:

PHOTOGRAPH LOCATION AND DIRECTION



PREFERRED ALIGNMENT



EXISTING HIGHWAY 11 / 17



ULTIMATE DESIGN



REFERENCE: THIS DRAWING WAS PREPARED FROM STANTEC CONSULTING LIMITED DRAWING - 714_design_Preferred.dwg - RECEIVED FROM STANTEC CONSULTING LIMITED, VIA EMAIL DATED MARCH 02, 2011.

HIGHWAY 11 / 17 - PREFERRED ALIGNMENT
ROUTE PLANNING & ENVIRONMENTAL ASSESSMENT
BETWEEN KAKABEKA FALLS AND SHABAQUA CORNERS

METRIC

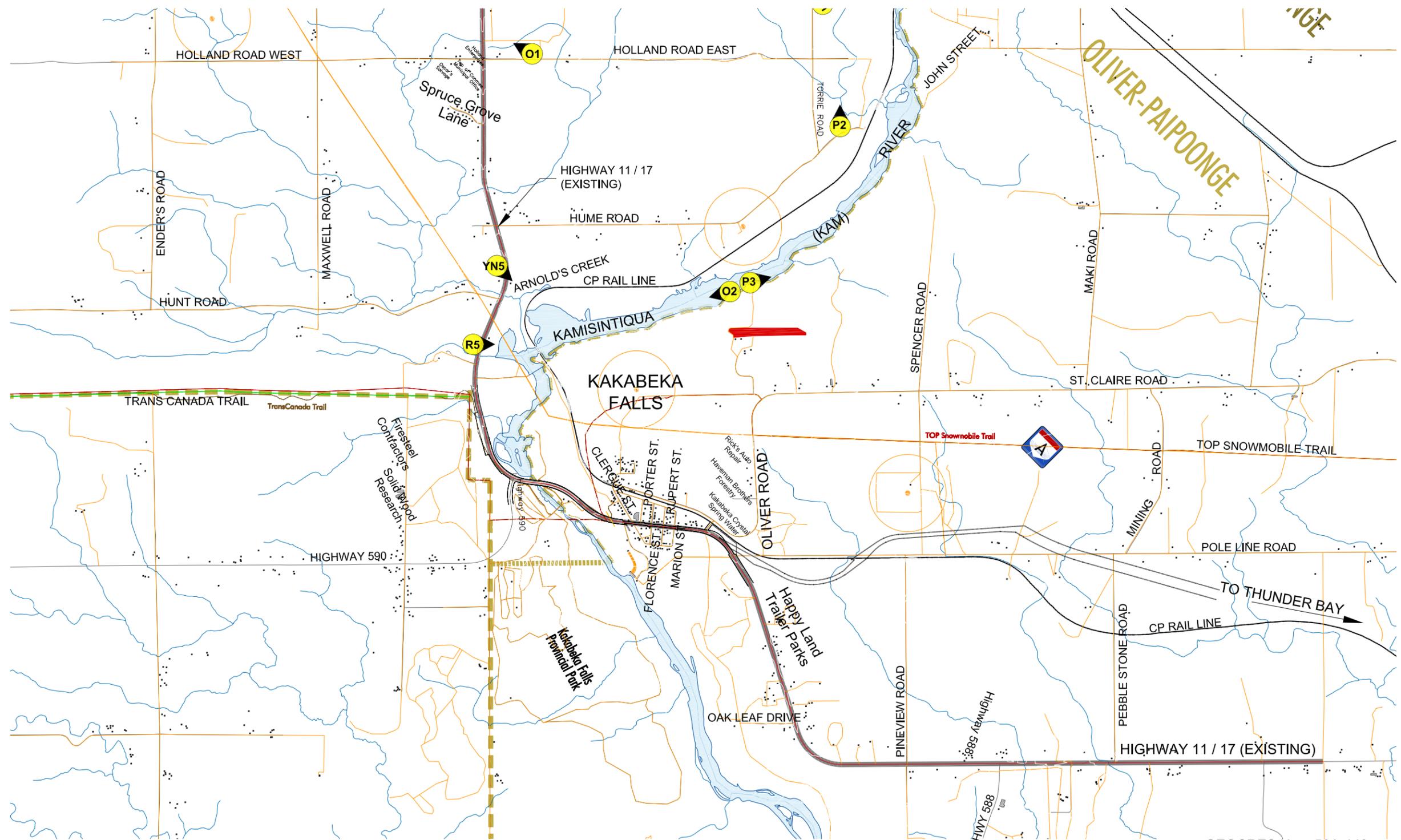
PLAN
SCALE



HIGHWAY 11 / 17
GWP No. 6054-03-00
P.O. 6007-E-0018



DRAWING
P4



GEOCRES No. : 52A-148
 LEGEND:
 PHOTOGRAPH LOCATION AND DIRECTION 
 PREFERRED ALIGNMENT 
 EXISTING HIGHWAY 11 / 17 
 ULTIMATE DESIGN 

REFERENCE: THIS DRAWING WAS PREPARED FROM STANTEC CONSULTING LIMITED DRAWING - 714_design_PREFERRED.dwg - RECEIVED FROM STANTEC CONSULTING LIMITED, VIA EMAIL DATED MARCH 02, 2011.

**HIGHWAY 11 / 17- PREFERRED ALIGNMENT
 ROUTE PLANNING & ENVIRONMENTAL ASSESSMENT
 BETWEEN KAKABEKA FALLS AND SHABAQUA CORNERS**

**PLAN
 SCALE**



HIGHWAY 11 / 17
 GWP No. 6054-03-00
 P.O. 6007-E-0018



**DRAWING
 P5**

METRIC



APPENDIX A

List of Reference Documents



APPENDIX A

LIST OF REFERENCE DOCUMENTS

HIGHWAY 11/17 ALTERNATE ROUTE FOUNDATION ASSESSMENT
FROM KAKABEKA FALLS WESTERLY 40 KM TO SHABAQUA CORNERS
DISTRICT OF THUNDER BAY, ONTARIO
GWP NO. 6054-03-00

A. **Geological Maps**

- Surficial Geology, Map S265, Thunder Bay, Ontario Department of Lands and Forests 1965, Scale 8 Miles : 1 Inch
- Ontario Base Maps, Maps 20 16 3000 53600, 20 16 3000 53700, 20 16 3000 53800 and 20 16 2800 53800, Ministry of Natural Resources, Map Air Photography 1983, Published 2002
- Geological Compilation Series, Atikokan-Lakehead Sheet, Map 2065, Kenora, Rainy River and Thunder Bay Districts, Scale 4 Miles : 1 Inch

B. **Resource Documents**

- Reconnaissance Soil Survey, Parts of Northwestern Ontario, Report No. 8 of the Ontario Soil Survey, Experimental Farms Service, Dominion Department of Agriculture and the Ontario Agricultural College, 1944.

C. **MTO Reports**

- Foundation Investigation report for Proposed Crossing of Kam River and Highway 11/17 at Kakabeka Falls, Geocres No. 52A-66, dated December 1955.
- Investigation Report for Performance of Gravel Sheeting on A Road Cut, Highway 11/17, North of the Kakabeka Falls, Geocres No. 52A-54, dated December 1961.
- Foundation Investigation report for Stability of Proposed Cuts, Highway 102 (known as Highway 17A) at Sistonen's Corners Easterly, WP 126-62-02, Geocres No. 52A-13, dated January 1970.
- Foundation Investigation report for Embankment Extension Between Sta. 21+00 and 28+00 , Highway 11/17, Sistonen's Corners, WP 126-62, Geocres No. 52A-15, dated November 1970.
- Foundation Investigation report for Matawia River , Highway 17, Sistonen's Corners, Geocres No. 52A-19, dated November 1954
- Investigation of Track Movement, C.P Trail, Mile 28.3 Kaministiquia Subdivision, Sunshine, Geocres No. 52A-127, dated February 1993
- Foundation Investigation report for Sunshine Creek Bridge on Ellis Road, Geocres No. 52A-89, dated October 1986



- Foundation Investigation report for Oskondaga River One-lane Bridge, Highway 11/17, Lots 78 and 79, Concession, Shabaqua Corners, Geocres No. 52A-61, dated September 1975.
- Foundation Investigation report for Shabaqua Patrol Yard-Office Addition , Highway 11/17, Shabaqua Corners, WP 2703-86-02, Geocres No. 52A-91, dated July 1988

D. Well Records (See Appendix B)

- Water Well Records provided by the Ministry of Environment from 1946 - 2009.

E. Air Photo

- Aerial Photographs
92-4814, 17-33
92-4815, 20-205
92-4816, 26-85
92-4817, 26-105
92-4818, 27-111
92-4819, 27-60
92-4819, 27-58
92-4819, 27-56
92-4820, 17-153 and
92-4820, 17-151



APPENDIX B

Water Well Records

TOWNSHIP
 CONCESSION (LOT)
 PAIPOONGE TOWNSHIP
 KAM N C (017)

UTM¹
 16 316631
 5361506N

DATE²
 CNTR³
 1994/07
 5557

CASING
 DIA⁴
 06 06

WATER^{5,6}
 DETAIL
 FR 0210
 FR 0140

STAT LVL/PUMP LVL⁷
 RATE⁸/TIME HR:MIN
 048 / 220
 001 / 1:0

WATER
 USE⁹
 DO

SCREEN
 INFO¹⁰
 DO

WELL # (AUDIT#) WELL TAG #
 DEPTHS TO WHICH FORMATIONS EXTEND^{5,11}
 6105275 (112823)
 BRWN LOAM 0002 BRWN SAND SILT 0040
 GREY CLAY 0060 GREY SILT 0090 HPAN
 GRVL 0095 GRN GRSN 0107 BLCK SHLE
 0180 GREY SHLE QTZ LYRD 0230

Notes:

1. UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
2. Date Work Completed
3. Well Contractor Licence Number
4. Casing diameter in inches
5. Unit of Depth in Feet
6. See Table 4 for Meaning of Code
7. STAT LVL: Static Water Level in Feet ; PUMP LVL: Water Level After Pumping in Feet
8. Pump Test Rate in GPM, Pump Test Duration in Hour : Minutes
9. See Table 3 for Meaning of Code
10. Screen Depth and Length in feet
11. See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms									
Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THLK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPG	GYPGUM	PCKD	PACKED	SILTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDG	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDY		

2. Core Color	
Code	Description
WHIT	WHITE
GREY	GREY
BLU	BLUE
GRN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Water Use			
Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial		
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail			
Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ¹¹
OLIVER TOWNSHIP CON 01(011)	16 312195 5365376 ^v	1963/11 3313	02 02	FR 0038	020 / 025 005 / 3:0	DO ST		6100384 () PRDG 0010 MSND 0012 SLTE 0042	
OLIVER TOWNSHIP CON 01(011)	16 319410 5364848 ^v	1751	06 06	FR 0030 FR 0160	010 / 002 / 1:0	DO		6106012 (170818) BRWN GRVL STNS LOOS 0003 RED CLAY LYRD 0016 BLCK SHLE MGRD 0190 6104379 (47584) BLUE CLAY 0015 BLCK SHLE 0200	
OLIVER TOWNSHIP CON 01(011)	16 311998 5364562 ^v	1989/07 3736	06			NU			
OLIVER TOWNSHIP CON 01(011)	16 312018 5363861 ^v	1990/10 6384	32	FR 0017	004 / 016 004 / 1:0	DO		6104538 (83667) PRDR 0017	
OLIVER TOWNSHIP CON 01(011)	16 315372 5364521 ^v	2000/09 1751	06 06	FR 0124	010 / 001 / 1:0	DO		6106575 (224053) BRWN LOAM SNDY LYRD 0007 BLCK SHLE 0124 BLCK SHLE QTZ 0220 6106607 (224482) BRWN CLAY STNS 0035 BRWN GRVL HARD PCKD 0048 6104745 (57131) BRWN LOAM SNDY PCKD 0012 BLCK GRVL STNS LYRD 0028 BLCK HPAN SILT MGRD 0038 BLCK SHLE MGRD 0118 GREY GRNT HARD 0240 6102442 () BRWN CLAY 0010 GREY STNS 0045	
OLIVER TOWNSHIP CON 01(012)	16 311345 5364276 ^v	1979/09 1362	06 06	FR 0014 FR 0032	/ 005 / :0	DO			
OLIVER TOWNSHIP CON 01(012)	16 310895 5363876 ^v	1974/01 1564	06	FR 0020	003 / 012 004 / 2:0	DO		6101165 () RED SAND 0015 GREY CLAY 0017 GREY SAND 0026 6103590 (02648) BRWN GRVL BLDR LOAM 0005 BLCK SHLE HARD VERY 0062 BLCK SHLE SOFT 0104, BLCK GRNT GRSN 0128 6101036 () YLLW CLAY STNS LOOS 0008 GREN ROCK GRSN HARD 0017 GREY ROCK HARD 0025 BLCK ROCK HARD VERY 0040 BLCK ROCK SHLE HARD 0042 GREY ROCK HARD VERY 0047 BLCK ROCK HARD 0058 6100385 () RED CLAY 0006 GREY SHLE 0037 GREY GRNT 0048 6103517 () BRWN CLAY SAND BLDR 0048 RED CONG 0375 BLCK GRNT PORS SOFT 0425 BLCK GRNT 0450 6101444 () BRWN CLAY SILT STNS 0010 GREY ROCK HARD 0026 GREY ROCK HARD 0036 GREY ROCK HARD 0046 GREY ROCK HARD 0050	
OLIVER TOWNSHIP CON 01(012)	16 311471 5364171 ^v	1986/11 5557	06 06	FR 0062 FR 0104 FR 0126	008 / 008 040 / 1:0	DO			
OLIVER TOWNSHIP CON 01(012)	16 311445 5363876 ^v	1973/05 1450	06 06	FR 0040	008 / 030 002 / 0:30	DO			
OLIVER TOWNSHIP CON 01(012)	16 311045 5365376 ^v	1957/05 1822	05 05	FR 0048	028 / 038 001 / 4:0	DO			
OLIVER TOWNSHIP CON 01(012)	16 311187 5364584 ^v	1986/11 3736	06	FR 0400	/ 002 / 1:0	CO			
OLIVER TOWNSHIP CON 01(012)	16 311345 5364176 ^v	1975/09 3911	05 05	FR 0036 FR 0046 FR 0026	008 / 008 / 1:0	DO			

Well Computer Print Out Data as of October 9 2009 © Queen's Printer, 2009

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	SPAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND S.I.:
OLIVER TOWNSHIP CON 01(012)	16 311545 5364226"	1976/09 3911	05 05	FR 0022 FR 0027 FR 0018	010 / 025 003 / 1:30	DO		6101637 () YLLW CLAY SILT STNS 0008 GREY CLAY HPAN STNS 0014 GREY ROCK SHLE LYRD 0025 GREY ROCK SHLE LYRD 0036
OLIVER TOWNSHIP CON 01(012)	16 311267 5363807"	1974/01 1564	06	FR 0012 FR 0020	005 / 005 004 / 2:0	DO		6101520 () BRWN SILT OSND 0012 BRWN SAND SILT 0016 BRWN SAND 0025
OLIVER TOWNSHIP CON 01(013)	16 311284 5364222"	1975/06 2560	06 06	FR 0047	007 / 052 009 / 0:30	DO		6101395 () BRWN GRVL 0004 BRWN BLDR GRVL 0007 BLACK ROCK 0046 BLACK ROCK 0055
OLIVER TOWNSHIP CON 01(013)	16 310695 5365226"	1979/07 1365	06 06	FR 0108 FR 0142	020 / 120 006 / 1:0	DO		6102298 () BRWN TILL BLDR PKCD 0019 GREY LMSN SHLY 0150
OLIVER TOWNSHIP CON 01(013)	16 310367 5363906"	2000/06 6880	06 06	FR 0060	/ 185 001 / 1:0	DO		6106536 (197799) BRWN LOAM 0002 BRWN CLAY 0005 BLACK SHLE SOFT 0015 BLACK SHLE HARD 0025 GREY SHLE HARD 0050 BLACK SHLE HARD 0100 BLACK SHLE SOFT 0150 GREY GRNT HARD 0195
OLIVER TOWNSHIP CON 01(014)	16 309895 5363976"	1976/12 3911	05	FR 0031 FR 0032	020 / 003 / 4:0	DO		6101729 () BRWN CLAY BLDR LTCL 0010 GREY CLAY BLDR HPAN 0030 BRWN GRVL SAND LOOS 0032
OLIVER TOWNSHIP CON 01(014)	16 309245 5365326"	1951/01 1822	05	FR 0042 FR 0068	006 / 003 / :0	ST		6100386 () CLAY 0030 CLAY BLDR 0040 CLAY MSND STNS 0072
OLIVER TOWNSHIP CON 01(014)	16 309391 5364429"	1975/06 2560	06 06	FR 0047	007 / 052 006 / 0:30	DO		6101394 () GREY CLAY 0036 BRWN BLDR 0039 BLACK ROCK SLTE 0055
OLIVER TOWNSHIP CON 01(014)	16 309276 5365106"	6384	06 06	FR 0200	021 / 227 001 / 1:0	DO		6105115 (112716) RED CLAY 0006 BRWN HPAN 0014 BLUE CLAY SNDY 0058 BLACK SHLE 0148 BLACK GRNT 0227
OLIVER TOWNSHIP CON 01(014)	16 309295 5365426"	1980/07 3915	06	FR 0042 FR 0059	/ 012 / 0:30	DO		6102652 () CLAY SAND BLDR 0018 BLACK HPAN HARD 0042 BLACK SHLE HARD 0059
OLIVER TOWNSHIP CON 01(014)	16 309995 5363876"	1975/10 3911	05 05	FR 0064	022 / 003 / 1:0	DO		6101650 () CLAY SILT STNS 0028 GREY ROCK HARD 0070
OLIVER TOWNSHIP CON 01(016)	16 307645 5364826"	1979/06 1365	06 06	FR 0126 FR 0104	038 / 130 002 / 1:0	DO		6102287 () BLACK FILL 0035 BRWN SAND 0070 GREY SILT 0086 BLACK GRNT FCRD HARD 0095 GRNT MGRD 0150
OLIVER TOWNSHIP CON 01(016)	16 308264 5365453"	1990/02 5557	06 06	MN 0100 FR 0186	/ 150 100 / 1:0	DO		6104295 (47338) BRWN LOAM SAND 0003 BRWN SAND 0011 BRWN SAND BLDR STNS 0014 BRWN SAND SLTY 0060 BRWN CLAY LYRD SLTY 0103 WHIT CRT GRN 0123 GREY GRNT 0185 BLACK GRNT 0190 GREY GRNT 0195

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TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
OLIVER TOWNSHIP CON 02(011)	16 312095 5365476"	1978/09 2568	06	FR 0105 FR 0136	021 / 136 025 / 1:0	DO		6102464 () BRWN SAND BLDL DNSE 0027 GREY HPAN STNS PCKD 0042 GREY SHLE SOFT 0061 BLCK SHLE SOFT 0063 GREY SHLE SOFT 0105 GREY GRNT QTZ HARD 0136 GREY GRNT QTZ FCRD 0143
OLIVER TOWNSHIP CON 02(011)	16 312552 5366215"	1989/11 1751	06	FR 0120	018 / 020 / 1:0	DO		6104269 (47358) BRWN CLAY SAND LOOS 0032 BLCK HPAN STNS PCKD 0082 BLCK GRVL FCRD 0116 BLCK GRVL PCKD 0123
OLIVER TOWNSHIP CON 02(011)	16 312425 5365429"	1995/08 6544	42	FR 0014	010 / 004 / 1:0	DO		6105554 (119486) BRWN CLAY ROCK BLDL 0021
OLIVER TOWNSHIP CON 02(012)	16 310938 5365726"	1986/08 5557	06 06	FR 0064 FR 0127	/ 025 / 1:0	DO		6103495 () BLUE CLAY 0012 GREY HPAN 0024 BLCK SHLE 0098 BLCK GRNT 0126 WHIT GRNT GRSN QTZ 0128
OLIVER TOWNSHIP CON 02(012)	16 311079 5367074"	1998/10 6880	06 06	FR 0126	035 / 090 011 / 1:0	DO		6106255 (170635) RED CLAY 0004 BRWN SAND GRVL 0020 GREY TILL GRVL 0023 BLCK GRNT 0030 BLCK SHLE 0121 BLCK GRNT QTZ 0138
OLIVER TOWNSHIP CON 02(013)	16 310414 5365475"	2000/08 1751	06 06	FR 0170	010 / 010 / 1:0	DO		6106566 (197629) LOAM SNDY STNS 0007 BLCK SHLE 0160 BLCK GRNT STNS QTZ 0180
OLIVER TOWNSHIP CON 02(014)	16 309432 5366785"	1999/11 6384	06 06	FR 0104	020 / 110 005 / 1:0	DO		6106446 (197558) BRWN CLAY SOFT 0012 BRWN HPAN SOFT 0021 BRWN SAND SOFT 0070 BRWN SAND STNS SOFT 0096 BLCK GRNT HARD 0110
OLIVER TOWNSHIP CON 02(015)	16 308406 5365564"	1975/06 2560	06 06	FR 0107	012 / 110 006 / 0:30	DO		6101399 () GREY CLAY 0083 BLCK BLDL 0097 BRWN GRVL 0103 GREY ROCK 0115
OLIVER TOWNSHIP CON 02(015)	16 308945 5365526"	1973/05 1564	06	FR 0081	040 / 070 003 / 2:0	DO ST		6101172 () BRWN SAND 0051 GREY CLAY 0089 BLCK SHLE 0090
OLIVER TOWNSHIP CON 02(016)	16 307568 5365538"	1987/12 5557	06 06	FR 0131 FR 0123	058 / 140 004 / 1:0	DO		6103837 (17049) BRWN CLAY 0007 BRWN CLAY STNS 0023 WHIT SAND 0089 GREY CLAY 0111 WHIT GRNT FCRD 0117 WHIT GRNT SOFT 0124 BLCK GRNT GRSN QTZ 0142
OLIVER TOWNSHIP CON 03(011)	16 312220 5367176"	1963/12 3313	02	FR 0030	020 / / :0	NU		6100405 () PRDG 0014 SLTE 0035
OLIVER TOWNSHIP CON 03(011)	16 312195 5367276"	1951/12 1822	06	FR 0015 FR 0040	008 / / :0	ST		6100404 () GREY CLAY 0010 GREY CLAY BLDL 0030 CLAY MSND STNS 0040
OLIVER TOWNSHIP CON 03(011)	16 312495 5368576"	1977/03 2560	06	FR 0025	011 / 026 003 / 1:0	DO		6101796 () BRWN SAND STNS 0012 HPAN 0014 BLDL 0015 HPAN 0024 GRVL 0026

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
OLIVER TOWNSHIP CON 03 (013)	16 310895 5367326"	1983/08 3736	06 06	FR 0124 FR 0098 FR 0115 FR 0118	029 / 100 030 / 1:0	DO		6103113 () RED CLAY 0005 HPAN BLDR 0032 BLCK SHLE 0101 GRNT 0127
OLIVER TOWNSHIP CON 03 (013)	16 310823 5367330"	1988/06 5557	06 06	UK 0037 FR 0084 FR 0111	/ 100 015 / 1:0	NU		6103941 (32214) BRWN CLAY SAND 0016 GREY HPAN STNS 0032 BLCK SHLE 0037 BLCK SHLE FCRD 0039 BLCK SHLE 0104 GREY GRNT QTZ GRSN 0127
OLIVER TOWNSHIP CON 03 (013)	16 309695 5368726"	1978/11 3911	05			NU		6102229 () RED CLAY BLDR HARD 0011 GREY HPAN VERY HARD 0055 GREY SAND BLDR LOOS 0062
OLIVER TOWNSHIP CON 03 (013)	16 310512 5368719"	1997/12 6384	06 06	FR 0055	025 / 050 016 / 1:0	DO		6106094 (170563) BRWN CLAY SOFT 0010 BRWN GRVL CLAY SOFT 0055
OLIVER TOWNSHIP CON 03 (013)	16 309695 5368776"	1978/11 3911	05	FR 0080	027 / 030 / 2:0	DO	0067	6102230 () RED CLAY STNS BLDR 0011 GREY CLAY HPAN HARD 0057 GREY SAND LOOS 0062 GREY HPAN HARD 0070 BLCK GRVL LOOS 0081
OLIVER TOWNSHIP CON 03 (014)	16 309434 5368107"	1995/05 1751	06	FR 0117	023 / 005 / 2:0	DO		6105468 (136684) RED CLAY STNS PCKD 0016 BLCK HPAN STNS HARD 0072 BLCK GRVL SILT LYRD 0104 BLCK GRVL PCKD 0117
OLIVER TOWNSHIP CON 04 (012)	16 311045 5370338"	1993/06 1751	06	FR 0052	/ 004 / 1:0	DO		6105043 (112632) BRWN CLAY STNS PCKD 0032 BLCK GRVL HPAN PCKD 0050 BLCK GRVL 0055
OLIVER TOWNSHIP CON 04 (013)	16 310645 5369026"	1979/04 3911	05	FR 0051	030 / 030 004 / 2:0	DO		6102263 () BRWN CLAY SAND BLDR 0015 GREY HPAN SAND BLDR 0032 GREY HPAN BLDR HARD, 0043 GREY HPAN SAND HARD 0051
OLIVER TOWNSHIP CON 04 (013)	16 310895 5369426"	1980/06 1365	06	FR 0075 FR 0160	018 / 180 004 / 1:0	DO		6102539 () BRWN SAND GRVL STNS 0032 BLUE HPAN 0051 BRWN SAND GRVL SILT 0065 BLCK SHLE 0073 RED GRNT 0092 BLCK GRNT GRSN LYRD 0200
OLIVER TOWNSHIP CON 04 (013)	16 310795 5369826"	1981/08 3911	05 05	FR 0091	011 / 080 / 4:0	DO		6102815 () BRWN CLAY PCKD 0003 GREY HPAN PCKD 0040 GREY SILT LOOS 0068 BRWN CLAY PCKD 0085 BLCK GRNT FCRD MGRD 0091
OLIVER TOWNSHIP CON 04 (013)	16 310875 5370026"	1971/09 1564	06					6100845 () BRWN CLAY SILT 0004 BRWN CLAY 0008 BRWN CLAY SILT 0016 GREY CLAY 0022 GRVL MSND FSND 0023 GRVL BLDR 0027 GRNT 0032
OLIVER TOWNSHIP CON 04 (013)	16 310895 5369326"	1977/11 3911	05	FR 0049 FR 0021	029 / 007 / :0	ST DO		6101981 () RED CLAY STNS BLDR 0019 GREY CLAY GRVL HARD 0021 GREY CLAY STNS 0048 GREY SAND STNS LOOS 0052 GREY CLAY 0053

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TOWNSHIP	CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
OLIVER TOWNSHIP	CON 05(012)	16 311278 5370381*	1998/05 6880	06 06	FR 0080 FR 0092	012 / 0:0	DO		6106165 (170529)	BRWN TILL BLDR 0015 GREY SILT CLAY SAND 0070 GREY GRVL SILT SAND 0076 BLCK GRNT 0080 BLCK GRNT FCRD 0082 BLCK GRNT QTZ GRSN 0092 BLCK GRNT FCRD 0094 BLCK GRNT QTZ GRSN 0100
OLIVER TOWNSHIP	CON 05(012)	16 311395 5371526*	1980/07 1365	06	FR 0100	010 / 1:0	DO		6102580 ()	RED CLAY 0012 GREY TILL HARD 0094 GRVL 0100
OLIVER TOWNSHIP	CON 05(013)	16 310995 5371726*	1967/12 3804	02 02			NU		6100410 ()	BRWN MSND BLDR 0038 GREY ROCK 0190
OLIVER TOWNSHIP	CON 05(014)	16 309445 5371426*	1976/05 3313	02	FR 0016 FR 0050	010 / 015 004 / 1:0	DO		6101735 ()	BRWN GRVL BLDR 0013 GREY QRTZ LMSN 0058
OLIVER TOWNSHIP	CON 05(014)	16 309995 5368926*	1978/03 3911	05 05	FR 0044 FR 0050 FR 0045	033 / 005 / 1:30	DO		6102087 ()	BRWN SILT CLAY BLDR 0011 GREY CLAY HPAN STNS 0044 GREY SAND GRVL LOOS 0050
OLIVER TOWNSHIP	CON 05(014)	16 309445 5371426*	1976/01 3911	05			NU		6101494 ()	BRWN CLAY SILT STNS 0008 BRWN CLAY SILT GRVL 0015 GREY ROCK HARD 0097 GREY ROCK HARD 0210
OLIVER TOWNSHIP	CON 06(011)	16 312586 5372255*	1991/10 1751	06 06	FR 0036 FR 0116	012 / 007 / 1:0	DO		6104738 (83956)	BRWN CLAY STNS PKD 0012 GREY GRNT MGRD 0116 RED GRNT QTZ MGRD 0128
OLIVER TOWNSHIP	CON 06(011)	16 312515 5373363*	1995/07 1751	06 06	FR 0067 FR 0110	020 / 005 / 1:0	DO		6105522 (136689)	BRWN LOAM STNS PKD 0005 BLCK GRNT QTZ MGRD 0128
OLIVER TOWNSHIP	CON 06(012)	16 311163 5371879*	1987/10 3736	06 06	FR 0195	/ 252 / 1:0	DO		6103939 (17008)	BRWN LOAM CLAY SOFT 0056 BLCK GRNT HARD 0252
OLIVER TOWNSHIP	CON 06(012)	16 311424 5371931*	2001/07 6941	06	FR 0054	050 / 050 004 / 2:0	DO		6106718 (229971)	BRWN CLAY BLDR 0006 BRWN CLAY HPAN STNS 0027 BRWN CLAY SILT LYRD 0040 BRWN CLAY STNS 0053 BLCK GRVL STNS 0054
OLIVER TOWNSHIP	CON 06(012)	16 311165 5371797*	1997/05 6880	06 06	UK 0095 FR 0085	/ 008 / 1:0	DO		6105809 (170244)	BRWN CLAY SAND BLDR 0039 GREY GRVL MGRD 0065 BRWN SILT GRVL CGRD 0082 GREN GRSN QTZ FCRD 0086 BLCK GRNT QTZ GRSN 0100
OLIVER TOWNSHIP	CON 06(012)	16 311495 5371876*	1973/05 1569	06 06					6101046 ()	BRWN GRVL BLDR LOOS 0043 GREY HPAN STNS HARD 0050 GREY ROCK GRNT HARD 0070
OLIVER TOWNSHIP	CON 06(012)	16 311120 5371998*	1991/06 1751	06	FR 0034	020 / 008 / 1:0	DO		6104744 (57134)	BRWN LOAM SNDY PKD 0029 BLCK GRVL PKD 0042
OLIVER TOWNSHIP	CON 06(014)	1993/03 6384	06 06	06	FR 0180	022 / 004 / 1:0	DO		6107279 (112710)	BRWN GRVL SOFT 0034 BLCK GRNT HARD 0202

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TOWNSHIP	CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
OLIVER TOWNSHIP	CON 06 (014)	16 309817 5372639"	2003/05 6384	06 06	FR 0070	040 / 070 005 / 1:0	DO		6106975 (257758) BRWN GRVL SOFT 0001 BRWN SAND SOFT 0060 BRWN GRVL SOFT 0070	
OLIVER TOWNSHIP	CON 06 (014)	16 310145 5373176"	1976/08 2560	06	FR 0081 FR 0026	012 / 098 005 / 0:30	DO		6101657 () BRWN SAND LOOS 0008 GREY GRNT QTZ HARD 0068 RED GRNT HARD 0070 GREY GRNT HARD 0080 GREY QTZ SOFT 0081 GREY GRNT QTZ HARD 0100	
OLIVER TOWNSHIP	01 (011)	16 311534 5364911"	2005/12 7131	48	FR 0020	/ 019 004 / 1:0	DO		6107482 (Z05870) A005780 BRWN LOAM 0001 BRWN GRVL STNS HARD 0014 BLUE CLAY SILT DNSE 0025	
OLIVER TOWNSHIP	01 (016)	16 307672 5365261"	2006/09 6941	06	FR 0157 0121	043 / 140 004 / 3:0	DO		6107596 (Z51104) A045593 BRWN CLAY SAND STNS 0004 BRWN SAND STNS 0055 GREY SILT 0118 GREY CLAY STNS 0119 BLACK GRVL SILT 0121 GREY GRNT HARD 0132 WHIT GRNT QTZ LYRD 0162	
OLIVER TOWNSHIP	02 (013)	16 310917 5366492"	2007/06 6941	36 42	FR 0013	002 / 018 / :15	DO		7046221 (Z74103) A056146 BRWN CLAY STNS 0011 BLACK SLTE SHLE 0018	
OLIVER TOWNSHIP	03 (013)	16 317645 5361582"	2007/04 6941	06	FR 0047 FR 0076	012 / 076 004 / 2:0	DO		7043881 (Z51119) A045601 BRWN CLAY 0027 GREY CLAY HPAN 0041 GREY GRNT 0064 BLACK SLTE 0085	
OLIVER TOWNSHIP	04 (011)	16 312459 5368818"	2008/08 1751	06	FR 0060	003 / 035 025 / 2:0	DO		7118851 (Z60259) A059700 BRWN LOAM SNDS LOOS 0009 BRWN GRVL STNS BLDR 0033 BLACK GRNT MGRD 0065	
OLIVER TOWNSHIP	05 (012)	16 318383 5353247"	2007/04 6941	06	FR 0082	020 / 068 002 / 24:0	DO		7043882 (Z51118) A045603 BRWN CLAY 0059 GREY CLAY SLTY STNS 0078 GREY SAND GRVL SILT 0085	
OLIVER TOWNSHIP	06 (011)	16 312383 5373240"	2007/07 6941	42 42 42	FR 0023	009 / 013 004 / 1:0	DO		7047243 (Z74105) A056149 BRWN HPAN STNS 0010 GREY HPAN STNS 0024	

Notes:

1. UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
2. Date Work Completed
3. Well Contractor Licence Number
4. Casing diameter in inches
5. Unit of Depth in Feet
6. See Table 4 for Meaning of Code
7. STAT LVL: Static Water Level in Feet ; PUMP LVL: Water Level After Pumping in Feet
8. Pump Test Rate in GPM, Pump Test Duration in Hour : Minutes
9. See Table 3 for Meaning of Code
10. Screen Depth and Length in feet
11. See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms											
Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
		IRON FORMATION		PORS		POROUS		SOFT		SOFT	
BLDR	BOULDERS	FCRD	FRACTURED	IRFM		PORS		POROUS		SOFT	
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE		
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY		
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STMS	STONES		
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY		
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK		
CLN	CLEAN	FOSS	FOSILLIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN		
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL		
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE		
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY		
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING		
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS		
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED		
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE				
DNSE	DENSE	GYPG	GYPGUM	PKCD	PACKED	SILTY	SILTY				
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDS	SANDSTONE				
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDY				

2. Core Color		
Code	Description	
WHIT	WHITE	
GREY	GREY	
BLU	BLUE	
GRN	GREEN	
YLLW	YELLOW	
BRWN	BROWN	
RED	RED	
BLK	BLACK	
BLGY	BLUE-GREY	

3. Water Use		
Code	Description	
DO	Domestic	OT Other
ST	Livestock	TH Test Hole
IR	Irrigation	DE Dewatering
IN	Industrial	MO Monitoring
CO	Commercial	
MN	Municipal	
PS	Public	
AC	Cooling And A/C	
NU	Not Used	

4. Water Detail		
Code	Description	
FR	Fresh	GS Gas
SA	Salty	IR Iron
SU	Sulphur	
MN	Mineral	
UK	Unknown	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
CONMEE TOWNSHIP CON 03(001)	16 304345 5368826"	1977/04 2560	06 06	UK 0037				6101829 () BRWN SAND CLAY BLDR 0010 GREY GRNT HARD 0075 GREY GRNT HARD 0115 RED SLTE HARD 0150 RED SLTE HARD 0162 GREY GRNT HARD 0200 6102314 () RED TILL 0009 GREY GRNT 0280
CONMEE TOWNSHIP CON 03(001)	16 305045 5369076"	1979/07 1365	06	FR 0270	020 / 175 080 / 2:0	DO		6103907 (16871) RED CLAY GRVL 0030 GRVL 0125
CONMEE TOWNSHIP CON 03(001)	16 304685 5369657"	3736	06	FR 0125	/ 125 030 / 1:0	DO		6100032 () PRDG 0022 ROCK 0060
CONMEE TOWNSHIP CON 03(001)	16 304745 5368926"	1964/11 3804	02 02	FR 0040	016 / 018 001 / 3:0	DO		6100031 () PRDG 0030 BLDR CLAY 0040 GREN ROCK 0050 GREY GRNT 0066 6105018 (112008) BRWN LOAM STNS 0006 BLCK GRNT 0167
CONMEE TOWNSHIP CON 03(001)	16 305070 5370401"	1959/06 4906	08 08			DO		6105183 (112875) PRDR ROCK FCRD 0252
CONMEE TOWNSHIP CON 03(002)	16 303550 5370447"	1991/06 5557	06 06	FR 0063 FR 0098 FR 0071	/ 055 015 / 1:0	DO		6104584 (83746) BRWN GRVL FILL 0002 BRWN CLAY TILL 0006 BRWN TILL FSDND 0018 TILL 0031 GRVL PCKD DNSE 0062 BLCK GRNT GRSN QTZ 0080 BLCK GRNT GRSN QTZ 0100 6105160 (112866) BRWN CLAY 0082 GREY GRVL SAND 0086 BLCK GRNT FCRD ROCK 0089 GREY GRNT QTZ LYRD 0149 BLCK GRNT QTZ GRSN 0168, BLCK GRNT 0196 BLCK GRNT QTZ GRSN 0234, BLCK GRNT 0252
CONMEE TOWNSHIP CON 03(002)	16 303520 5370117"	1993/10 5557	06 06	FR 0083 FR 0166 FR 0226 FR 0238	/ 035 001 / 1:0	DO		6101067 () BRWN GRVL STNS 0002 RED CLAY SILT 0014 GREY CLAY 0024 GREY HPAN STNS 0027
CONMEE TOWNSHIP CON 03(002)	16 303875 5368826"	1973/06 1569	06 06	FR 0002	016 / 035 008 / 1:0	DO		6107222 (201496) A001411 BRWN LOAM 0001 BRWN TILL 0005 GREY GRVL BLDR 0020 BLCK GRVL 0030 BLCK SAND 0033 BLCK GRVL 0040 6105230 (136227) GREY CLAY STNS 0005 RED CLAY SAND 0018 SILT FSDND 0042 SAND CGRD 0074 CLAY SILT FGVL 0089 GRVL MGRD 0104 GRVL CGRD 0105 FGVL 0106 GRNT 0107
CONMEE TOWNSHIP CON 03(002)	16 303458 5369166"	2004/03 6880	60	FR 0039	024 / 025 015 / 2:0	DO		6107159 (212405) A005510 BRWN SAND SILT GRVL 0013 BRWN CLAY SILT SAND 0043 BRWN SAND GRVL SILT 0052
CONMEE TOWNSHIP CON 03(002)	16 303526 5369314"	1994/06 5557	06 06	UK 0099 FR 0106	/ 038 015 / 1:0	DO		
CONMEE TOWNSHIP CON 03(003)	16 303427 5369058"	2003/11 6897	02	FR		NU	0038 10	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
CONMEE TOWNSHIP CON 03(003)	16 303345 5370396"	1968/12 3804	02 02	FR 0120	042 / 097 002 / 4:0	DO		6100636 () MSND BLDL 0060 GREN ROCK 0140
CONMEE TOWNSHIP CON 03(003)	16 303386 5369232"	2004/06 1751	06	FR 0138	089 / 101 005 / 24:0	DO		6107207 (Z02379) A002289 BRWN GRVL STNS BLDL 0050 GREY SAND SILT 0088 BLCK HPAN SILT 0131 BLCK GRVL SAND 0140
CONMEE TOWNSHIP CON 03(003)	16 303395 5369826"	1980/06 2568	06	FR 0090	096 / 110 008 / 2:0	DO		6102823 () BRWN SAND BLDL PKCD 0080 BRWN SAND GRVL LOOS 0118
CONMEE TOWNSHIP CON 03(003)	16 303275 5370396"	1968/11 3804	02					6100635 () PRDR 0011 MSND BLDL 0070 GREN ROCK QRTZ 0501
CONMEE TOWNSHIP CON 03(003)	16 303354 5369308"	2003/11 6838	02	FR 0012		NU	0007 10	6107158 (Z05596) A005508 BLCK PEAT 0003 BRWN SAND GRVL CLAY 0006 BRWN SAND 0008 BRWN SILT SAND GRVL 0012 BRWN SAND GRVL 0017
CONMEE TOWNSHIP CON 03(003)		2003/08 1751	06 06	FR 0122	040 / :0 001 / :0	DO		6107055 (Z66342) BRWN CLAY STNS PKCD 0022 GREY HPAN BLDR STNS 0058 GREY GRNT QTZ 0160
CONMEE TOWNSHIP CON 03(003)		2003/11 6838	02	FR 0012		NU	0007 10	6107110 (Z05596) A005508 BLCK PEAT 0003 BRWN SAND GRVL CLAY 0006 BRWN SAND 0008 BRWN SILT SAND GRVL 0012 BRWN SAND GRVL 0017
CONMEE TOWNSHIP CON 03(003)		2003/11 6838	02	FR 0011		NU	0038 10	6107109 (Z05598) A005510 BRWN SAND SILT GRVL 0013 BRWN CLAY SILT SAND 0043 BRWN SAND GRVL SILT 0052
CONMEE TOWNSHIP CON 03(005)	16 301905 5369763"	1993/11 5557	06 06	FR 0138 FR 0104 FR 0125	088 / :0 004 / 1:0	DO		6105159 (112883) BRWN CLAY STNS 0015 GREY GRVL SAND STNS 0051 GREY GRNT 0063 GREY GRVL STNS 0079 GREY GRNT HARD 0082 GREY GRVL QTZ 0085 GREY GRNT HARD VERY 0089 GREY GRVL 0094 GREY GRNT 0103 GREY GRNT QTZ 0105 GREY GRNT 0131 GREY GRNT GRSN QTZ 0149
CONMEE TOWNSHIP CON 03(005)	16 301845 5369076"	1976/04 2560	05 06	FR 0110	086 / 126 020 / 1:0	DO		6101605 () RED CLAY 0004 BRWN GRVL 0056 BLDL GRVL 0082 CGVL 0094 BLDL GRVL 0110 GREY GRVL 0126
CONMEE TOWNSHIP CON 03(005)	16 301845 5369326"	1979/01 3911	05	FR 0114	050 / :0 005 / 3:0	DO		6102241 () BRWN SAND STNS LOOS 0014 BRWN GRVL SAND LOOS 0093 BLCK GRVL SAND LOOS 0114
CONMEE TOWNSHIP CON 03(005)	16 301845 5369076"	1979/02 3911	05	FR 0110	060 / :0 005 / 5:0	DO		6102242 () RED CLAY STNS BLDL 0015 RED SAND GRVL BLDL 0035 BRWN SAND BLDL LOOS 0059 BLCK GRVL SAND LOOS 0080 BRWN SAND GRVL LYRD 0108 BLCK GRVL SAND LOOS 0122

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR	CASING DIA	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#)	WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
CONMEE TOWNSHIP CON 03(006)		2001/07 6880	06 06	FR 0022	010 / 001 / 1:0	DO		6106674 (232484)		BLACK TILL LOAM 0003 BLACK GRNT FCRD 0030 BLACK GRNT HARD 0090 BLACK GRNT STNS QTZ 0180 BLACK GRNT HARD 0233
CONMEE TOWNSHIP CON 04(001)	16 305012 5370511"	1998/01 6880	06 06	FR 0048	038 / 041 003 / 12:0	DO		6106071 (170514)		BRWN CLAY GRVL 0020 BLACK GRVL STNS SAND 0043 BLACK GRVL 0048 GREN GRSN GRNT SOFT 0050
CONMEE TOWNSHIP CON 04(002)	16 303695 5370626"	1980/05 3911	05	FR 0260	/	DO		6102697 ()		BRWN CLAY LOAM LOOS 0006 GREY CLAY GRVL PCKD 0023 GREY BLDR GRVL PCKD 0027 GREN GRNT QTZ MGRD 0289
CONMEE TOWNSHIP CON 04(002)	16 303524 5370528"	1996/06 6880	06 06	FR 0055 FR 0075	/ 050 015 / 1:0	DO		6105689 (136536)		BRWN SAND GRVL LOOS 0020 BRWN GRVL PCKD 0052 BLACK GRNT 0055 WHIT QTZ 0057 BLACK GRNT QTZ 0081
CONMEE TOWNSHIP CON 04(003)	16 303420 5370701"	1965/11 3804	02 02	FR 0093	049 / 060 004 / 4:0	DO		6100034 ()		PRDG 0050 CLAY 0070 GRVL 0080 ROCK 0096
CONMEE TOWNSHIP CON 04(004)	16 302379 5371362"	1991/06 6384	06 06	FR 0140	095 / 252 / 1:0	DO		6104628 (83852)		BRWN CLAY SNDY LOAM 0009 BLACK GRNT HARD 0090 BLACK SHLE MGRD HARD 0252
CONMEE TOWNSHIP CON 04(004)	16 302045 5371226"	1975/10 2560	06 06	FR 0285 FR 0312 FR 0137	027 / 360 / 1:0	DO		6101465 ()		BRWN GRVL CLAY 0004 GREY GRVL BLDR 0034 BRWN CGVL 0047 GREY GRNT HARD 0136 GREY GRNT QTZ SOFT 0139 BLACK ROCK SOFT 0142 GREY GRNT QTZ SOFT 0163 BRWN ROCK HARD 0174 GREY ROCK GRNT LMSN 0189 GREY ROCK GRNT GRSN 0207 GREN ROCK LMSN SOFT 0216 GREY ROCK GRNT QTZ 0253 BLACK ROCK HARD 0283 BLACK ROCK QTZ SOFT 0299 GREY ROCK GRNT HARD 0307 BLACK ROCK HARD 0365
CONMEE TOWNSHIP CON 05(001)	16 305157 5372862"	1991/10 6384	06	FR 0057	048 / 003 / 1:0	DO		6104718 (83898)		BRWN LOAM SOFT 0010 RED CLAY STNS HPAN 0056 BRWN GRVL STNS 0057
CONMEE TOWNSHIP CON 05(001)	16 304895 5373276"	1977/09 1363	02	FR 0100	040 / 056 002 / 3:0	DO		6101936 ()		BRWN SAND CLAY GRVL 0039 GREY FLDS BSLT 0109 GREY FLDS BSLT FGRD 0122 GREY FLDS BSLT FCRD 0200 GREN CLAY SHST 0201 GREY FLDS BSLT 0287
CONMEE TOWNSHIP CON 05(001)	16 305295 5373026"	1981/08 3736	06	FR 0085	020 / 020 / 1:30	DO		6102780 ()		RED CLAY 0015 GREY CLAY 0075 GRVL 0085
CONMEE TOWNSHIP CON 05(001)	16 305095 5372826"	1979/08 1365	06 06	FR 0118 FR 0130	026 / 140 004 / 1:0	DO		6102360 ()		RED CLAY 0013 BLUE CLAY HPAN 0054 BLACK GRNT MGRD HARD 0150
CONMEE TOWNSHIP CON 05(001)	16 305367 5372649"	1990/09 1751	06	FR 0067	020 / 006 / 1:0	DO		6104446 (83604)		CLAY STNS PCKD 0014 BLACK GRVL STNS PCKD 0070

TOWNSHIP	CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
CONMEE TOWNSHIP CON 05(001)	16 305195 5372926"	1981/08 3736	06 06	FR 0275	074 / 380 / 2:0	DO	6102779 () RED CLAY 0015 GREY CLAY 0045 BLACK GRVL 0060 GREY GRNT 0301			
CONMEE TOWNSHIP CON 05(002)	16 303895 5373626"	1979/10 1365	06 06	FR 0205	014 / 170 002 / 1:0	DO	6102361 () RED CLAY 0024 GREY HPAN 0041 BLACK GRNT 0046 UNKN 0051 BLACK GRNT 0405 BLACK GRNT GRSN 0410 BLACK GRNT 0425 6102362 () RED CLAY 0021 GREY HPAN 0037 BLACK GRNT GRSN 0200 RED GRNT GRSN 0215 BLACK GRNT 0310 RED GRNT GRSN 0340 6103057 () BRWN CLAY 0012 BLACK GRNT 0175			
CONMEE TOWNSHIP CON 05(003)	16 302795 5373726"	1983/04 3736	06 06	FR 0050 FR 0034	623 / 185 001 / 1:0	DO	6107141 (Z01515) A001416 GREY CLAY 0016 RED CLAY SNDY 0028 BLACK TILL BLDR 0030 GREY CLAY 0066 BLACK GRVL SAND 0094 BLACK GRNT 0115 BLACK GRNT ROCK IRFM 0148 BLACK GRNT 0195			
CONMEE TOWNSHIP CON 05(004)	16 301895 5372726"	2003/12 6880	02	FR 0098	021 / 125 010 / 1:0	DO	6102974 () RED CLAY 0019 HPAN STNS BLDR 0048 GRNT GRSN LYRD 0175			
CONMEE TOWNSHIP CON 05(005)	16 302031 5373327"	1993/10 6384	06 06	FR 0050	001 / 1:0	DO	6105103 (1127331) BRWN CLAY SAND SOFT 0020 RED GRNT QTZ HARD 0127			
CONMEE TOWNSHIP CON 05(006)	16 301656 5373623"	1994/07 5557	06 06	FR 0240 FR 0065 FR 0150	035 / 200 004 / 1:0	DO	6105229 (136270) LOAM 0001 CLAY STNS 0017 HPAN GRVL 0029 GREY GRNT 0075 BLACK GRNT 0104 RED GRNT 0170 BLACK GRNT GRSN QTZ 0252 6103770 () RED CLAY 0028 GRVL 0030			
CONMEE TOWNSHIP CON 05(007)	16 301242 5373670"	1987/03 3736	06	FR 0030	020 / 030 006 / 1:0	DO	6103515 () RED CLAY BLDR 0022 GREY GRNT GRSN 0252			
CONMEE TOWNSHIP CON 05(008)	16 301114 5373706"	1986/10 3736	06	FR 0230	001 / 1:0	NU	6101563 () RED CLAY 0036 BRWN SILT SAND STNS 0037 GRN SAND GRVL ROCK 0038 GRN ROCK VERY HARD 0039 6104638 (83866) RED CLAY SOFT 0019 BRWN GRVL SOFT 0027 BLACK GRNT HARD 0054 6103514 () BRWN CLAY BLDR 0025 GREY GRNT 0302			
CONMEE TOWNSHIP CON 06(001)	16 304945 5375176"	1976/04 3911	05	FR 0038 FR 0037	025 / 035 005 / 4:0	DO	6102363 () BRWN SAND CLAY 0012 BLACK GRVL 0015 GRSN 0028 BLACK GRNT 0170 RED GRNT 0180 GREY GRNT 0300			
CONMEE TOWNSHIP CON 06(002)	16 304838 5373724"	1991/07 6384	06 06	FR 0052	020 / 054 010 / 1:0	DO				
CONMEE TOWNSHIP CON 06(003)	16 302438 5373829"	1986/10 3736	06	SA 0275	001 / 1:0	DO				
CONMEE TOWNSHIP CON 06(004)	16 302945 5373776"	1979/10 1365	06 06	FR 0024 FR 0175 FR 0230	002 / 1:0	DO				

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
CONNEE TOWNSHIP CON 06(004)	16 302795 5373726"	1979/09 2568	06	FR 0197	063 / 260 004 / 2:30	DO		6102449 () BRWN SAND BLDR PKCD 0010 GREY GRNT QTZ HARD 0123 RED GRNT SOFT 0131 GREY GRNT VERY HARD 0197 BLCK GRNT QTZ SOFT 0203 GREY GRNT QTZ HARD 0263
CONNEE TOWNSHIP CON 06(005)	16 301434 5373791"	1985/07 5557	06 06	UK 0158 UK 0063 UK 0148 UK 0141	/ 150 005 / 1:0	DO		6103967 (32119) BRWN LOAM SNDY 0007 BLDR 0009 GRVL SAND 0015 BLCK GRNT FCRD LYRD 0021 RED GRNT LYRD 0063 WHIT QTZ GRNT 0064 BLCK GRNT LYRD 0140 RED GRNT QTZ GRSN 0160
CONNEE TOWNSHIP CON 06(006)	16 300887 5374540"	1985/06 5557	06 06	UK 0215 UK 0125	/ 215 / 2:0	DO		6103302 () BRWN LOAM 0002 RED CLAY 0029 GREY GRNT FCRD 0051 GRNT LYRD GRSN 0080 BLCK GRNT HARD 0145 BLCK GRNT GRSN 0196 WHIT QRTZ 0197 BLCK GRNT LYRD THIN 0225
CONNEE TOWNSHIP CON 07(001)	16 305122 5375307"	1979/11 1362	06 06	FR 0053	030 / 040 / 1:0	DO		6102435 () BRWN CLAY STNS SOFT 0016 GRVL STNS SNDY 0018 GRN GRNT HARD 0060
CONNEE TOWNSHIP CON 07(001)	2002/07 6384	06 06	FR 0053	025 / 050 010 / 1:0	DO			6106832 (249097) RED CLAY SOFT 0052 BRWN GRVL SOFT 0060
CONNEE TOWNSHIP CON 07(002)	16 304295 5376526"	1980/08 1365	06 06	FR 0350 FR 0390	010 / 300 005 / 1:0	DO		6102604 () BRWN SAND 0003 RED CLAY 0027 GREY GRNT 0100 GRN STNS 0400
CONNEE TOWNSHIP CON 07(002)	16 304580 5375720"	1990/10 6384	06 06	FR 0042	006 / 042 030 / 1:0	DO		6104521 (83662) RED CLAY SOFT 0041 BRWN GRVL SOFT 0042
CONNEE TOWNSHIP CON 07(002)	16 304737 5375602"	1995/06 6880	06 06	FR 0116	030 / 006 / 1:0	DO		6105502 (136744) BRWN TILL 0012 BLCK GRNT CONG 0030 GRN GRSN SOFT 0060 RED GRNT 0080 BLCK GRNT GRSN QTZ 0115 GRN GRSN GRNT 0121
CONNEE TOWNSHIP CON 08(002)	16 304295 5378226"	1975/07 3133	02	FR 0071 FR 0048	008 / 015 005 / 0:30	DO		6101538 () RED CLAY 0020 GREY ROCK 0079
CONNEE TOWNSHIP CON 08(002)	16 304512 5378048"	1979/11 1362	06 06	FR 0215	050 / 002 / :0	DO		6102405 () BRWN CLAY STNS SOFT 0010 SAND GRVL SNDY 0014 GREY GRNT HARD 0242
CONNEE TOWNSHIP CON 08(002)	16 304195 5377926"	1975/07 3133	02	FR 0075 FR 0077	040 / 040 003 / 3:0	DO		6101537 () BRWN CLAY 0073 GREY GRNT 0081
CONNEE TOWNSHIP 03(001)	16 305028 5370420"	2004/11 6384	02	0170 0100		DO		6107549 (Z205336) A020318 BLUE CLAY STNS SOFT 0042 BLCK GRNT HARD 0177

Notes:

1. UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
2. Date Work Completed
3. Well Contractor Licence Number
4. Casing diameter in inches
5. Unit of Depth in Feet
6. See Table 4 for Meaning of Code
7. STAT LVL: Static Water Level in Feet ; PUMP LVL: Water Level After Pumping in Feet
8. Pump Test Rate in GPM, Pump Test Duration in Hour : Minutes
9. See Table 3 for Meaning of Code
10. Screen Depth and Length in feet
11. See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms									
Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPG	GYPGUM	PCKD	PACKED	SLTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDG	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDY		

2. Core Color	
Code	Description
WHIT	WHITE
GREY	GREY
BLU	BLUE
GRN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Water Use			
Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial		
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail			
Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

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TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE/TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
CONMEE TOWNSHIP CON 03 (A)	16 305145 5369376*	1976/06 2560	06	FR 0031	012 / 031 015 / 0:30	DO		6101597 () RED CLAY GRVL 0003 BRWN FGVL 0026 BRWN CGVL 0031 6100030 () GRVL BLDR 0058
CONMEE TOWNSHIP CON 03 (A)	16 305165 5370330*	1967/10 3804	02 02	FR 0055	044 / 050 001 / 3:0	DO	0047 01	6103303 () BRWN SAND STNS LOOS 0121
CONMEE TOWNSHIP CON 03 (A)	16 305506 5369661*	1985/06 3736	06	FR 0120	003 / 095 010 / 1:0	DO		6104162 (47653) BRWN SAND GRVL 0015 GREY FSND 0043 HPAN 0062 BLCK GRNT FCRD LYRD 0070 GRN GRSN 0071
CONMEE TOWNSHIP CON 03 (A)	16 305198 5370338*	1989/07 5557	06 06	FR 0068	040 / 010 / 1:0	DO		6101916 () RED CLAY STNS BLDR 0012 BRWN CLAY STNS BLDR 0027 BRWN CLAY GRVL PCKD 0052 GRN SILT STNS SOFT 0054 BLCK GRVL LOOS 0060
CONMEE TOWNSHIP CON 03 (B)	16 306325 5368911*	1985/07 3736	06	FR 0150	015 / 220 / 1:0	DO		6103345 () BLUE CLAY 0008 BRWN SAND GRVL 0013 BLCK GRNT 0227
CONMEE TOWNSHIP CON 03 (D)	16 307927 5368802*	1993/08 6384	06 06	FR 0225	020 / 227 040 / 1:0	DO		6105105 (112734) RED CLAY STNS SOFT 0013 BLCK GRNT QTZ HARD 0227
CONMEE TOWNSHIP CON 03 (D)	16 306765 5370245*	1980/05 3911	05	FR 0260	060 / 001 / 1:0	DO		6102837 () BRWN CLAY LOAM LOOS 0006 GREY CLAY GRVL LOOS 0023 GREY BLDR GRVL PCKD 0027 GRN GRNT QTZ LYRD 0289
CONMEE TOWNSHIP CON 04 (A)	16 305238 5370864*	1995/08 6880	06 06	FR 0058 FR 0140	021 / 200 001 / 1:0	DO		6105556 (136867) BLCK LOAM 0003 BRWN SAND SLTY 0010 GREY CLAY 0022 BRWN SAND GRVL 0025 WHIT QTZ GRNT 0063 BLCK GRNT 0081 . RED GRNT QTZ GRSN 0121 BLCK GRNT 0140 WHIT QTZ GRSN 0163 BLCK GRNT 0216
CONMEE TOWNSHIP CON 04 (A)	16 305645 5370576*	1979/05 3911	05	FR 0114	/ 008 / 1:0	DO		6102313 () RED CLAY BLDR 0012 BRWN SAND LOOS 0013 BRWN GRVL BLDR LOOS 0045 BRWN GRVL SAND LYRD 0077 GREY CLAY HPAN HARD 0099 BLCK GRVL SAND SILT 0115
CONMEE TOWNSHIP CON 04 (B)	16 305745 5370776*	1979/10 1362	06	FR 0096	030 / 015 / :0	DO		6102428 () BRWN CLAY BLDR 0020 BRWN SAND 0080 BRWN GRVL 0096
CONMEE TOWNSHIP CON 04 (B)	16 306599 5373499*	1991/07 5557	06 06	FR 0125 FR 0080	047 / 280 001 / 1:0	DO		6104755 (83741) CLAY LOAM STNS 0008 SAND 0026 HPAN STNS 0035 GREY GRNT GRSN 0214 GREY GRNT GRSN QTZ 0309
CONMEE TOWNSHIP CON 04 (D)	16 305745 5370776*	1989/05 5557	06 05	FR 0125 FR 0080	/ 180 001 / 1:0	DO		6104142 (32229) FILL GRVL 0002 RED CLAY 0013 TILL 0023 BLDR SAND GRVL 0061 GRNT 0077 GRNT GRSN FCRD 0085 GREY GRNT GRSN QTZ 0128 BLCK GRNT 0155 GREY GRNT GRSN LYRD 0200

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
CONMEE TOWNSHIP CON 04 (D)	16 307987 5371145"	1999/10 6880		FR 0090	080 / 092 008 / 1:0				6106466 (170655)
CONMEE TOWNSHIP CON 05 (A)	16 305547 5372921"	1988/05 3736	06 06	FR 0260	038 / 327 / 1:0	DO			6104038 (16867) RED CLAY GRVL 0037 BLACK GRNT 0327
CONMEE TOWNSHIP CON 05 (A)	16 305216 5374102"	1998/06 6384	06 06	FR 0151	027 / 165 001 / 1:0	DO			6106268 (170576) BRWN CLAY STNS SOFT 0100 BRWN GRVL SOFT 0109 BLACK GRNT 0165
CONMEE TOWNSHIP CON 05 (A)	16 305385 5372426"	1972/11 1450	06						6100957 () YLLW CLAY STNS 0033 BLACK ROCK 0087
CONMEE TOWNSHIP CON 05 (A)	16 305395 5372551"	1967/09 3804	02 02	FR 0348	044 / 100 002 / 4:0	PS			6100035 () GRVL BLDR 0040 BRWN MSND 0078 GRVL BLDR 0088 GREY ROCK 0350
CONMEE TOWNSHIP CON 05 (A)	16 305545 5372941"	1997/07 1751		FR 0086	020 / 001 / 1:0	DO			6105858 (170158) PRDR 0327
CONMEE TOWNSHIP CON 05 (A)	16 305253 5372500"	1990/09 1751	06	FR 0070	018 / 010 / 1:0	DO			6104444 (83603) BRWN CLAY STNS PKCD 0013 BLACK GRVL PKCD 0075
CONMEE TOWNSHIP CON 05 (A)	16 305297 5373527"	1977/06 2560	06	FR 0090 FR 0108	021 / 125 001 / 3:0	DO			6101868 () RED CLAY SAND BLDR 0012 GREY GRNT HARD 0031 GREY GRNT QTZ SOFT 0044 GREY GRNT HARD 0125
CONMEE TOWNSHIP CON 06 (A)	16 306095 5373726"	1983/09 3736	06 06		/ / :0	DO			6103096 () RED CLAY 0014 GREY CLAY BLDR HPAN 0030 BLACK GRNT GRSN FCRD 0037 BLACK GRNT QTZ GRSN 0152
CONMEE TOWNSHIP CON 06 (B)	16 305277 5373635"	1983/09 3736	06 06	FR 0090	064 / 160 003 / 2:0	DO			6103095 () RED CLAY 0070 BLACK GRNT 0076 BLACK GRNT FCRD 0100 GREY GRNT 0175
CONMEE TOWNSHIP CON 06 (B)		2001/06 6880	06 06	FR 0095 FR 0155	015 / 165 002 / 1:0	DO			6106673 (232476) BRWN CLAY 0005 BRWN TILL BLDR 0013 BLACK GRNT HARD 0040 BLACK GRNT QTZ LYRD 0090 BLACK GRNT FCRD LOAM 0105 BLACK GRNT QTZ HARD 0155 BLACK GRNT LYRD SOFT 0160 BLACK GRNT HARD 0176

Notes:

1. UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
2. Date Work Completed
3. Well Contractor Licence Number
4. Casing diameter in inches
5. Unit of Depth in Feet
6. See Table 4 for Meaning of Code
7. STAT LVL: Static Water Level in Feet ; PUMP LVL: Water Level After Pumping in Feet
8. Pump Test Rate in GPM, Pump Test Duration in Hour : Minutes
9. See Table 3 for Meaning of Code
10. Screen Depth and Length in feet
11. See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms											
Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IREM	IRON FORMATION	PORS	POROUS	SOFT	SOFT		
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE		
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY		
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES		
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY		
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK		
CLN	CLEAN	FOSS	FOSILLIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN		
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL		
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE		
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY		
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING		
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS		
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED		
DLMT	DOLOMITE	GVLY	GRAVELLY	OBND	OVERBURDEN	SILT	SILT				
DNSE	DENSE	GYPS	GYPSPUM	PCKD	PACKED	SILTY	SILTY				
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SANDS	SANDSTONE				
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDY				

2. Core Color		
Code	Description	
	WHIT WHITE	
	GREY GREY	
	BLUE BLUE	
	GRN GREEN	
	YLLW YELLOW	
	BRWN BROWN	
	RED RED	
	BLCK BLACK	
	BLGY BLUE-GREY	

3. Water Use		
Code	Description	Description
DO	Domestic	OT Other
ST	Livestock	TH Test Hole
IR	Irrigation	DE Dewatering
IN	Industrial	MO Monitoring
CO	Commercial	
MN	Municipal	
PS	Public	
AC	Cooling And A/C	
NU	Not Used	

4. Water Detail		
Code	Description	Description
FR	Fresh	GS Gas
SA	Salty	IR Iron
SU	Sulphur	
MN	Mineral	
UK	Unknown	

TOWNSHIP
CONCESSION (LOT)

PAIPOONGE TOWNSHIP
KAM N 02 (034)

UTM¹
16 309195
5361826^N

DATE²
CNTR³ 1978/10 06 06
2402

CASING
DIA⁴ FR 0205

WATER^{5,6}
DETAIL RATE⁸/TIME HR:MIN
158 / 310
002 / 18:0

STAT LVL/PUMP LVL⁷
WATER USE⁹
PS
DO

SCREEN
INFO¹⁰
WELL # (ADDIT#) WELL TAG #
DEPTHS TO WHICH FORMATIONS EXTEND^{5,11}
6102206 ()
SAND GRVL 0025 CLAY 0095 STNS LYRD
0115 CLAY 0135 STNS LYRD 0150 STNS
FCRD 0160 GRNT 0316

Notes:

1. UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
2. Date Work Completed
3. Well Contractor Licence Number
4. Casing diameter in inches
5. Unit of Depth in Feet
6. See Table 4 for Meaning of Code
7. STAT LVL: Static Water Level in Feet ; PUMP LVL: Water Level After Pumping in Feet
8. Pump Test Rate in GPM, Pump Test Duration in Hour : Minutes
9. See Table 3 for Meaning of Code
10. Screen Depth and Length in feet
11. See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms											
Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IREM	IRON FORMATION	PORS	POROUS	SOFT	SOFT		
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE		
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV DRILLED	STKY	STICKY		
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES		
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY		
CLAY	CLAY	FLNT	FLINT	LICL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK		
CLN	CLEAN	FOSS	FOSILLIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN		
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL		
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE		
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY		
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING		
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS		
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED		
DLMT	DOLOMITE	GVLY	GRAVELLY	OBND	OVERBURDEN	SLTE	SLATE				
DNSE	DENSE	GYPG	GYPGUM	PCKD	PACKED	SLTY	SILTY				
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDG	SANDSTONE				
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDY				

2. Core Color		
Code	Description	
WHIT	WHITE	
GREY	GREY	
BLUE	BLUE	
GRN	GREEN	
YLLW	YELLOW	
BRWN	BROWN	
RED	RED	
BLCK	BLACK	
BLGY	BLUE-GREY	

3. Water Use		
Code	Description	
DO	Domestic	OT
ST	Livestock	TH
IR	Irrigation	DE
IN	Industrial	MO
CO	Commercial	
MN	Municipal	
PS	Public	
AC	Cooling And A/C	
NU	Not Used	

4. Water Detail		
Code	Description	
FR	Fresh	GS
SA	Salty	IR
SU	Sulphur	
MN	Mineral	
UK	Unknown	

Well Computer Print Out Data as of November 17 2009 © Queen's Printer, 2009

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁹ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDITH) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
Plan 73(017)	16 306403 5349031*	2007/09 1751	06	FR 0070	040 / 004 / :0			7104734 (Z60243) A059684 RED CLAY STNS LYRD 0009 GREY CLAY PKCD 0030 BLK SHLE 0280	
03(007)	16 308893 5341367*	2007/09 1751	06	FR 0186	040 / 193 001 / 2:0			7104736 (Z60245) A059686 RED CLAY STNS PKCD 0016 BLACK GRNT HARD 0186 BLK SHLE 0220	
NEEBING TOWNSHIP (BL CON 08(010)	16 305723 5364708*	1995/01 5557	06 06	FR 0092	035 / 070 004 / 18:0	DO	0090 04	6105422 (136827) BRWN TILL STNS 0015 GREY CLAY HPAN 0055 BLK SILT FSND VERY 0085 BLK FSND 0094 GREY CLAY 0100	
CONMEE TOWNSHIP CON 01(001)	16 304845 5366539*	1995/09 1751	06 06	FR 0164	012 / 001 / 1:0	DO		6105589 (136710) BRWN LOAM SNDY LOOS 0012 BLACK GRNT MGRD 0164 RED GRNT MGRD 0253	
CONMEE TOWNSHIP CON 01(001)	16 304895 5367126*	1980/06 3915	06	FR 0076	/ 004 / 0:30	DO		6102512 () RED CLAY SOFT 0009 BLK HPAN STNS HARD 0028 GREY CLAY SOFT 0034 SAND 0041 GREY CLAY 0074 GREY GRVL 0076	
CONMEE TOWNSHIP CON 01(001)	16 304994 5367075*	1990/09 6384	06 06	FR 0038	020 / 038 005 / 1:0	DO		6104476 (83619) RED CLAY SOFT 0020 BLUE CLAY SOFT 0038 UNKN 0040	
CONMEE TOWNSHIP CON 01(001)	16 305210 5367213*	1998/08 6880	06 06	FR 0057	022 / 030 020 / 1:0	DO		6106239 (170630) BRWN SAND GRVL 0014 RED SAND GRVL 0015 GREY CLAY GRVL SILT 0028 GREY GRVL SILT 0047 BLK GRNT GRSN QTZ 0062	
CONMEE TOWNSHIP CON 01(001)	16 304945 5367106*	1973/05 1569	06	FR 0060		DO		6101050 () BRWN SAND STNS 0016 GREY CLAY SILT 0042 GREY HPAN ROCK 0057 GREY GRVL 0062	
CONMEE TOWNSHIP CON 01(A)	16 304995 5367276*	1980/06 3915	06 06	FR 0125 FR 0200	060 / 010 / 0:30	DO		6102511 () SAND LOOS 0005 RED CLAY SOFT 0028 GREY CLAY SAND SOFT 0051 BLK HPAN GRVL HARD 0064 GREY GRNT HARD 0200	
CONMEE TOWNSHIP CON 01(A)	16 305243 5367043*	1975/06 3911	06 06	FR 0028 FR 0040 FR 0046 FR 0048	013 / 025 / 4:0	DO		6101379 () BRWN CLAY STNS 0007 BRWN CLAY STNS 0013 GREY CLAY STNS 0016 GREY CLAY GRVL 0028 GREY SAND GRVL CLAY 0030 GREY CLAY STNS 0036 GREY SILT SAND 0047 GREY SILT SAND STNS 0049 GREN STNS BLDR 0050 GREY CLAY STNS 0052 GREY SAND GRVL CLAY 0055	
CONMEE TOWNSHIP CON 01(C)	16 307295 5367026*	1981/09 1365	06	FR 0088	013 / 075 012 / 1:0	DO		6102721 () BRWN CLAY GRVL 0031 BRWN TILL 0079 GRVL 0089	
CONMEE TOWNSHIP CON 01(C)	16 307010 5367138*	1993/08 5557	06 06	FR 0083	/ 008 / 1:0	NU		6105126 (112802) BRWN GRVL FILL 0002 BRWN TILL STNS 0015 HPAN CLAY 0025 RED CLAY 0040 GREY CLAY GRVL 0060 GRVL LMSN 0070 GRVL 0083	
CONMEE TOWNSHIP CON 01(C)	16 306999 5366839*	1991/11 5557		FR 0089	/ 075 018 / 2:0	DO		6104706 (83983) PRDR SAND 0089	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDITH) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
CONMEE TOWNSHIP CON 02 (001)	16 304746 5368043 ^w	1990/09 6384	06 06	FR 0040	040 012 / 1:0	PS		6104475 (83622) RED CLAY GRVL SOFT 0040
CONMEE TOWNSHIP CON 02 (001)	16 305160 5367071 ^w	1990/09 6384	06 06	UK 0140	152 001 / 1:0	DO		6104473 (83621) RED CLAY SOFT 0040 BLACK GRNT HARD 0152
CONMEE TOWNSHIP CON 02 (001)	16 304977 5367596 ^w	1990/06 6384	06 08	FR 0040	015 / 040 035 / 1:0	DO		6104345 (57077) BRWN CLAY SOFT 0010 BRWN GRVL SOFT 0040 BLACK GRNT HARD 0042
CONMEE TOWNSHIP CON 02 (001)	16 304629 5368044 ^L	1989/09 5557	06 06	FR 0034 FR 0042	009 / 019 100 / 1:0	DO		6104026 (32154) BRWN CLAY 0009 HPAN STNS 0019 BLACK GRNT 0034 BLACK GRNT QTZ GRSN 0038 BLACK GRNT 0047
CONMEE TOWNSHIP CON 02 (001)	16 304432 5366450 ^w	1975/07 2560	06 06	FR 0068	015 / 098 005 / 1:0	DO		6101419 () RED CLAY 0005 GREY ROCK 0100
CONMEE TOWNSHIP CON 02 (001)	16 305034 5368184 ^w	2004/05 6384	06	FR		DO		6107169 (Z00295) A000204 BRWN CLAY STNS 0034 BLACK GRNT 0127
CONMEE TOWNSHIP CON 02 (001)	16 304995 5367261 ^w	1965/10 3804	02 02 02	FR 0096	019 / 030 004 / 8:0	DO		6100033 () RED MSND 0012 ROCK 0098
CONMEE TOWNSHIP CON 02 (001)	16 305000 5368309 ^w	2000/10 6384	06 06	FR 0073 FR 0058 FR 0098	102 030 / 1:0	PS		6106591 (197597) BRWN CLAY STNS SOFT 0032 BLACK GRNT HARD 0102
CONMEE TOWNSHIP CON 02 (A)	16 305428 5368029 ^w	1992/07 6384	06 06	FR 0040 FR 0120	025 / 120 030 / 1:0	DO		6104903 (112020) BRWN CLAY 0018 BLACK GRNT QTZ 0120
CONMEE TOWNSHIP CON 02 (A)	16 305219 5367045 ^w	1990/09 6384	06 06	FR 0046	046 005 / 1:0	DO		6104474 (83620) RED CLAY 0044 BRWN GRVL 0046
CONMEE TOWNSHIP CON 02 (A)	16 305145 5367876 ^w	1971/10 3313	02 02	FR 0103 FR 0137	015 / 015 003 / 2:0	DO		6100973 () BLDR GRVL SAND 0015 BLDR GRVL 0057 ROCK 0141
CONMEE TOWNSHIP CON 02 (A)	16 305965 5367289 ^w	1999/10 6384	06 06	FR 0146 FR 0070	040 / 152 003 / 1:0	DO		6106442 (197551) RED CLAY STNS SOFT 0038 BLACK GRNT HARD 0152
CONMEE TOWNSHIP CON 02 (B)	16 306256 5367982 ^L	2003/04 1751	06 06	FR 0146	015 / 001 / 1:0	DO		6106962 (246135) RED CLAY STNS LYRD 0010 BRWN SAND GRVL PKCD 0029 BLACK GRNT 0146 BLACK GRNT QTZ 0220
CONMEE TOWNSHIP CON 02 (C)	16 306760 5367242 ^w	1993/07 5557	06 06	FR 0093	042 / 085 004 / 1:0	DO		6105058 (112406) RED CLAY 0020 BRWN SAND LYRD FGVL 0045 BLACK HPAN 0060 GREY CLAY 0090 GRVL 0092 RED GRNT FCRD 0094 RED GRNT 0100
CONMEE TOWNSHIP CON 02 (C)	16 307010 5367211 ^w	1992/04 6384	06	FR 0054	010 / 003 / 1:0	DO		6105019 (112007) BRWN LOAM SOFT 0001 BRWN CLAY SOFT 0012 BLUE CLAY STNS SOFT 0053 BRWN GRVL STNS SOFT 0054

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
CONNOR TOWNSHIP CON 02(001)	16 306887 5367276"	2006/03 6880	06	FR 0050	039 / 031 005 / 4:0	DO		7047042 (Z40399) A036416 GREY CLAY 0012 GREY CLAY HPAN STNS 0044 GREY SAND GRVL 0050 6101649 () BRWN GRVL 0027 BLACK SLTE SOFT 0039 GREY GRNT 0042 BLACK SLTE 0083 GREY GRNT 0120 BLACK SLTE FCRD 0126 6104155 (32226) BRWN SAND 0039 HPAN 0056 GRVL 0057 HPAN 0058 SAND GRVL FGRD 0077 GRVL STNS CGRD 0083 6105227 (112920) BRWN SAND STNS PCKD 0018 BLACK HPAN SLTY PCKD 0038 BLACK GRVL CGRD 0044 6105032 (112609) BRWN SAND STNS LOOS 0032 BLUE CLAY STNS PCKD 0080 BRWN GRVL PCKD 0083 BLACK SHLE MGRD 0086 6105820 (136879) BRWN SAND LOAM LYRD 0080 BLACK SLIT 0082 BLACK SHLE MGRD 0087 GREY GRNT QTZ MGRD 0273 6106960 (246126) BRWN SAND STNS LYRD 0062 BLACK SHLE FCRD 0069 BLACK GRNT QTZ 0102 6106974 (257745) BRWN SAND SOFT 0040 BLUE CLAY SOFT 0042 6104093 (32510) BRWN SAND 0028 BRWN CLAY SAND SLTY 0071 GRNT 0073 6104062 (32517) BRWN SAND 0029 BRWN SAND STNS 0032 BRWN CLAY SNDY 0041 HPAN CLAY 0054 GRVL 0058 BLACK HPAN GRVL 0098 RED GRNT 0230 RED GRNT LYRD 0270 BLACK GRNT LYRD 0352 6104061 (32516) BRWN LOAM SNDY 0012 CLAY SNDY 0021 HPAN CLAY 0030 BLDR 0031 HPAN 0046 GRVL 0049 BLACK HPAN 0070 GRVL 0074 6105382 (136308) BRWN SAND 0030 GREY CLAY HPAN 0041 SAND 0077 GRVL SAND 0079 6106972 (257743) BRWN SAND SOFT 0032 BLUE CLAY SOFT 0060 BRWN SAND SOFT 0080 BLUE CLAY SOFT 0084 6105483 (136830) BRWN SAND 0030 CLAY HPAN 0058 BRWN SAND GRVL 0077 CLAY HPAN 0080	
O'CONNOR TOWNSHIP CON 06(001)	16 304445 5356326"	1976/08 2560	06	FR 0083	016 / 126 / :0	DO			
O'CONNOR TOWNSHIP CON 06(001)	16 304531 5363927"	1989/05 5557	06	FR 0060	035 / 042 008 / 1:0	DO			
O'CONNOR TOWNSHIP CON 06(001)	16 304529 5363932"	1994/05 1751	06	FR 0038	024 / 008 / 1:0	DO			
O'CONNOR TOWNSHIP CON 06(001)	16 304876 5363829"	1993/03 1751	06	FR 0083	026 / 002 / 1:0	DO			
O'CONNOR TOWNSHIP CON 06(001)	16 304889 5363872"	1996/07 1751	06	FR 0265	050 / 004 / 1:0	DO			
O'CONNOR TOWNSHIP CON 06(001)	16 304514 5363111"	2002/10 1751	06	FR 0092	022 / 005 / :0	DO			
O'CONNOR TOWNSHIP CON 06(001)	16 304514 5363111"	2003/05 6384	06	FR 0040	022 / 022 020 / 1:0	DO			
O'CONNOR TOWNSHIP CON 06(001)	16 304914 5363963"	1988/10 5557	06	FR 0295 FR 0335 UK 0054	001 / 300 001 / 1:0	DO			
O'CONNOR TOWNSHIP CON 06(002)	16 304050 5363568"	1988/10 5557	06	FR 0073	037 / 062 005 / 1:0	DO			
O'CONNOR TOWNSHIP CON 07(001)	16 304236 5364041"	1994/12 5557	06	FR 0079	035 / 053 020 / 1:0	DO			
O'CONNOR TOWNSHIP CON 07(001)	16 304585 53647631	2003/05 6384	06	FR 0078	032 / 070 020 / 1:0	DO			
O'CONNOR TOWNSHIP CON 07(001)	16 304190 5364072"	1995/04 6880	06	FR 0070	030 / 048 004 / 1:0	DO			

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR-MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDITH) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
O'CONNOR TOWNSHIP CON 07(001)	16 304252 5364000"	5557	06	FR 0005	028 / 043 010 / 1:0	DO		6104032 (32130)	BRWN SAND 0030 BRWN CLAY SAND LYRD 0039 HPAN GRVL 0048 GRVL 0051
O'CONNOR TOWNSHIP CON 07(001)	16 304722 5364063"	1988/09 5557	06 06	FR 0063	028 / 054 003 / 1:0	DO		6104031 (32150)	BRWN SAND 0040 HPAN 0053 BLCK SHLE GRVL HPAN 0058 BLCK GRVL ROCK FCRD 0063
O'CONNOR TOWNSHIP CON 07(001)	16 304608 5363988"	1988/04 3736	06 06	FR 0147	/ 152 004 / 1:0	DO		6103936 (16884)	BRWN SAND SOFT 0034 BLCK GRVL BLDL 0095 RED CONG 0152
O'CONNOR TOWNSHIP CON 07(002)	16 304134 5364550"	1988/05 3736	06 06	FR	/ / 1:0	CO		6103937 (16869)	RED CLAY SAND 0040 BLCK GRNT 0150 WHIT GRNT 0226
O'CONNOR TOWNSHIP CON 07(002)	16 304155 5365562"	1995/10 6880	06 06	FR 0340 FR 0290	003 / 315 001 / 1:0	DO		6105616 (136436)	PRDR 0028 GREY CLAY SAND GRVL 0030 WHIT QTZ GRSN 0067 BLCK GRNT QTZ GRSN 0150 RED GRNT 0211 BLCK GRNT 0252 WHIT QTZ GRSN 0292 RED GRNT 0313 BLCK GRNT QTZ 0332 RED GRNT GRSN QTZ 0352
O'CONNOR TOWNSHIP 06(001)	16 304210 5363927"	2007/12 6384			/ / :0	DO		7102818 (Z63540) A061474	BRWN SAND SOFT 0040 GREY CLAY SAND STNS 0118 GREY GRNT QTZ HARD 0227
O'CONNOR TOWNSHIP 06(001)	16 304697 5363931"	2007/11 6384			/ / :0	DO		7102819 (Z63545)	0059 0039 0030 0023 0020 0000
OLIVER TOWNSHIP CON 01(010)	16 306495 5364726"	1987/10 5557	06 06	FR 0144 MN 0048 FR 0098	042 / 055 020 / 2:0	NU		6103800 (16709)	BRWN SAND 0008 BRWN GRVL SAND 0017 BRWN BLDL SAND GRVL 0048 BRWN GRVL SNDY 0083 GREY GRNT ROCK 0084 BLCK GRVL FCRD ROCK 0091 GREN GRSN GRNT ROCK 0093 BRWN GRVL 0105 BRWN HPAN 0121 GREY GRNT ROCK 0123 GREY SAND SLTY FGVL 0144 BLCK GRNT 0145
OLIVER TOWNSHIP CON 01(016)	16 308264 5365453"	1990/02 5557	06 06	MN 0100 FR 0186	/ 150 100 / 1:0	DO		6104295 (47338)	BRWN LOAM SAND 0003 BRWN SAND 0011 BRWN SAND BLDL STNS 0014 BRWN SAND SLTY 0060 BRWN CLAY LYRD SLTY 0103 WHIT CRT GRSN 0123 GREY GRNT 0185 BLCK GRNT 0190 GREY GRNT 0195
OLIVER TOWNSHIP CON 01(016)	16 307845 5364826"	1979/06 1365	06 06	FR 0126 FR 0104	038 / 130 002 / 1:0	DO		6102287 ()	BLCK FILL 0035 BRWN SAND 0070 GREY SILT 0086 BLCK GRNT FCRD HARD 0095 GRNT MGRD 0150
OLIVER TOWNSHIP CON 01(017)	16 307455 5364786"	1965/10 3804	02 02	FR 0040	029 / 033 002 / 3:0	DO		6100388 ()	RED MSND GRVL 0046
OLIVER TOWNSHIP CON 01(017)	16 306995 5364226"	1969/11 3642	30	FR 0025	017 / 025 010 / 0:30	CO	0016 12	6100676 ()	GREY MSND GRVL 0001 RED MSND STNS GRVL 0018 BLCK CLAY 0025 GREN STNS CLAY 0026 BLUE CLAY 0028

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
OLIVER TOWNSHIP CON 01(017)	16 306945 5364166"	1971/10 08 1564	08	FR 0018	018 / / :0	NU		6101132 () SAND GRVL BLDL 0019 BRWN CLAY BLDL 0038 GRNT 0040	
OLIVER TOWNSHIP CON 01(017)	16 307545 5365201"	1994/06 06 06 6384	06 06	FR 0320	/ 327 001 / 1:0	DO		6105282 (112992) BRWN SAND STNS 0131 BLCK GRNT QTZ 0327	
OLIVER TOWNSHIP CON 01(017)	16 306945 5364276"	1975/08 05 05 3911 04	05 05			NU		6101441 () BRWN SAND GRVL LOOS 0006 BRWN GRVL SAND BLDL 0013 GREY CLAY SILT STNS 0023 GREY CLAY HPAN BLDL 0025 GREY CLAY SILT STNS 0041 GREY CLAY HPAN STNS 0051 GREY CLAY HPAN STNS 0053 WHIT GRNT QTZ HARD 0073 GREY GRNT QTZ 0075 WHIT GRNT QTZ 0162	
OLIVER TOWNSHIP CON 01(017)	16 307483 5364682"	1987/11 06 06 5557	06 06	FR 0121 FR 0126	036 / 095 015 / 1:0	DO		6103821 (17044) BRWN SAND 0002 GREY CLAY SAND 0013 BRWN SAND 0053 BLDL 0058 GREY CLAY SAND 0104 GREY HPAN 0113 RED GRNT SOFT VERY 0128	
OLIVER TOWNSHIP CON 01(017)	16 307445 5364826"	1976/10 06 2560	06	FR 0118	026 / 118 009 / 1:0	DO		6101714 () GREY CLAY BLDL 0112 BRWN CGVL 0118 BLCK SLTE SOFT 0122	
OLIVER TOWNSHIP CON 01(017)	16 307195 5364076"	1977/10 06 06 2402	06 06	UK 0090	053 / 003 / :0			6101988 () SAND 0015 CLAY 0038 GRVL 0040 SHLE 0045 CLAY 0087 GRNT 0100	
OLIVER TOWNSHIP CON 01(017)	16 307195 5364136"	1977/10 2402						6101989 () GRVL 0022 CLAY 0037 HPAN 0039	
OLIVER TOWNSHIP CON 01(017)	16 307145 5364026"	1977/11 06 06 2402	06 06					6101990 () GRVL 0015 CLAY 0031 GRVL 0038 SHLE 0044 CLAY 0090 GRNT 0250	
OLIVER TOWNSHIP CON 01(017)	16 307195 5365476"	1979/07 06 06 1365	06 06	FR 0168 FR 0155	/ 155 012 / 1:0	DO		6102297 () BLCK TILL 0015 RED HPAN 0030 FSND 0068 OSND 0073 SAND 0138 HPAN 0146 BLCK SHLE 0155 GREY GRNT 0175	
OLIVER TOWNSHIP CON 01(017)	16 306895 5364036"	1980/12 05 05 3911	05 05	FR 0103	030 / 010 / :0	DO		6102680 () BRWN SAND GRVL PCKD 0023 GREY CLAY PCKD 0085 BLCK CLAY CMTD 0103	
OLIVER TOWNSHIP CON 01(017)	16 307523 5364825"	1987/03 06 06 5557	06 06	FR 0180	020 / 180 022 / 1:0	PS		6103626 (02670) BRWN GRVL SAND SILT 0008 BRWN SAND SLTY DRY 0030 BLCK CLAY SAND GRVL 0066 BRWN GRVL HPAN HARD 0070 WHIT GRNT GRSN 0180 RED GRNT QTZ GRSN 0190	
OLIVER TOWNSHIP CON 01(017)	16 307526 5364823"	1994/06 06 06 5557	06 06	FR 0136	/ 130 004 / 1:0	DO		6105238 (112896) BLCK LOAM 0002 BRWN SAND GRVL 0024 BLCK HPAN 0074 GREY CLAY 0095 GREY HPAN 0125 GRVL 0132 GRSN CHRT SOFT 0138 RED GRNT HARD 0141	
OLIVER TOWNSHIP CON 01(017)	16 307045 5364176"	1964/09 02 02 3804	02 02	FR 0028	016 / 020 003 / 6:0	DO		6100387 () GRVL BLDL 0030 MSND 0033	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND S.I.:
OLIVER TOWNSHIP CON 01(017)	16 307429 5364241"	1991/04 6384	06 05	FR 0099	055 / 100 001 / 1:0	CO		6104604 () BRWN SAND SOFT 0004 RED CLAY SOFT 0020 BRWN GRVL CLAY SOFT 0050 BRWN HPAN GRVL HARD 0090 BRWN SAND GRVL BLDR 0110
OLIVER TOWNSHIP CON 01(017)	16 307476 5365063"	1991/09 5557	06 06	FR 0118	/ 090 020 / 1:0	DO		6104681 (83785) BLACK LOAM 0002 BRWN SAND 0005 BRWN CLAY 0016 HPAN BLDR 0020 SILT SAND 0092 GREY CLAY 0110 HPAN 0114 GRVL 0116 WHIT GRNT GRSN QTZ 0120
OLIVER TOWNSHIP CON 01(017)	16 307543 5364381"	1991/11 5557	06 06	FR 0120 FR 0180	049 / 190 002 / 1:0	DO		6104711 (83636) BRWN SAND GRVL 0016 CLAY 0040 HPAN 0065 SILT CLAY 0081 HPAN 0117 WHIT QTZ GRSN 0124 GREY GRNT GRSN 0195
OLIVER TOWNSHIP CON 01(017)	16 307483 5364682"	1993/07 5557	06 06	UK 0255 FR 0160	/ 260 001 / 1:0	DO		6105063 (112845) TILL 0010 BLACK HPAN STNS ROCK 0102 BLACK GRNT 0130 RED GRNT 0230 RED GRNT GRSN LYRD 0271
OLIVER TOWNSHIP CON 01(017)	16 307145 5364336"	1971/10 1564	08	FR 0028	026 / / :0	NU		6101134 () MSND 0020 GRVL BLDR 0027 RED CLAY 0028 CSND 0036 GREY CLAY 0050 GRNT 0052
OLIVER TOWNSHIP CON 01(018)	16 306525 5364312"	1989/09 5557	06	FR 0090	/ 075 003 / 1:0	DO		6104219 (32232) PRDR 0008 GRVL SAND WDFR 0014 GRVL 0051 CLAY HPAN 0084 GRVL 0090
OLIVER TOWNSHIP CON 01(018)	16 306252 5364815"	1992/09 5557	06 06	FR 0085 FR 0195	/ 007 / 1:0	DO		6104876 (112411) BRWN SAND GRVL 0021 BRWN CLAY SAND 0030 ROCK 0032 GREY CLAY 0052 ROCK FCRD 0081 RED GRNT 0095 BLACK GRNT 0120 GREY GRNT QTZ LYRD 0202
OLIVER TOWNSHIP CON 01(018)	16 306148 5364637"	1996/05 6880	06 06	FR 0061	041 / 052 006 / 1:0	DO		6105671 (136139) BLACK LOAM 0002 GRVL SILT SAND 0012, GREY STNS GRVL SAND 0035 BRWN SAND GRVL LOOS 0055 GRVL SAND LOOS 0063
OLIVER TOWNSHIP CON 01(018)	16 306424 5364923"	1998/02 6880	06 06	FR 0125	035 / 110 010 / 1:0	DO		6106082 (170345) PRDG 0030 SILT SAND GRVL 0033 WHIT GRNT FCRD 0035 WHIT GRNT HARD 0117 WHIT GRNT SOFT 0128
OLIVER TOWNSHIP CON 01(018)	16 306362 5365114"	1998/11 6941	05	FR 0048	035 / 045 004 / 3:0	CO		6106302 (170594) PRDR 0052
OLIVER TOWNSHIP CON 01(018)	16 306297 5364921"	2001/10 1751	06 06	FR 0116	012 / 001 / 1:0	DO		6106733 (224078) BRWN LOAM SNDY LYRD 0030 GREY CLAY STNS PCKD 0042 BLACK GRNT 0116 RED GRNT 0180
OLIVER TOWNSHIP CON 01(018)	16 306298 5364832"	2002/09 1751	06 06	FR 0126	043 / 001 / :0	DO		6106902 (246119) BRWN STNS SNDY PCKD 0029 GREY HPAN BLDR STNS 0046 GRNT 0126 BLACK GRNT QTZ 0220
OLIVER TOWNSHIP CON 01(018)	16 306095 5364826"	1960/07 4906	06 06	FR 0040 FR 0050	018 / 035 005 / 4:0	DO		6100390 () LOAM MSND 0003 FSND 0021 BLUE CLAY 0039 CSND 0050

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11} :
OLIVER TOWNSHIP CON 01(018)	16 306345 5364386"	1961/11 4906	06	FR 0082	022 / 040 001 / 4:0	DO		6100391 () LOAM MSND 0005 MSND GRVL 0028 BLUE CLAY BLDR 0044 FSND 0060 BLUE CLAY BLDR 0082 GRVL 0085 6100392 () GRVL 0040 CLAY HPAN 0046 GRVL 0065
OLIVER TOWNSHIP CON 01(018)	16 306305 5364451"	1964/10 3804	02 02	FR 0046	028 / 002 / 4:0	DO		
OLIVER TOWNSHIP CON 01(018)	16 306510 5364306"	1965/05 3313	04 04	FR 0075	040 / 055 003 / 1:0	CO		6100394 () GRVL 0040 MSND SILT 0075 GRVL CSND 0083
OLIVER TOWNSHIP CON 01(018)	16 306555 5364301"	1965/05 3804	02 02	FR 0094	033 / 078 002 / 4:0	PS		6100395 () RED MSND 0008 GRVL 0041 GREY MSND 0047 GRVL 0053 SILT 0080 GRVL 0098
OLIVER TOWNSHIP CON 01(018)	16 306185 5364566"	1966/09 1514	06	FR 0061	018 / 054 002 / 2:0	DO		6100396 () PRDG 0025 GREY CLAY GRVL 0062
OLIVER TOWNSHIP CON 01(018)	16 306515 5364446"	1967/04 1514	06	FR 0075	033 / 074 002 / 0:15	DO		6100397 () PRDG 0037 PRDR 0071 BLDR 0072 BLUE CLAY 0075 GRVL 0076
OLIVER TOWNSHIP CON 01(018)	16 306395 5364826"	1967/11 3804	02 02	FR 0051	029 / 040 002 / 3:0	DO		6100398 () BRWN MSND 0014 HPAN CLAY BLDR 0035 GREY ROCK 0053
OLIVER TOWNSHIP CON 01(018)	16 306305 5364451"	1965/01 3804	02 02	FR 0081	036 / 075 003 / 4:0	DO		6100399 () PRDR 0065 GRVL GRNT BLDR 0087
OLIVER TOWNSHIP CON 01(018)	16 306245 5364426"	1965/05 3804	02 02	FR 0047	030 / 040 003 / 3:0	DO		6100400 () RED MSND 0005 GRVL BLDR 0051
OLIVER TOWNSHIP CON 01(018)	16 306470 5364251"	1963/05 3621	06 06	FR 0048	035 / 045 005 / 2:0	CO		6100412 () MSND GRVL 0022 BRWN CLAY GRVL BLDR 0040 BLUE CLAY 0046 GRVL 0052
OLIVER TOWNSHIP CON 01(018)	16 306195 5364466"	1963/07 3621	06	FR 0080	025 / 075 001 / 2:0	DO		6100413 () GRVL 0020 GRVL BLDR 0037 BLUE CLAY 0070 BLUE CLAY BLDR 0080 GRVL 0081
OLIVER TOWNSHIP CON 01(018)	16 306470 5364461"	1963/08 3621	06 06	FR 0080	025 / 075 002 / 2:0	PS		6100414 () PRDG 0030 GRVL BLDR 0037 BLUE CLAY 0070 BLDR CLAY 0080 GRVL 0081
OLIVER TOWNSHIP CON 01(018)	16 306195 5364776"	1967/06 3804	02 02	FR 0073	035 / 050 003 / 3:0	DO		6100415 () GRVL BLDR 0035 GREY MSND 0063 GRVL BLDR 0076
OLIVER TOWNSHIP CON 01(018)	16 306295 5364816"	1967/06 3804	02 02	FR 0063	036 / 050 003 / 3:0	DO	0049 01	6100416 () GRVL 0037 GREY MSND 0057 GRVL BLDR 0067
OLIVER TOWNSHIP CON 01(018)	16 306495 5364176"	1967/05 3804	02 02	FR 0226	037 / 094 002 / 4:0	DO		6100417 () PRDG 0036 GREY MSND 0072 GRVL BLDR 0137 GREY GRNT 0205 ROCK 0216 RED GRNT 0236
OLIVER TOWNSHIP CON 01(018)	16 306495 5364146"	1967/05 3804	02 02	FR 0117	030 / 060 002 / 3:0	DO	0059 01	6100418 () PRDG 0036 GREY MSND 0078 GRVL BLDR 0119

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TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11} :
OLIVER TOWNSHIP CON 01(018)	16 306570 5364426"	1967/05 3804	02 02	FR 0168	036 / 080 002 / 2:0	DO	0079 01	6100419 () BRWN MSND 0007 GRVL BLDL 0087 ROCK GRNT 0171	
OLIVER TOWNSHIP CON 01(018)	16 306395 5364116"	1968/12 1514	06 06	FR 0071	027 / 065 001 / 1:0	DO		6100627 () PRDR 0030 GRVL 0045 BLUE CLAY 0060 SHLE 0071	
OLIVER TOWNSHIP CON 01(018)	16 306225 5364466"	1969/12 3642	30	FR 0038	036 / 039 002 / 1:0	CO	0036 02	6100706 () RED GRVL MSND ROCK 0034 RED CLAY STNS 0038 GREY GRVL MSND 0039	
OLIVER TOWNSHIP CON 01(018)	16 306715 5364446"	1972/08 3313	02	FR 0085	030 / 130 002 / 4:0	DO		6100938 () RED GRVL 0073 GREY GRNT 0145	
OLIVER TOWNSHIP CON 01(018)	16 306975 5364306"	1972/11 3804	02		069 / / :0	DO		6100975 () BRWN GRVL BLDL 0034 BRWN SAND 0051 GREY HPAN BLDL 0056 BRWN GRVL BLDL 0067 GREY GRNT 0077	
OLIVER TOWNSHIP CON 01(018)	16 306345 5364546"	1971/10 1564	08	FR 0016	010 / / :0	NU		6101133 () SAND 0010 SAND GRVL BLDL 0020 RED CLAY 0030 GREY CLAY 0058 GRNT 0070	
OLIVER TOWNSHIP CON 01(018)	16 306645 5364366"	1971/11 1564	06	FR 0030	029 / / :0	NU		6101135 () SAND GRVL 0018 BLDL 0020 GRVL 0025 MSND 0030 CLAY SILT 0059 BRWN CLAY 0070 SHLE 0079 GRVL SAND 0090 GRNT 0092	
OLIVER TOWNSHIP CON 01(018)	16 306415 5364386"	1971/11 1564	06	FR 0114	038 / 056 020 / 2:25	NU	0113 11	6101136 () SAND 0005 SAND GRVL 0047 CLAY SILT 0073 CLAY 0081 SAND GRVL 0123	
OLIVER TOWNSHIP CON 01(018)	16 306121 5364706"	1974/07 3911	06 06	FR 0040 FR 0107	036 / 002 / 4:30	DO		6101254 () SAND SILT 0018 BRWN CLAY STNS BLDL 0036 GREY SILT CLAY 0082 BRWN CLAY HPAN BLDL 0105 GREY SAND GRVL STNS 0107	
OLIVER TOWNSHIP CON 01(018)	16 306492 5364248"	1977/11 3911	05	FR 0085 FR 0098 FR 0103	039 / 002 / 1:0	DO		6101980 () GRVL SAND BLDL 0035 BRWN SILT CLAY LOOS 0040 BRWN CLAY HARD 0041 BRWN SILT SOFT LOOS 0056 GREY SILT SOFT LOOS 0081 GREY CLAY CGVL HARD 0102 GREY CGVL HARD SOFT 0103 CGVL HARD SOFT 0107	
OLIVER TOWNSHIP CON 01(018)	16 306495 5364226"	1979/11 1365	06	FR 0122	038 / 060 025 / 1:0	DO		6102407 () BRWN SAND STNS 0011 GRVL 0015 BLUE CLAY SAND 0086 GRVL STNS 0122	
OLIVER TOWNSHIP CON 01(018)	16 306195 5364726"	1979/08 1362	06	FR 0086	015 / 010 / :0	DO		6102421 () BRWN SAND 0030 BRWN CLAY 0050 BRWN STNS 0086	
OLIVER TOWNSHIP CON 01(018)	16 306595 5364026"	1980/04 3915	06	FR 0115 FR 0122	040 / 015 / 0:30	DO		6102445 () BRWN GRVL BLDL 0030 GREY SAND CLAY 0060 BLACK CLAY 0080 BLACK GRVL SAND 0115 BRWN GRVL 0121 UNKN 0122	
OLIVER TOWNSHIP CON 01(018)	16 306595 5364126"	1982/08 3736	06	FR 0198 UK 0223	035 / 200 002 / 1:0	DO		6103006 () BRWN SAND 0006 RED CLAY BLDL 0026 BLDL HPAN 0168 BLACK GRNT QRTZ 0227	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11} :
OLIVER TOWNSHIP CON 01(018)	16 306195 5364926"	1982/10 3736	06 06	FR 0150 FR 0190	003 / 1:0	DO		6103014 () BRWN SAND BLDR GRVL 0142 BLACK GRNT QRTZ GRSN 0202
OLIVER TOWNSHIP CON 01(018)	16 306677 5364034"	1986/09 3736	06 06	FR 0149	028 / 004 / 1:30	DO		6103547 () BRWN SAND GRVL 0004 BRWN CLAY 0139 BRWN SAND GRVL 0153
OLIVER TOWNSHIP CON 01(018)	16 306500 5364188"	1986/09 3736	06 06	FR 0160	016 / 008 / 0:30	DO		6103548 () BRWN CLAY 0121 BRWN LOAM GRVL SNDY 0154 WHIT GRVL 0160
OLIVER TOWNSHIP CON 01(018)	16 306659 5364427"	1987/05 5557	06 06	FR 0075 FR 0165	030 / 1:55 004 / 1:0	DO		6103653 (02598) BRWN SAND 0012 BRWN GRVL STNS HPAN 0037 BRWN CLAY SNDY 0067 BRWN HPAN 0074 GREN GRSN QTZ 0077 BLACK GRNT GRSN QTZ 0165
OLIVER TOWNSHIP CON 01(018)	16 306423 5364867"	1987/06 1751	06 06	FR 0045	001 / 1:0	DO		6103718 (02638) BRWN SAND BLDR LOOS 0019 BLUE HPAN CLAY PCKD 0034 RED GRNT GRSN MGRD 0155 BLACK GRNT GRSN HARD 0202
OLIVER TOWNSHIP CON 01(019)	16 304820 5364366"	1951/11 1822	06 06					6100389 () CLAY STNS 0014 ROCK 0028 BLACK SHLE 0121 GREY SHLE 0132 BLACK SHLE 0141 GREY GRVL 0176
OLIVER TOWNSHIP CON 01(019)	16 305495 5364226"	1982/09 3736	06 06	FR 0177 FR 0051	012 / 3:00 005 / 2:0	DO		6103007 () BRWN GRVL SNDY 0005 HPAN GRVL 0038 BLACK SHLE SOFT LYRD 0051 BLACK SHLE 0177 WHIT QRTZ 0190 BLACK SHLE MGRD HARD 0230 BLACK GRNT LYRD 0350
OLIVER TOWNSHIP CON 01(019)	16 306195 5364626"	1981/09 1365	06 06	FR 0098 FR 0106	040 / 0:80 015 / 1:0	DO		6102754 () BRWN GRVL SAND 0034 GREY HPAN TILL 0096 GRVL 0107
OLIVER TOWNSHIP CON 01(019)	16 306295 5364626"	1981/09 1365	06 06	FR 0096	026 / 0:80 008 / 1:0	DO		6102752 () BRWN FSND GRVL 0035 BLACK TILL 0100
OLIVER TOWNSHIP CON 01(031)	16 306252 5364452"	1994/12 5557	06 06	FR 0085	003 / 1:0	CO		6105383 (136838) BRWN FSND 0015 GRVL CGRD 0035 CLAY 0040 GRVL HARD PCKD 0064 STNS 0070 SAND GRVL 0100
OLIVER TOWNSHIP CON 01(B)	16 306495 5364526"	1983/08 3736	06 06	FR 0276 FR 0279	063 / 2:80 003 / 1:0	DO		6103116 () BRWN SAND 0017 GRVL STNS 0040 QSNB 0045 RED CLAY SILT 0080 BLDR 0095 GRVL CLAY 0136 BLACK SHLE GRNT LYRD 0302
OLIVER TOWNSHIP CON 01(C)	16 306595 5364126"	1983/08 3736	06 06	FR 0103	022 / 0:50 010 / 3:0	DO		6103114 () BRWN SAND 0010 BLDR 0012 GRVL 0025 GREY CLAY 0085 GRVL STNS FCRD 0115
OLIVER TOWNSHIP CON 01(C)	16 306795 5364526"	1983/11 3736	06 06	FR 0031	030 / 0:70 005 / 1:0	DO		6103158 () BRWN SAND 0008 BLDR 0012 TILL HPAN 0075 GRVL 0081

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
OLIVER TOWNSHIP CON 01(1)	16 306556 5364384"	1998/10 7060	06 06	FR 0102 FR 0125	065 / 006 / : 0	DO		6106262 (197425) BRWN SAND GRVL 0002 BRWN GRVL STNS 0032 BRWN GRVL 0037 GREY CLAY SLTY 0070 GREY HPAN GRVL STNS 0095 BRWN GRVL PCKD 0125
OLIVER TOWNSHIP CON 02(015)	16 308406 5365564"	1975/06 2560	06 06	FR 0107	012 / 1:0 006 / 0:30	DO		6101399 () GREY CLAY 0083 BLACK BLDR 0097 BRWN GRVL 0103 GREY ROCK 0115
OLIVER TOWNSHIP CON 02(015)	16 308945 5365526"	1973/05 1564	06 06	FR 0081	040 / 0:0 003 / 2:0	DO ST		6101172 () BRWN SAND 0051 GREY CLAY 0089 BLACK SHLE 0090
OLIVER TOWNSHIP CON 02(016)	16 307568 5365538"	1987/12 5557	06 06	FR 0131 FR 0123	058 / 1:0 004 / 1:0	DO		6103837 (17049) BRWN CLAY 0007 BRWN CLAY STNS 0023 WHIT SAND 0089 GREY CLAY 0111 WHIT GRNT FCRD 0117 WHIT GRNT SOFT 0124 BLACK GRNT GRSN QTZ 0142
OLIVER TOWNSHIP CON 02(017)	16 307169 5365950"	1994/07 5557	06 06		/ 2:0 003 / 2:0	DO		6105272 (136233) BRWN SAND GRVL FGRD 0006 GRVL SAND 0090 HPAN ROCK 0095 SILT SAND 0119 GRVL 0120 CRT 0135 GRNT 0170 SHLE QTZ 0230 RED GRNT GRSN QTZ 0313
OLIVER TOWNSHIP CON 02(018)	16 306395 5364426"	1979/04 3911	05	FR 0078	035 / 015 / 1:0	DO		6102264 () BRWN GRVL SAND BLDR 0037 GREY CLAY STNS HARD 0070 BLACK GRVL SAND LOOS 0080
OLIVER TOWNSHIP CON 02(018)	16 306563 5364386"	1989/09 5557	06 06	UK 0147 UK 0112	/ 2:0 002 / 1:0	DO		6104220 (47677) BRWN SAND GRVL STNS 0030 GRVL CLAY LYRD 0060 GRVL STNS HPAN 0106 RED GRNT FCRD LYRD 0118 BLACK GRNT 0147 WHIT QTZ GRNT 0152 RED GRNT LYRD QTZ 0224
OLIVER TOWNSHIP MINE L X11()	16 306095 5364426"	1969/04 3804	02	FR 0089	016 / 0:18 001 / 5:0	NU		6100644 () PRDR 0020 GRVL BLDR 0054 GREY GRNT 0120
OLIVER TOWNSHIP 01(016)	16 307672 5365261"	2006/09 6941	06	FR 0157 0121	043 / 1:40 004 / 3:0	DO		6107596 (251104) A045593 BRWN CLAY SAND STNS 0004 BRWN SAND STNS 0055 GREY SILT 0118 GREY CLAY STNS 0119 BLACK GRVL SILT 0121 GREY GRNT HARD 0132 WHIT GRNT QTZ LYRD 0162
OLIVER TOWNSHIP 01(018)	16 306428 5364648"	2005/07 1751	06		038 / 1:40 002 / 2:0	DO		6107396 (218935) A018780 BRWN LOAM SNDY STNS 0038 GREY GRNT 0106 GREY GRNT QTZ 0200
OLIVER TOWNSHIP D(019)	16 307755 5363426"	2007/09 6880	06	FR 0063 FR 0085	050 / 0:59 012 / 1:0	DO		7102780 (255099) A052219 BRWN GRVL SNDY 0015 GREY CLAY 0030 GREY HPAN GRVL 0050 BLACK GRVL 0057 BLACK SHLE SOFT 0062 BLACK SHLE FCRD 0100
OLIVER TOWNSHIP M(026)	16 306286 5364408"	1991/02 6384	06 06	FR 0098	/ 1:00 018 / 1:0	CO		6104562 (83674) BRWN GRVL SNDY 0050 BLUE CLAY 0056 BRWN GRVL BLDR HPAN 0060 BLUE CLAY SNDY 0080 BRWN HPAN BLDR HARD 0097 BRWN GRVL SOFT 0100

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
OLIVER TOWNSHIP M(038)	16 306378 5364316 ^v	1989/04 5557	06 06	FR 0046	025 / 005 / 1:0	DO		6104137 (32547) BRWN GRVL SNDY DRY 0026 SAND CGVL LYRD 0042 GRVL 0046
OLIVER TOWNSHIP M(102)	16 306432 5364415 ^v	1989/04 5557	05 05	UK 0094 UK 0124	042 / 070 004 / 2:0	DO		6104138 (32530) PRDR 0085 GREY CLAY SILT 0089 GRVL SAND 0104 HPAN 0122 GRVL 0130 HPAN GRVL SAND 0138 GREY GRNT 0142
OLIVER TOWNSHIP M(192)	16 306568 5364369 ^v	1991/10 6384	06	FR 0105	039 / 105 004 / 1:0	DO		6104695 (83889) BRWN GRVL STNS BLDR 0045 BLUE SAND SOFT 0070 BLUE CLAY 0080 BRWN GRVL 0110
OLIVER TOWNSHIP P(040)	16 306240 5364504 ^v	1996/12 6384	06	FR 0081	020 / 080 010 / 1:0	DO		6105936 (170119) BRWN GRVL SAND SOFT 0040 BRWN CLAY SOFT 0050 BRWN SAND SOFT 0072 BLUE CLAY SOFT 0078 BRWN STNS SOFT 0083
OLIVER TOWNSHIP P(058)	16 306170 5364621 ^v	1997/11 6880	06 06	FR 0075	041 / 051 010 / 1:0	DO		6105981 (170099) PRDG 0063 GREY GRVL ROCK 0076
OLIVER TOWNSHIP (013)	16 306765 5364313 ^v	2004/11 6880	30	FR 0036	028 / 028 001 / 1:0	DO		6107369 (212556) A020402 BRWN LOAM 0003 BRWN SAND 0010 BRWN SAND GRVL 0023 BRWN GRVL 0036
OLIVER TOWNSHIP (016)	16 306254 5364778 ^v	1998/11 6384	06 06	SA 0124	037 / 125 003 / 1:0	DO		6106415 (170678) BRWN LOAM 0005 BRWN GRVL SOFT 0020 RED CLAY 0060 BRWN CLAY SNDY 0070 RED CLAY SAND 0110 BRWN SAND SILT 0115 BRWN CLAY STNS SOFT 0120 BRWN GRVL CLAY SILT 0125
OLIVER TOWNSHIP (016)	16 307644 5365060 ^v	1998/08 6880	05 06 06		022 / 220 002 / 2:0	DO		6106254 (170522) BRWN SAND TILL 0015 GREY CLAY 0025 GREY TILL STNS 0057 GREY TILL STNS 0095 GREY TILL STNS GRVL 0105 GREY CLAY TILL 0113 RED GRNT QTZ 0230
OLIVER TOWNSHIP (043)	16 306451 5364482 ^v	1989/04 5557	06 06	FR 0083 FR 0060	055 / 003 / 1:0	DO		6104139 (32538) LOAM 0001 SAND GRVL FGRD 0012 GRVL CGRD 0017 SAND GRVL FGRD 0036 GREY CLAY HPAN 0057 GRVL PCKD 0083 GRNT 0084
OLIVER TOWNSHIP (110)	16 306398 5364328 ^v	1997/07 6880	06 05 06	FR 0102	050 / 075 012 / 24:0	DO		6105892 (170065) BRWN GRVL SAND 0030 GREY CLAY SILTY 0050 GREY CLAY 0082 BLCK CLAY GRVL 0084 BLCK GRVL STNS 0085 BLCK CLAY GRVL 0090 GREY GRVL SILT MSND 0102 GREY GRVL SILT MSND 0117
OLIVER TOWNSHIP (116)	16 306628 5364425 ^v	2008/05 6880	06	FR 0200	050 / 150 003 / 1:0	DO		7110855 (268980) A062106 BRWN SAND 0008 BLCK GRVL 0031 GREY SAND SILTY 0052 GREY CLAY 0062 BLCK GRNT 0165 RED GRNT SOFT 0306 BLCK 7110867 (269000) A062084 BRWN SAND 0098 GREY CLAY 0197 GREY HPAN STNS 0361 BLCK GRVL SILT 0410 BLCK GRVL MGRD 0446 CGRD
OLIVER TOWNSHIP (200)	16 306485 5364154 ^v	2008/07 6880	02	UK 0446	131 / 312 001 / 1:0	DO		

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETRAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
OLIVER TOWNSHIP ()	16 306225 5364453 ^w	1991/04 5557	06 06	FR 0110	040 / 085 003 / 1:0	DO	6104579 (57161) BRWN SAND GRVL 0020 GRVL HARD PKCD 0041 CLAY HPAN 0082 GRVL 0089 GRVL HARD PKCD 0097 GRVL LYRD GRNT 0120 6104715 (83546) TILL 0018 GRVL 0042 GRVL ROCK 0048 GRVL 0062 GRVL ROCK 0065 GRVL 0070 ROCK 0071 GRVL 0119 6105363 (136320) BRWN FSND 0008 GRVL 0030 GREY SAND SILT 0063 ROCK 0064 HPAN 0068 GREY GRNT 0140 BLCK GRNT QTZ GRSN 0230 BLCK GNIS QTZ 0353
OLIVER TOWNSHIP ()	16 306237 5364461 ^w	1991/11 5557	06 05 05	FR 0118	037 / 075 006 / 2:0	DO	
OLIVER TOWNSHIP ()	16 307126 5364385 ^w	1994/10 5557	06 06	FR 0088 FR 0252 FR 0313 FR 0324 FR 0352	/ 330 020 / 1:0	DO	
OLIVER TOWNSHIP ()	16 306371 5364194 ^w	1991/10 5557	06 06	FR 0133 FR 0152	055 / 080 020 / 1:0	DO	6104713 (83633) BRWN SAND STNS 0022 HPAN GRVL 0039 BRWN GRVL SAND SILT 0040 RED GRNT FCRD 0044 RED GRNT 0096 BLCK GRNT QTZ 0142 WHIT GRNT QTZ 0157 6106349 (197447) BRWN SAND 0015 BRWN CLAY SLTY STNS 0050 GREY HPAN STNS 0068 BRWN SHLE 0070 WHIT GRNT 0074 GRNT GRSN 0084 WHIT GRNT 0130 WHIT GRNT GRSN 0200 GREY GRNT GRSN 0294 6101471 () RED CLAY BLDR LOOS 0004 GREY GRNT HARD 0163 RED GRNT SOFT 0171 GREY GRNT QTZ HARD 0177 RED GRNT SOFT 0205 6101606 () BRWN FSND BLDR 0027 BRWN CGVL BLDR 0056 GREY CLAY FGRD 0172 BLCK GRVL BLDR 0178 BLCK SLTE SOFT FCRD 0210 6101193 () BRWN SAND GRVL 0073 GREY GRNT 0100
PAIPOONGE TOWNSHIP CON D(006)	16 307545 5357926 ^w	1975/08 2560	06	FR 0197	018 / 200 004 / 1:0	ST DO	
PAIPOONGE TOWNSHIP CON D(012)	16 307195 5360476 ^w	1976/06 2560	06	MN 0178	036 / 210 003 / 2:0	DO	
PAIPOONGE TOWNSHIP CON D(013)	16 307845 5360726 ^w	1974/05 1569	06	FR 0097	030 / 060 008 / 1:0	DO	
PAIPOONGE TOWNSHIP CON D(019)	16 307795 5363476 ^w	1976/11 3911	05 05	FR 0079	018 / 095 018 / 1:30	DO	6101727 () BRWN SAND LOOS 0005 BRWN SAND GRVL STNS 0010 BRWN SILT GRVL STNS 0014 BRWN CLAY STNS LOOS 0027 GREY CLAY STNS 0051 BLCK SHLE HARD 0080 BLCK SHLE HARD 0082 BLCK SHLE SOFT 0102 6101705 () SAND 0035 GRVL 0037 BLCK SHLE 0186
PAIPOONGE TOWNSHIP CON F(014)	16 304895 5361326 ^w	1973/07 1564	06			DO	6101075 () PRDG 0025 UNKN 0038 GREY CLAY SAND 0043 BRWN SAND 0062 CLAY 0069 BRWN SAND 0076 GREY CLAY SAND LYRD 0105 6106458 (197770) BRWN SAND 0040 GREY CLAY 0057 BLCK GRVL SAND 0067
PAIPOONGE TOWNSHIP KAM N 01(042)	16 306593 5363839 ^w	1999/11 6880	06 06	FR 0067	043 / 064 003 / 6:0	DO	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE/TIME HR:MIN	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
PAIPOONGE TOWNSHIP KAM N C(016)	16 308695 5362326W	1980/06 3915	06	FR 0152	020 / 3:0	DO	6102514 () SAND LOOS 0065 GREY CLAY LOOS SOFT 0135 GREY HPAN STNS SAND 0150 BLACK SAND 0160 BLACK ROCK 0160 6105214 (32373) RED LOAM 0001 YLLW SAND STNS 0010 YLLW CLAY SAND LYRD 0027 6100422 () BRWN LOAM MSND 0002 GRVL BLDR 0021 GRVL 0032
PAIPOONGE TOWNSHIP KAM N D(017)	16 307815 5362299W	1994/04 6544	42	FR 0019	017 / 019 004 / 1:0	DO	6105780 (170205) BRWN SAND SILT LOOS 0040 GREY HPAN HARD LYRD 0055 GREY CLAY 0063 BLACK SHLE SOFT 0070 GREY SHLE 0081 BLACK SHLE LYRD 0195 6105775 (170204) PRDR 0260
PAIPOONGE TOWNSHIP KAM N D(017)	16 307770 5362401W	1952/06 1822	05	FR 0023	023 / 023 004 / :0	DO	6105205 (112046) RED LOAM 0001 YLLW SAND 0025
PAIPOONGE TOWNSHIP KAM N D(018)	16 307693 5362861W	1996/12 6880	06 06			DO	6104849 (112101) BRWN SAND GRVL 0020 GREY CLAY SOFT 0045 HPAN 0065 GRNT 0260 6104752 (103806) BRWN SAND LOOS 0022 GREY CLAY PCKD 0040 BLACK SHLE SOFT 0270 6101578 () PRDG 0020 FILL GRVL 0026 BRWN FSND 0043 BRWN CGVL 0049 GREY HPAN 0061 BLACK SLTE SOFT 0069 GREY SLTE SOFT 0142 GREY GRNT 0250 6100424 () GRVL 0042 FSND 0102 GRVL BLDR 0108
PAIPOONGE TOWNSHIP KAM N D(018)	16 307568 5363042W	1992/06 1606	06	FR 0260	/ / :0	DO	6100678 () MSND CLAY BLDR 0109 BLACK ROCK 0262
PAIPOONGE TOWNSHIP KAM N D(018)	16 307653 5362686W	1993/05 6544	45	FR 0018	017 / 022 010 / 1:0	DO	6100423 () LOAM 0001 MSND 0018 CLAY BLDR 0070 GRVL 0072 6100858 () YLLW CLAY MSND 0040 BLACK MSND BLDR 0055 GREY CLAY 0096 BLACK FSND STNS 0099 GREY ROCK 0121 6101248 () PRDR 0020 GREY GRNT 0057
PAIPOONGE TOWNSHIP KAM N D(018)	16 307667 5362866W	1996/12 6880				NU	
PAIPOONGE TOWNSHIP KAM N D(018)	16 307653 5362686W	1993/05 6544	45	FR 0018	017 / 022 010 / 1:0	DO	
PAIPOONGE TOWNSHIP KAM N D(018)	16 307568 5363042W	1992/06 1606	06	FR 0260	/ / :0	DO	
PAIPOONGE TOWNSHIP KAM N D(018)	16 307666 5362985W	1991/11 1606	06	FR 0270	018 / 015 / 1:0	DO	
PAIPOONGE TOWNSHIP KAM N D(018)	16 307745 5363026W	1976/03 2560	06	UK 0145 UK 0220	/ / :0	DO	
PAIPOONGE TOWNSHIP KAM N D(019)	16 307310 5363426W	1965/06 3313	04	FR 0102 FR 0108	040 / 040 004 / 8:0	DO	
PAIPOONGE TOWNSHIP KAM N D(019)	16 307345 5363416W	1969/10 3642	06	FR 0233 UK 0257	178 / 190 020 / 8:0	IN	
PAIPOONGE TOWNSHIP KAM N D(019)	16 307510 5363361W	1951/12 1822	06	FR	017 / 017 001 / :0	DO	
PAIPOONGE TOWNSHIP KAM N D(019)	16 307645 5363376W	1955/08 4906	04	FR 0072	026 / 060 002 / 3:0	DO	
PAIPOONGE TOWNSHIP KAM S C(004)	16 308645 5357296W	1971/09 4906	02	FR 0116	015 / 028 002 / 20:0	DO	
PAIPOONGE TOWNSHIP KAM S C(006)	16 307813 5358183W	1974/07 2560	06 06	FR 0055	014 / 055 050 / 2:0	DO	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
PAIPOONGE TOWNSHIP KAM S C(006)	16 307695 5357926"	1980/06 1365	06 06	FR 0046 FR 0084 FR 0043	/ 085 004 / 1:0	DO		6102551 () BRWN SAND CLAY 0003 BLUE CLAY 0028 BLACK SHLE 0043 SHLE 0048 BLACK SHLE 0083 SHLE FCRD 0085 BLACK SHLE 0100	
PAIPOONGE TOWNSHIP KAM S D(006)	16 307286 5358051"	1984/05 5557	06 06	FR 0237 FR 0240	018 / 200 010 / 2:0	DO		6103198 () BRWN CLAY 0003 RED CLAY 0009 BLACK GRNT 0121 GRSN 0130 BLACK GRNT 0197 BLACK GRNT 0216 BLACK GRNT 0237 BLACK GRNT QTZ 0242	
PAIPOONGE TOWNSHIP KAM S D(010)	16 307565 5358069"	1998/10 7060	06 06	FR 0077 FR 0085 FR 0057	/ 020 / :0	DO		6106235 (192450) BRWN LOAM 0002 RED CLAY 0015 GREN GRNT 0035 BLACK GRNT 0087 BLACK GRNT GRSN LYRD 0089	
PAIPOONGE TOWNSHIP KAM S E(019)	16 305687 5363356"	2000/06 6880	06 06	UK 0087 FR 0101	052 / 030 015 / 24:0	PS	0098 03	6106634 (197797) BRWN CSND 0028 GREY CLAY 0057 GREY CLAY SILT LOOS 0065 GREY SAND SLTY CLAY 0087 BLACK CSND 0090 BLACK SAND CLAY LYRD 0092 BLACK SAND GRVL LYRD 0098 BLACK CGVL 0101	
PAIPOONGE TOWNSHIP KAM S F(003)	16 305120 5356889"	1992/09 1751	06 07	FR 0056	010 / / 1:0	DO		6104921 (83731) BRWN LOAM SNDY STNS 0003 BLACK SHLE QTZ MGRD 0212	
PAIPOONGE TOWNSHIP ()	16 307448 5362546"	2004/12 6384	06 06	0060	/ 002 / 2:0	PS		6107427 (220529) A020310 BRWN SAND GRVL SOFT 0058 BLACK SHLE HARD 0177	
NEEBING TOWNSHIP (PA CON 01(009)	16 306608 5363906"	2005/09 6880	02	0141	118 / 120 002 / 1:0	DO		6107453 (220607) A020390 BRWN GRVL SAND 0046 BRWN GRVL SAND 0085 BRWN GRVL SAND 0118 BRWN GRVL 0141	
NEEBING TOWNSHIP (PA CON 02(008)	16 306395 5337126"	1979/07 2568	06 06	FR 0129	/ 140 025 / 2:0	DO		6102489 () RED CLAY DNSE 0061 RED SHLE LYRD 0140	
NEEBING TOWNSHIP (PA CON 02(009)	16 308390 5334522"	1991/10 6384	06 06	FR 0143	046 / 152 001 / 1:0	DO		6104722 (83895) RED CLAY STNS SOFT 0023 BLACK GRNT HARD 0152	
NEEBING TOWNSHIP (PA CON 03(008)	16 306950 5335301"	1990/02 1751	06 06	FR 0122	018 / 001 / 1:0	DO		6104315 (47362) BRWN GRVL STNS PCKD 0018 GREY GRNT HARD 0122 BLACK GRNT QTZ MGRD 0253	
NEEBING TOWNSHIP (PA CON 04(007)	16 308295 5333926"	1984/12 1751	06 06	FR 0100	042 / 010 / 1:0	DO		6103267 () RED CLAY BLDR PCKD 0007 BLACK GRNT QTZ HARD 0050 BLACK GRNT HARD 0100 BLACK GRNT QTZ MGRD 0120	
NEEBING TOWNSHIP (PA CON 04(008)	16 307579 5332422"	1982/07 2568	06 06	FR 0208	057 / 057 002 / 6:0	DO		6101145 () BSLT LYRD DKCL 0008 BSLT DKCL MGRD 0142 BSLT CGRD LTCL 0148 GRMK LTCL 0162 SLTE LYRD DKCL 0224	
NEEBING TOWNSHIP (PA CON 04(008)	16 307579 5332422"	1982/07 2568	06 06	FR 0208	057 / 057 002 / 6:0	DO		6103046 () RED CLAY LOAM DNSE 0027 GREY SHLE GRNT HARD 0260	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
NEEBING TOWNSHIP (PA (16 305270 5321626"	1955/11 2415	06 06	FR 0040	/ 234 001 / 2:0	PS		6100462 () MSND BLDR 0010 BLUE CLAY 0019 GRVL 0023 BLACK SHLE 0240
PEARSON TOWNSHIP CON 01(012)	16 304435 5337383"	1974/07 3313	02 02	FR 0100 FR 0185	025 / 080 004 / 10:0	ST DO		6101232 () BRWN CLAY 0010 BRWN SAND GRVL 0024 BLCK SLTE 0180 GREY ROCK 0192
PEARSON TOWNSHIP CON 02(012)	16 304795 5339926"	1979/07 2568	06 06	FR 0176	027 / 240 002 / 2:0	DO		6102491 () BRWN GRVL LOOS 0004 GREY SHLE SOFT LYRD 0176 RED SHLE QTZ HARD 0226 GREY GRNT HARD 0240
PEARSON TOWNSHIP CON 02(012)	16 304495 5340426"	1983/05 1454	06 06	FR 0024 FR 0112	015 / 005 / 2:0	DO		6103068 () RED CLAY STNS DRY 0012 GREY GRNT HARD 0130
PEARSON TOWNSHIP CON 02(012)	16 304663 5339659"	1995/07 6384	06 06	FR 0280	/ 302 006 / 1:0	DO		6105496 (136820) RED CLAY SOFT 0046 BLACK GRNT HARD 0230 BLCK SHLE MGRD HARD 0247 BLCK GRNT HARD 0302
PEARSON TOWNSHIP CON 03(010)	16 306407 5341934"	2001/04 6384	06 06	FR 0225	025 / 252 / 1:0	CO		6106702 (224491) RED CLAY STNS SOFT 0024 BLCK GRNT HARD 0210 BLCK SHLE HARD 0252
PEARSON TOWNSHIP CON 03(010)	16 306445 5342026"	1977/06 4326	02 02	FR 0026 FR 0162 FR 0305	110 / 156 002 / 1:30	DO		6102004 () BRWN SAND CLAY 0023 GREY IMSN 0327
PEARSON TOWNSHIP CON 03(010)	16 306098 5341226"	1981/09 2568	06 06	FR 0250	012 / 280 001 / 1:0	DO		6102879 () RED CLAY 0079 GREY SHLE GRNT HARD 0285
PEARSON TOWNSHIP CON 03(010)	16 306074 5340506"	1991/10 5557	06 06	FR 0390 FR 0119	/ 350 001 / 1:0	DO		6104717 (83978) CLAY HPAN 0011 BLCK GRNT HARD VERY 0121 BLCK GRNT GRSN HARD 0209 BLCK SLTE SHLE SOFT 0321 GREY SILT GRWK 0404
PEARSON TOWNSHIP CON 03(012)	16 304145 5342076"	1979/08 1362	06 06	FR 0335	040 / / :0	DO		6102431 () RED CLAY SOFT 0030 BLCK GRNT HARD 0350
PEARSON TOWNSHIP CON 04(007)	16 308205 5341946"	1990/03 5557	06 06	FR 0215 FR 0324	/ 002 / 1:0	DO		6104332 (47427) CLAY 0110 GRVL HPAN 0129 BLCK GRNT 0300 BLCK SHLE QTZ 0343
PEARSON TOWNSHIP CON 04(007)	16 308976 5343399"	1996/03 6384	06 06	FR 0291	012 / 302 001 / 1:0	DO		6105939 (136978) RED CLAY SOFT 0151 BLCK GRNT HARD 0303
PEARSON TOWNSHIP CON 04(008)	16 307770 5342788"	1992/09 5557	06 06	FR 0086 FR 0115	011 / 025 / 1:0	DO		6104898 (112418) GREY CLAY 0030 RED CLAY 0085 BLCK GRVL 0086 BLCK HPAN SAND GRVL 0120
PEARSON TOWNSHIP CON 04(008)	16 307770 5342039"	1992/06 5557	06 06	FR 0284 FR 0306 FR 0160	/ 280 002 / 1:0	DO		6104829 (112076) FILL 0001 RED CLAY 0104 SILT SAND 0111 BLCK GRNT 0280 CHRT SHLE 0310
PEARSON TOWNSHIP CON 04(008)	16 307795 5342026"	1984/06 3736	06 06	FR 0285	/ 280 001 / 1:0	DO		6103199 () RED CLAY 0082 BLCK GRNT 0260 BLCK SHLE 0302

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
PEARSON TOWNSHIP CON 04 (008)	16 307495 5342126"	1982/03 2568	06	FR 0250	006 / 255 001 / 1:0	DO		6102880 () RED CLAY HARD 0085 GREY GRNT HARD 0262
PEARSON TOWNSHIP CON 04 (008)	16 307495 5342126"	1978/07 2568	06	FR 0240	006 / 253 003 / 4:0	DO		6102161 () RED CLAY DNSE 0083 GREY GRNT HARD 0240 GREY SHLE LYRD 0255
PEARSON TOWNSHIP CON 04 (008)	16 307515 5342126"	1966/05 3804	02 02	FR 0289 FR 0273	/ 083 002 / 5:0	ST DO		6100463 () RED CLAY 0081 GREY ROCK 0239 BLACK ROCK 0294
PEARSON TOWNSHIP CON 04 (009)	16 306587 5342835"	1991/06 6384	06 06	FR 0200	/ 202 / 1:0	DO		6104642 (83853) RED CLAY SOFT 0025 BLACK GRNT HARD 0202
PEARSON TOWNSHIP CON 04 (009)	16 307286 5343563"	1986/05 3736	06	SU 0240	023 / 003 / 1:0	DO		6103446 () BRWN CLAY SOFT 0047 BLACK GRNT HARD 0210 BLACK SHLE SOFT 0252
PEARSON TOWNSHIP CON 04 (009)	16 306845 5342076"	1977/06 4326	02	FR 0152 FR 0205	010 / 010 004 / 1:0	DO		6102005 () RED CLAY 0036 GREY SPST GRNT 0220
PEARSON TOWNSHIP CON 04 (009)	16 307095 5342126"	1984/09 5557	06 06	FR 0123 FR 0058	038 / 125 001 / 2:0	DO		6103234 () RED CLAY 0049 GREY CLAY 0059 BLACK SHLE 0060 BLACK GRNT HARD VERY 0131
PEARSON TOWNSHIP CON 04 (010)	16 306539 5343520"	1996/01 6384	06 06	FR 0248	251 / 251 001 / 1:0	DO		6105940 (136999) RED CLAY SOFT 0022 BLACK GRNT HARD 0251
PEARSON TOWNSHIP CON 04 (010)	16 306159 5342843"	1984/06 3736	06	FR 0225 FR 0260	030 / 260 001 / 1:0	DO		6103200 () RED CLAY 0012 GRVL 0014 BLACK GRNT 0175 BLACK SHLE 0250 GREY SHLE 0277
PEARSON TOWNSHIP CON 04 (010)	16 306493 5341945"	1995/08 1751	06 06	FR 0045 FR 0160	020 / 003 / 1:0	DO		6105524 (136692) RED CLAY STNS PKCD 0034 BLACK GRNT MGRD 0160 BLACK GNIS QTZ SHLE 0290
PEARSON TOWNSHIP CON 04 (011)	16 305304 5342493"	1997/10 6880	06 06	FR 0185 FR 0170	018 / 002 / 1:0	DO		6105983 (170074) BRWN CLAY 0014 BLACK GRNT QTZ GRSN 0170 GREY SHLE 0214
PEARSON TOWNSHIP CON 05 (009)	16 306696 5343697"	1988/06 3736	36	FR 0030	/ 030 002 / 2:0	DO		6103953 (168662) PRDR 0030
PEARSON TOWNSHIP CON 05 (009)	16 307008 5343675"	1998/11 1751	07 06	FR 0280 FR 0098	020 / 001 / 1:0	DO		6106294 (170733) RED CLAY STNS PKCD 0033 BLACK GRNT HARD 0257 BLACK GRNT QTZ MGRD 0313
PEARSON TOWNSHIP CON 05 (009)	16 306672 5343672"	1994/11 6384	06 06	FR 0045	022 / 202 / 1:0	DO		6105407 (136811) RED CLAY SOFT 0028 BLACK GRNT HARD 0202
PEARSON TOWNSHIP CON 05 (012)	16 304195 5344326"	1980/08 3915	06 06	FR 0135	/ 030 001 / 0:30	DO		6102651 () BRWN CLAY SOFT 0042 BLACK CLAY SOFT 0047 BLACK GRNT HARD 0250
PEARSON TOWNSHIP 03 ()	16 306503 5341122"	2008/08 6941	30 06 06		/ / 0 / / 0	DO		7111632 (283951) A068007 BRWN CLAY STNS 0041 GREY GRNT HARD 0147
PEARSON TOWNSHIP 03 ()	16 306455 5341123"	2008/08 6941	06 06	FR 0249 FR 0269	012 / 085 004 / 1:0	DO		7111631 (283952) A068013 BRWN CLAY STNS 0041 GREY GRNT HARD 0205 BLACK GRNT 0240 BLACK SLTE QTZ LYRD 0295 GREY SITE 0325

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDITH) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
PEARSON TOWNSHIP ()	16 308978 5344298"	2005/09 6973	42	FR 0011	005 / 011 119 / 0:20	DO		6107403 (Z34911) A032336 GREY CLAY LOOS 0003 GREY CLAY ROCK HARD 0011 ROCK 0011	
SCOBLE TOWNSHIP CON 01(002)	16 305696 5346049"	1997/09 1751	06 06	FR 0054	040 / 001 / 1:0	DO		6105912 (170166) RED CLAY STNS PCKD 0023 BLACK GRNT HARD 0174 BLCK SHLE MGRD 0210	
SCOBLE TOWNSHIP CON 01(007)	16 308595 5345476"	1953/08 1822	06	FR 0101	/ / :0	DO ST		6100475 () PRDG 0015 BRWN CLAY 0055 CLAY 0070 CLAY GRVL 0090 BLUE CLAY GRVL 0094 CLAY MSND STNS 0100 BLACK CSND 0101 6105598 (136718) PRDG 0250	
SCOBLE TOWNSHIP CON 01(007)	16 308258 5345361"	1987/07 5557	06 06	FR 0360 FR 0265	/ 001 / 1:0	DO		6103683 () RED CLAY 0048 GREY CLAY HPAN 0070 BLACK GRNT HARD VERY 0265 BLACK GRNT CHRT LYRD 0330 BLCK SHLE QTZ LYRD 0372	
SCOBLE TOWNSHIP CON 01(007)	16 308995 5345876"	1980/03 1365	06 06	FR 0475	/ 002 / 2:0	DO		6102582 () BRWN CLAY 0004 GREY CLAY HPAN 0026 BLACK GRNT MGRD HARD 0220 BLACK SHLE MGRD SOFT 0500	
SCOBLE TOWNSHIP CON 01(008)	16 307852 5345314"	1988/06 3736	06	FR 0059	/ 059 003 / 1:0	DO		6103955 (16861) RED CLAY SOFT 0045 RED CLAY STNS HARD 0059	
SCOBLE TOWNSHIP CON 01(008)	16 308773 5345304"	1989/10 3736	06 06	FR 0300	015 / 327 / 1:0	DO		6104380 (57046) GNIS CLAY SOFT 0016 BLACK GRNT HARD 0327	
SCOBLE TOWNSHIP CON 01(008)	16 307895 5345426"	1983/07 3736	06 06	FR 0245 FR 0248	006 / 100 008 / 1:0	DO		6103088 () RED CLAY 0044 BLACK SHLE 0252	
SCOBLE TOWNSHIP CON 01(008)	16 307603 5345460"	1980/03 3911	05 05	FR 0197	020 / 005 / 1:0	DO		6102561 () CLAY BLDR SOFT 0032 BLACK GRNT MGRD HARD 0054 GREN GRNT MGRD 0092 GREY GRNT HARD 0127 GREN GRNT QTZ MGRD 0143 GREN GRNT SPST MGRD 0190 BLACK SHLE SOFT 0212 BLACK GRNT SPST HARD 0222	
SCOBLE TOWNSHIP CON 01(008)	16 308428 5345589"	1998/07 6880	06 06	FR 0180	030 / 001 / 1:0	DO		6106201 (170621) BRWN CLAY 0030 BLACK GRVL CLAY 0059 BLACK GRNT HARD VERY 0214	
SCOBLE TOWNSHIP CON 01(008)	16 308245 5345376"	1977/08 2568	06 06	FR 0314	020 / 327 / 1:0	DO		6104378 (57055) BRWN CLAY SOFT 0014 BLACK GRNT HARD 0327	
SCOBLE TOWNSHIP CON 01(008)	16 307577 5345341"	1997/07 1751	06 06	FR 0056 FR 0101	018 / 070 002 / 2:0	DO		6101928 () BRWN CLAY 0030 BLUE CLAY 0053 GREY HPAN SHLE FCRD 0057 GREY SHLE FCRD 0070	
SCOBLE TOWNSHIP CON 01(009)	16 305960 5345314"	1997/09 6880	06 06	FR 0180	002 / 020 007 / 1:0	DO		6105904 (170153) RED CLAY STNS PCKD 0075 GREY HPAN STNS LYRD 0084 BLACK GRNT QTZ MGRD 0253 6105985 (170090) PRDR 0157 BLACK GRNT QTZ GRSN 0180 GREY SHLE GRSN FCRD 0185	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
SCOBLE TOWNSHIP CON 01(009)	16 305975 534532 ^v	1997/06 6880	06 06	FR 0225	005 / 240 001 / 1:0	DO		6105898 (170227) BRWN CLAY 0008 GRN GRNT 0015 BLCK GRNT 0100 BLCK GRNT QTZ GRSN 0157 6102766 () RED CLAY 0014 BLCK GRNT HARD 0171 GREY SLTE 0250	
SCOBLE TOWNSHIP CON 01(009)	16 306795 534552 ^v	1981/07 1365	06	FR 0225	005 / 240 001 / 1:0	DO		6105898 (170227) BRWN CLAY 0008 GRN GRNT 0015 BLCK GRNT 0100 BLCK GRNT QTZ GRSN 0157 6102766 () RED CLAY 0014 BLCK GRNT HARD 0171 GREY SLTE 0250	
SCOBLE TOWNSHIP CON 01(012)	16 304854 5346126 ^v	1991/11 1751	06 06	FR 0061 FR 0153	006 / 001 / 1:0	DO		6104746 (83957) BRWN CLAY STNS PKD 0011 BLCK GRNT HARD 0153 BLCK SHLE MGRD 0273 6105816 (170150)	
SCOBLE TOWNSHIP CON 02(010)	16 305929 5346968 ^v	1997/06 1751	06	FR 0170	002 / 1:0	DO		6105816 (170150) RED CLAY STNS PKD 0032 BLCK GRNT MGRD 0170 BLCK SHLE QTZ MGRD 0210 6105211 (112917)	
SCOBLE TOWNSHIP CON 02(010)	16 305954 5346958 ^v	1994/05 1751	06 06	FR 0046	008 / 001 / 1:0	DO		6105211 (112917) RED CLAY STNS LOOS 0018 BLCK GRNT MGRD 0046 BLCK SHLE MGRD 0223 6102266 ()	
SCOBLE TOWNSHIP CON 02(010)	16 305995 5347026 ^v	1979/03 1362	06	FR 0207	010 / 005 / :0	DO		6102266 () RED CLAY SAND PKD 0010 GREY GRNT HARD 0190 BLCK SLTE HARD 0214 6102827 ()	
SCOBLE TOWNSHIP CON 02(011)	16 305695 5346126 ^v	1980/07 2568	06	FR 0110	014 / 1:20 004 / 1:0	DO		6102827 () RED CLAY DNSE 0050 GREY GRNT HARD 0122	
SCOBLE TOWNSHIP CON 02(012)	16 304295 5347326 ^v	1983/08 1454	06 06	FR 0148	006 / 007 / 1:0	DO		6103093 () GREY CLAY BLDR LOOS 0014 GREY GRNT HARD 0148 GREY SHLE QTZ MGRD 0175 6104396 (47391)	
SCOBLE TOWNSHIP CON 03(008)	16 307866 5348219 ^v	1990/06 1751	06 06	FR 0051	070 / / 1:0	DO		6104396 (47391) BRWN CLAY SNDY PKD 0005 BLCK GRNT QTZ MGRD 0051 BLCK SHLE MGRD 0252 6101234 ()	
SCOBLE TOWNSHIP CON 03(008)	16 308038 5347171 ^v	1974/06 3804	02 02	FR 0110 FR 0167	007 / 023 004 / 5:0	DO		6101234 () BRWN SAND GRVL BLDR 0019 GREY ROCK 0110 BLCK SLTE ROCK 0170 6106735 (236909)	
SCOBLE TOWNSHIP CON 03(008)	16 308148 5348329 ^v	1998/05 6384	06 06	FR 0162 FR 0126	018 / 177 005 / 1:0	DO		6106735 (236909) BRWN CLAY SNDY CLAY 0011 BLCK GRNT QTZ HARD 0177	
SCOBLE TOWNSHIP CON 03(010)	16 306496 5349303 ^v	1994/07 6384	06 06	FR 0060	020 / 090 001 / 1:0	DO		6105408 (112993) BRWN CLAY HPAN SOFT 0014 BLCK GRNT HARD 0070 BLCK SHLE HARD 0090 6105148 (112649)	
SCOBLE TOWNSHIP CON 03(010)	16 306686 5349141 ^v	1993/10 1751	06 06	FR 0056	020 / 001 / 1:0	DO		6105148 (112649) GREY CLAY STNS LOOS 0006 BLCK GRNT QTZ MGRD 0056 BLCK SHST MGRD 0092 BLCK SHLE QTZ MGRD 0128 6104245 (47305)	
SCOBLE TOWNSHIP CON 03(010)	16 306641 5349177 ^v	1989/10 5557	06 06	UK 0017 FR 0136 FR 0119 FR 0073	/ 003 / 1:0	DO		6104245 (47305) BRWN SAND GRVL 0012 STNS HPAN PKD 0027 BLCK GRNT 0081 BLCK GRNT LYRD GRSN 0138	
SCOBLE TOWNSHIP CON 03(010)	16 307286 5348672 ^v	1989/10 5557	06 06	FR 0055	021 / 045 002 / 1:0	DO		6104244 (47668) SAND GRVL 0008 GREY CLAY 0015 HPAN 0042 STNS GRVL SILT 0050 GRVL 0055 6105078 (112835)	
SCOBLE TOWNSHIP CON 03(011)	16 305916 5349361 ^v	1993/07 5557	06 06	UK 0190 UK 0225 UK 0209	040 / 210 003 / 1:0	DO		6105078 (112835) BRWN CLAY 0012 HPAN 0016 BLCK GRNT HARD 0190 GREY CRT 0209 BLCK SHLE 0231	

TOWNSHIP	CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁹ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
SCOBLE TOWNSHIP	CON 03 (012)	16 304888 5348688W	1994/05 1751	06 06	FR 0208 FR 0043	043 / 002 / 1:0	DO		6105210 (112916) BRWN CLAY STNS LOOS 0008 BLACK GRNT MGRD 0043 BLACK SHLE MGRD 0260	
SCOBLE TOWNSHIP	CON 03 (027)	16 306414 5349352W	1992/06 6384	06 06	FR 0086	024 / 127 001 / 1:0	DO		6104910 (112017) BRWN GRVL CLAY SOFT 0086 BLACK GRNT QTZ HARD 0127	
SCOBLE TOWNSHIP	CON 04 (010)	16 306689 5349243W	1992/07 5557	06 06	FR 0062 FR 0090	010 / 115 001 / 1:0	DO		6104831 (112094) BLACK LOAM 0003 GREY UNKN 0018 HPAN LOOS 0040 HPAN GRVL PCKD 0060 BLACK GRNT 0090 BLACK SHLE 0139	
SCOBLE TOWNSHIP	01 ()	16 308247 5348382W	1998/07 6384	06 06	FR 0295	075 / 302 002 / 1:0	DO		6106281 (170666) BRWN SAND CLAY SOFT 0011 BLACK GRNT HARD 0302	
SCOBLE TOWNSHIP	()	16 307896 5347984W	2005/09 1751	06	0035 0128	030 / 138 002 / 2:13	DO		6107424 (Z36436) A033241 BLUE LOAM SNDY BLDR 0027 BLACK GRNT 0300	
THUNDER BAY CITY	03 (011)	16 305425 5349297W	2009/06 6384						7130687 (Z84799) A083745	

Notes:

1. UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
2. Date Work Completed
3. Well Contractor Licence Number
4. Casing diameter in inches
5. Unit of Depth in Feet
6. See Table 4 for Meaning of Code
7. STAT LVL: Static Water Level in Feet ; PUMP LVL: Water Level After Pumping in Feet
8. Pump Test Rate in GPM, Pump Test Duration in Hour : Minutes
9. See Table 3 for Meaning of Code
10. Screen Depth and Length in feet
11. See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms											
Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT		
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE		
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY		
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES		
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY		
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK		
CLN	CLEAN	FOSS	FOSLIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN		
CLY	CLAYEY	PSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL		
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE		
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY		
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING		
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS		
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED		
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE				
DNSE	DENSE	GYP	GYPSON	PKCD	PACKED	SLTY	SILTY				
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SND	SANDSTONE				
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDY				

2. Core Color	
Code	Description
WHIT	WHITE
GREY	GREY
BLU	BLUE
GRN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Water Use			
Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial		
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail			
Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE/TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDITH) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11} :
UNSURVEYED A(051)	16 296747 5381752"	1985/11 5557	06 06	FR 0030 FR 0018	005 / 150 004 / 2:0	DO PS		6103457 () PRDR 0006 BRWN SAND HPAN 0013 GREY GRNT 0018 BLCK GRNT GRSN QRTZ 0035 BLCK GRNT LYRD QRTZ 0165	
UNSURVEYED A(051)	16 296758 5381759"	1985/11 5557	06 06	FR 0174	/	PS DO		6103456 () BRWN CLAY SAND HPAN 0017 GREY GRNT HARD VERY 0174 GRN QRTZ 0175 BLCK GRNT LYRD QRTZ 0304	
CONNEE TOWNSHIP CON 08(002)	16 304295 5378226"	1975/07 3133	02	FR 0071 FR 0048	008 / 015 005 / 0:30	DO		6101538 () RED CLAY 0020 GREY ROCK 0079	
CONNEE TOWNSHIP CON 08(002)	16 304512 5378048"	1979/11 1362	06 06	FR 0215	050 / 002 / :0	DO		6102405 () BRWN CLAY STNS SOFT 0010 SAND GRVL SNDY 0014 GREY GRNT HARD 0242	
FORBES TOWNSHIP CON 01(013)	16 305934 5382582"	1982/10 2568	06	FR 0069	012 / 092 002 / 1:0	DO		6103031 () RED CLAY STNS DNSE 0019 GREY GRNT HARD 0093	
FORBES TOWNSHIP CON 02(010)	16 303555 5383876"	1988/08 3736	06 06	/	/ :0	DO		6104042 (32412) RED CLAY STNS SOFT 0001 BLCK GRNT HARD 0223 BLCK GRNT QTZ MGRD 0229 BLCK GRNT 0235 BLCK GRNT MGRD HARD 0242 BLCK GRNT QTZ HARD 0253 BLCK GRNT QTZ 0256 BLCK GRNT QTZ 0256	
FORBES TOWNSHIP CON 02(011)	16 304517 5383879"	1959/04 4906	06 06	FR 0017	008 / 017 003 / 2:0	ST		6100058 () RED CLAY 0013 CLAY SILT 0015 GRVL 0017 GRN ROCK 0022	
FORBES TOWNSHIP CON 03(010)	16 303785 5385401"	1971/09 1564	06	FR 0048	024 / 062 / 2:0	DO		6100842 () PRDR 0025 BLCK ROCK 0055 GRN ROCK 0065	
FORBES TOWNSHIP CON 03(010)	16 303895 5386126"	1982/07 3736	06 06	FR 0090 FR 0100	017 / 100 003 / 1:0	DO		6102977 () RED CLAY 0004 HPAN 0008 BLCK GRNT 0110	
FORBES TOWNSHIP CON 03(012)	16 305595 5386726"	1982/09 3736	06 06	FR 0070 FR 0165	019 / 150 / 1:0	DO		6102978 () RED CLAY 0018 BLCK GRNT 0175	
FORBES TOWNSHIP 01(012)	16 305343 5382179"	2006/06 1751	02	0427	079 / 492 / 2:0	DO		6107586 (218936) A033246 RED CLAY STNS 0039 BLCK GRNT 0722	
THUNDER BAY CITY (MC CON A(008)	16 304495 5379226"	1984/05 3736	06	FR 0180 FR 0202	120 / 210 002 / 1:0	DO		6103179 () BLCK LOAM LOOS 0002 WHIT GRNT LOOS SOFT 0197 BLCK GRNT PKCD 0222	
THUNDER BAY CITY A (036)	16 302487 5380038"	2009/09 6384						7130677 (Z096382)	
THUNDER BAY CITY A (036)	16 302504 5380050"	2009/09 6384						7130678 (Z096377) A061461	
THUNDER BAY CITY 01(022)	16 299620 5382746"	2009/03 6384						7130680 (Z84787) A083756	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
THUNDER BAY CITY 02 (031)	16 296540 5384490 ^w	2008/11 6941	06	FR 0115	010 / 054 004 / 2:0	DO		7115452 (Z83947) A068014 BRWN CLAY 0010 GREY SAND CLAY SILTY 0105 GREY GRVL 0125 7048818 (Z74108) A056151	
THUNDER BAY CITY A(031)	16 304344 5379033 ^w	2007/08 6941							
THUNDER BAY CITY (DA DWSN 01(005)	16 306295 5379901 ^w	1962/08 1814	05 05	FR 0044	020 / 042 001 / 12:0	DO		6100511 () PRDR 0017 RED MSND 0024 HPAN 0034 QSNL 0040 GRVL 0044 BLACK ROCK 0045 6103172 () BRWN GRVL LOOS 0001 RED CLAY STNS PCKD 0018 GRN GRSN QTZ 0100	
THUNDER BAY CITY (DA DWSN 01(006)	16 305695 5380026 ^w	1984/04 1751	06 06	FR 0047 FR 0056 FR 0083	014 / 004 / 2:0	DO			
THUNDER BAY CITY (DA DWSN 01(011)	16 304174 5381193 ^w	1993/04 6680	06 06	FR 0050	023 / 130 001 / 1:0	DO		6104983 (112760) BRWN LOAM 0001 RED CLAY 0006 GRN GRNT HARD 0027 GRN GRNT QTZ 0138 6102758 () BRWN TILL 0004 BLACK GRNT 0145 GRNT QTZ GRSN 0170 BLACK GRNT 0175	
THUNDER BAY CITY (DA DWSN 01(030)	16 303395 5381826 ^w	1981/08 1365	06 06	FR 0145 FR 0165 FR 0019	015 / 160 005 / 1:0	DO			
THUNDER BAY CITY (DA DWSN 01(030)	16 296709 5384281 ^w	1997/08 6880	06 06	FR 0086	030 / 060 008 / 1:0	DO		6105989 (170080) RED CLAY 0025 GREY CLAY 0040 GREY CLAY SILTY GRVL 0045 GREY CLAY 0085 GREY SAND GRVL MGRD 0087 BLACK GRNT 0087	
THUNDER BAY CITY (DA DWSN 02(015)	16 302592 5383177 ^w	1996/10 6880	06 06	FR 0160	024 / 180 002 / 1:0	DO		6105733 (170198) GREY CLAY 0006 GRN GRSN QTZ LYRD 0195	
THUNDER BAY CITY (DA DWSN 02(029)	16 297445 5384226 ^w	1975/11 3313	02	FR 0070 FR 0116	010 / 010 004 / 1:0	DO		6101500 () RED GRVL CLAY 0037 GREY GRNT 0129	
THUNDER BAY CITY (DA DWSN A(024)	16 305971 5378755 ^w	1982/11 3736	06 06		/ / 2:0	DO		6102976 () RED CLAY 0068 HPAN BLDR 0074 BLCK GRNT 0170 GRSN QTZ 0200 BLCK GRNT GRSN LYRD 0425 6106597 (197598) RED CLAY 0050 GREY CLAY 0093 CLAY ROCK 0117 6102233 () RED CLAY DNSE 0030 GREY HPAN BLDR PCKD 0060	
THUNDER BAY CITY (DA DWSN A(026)	16 305969 5378793 ^w	2000/10 6384	06 06	FR 0113	/ 1:0 008 / 1:0	DO		6106523 (197782) RED CLAY 0025 GREY SAND 0040 GREY SAND GRVL 0047 GRN GRVL 0052 6101095 () SAND 0089 ROCK 0092	
THUNDER BAY CITY (DA DWSN A(030)	16 306295 5378676 ^w	1978/07 2568							
THUNDER BAY CITY (DA DWSN A(030)	16 304670 5379123 ^w	2000/03 6880	06 06	FR 0052	006 / 050 / 1:0	DO			
THUNDER BAY CITY (DA DWSN A(030)	16 304745 5379076 ^w	1973/10 4906	02	FR 0092	040 / 043 006 / 8:0	DO			
THUNDER BAY CITY (DA DWSN A(031)	16 304350 5379096 ^w	1974/10 2560	06 06	FR 0128 FR 0198 FR 0247 FR 0308	087 / 310 005 / 1:0	CO		6101302 () BRWN GRVL FILL 0009 RED CLAY 0082 GREY GRNT 0312	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
THUNDER BAY CITY (DA) DWSN A(032)	16 304295 5379476W	1954/09 1822	05 05	FR 0086	026 / 030 001 / :0	DO		6100507 () RED CLAY 0030 GREEN ROCK 0086	
THUNDER BAY CITY (DA) DWSN A(032)	16 301795 5380326W	1981/10 1365	06 06	FR 0065	/ 015 / 1:0	DO		6102913 () RED CLAY 0035 BRWN FSND 0060 GREY TILL 0054 GRVL 0065 6104656 (83762) PRDR 0200	
THUNDER BAY CITY (DA) DWSN A(032)	16 304148 5379243W	1991/07 5557			/ / :0	DO			
THUNDER BAY CITY (DA) DWSN A(032)	16 303642 5379271W	1995/11 6880	06 06	FR 0045 FR 0133	/ 120 001 / 1:0	DO		6105599 (136102) WHIT QTZ GRSN 0020 BLCK GRNT QTZ GRSN 0047 GRN GNIS QTZ 0088 BLCK GRNT QTZ GRSN 0150 6104643 (83878) RED CLAY SOFT 0052 RED CLAY BLDR 0054 GREY GRNT GRSN QTZ 0177	
THUNDER BAY CITY (DA) DWSN A(032)	16 304100 5379039W	1991/09 6384	06 06	FR 0140	033 / 001 / 1:0	DO		6101530 () BRWN UNKN 0035 GREY UNKN 0090 RED GRNT 0100 6101934 () RED CLAY 0029 GREY FLDS QTZ GRSN 0121	
THUNDER BAY CITY (DA) DWSN A(036)	16 302345 5380126W	1974/06 1564	06	FR 0100	/ 005 / 2:0	DO			
THUNDER BAY CITY (DA) DWSN A(036)	16 302745 5379976W	1977/07 1363	02	FR 0121	/ 030 007 / 1:0	DO			
THUNDER BAY CITY (DA) DWSN A(036)	16 302841 5379994W	1994/08 5557	06 06	FR 0165 FR 0245 FR 0208	026 / 230 002 / 2:0	DO		6105327 (1362334) RED CLAY 0032 ROCK 0034 HPAN STNS 0053 ROCK 0057 HPAN 0061 BLCK GRNT LYRD GRSN 0170 RED GRNT 0210 BLCK GRNT GRSN QTZ 0252 6101498 () BRWN SAND GRVL CLAY 0038 BLCK BSLT 0195 6102570 () RED CLAY 0015 GREY CLAY 0061 CGVL, 0065 6102389 () RED CLAY 0026 GRVL STNS SAND 0062	
THUNDER BAY CITY (DA) DWSN A(038)	16 302345 5380126W	1975/09 3313	02	FR 0125 FR 0185	040 / 070 004 / :0	DO			
THUNDER BAY CITY (DA) DWSN A(038)	16 302195 5380226W	1980/07 1365	06	FR 0065	/ 007 / 2:0	DO			
THUNDER BAY CITY (DA) DWSN A(038)	16 302045 5380176W	1979/09 1365	06	FR 0062	027 / 050 010 / 1:0	DO			
THUNDER BAY CITY (DA) DWSN A(043)	16 300595 5380826W	1980/07 2568	06	FR 0030	007 / 030 050 / 1:0	DO		6102828 () RED CLAY DNSE 0025 BRWN GRVL STNS LOOS 0034 6101104 () RED CLAY SOFT 0008 BRWN GRVL SAND LOOS 0016 BLCK ROCK HARD 0017 BLCK GRVL LOOS 0022 GREY GRNT HARD 0050 6101090 () RED CLAY BLDR SOFT 0010 BRWN SAND GRVL CONG 0026 BLCK GRNT QRTZ HARD 0120 6103058 () RED CLAY 0025 GRNT FCRD 0034 WHIT GRNT 0170 WHIT QRTZ 0175 WHIT GRNT 0204 BLCK GRNT SOFT 0225	
THUNDER BAY CITY (DA) DWSN A(049)	16 297695 5381676W	1973/10 1569	06	FR 0040	015 / 035 008 / 0:30	DO			
THUNDER BAY CITY (DA) DWSN A(049)	16 297695 5381676W	1973/09 1569	06			DO			
THUNDER BAY CITY (DA) DWSN A(049)	16 297795 5381726W	1983/04 3736	06 06	FR 0170 FR 0210	030 / 170 002 / 1:0	DO			

TOWNSHIP	CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
THUNDER BAY CITY (DA)	DWSN A(051)	16 296845 5382176 ^N	1967/10 3804	02 02	SU 0257	005 / 085 003 / 4:0	PS	0084 01	6100057 () BRWN MSND BLDR 0013 GREY ROCK 0260	
THUNDER BAY CITY (DA)	DWSN A(052)	16 296495 5382526 ^N	1979/12 1365	06 06	FR 0130 FR 0099	023 / 130 006 / 1:0	DO		6102571 () BRWN SAND 0003 BRWN CLAY HPAN 0018 BLCK GRNT 0098 BRWN GRNT QRTZ 0104 BLCK GRNT 0150	
THUNDER BAY CITY (DA)	DWSN A(052)	16 296705 5382276 ^N	1976/10 2402	06 06	SU 0145	016 / 245 004 / 2:0	DO		6101706 () SAND GRVL 0014 GRNT 0257	
THUNDER BAY CITY (DA)	DWSN A(054)	16 295695 5382926 ^N	1979/11 1365	06	FR 0134	/ 075 015 / 1:0	DO		6102408 () RED CLAY 0056 BLUE CLAY 0088 GREY SAND CLAY 0128 GRVL 0134 6106690 (232475) RED CLAY 0055 GREY SAND 0155 GREY CLAY 0182 BLCK GRVL 0187	
THUNDER BAY CITY (DA)	DWSN A(056)	16 295360 5383078 ^N	2001/06 6880	06 06	FR 0187	050 / 180 015 / 1:0	DO		6100505 () RED CLAY 0031 RED CLAY BLDR 0038 HPAN BLDR 0047 QSNB 0066 GREY GRNT 0067	
THUNDER BAY CITY (DA)	DWSN A(057)	16 294770 5383466 ^N	1954/11 1822	05 05	FR 0114	056 / 060 004 / 2:0	DO		6100504 () RED CLAY 0039 FSNB 0087 CSND BLDR 0106 RED GRNT 0116 6105812 (170224) RED CLAY 0023 BRWN CLAY 0034 BLCK SAND 0045 BLCK GRVL 0055 BRWN CLAY SLTY 0072 GREY GRVL SAND 0080	
THUNDER BAY CITY (DA)	DWSN A(058)	16 295268 5383193 ^N	1977/08 3804	02	FR 0122	056 / 060 004 / 2:30	DO		6101948 () RED CLAY 0033 BRWN QSNB 0056 GREY SAND 0073 BRWN GRVL BLDR 0128 6102867 () PRDG 0006 BRWN SAND BLDR LOOS 0020 GREY GRNT HARD 0200	
THUNDER BAY CITY (DA)	DWSN A(077)	16 287095 5386526 ^N	1981/04 2568	06	FR 0025	017 / 195 / 1:0	DO		6102868 () BRWN SAND BLDR LOOS 0020 GREY GRNT HARD FCRD 0200 6100083 () PRDG 0047 ROCK 0222	
THUNDER BAY CITY (DA)	DWSN A(077)	16 287095 5386526 ^N	1981/04 2568	06	FR 0020	017 / 190 002 / 1:0	DO		6101987 () CLAY 0014 BLDR 0031 GRVL 0040 QSNB 0049 GRVL 0091 GRNT 0185 6102975 () RED CLAY 0020 BLDR HPAN 0034 BLCK GRNT GRSN 0260 BLCK GRNT GRSN LYRD 0330	
THUNDER BAY CITY (DA)	DWSN A(079)	16 286445 5386776 ^N	1977/10 2402	06 06	FR 0147	019 / 175 004 / 3:0	DO		6102660 () RED CLAY SAND 0018 BLCK SHLE 0300	
THUNDER BAY CITY (DA)	DWSN B(024)	16 305595 5379026 ^N	1982/09 3736	06 06	FR 0225	040 / 275 010 / 1:0	DO		6100768 () LOAM 0001 RED CLAY 0019 BLUE CLAY 0024 GREY CLAY 0025	
THUNDER BAY CITY (DA)	DWSN B(026)	16 306095 5378826 ^N	1980/11 1365	06	FR 0048 FR 0289	/ 001 / 1:0	DO			
THUNDER BAY CITY (DA)	DWSN B(027)	16 305845 5378966 ^N	1970/08 3642	30	FR 0025	019 / 005 / 1:0	DO			

Well Computer Print Out Data as of November 17 2009

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TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG #	DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
THUNDER BAY CITY (DA) DWSN B(029)	16 304816 5379264"	1988/11 5557	06 06	FR 0272 FR 0311 FR 0148 FR 0066	025 / 320 003 / 1:0	DO		6104089 (32528) RED CLAY 0034 GRVL HPAN 0035 BLACK GRNT GRSN 0142 BLACK GRNT GRSN QTZ 0391 BRWN GRNT QTZ GRSN 0332	
THUNDER BAY CITY (DA) DWSN B(030)	16 305345 5379076"	1977/05 2560	06	FR 0062	028 / 070 002 / 1:0	DO		6101843 (RED CLAY 0033 GREY CLAY BLDR 0040 GREY GRNT HARD 0055 GREY GRNT SOFT 0070	
THUNDER BAY CITY (DA) DWSN B(032)	16 304126 5379231"	1985/07 3736	06	FR 0150	025 / 200 / 1:0	DO		6103382 (RED CLAY 0026 CONG 0125 GREY GRNT 0202	
THUNDER BAY CITY (DA) DWSN B(036)	16 302498 5380120"	1980/07 1365	06 06	FR 0290 FR 0146	011 / 285 005 / 1:0	DO		6102559 (GREY CLAY 0004 RED CLAY 0021 GREY HPAN STNS BLDR 0040 WHIT GRNT 0142 GRSN 0150 RED GRNT 0300	
THUNDER BAY CITY (DA) DWSN B(036)	16 302795 5380076"	1979/09 1365	06 06	FR 0096 FR 0148 FR 0173	028 / 120 012 / 1:0	DO		6102390 (RED CLAY 0045 BLUE CLAY GRVL BLDR 0069 GRNT FCRD 0071 BLACK GRNT 0173 RED GRNT 0175	
THUNDER BAY CITY (DA) DWSN B(043)	16 300289 5381072"	1974/10 2560	06 06	FR 0067 FR 0136 FR 0150	040 / 160 / 1:0	DO		6101301 (BRWN GRVL CLAY BLDR 0017 GREY GRNT 0049 RED GRNT 0068 GREY GRNT 0127 RED GRNT CLAY BLDR 0148 GREY GRNT CLAY BLDR 0165	
THUNDER BAY CITY (DA) DWSN B(052)	16 296589 5382536"	1991/09 6384	06 06	FR 0240	/ 252 008 / 1:0	DO		6104644 (83874) RED CLAY SOFT 0012 BRWN SAND STNS SOFT 0072 BLACK GRNT HARD 0252	
THUNDER BAY CITY (DA) DWSN B(077)	16 286945 5386426"	1964/11 3313	02 02	FR 0160	045 / 060 003 / 3:0	PS		6100070 (GRVL BLDR 0018 ROCK 0050 GREY GRNT 0070 ROCK 0172	
THUNDER BAY CITY (DA) DWSN B(077)	16 287033 5386309"	1987/08 3736	06 06	FR 0260	/ 302 / 1:0	DO		6103733 (16856) BRWN SAND GRVL BLDR 0145 BLACK GRNT 0302	
THUNDER BAY CITY (DA) DWSN B(077)	16 287012 5386328"	1993/06 6384	06 06	FR 0052	/ 1:0	DO		6105107 (112718) BRWN GRVL LOAM 0006 RED CLAY 0030 BRWN HPAN STNS 0052 BLACK GRNT QTZ 0302	
THUNDER BAY CITY (DA) DWSN B(077)	16 287035 5386326"	1967/06 1201	03 04	FR 0120	012 / 002 / 2:0	PS		6100102 (CLAY MSND BLDR 0014 GREY GRNT 0140	
THUNDER BAY CITY (DA) DWSN B(078)	16 286594 5387090"	1976/03 2560	06	FR 0078	019 / 084 004 / 1:0	DO		6101559 (PRDR 0018 RED GRVL SILT QSND 0076 RED GRVL CGRD 0085	
THUNDER BAY CITY (DA) DWSN B(078)	16 286523 5386851"	1958/12 2415	07 07	FR 0130 FR 0140	024 / 100 010 / 4:0	PS		6100510 (LOAM 0003 RED CLAY 0040 QSND 0100 RED GRNT 0146	
THUNDER BAY CITY (DA) DWSN B(078)	16 286470 5386751"	1957/12 2415	07 07	FR 0086	020 / 080 010 / 4:0	PS		6100509 (CLAY 0022 ROCK 0027 RED GRNT 0091	
THUNDER BAY CITY (DA) DWSN B(078)	16 286515 5386826"	1954/12 1822	05	FR 0030	025 / 029 005 / 1:0	PS		6100508 (PRDG 0019 BLDR GRVL MSND 0030	

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5.6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDITH) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5.11}
THUNDER BAY CITY (DA DWSN B(078)	16 286645 5386596 ^v	1956/11 4906	06 06					6100071 () RED CLAY 0014 MSND BLDR 0026 GREN ROCK 0052 6102417 () CLAY 0032 GRNT 0254
THUNDER BAY CITY (DA DWSN B(078)	16 286595 5386576 ^w	1979/08 2402	06 06	FR 0250	030 / 190 005 / 12:0	DO		
THUNDER BAY CITY (DA 02(010)	16 304770 5381365 ^w	2005/09 6384	06	FR 0050	/ / :0	DO		6107435 (Z20550) A020311 BRN CLAY SOFT 0024 BLCK GRNT HARD 0152
B 1/2(053)	16 296570 5383222 ^w	2008/11 1751	06	FR 0165	004 / 118 005 / 1:0	DO		7118860 (Z88417) A078642 RED CLAY STNS BLDR 0020 BLCK GRVL STNS PKCD 0052 BLCK GRNT MGRD 0180

Notes:

1. UTM in Zone, Easting, Northing and Datum is NAP83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
2. Date Work Completed
3. Well Contractor Licence Number
4. Casing diameter in inches
5. Unit of Depth in Feet
6. See Table 4 for Meaning of Code
7. STAT LVL: Static Water Level in Feet ; PUMP LVL: Water Level After Pumping in Feet
8. Pump Test Rate in GPM, Pump Test Duration in Hour : Minutes
9. See Table 3 for Meaning of Code
10. Screen Depth and Length in feet
11. See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms											
Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT		
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE		
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY		
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES		
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY		
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QRTZ	QUARTZ	THIK	THICK		
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN		
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL		
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE		
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY		
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING		
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS		
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED		
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE				
DNSE	DENSE	GYPS	GYPSUM	PCKD	PACKED	SLTY	SILTY				
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SND	SANDSTONE				
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDY				

2. Core Color	
Code	Description
WHIT	WHITE
GREY	GREY
BLU	BLUE
GRN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLK	BLACK
BLGY	BLUE-GREY

3. Water Use			
Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial		
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail			
Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		



APPENDIX C

SITE RECONNAISSANCE OBSERVATIONS AND SITE PHOTOGRAPHS



APPENDIX C

SITE RECONNAISSANCE OBSERVATIONS AND SITE PHOTOGRAPHS

Mr. M. Narduzzi and Mr. B. R. Gray of Peto MacCallum Ltd. carried out Site Reconnaissance Surveys (SRS) of the existing alignment and the adjacent lands within various alternate routes. The SRS consisted of a drive-by, boat-by and walk-through of selected sections of the Highway 11/17 corridor and adjacent lands. The ground truth checks verified the surficial geology and drainage conditions inferred from the literature and map reviews as summarized below.

A total of four alternate routes including five partial routes were investigated during the period of October 26 to 30, 2009. The corridor alignments were modified after the October 2009 reconnaissance visits with updated corridor drawings received from Stantec on December 13, 2009. At the time of issuing this study, the updated plan and profile drawings were not yet available. The following table lists the alternate and partial alternate routes and should be referred to when viewing the photographs.

ALTERNATE ROUTES
Blue (Northerly Route)
<i>Partial Route - Purple (Blue 1a)</i>
Yellow North (North of Highway 11/17)
<i>Partial Route - Brown (Yellow North 1a)</i>
<i>Partial Route - Orange (Yellow North 1b)</i>
Yellow South (South of Highway 11/17)
Red (Southerly Route)
<i>Partial Route - Green (Red 1a)</i>
<i>Partial Route - Dark Green (Red 1b)</i>

The photographs were numbered from west to east to follow increasing chainage along the alignments. Each photograph number has been given an associated prefix to relating each photograph to the specific alternate route. For example, the first photograph for the Blue (Northerly Route) is identified as B1.

Blue (Northerly Route)

- Where the route diverges off of the existing Highway 17 north of Shabaqua Corners, the terrain consists of bedrock outcrops and layered cohesive and non-cohesive soils. Typically, bedrock and non-cohesive soils are anticipated to the west and within the Oskonodaga River watershed with a layered stratigraphy comprising both cohesive and non-cohesive soils to east of the Oskonodaga River watershed. (Photograph B1)
- The route crosses a major hydro corridor at the intersection of Goldie Road. (Photograph B1)
- Beyond Goldie Road, extending to Finmark Road, the terrain is generally undulating with localized bedrock outcrops at the higher elevations and rivers/streams and swampy areas closer to and at the Finmark Road crossing corresponding to the lower elevations. Boulders and non-cohesive soils were noted along Bylund's Pit Road. (Photograph B2)



- Structures are anticipated where the route crosses the CP rail line and Sunshine Creek. Cohesive soils were observed along the abandoned rail line with non-cohesive sand and gravel deposits and bedrock outcrops were observed along Sunshine Creek.
- Swampy and wetland areas exist to the north and south where the route crosses Sunshine Road.
- Structures are anticipated where the route crosses the abandoned CN rail line, Shebandowan River, CP rail lines and the CN rail line. The terrain consists of bedrock outcrops to the north and south and within Shebandowan River. (Photographs B3 and B4)
- Cohesive soils and localized swampy areas were observed along the Highway 102 corridor. Skewed hydro poles were noted along the south side of Highway 102 indicating the presence of soft soils. (Photograph B5)
- Exposed cohesive soils were noted along the Teitto Road for agricultural land use purposes.
- A structure is anticipated where the alternate route crosses Brule Creek. Exposed bedrock was observed at the eastern limit of Pajamaki Road, along Mokomon Road and at various points within Brule Creek.
- Structures are anticipated where the alternate route crosses the CN rail line and the Kam River. Sand and gravel deposits are anticipated to the west and north of this crossing with exposed bedrock and cohesionless soils anticipated along the eastern side of the Kam River. (Photograph B6)
- Open flat and rolling terrain is noted further south of the Kam River beyond John Street Road, extending to the end of the alternate route at the intersection of Pebble Stone and Pole Line Road. A layered stratigraphy of cohesive and non-cohesive soils are anticipated. Land use is primarily agricultural.

Partial Route Purple (Blue 1a)

- Where the partial route diverges off of the Blue alternate route, northeast of the northern limit of Torrie Road, the partial route crosses and runs approximately 150 m parallel with a large one kilometre stretch of swamp. The swampy area approximately extends to the intersection of Holland Road East and Torrie Road. Cohesive soils were observed along Torrie Road with sections of cohesionless soil pockets occurring along the alignment. (Photographs P1 and P2)
- The partial route merges with the partial Brown (Yellow North 1a) at the Kam River crossing where a structure is anticipated. A structure is also anticipated for the CN rail line. Bedrock and cohesionless soils are anticipated along the northern bank of the Kam River. (Photograph P3)

Yellow North (North of Highway 11/17)

- Where the route diverges off of the existing Highway 17 north of Shabaqua Corners, the terrain consists of bedrock outcrops and layered cohesive and non-cohesive soils. Typically, bedrock and non-cohesive soils are anticipated to the west and within the Oskonodaga River watershed with a layered stratigraphy comprising both cohesive and non-cohesive soils to east of the Oskonodaga River watershed.



- The route crosses a major hydro corridor east of Highway 17 and west of the Oskonodaga River.
- The route runs parallel to the north side of the existing Highway 11/17 from Bylund's Pit Road to Goldie Road. As the alternate route proceeds beyond Bylund's Pit Road, great expanses of swampy terrain with associated wetland areas are prominent. This terrain extends to about 2 km west of Finmark Road. (Photographs YN1 and YN2)
- Structures are anticipated where the route crosses the CP rail line and Sunshine Creek. Cohesive soils were observed along the abandoned rail line with non-cohesive sand and gravel deposits and bedrock outcrops noted along Sunshine Creek.
- Structures are anticipated where the route crosses the existing CP rail line, Highway 11/17 and the Shebandowan River at Sunshine. Cohesive soils were observed along the west and east sides Sunshine Road and along the eastern bank of the Shebandowan River. Bedrock outcrops and with non-cohesive sand and gravel deposits were observed within and along the western bank of the Shebandowan River. A rock cut of about 300 m in length was observed along the south side of Highway 11/17 just beyond the intersection of Sunshine Loop Road. (Photograph YN3)
- A structure is anticipated where the route crosses the CP rail line just west of Sistonens Corners. Prior to the crossing at Sunshine Loop Road, rolling terrain with sections exposed cohesive soils were noted. At the anticipated CP rail line intersection, rock outcrops and shallow soil cover were found.
- Wetland and swampy areas were noted along the route running parallel with the west side Highway 11/17, bordered to the north and south by Wiljala Drive. Exposed bedrock was observed along the steep rock ridges some 300 m north of Wiljala Drive and some 200 m east of Highway 11/17. Wetland and swampy areas were noted again some 400 m south of Wiljala Drive where the alternate route crosses Highway 11/17. (Photographs YN 4 and YS4)
- Exposed cohesive soils were noted along the Teitto Road for agricultural land use purposes.
- A structure is anticipated where the alternate route crosses Brule Creek. Exposed bedrock was observed along Pajamaki Road, Mokomon Road and along Ilkka Drive. Both cohesive and non-cohesive soils were noted in proximity to this crossing.
- A cohesive soil slope failure was observed on the north side of Mokomon Road, just west of Highway 11/17, cut for the Mokomon Road alignment.
- Extensive flat and wetland terrain were noted south of the southern intersection of Ilkka Drive and Highway 11/17.
- Rock outcrops partially cut for the existing Holland Road East alignment were noted where the alignment crosses Holland Road East.
- Structures are anticipated where the alternate route crosses the CN rail line and the Kam River. Sand and gravel deposits with shallow cover over bedrock are anticipated along the banks of the Kam River. The alternate route Yellow North (North of Highway 11/17) merges with the Red (Southerly Route) beyond the crossing of the Kam River. (Photograph YN5)



Partial Route Brown (Yellow North 1a)

- Where the partial route diverges off of the Yellow North alternate route, some 1.2 km north of Holland Road East, the partial route crosses some localized small sections of streams and wetlands areas north and south of Holland Road.
- Structures are anticipated where the alternate route crosses the CN rail line and the Kam River. Sand and gravel deposits with shallow cover over bedrock are anticipated along the banks of the Kam River.
- The route crosses a major hydro corridor about 500 m south of Oliver Road.
- The route crosses the Oliver Paipoonge North Landfill Site, south of Oliver Road at the southern limit of Spence Road.
- The partial alternate route Brown (Yellow North 1a) merges with the Red (Southerly Route) beyond Spence Road.

Partial Route Orange (Yellow North 1b)

- Where the partial route diverges off of the Yellow North alternate route, some 0.5 km north of Holland Road East, the partial route crosses a small wetland area south of Holland Road. (Photograph O1)
- Structures are anticipated where the alternate route crosses the CN rail line and the Kam River. Sand and gravel deposits with shallow cover over bedrock are anticipated along the north bank of the Kam River. Exposed bedrock, steeply sloping into the river was noted along the south bank. (Photograph O2)
- The route crosses a major hydro corridor near the intersection of Oliver Road.
- The partial alternate route Orange (Yellow North 1b) merges with the Red (Southerly Route) just beyond Oliver Road.

Yellow South (South of Highway 11/17)

- Where the route diverges off of the existing Highway 17 north of Shabaqua Corners, the terrain consists of bedrock outcrops and layered cohesive and non-cohesive soils. Typically, bedrock and non-cohesive soils are anticipated to the west and within the Oskonodaga River watershed with a layered stratigraphy comprising both cohesive and non-cohesive soils to east of the Oskonodaga River watershed. (Photograph YS1)
- The route runs parallel along the south side of Highway 11/17 after the existing highway intersects with Shabaqua Road. As the alternate route proceeds east of this point densely treed and hilly terrain was noted. Swampy terrain with associated wetland areas were observed at about 2.5 km west of Finmark Road and to the east of the Fourway Community School (unoccupied during the SRS). (Photograph YS2)
- A structure is anticipated where the route crosses the Shebandowan River. Non-cohesive sand and gravel deposits and bedrock outcrops were observed along both banks of the Shebandowan River at the proposed crossing. (Photograph YS3)



- A structure is anticipated where the route crosses existing CN rail line near Sunshine, south of Glenwater Road. Cohesive soils and bedrock outcrops were observed along the south side of the Shebandowan River north of this location. The crossing is located just beyond a stream and wetland area to the west.
- Wetland and swampy areas were noted along the route running parallel with the west side Highway 11/17, bordered to the north and south by Wiljala Drive. Exposed bedrock was observed along the steep rock ridges some 300 m north of Wiljala Drive and some 200 m east of Highway 11/17. (Photograph YS4)
- A cohesive soil slope failure was observed on the north side of Mokomon Road, just west of Highway 11/17, cut for the Mokomon Road alignment. (Photograph YS5)
- Extensive flat and wetland terrain was noted south of the southern intersection of Ilkka Drive and Highway 11/17, extending to some 400 m north of Lundstrom Road West. (Photograph YS6)
- The alternate route Yellow South (South of Highway 11/17) merges with the Red (Southerly Route) just beyond Hunt Road.

Red (Southerly Route)

- Where the route diverges off of the existing Highway 17 north of Shabaqua Corners, the terrain consists of bedrock outcrops and layered cohesive and non-cohesive soils. Typically, bedrock and non-cohesive soils are anticipated to the west and within the Oskonodaga River watershed with a layered stratigraphy comprising both cohesive and non-cohesive soils to east of the Oskonodaga River watershed.
- The route crosses the existing Highway 11/17 just beyond Goldie Road and swampy terrain with associated wetland areas were noted along either side of Shabaqua Road.
- The route crosses a major hydro corridor at Shabaqua Road.
- The route crosses an existing sand and gravel pit (HCL - Hacquoil Construction Limited) about a kilometre east of the intersection of Highway 11/17 and Shabaqua Road. Cohesionless soil measuring some eight to ten metres in height was noted. Cohesive soil was also observed at the base of the currently excavated deposits and along the entrance road. (Photographs R1 and R2)
- As the alternate route proceeds east of the sand and gravel pit densely treed and hilly terrain was noted.
- Beyond the sand and gravel pit, vantage points to the route were inaccessible for some 18.5 km.
- Inferred from aerial photographs the route crosses a major hydro corridor again at approximately station 22+400.
- The route crosses Mokomon Road about 1.5 km east of the western road limit. A parallel running swamp and wetland area was noted some 250 m east of this point north of Mokomon Road. Rock outcrops were noted along Tienhaara Road near the hydro tower bases. (Photograph R3)



- The route continues to run parallel with the major hydro corridor from Mokomon Road to Hunt Road.
- Wetland and swampy areas were noted along Enders Road at the point where the hydro corridor crosses the road. Swampy areas were observed on both the west and east sides of Enders Road. Rock outcrops were also noted along Enders Road some 200 m south and 400 m north of this area. (Photograph R4)
- Exposed non-cohesive and cohesive soils were noted along Hunt Road, from Maxwell Road to Highway 11/17.
- Exposed rock outcrops and cohesionless soil deposits were noted within the Kam River basin. (Photograph R5)
- The Red Alternate Route will cross the major hydro corridor again at the eastern limit of Rydhom Road.
- After crossing the Kam River the route will cross the hydro dam corridor on the east side of the River.
- The Red Alternate Route will cross the major hydro corridor again at about 700 m west of Oliver Road.
- Open flat and rolling terrain is noted further east of the Kam River beyond Oliver Road, extending to the end of the alternate route at the intersection of Pebble Stone Road and Pole Line Road. A layered stratigraphy of cohesive and non-cohesive soils are anticipated. Land use is primarily agricultural.

Partial Route Green (Red 1a)

- From aerial photography, where the partial route diverges off of the Red Alternate Route, some 4 km west of Finmark Road, the partial route crosses a major hydro corridor and some localized sections of swampy and wetlands areas.
- A structure is anticipated where the route crosses the Shebandowan River. Non-cohesive sand and gravel deposits and bedrock outcrops were observed along both banks of the Shebandowan River at the proposed crossing. (Photograph G1)
- The route comes very close the CN rail line but does not actually cross it where the CN rail line and Glenwater Road intersect.
- A large wetland and swamp area was noted along the west side of Wolfe Road some 400 from the northwestern road limit. A rock outcrop was noted to the east within the densely forested area. (Photograph G2)
- A possible sand and gravel borrow pit was observed near the western limit of Oikonen Road. (Photograph G3)
- A cohesive soil slope failure was observed on the north side of Mokomon Road, just west of Highway 11/17, cut for the Mokomon Road alignment.
- The Partial Route Green (Red 1a) merges with the Red (Southerly Route) beyond Hunt Road.



Partial Route Dark Green (Red 1b)

- Where the partial route diverges off of the Partial Route Green (Red 1a), some 350 m northwest of the northwestern limit of Wolfe Road, the partial route traverses densely treed and hilly terrain. (Photograph DG1)
- Rock outcrops were noted north of, and along Mokomon Road within the open agricultural land use areas. Gently sloping terrain north and south of Mokomon Road was noted. (Photograph DG2)
- From aerial photography, the partial route crosses a major hydro corridor north of Holland Road West and some localized larger sections of swampy and wetlands areas exist to the south and north of Mokomon Road.
- The Partial Route Dark Green (Red 1b) merges with the Red (Southerly Route) about 1 km northwest of the intersection of Holland Road West and Maxwell Road.



PHOTOGRAPH B1: Looking west from the east side of Goldie Road, about 850 m north of Highway 11/17. The Blue Alternate Route crosses the Oskondaga River and the hydro corridor in background. Approximate station 2+700 - (October 26, 2009)



PHOTOGRAPH B2: Looking southeast from a southern pathway off of Finmark Road. This swamp and wetland is about 300 m north of the Blue Alternate Route. This area is fed from a stream and beaver dam which crosses the Blue Alternate Route connecting to another upstream swamp and wetland area some 20 m south of the route. Approximate station 12+400 (October 26, 2009)



PHOTOGRAPH B3: Looking west from the abandoned CN rail line, about 850 m east of Highway 11/17. The Blue Alternate Route crosses the abandoned CN rail line, the Shebandowan River, the CP rail lines and the CN rail line (not in photo). Approximate station 22+900 (October 27, 2009)



PHOTOGRAPH B4: Looking east from the south bank of the Shebandowan River, adjacent to the CP rail lines, about 850 m east of Highway 11/17. Outcropping bedrock noted in all directions with cuts for the southern CP and CN rail alignments. Approximate station 22+900 (October 27, 2009)



PHOTOGRAPH B5: Looking west from the south side of Highway 102, about 1.7 km east of Highway 11/17. Note the leaning hydro poles towards the north which indicates the possibility of soft soils. Approximate station 24+100 (October 27, 2009)



PHOTOGRAPH B6: Looking east over the Kam River from the west bank, about 300 m north of where the Brule Creek outlets into the Kam. Sand and gravel within the river basin, a slope failure noted in the background. Approximate station 29+250 (October 27, 2009)



PHOTOGRAPH P1: Looking northeast from Torrie Road, about 650 m north of Holland Road East. A large swamp area runs parallel with the Purple Partial Alternate Route at about 150 m to the east. Approximate station 34+300 (October 28, 2009)



PHOTOGRAPH P2: Looking north from within sand and gravel pit, about 400 m north of Hume Road and 450 m east of Torrie Road. Cohesive soils were noted at the base of this excavation. Approximate station 35+100 (October 28, 2009)



PHOTOGRAPH P3: Looking northeast across the Kam River from the northern limit of Airport Road. The Brown and Purple Partial Alternate Routes structures would be some 550 m northeast of this point. Gentle sloping river banks to the north and south. Approximate station 36+800 (October 28, 2009)



PHOTOGRAPH YN1: Looking northwest across a swamp, some 5 m north of the Highway 11/17. This swamp and wetland portion on the Yellow North alternate route is about 650 m in length and is on average about 75 m wide. Approximate station 9+500 (October 29, 2009)



PHOTOGRAPH YN2: Looking east/ southeast across a swamp, from the guardrail on the east side of Highway 11/17. This swamp and wetland portion on the Yellow North alternate route is about 900 m in length and is on average about 75 m wide. Approximate station 12+200 (October 26, 2009)



PHOTOGRAPH YN3: Looking southeast across Highway 11/17 at Sunshine. Sunshine Crossing in the foreground, with the CP rail and Highway 11/17 bridges shown. Sunshine Loop adjacent to the west of the 300 m rock cut in the background. Approximate station 20+400 (October 26, 2009)



PHOTOGRAPH YN4: Looking north from the east shoulder of Highway 11/17 about 350 m south of Wiljala Drive. This swamp and wetland portion on the Yellow North alternate route is about 200 m in length and connects to another 600 m long portion to the west of Highway 11/17. Approximate station 25+650 (October 27, 2009)



PHOTOGRAPH YN5: Looking southeast from the east shoulder of Highway 11/17 about 150 m north of Hunt Road. Flat terrain along the northwest portion of the Kam River shown. The CN rail bridge in the far background. Approximate station 35+900 (October 28, 2009)



PHOTOGRAPH 01: Looking northwest from the south side of Holland Road East. Bedrock ridges and outcrops noted along both sides of the road. Approximate station 33+750. (October 28, 2009)



PHOTOGRAPH 02: Looking southwest along the Kam River from the northern limit of Airport Road. The Orange Partial Alternate Route structure would be some 850 m west of this point. Steeply sloping exposed rock on the southern river bank. Approximate station 36+500 (October 28, 2009)



PHOTOGRAPH YS1: Looking northeast along the Oskondaga River from the east shoulder of the Highway 11/17 bridge. Cobbles and boulders noted within and along the banks of the Oskondaga River. Approximate station 7+900 (October 26, 2009)



PHOTOGRAPH YS2: Looking south/ southeast across a swamp, from the guardrail on the south side of Highway 11/17. This swamp and wetland portion on the Yellow South Alternate Route is about 300 m in length and is on average about 150 m wide. This swamp is adjacent to the Fourway Community School. Approximate station 18+500 (October 26, 2009)



PHOTOGRAPH YS3: Looking northeast from the east bank of the Shebandowan River. The Yellow South Alternate Route structure would be approximately at this point. Exposed rock was noted at various points along both sides of the river bank. Approximate station 21+250 (October 29, 2009)



PHOTOGRAPH YS4: Looking south from the south side of Wiljala Drive, about 150 m west of Highway 11/17. This swamp and wetland portion on the Yellow North and Yellow South Alternate Routes is about 600 m in length and about 100 m in width. Approximate station 27+500 (October 27, 2009)



PHOTOGRAPH YS5: Looking northwest from Mokomon Road, about 100 m west of Highway 11/17. A cohesive soil slope failure is shown. Note the upper fallen trees. Approximate station 31+750 (October 27, 2009)



PHOTOGRAPH YS6: Looking northwest from the west shoulder of Highway 11/17 about 900 m north of Lundstrom Road. Flat terrain with swamp and wetland areas are noted on both sides of the highway. This swamp and wetland portion on the Yellow South Alternate Route is about 800 m in length and about 250 m in width. Approximate station 34+000 (October 28, 2009)



PHOTOGRAPH R1: Looking southeast from the base of a hydro tower, about 100 m south of Highway 11/17 and 350 m east of Shabaqua Road. The HCL – Hacquoil Construction Limited gravel pit is in the far right background. Approximate station 9+300 (October 29, 2009)



PHOTOGRAPH R2: Looking southeast at the HCL – Hacquoil Construction Limited gravel pit. The Red Alternate Route is approximately 100 m beyond this point. Mr. M. Narduzzi standing to the left is on cohesive soils at the base of the pit. Approximate station 10+000 (October 29, 2009)



PHOTOGRAPH R3: Looking southeast from the east side of Tienhaara Road. The hydro corridor runs parallel with the road. Rock outcrops noted within the road and swamp and wetland areas are running parallel to the road at some 250 m east of the proposed route. Approximate station 27+500 (October 27, 2009)



PHOTOGRAPH R4: Looking west from the east side of Enders Road. The hydro corridor crosses the road at this point. Rock outcrops noted about 200 south on Enders Road. Large swamp and wetland areas extend to the west and east of this point on the proposed route. Approximate station 30+500 (October 27, 2009)



PHOTOGRAPH R5: Looking east from the west guardrail of Highway 11/17, about 80 m north of Pifer Road. The CN rail bridge and Kam River in the background. Approximate station 36+750 (October 28, 2009)



PHOTOGRAPH G1: Looking southeast from the south bank of the Shebandowan River. The Green Partial Alternate Route structure is approximately 350 m further southeast from this point. Exposed rock was noted at various points along both sides of the river bank. Approximate station 22+500 (October 29, 2009)



PHOTOGRAPH G2: Looking northwest from Wolfe Road. The Green Partial Alternate Route is about 190 m to the west. A large swamp and wetland area is noted to the west of Wolfe Road about 200 m in length and 100 m in width. The swamp extends to some 50 m east of the route. Approximate station 28+000 (October 27, 2006)



PHOTOGRAPH G3: Looking north from the western limit of Oikonen Road. Possible sand and gravel borrow pit shown in this photograph measuring some 100 m in length and 40 m in width. Approximate station 30+200 (October 27, 2009)



PHOTOGRAPH DG1: Looking southeast from the northwest limit of Wolfe Road. The open area shown here was possibly cleared for development. A single dwelling was noted further west. This area drains into swamp shown in Photograph G2. Approximate station 27+600 (October June 28, 2006)



PHOTOGRAPH DG2: Looking south from Mokomon Road, about 2.3 km west of Highway 11/17. Bedrock outcrops noted along Mokomon Road at this point with agricultural land use and gently sloping terrain. Approximate station 31+200 (October 27, 2009)