



**TABLE 1**  
**RECOMMENDED LOCATIONS FOR FOUNDATION INVESTIGATIONS**  
**STRUCTURES AND CULVERTS**  
**PREFERRED INTERCHANGE LOCATION**

<b>PROPOSED WORKS</b>	<b>STATIONS</b>
<b>Highway 11 (Mainline)</b>	
Interchange Underpass at Highway 11 NBL and SBL	Sta. 20+200
Lancelot (Bullen) Creek Culvert (Extensions)	Sta. 20+760
<b>Crossing Road</b>	
Culvert for Tributary of Lancelot (Bullen) Creek	Sta. 9+900
<b>East Service Road</b>	
Culvert for Tributary of Lancelot (Bullen) Creek	Sta. 9+600
<b>West Service Road / Highway 11 Ramp E/W-S</b>	
Culverts at Swamp Crossing (50 m long)	Sta. 9+650
<b>Highway 11 Ramp N-E/W</b>	
Culvert at swamp crossing	Sta. 20+320

**NOTE:** 1. Chainages may vary for northbound and southbound mainlines to be confirmed / refined during detailed design.



TABLE S-1– SOFT GROUND/SWAMPS

INTERCHANGE ALTERNATIVES		SOFT GROUND/SWAMPS DEPTHS AND FAVOURABILITY						WEIGHTED FAVOURABILITY VALUE(Ai)	
		L1	F1	L2	F2	L3	F3		
		Depth Range ( 0 - 3 m )		Depth Range ( 3 - 10 m )		Depth Range ( >10 m )			
1A	Interchange at Sta. 20+200 (Paclo A) (Blue)	50	5	790	3	80	1	2.93	A <sub>1</sub>
1B	Interchange at Sta. 20+300 (Note 1) (Dark Green)	40	5	310	3	320	1	2.16	A <sub>2</sub>
1C	Interchange at Sta. 20+200 (Diamond) (Purple)	–	5	630	3	140	1	2.64	A <sub>3</sub>
2A	Interchange at Sta. 21+780 (Paclo A) (Brown)	–	5	1840	3	3255	1	1.72	A <sub>4</sub>
2B	Interchange at Sta. 21+780 (Paclo B) (Red)	–	5	90	3	3425	1	1.05	A <sub>5</sub>
2C	Interchange at Sta. 21+780 (Diamond) (Green)	–	5	120	3	1600	1	1.14	A <sub>6</sub>
3A	1992 Recommended Plan	–	5	220	3	4020	1	1.10	A <sub>7</sub>

NOTES: Embankment lengths (L1, L2, L3) measured at ramps and approach fills

Enter weighted favourability value A<sub>i</sub> in Table S-7.

Note 1: Includes underpass at Sta. 21+420 (Allensville Road and Rowanwood Road Interchange).



TABLE S-2– GROUNDWATER CONDITIONS

INTERCHANGE ALTERNATIVES		GROUNDWATER DEPTHS AND FAVOURABILITY						WEIGHTED FAVOURABILITY VALUE(Ai)	
		L1	F1	L2	F2	L3	F3		
		Depth Range ( >5m )		Depth Range ( 1 - 5m )		Depth Range ( 0 -1 m )			
1A	Interchange at Sta. 20+200 (Paclo A) (Blue)	3915	5	2600	3	920	1	3.81	A <sub>1</sub>
1B	Interchange at Sta. 20+300 (Note 1) (Dark Green)	1740	5	1765	3	670	1	3.51	A <sub>2</sub>
1C	Interchange at Sta. 20+200 (Diamond) (Purple)	2435	5	2625	3	770	1	3.57	A <sub>3</sub>
2A	Interchange at Sta. 21+780 (Paclo A) (Brown)	530	5	630	3	5095	1	1.54	A <sub>4</sub>
2B	Interchange at Sta. 21+780 (Paclo B) (Red)	480	5	1500	3	3515	1	1.90	A <sub>5</sub>
2C	Interchange at Sta. 21+780 (Diamond) (Green)	530	5	2495	3	1720	1	2.50	A <sub>6</sub>
3A	1992 Recommended Plan	1080	5	—	3	4240	1	1.81	A <sub>7</sub>

NOTES: Enter weighted favourability value A<sub>i</sub> in Table S-7.

Note 1: Includes underpass at Sta. 21+420 (Allensville Road and Rowanwood Road Interchange).



TABLE S-3– STRUCTURE FOUNDATIONS

INTERCHANGE ALTERNATIVES		CONTEMPLATED STRUCTURE/INTERCHANGE SITE												WEIGHTED FAVOURABILITY VALUE(Ai)	
		Highway 11 Underpass At Sta. 20+200		Highway 11 Underpass At Sta. 20+300		Highway 11 Underpass At Sta. 21+420		Highway 11 Structure At Sta. 20+780		Lancelot (Bullen) Creek Bridge At Sta. 10+400 (*) Sta.10+550 (**)		Lancelot (Bullen) Creek Bridge At Sta. 9+400 <sup>(1)</sup> Sta.10+550 <sup>(11)</sup>			
		Type	F1	Type	F2	Type	F3	Type	F4	Type	F5	Type	F6		
1A	Interchange at Sta. 20+200 (Paclo A) (Blue)	A	5	–	–	–	–	–	–	A	5	–	–	5.00	A <sub>1</sub>
1B	Interchange at Sta. 20+300 (Note 1) (Dark Green)	–	–	A	5	B	4	–	–	–	–	–	–	4.50	A <sub>2</sub>
1C	Interchange at Sta. 20+200 (Diamond) (Purple)	A	5	–	–	–	–	–	–	A	5	–	–	5.00	A <sub>3</sub>
2A	Interchange at Sta. 21+780 (Paclo A) (Brown)	–	–	–	–	–	–	B	4	–	–	B	4	4.00	A <sub>4</sub>
2B	Interchange at Sta. 21+780 (Paclo B) (Red)	–	–	–	–	–	–	B	4	–	–	–	–	4.00	A <sub>5</sub>
2C	Interchange at Sta. 21+780 (Diamond) (Green)	–	–	–	–	–	–	B	4	–	–	B	4	4.00	A <sub>6</sub>
3A	1992 Recommended Plan	–	–	–	–	–	–	–	–	–	–	B	4	4.00	A <sub>7</sub>

NOTES: Enter weighted favourability value Ai in Table S-7.

A: Shallow Foundation, F = 5

B: Deep Foundation: Integral Abutments, F = 4; Others, F=3

Note 1: Includes underpass at Sta. 21+420 (Allensville Road and Rowanwood Road Interchange).

(\*) New Alternate 1A West Service Road Chainage (\*\*) New Alternate 1C West Service Road Chainage

<sup>(1)</sup> New Alternate 2C East Side Road Chainage <sup>(11)</sup> New Alternate 2A East Side Road Chainage





**TABLE S-4– EMBANKMENT SETTLEMENT**

INTERCHANGE ALTERNATIVES		SUBSOIL TYPE AND FAVOURABILITY FACTOR						WEIGHTED FAVOURABILITY VALUE(Ai)	
		Less than 3 m Deep		3-10 m Deep		Deeper than 10 m			
		L1	L2	L3	L4	L5	L6		
		Silty/Sandy (F1=5)	Clayey (F2 =4)	Silty/Sandy (F3=4)	Clayey (F4 =3)	Silty/Sandy (F5=2)	Clayey (F6 =1)		
1A	Interchange at Sta. 20+200 (Paclo A) (Blue)	3735	–	2780	840	–	80	4.36	A <sub>1</sub>
1B	Interchange at Sta. 20+300 (Note 1) (Dark Green)	1740	40	1765	310	–	320	4.11	A <sub>2</sub>
1C	Interchange at Sta. 20+200 (Diamond) (Purple)	2435	–	2625	630	–	140	4.24	A <sub>3</sub>
2A	Interchange at Sta. 21+780 (Paclo A) (Brown)	530	–	430	1840	200	3255	2.17	A <sub>4</sub>
2B	Interchange at Sta. 21+780 (Paclo B) (Red)	480	–	600	90	900	3425	1.87	A <sub>5</sub>
2C	Interchange at Sta. 21+780 (Diamond) (Green)	530	–	95	120	2350	1650	2.05	A <sub>6</sub>
3A	1992 Recommended Plan	1080	–	–	220	–	4020	1.89	A <sub>7</sub>

NOTE: Enter weighted favourability value A<sub>i</sub> in Table S-7.

Note 1: Includes underpass at Sta. 21+420 (Allensville Road and Rowanwood Road Interchange).



TABLE S-5– EMBANKMENT STABILITY

INTERCHANGE ALTERNATIVES		EMBANKMENT REQUIRING SPECIAL OR CONVENTIONAL DESIGN				WEIGHTED FAVOURABILITY VALUE(A <sub>i</sub> )	
		L1	L2	L3	L4		
		Conventional Embankment (F1 = 5)	Embankment Requiring Subexcavation (F2 = 3)	Embankment Requiring Toe- Stabilizing Berms (F3 = 2)	Embankment Requiring pre- loading/ Wick Drains (F4 = 1)		
1A	Interchange at Sta. 20+200 (Paclo A) (Blue)	6515	920	–	–	<b>4.75</b>	A <sub>1</sub>
1B	Interchange at Sta. 20+300 (Note 1) (Dark Green)	3505	470	–	200	<b>4.58</b>	A <sub>2</sub>
1C	Interchange at Sta. 20+200 (Diamond) (Purple)	5060	630	–	140	<b>4.69</b>	A <sub>3</sub>
2A	Interchange at Sta. 21+780 (Paclo A) (Brown)	1160	1840	1715	1540	<b>2.60</b>	A <sub>4</sub>
2B	Interchange at Sta. 21+780 (Paclo B) (Red)	1980	90	1395	2030	<b>2.73</b>	A <sub>5</sub>
2C	Interchange at Sta. 21+780 (Diamond) (Green)	3025	120	500	1100	<b>3.71</b>	A <sub>6</sub>
3A	1992 Recommended Plan	1080	220	1900	2120	<b>2.25</b>	A <sub>7</sub>

NOTE: Enter weighted favourability value A<sub>i</sub> in Table S-7.

Note 1: Includes underpass at Sta. 21+420 (Allensville Road and Rowanwood Road Interchange).

TABLE S-6– CONSTRUCTION FEASIBILITY

INTERCHANGE ALTERNATIVES		REQUIRED NUMBER OF STRUCTURES								WEIGHTED FAVOURABILITY VALUE(Ai)	
		Bridges						Major Culverts			
		Highway 11 Underpass At Sta. 20+200 (F=5)	Highway 11 Underpass At Sta. 20+300 (F=5)	Highway 11 Underpass At Sta. 21+420 (F=4)	Highway 11 Underpass At Sta. 21+780 (F=4)	Lancelot (Bullen) Creek Bridge At West Service Road (F=5)	Lancelot (Bullen) Creek Bridge At East Side Road (F=4)	To be Constructed (F=4)	To be Extended (F=5)		
1A	Interchange at Sta. 20+200 (Paclo A) (Blue)	1	–	–	–	1	–	–	1	5.00	A <sub>1</sub>
1B	Interchange at Sta. 20+300 (Note 1) (Dark Green)	–	1	1	–	–	–	–	1	4.67	A <sub>2</sub>
1C	Interchange at Sta. 20+200 (Diamond) (Purple)	1	–	–	–	1	–	–	1	5.00	A <sub>3</sub>
2A	Interchange at Sta. 21+780 (Paclo A) (Brown)	–	–	–	1	–	1	–	1	4.33	A <sub>4</sub>
2B	Interchange at Sta. 21+780 (Paclo B) (Red)	–	–	–	1	–	–	–	1	4.50	A <sub>5</sub>
2C	Interchange at Sta. 21+780 (Diamond) (Green)	–	–	–	1	–	1	–	1	4.33	A <sub>6</sub>
3A	1992 Recommended Plan	–	–	–	–	–	1	–	1	4.50	A <sub>7</sub>

NOTES: Enter weighted favourability value A<sub>i</sub> in Table S-7.

Embankment construction considered not applicable for this Table on this project.

Bridge Foundations Favourability: Shallow F=5 and Deep F=4; Culvert Favourability: New F=4; Extension F=5

Note 1: Includes underpass at Sta. 21+420 (Allensville Road and Rowanwood Road Interchange).



**TABLE S-7 – SCORING OF FOUNDATION CRITERIA (INTERCHANGES)**

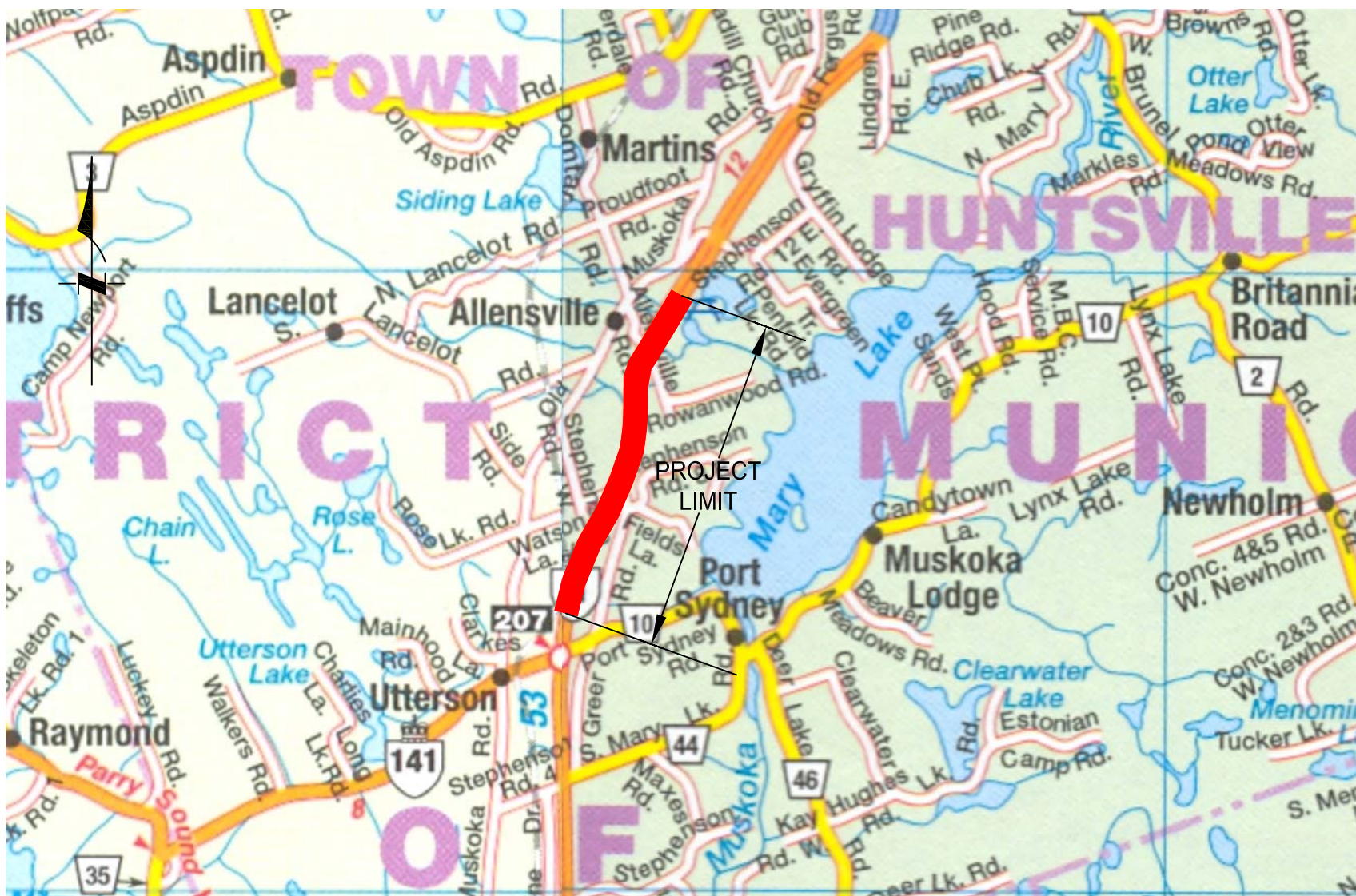
EVALUATION CRITERIA		SOFT GROUND/ SWAMPS		GROUNDWATER CONDITIONS		STRUCTURE FOUNDATIONS		EMBANKMENT SETTLEMENT		EMBANKMENT STABILITY		CONSTRUCTION FEASIBILITY		SCORE	RANKING
TABLE No.		S1		S2		S3		S4		S5		S6			
IMPACT WEIGHT, Bi		0.10		0.15		0.25		0.20		0.20		0.10			
INTERCHANGE ALTERNATIVES		Ai	Ni	Ai	Ni	Ai	Ni	Ai	Ni	Ai	Ni	Ai	Ni		
1A	Interchange at Sta. 20+200 (Paclo A) (Blue)	2.93	1.00	3.81	1.00	5.00	1.00	4.36	1.00	4.75	1.00	5.00	1.00	5.00	1
1B	Interchange at Sta. 20+300 (Note 1) (Dark Green)	2.16	0.74	3.51	0.92	4.50	0.90	4.11	0.94	4.58	0.96	4.67	0.93	4.56	3
1C	Interchange at Sta. 20+200 (Diamond) (Purple)	2.64	0.90	3.57	0.94	5.00	1.00	4.24	0.97	4.69	0.99	5.00	1.00	4.86	2
2A	Interchange at Sta. 21+780 (Paclo A) (Brown)	1.72	0.59	1.54	0.40	4.00	0.80	2.17	0.50	2.60	0.55	4.33	0.87	3.08	5
2B	Interchange at Sta. 21+780 (Paclo B) (Red)	1.05	0.36	1.90	0.50	4.00	0.80	1.87	0.43	2.73	0.57	4.50	0.90	3.01	6
2C	Interchange at Sta. 21+780 (Diamond) (Green)	1.14	0.39	2.50	0.66	4.00	0.80	2.05	0.47	3.71	0.78	4.33	0.87	3.37	4
3A	1992 Recommended Plan	1.10	0.38	1.81	0.48	4.00	0.80	1.89	0.43	2.25	0.47	4.50	0.90	2.90	7

NOTES: Enter weighted favourability value Ai in Table S-7.

Ai - Weighted Favourability Value

Ni - Normalized Favourability Value

Note 1: Includes underpass at Sta. 21+420 (Allensville Road and Rowanwood Road Interchange).



REFERENCE: THIS FIGURE WAS REPRODUCED FROM ONTARIO ROAD ATLAS – 2006 BY MAPART PUBLISHING CORP.

GEOCREs No.: 31E-296

## PROJECT LOCATION MAP

METRIC



Ontario

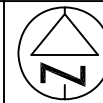


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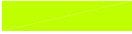




**HIGHWAY 11**  
Highway 11 Between Highway 141  
and Allensville Road  
G.W.P. 320 - 00 - 00



FIGURE

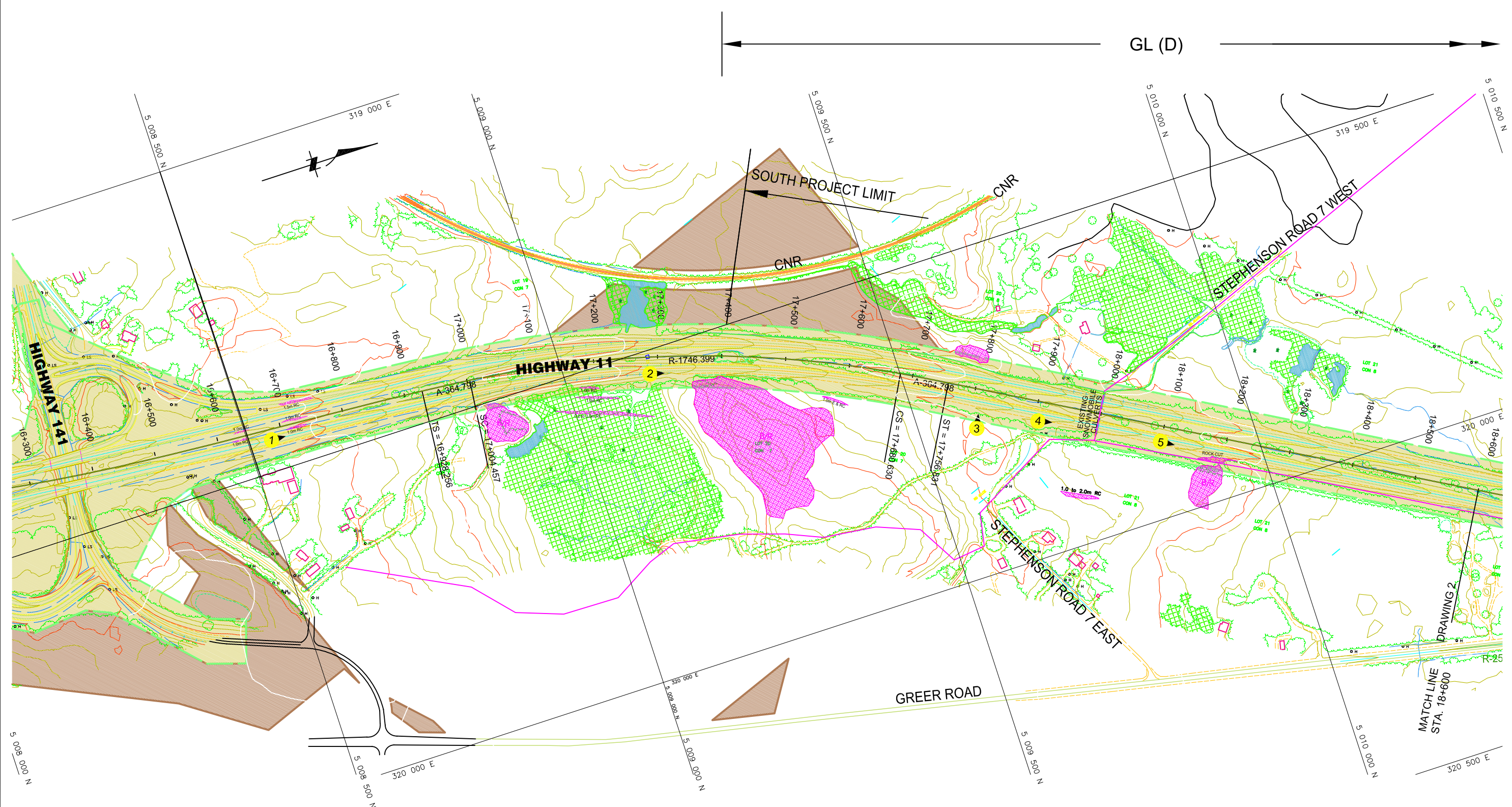
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<p><b>NOTES:</b></p> <p>1. BEDROCK OUTCROPS SHOWN ON PLAN ARE BASED ON EXISTING CONSTRUCTION DATA, SITE RECONNAISSANCE AND AERIAL PHOTOGRAPHS. THE SYMBOLS ON THE PLANS INDICATE THE LOCAL PRESENCE OF THE BEDROCK UNIT AND DO NOT REPRESENT THE FULL EXTENT OF EACH ROCK OUTCROP.</p> <p>2. THE EXTENT OF SWAMPS, WATER BODIES AND FILL AREAS IS AS INTERPRETED FROM SITE RECONNAISSANCE AND AERIAL PHOTOGRAPHS. THE AREAS EXTENT SHOWN ON THE PLANS REPRESENT ESTIMATES ONLY AND ACTUAL AREAS MAY VARY FROM THOSE SHOWN.</p> <p>3. ESTIMATED DEPTH TO COMPETENT GROUND AND OR BEDROCK IN SWAMPS IS BASED ON GEOLOGICAL EVIDENCE, DESKTOP LITERATURE SEARCH DATA AND LIMITED SITE RECONNAISSANCE INFORMATION AND MAY VARY SUBSTANTIALLY WITHIN THE LIMITS OF THE SWAMP.</p> <p>4. THE GEOLOGIC UNIT SYMBOLS SHOWN ON THE PLANS REPRODUCE THOSE SHOWN ON GEOLOGIC MAPPING OF THE AREA AND ARE ONLY A GENERAL REPRESENTATION OF BEDROCK AND SOIL UNITS.</p> <p>5. THE PLANS ARE AN ENCLOSURE TO THE ALTERNATE INTERCHANGE LOCATION SELECTION STUDY PREPARED BY PETO MACCALLUM LTD. THE DATA ON THESE PLANS MUST BE READ IN CONJUNCTION WITH THE REPORT.</p> <p>6. THE DETAIL SHOWN ON THE PLAN IS CONSIDERED APPROPRIATE FOR ALTERNATE INTERCHANGE LOCATION SELECTION PURPOSES. WHEN THE PREFERRED INTERCHANGE LOCATION HAS BEEN SELECTED, A SUBSURFACE INVESTIGATION SHOULD BE UNDERTAKEN TO DELINEATE THE STRATIGRAPHIC CONDITIONS ON A SITE SPECIFIC BASIS FOR PRELIMINARY AND DETAILED DESIGN PURPOSES.</p>	<p><b>LEGEND:</b></p> <div><div> HIGHWAY 11 (EXISTING)</div><div> ALTERNATE 1A</div><div> ALTERNATE 1B</div><div> ALTERNATE 1C</div><div> ALTERNATE 2A</div><div> ALTERNATE 2B</div><div> ALTERNATE 2C</div></div> <div><div> BEDROCK OUTCROP (R O/C)</div><div> SOFT GROUND / SWAMP</div><div> ANTICIPATED DEPTH (metres) TO COMPETENT MATERIAL/BEDROCK</div><div> WATER BODY</div><div><div>GL (D)</div><div>GLACIOLACUSTRINE (DELTA)</div></div><div><div>GL (P)</div><div>GLACIOLACUSTRINE (PLAIN)</div></div><div><div>BR (R)</div><div>BEDROCK (RIDGES)</div></div><div><div>BR (N)</div><div>BEDROCK (KNOBS)</div></div><div><div> PHOTOGRAPH NUMBER (ARROW SHOWS DIRECTION OF VIEW)</div></div></div>
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GEOCRES No.: 31E-296





GL (D)

GEOCRES No.: 31E-296

**LEGEND:**

- |  |                   |  |              |
|--|-------------------|--|--------------|
|  | HWY 11 (EXISTING) |  | ALTERNATE 2A |
|  | ALTERNATE 1A      |  | ALTERNATE 2B |
|  | ALTERNATE 1B      |  | ALTERNATE 2C |
|  | ALTERNATE 1C      |  |              |

HIGHWAY 11 - STA. 16+200 TO 18+600

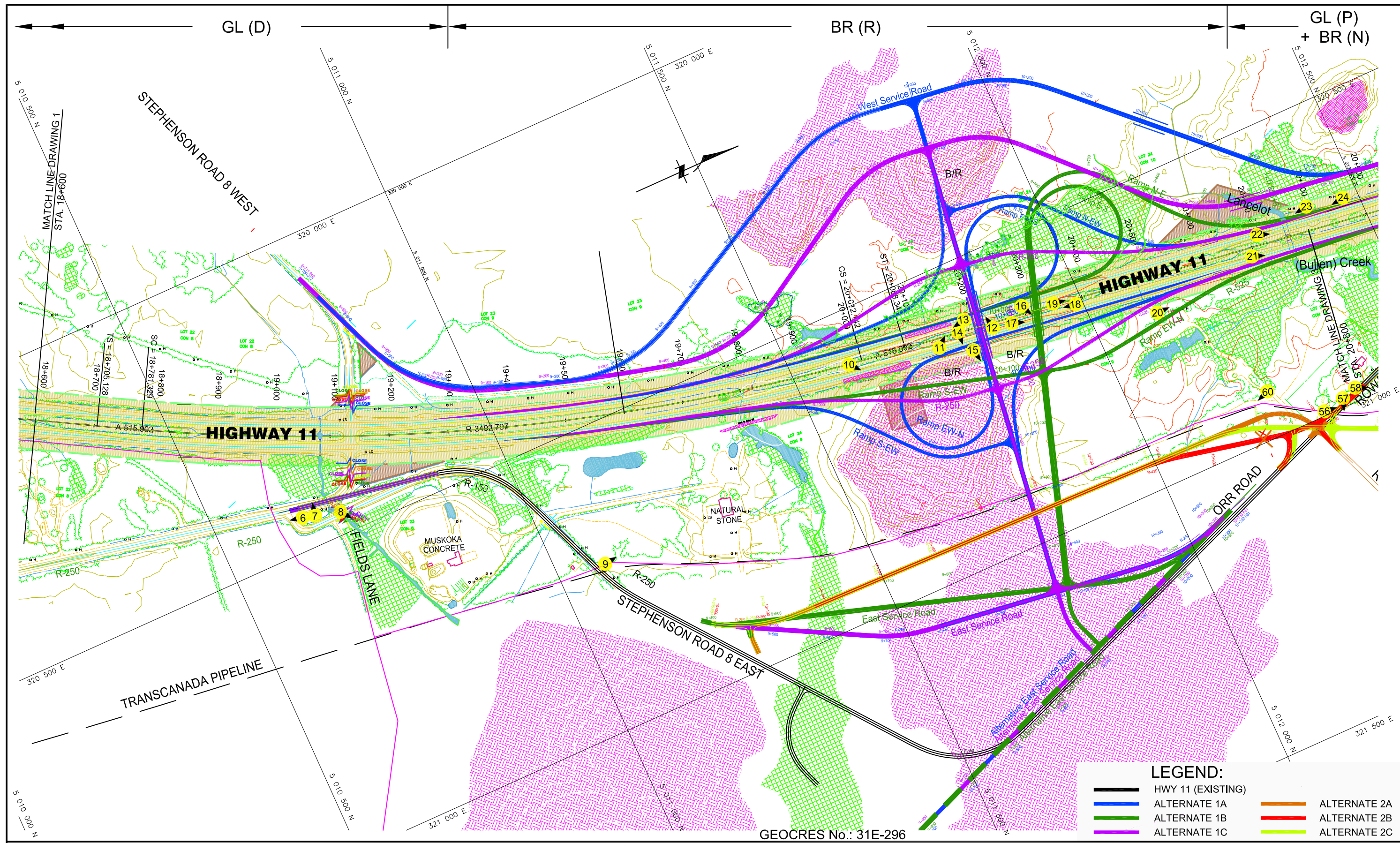
PLAN  
SCALE



METRIC

 <b>Peto MacCallum Ltd.</b> CONSULTING ENGINEERS	<b>Stantec Consulting Ltd.</b>	 DRAWING 1
	<b>HIGHWAY 11</b> HIGHWAY 11 BETWEEN HIGHWAY 141 AND ALLENSVILLE ROAD GWP No. 320-00-00	





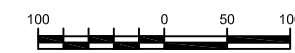
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	HWY 11 (EXISTING)		ALTERNATE 2A
	ALTERNATE 1A		ALTERNATE 2B
	ALTERNATE 1B		ALTERNATE 2C
	ALTERNATE 1C		

GEOCRES No.: 31E-296

HIGHWAY 11 - STA. 18+600 TO 20+800

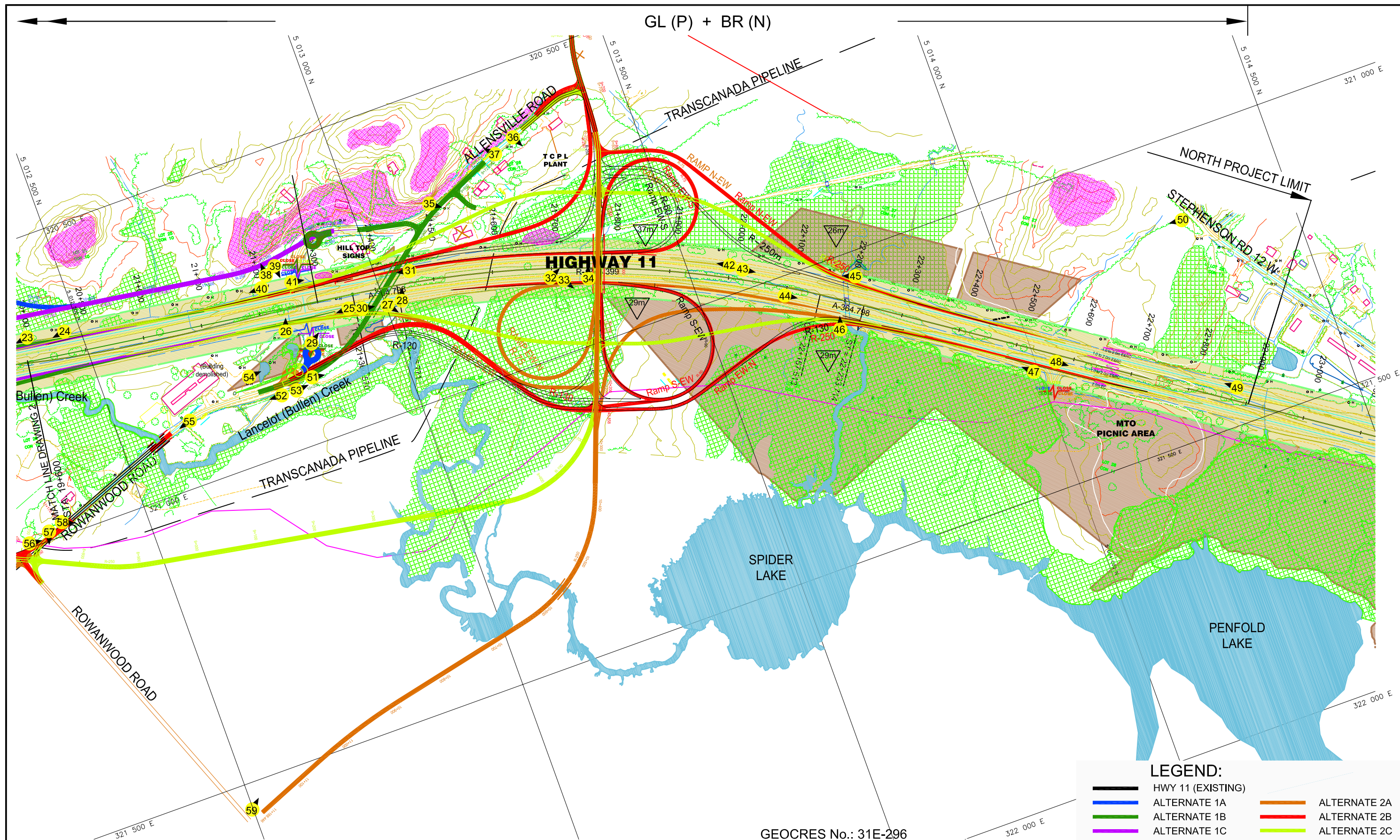
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METRIC

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	<b>HIGHWAY 11</b> HIGHWAY 11 BETWEEN HIGHWAY 141 AND ALLENSVILLE ROAD <b>GWP No. 320-00-00</b>	





HIGHWAY 11 - STA. 20+800 TO 22+900

GEOCREs No.: 31E-296

PLAN  
SCALE



LEGEND:			
	HWY 11 (EXISTING)		ALTERNATE 2A
	ALTERNATE 1A		ALTERNATE 2B
	ALTERNATE 1B		ALTERNATE 2C
	ALTERNATE 1C		

METRIC

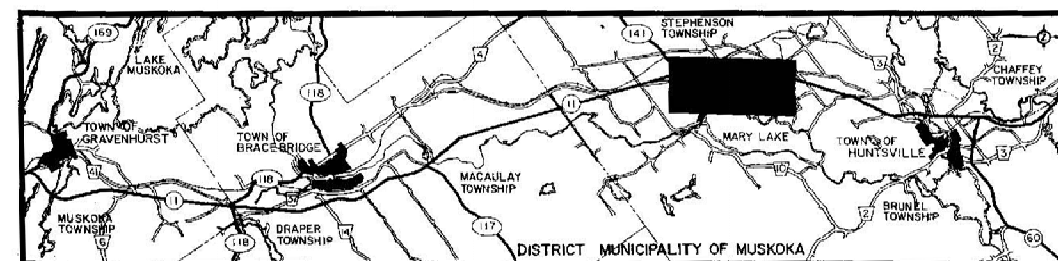
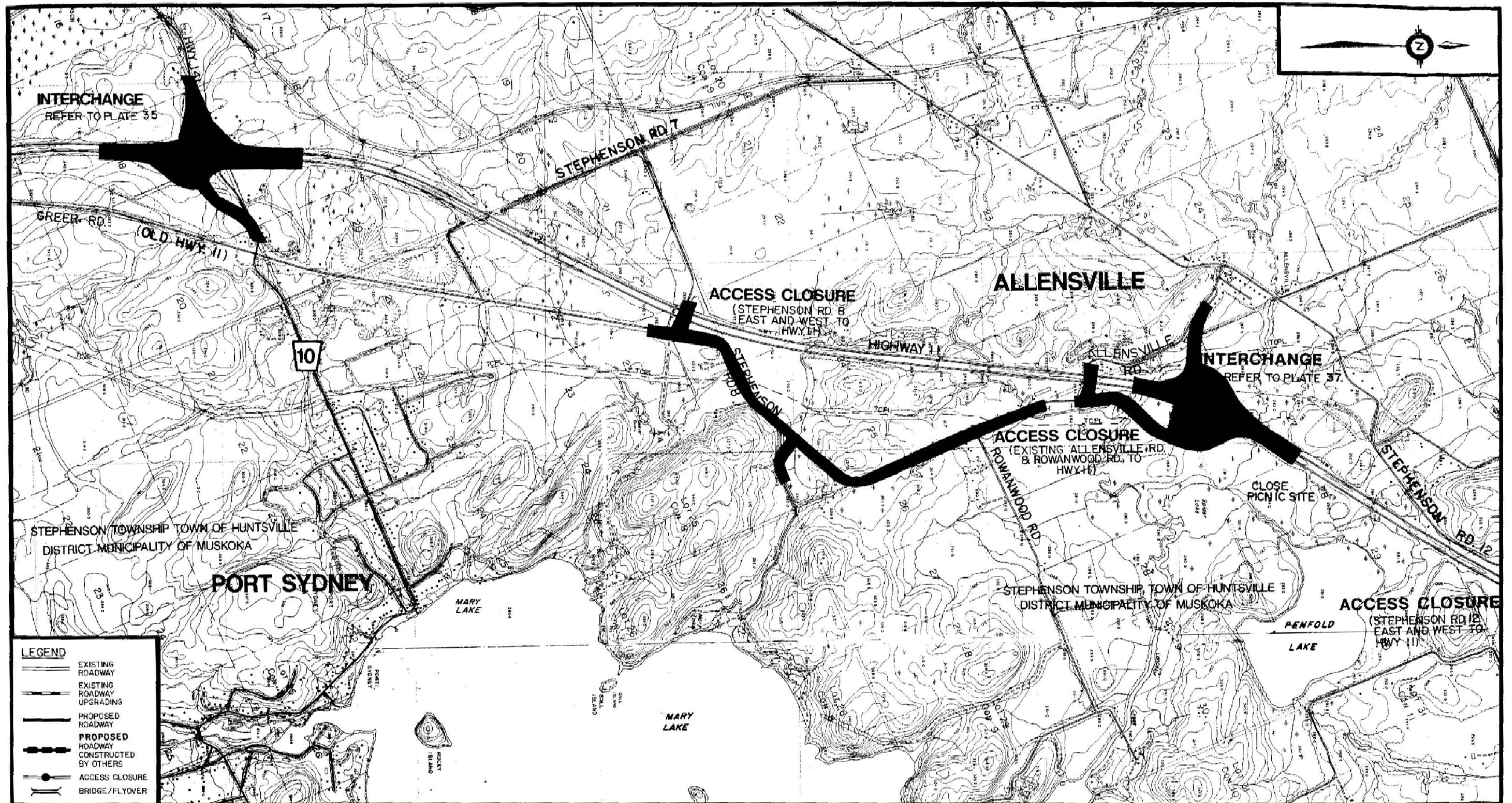


**HIGHWAY 11**  
HIGHWAY 11 BETWEEN HIGHWAY 141  
AND ALLENSVILLE ROAD  
GWP No. 320-00-00



DRAWING  
3





## RECOMMENDED NETWORK

FROM HIGHWAY 141 TO ALLENSTVILLE RD.

PLATE  
7

SCALE  
300 200 100 0 100 200 300

NOTE:

THIS DRAWING WAS REPRODUCED FROM THE "Highway 11: Preliminary Design Study for the Ultimate Freeway Design" REPORT W.P. 347-87-00

GEOCRES No.: 31E-296

1992 - RECOMMENDED PLAN



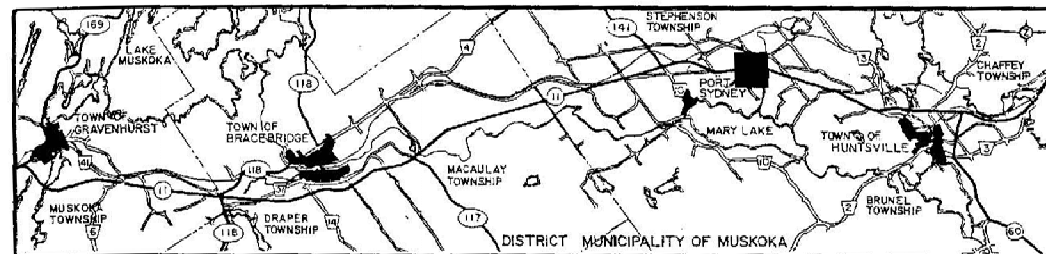
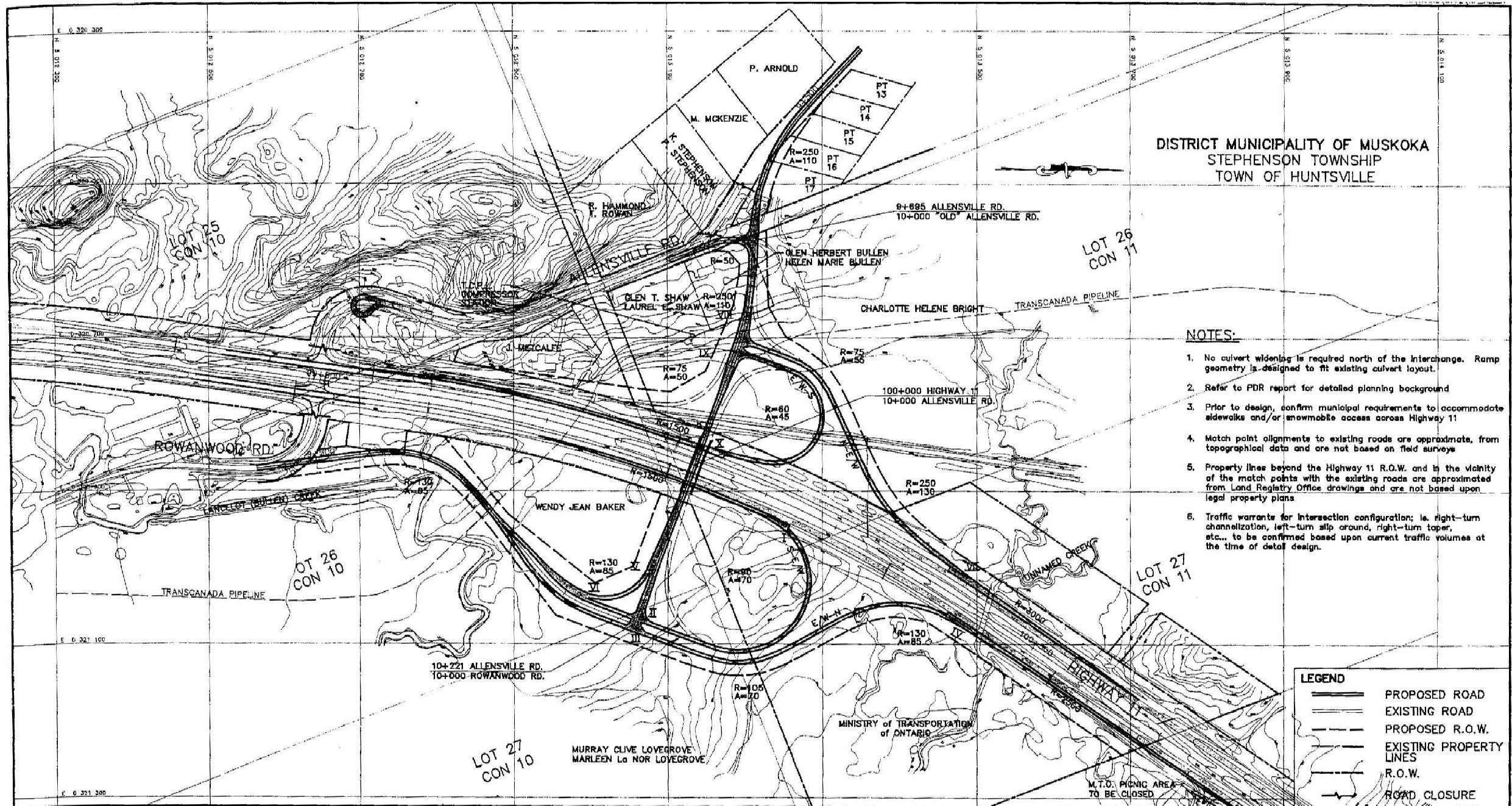
**HIGHWAY 11**  
HIGHWAY 11 BETWEEN HIGHWAY 141  
AND ALLENSTVILLE ROAD  
GWP No. 320-00-00



DRAWING  
4

METRIC





## RECOMMENDED CONFIGURATION

### ALLENSVILLE RD./ROWANWOOD RD. INTERCHANGE

PLATE

**37**

SCALE



**NOTE:**

THIS DRAWING WAS REPRODUCED FROM THE "Highway 11: Preliminary Design Study for the Ultimate Freeway Design" REPORT W.P. 347-87-00

GEOCRES No.: 31E-296

1992 - RECOMMENDED PLAN

METRIC



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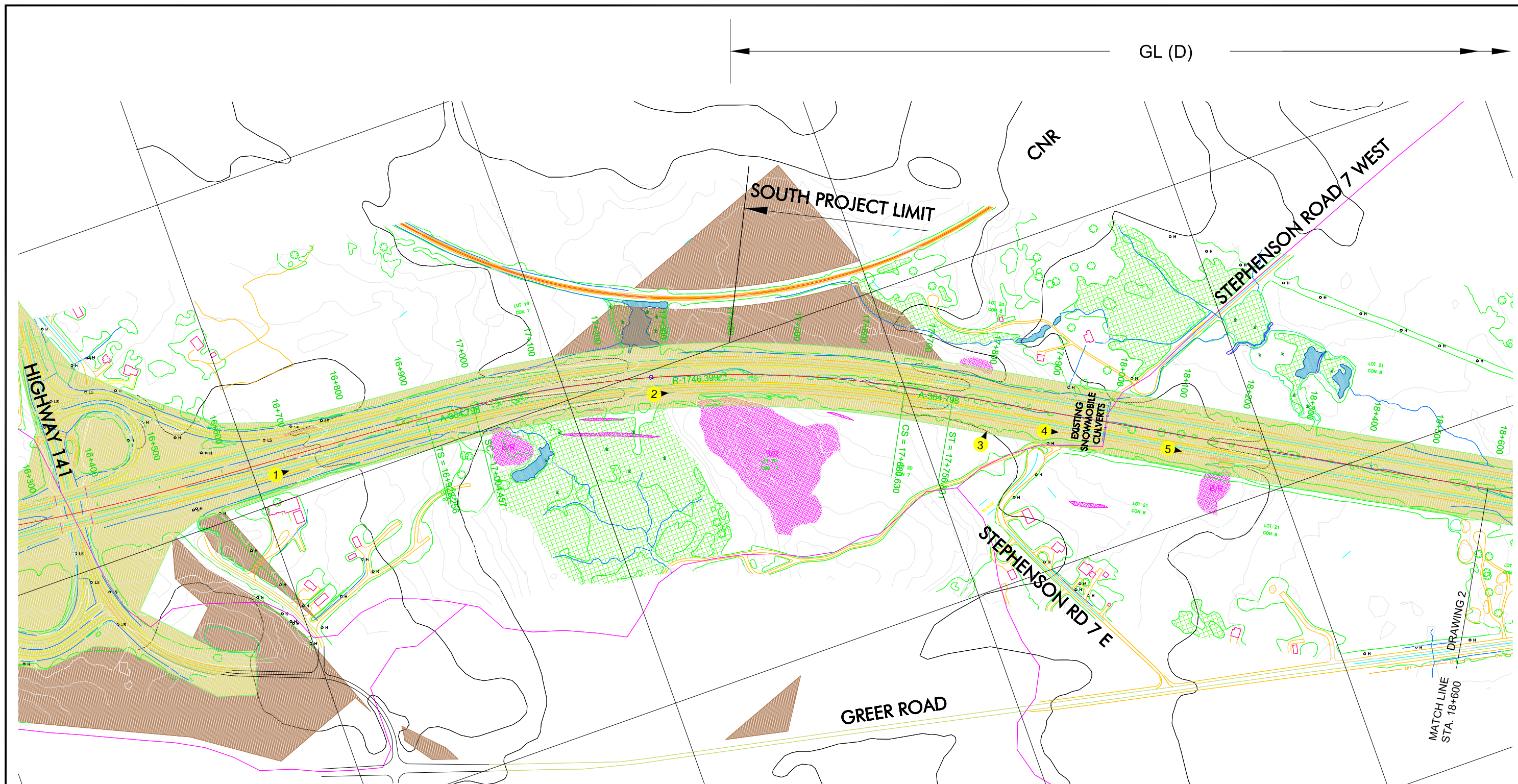


**HIGHWAY 11**  
HIGHWAY 11 BETWEEN HIGHWAY 141  
AND ALLENSVILLE ROAD  
GWP No. 320-00-00



DRAWING  
**5**

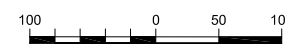




GEOCRES No.: 31E-296

HIGHWAY 11 - STA. 16+200 TO 18+600

RECOMMENDED PLAN  
SCALE



METRIC



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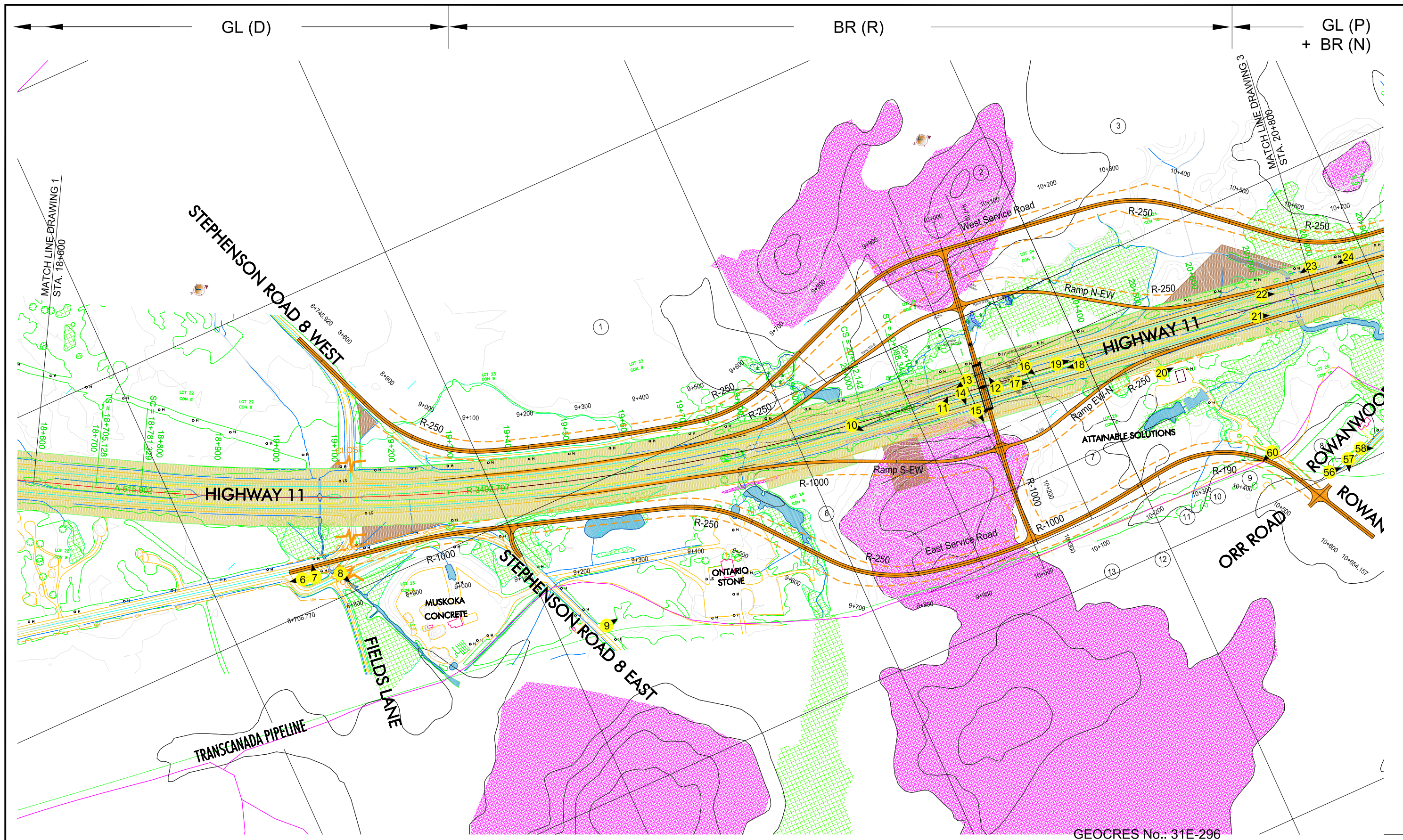
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**HIGHWAY 11**  
HIGHWAY 11 BETWEEN HIGHWAY 141  
AND ALLENSVILLE ROAD  
GWP No. 320-00-00



DRAWING  
6





GEOCRES No.: 31E-296

HIGHWAY 11 - STA. 18+600 TO 20+800

RECOMMENDED PLAN  
SCALE



METRIC



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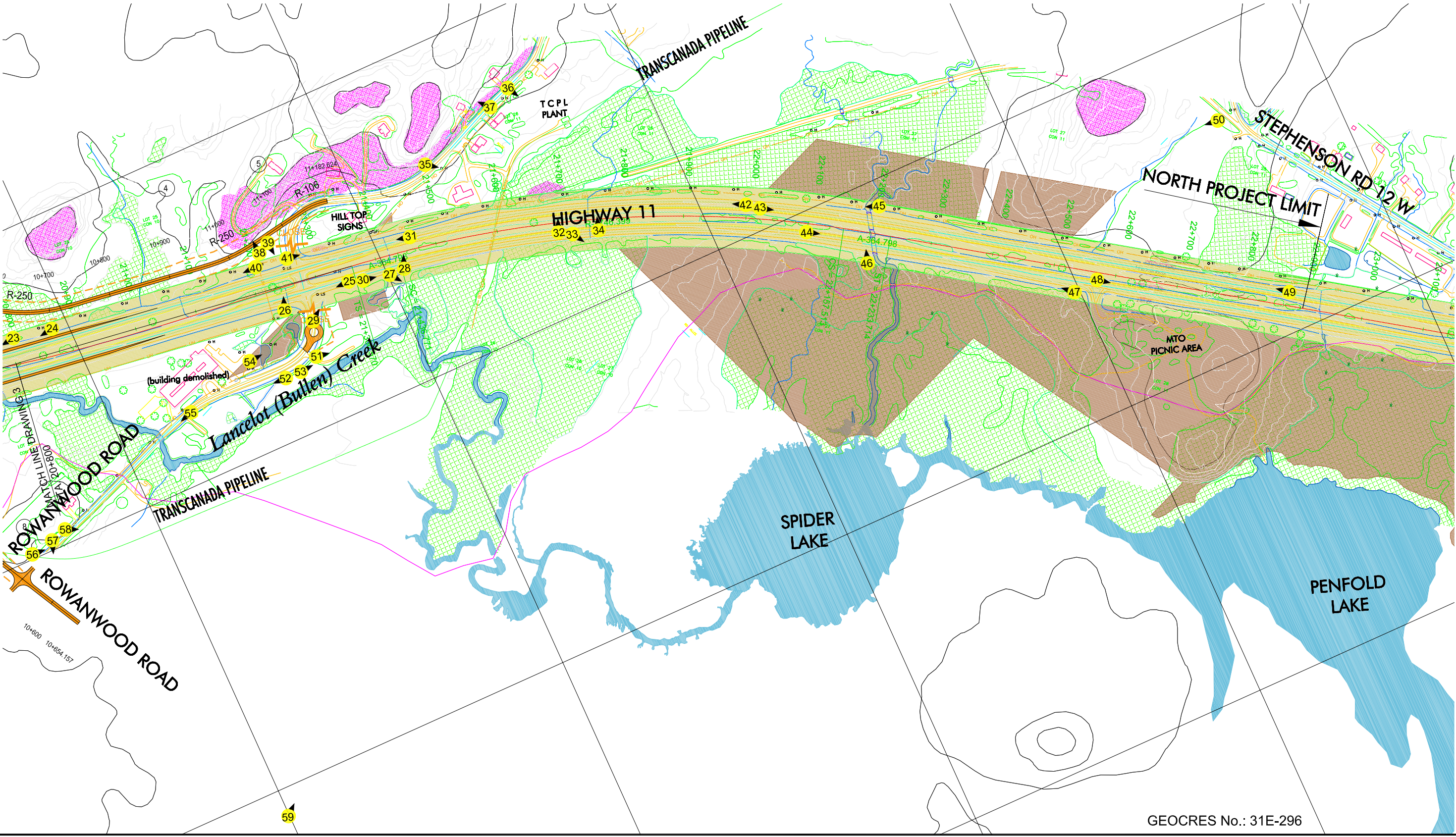
**HIGHWAY 11**  
HIGHWAY 11 BETWEEN HIGHWAY 141  
AND ALLENSVILLE ROAD  
GWP No. 320-00-00



DRAWING  
7



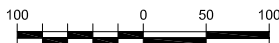
GL (P) + BR (N)



GEOCRES No.: 31E-296

HIGHWAY 11 - STA. 20+800 TO 22+900

RECOMMENDED PLAN  
SCALE



METRIC

 <b>Peto MacCallum Ltd.</b> CONSULTING ENGINEERS	Stantec Consulting Ltd.	 DRAWING 8
	HIGHWAY 11 HIGHWAY 11 BETWEEN HIGHWAY 141 AND ALLENSVILLE ROAD GWP No. 320-00-00	





## **APPENDIX A**

### List of Reference Documents



## LIST OF REFERENCE DOCUMENTS

HIGHWAY 11 FROM 1.0 KM NORTH OF HIGHWAY 141  
NORTHERLY FOR 5.5 KM  
TOWN OF HUNTSVILLE  
TOWNSHIP OF STEPHENSON, ONTARIO  
GWP NO. 320-00-00

### A. Geological Maps

- Ontario Geological Survey 1991. Bedrock geology of Ontario, Southern sheet; Ontario Geological Survey, Map 2544 Scale 1:1 000 000.
- Ministry of Natural Resources, Sheet 1017630050100, dated 2003. Map base by Natural Resources Information Branch Air Photography 1986. Scale 1: 10 000.
- Ontario Geological Survey 1981. Southern Ontario Engineering Geology Terrain Study, Data Base Map, Muskoka, Map 5504, Scale 1:100 000.

### B. Physiography

- Ontario Geological Survey Map P. 2715, Physiography of Southern Ontario, Ontario Ministry of Natural Resources.

### C. MTO Documents

- Foundation Investigation Report for Interchange at Highway 11 near Allensville Road and Rowanwood Road, District 11, Huntsville, WP No. 341-87-00, GEOCREs No. 31E-107 dated October 1991.
- Foundation Investigation and Stability Analysis for the Embankment Approaches, Sta. 23+000 to 31+000, Huntsville By-Pass, Highway 11, District 11, W.J. 61-F-100, GEOCREs No. 31E-25.
- Piezometer Installation and Stability Analysis, C.N.R. Overpass - Sta. 29+00, Huntsville By-Pass, W.P. 617-56, GEOCREs No. 31E-26, dated January 1958.
- Plates No. 557-1/25-0 to 42-0 for W.P. No. 62-86-00 and W.P. No. 346-91-00.

### D. Well Records (See Appendix B)

- Water Well Records from Ontario Northern Area provided by the Ministry of the Environment from 1946 - 1969 (32 wells).

### E. Air Photo

- Photo mosaic of oblique colored aerial photographs taken along the study corridor provided by Stantec Consulting Ltd.
- Aerial photographs 87-4509, 21-083 and 21-084.
- Aerial photographs 87-4510, 21-066 and 21-067.
- Aerial photographs 87-4511, 21-040 and 21-041.





## **APPENDIX B**

MOE Well Records



MUSKOGA DISTRICT 42

MUNICIPALITY CONCESSION ETC	LGT	WELL NO	LTH EASTING NORTHING	ELEV FEET	DATE	GRILLER	CSG INS	KIND OF WATER	STAT FEET	PUMP LVL	TEST RATE GPM	TEST TIME HR/MN	WATER USE	CHNER/LOG DEPTHS IN FEET TO WHICH FORMATIONS EXTEND	
MUNTSVILLE TOWN (STEPHENSON)															
CCN	1	25	417	437120	1000	04/67	1102	2	FR	102	6	16	6	2/00 DO	HOGG C
				5003570											BLDR GRVL 0012 GRNT 0104
CCN	1	26	717	437400	1000	04/68	1102	2	FR	152	FLW	30		DO	MITIC B
				5003450											MSND 0012 GRNT 0153
CCN	2	22	418	439400	1050	10/64	2512	3	FR	157	10	150	2	1/00 PS	CAMP PIONEER
				5006125											MSND 0002 GRNT 0162
CCN	5	14	419	431180	1100	07/66	2512	3	FR	180		256		1/00 DO	JOINER G
				5006210											PRDG 0004 GRNT 0256
CCN	5	17	743	432550	1040	02/69	1102	2	FR	180	5	20	10	2/00 CO	SMITH B
				5005900											MSND 0028 GRNT 0190
CCN	6	11	644	425710	995	10/68	2512	3	FR	87	11	35	10	1/00 DO	WHITE LGANE
				5006460											RED TPCL BLDR 0007 GREY GRNT 0157
CCN	6	13	724	430320	995	02/68	1413	3	FR	39	8	18	14	3/00 IN	ONTARIO HYDRC
				5006930											MSND 0008 RED MSND 0039
CCN	6	15	420	431150	1000	06/63	1102	2	FR	42	5	5	4	2/00 CO	HLNT M
				5007400											MSND 0022 GRNT 0045
CCN	6	15	726	431360	1000	06/68	1102	2	FR	141	22	22	6	2/00 CO	HAIGHT G
				5007470											MSND BLDR 0015 GRNT 0142
CCN	6	24	421	434720	1000	11/65	1102	2	FR	370	57	65	8	CC	MCKENKIE G N
				5006700											GRNT 0371
CCN	6	25	424	434880	1000	08/59	2512	3		CRV					BROWN C
				5008675											GRVL MSND 0022 GRVL 0047
CCN	6	25	423	435150	1000	08/59	2802	2		14					KIPP K J
				5008525											RED GRNT 0005 GREY GRNT 0062
CCN	6	25	423	435170	1000	08/59	2802	2		CRV					KIPP K J
				5008450											RED GRNT 0005 GREY GRNT 0019
CCN	6	25	422	435170	1000	08/59	2802	2		9					KIPP K J
				5008400											RED GRNT 0005 GREY GRNT 0010
CCN	6	30	427	436450	950	07/56	2512	3	FR	95	68	98		1/30 DO	NEHILL J
				5009350											TPSL 0024 GREY GRNT 0098
CCN	6	22	428	437675	1000	05/49	1640	3		CRV					GENSBURG S
				5009550											HPAN BLDR 0033 GRNT 0073
CCN	7	15	458	431250	995	07/68	2512	3	FR	99	8	90	9	1/30 DO	CAN NAT RAILWAYS
				5007600											MSND 0002 RED GRNT 0102
CCN	7	16	723	431300	955	08/68	1102	2	FR	221			12	2/00	PATTERSON M
				5007650											TPSL 0002 GRNT 0222
CCN	7	17	739	421770	1100	05/68	2512	3	FR	65	14	120	4	1/00 DO	DNG
				5007850											CLAY BLDR 0005 GRNT 0120
CCN	7	20	425	432975	1025	06/59	2512	3	FR	50	45	47	3	5/00 CO	GRIMES S
				5008480											PRDG 0015 GRVL 0065
CCN	7	20	430	432975	1025	05/66	2512	3	FR	91	60	65	6	14/00 CO	GCCLEY J
				5008525											MSND 0091
CCN	7	24	431	424275	975	07/57	2512	3		CRV					WCCDCROFT J
				5009520											MSND 0018 GREY GRNT 0277
CCN	7	25	758	434550	990	10/68	2512	3		CRV					DENRICK
				5009600											PRDG 0005 GRNT 0048
CCN	9	24	433	433550	950	06/64	2512	3	FR	190	12	201		1/00 DO	HOWSE L
				5011310											CLAY 0050 Q5ND 0078 GRNT 0201
CCN	9	26	434	434200	1050	08/60	3118	6	FR	119	17	20	2	1/00 DO	BULLEN U
				5011550											BLUE CLAY 0010 GRNT 0120
CCN	12	27	435	433760	950	05/58	2512	3	FR	200	30	104		2/00 ST	HARES G
				5014200											BLUE CLAY 0010 GRNT 0104
CCN	12	25	436	434510	1000	09/58	3118	3	FR	47	18	47	3	1/00 CO	ROCK HOTEL
				5014475											CLAY 0008 GRNT 0047
CCN	13	23	437	435210	1050	05/53	2512	3	FR	180	75	150	4	1/00 PS	HAWN C
				5016630											CSND 0042 MSND 0075 Q5ND 0180 FSND 0
CCN	14	6	756	424550	955	10/68	2512	3	FR	171	16	100	3	1/00 DO	HILLWARD B
				5013480											MSND HPAN 0033 GREY GRNT 0173
CCN	14	27	440	432760	1000	09/61	1636	3	FR	70	55	55	10	2/00 CC	BOLES B
				5016060											FSND 0070 GRVL 0084
CCN	14	27	435	432515	1000	07/61	1636	3	FR	80	61	61	10	3/00 TR DO	CANADA PINE PLANTATI
				5016040											HP. 0015 Q5ND 0070 GRVL 0085
CCN	6	8	415	426600	1025	04/59	2512	3		CRV					NAT. HENS A B
				5002600											MSND 0004 RED GRNT 0050



## **APPENDIX C**

Site Photographs 1 to 60



**Photograph 1** VIEW: Looking north from east shoulder Highway 11 NBL at about Sta. 16+700. Bedrock outcrops typically up to 1.0 m visible in median. (Nov. 2007)

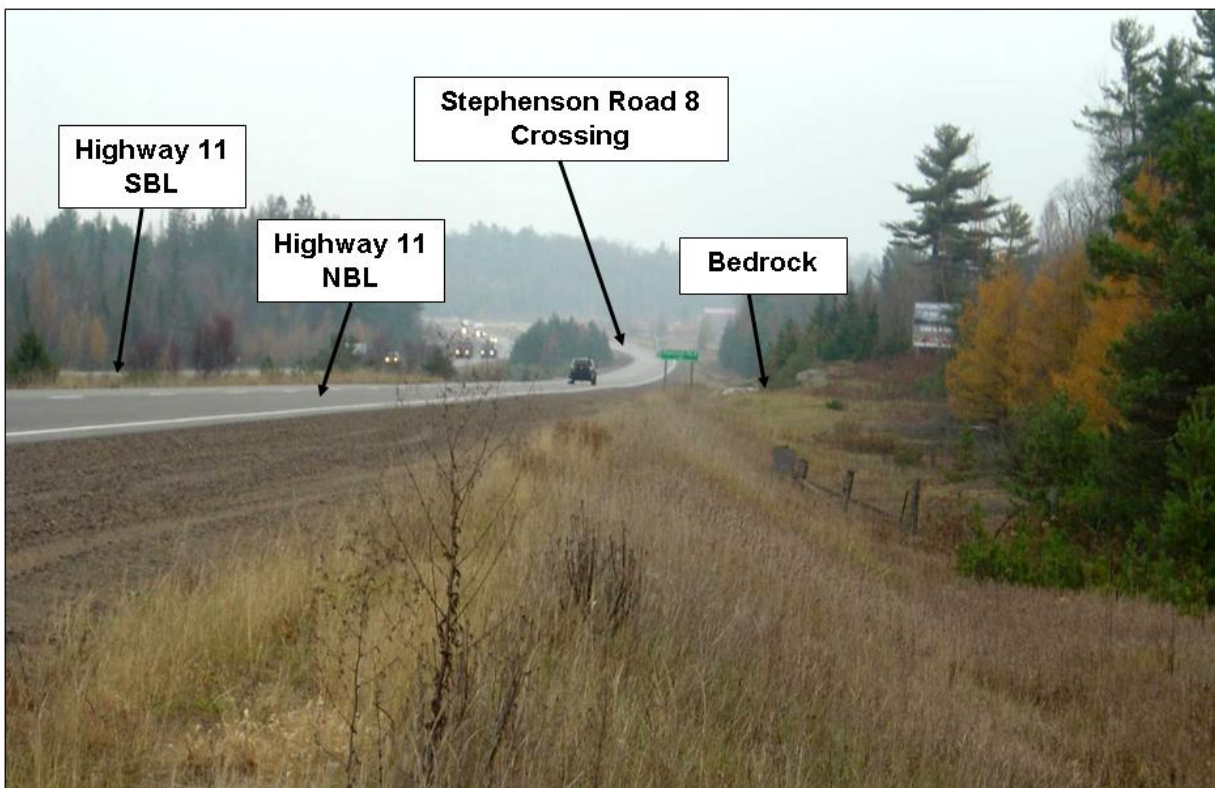


**Photograph 2** VIEW: Looking north from east shoulder of Highway 11 NBL at about Sta. 17+300, with bedrock slope visible to Sta. 17+400. (Nov. 2007)





**Photograph 3** VIEW: Looking west across Highway 11 from Stephenson Road 7 East cul-de-sac at about Sta. 17+800 at 1.5 m rock cut in Highway 11 SBL ditch. (Nov. 2007)



**Photograph 4** VIEW: Looking north from Highway 11 NBL ditch at about Sta. 17+900 with bedrock cut (1.0 to 2.0 m) in distance (Sta. 18+160). (Nov. 2007)



**Photograph 5 VIEW:** Looking north from east shoulder of Highway 11 NBL at about Sta. 18+100 at 1.5 to 2.0 m bedrock cut (Sta. 18+160). Stephenson Road 8 is 1.0 km in distance. (Nov. 2007)



**Photograph 6 VIEW:** Looking south from east shoulder of Stephenson Road 8 along Greer Road. Bush area both sides of road. (Nov. 2007)



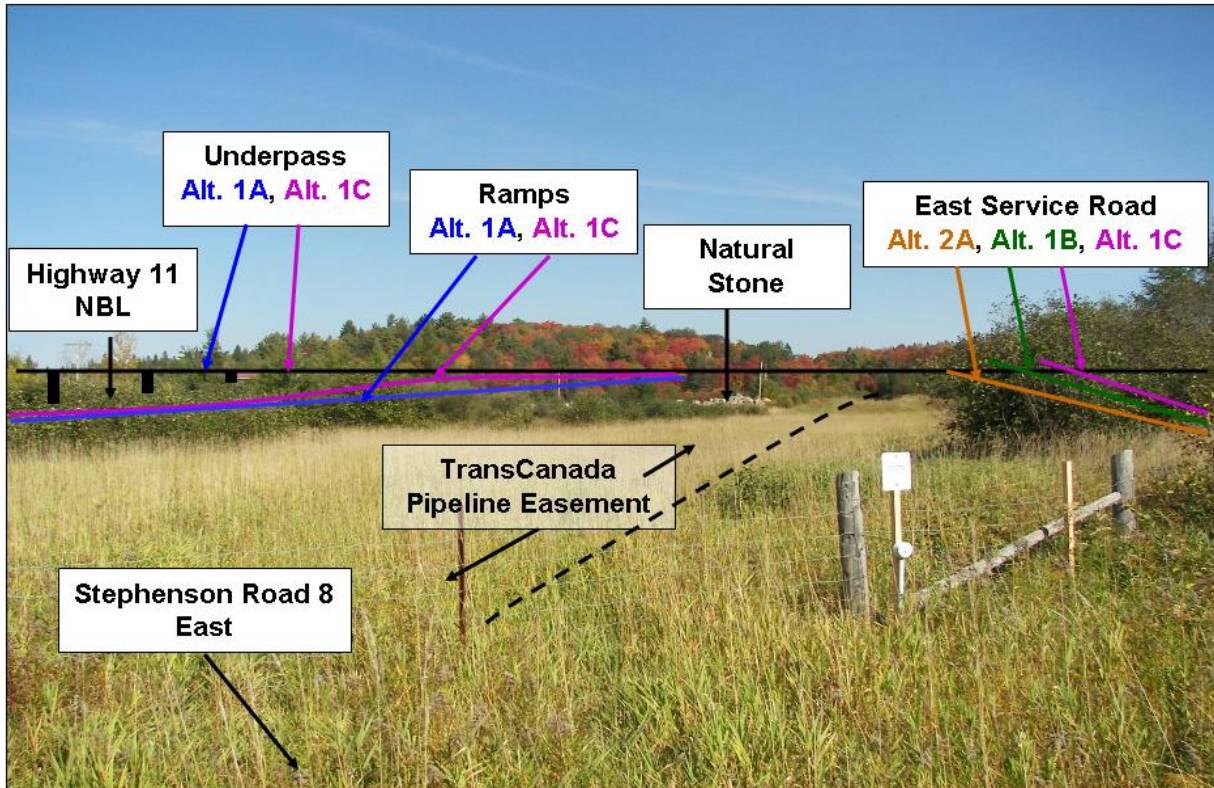


**Photograph 7** VIEW: Looking west from east shoulder of Stephenson Road 8 at about Sta. 19+080 at the at grade crossing with Highway 11. Swamp area in foreground. (Nov. 2007)



**Photograph 8** VIEW: Looking east from east shoulder of Stephenson Road 8, at about Sta. 19+080. Culvert (2200 SPCSP) ON Stephenson Road 7 East in foreground with Muskoka Ready Mix Concrete plant on fill pad in background. (Nov. 2007)



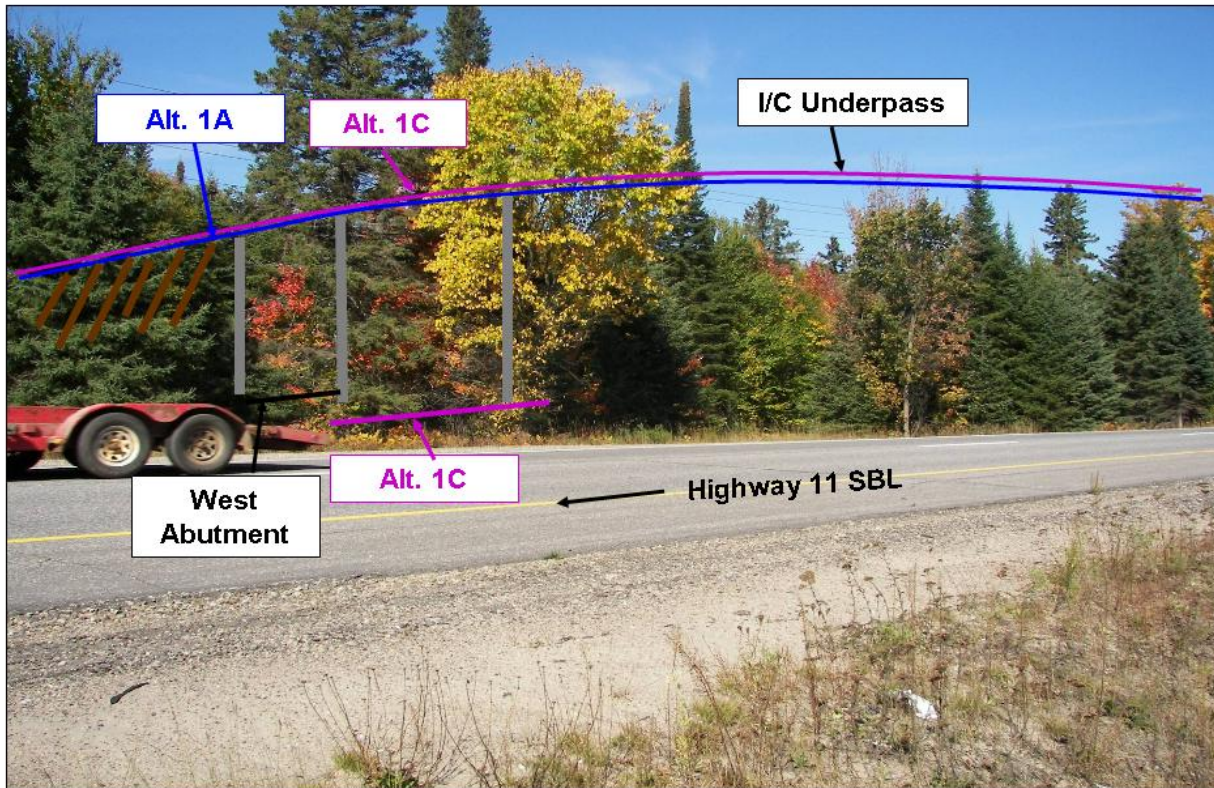


**Photograph 9 VIEW:** Looking northerly from north shoulder of Stephenson Road 8 East along TransCanada Pipeline alignment. Natural Stone in middle of view. Alignment for ramps of Alt. 1A and 1C cross over forested rock outcrop. (Sept. 26, 2008)

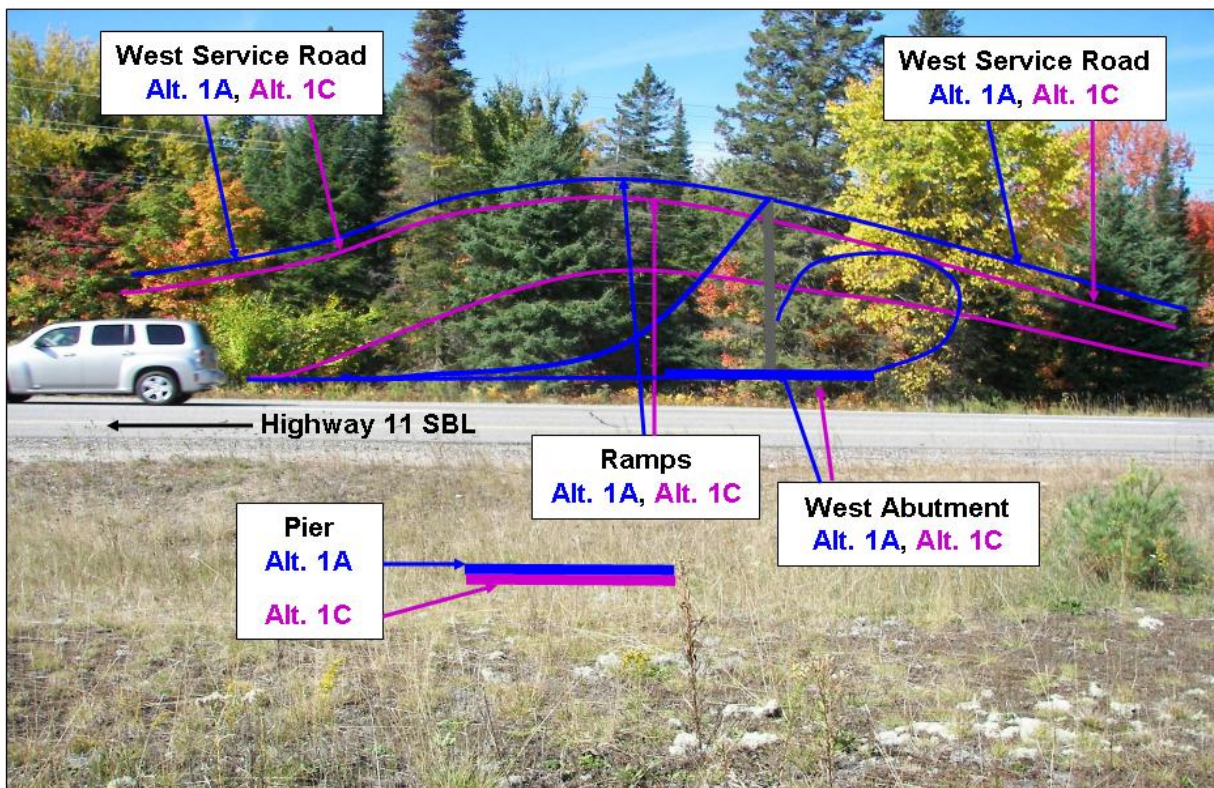


**Photograph 10 VIEW:** Looking northeasterly from median of Highway 11 at about Sta.19+960. Rock cut in photograph is 1.0 to 3.0 m high and located about 240 m south of I/C Alt. 1A and 1C. (Sept. 26, 2008)



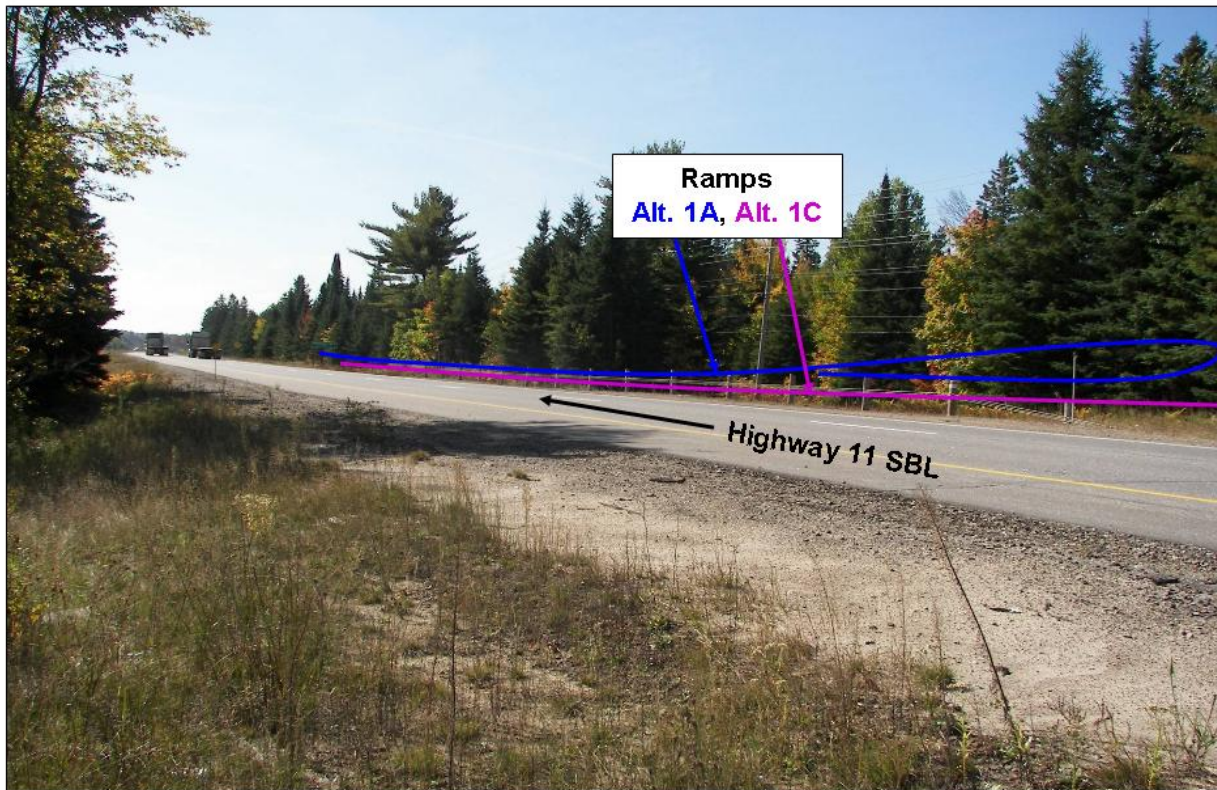


**Photograph 11** VIEW: Looking northwesterly from east shoulder of Highway 11 SBL at west abutment option of I/C underpass (Sta. 20+200). (Sept. 26, 2008)

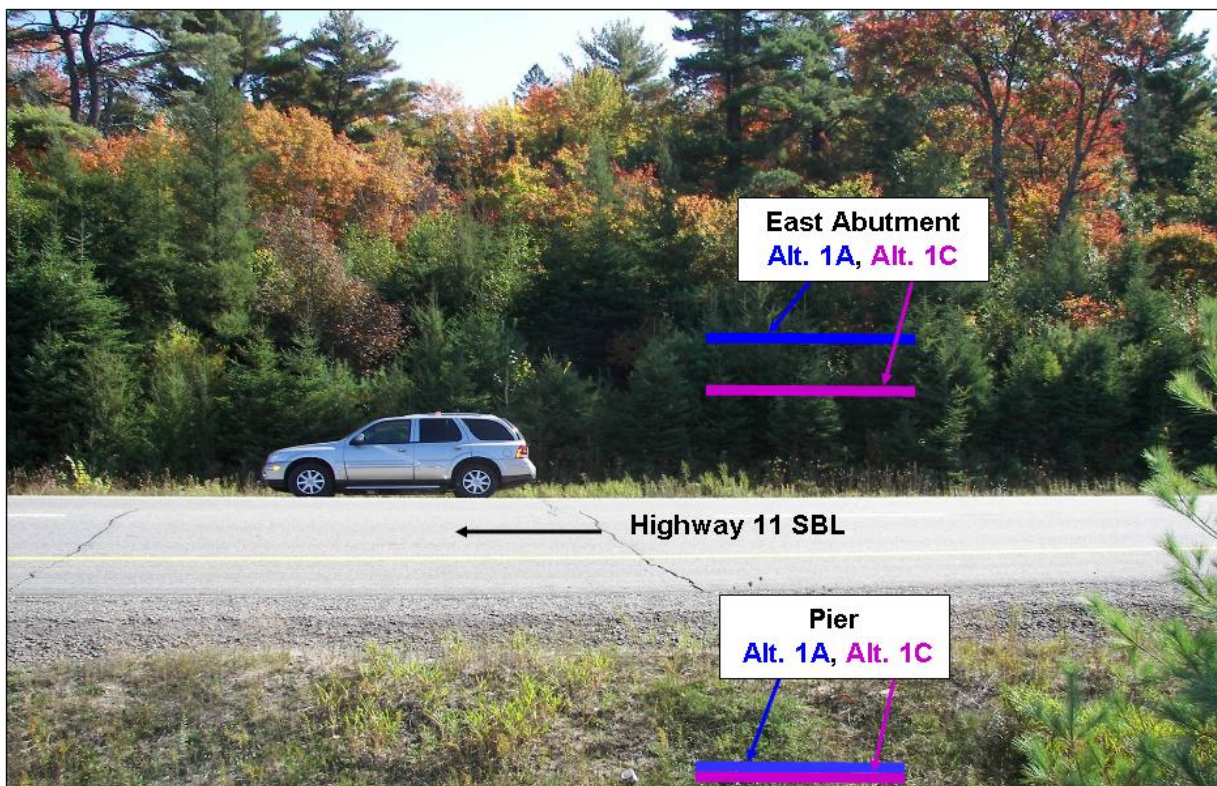


**Photograph 12** VIEW: Looking west from median of Highway 11 across SBL at approximate locations of pier (foreground) and west abutment of I/C underpass (Sta. 20+200). Ground surface slopes down from west shoulder towards Bullen Creek floodplain. (Sept. 26, 2008)





**Photograph 13** VIEW: Looking southwesterly from east shoulder of Highway 11 SBL at alignment of on-ramps from I/C at Sta. 20+200. Highway embankment is about 6 m high at guardrail. (Sept. 26, 2008)

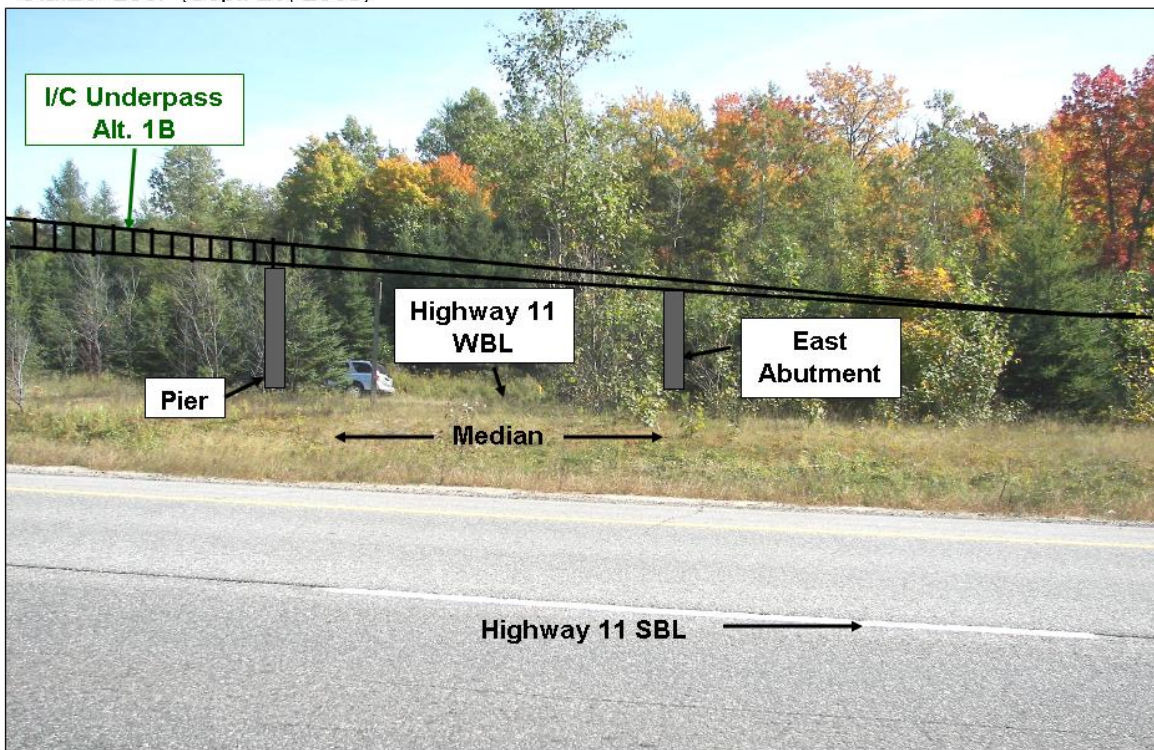


**Photograph 14** VIEW: Looking east from median of Highway 11 across NBL at approximate location of east abutment of I/C underpass (Sta. 20+200). Bedrock outcrops about 10 m beyond east shoulder. (Sept. 26, 2008)



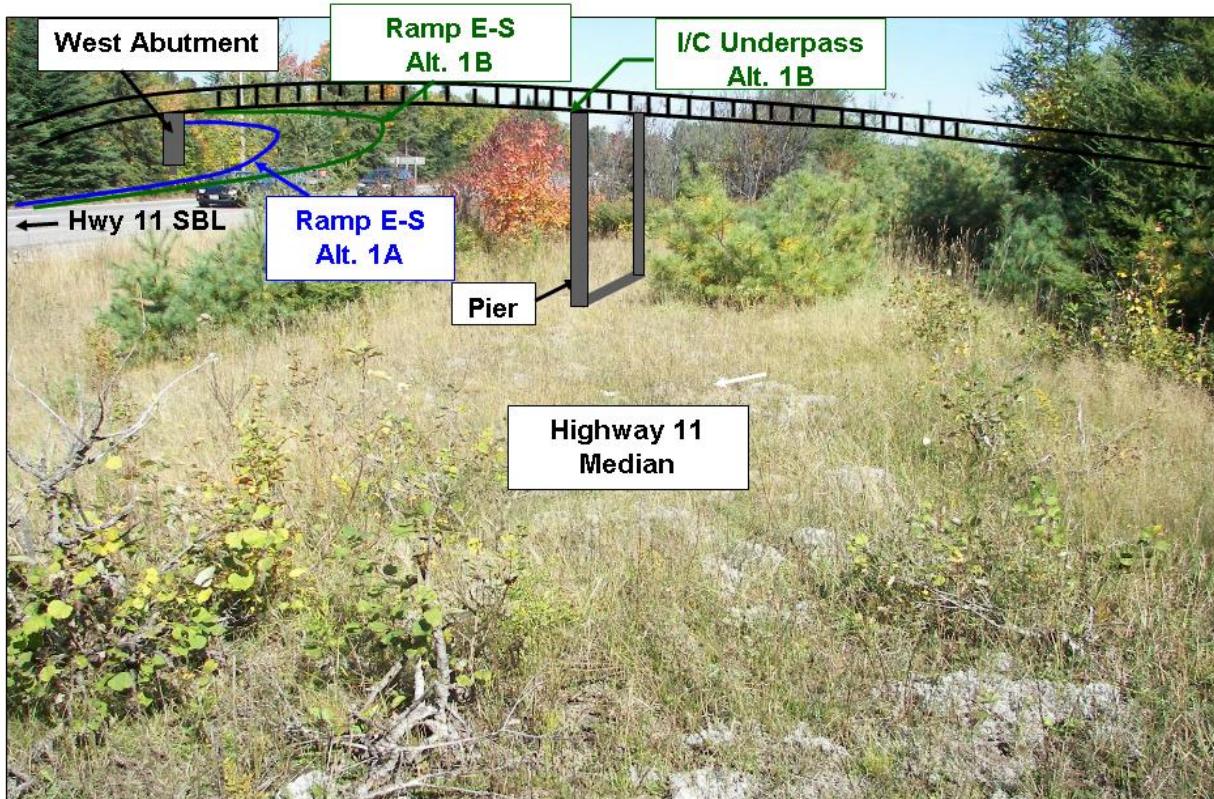


**Photograph 15** VIEW: Looking east at rock outcrops about 15 m east of Highway 11 NBL at Sta. 20+200. (Sept. 26, 2008)

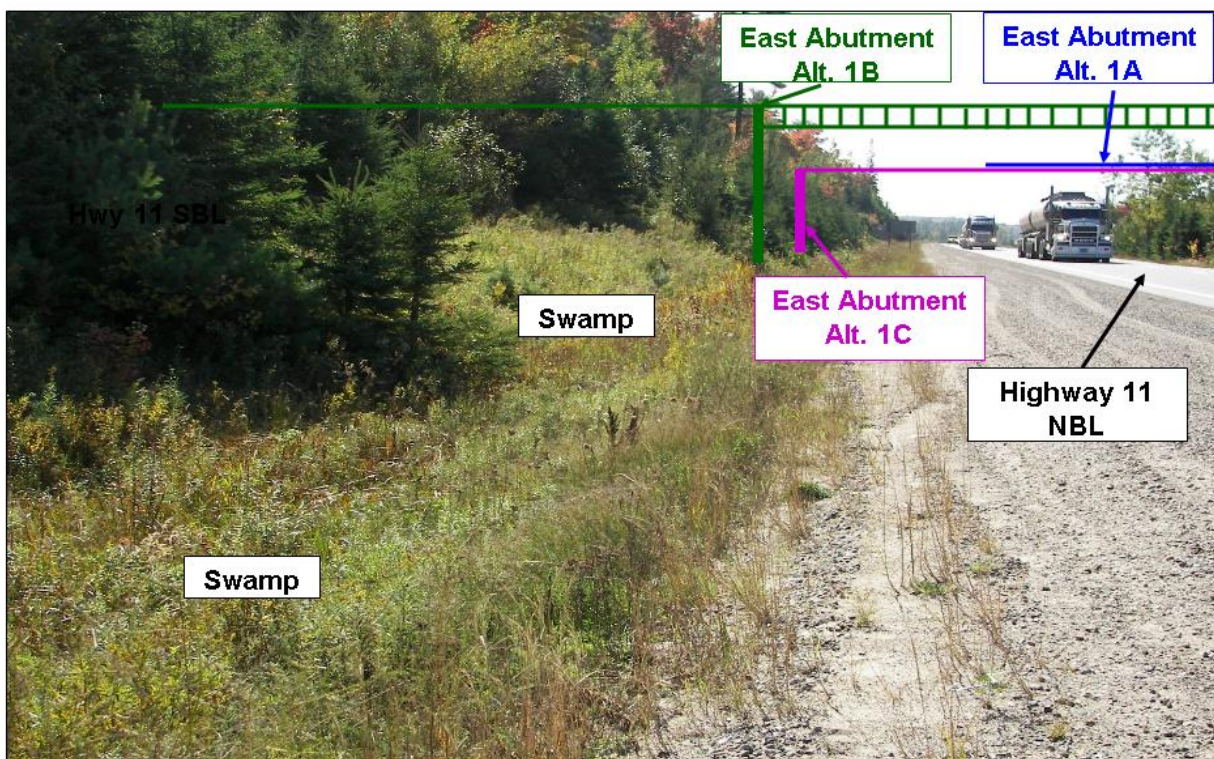


**Photograph 16** VIEW: Looking northeasterly from west shoulder of Highway 11 SBL at pier and east abutment locations of I/C underpass at Sta. 20+300. (Sept. 26, 2008)



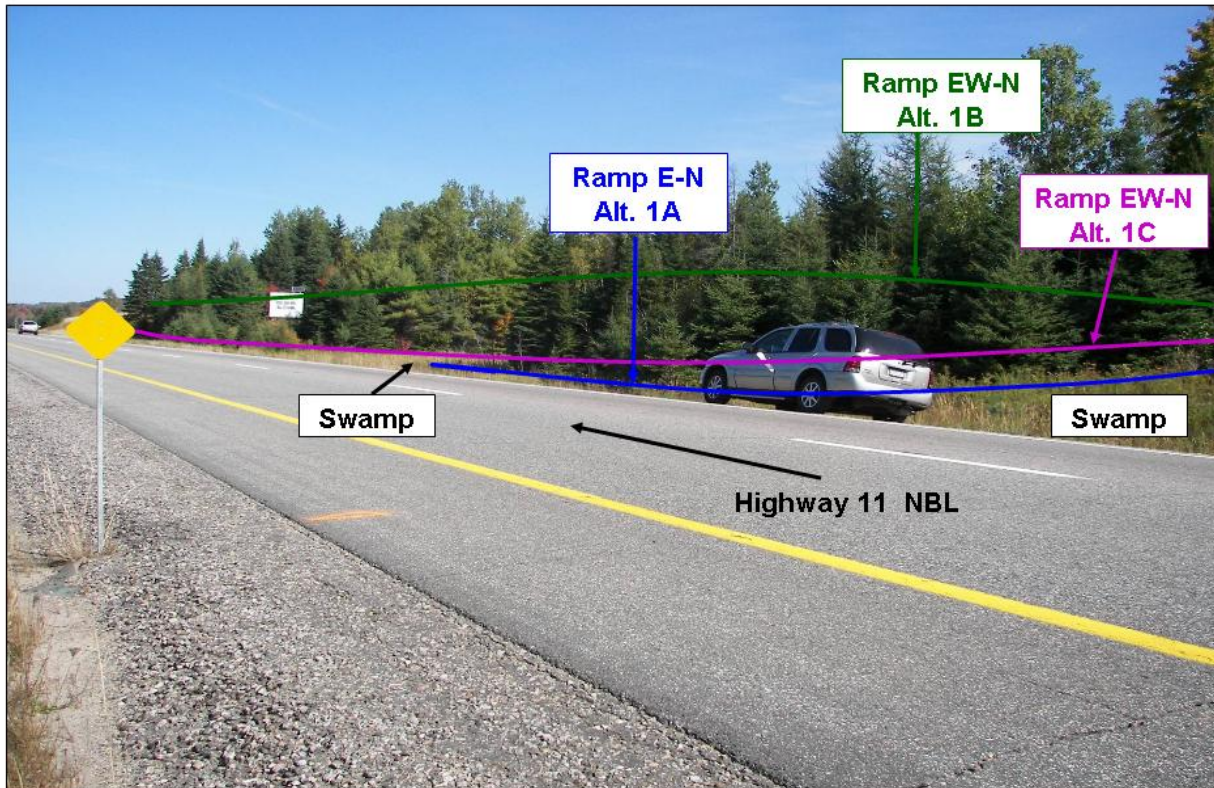


**Photograph 17 VIEW:** Looking northwesterly from median of Highway 11 at Sta. 20+250 at west abutment and pier locations of I/C underpass. (Sept. 26, 2008)

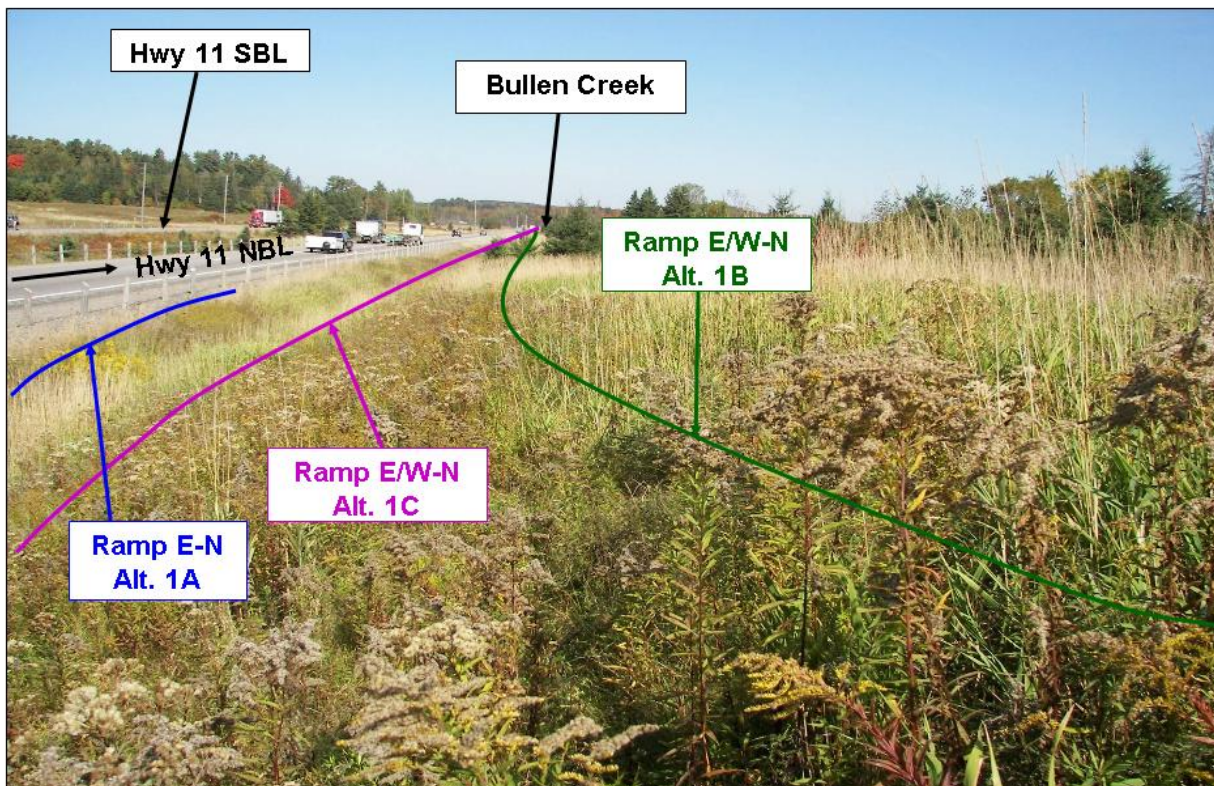


**Photograph 18 VIEW:** Looking south from east shoulder of Highway 11 NBL at about Sta. 20+400. East abutments for underpasses for I/C at Sta. 20+200 (Alt. 1A and 1C) and at Sta. 20+300 are illustrated. Note swamps in foreground. High ground behind east abutments of Alt. 1A and 1C is a rock outcrop. (Sept. 26, 2008)



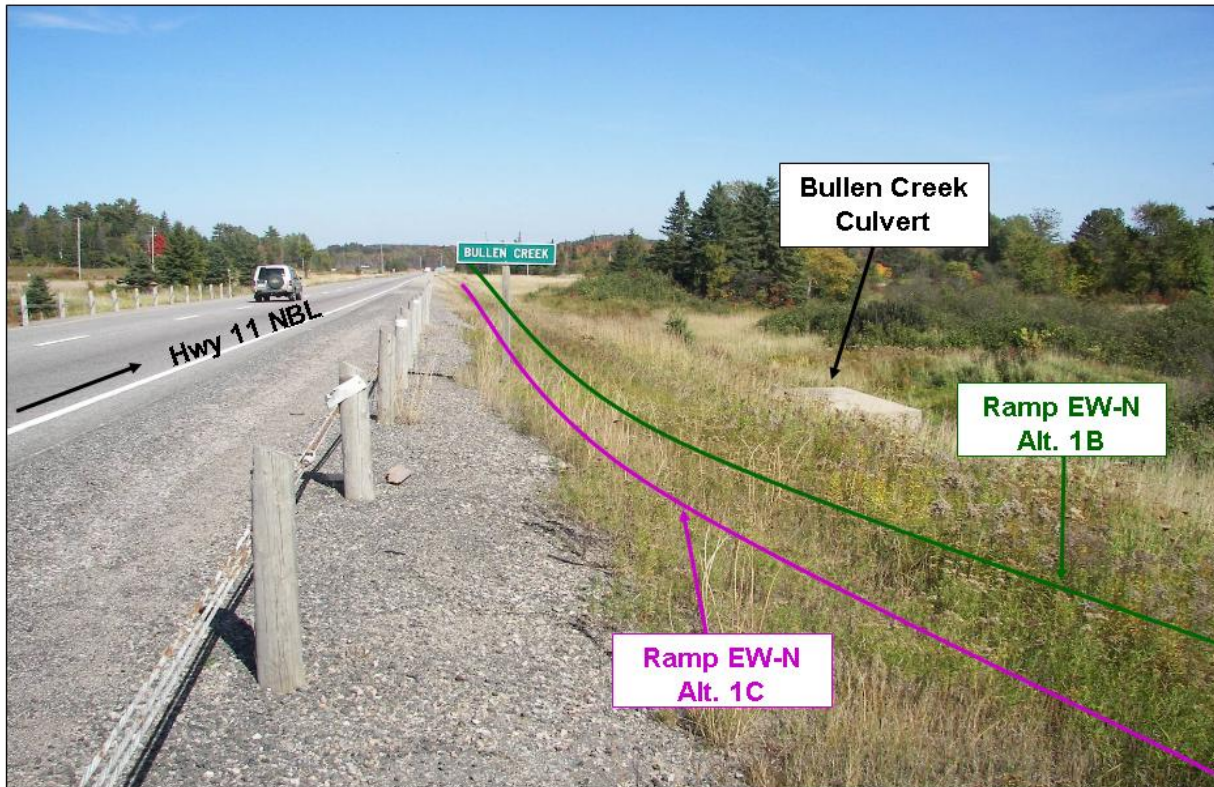


**Photograph 19** VIEW: Looking northeasterly from west shoulder of Highway 11 NBL at alignment of EW-N ramps of I/C at Sta. 20+200 and 20+300. Note swamps along alignments of EW-N ramp of Alt. 1C and E-N ramp of Alt. 1A. (Sept. 26, 2008)

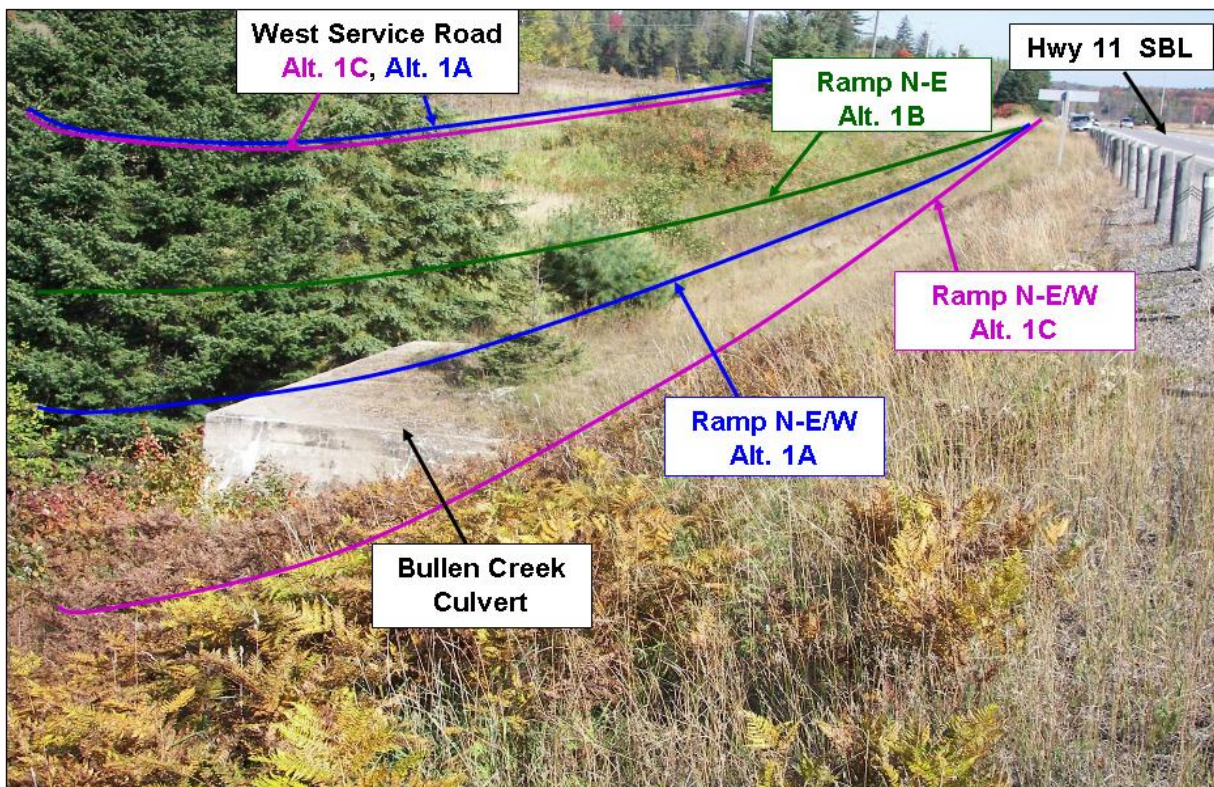


**Photograph 20** VIEW: Looking northerly from 30 m east of east shoulder of Highway 11 NBL at Sta. 20+500. Alignment of ramps, E-N for Alt. 1A, E/W-N for Alt. 1B and 1C extend over east end of Bullen Creek culvert. (Sept. 26, 2008)





**Photograph 21 VIEW:** Looking north from east shoulder of Highway 11 NBL at Sta. 20+700. EW-N ramps for Alt. 1B and 1C extend over east end of Bullen Creek culvert floodplain. (Sept. 26, 2008)

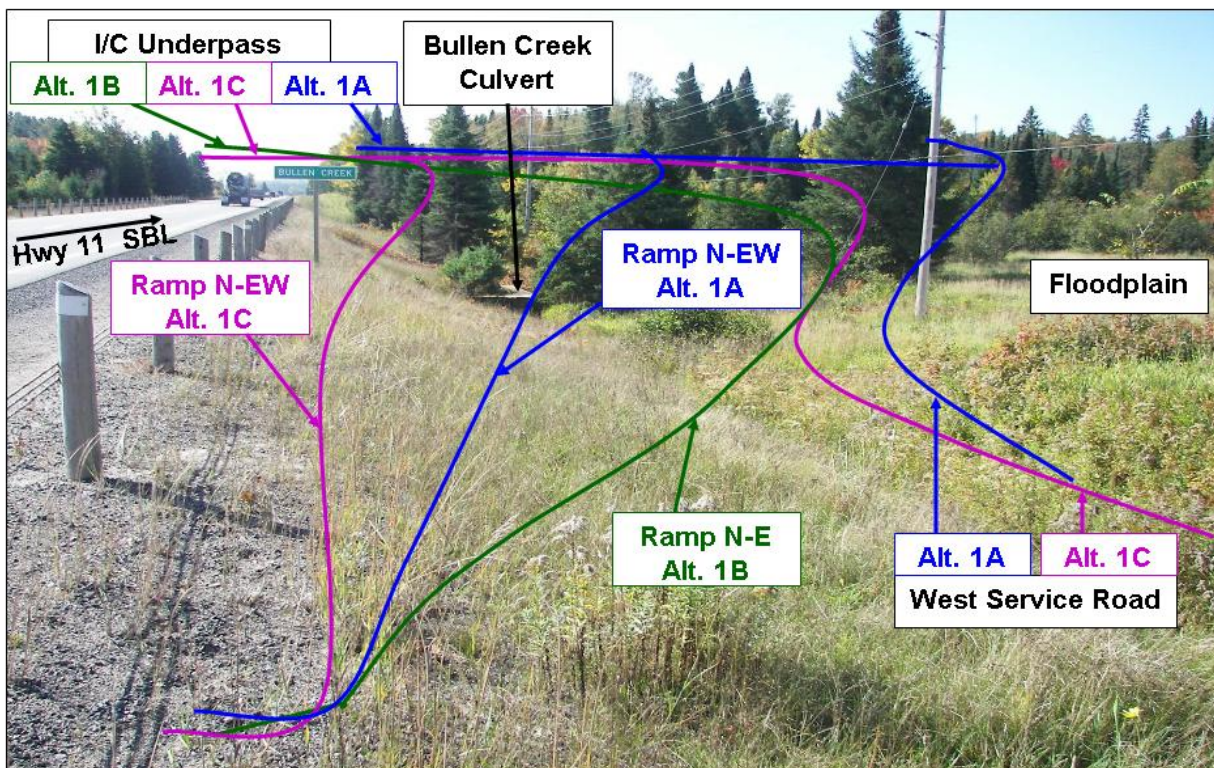


**Photograph 22 VIEW:** Looking north from west shoulder rounding of Highway 11 SBL at Sta. 20+700 across the west end of Bullen Creek culvert. Note that current ramp alternatives require the extension of the culvert westerly. (Sept. 26, 2008)



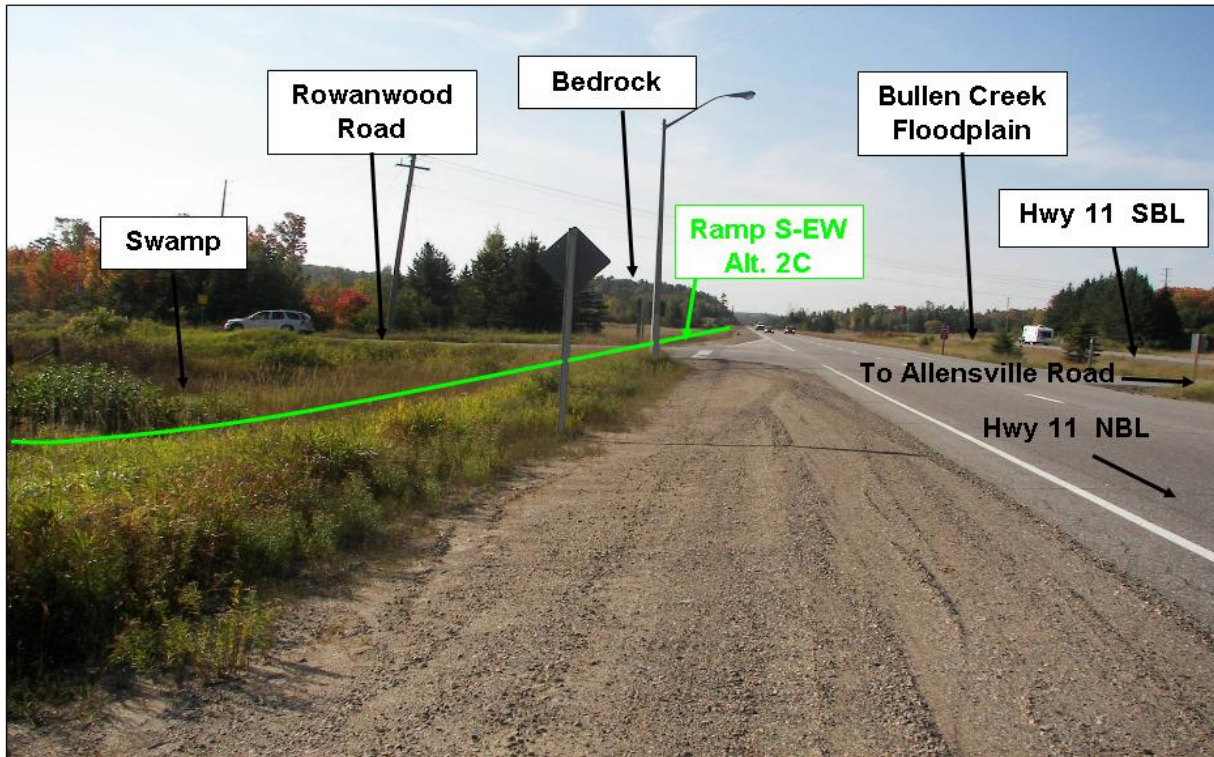


**Photograph 23** VIEW: Looking southwesterly at west end of Bullen Creek culvert at about Sta. 20+780. Floodplain is visible beyond and west of trees in foreground. Estimated embankment height over the Bullen Creek floodplain is 6 m. (Sept. 26, 2008)



**Photograph 24** VIEW: Looking south from west shoulder rounding of Highway 11 SBL at about Sta. 20+820. Alternative west ramps and service roads are illustrated for I/C alternatives at Sta. 20+200 (Alt. 1A and 1C) and Sta. 20+300 (Alt. 1B). West end of Bullen Creek culvert and floodplain in photograph will affect the preferred alignment. (Sept. 26, 2008)





**Photograph 25** VIEW: Looking south from east shoulder of Highway 11 NBL at Sta. 21+320. Rowanwood Road/Allensville Road intersection to be removed. Rock outcrop in the distance is at Sta. 19+900 to 20+300 east side. Bullen Creek floodplain is to the south of white van on SBL west side. (Sept. 26. 2008)



**Photograph 26** VIEW: Looking west from north shoulder of Rowanwood Road about 30 m east of Allensville Road/Highway 11/Rowanwood Road at grade crossing. Bedrock ridge visible in bush area in distance. (Nov. 2007)



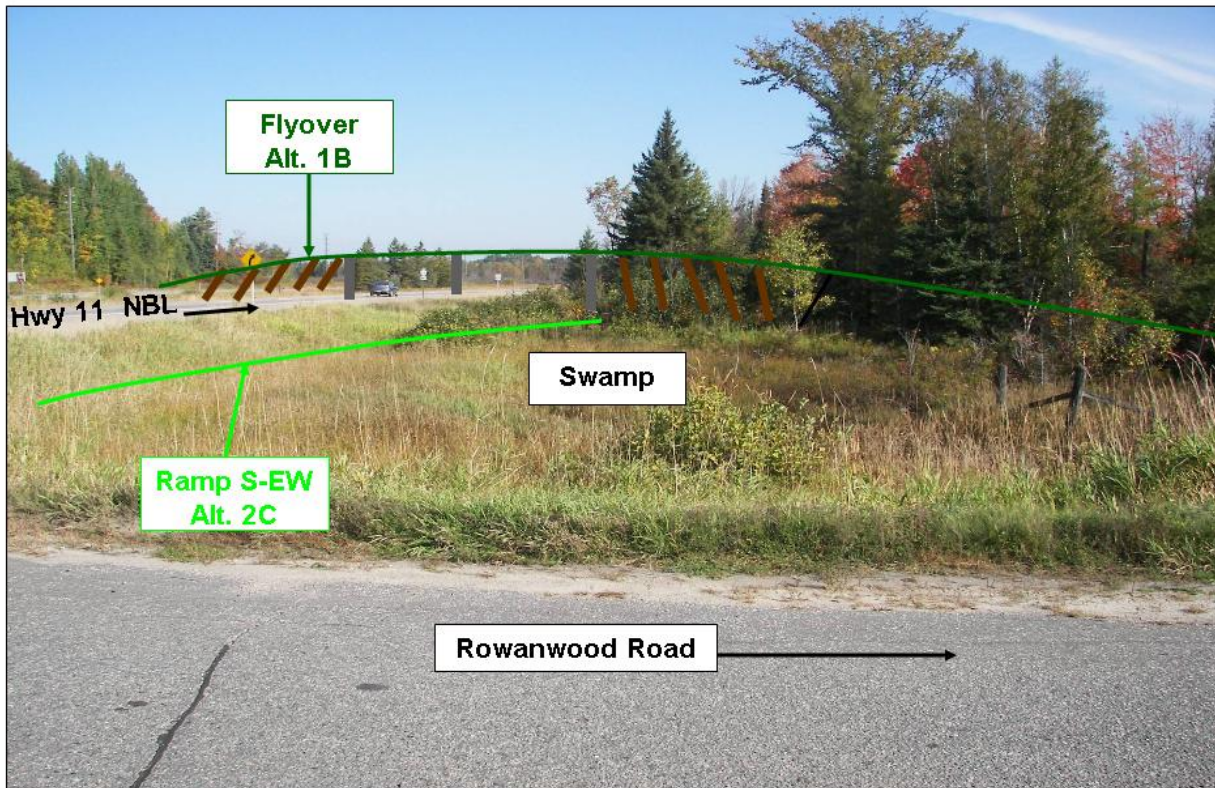


**Photograph 27 VIEW:** Looking northeast from east shoulder of Highway 11 NBL at about Sta. 21+400, about 100 m north of the Allensville/Rowanwood Roads/Highway 11 at grade crossing. Extensive ponded water in major swamp area east of Highway NBL. (Nov. 2007)

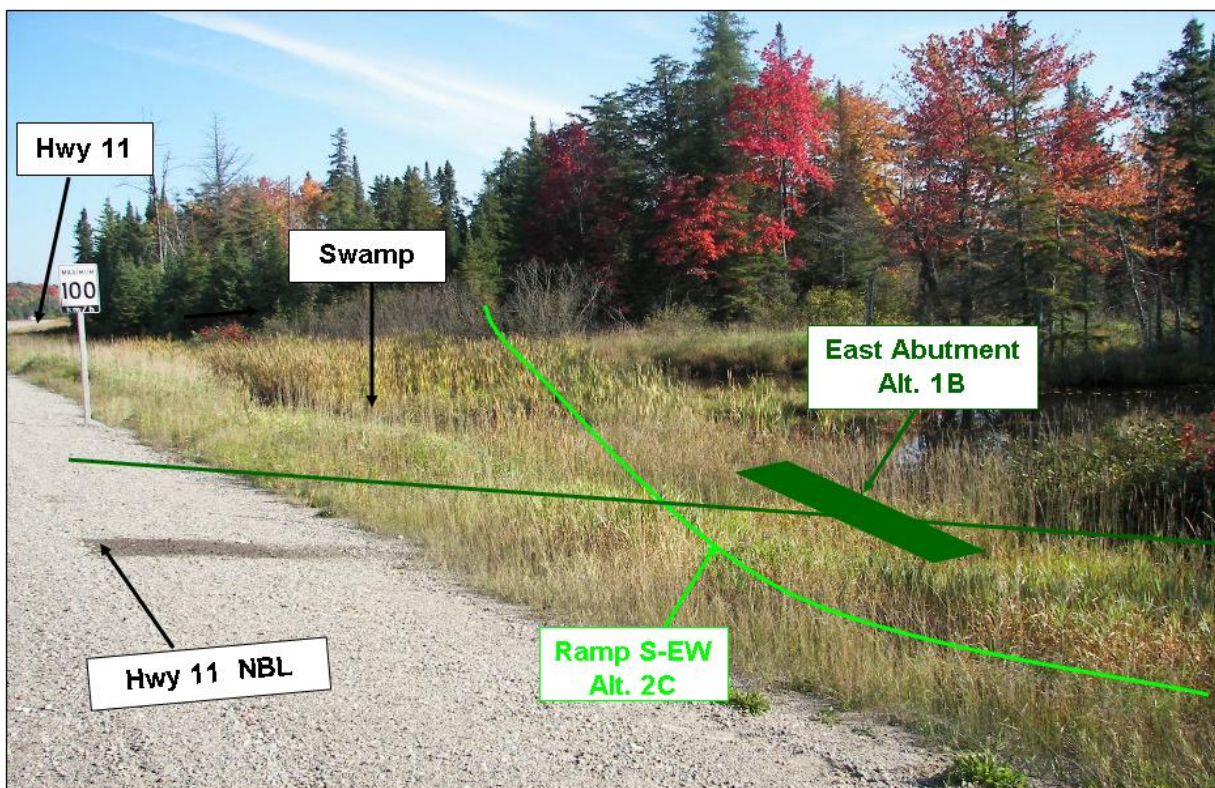


**Photograph 28 VIEW:** Looking west from east shoulder of Highway 11 NBL at about Sta. 21+400 about 100 m north of the Allensville/Rowanwood Roads/Highway 11 at grade crossing. Bedrock exposure in Highway 11 SBL ditch area. (Nov. 2007)



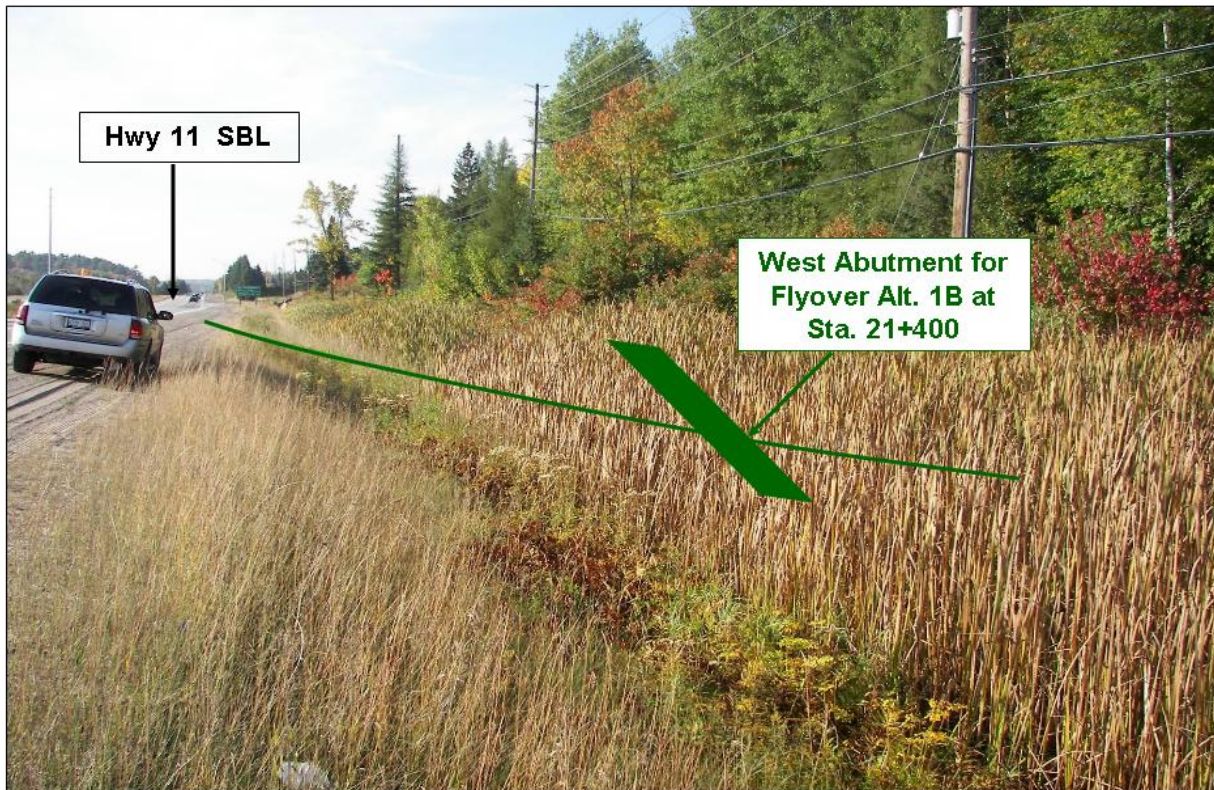


**Photograph 29** VIEW: Looking northwesterly from south shoulder of Rowanwood Road about 30m east of Highway 11 NBL. (Sept. 26, 2008)

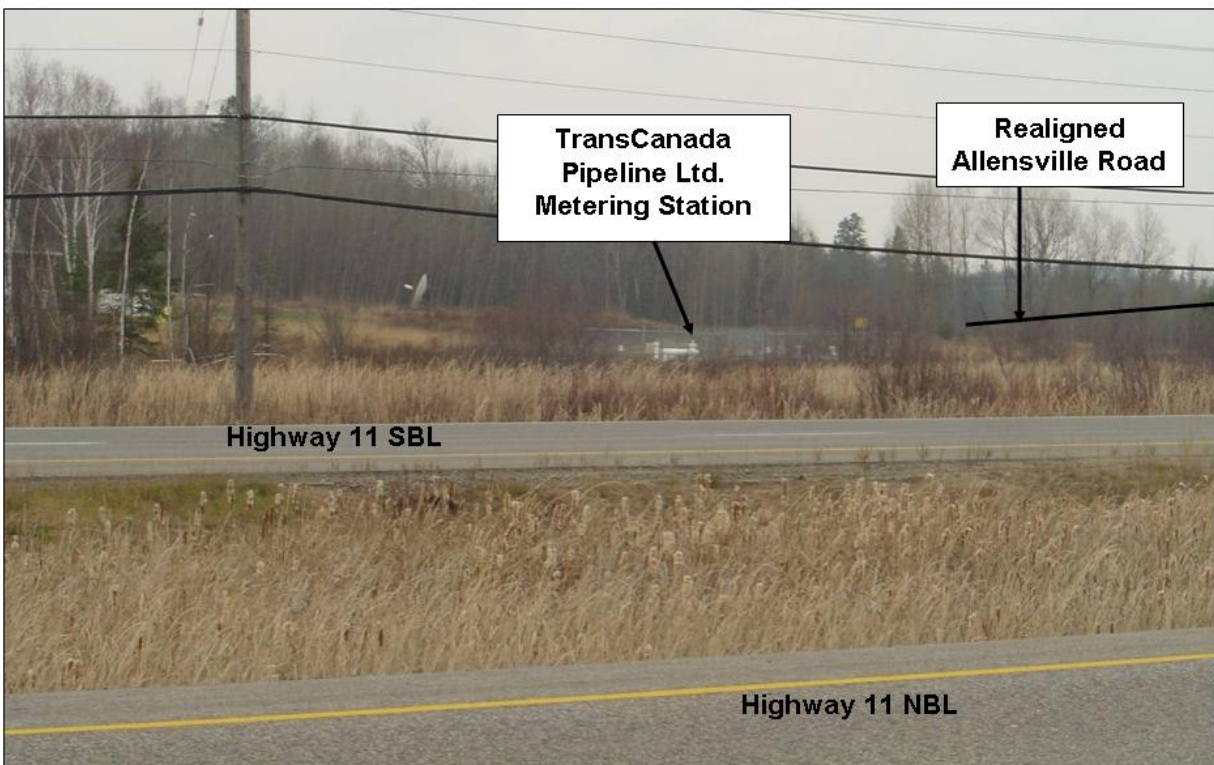


**Photograph 30** VIEW: Looking northeasterly from east shoulder of Highway 11 NBL at Sta. 21+350. East abutment foundations is located in swamp area with open water. (Sept. 26, 2008)



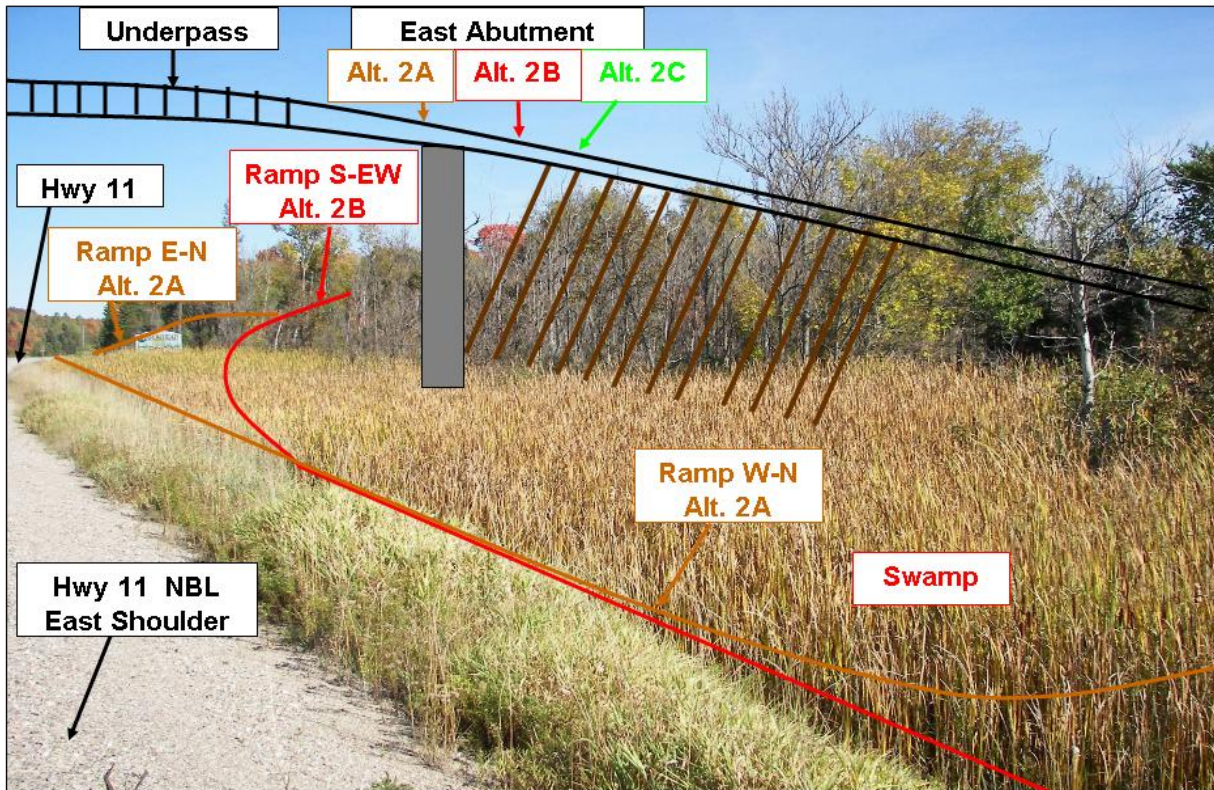


**Photograph 31** VIEW: Looking south along west shoulder of Highway 11 SBL at Sta. 21+450. Foundation for west abutment of flyover is located in swampy area in the west ditch of the highway. (Sept. 26, 2008)

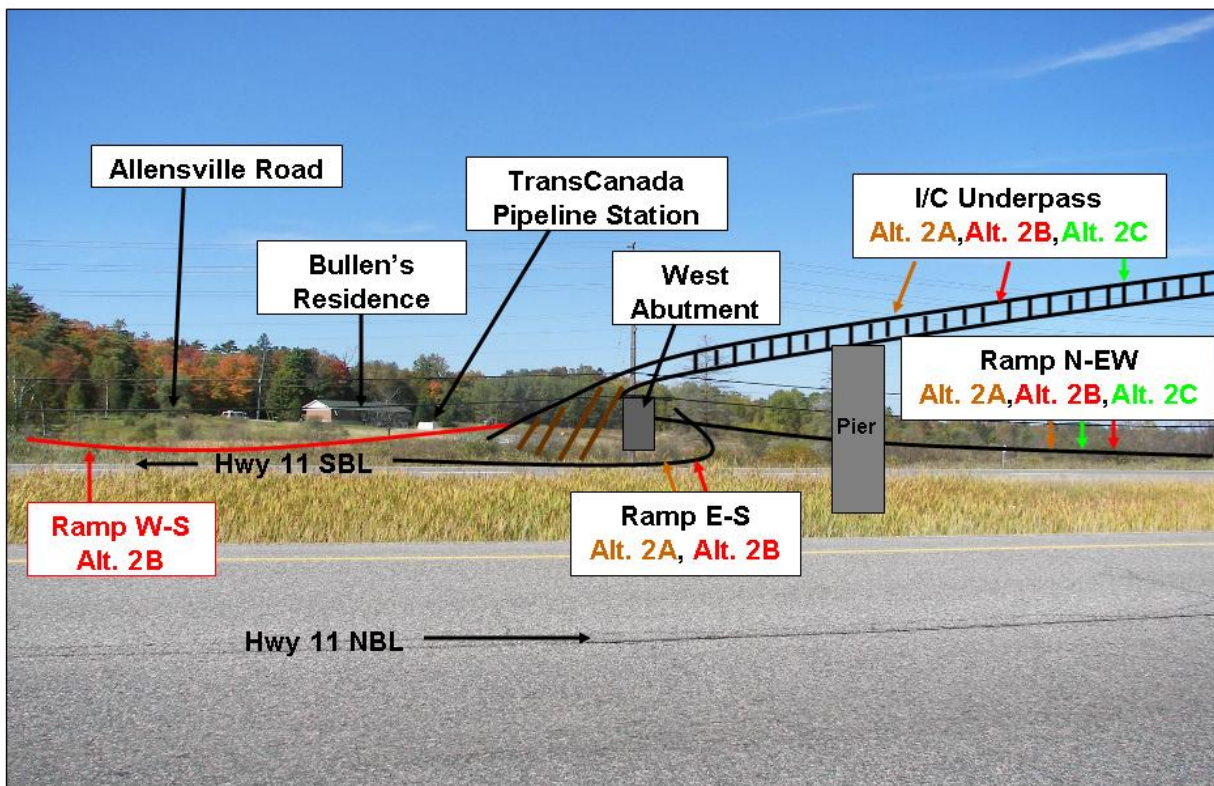


**Photograph 32** VIEW: Looking west from east shoulder of Highway 11 NBL at about Sta. 21+650 across swamp area. Realigned Allensville Road extends across major swamp. TransCanada Pipeline Metering Station on west side of Highway 11 SBL. Bedrock at bushline at Allensville Road. (Nov. 2007)



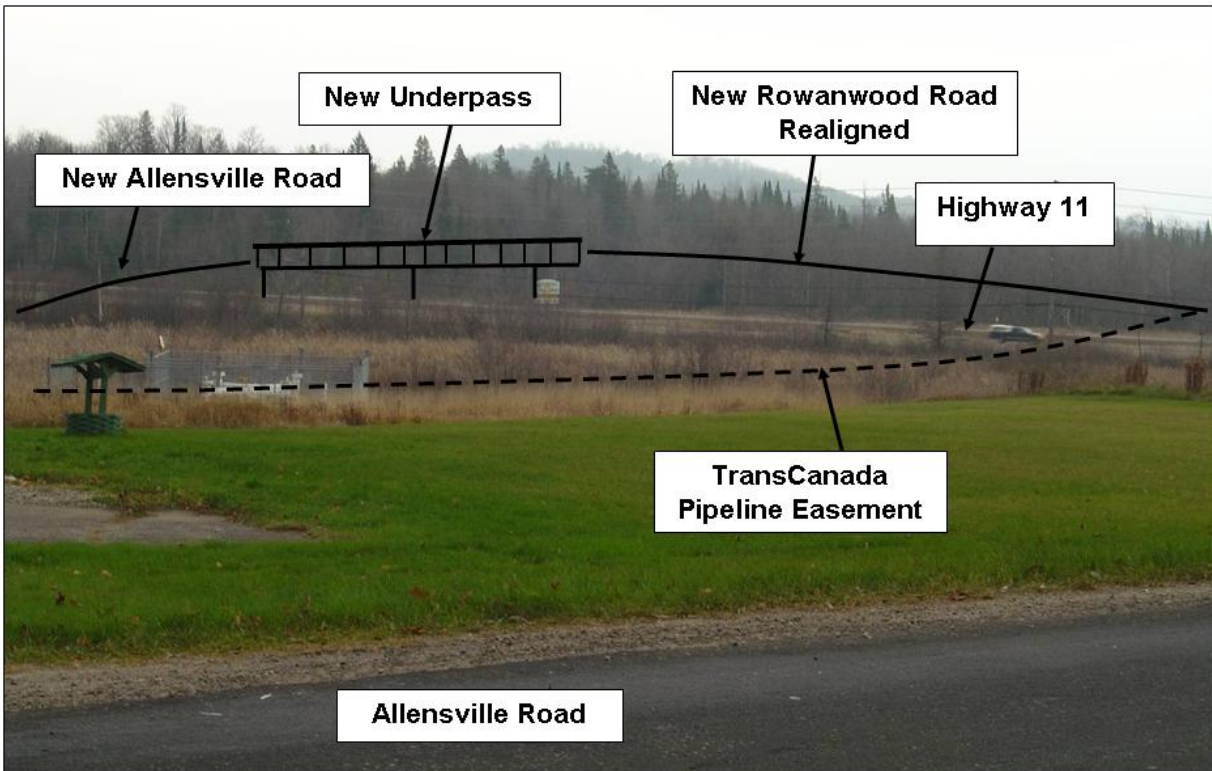


**Photograph 33** VIEW: Looking north from east shoulder of Highway 11 NBL at about Sta. 21+700. An extensive swamp is located to the east. East abutment and ramps of Alt. 2A, 2B and 2C are located in the swamp area. (Sept. 26, 2008)

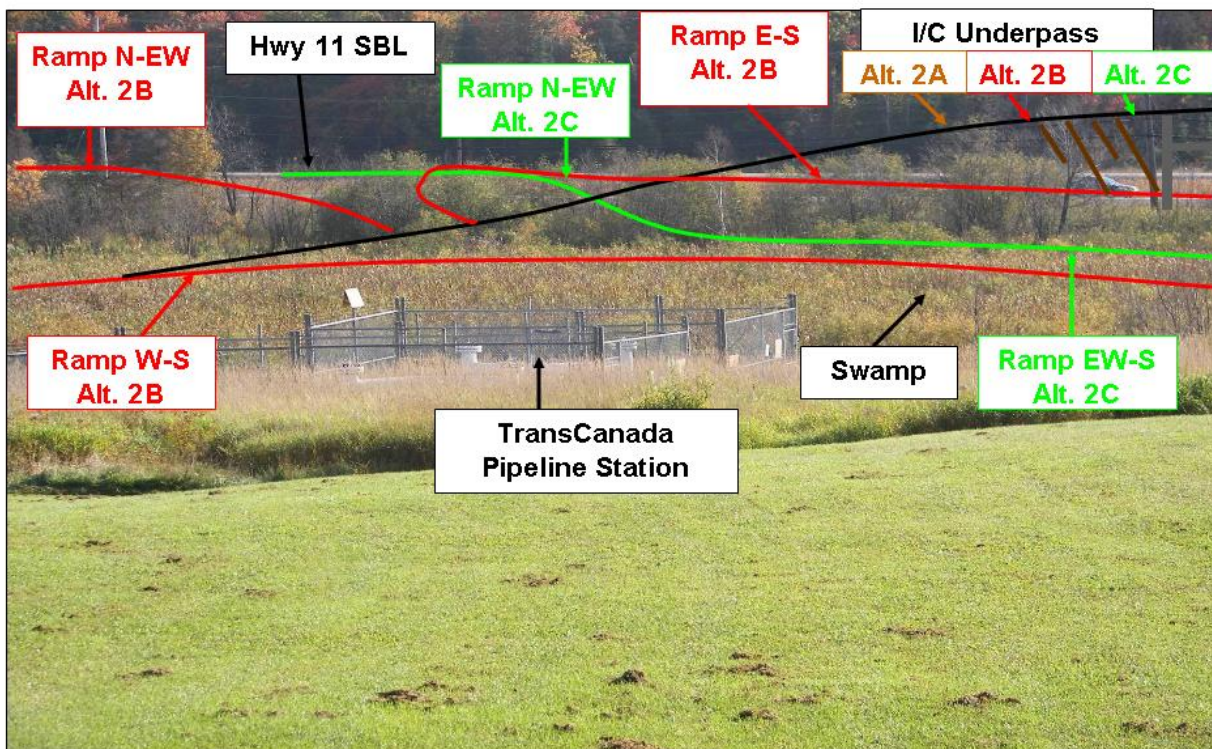


**Photograph 34** VIEW: Looking northwesterly from east shoulder of Highway 11 NBL at Sta. 21+700. I/C underpass is common to Alt. 2A, 2B and 2C. Swamps noted at proposed pier and west abutment which are drawn on the photograph. (Sept. 26, 2008)



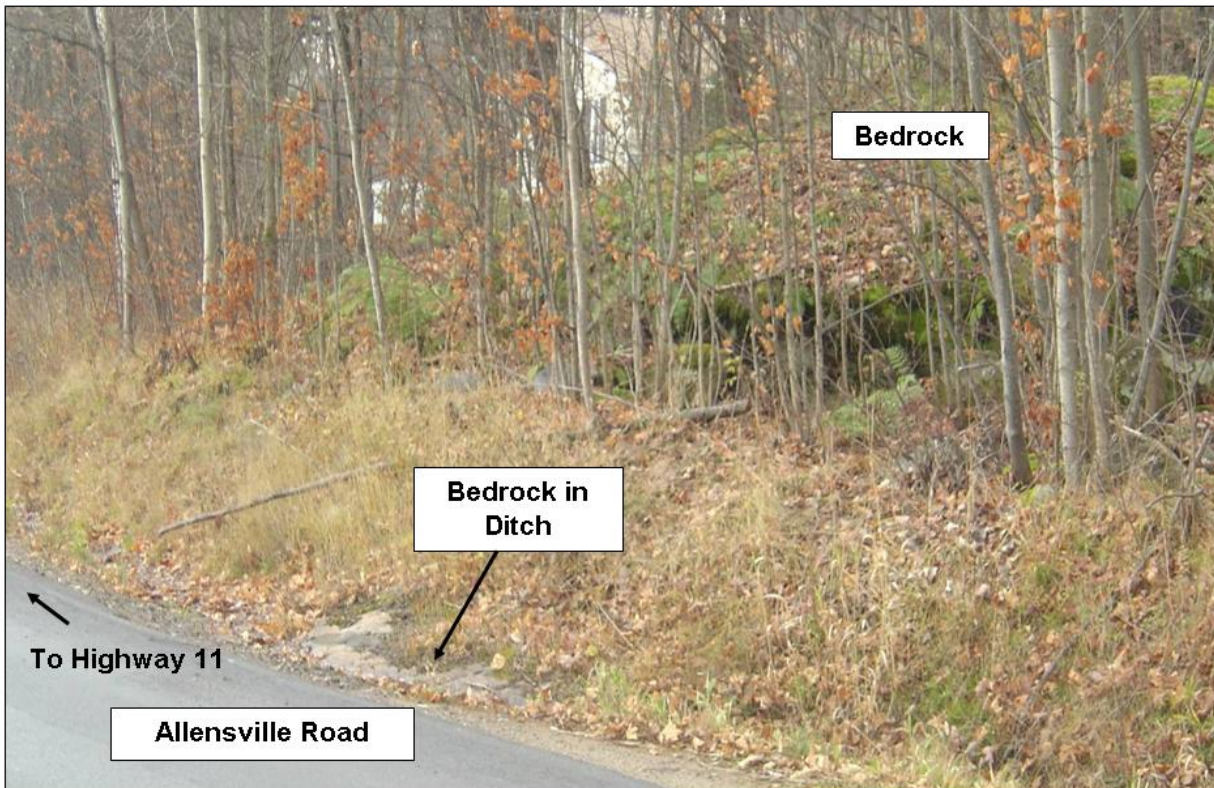


**Photograph 35** VIEW: Looking east from west shoulder of Allensville Road along Highway 11 between about Sta. 21+600 to 21+900. New Allensville Road from west (left) crosses Highway 11 with underpass structure. Rowanwood Road realigned 100 to 200 m east of Highway 11 NBL in heavily bush and swamp areas. (Nov. 2007)



**Photograph 36** VIEW: Looking northeasterly to Highway 11 (Sta. 21+780) from road outcrop on Allensville Road (Bullen's Residence). View shows TransCanada Pipeline Plant ramps W-S (Alt. 2B) and EW-S (Alt. 2C) cross pipeline at a location to the right of the photograph field of view. (Sept. 26, 2008)





**Photograph 37** VIEW: Looking west from Allensville Road just south of Bullen's Residence. Extensive bedrock outcrops visible to the west and in the west road ditch. (Nov. 2007)

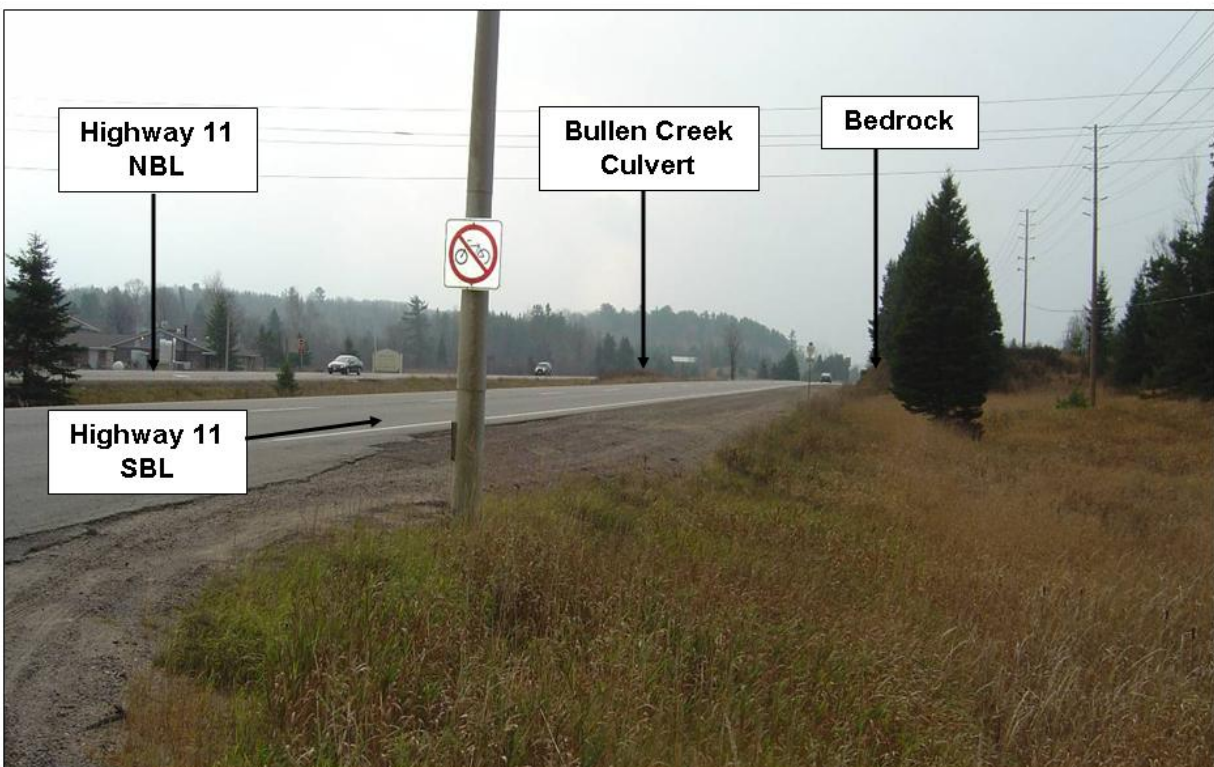


**Photograph 38** VIEW: Looking west from south shoulder of Allensville Road, about 20 m west of the at grade crossing with Highway 11 SBL. Extensive bedrock outcrops in ridge beyond Allensville Road. (Nov. 2007)





**Photograph 39 VIEW:** Looking east from south shoulder of Allensville Road about 50 m west of Highway 11 at grade crossing at about Sta. 21+280. Extensive swamp area extends entire width of photo along Rowanwood Road parallel to Highway 11 NBL. (Nov. 2007)

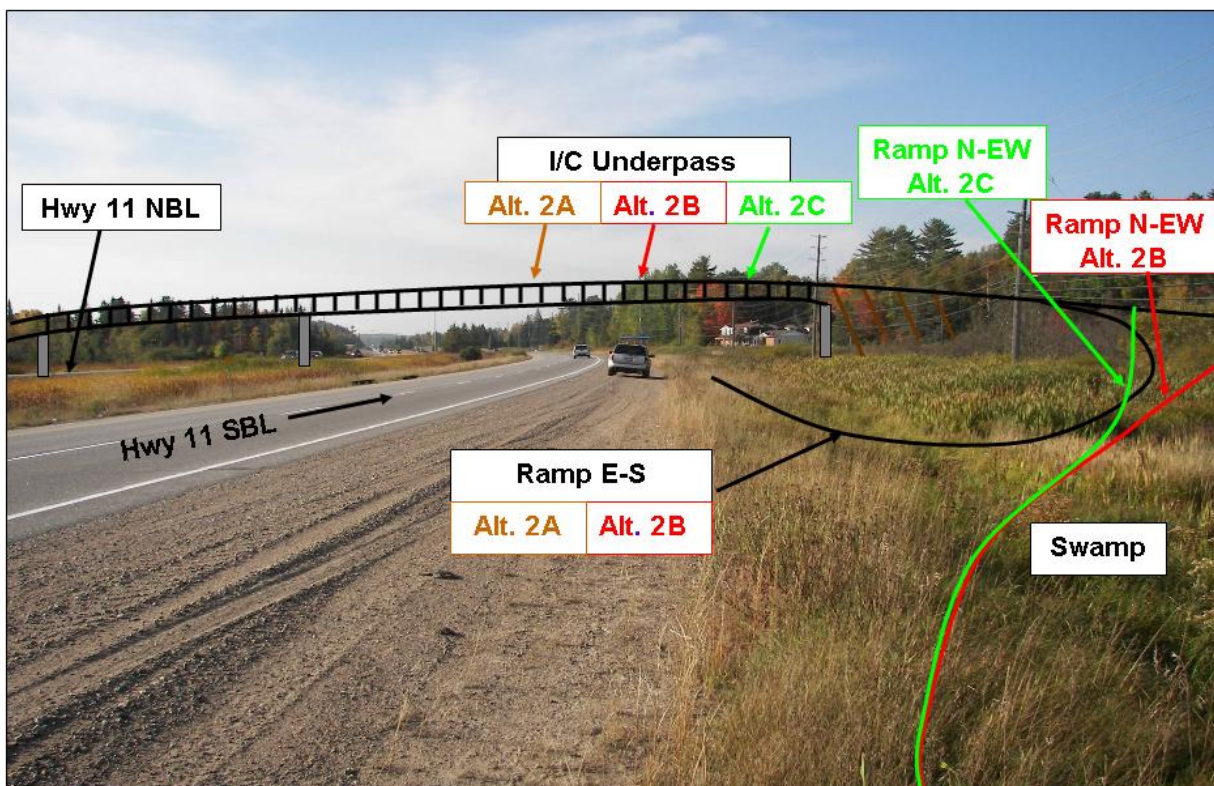


**Photograph 40 VIEW:** Looking south from south shoulder of Allensville Road, 10 m west of Highway 11 SBL along west ditch of Highway 11 SBL. Bedrock outcrop on west side (right side photo). Bullen Creek culvert crossing Highway 11, some 500 m south of intersection. (Nov. 2007)



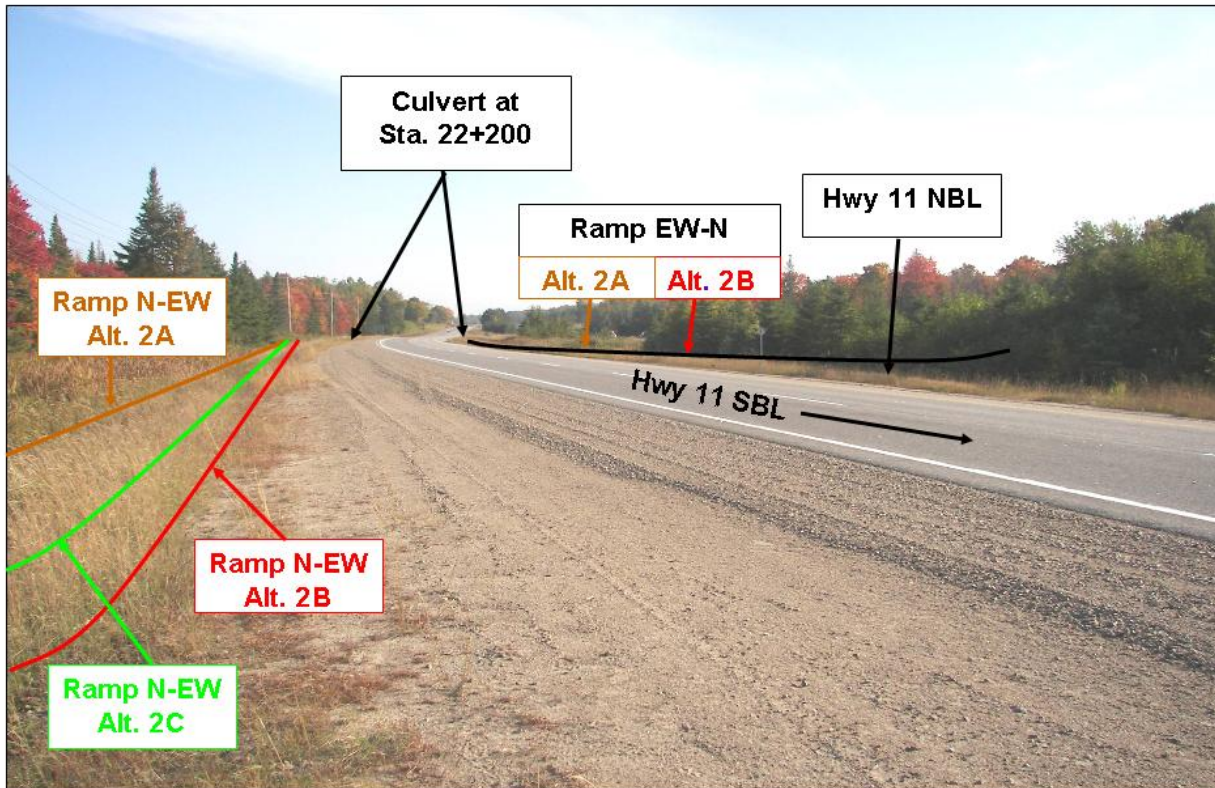


**Photograph 41 VIEW:** Looking north from south shoulder of Allensville Road, 10 m west of Highway 11 SBL along west ditch line of Highway 11 SBL. Bedrock outcrop on west side of Highway 11 SBL and extensive swamp on east side of Highway 11 NBL in treed area. (Nov. 2007)

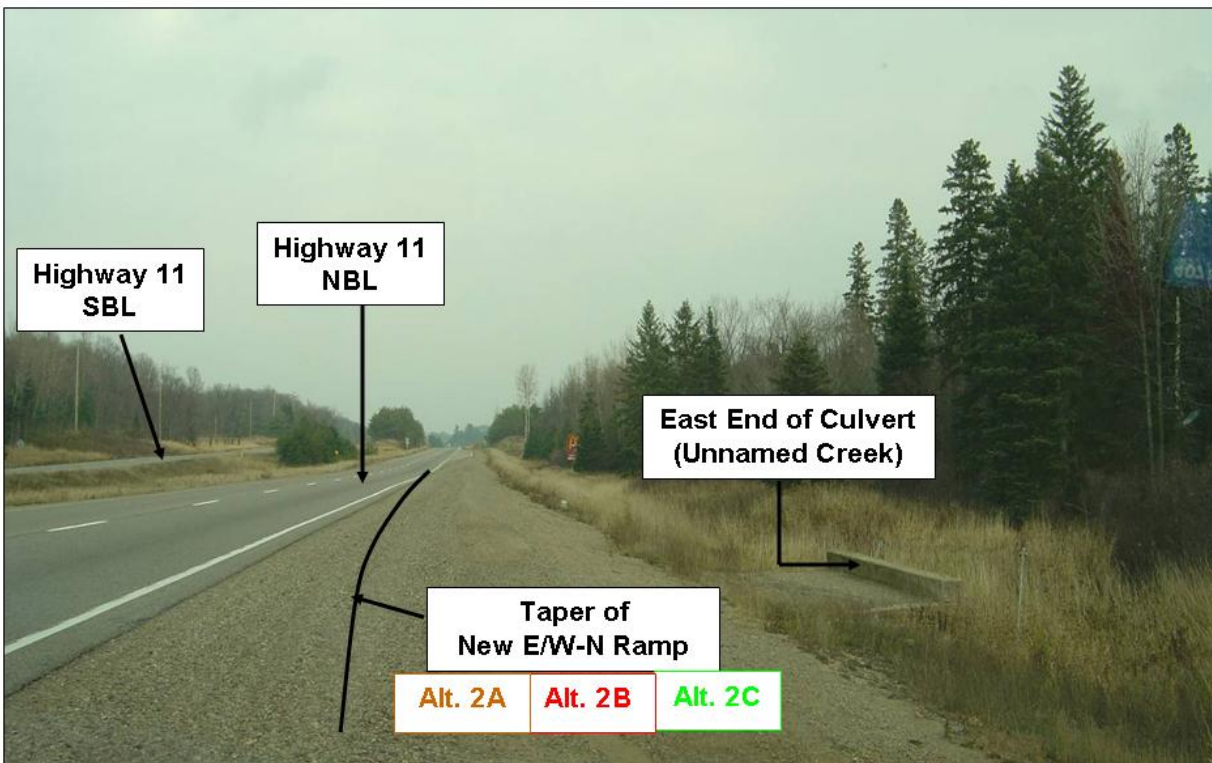


**Photograph 42 VIEW:** Looking south from west shoulder of Highway 11 SBL at Sta. 21+900. Extensive swamp in median and west of Highway 11. (Sept. 26, 2008)



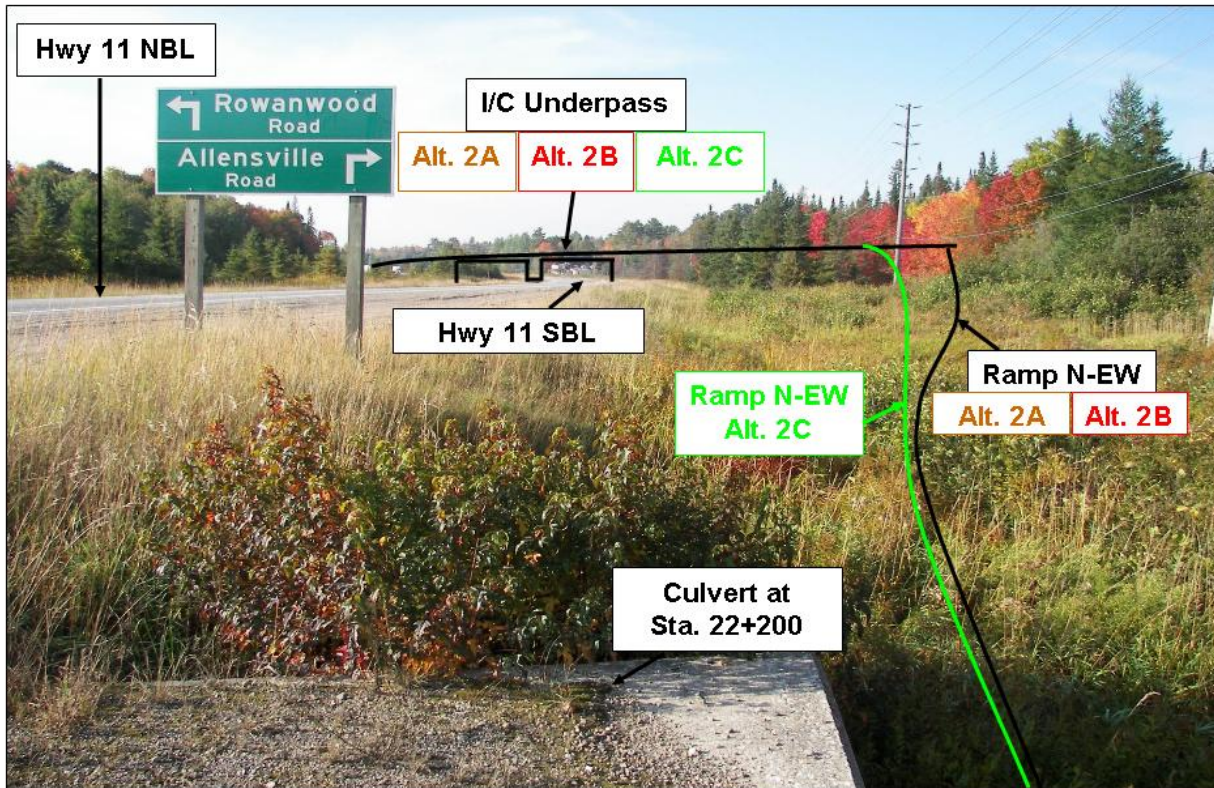


**Photograph 43** VIEW: Looking north from west shoulder of Highway 11 SBL from Sta. 21+970. Proposed ramps will require the extension of the existing culvert at Sta. 22+200. (Sept. 26, 2008)

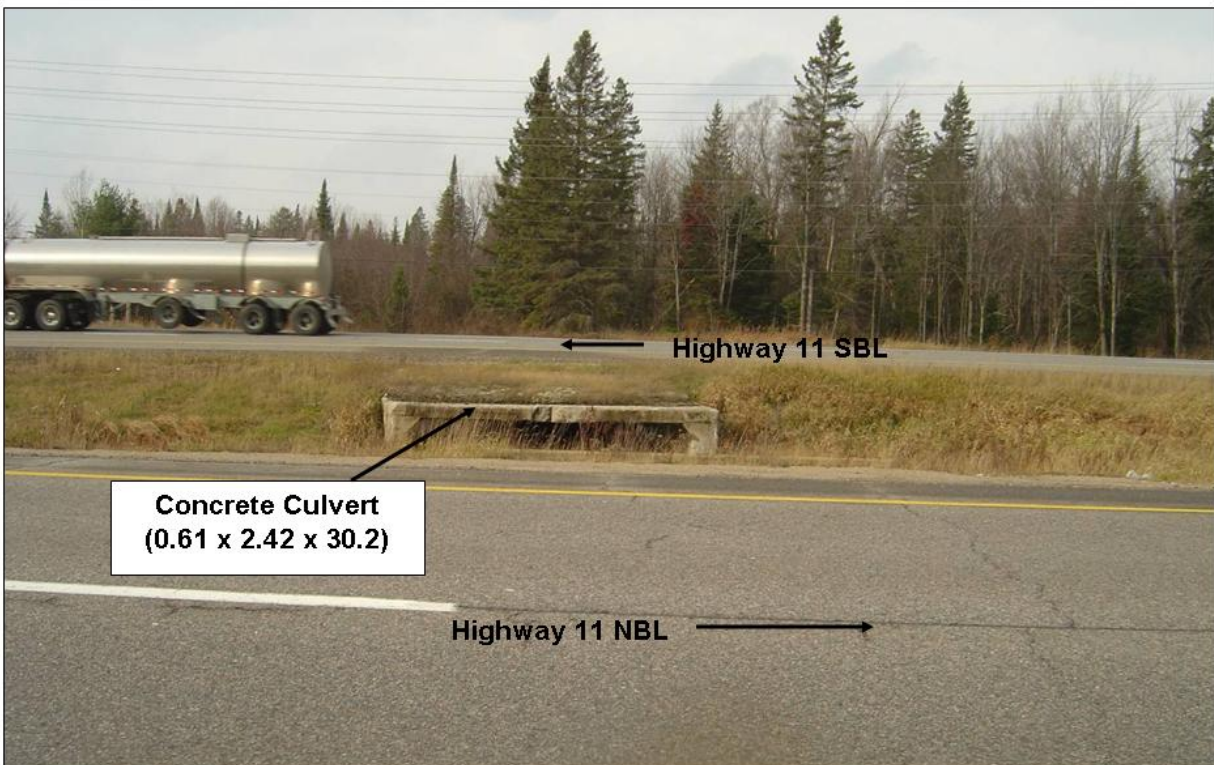


**Photograph 44** VIEW: Looking north from east shoulder of Highway 11 NBL at about Sta. 22+100. Unnamed tributary to Spider Lake restricts alignment of the E/W-N Ramp. The proposed ramp must be parallel to Highway 11 before this water course and utilize the existing concrete culvert to minimize impacts to the stream. (Nov. 2007)





**Photograph 45** VIEW: Looking south across west end of culvert of stream feeding Spider Lake at Sta. 22+200. Note proposed ramps will require the extension of the culvert. (Sept. 26, 2008)



**Photograph 46** VIEW: Looking west from east shoulder of Highway 11 NBL at about Sta. 22+200. Unnamed tributary to Spider Lake restricts alignment of the N-E/W Ramp. The proposed ramp must be parallel to Highway 11 before this water course and utilize the existing concrete culvert to minimize impacts to the stream. (Nov. 2007)





**Photograph 47** VIEW: Looking south from south shoulder of Right-in-Lane to Picnic Area at about Sta. 22+525. (Nov. 2007)

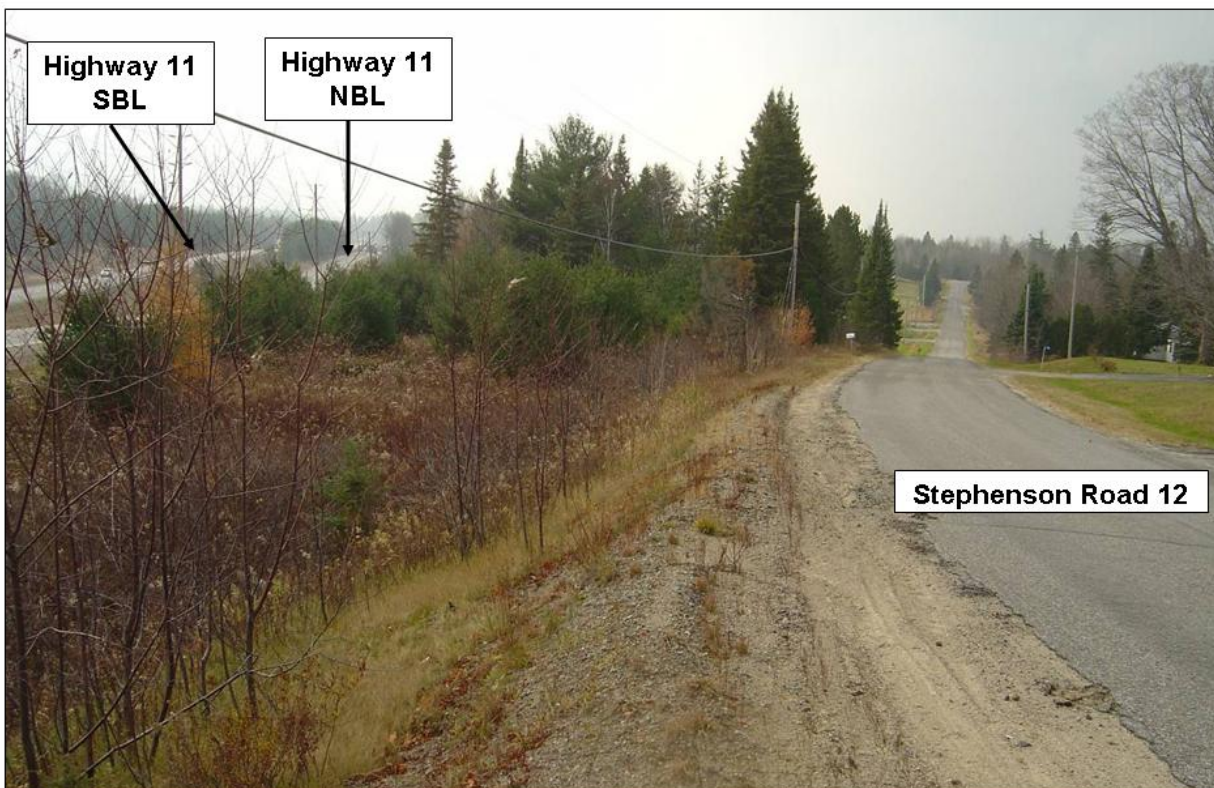


**Photograph 48** VIEW: Looking north from traffic island at right turn into MTO Picnic Area at about Sta. 22+580 along Highway 11 NBL east ditch. Bedrock visible in median at Sta. 22+650. (Nov. 2007)



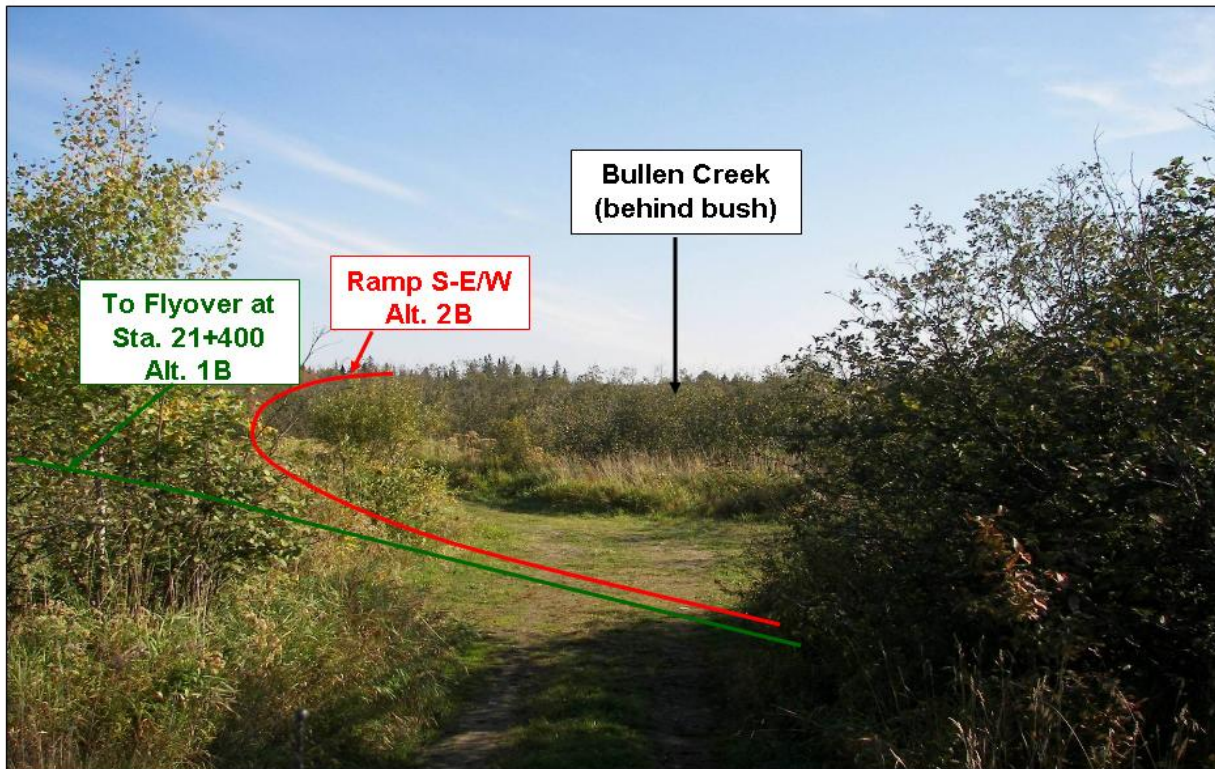


**Photograph 49 VIEW:** Looking south from west shoulder of Highway 11 SBL at about Sta. 22+680. Bedrock exposures (1.0 to 2.0 m) on both sides of Highway SBL at Sta. 22+620 to 22+680. (Nov. 2007)



**Photograph 50 VIEW:** Looking south from east shoulder of Stephenson Road 12 across bush area and Highway 11 bedrock cut in distance. Bedrock cut at Sta. 22+750. (Nov. 2007)



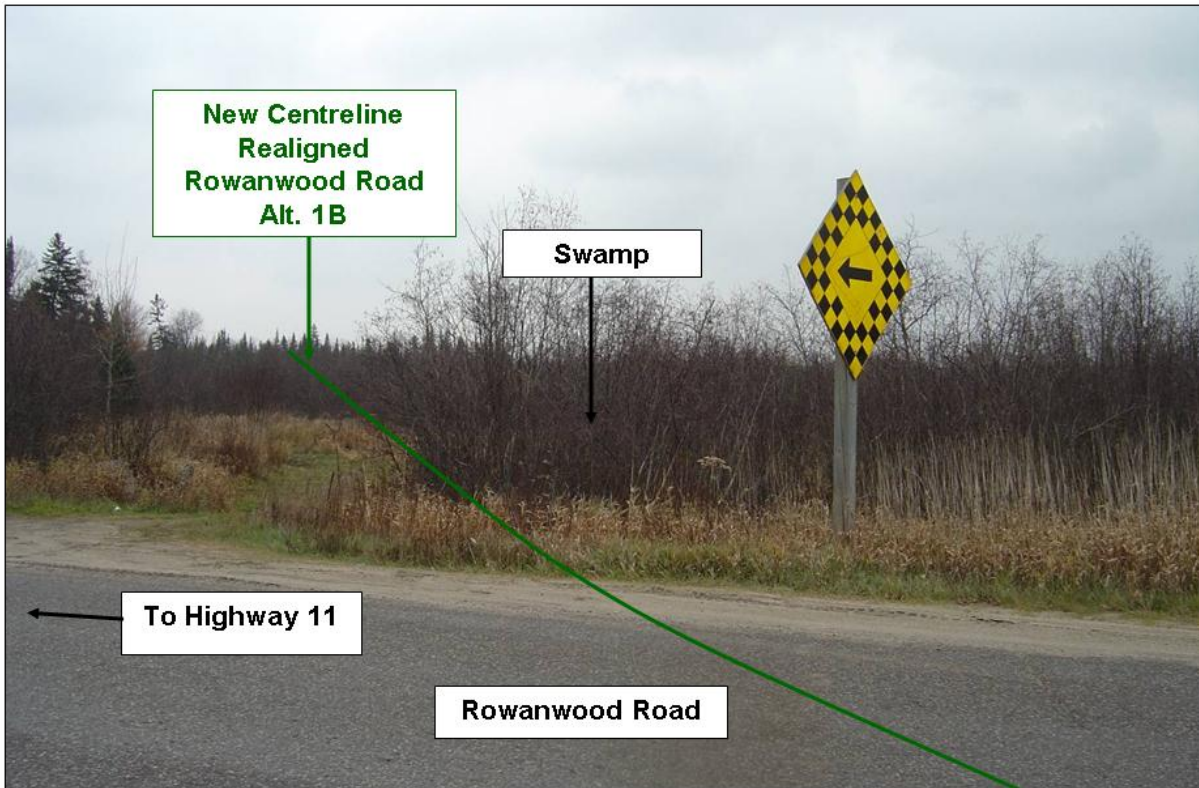


**Photograph 51 VIEW:** Looking northerly from north shoulder of Rowanwood Road about 120m east of east shoulder of Highway 11 NBL. Connection of Rowanwood Road to alternative flyover at Sta. 21+400 or interchange at Sta. 21+780 are illustrated. Roads are in the Bullen Creek floodplain. (Sept. 26, 2008)

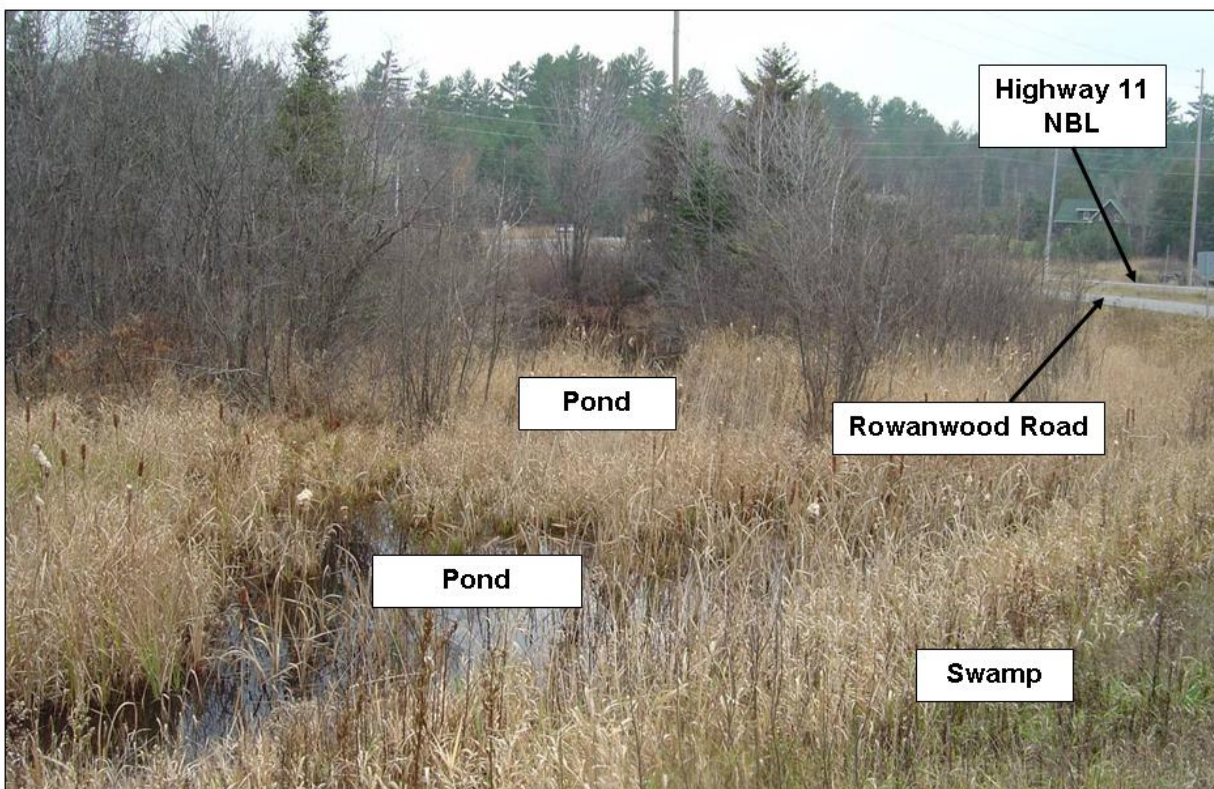


**Photograph 52 VIEW:** Looking south from east shoulder of Rowanwood Road at about 100 m north of Rowanwood Retirement Home. Swamp area in foreground. (Nov. 2007)





**Photograph 53** VIEW: Looking north from west shoulder of Rowanwood Road about 50 m south of Highway 11 at grade crossing along the new centreline of the realigned Rowanwood Road across major swamp area. (Nov. 2007)

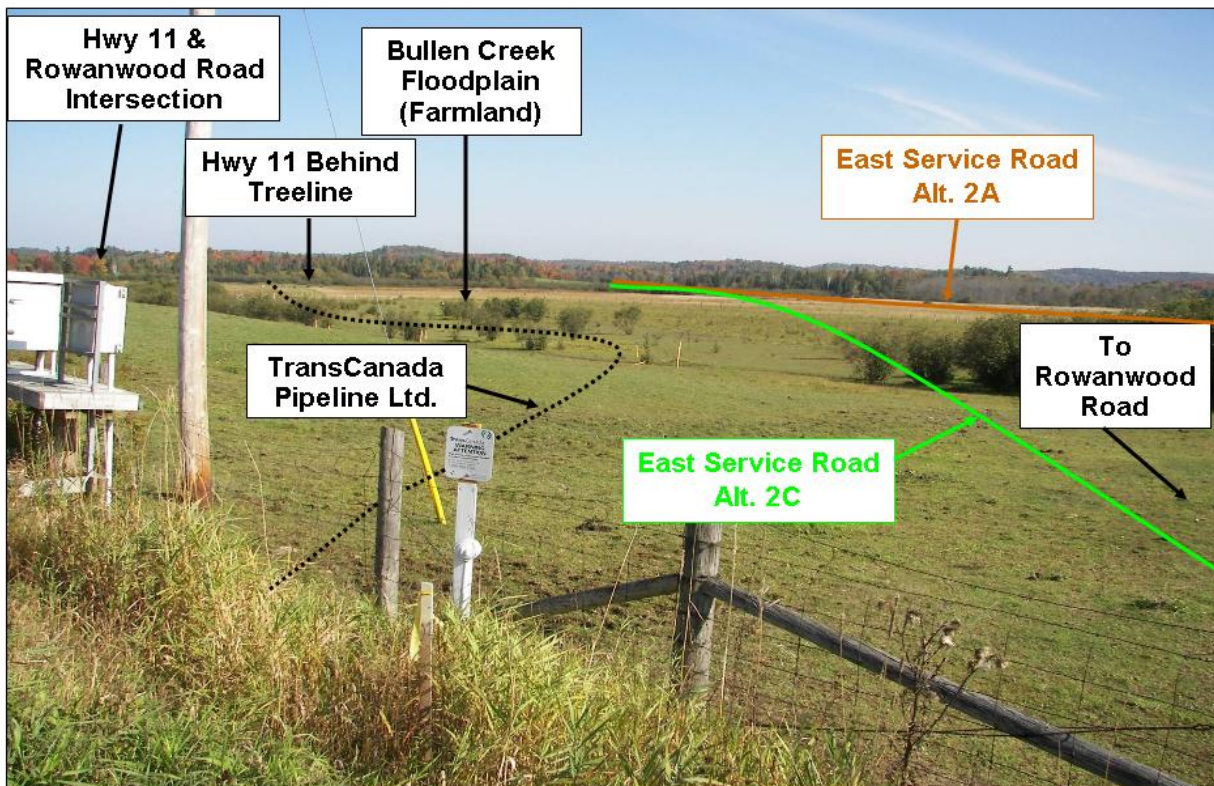


**Photograph 54** VIEW: Looking west from west shoulder of Rowanwood Road at about Sta. 21+200, some 100 m south of the Highway 11 at grade crossing. Two major ponds readily evident in swamp area at SE quadrant of Rowanwood Road and Highway 11 at grade intersection. (Nov. 2007)





**Photograph 55** VIEW: Looking south from east shoulder of Rowanwood Road at single lane bridge structure crossing Bullen Creek at 50 m south of Rowanwood Retirement Home. (Nov. 2007)

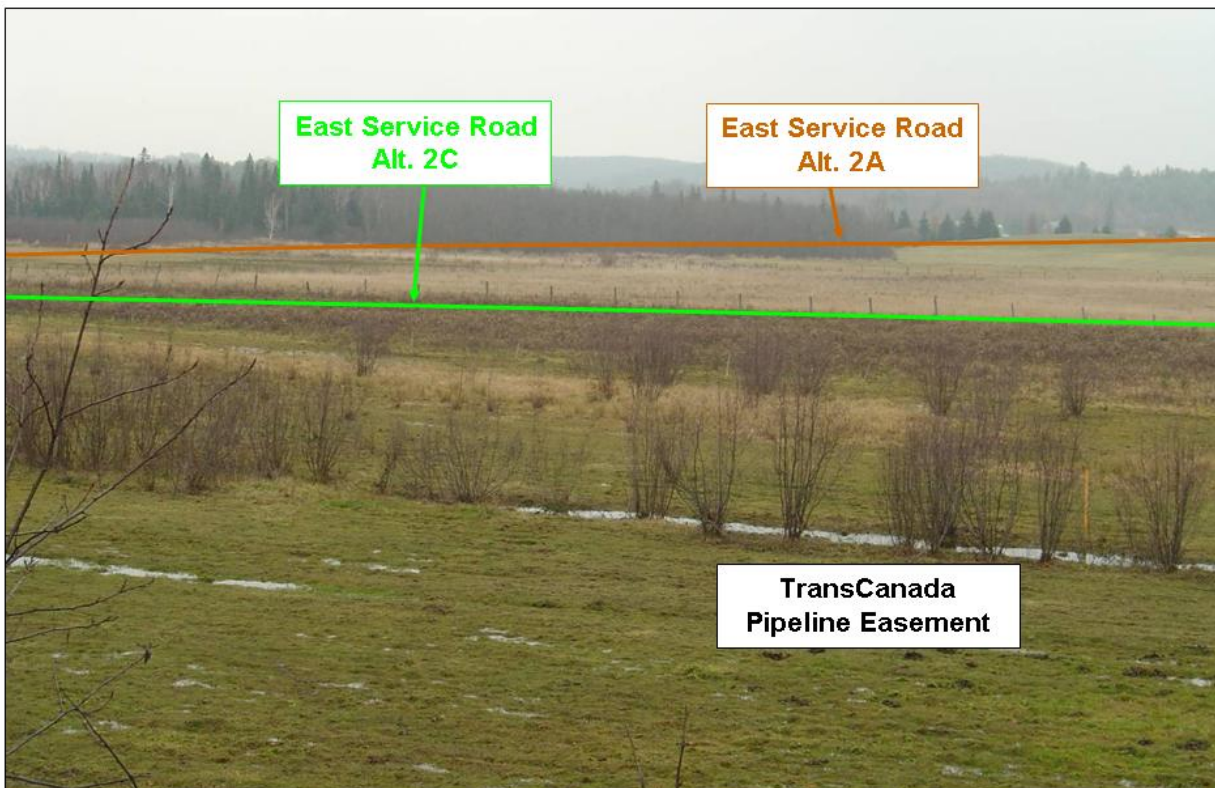


**Photograph 56** VIEW: Looking northerly from TransCanada Pipeline Ltd. crossing of Rowanwood Road across Bullen Creek floodplain. Both east Service Road alternatives traverse the Bullen Creek floodplain. (Sept. 26, 2008)



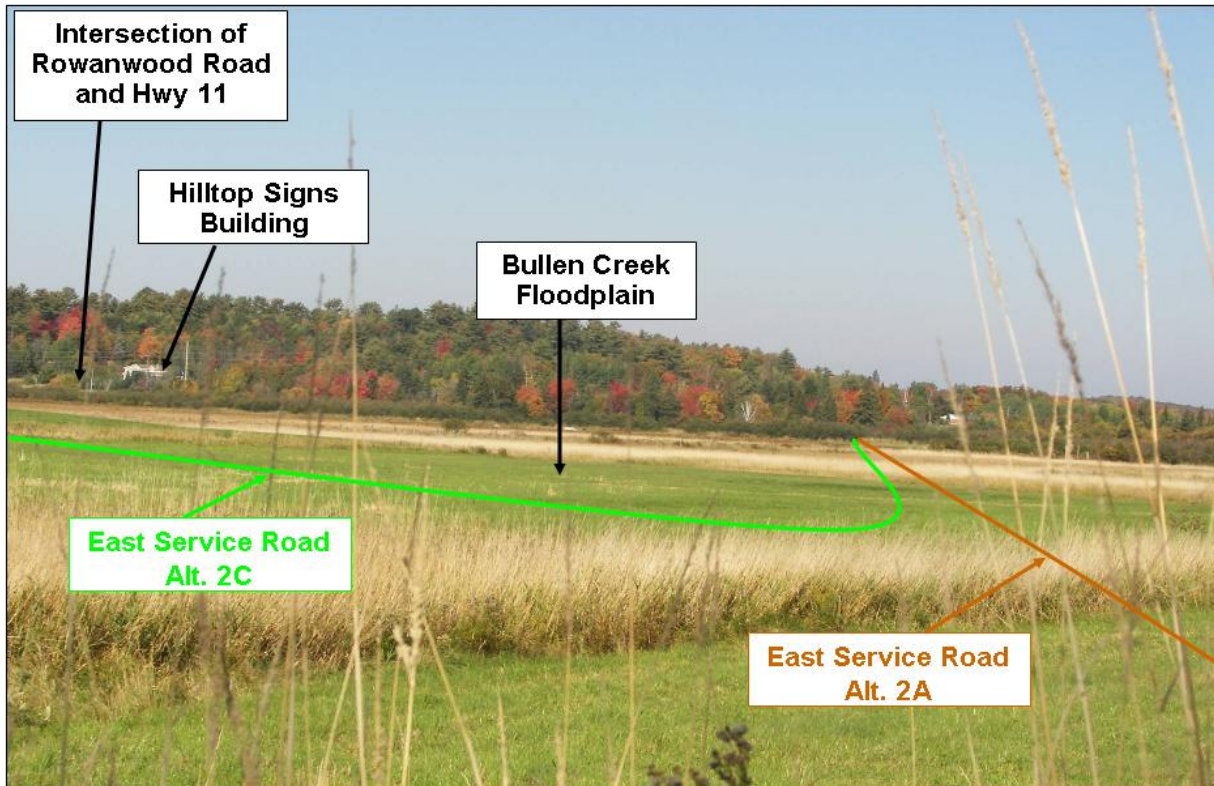


**Photograph 57** VIEW: Looking east from east shoulder of Rowanwood Road opposite No.119 (Hoover/Robertson) across open field. TransCanada Pipeline Easement in foreground at creek. (Nov. 2007)

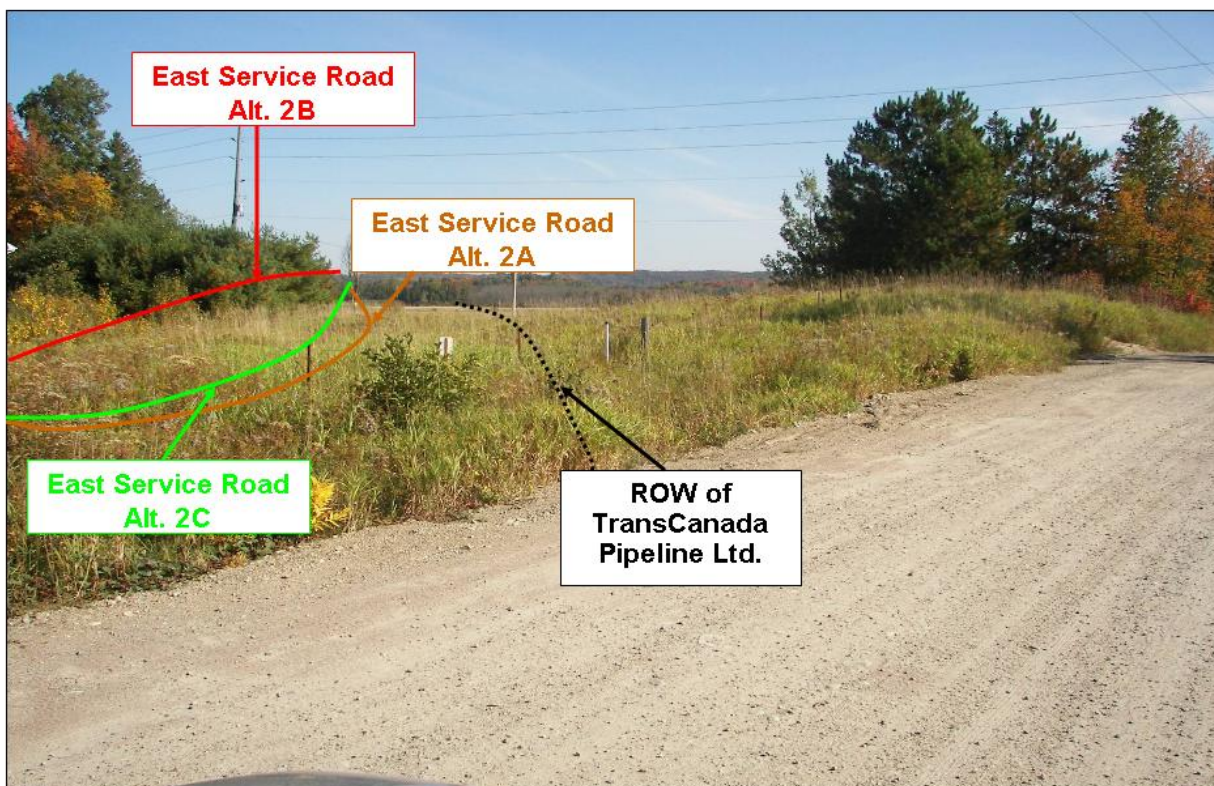


**Photograph 58** VIEW: Looking northeast from east shoulder of Rowanwood Road opposite No. 119 (Hoover/Robertson) across open field with bush and swamp area in distance. TransCanada Pipeline Easement in foreground at creek. (Nov. 2007)





**Photograph 59** VIEW: Looking westerly from Rowanwood Road to Highway 11 across Bullen Creek floodplain. (Sept. 26, 2008)



**Photograph 60** VIEW: Looking southerly along right-of-way of TransCanada Pipeline Ltd. East Service Road alternatives 2A, 2B and 2C traverse typically silty/sandy deposits in this section. (Sept. 26, 2008)