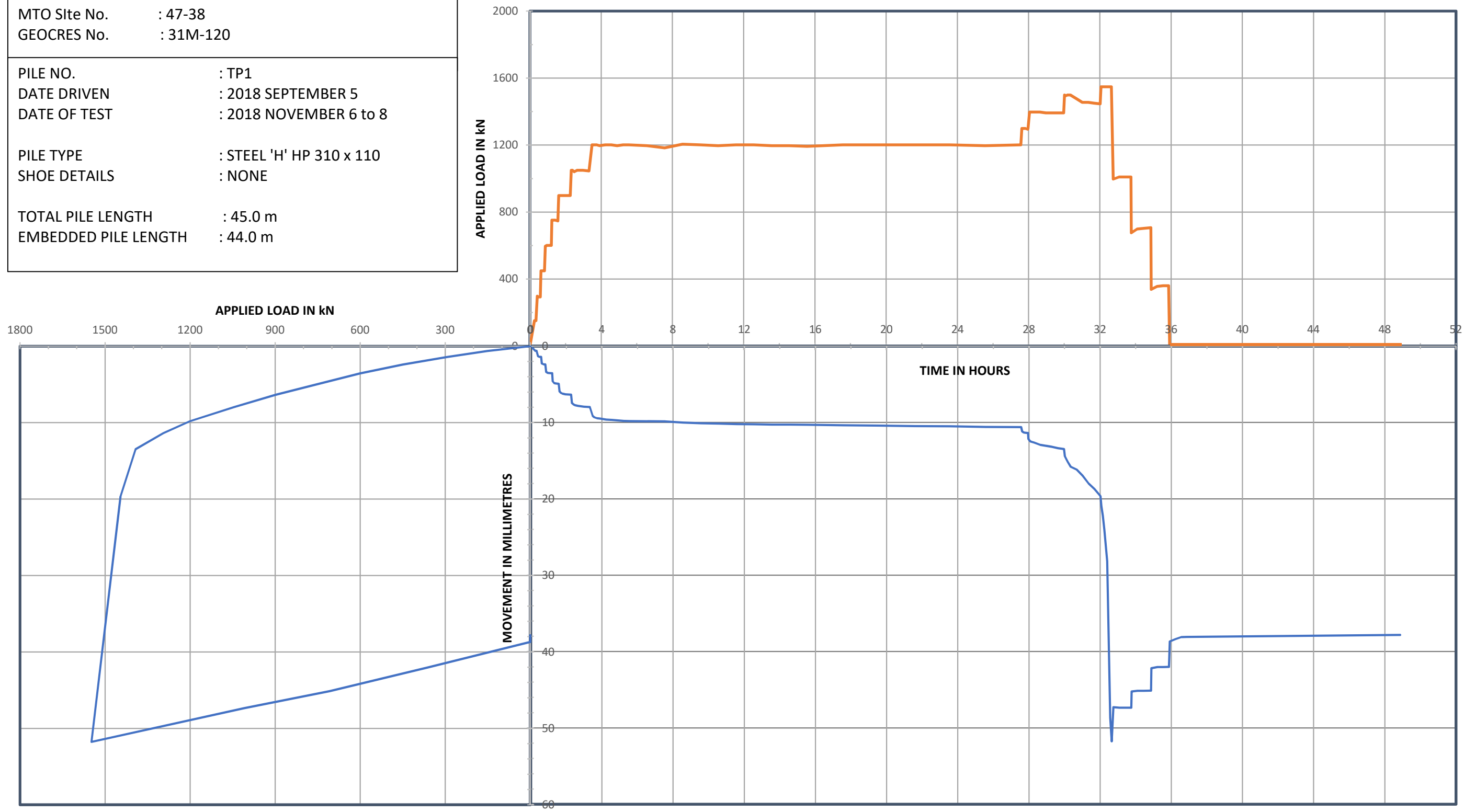


LOCATION	: Blanche River Bridge Hwy 569 & Blanche River 10 km North of Temiskaming Shores (New Liskeard)
MTO CONT WP No.	: 5163-13-00
MTO Site No.	: 47-38
GEOCRES No.	: 31M-120
PILE NO.	: TP1
DATE DRIVEN	: 2018 SEPTEMBER 5
DATE OF TEST	: 2018 NOVEMBER 6 to 8
PILE TYPE	: STEEL 'H' HP 310 x 110
SHOE DETAILS	: NONE
TOTAL PILE LENGTH	: 45.0 m
EMBEDDED PILE LENGTH	: 44.0 m

DRAWING 2





Bermingham Construction
600 Ferguson Avenue North
Hamilton, Ontario
L8L 4Z9

Proposed Replacement of Blanche River Bridge
Highway 569 in New Liskeard, Ontario
Pile Load Test Program
~ Static Load Testing of Pile TP1
(8 Weeks After Initial Driving)

Project Number
BRM- 607254-A0

Prepared By:

exp Services Inc.
1595 Clark Boulevard
Brampton, Ontario L6T 4V1
Telephone: (905) 793-9800
Facsimile: (905) 793-0641

Date Submitted
2018-11-27

Table of Contents

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1 Introduction	1
2 Fieldwork – Pile Installation and Testing	2
3 Observations and Test Results	4
4 Closure	5

Appendices

Appendix A: Drawings

Appendix B: Reference Drawings, Documents and Subsurface Information

Appendix C: Calibration Certificates

1 Introduction

The Ministry of Transportation of Ontario (MTO) has commissioned Bermingham Foundation Solutions (Bermingham) to carry out a pre-construction pile load test program for the proposed replacement of the Blanche River Bridge (MTO Structure No. 47-38), located approximately 150 m north of the intersection of Hilliardton Road and Highway 569, in the town of Hilliardton near the district of New Liskeard.

The primary purpose of the program is to examine the geotechnical resistances of steel pile foundations that have been proposed for the planned bridge. The area of the test pile program is the south-east corner of the bridge. The methods for examination include a series of two static load tests of one pile (TP1) and a series of three dynamic load tests on the second, adjacent pile (TP2).

Exp Services Inc. (EXP) was retained by Bermingham to monitor the Static Load Testing of Pile TP1 and to perform dynamic testing of the Pile TP2.

In this report is presented the results of the static load test that was carried out on the Pile TP1 from November 6 to 8, 2018 (approximately 8 weeks after the end of initial driving). This test is the second of two static load tests that were planned. The results of the dynamic tests and first static load test are to be published under separate covers.

Pile TP1 is a 310 mm x 110 kg/m steel HP-section and is made up of three 15.2 m (~50 feet) long steel sections and driven to an embedded depth of 44.0 m. The pile was statically load tested in general accordance with ASTM D1143; static load to the pile was imposed by jacking the test pile against a steel reaction frame. The steel frame was designed and constructed by Bermingham and supported in by eight (8) open-ended pipe piles (406 mm dia. x 9.5 mm thick) that are embedded 33 m into the ground.

Subsurface characteristics of the site is described in detail in the project Foundation Investigation Report (report Geocres No. 31M-120); it indicates that the site is underlain by a deposit of soft to firm varved clay that is more than 50 m thick. At the request of the Owner, Bermingham had also commissioned a cone penetrometer test (CPTu) at the site. Full results were published by under a separate cover by others. Selected subsurface information (borehole logs, CPTu plots) are shown on Appendix B.

2 Fieldwork – Pile Installation and Testing

Pile Installation

On September 10, 2018, pile TP1 was driven to an embedded length of approximately 44.0 m. On September 11, it was re-tapped and dynamically load tested. On October 4, 2018, pile TP1 was statically load tested at approximately 3 weeks after installation and re-tapping. On November 6, 2018, it was statically tested to examine its geotechnical resistance at approximately 3 weeks after installation and re-tapping.

Pile TP1 is a steel H-pile (HP310x110) and it was driven with a Berminghammer B-32, open-ended diesel impact hammer. The hammer is rated at 110 kJ and has a maximum physical stroke of 3.5 m at the rated energy (35 blows per minute).

The pile installation record indicates that the effort required to drive the pile into the soft to firm varved clay deposit was low (less than 150 blows in total). The penetration resistance at the end of driving was reported to be approx. 0.25 m per 2 blows. It is understood the diesel engine did not combust during installation due to the relatively large pile movement per blow.

The following day after installation, pile TP1 was re-tapped and dynamically tested. Prior to the beginning of the re-tapping, the hammer was warmed up by striking an adjacent pile. The penetration resistance during the beginning of the 1-day re-tap was found to be approx. 7 mm for 5 blows (average rebound of 7 mm); the energy transferred to the pile was approximately 4 kJ, as calculated by the Pile Driving Analyzer.

Load Test Procedure

Pile TP1 was statically load tested in general accordance with ASTM D1143-07 Standard Test Methods for Deep Foundations Under Static Axial Compressive Load. Procedure 'B' of the ASTM D1143, with modifications specified by the Owner.

The procedure for the 8-week test is summarized below, and in Appendix A.

The 8-week static load test comprised a single load–unload cycle where axial compressive load were imposed at 150 kN increments until a load of 1200 kN.

After a load of 1200 kN was reached, load were placed at increments of 100 kN until the imposed load reached 1500 kN. When the load of 1500 kN was reached, loads were to be placed at increments of 50 kN until the Maximum Test Load of

1700 kN or until the pile head had displaced by 15 % of its width (i.e. ~46.5 mm for a HP310x110 pile).

Load increments were maintained on the pile until the pile movement was equal/less than 0.25 mm per hour or for a maximum of 2 hours. At the specific request of the client, the load increment of 1200 kN was maintained for 24 hours.

Pile movement under each load increment were measured after load placement and at intervals of 5, 10 and at every 20 minutes for the first two hours. Where the load was held a load of 1200 kN, readings were to be taken as above for the first 2 hours, at every hour from the 2nd to 12th hour and at every 2 hours from the 12 to 24th hour after load placement.

Removal of the imposed loads was carried out in decrements of 25% of the maximum imposed load and at 1 hour intervals. Readings were taken at zero load until all readings had stabilized (i.e. every 20 mins for the first hour and at 12 hours after fully unloading).

Equipment for Static Load Test and Test Setup

Loads were imposed to the test pile by jacking it against a reaction frame using a hydraulic jack. The reaction frame comprised a steel test beam and anchor piles that were designed and constructed by Bermingham. Eccentric loading was limited through the use of a hemispherical bearing and imposed loads were measured using a load cell in conjunction with a digital pressure gauge. The layout and setup of the test are shown on Appendix A.

Pile head movement was measured using two (2) dial gauges mounted at approximately equidistance from the centre and on opposites sides of the pile top. Gauge stems were parallel to the direction of the load application. The gauges recorded vertical displacement relative to two (2) self-supporting reference beams. The true movement of the pile was taken to be the average of the two (2) deflections measured on the gauges. The true, imposed load was taken to be the readings from the load cell.

The load cell, hydraulic jack, pressure gauge and dial gauges were calibrated prior to the commencement of the test.

3 Observations and Test Results

Test loads were imposed incrementally at approximately 150 kN increments until an imposed load of 1200 kN was reached. At the request of the Owner, this load was held for 24 hours before load placement resumed at increments of 100 kN.

Once the imposed load had reached 1500 kN, the subsequent load increment was placed at an increment of 50 kN. When the imposed load was increased to 1550 kN, “plunging” failure of the pile was observed. Attempts to maintain the load increment of 1550 kN on the pile resulted in continuous, downward movement of the pile.

The results are graphically illustrated on Drawings 1 & 2. On Drawing 1, the results of the previous load test were also plotted. Several key observations are noted below:

- a. Immediately after the load of 1200 kN was placed, the pile head movement was approximately 9.14 mm (0.36 inches).
- b. Two hours after the load of 1200 kN was placed, the pile head movement was 9.82 mm (0.39 inches). The rate of movement was 0.076 mm / hour (0.003 inches / hour).
- c. 24 hours after the load of 1200 kN was placed, the pile head movement was observed to be 10.62 mm (0.418 inches).
- d. At a load of approximately 1300 kN, the load increment prior to an obvious increase in the load-movement gradient, the pile head movement was approximately 11.38 mm
- e. The incremental load of 1550 kN could not be maintained on the pile and resulted in “plunging” failure of the pile.

When the total (gross) downward movement of the pile head reached ~52 mm, the pile was unloaded in decrements of approximately 25% of its maximum imposed load.

Upon fully unloading, the pile head movement had recovered; the displacement was ~38.7 mm from its original position. At 12 hours after full unloading, the pile head movement had further recovered; its displacement was found to be ~37.8 mm from its original position.

4 Closure

As part of a preconstruction test pile program for the proposed replacement of Blanche River Bridge on Highway 569, New Liskeard, a static load test was carried out on Test Pile TP1 at about 8 weeks after it was installed. The 8-week static test is the second of a series of two planned static load tests. The first test is took place in October 2018.

Pile TP1 was originally driven to an embedment depth of 44 m below grade on September 10, 2018 and then re-tapped and dynamically at the beginning of its 1-day restrike (BOR₁) with equipment from the PDA. The ultimate geotechnical resistance at the BOR₁ was evaluated to be 560 kN.

On October 2, 2018, Pile TP1 was statically load tested at approximately 3 weeks after installation. The results of the test indicated that the pile was not able to maintain the incremental load of 1350 kN, which resulted in its plunging failure.

On November 6, 2018, Pile TP1 was statically tested at approximately 8 weeks after installation. The results of the test indicate that the pile was able to maintain the imposed load of 1200 kN for 24 hours, but was not able to maintain the incremental load of 1550 kN, which resulted in its plunging failure.

The results of the static load test also confirm that the ultimate geotechnical resistance of Pile TP1 had increased since it was installed on September 10, and since the static testing on November 6, 2018.

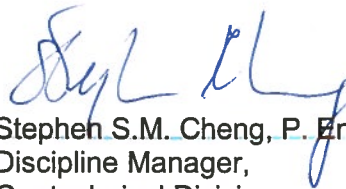
The behaviour and evaluated geotechnical resistance of TP1 reflects the pile resistance at the time of testing i.e. at 8 week after installation; it is possible that the resistance may continue to increase further with time.

We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

Exp Services Inc.



Michael W.K. Choy, P. Eng
Senior Geotechnical Engineer

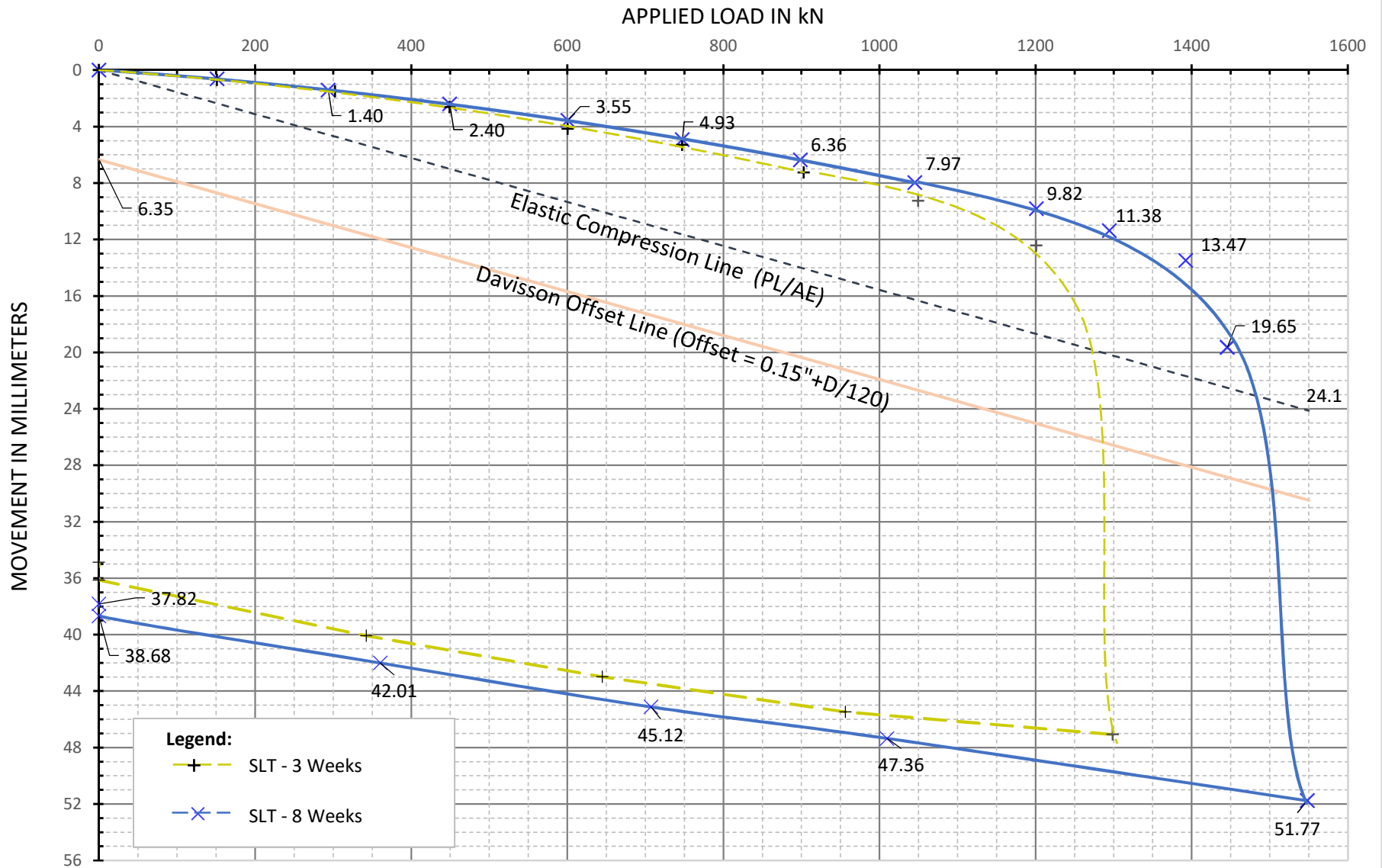


Stephen S.M. Cheng, P. Eng
Discipline Manager,
Geotechnical Division

Appendix A

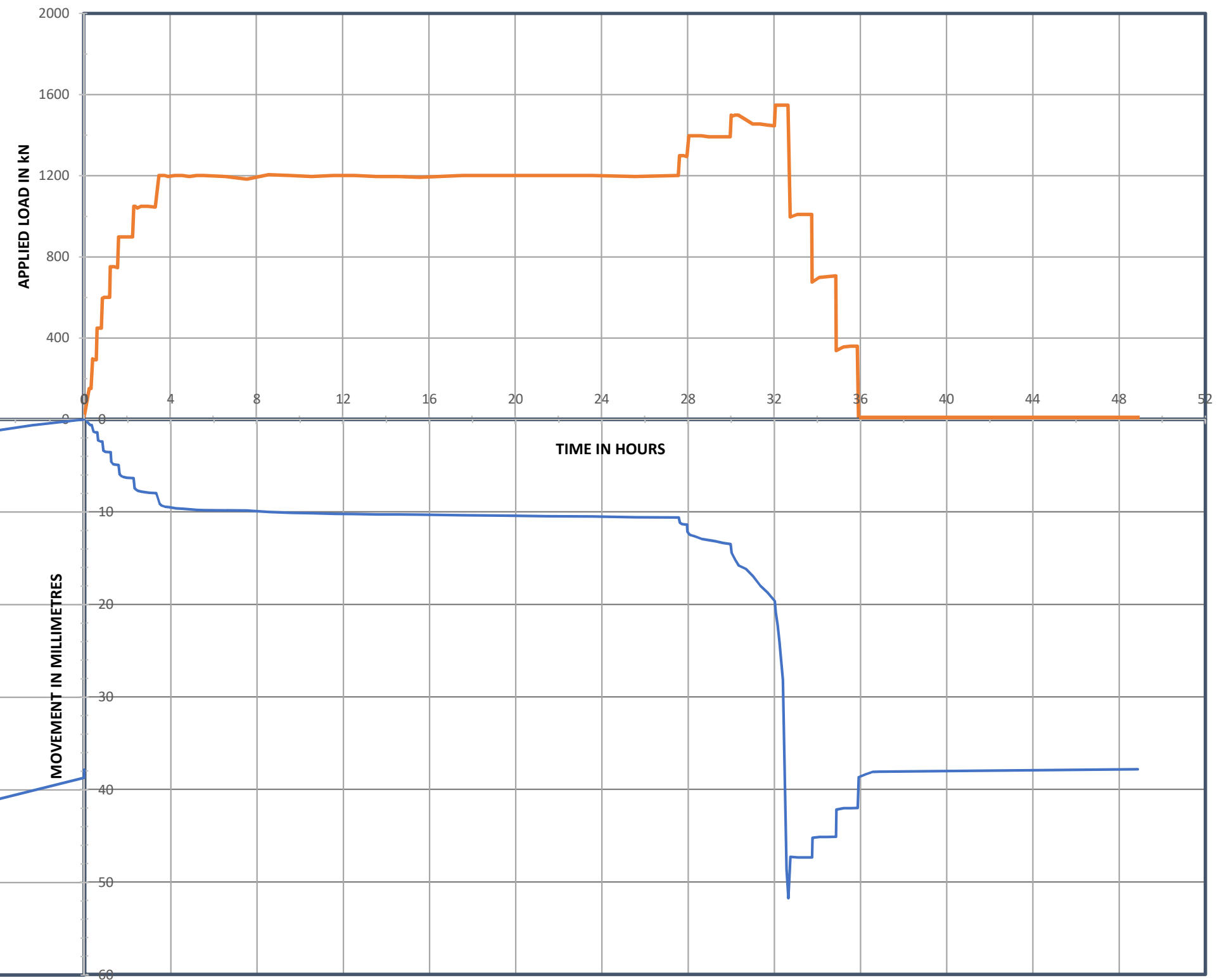
Drawings and Tables

DRAWING 1 - STATIC LOAD TEST ON PILE TP1 - 8 WEEKS AFTER DRIVING LOAD MOVEMENT PLOT



LOCATION : Blanche River Bridge
Hwy 569 & Blanche River
10 km North of Temiskaming Shores
(New Liskeard)
MTO CONT WP No. : 5163-13-00
MTO Site No. : 47-38
GEOCRES No. : 31M-120

PILE NO. : TP1
DATE DRIVEN : 2018 SEPTEMBER 5
DATE OF TEST : 2018 NOVEMBER 6 to 8
PILE TYPE : STEEL 'H' HP 310 x 110
SHOE DETAILS : NONE
TOTAL PILE LENGTH : 45.0 m
EMBEDDED PILE LENGTH : 44.0 m



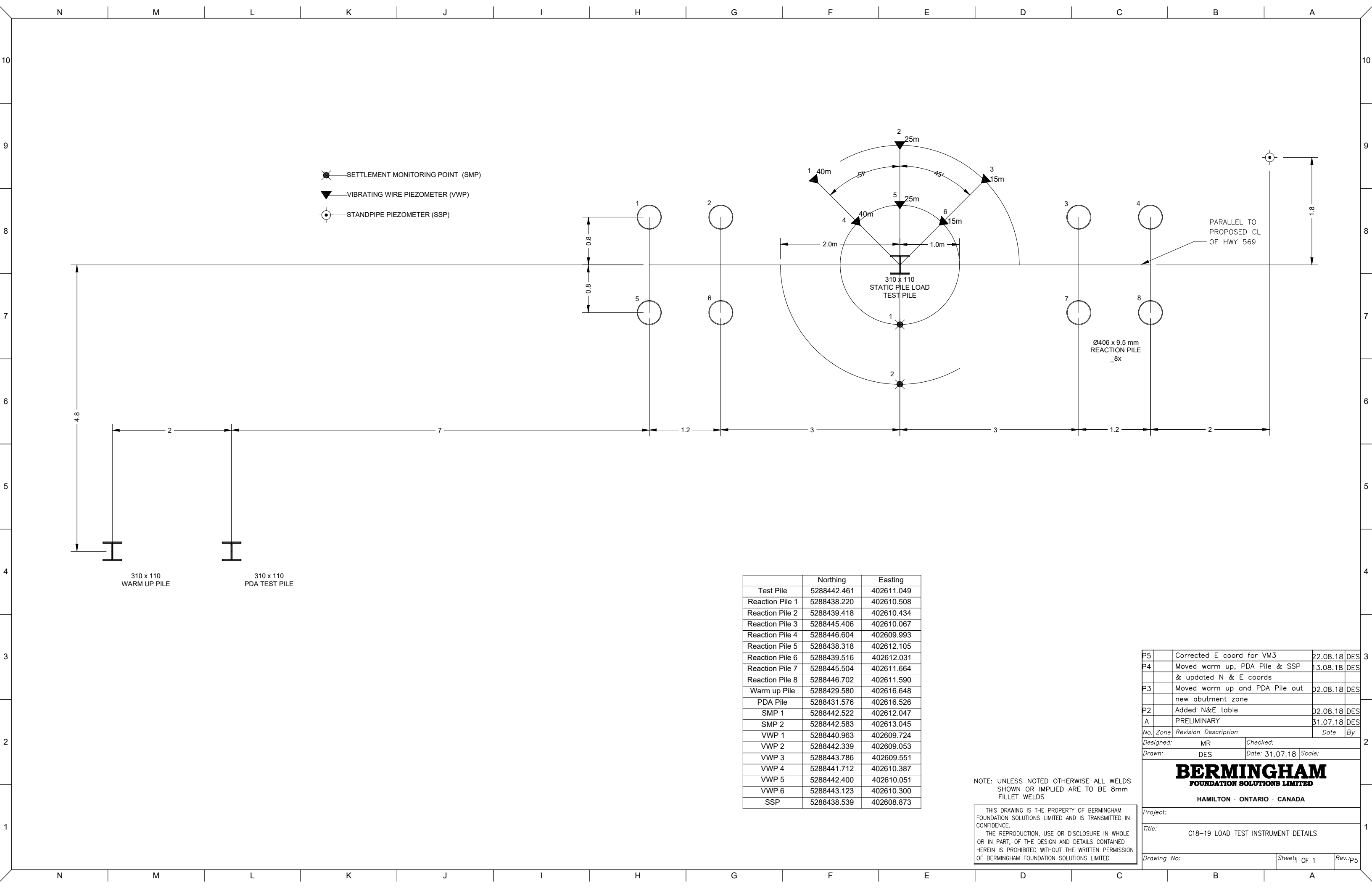
Blanche River Trial Pile Program - Load Placement and Holding Table

Static Load Test at 8 Weeks after Pile Installation

Test Stage	Test Load (kN)	Load Holding Period	Frequency of Readings
LOADING	0	-	baseline reading
	150	2 hours ^{see Note 3}	5 mins., 10 mins. & 20 mins. after load placement, every 20 mins. thereafter for the first 2 hours after load placement, every 60 mins. thereafter from 2nd to 12th hour after load placement, and every 120 mins. thereafter
	300		
	450		
	600		
	750		
	900		
	1050		
	1200	24 hours	
	1300	2 hours ^{see Note 3}	
	1400		
	1500		
	1550		
	UNLOADING	75 % of MTL	1 hour
50% of MTL			
25 % of MTL			
0		12 hours	immediately after unloading, every 20 mins for first hour, and 12 hours after unloading.

Notes:

1. Pile is a steel H-Pile, HP 310x110. MTL is Maximum Test Load.
2. Apply loads incrementally up to MTL or until total pile head movement reaches 46.5mm
3. Maintain load for prescribed period or until movement rate is < 0.25 mm / hr., whichever earlier.



- SETTLEMENT MONITORING POINT (SMP)
- VIBRATING WIRE PIEZOMETER (VWP)
- STANDPIPE PIEZOMETER (SSP)

Test Pile	Northing	Easting
Reaction Pile 1	5288438.220	402610.508
Reaction Pile 2	5288439.418	402610.434
Reaction Pile 3	5288445.406	402610.067
Reaction Pile 4	5288446.604	402609.993
Reaction Pile 5	5288438.318	402612.105
Reaction Pile 6	5288439.516	402612.031
Reaction Pile 7	5288445.504	402611.664
Reaction Pile 8	5288446.702	402611.590
Warm up Pile	5288429.580	402616.648
PDA Pile	5288431.576	402616.526
SMP 1	5288442.522	402612.047
SMP 2	5288442.583	402613.045
VWP 1	5288440.963	402609.724
VWP 2	5288442.339	402609.053
VWP 3	5288443.786	402609.551
VWP 4	5288441.712	402610.387
VWP 5	5288442.400	402610.051
VWP 6	5288443.123	402610.300
SSP	5288438.539	402608.873

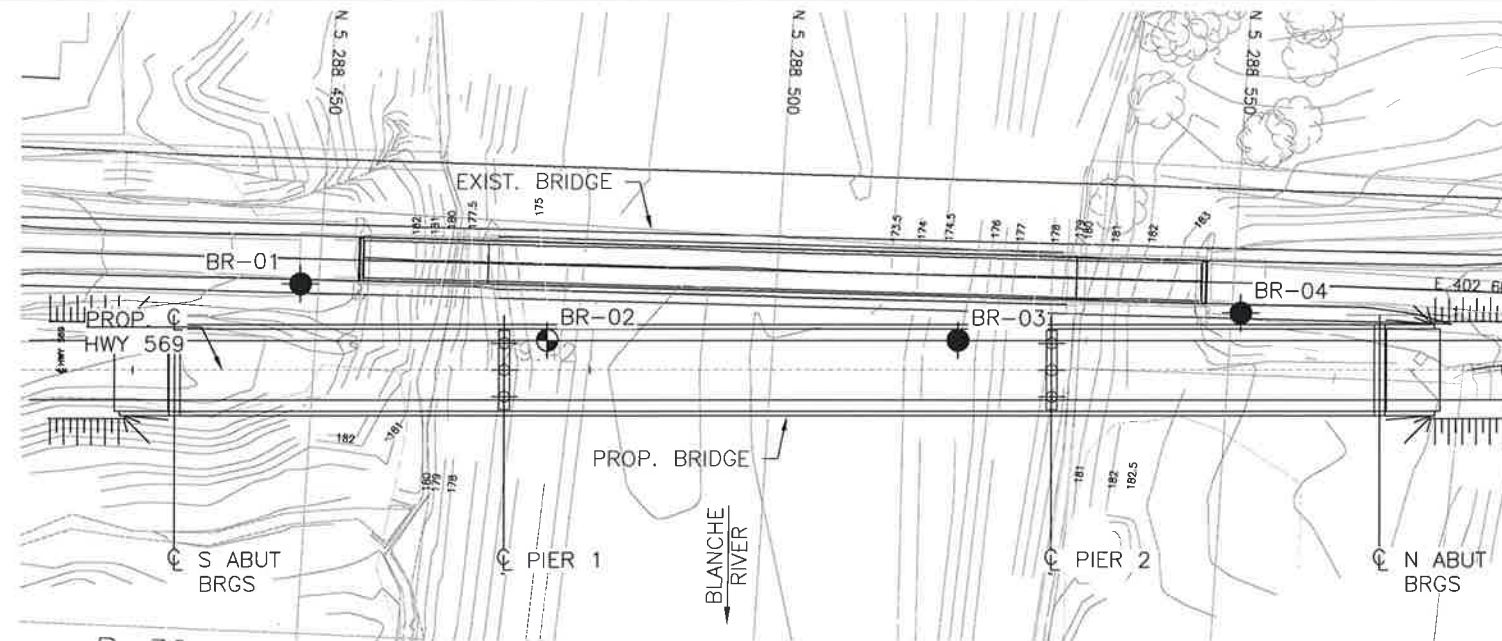
NOTE: UNLESS NOTED OTHERWISE ALL WELDS SHOWN OR IMPLIED ARE TO BE 8mm FILLET WELDS

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THE REPRODUCTION, USE OR DISCLOSURE IN WHOLE OR IN PART, OF THE DESIGN AND DETAILS CONTAINED HEREIN IS PROHIBITED WITHOUT THE WRITTEN PERMISSION OF BIRMINGHAM FOUNDATION SOLUTIONS LIMITED

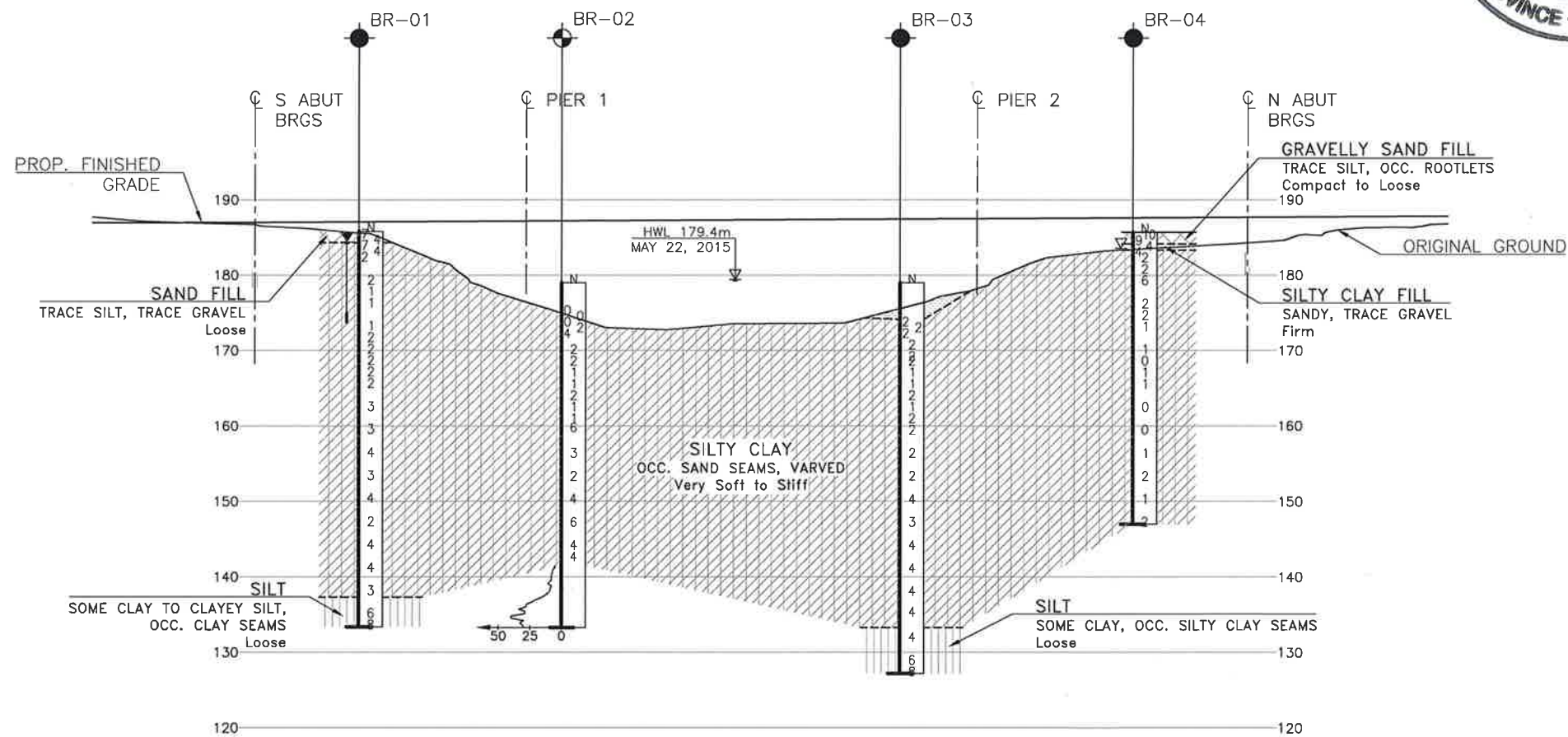
P5	Corrected E coord for VM3	22.08.18	DES		
P4	Moved warm up, PDA Pile & SSP	13.08.18	DES		
	& updated N & E coords				
P3	Moved warm up and PDA Pile out	02.08.18	DES		
	new abutment zone				
P2	Added N&E table	02.08.18	DES		
A	PRELIMINARY	31.07.18	DES		
No.	Zone	Revision	Description	Date	By
Designed:		MR		Checked:	
Drawn:		DES		Date: 31.07.18	Scale:
<div><div>BERMINGHAM</div><div>FOUNDATION SOLUTIONS LIMITED</div><div>HAMILTON · ONTARIO · CANADA</div></div>					
Project:					
Title: C18-19 LOAD TEST INSTRUMENT DETAILS					
Drawing No:				Sheet 1 OF 1	Rev.:p5

Appendix B

Reference Drawings, Documents and Subsurface Investigations



PLAN
SCALE 1:800



PROFILE ALONG C HWY 569

SCALE 1:800
SCALE 1:200

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

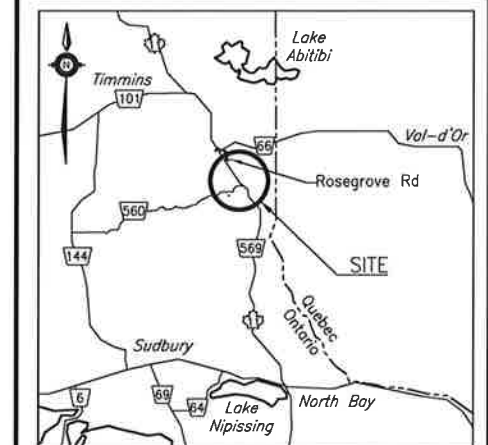


CONT No
WP No 5163-13-00

HIGHWAY 569
BLANCHE RIVER BRIDGE
REPLACEMENT
BOREHOLE LOCATIONS AND SOIL STRATA



SHEET



KEYPLAN

LEGEND

◆	Borehole
◆	Borehole and Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
▽	Water Level
↑	Head Artesian Water
⊥	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING (MTM)	EASTING (MTM)
BR-01	185.8	5 288 448.0	402 608.3
BR-02	179.0	5 288 475.4	402 612.8
BR-03	179.0	5 288 520.3	402 610.0
BR-04	185.7	5 288 551.0	402 605.2

-NOTES-

- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 31M-120

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	AMP	CHK	KS
DRAWN	AN	CHK	SITE
LOAD	DATE	JUN 2017	
STRUCT	DWG	1	

RECORD OF BOREHOLE No BR-01

1 OF 6

METRIC

W.P. 5163-13-00 LOCATION Blanche River Bridge N 5 288 448.0 E 402 608.3 ORIGINATED BY GA
 HWY 569 BOREHOLE TYPE NW Casing COMPILED BY AN
 DATUM Geodetic DATE 2015.11.24 - 2015.11.26 CHECKED BY AMP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										
185.8	GROUND SURFACE							20	40	60	80	100						
0.0	TOPSOIL: (50mm)							20	40	60	80	100						
	SAND , trace silt, trace gravel Loose Brown Moist (FILL)		1	SS	7		185											1 95 4 (SI+CL)
			2	SS	4													
184.4																		
1.4	Silty CLAY , occasional sand seams, varved Firm to Stiff Grey Wet		3	SS	7		184											
			4	SS	4		183											0 0 44 56
			5	SS	2		182											
			1	TW			181											0 0 28 72
							180											
			6	SS	2		179											
			7	SS	1		178											
							177											
			8	SS	1		176											0 0 20 80

Continued Next Page

+³, ×³: Numbers refer to Sensitivity
 20
15 10 5 0
 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BR-01

2 OF 6

METRIC

W.P. 5163-13-00 LOCATION Blanche River Bridge N 5 288 448.0 E 402 608.3 ORIGINATED BY GA
 HWY 569 BOREHOLE TYPE NW Casing COMPILED BY AN
 DATUM Geodetic DATE 2015.11.24 - 2015.11.26 CHECKED BY AMP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa	WATER CONTENT (%)					
	Continued From Previous Page													
	Silty CLAY , occasional sand seams, varved Firm to Stiff Grey Wet		2	TW			175	4.0						
							174							
			9	SS	1		173							
							172	5.0						
			10	SS	2		171							
							170							
			11	SS	2		169	5.0						
							168							
			12	SS	2		167							
							166	4.0						

Continued Next Page

+³, ×³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No BR-01

5 OF 6

METRIC

W.P. 5163-13-00 LOCATION Blanche River Bridge N 5 288 448.0 E 402 608.3 ORIGINATED BY GA
HWY 569 BOREHOLE TYPE NW Casing COMPILED BY AN
DATUM Geodetic DATE 2015.11.24 - 2015.11.26 CHECKED BY AMP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa	WATER CONTENT (%)					
	Continued From Previous Page													
	Silty CLAY , varved Firm to Stiff Grey Wet		21	SS	4		145							0 0 32 68
							144	3.0						
							143							
							142							
			22	SS	4		141							
							140							
							139							
			23	SS	3		138							
							137							
137.3 48.5	SILT , some clay to clayey silt, occasional clay seams Loose Grey Wet						136							

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity 20
15 10 5 (%) STRAIN AT FAILURE

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity



Birmingham Foundation Solutions

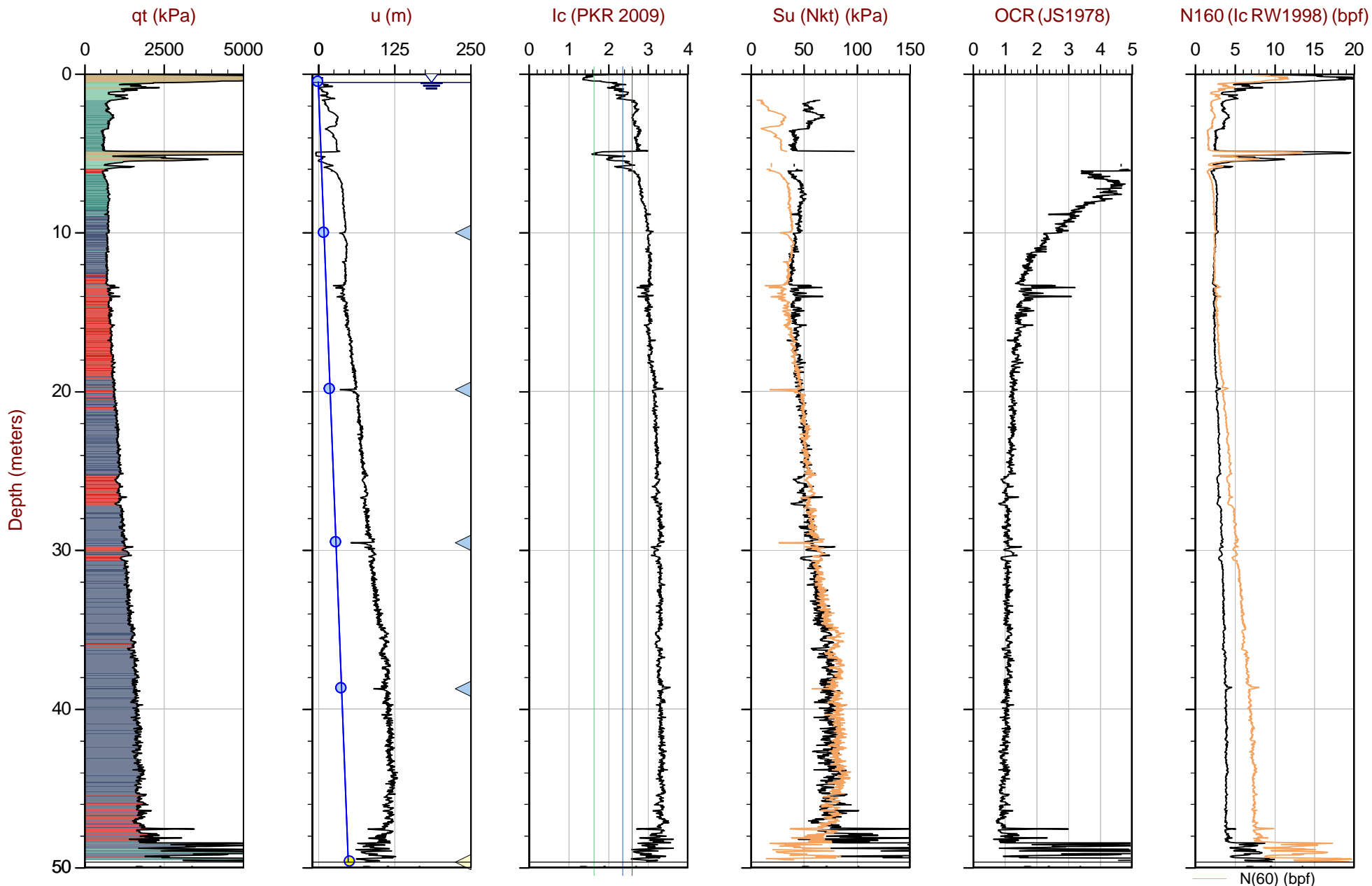
Job No: 18-05053

Date: 2018-09-04 09:19

Site: Hwy 569 and Hilliardton Rd, New Liskeard, ON

Sounding: CPT18-01

Cone: 428:T1000F10U500



Max Depth: 49.650 m / 162.89 ft

Depth Inc: 0.025 m / 0.082 ft

Avg Int: Every Point

Overplot Item: ● Ueq ● Assumed Ueq

File: 18-05053_CP1.COR

Unit Wt: SBTQtn(PKR2009)

Su Nkt/Ndu: 12.5 / 9.0

△ Dissipation, Ueq achieved

— Hydrostatic Line

SBT: Robertson, 2009 and 2010

Coords: UTM 17N N: 5286865m E: 597774m

Sheet No: 1 of 1

△ Dissipation, Ueq assumed

Appendix C

Calibration Certificates

Equipment Corps Inc./ United Machine Tool Corp

October 22, 2018

Dear Andy,

Calibration of a jack system and load cell was conducted by Equipment Corps prior to dispatching the equipment to site. The calibration was conducted using a test frame in which all equipment is third party certified and calibrated to standards ASTM E4-16 AND/OR CSA A23.2-

14. Traceable to NIST to the International Systems of Units (SI Units)

The calibration test was conducted with all of the following components together:

- Digital Pressure Gauge (SN1A00RLH2430)
- Hydraulic jack & powerpack (RCD3006C, SN# 22T031)
- Hemispherical bearing
- Digital load cell (SN21M301)

The following information was recorded at each pressure interval:

- PSI - Pressure applied to the jack being calibrated, as indicated by the digital pressure gauge
- Cylinder Output (i.e. measured force), in lbs as measured by the calibrated test frame
- Expected Output (i.e. theoretical force), in lbs calculated using the jack specifications
- Load Cell Output (i.e. measured force), in lbs as displayed by the load cell

At each pressure interval the load is maintained through the full stroke of the ram. Variance is calculated as the difference between the Cylinder Output and Expected Output, divided by the Expected Output:

$$\text{Variance} = \frac{(\text{Cylinder Output} - \text{Expected Output})}{\text{Expected Output}}$$

The results are tabulated on the following page, followed by the equipment specifications for the jack and load cell.

Regards,

DAVE KISEL
EQUIPMENT CORPS/
UNITED MACHINE TOOL LTD
1256 ARVIN AVENUE, STONEY CREEK, ON L8E 0H7
P 905-545-1234 F 905-545-1270 C 905-730-1117
www.equipmentcorps.com

1256 ARVIN AVE, STONEY CREEK ON L8E 0H7
(905)545-1234, 1-800-461-1847, Fax(905)545-1270

Certificate #	Date & Time	Surface Area	Tested By	NOTES
761	2018-09-14 13:26	91.5	SHANE ADORANTI	FULL VISUAL INSPECITON

Detailed Results for 22T031 loadcell/load cap

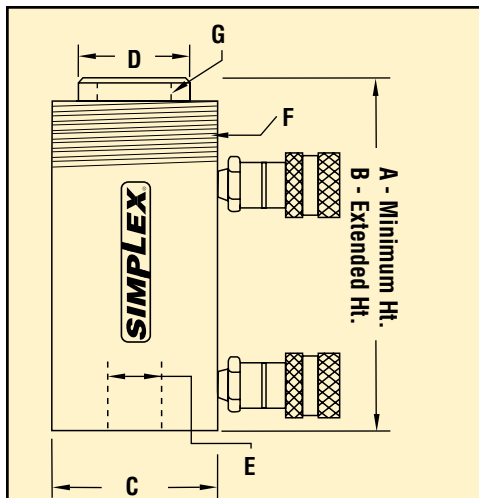
PSI	Cylinder Output	Expected Output	Load Cell Output	Variance	% Variance (+/- 5%)	Pass / Fail
1000	92,320	91,500	91,215	820	0.90%	Pass
2000	182,540	183,000	181,013	-460	-0.25%	Pass
3000	274,980	274,500	274,392	480	0.17%	Pass
4000	365,180	366,000	365,992	-820	-0.22%	Pass
5000	457,900	457,500	457,000	400	0.09%	Pass
6000	549,000	549,000	549,000	0	0.00%	Pass
7000	640,500	640,500	640,500	0	0.00%	Pass
8000	732,000	732,000	732,000	0	0.00%	Pass
9000	823,500	823,500	823,500	0	0.00%	Pass
10000	915,000	915,000	915,000			

LIGHT BLUE VALUES ARE ASSUMED VALUES DUE TO THE CAPACITY OF OUR TEST BED.
 VARIANCE AND PASS/FAIL CALCULATED ON THE CYLINDER OUTPUT VS. EXPECTED
 OUTPUT. LOAD CELL VALUES ADDED TO CHART FROM CAPTURED DATA FOR
 INFORMATION PURPOSES.

Simplex Center Hole Cylinders Raise 6,000 Ton Bridge Span 170 Ft.



Engineers from around the world watched as Simplex center hole cylinders raised a 6,000 ton bridge section more than 170 ft. over the Willamette River in Portland, OR. The span was constructed up river and barged into position. Using pull rods and couplings, Simplex RCD200 Series cylinders completed the lift in 40 hours.



- 11 standard models.
- **HARD-KOR™** Design for longer life.
- Relief valves protect against over pressurizing.
- High flow quality couplers.
- Large diameter center holes.
- **Rhino-Rod™** pistons resist scoring & corrosion.
- Stop ring for piston blow-out protection.
- Available in custom strokes.
- Rod wiper protects inner cylinder from dirt.

Base Mounting Holes

Capacity	Thread		Bolt Circle Dia. (in)
	Size (in)	Dpth. (in)	
30 Ton	3/8-16	3/8	3 5/8
60 Ton	1/2-13	7/16	5 1/8
100 Ton	5/8-11	3/4	7

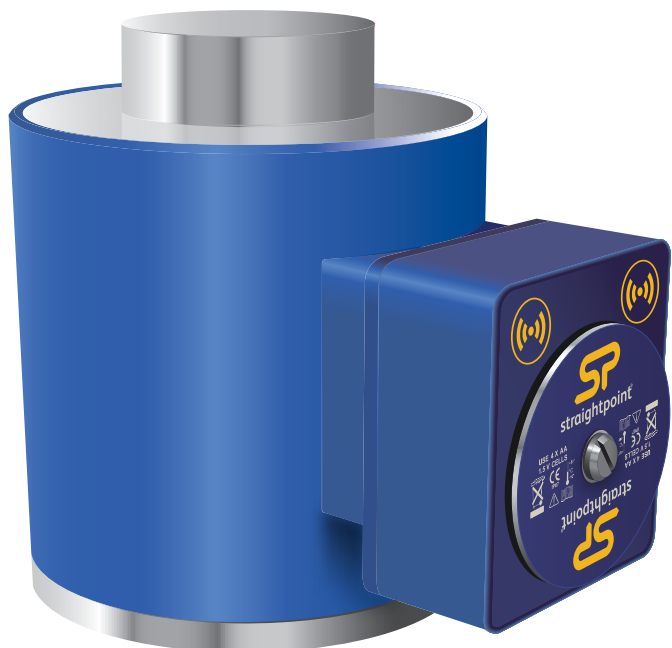
Double-Acting Center Hole Cylinders 30 Through 500 Ton Capacities

Model Number	Push Cap. (tons)	Pull Cap. (tons)	Stroke (in)	A Min. Ht. (in)	B Ext. Ht. (in)	Effect Area (sq in)	Pres. @ Cap. (psi)	Oil Cap. Req'd (cu in)	C Body O.D. (in)	D Piston O.D. (in)	E Center Hole Dia. (in)	F Collar		G Piston		Wgt. (lbs)
												Thrds. (in)	Thrds. Lgth. (in)	Thrds. (in)	Thrds. Lgth. (in)	
RCD302	30	30	2	7	9	8.6	6,950	8.6	5	2 1/2	1 5/16	4 1/2 - 12	1 3/4	1 13/16 - 16	7/8	48
RCD307			7	12 1/4	19 1/4			24.75								50
RCD6010	60	45	10	15 1/2	25 1/2	14.5	8,230	55	6 3/4	4	2 1/8	----	----	----	----	95
RCD1001	100	68	1	7	9	20.6	9,700	9.0	8 1/4	5	3 1/8	----	----	----	----	85
RCD1003			3	9	12			21.1				----	----	----	----	100
RCD1006			6	12	18			42.3				----	----	----	----	115
RCD10010			10	16	26			70.5				----	----	----	----	150
RCD1505C	150	----	5	13 1/8	18 1/8	31.60	9,491	78	10	6	3 1/8	----	----	----	----	240
RCD2006C	246	----	6	16 1/4	22 1/4	49.30	10,000	172	12	8	4 1/8	----	----	----	----	385
RCD3006C	434	----		18 3/4	24 3/4	91.50		296	15	9 1/2	4 1/4	----	----	----	----	720
RCD5006C	646	----		21 1/2	27 1/2	129.30		463	17 3/4	12	5 1/4	----	----	----	----	1230

CUSTOM STROKES AND CAPACITIES AVAILABLE
CONTACT FACTORY



Wireless Compression Load Cell



Features and benefits:

- Proprietary 2.4 GHz wireless
 - Industry leading wireless range of 700m/2300ft
 - Connects to SW-MWLC, WCOGS & SW-PTP software
 - Error free data transmission
 - Internal antennae
 - Environmentally sealed to IP67/NEMA 6
 - No cable assemblies required
 - Unrivalled resolution
 - Unmatched battery life of 1200hrs
 - Reduced maintenance cost
 - Compact size
 - Remote on-off
 - Design validated by F.E.A.
 - Bluetooth option is available and is supplied with a free HHP App for iOS and Android
- See page 29

The Straightpoint Wireless Compression Load Cell is taking the heavy lift and structural weighing industry by storm. By adding the Straightpoint wireless system to the already popular compression load cell line we have developed a cost-effective alternative to standard compression load cells.

No longer hindered by troublesome and hard to maintain cables, large scale projects can be completed in a fraction of time previously required. Maintenance costs are all but eliminated due to the absence of cables and connectors, and the products flexibility opens the door to a large number of applications in the heavy lift, energy, defence, rigging, shipping, and general transportation sectors, previously not considered.

Straightpoint's Wireless Compression Load Cells are machined from high grade stainless steel, providing excellent strength and corrosion resistance. The heavy duty, compact load cell utilises Straightpoint's advanced microprocessor based electronics and benefits from unrivalled resolution and accuracy. Data transmission is handled by the Straightpoint wireless systems proprietary transport protocol, is unmatched in performance and capable of a licence free transmission range of up to 700 metres or 2300 feet.

It is not until you add the powerful array of wireless accessories that the full potential of this product is realised. These accessories which include a wireless signal booster and several user friendly Windows-based software packages, provide a level of flexibility not previously known in the load monitoring industry.

When used with Straightpoint's WCOGS software these load cells will calculate centre of gravity and load. Connected to SW-MWLC it will allow the ability to data log and print reports, allowing the simultaneous display and monitoring of up to 100 wireless compression load cells on your PC or tablet. Lastly, coupled with Straightpoint's SW-PTP software the operator can perform load tests at a safe distance and generate real time test certificates on site.



making the lifting industry a safer place

Also available with
hazardous area approval



ATEX / IECEx

Ex ia II C T4 Ga

Certification numbers:

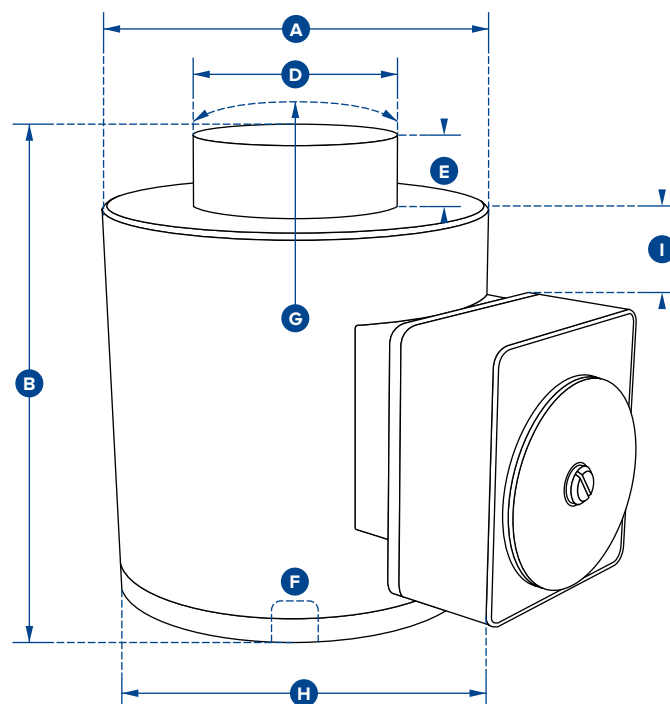
WNI ATEX

IECEx SIR 16.0041X / Sira 16ATEX2108X

SW-HHP ATEX

IECEx SIR 15.0072X / Sira 15ATEX2196X

**Add 'ATEX' to the part number
when ordering ATEX/IECEx products.
For example: WNI5TC-ATEX**



Part Number	WNI5TC	WNI10TC	WNI25TC	WNI50TC	WNI100TC	WNI150TC	WNI300TC	WNI500TC	WNI1000TC
Capacity	5te 11000lb	10te 22000lb	25te 55000lb	50te 110000lb	100te 220000lb	150te 330000	300te 660000lb	500te 1100000lb	1000te 2200000lb
Resolution	0.001te 2lb	0.002te 5lb	0.005te 10lb	0.01te 20lb	0.05te 100lb	0.05te 100lb	0.1te 200lb	0.2te 500lb	0.5te 1000lb
Units	tonne lb								
Weight	6.2kg 13.64lb	6.2kg 13.64lb	6.2kg 13.64lb	6.2kg 13.64lb	15.5kg 34lb	15.5kg 34lb	65kg 143lb	65kg 143lb	172kg 379lb
Safety Factor	3:1								
Battery Type	Load cell 4 x AA Alkaline								
Battery Life	Load cell 1,200 hours continuous								
Operating Temp	-10°C to +50°C / 14°F to 122°F								
Accuracy	±0.3% of applied load								
Frequency	2.4 GHz								
System Range	700 metres / 2300 feet								
Data Rate	3Hz (configurable to 200Hz)								
Protection	IP67 / NEMA 6								
Dimension ØA	102 4.02"	102 4.02"	102 4.02"	102 4.02"	152 5.98"	152 5.98"	185 7.28"	185 7.28"	362 14.25"
Dimension B	127 5.00"	127 5.00"	127 5.00"	127 5.00"	184 7.24"	184 7.24"	300 11.81"	300 11.81"	310 12.20"
Dimension ØD	59 2.32"	59 2.32"	59 2.32"	59 2.32"	80 3.15"	80 3.15"	155 6.10"	155 6.10"	270 10.63"
Dimension E	16 0.63"	16 0.63"	16 0.63"	16 0.51"	26 1.02"	26 1.02"	27.5 1.08"	27.5 1.08"	40 1.57"
Dimension F	M18 x 2.5 M18 x 2.5	M18 x 2.5 M18 x 2.5	M18 x 2.5 M18 x 2.5	M20 x 2.5 M20 x 2.5	M20 x 2.5 M20 x 2.5	M20 x 2.5 M20 x 2.5	M20 x 2.5 M20 x 2.5	M20 x 2.5 M20 x 2.5	M30 x 3.5 M30 x 3.5
Dimension G	152 5.98"	152 5.98"	152 5.98"	152 5.98"	432 17.01"	432 17.01"	432 17.01"	432 17.01"	950 37.40"
Dimension H	158 6.22"	158 6.22"	158 6.22"	158 6.22"	208 8.19"	208 8.19"	241 9.49"	241 9.49"	422 16.61"
Dimension I	8 0.31"	8 0.31"	8 0.31"	8 0.31"	33 1.30"	33 1.30"	49 1.93"	49 1.93"	102 4.02"
Loadcell top to SA700 top	0.31"	0.31"	0.31"	0.31"	1.30"	1.30"	1.93"	1.93"	4.02"



Chicago Dial Indicator Co.
1372 Redeker Road
Des Plaines, IL 60016
ISO Registered Firm

Factory Certificate of Calibration

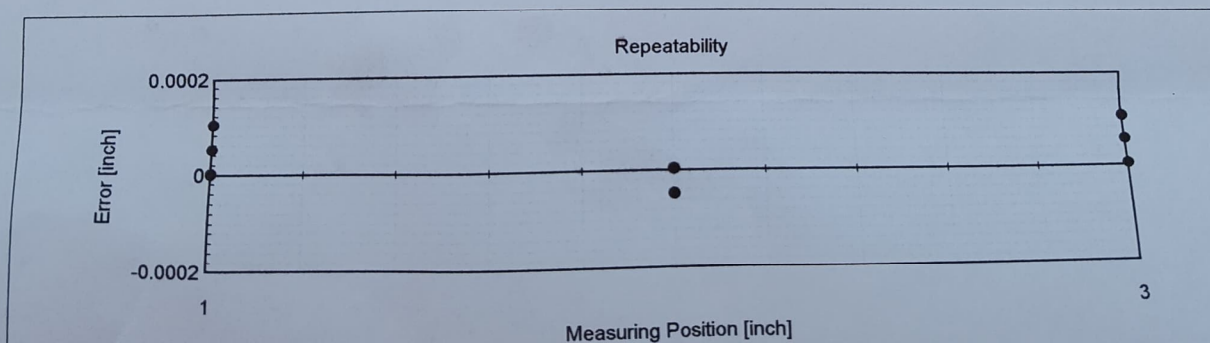
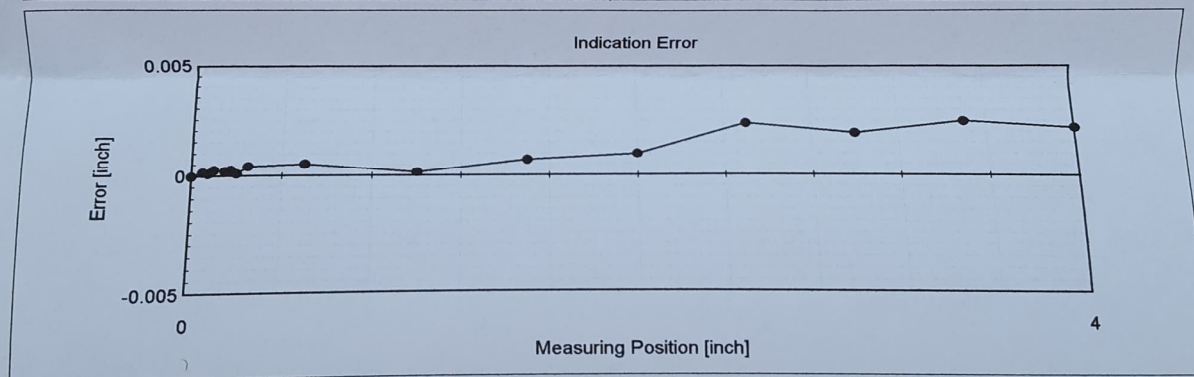
Model No.	26404CJ
Serial No.	173424713
Certificate No.	61924

Name of Inspection Standard	CDI STANDARD .001/4.0
Unit	inch
Scale Interval	0.001 inch
Measuring Range	4 inch
Reference Point	0 inch
End Point	4 inch

N.I.S.T. No. 821/268795-03

Inspection Item Name	Result	Permissible Value	Judgment
First 2-1/3 Revolutions	+0.0004056 inch	± 0.001 inch	GO
First 10 Revolutions	+0.0005057 inch	± 0.002 inch	GO
First 20 Revolutions	+0.0009582 inch	± 0.005 inch	GO
Hysteresis	-----	-----	N/A
Repeatability	+0.0001055 inch	± 0.0002 inch	GO

Inspection Item Name	Judgment
Inspection of Function and Appearance	GO



Repeatability is taken at three positions, with five readings at each position.

Phone: 847-827-7186

Fax: 847-827-0478

Website: www.dialindicator.com

Date _____

Put into service date, provided by end user

Signature: _____



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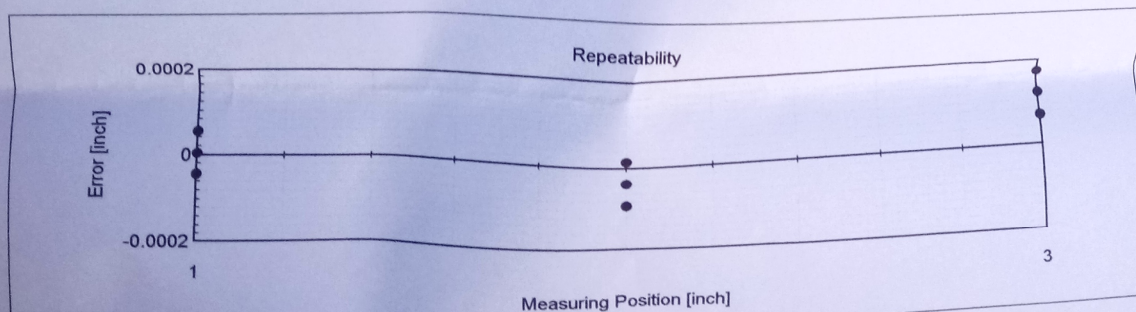
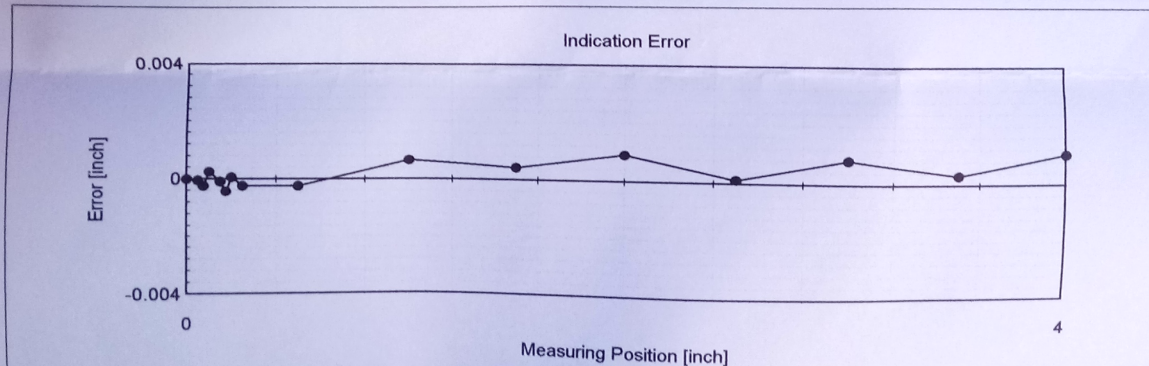
Factory Certificate of Calibration

Model No.	26404CJ	Name of Inspection Standard	CDI STANDARD .001/4.0
Serial No.	172981099	Unit	inch
Certificate No.	61109	Scale Interval	0.001 inch
		Measuring Range	4 inch
		Reference Point	0 inch
		End Point	4 inch

N.I.S.T. No. 821/268795-03

Inspection Item Name	Result	Permissible Value	Judgment
First 2-1/3 Revolutions	-0.0004462 inch	± 0.001 inch	GO
First 10 Revolutions	+0.0006586 inch	± 0.002 inch	GO
First 20 Revolutions	+0.0009112 inch	± 0.004 inch	GO
Hysteresis	-----	-----	N/A
Repeatability	+0.0001677 inch	± 0.0002 inch	GO

Inspection Item Name	Judgment
Inspection of Function and Appearance	GO



Repeatability is taken at three positions, with five readings at each position.

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Website: www.dialindicator.com

Date _____
Put into service date, provided by end user

Signature: _____