

Appendix A

Project Related Documents

- *Town of Woodstock – 2017 WSSA Report (Final)*
- *Conquest Engineering Geotechnical Report – Grafton Well Building*
- *Conquest Engineering Geotechnical Report – Transmission Line*
- *Detailed Engineering Drawing - Water Transmission Line*
- *Detailed Engineering Drawing - Water Treatment Facility*



TOWN OF WOODSTOCK
**Woodstock Water Source Exploration
Program**

Water Supply Source Assessment Report (FINAL)
Dillon Project Number: 16-4843



May 9, 2017

New Brunswick Department of Environment and Local Government
20 McGloin Street
PO Box 6000, Fredericton, NB
E3B 5H1

Attention: Ms. Lee Swanson, B. Sc., M.A.
Project Manager

Water Supply Source Assessments Report (FINAL)
Woodstock Water Exploration Program
Woodstock, NB
EIA Registration No. 4561-03-1422

Dear Ms. Swanson,

We are pleased to present our Water Supply Source Assessment report supporting the proposed Town of Woodstock water source exploration program. This document is being submitted on behalf of the Town of Woodstock to the NBDELG as part of an application for a Water Supply Source Assessment under the NBDELG EIA Registration process.

If you have any questions, please contact the undersigned.

Yours sincerely,

DILLON CONSULTING LIMITED

Parrish Arnott, P. Geo.
Project Manager

BCG:trw

cc: Mr. Ken Harding, CAO – Town of Woodstock

Our file: 16-4843

Table of Contents

1.0	Introduction	1
2.0	Project Description	1
2.1	Purpose/Rationale.....	1
2.2	Site Description	1
2.3	Current Groundwater Use	2
2.4	Geology, Hydrogeology, Topography, and Drainage.....	5
2.5	Climate Conditions	7
3.0	Water Supply Source Assessment	8
3.1	Scope	8
3.2	Methodology.....	8
3.2.1	Test Well Drilling	8
3.2.2	Production Well Installation	9
3.2.3	Water Elevation Monitoring	10
3.2.4	Step-Drawdown Test	10
3.2.5	72 Hour Constant Rate Pumping Test	11
3.2.6	Laboratory Analytical Program	11
3.2.7	Groundwater Under the Direct Influence of Surface Water (GUDI)	12
3.3	Results.....	12
3.3.1	Preliminary Water Elevations – Non Pumping Conditions	12
3.3.2	Step-Drawdown Test	12
3.3.3	72 Hour Constant Rate Pumping Test	13
3.3.4	Laboratory Analytical Results.....	20
3.3.5	GUDI Screening Results	23
3.3.6	Potential Well Interference Effects	23
4.0	Conclusions and Recommendations	25
5.0	Closing Remarks	26

Tables

Table 1 - Average Daily Temperature per Month (1981-2010)	7
Table 2 - Average Monthly Precipitation (1980-2010).....	7
Table 3 - Average Number of Days with Precipitation per Month (1980-2010).....	7

Table 4 - Observation Well Construction Details	9
Table 5 - Grain-Size Analysis Results	9
Table 6 - Production Well Construction Details	10
Table 7 - Laboratory Analytical Program	11
Table 8 - Aquifer Test Results	18
Table 9 - Total Coliforms and E. Coli in Groundwater	21
Table 10 - General Chemistry and Trace Metals in Groundwater	22
Table 11- BTEX and Petroleum Hydrocarbons in Groundwater	24

Figures

Figure 1 - Site Location Map	3
Figure 2 - Subject and Surrounding Properties	4
Figure 3 - Site Plan	6
Figure 4 - Preliminary Water Elevations - Non Pumping Conditions	14
Figure 5 - Step-Drawdown Test	15
Figure 6 - 72 Hour Constant Rate Pumping Test	16
Figure 7 - Pumping Test Analysis	19

Appendices

A	Initial Regulatory Applications
B	Water Well Driller's Reports
C	Laboratory Analytical Certificates
D	Raw Pumping Test Data
E	Disclaimer

References

1.0

Introduction

Dillon Consulting Limited (Dillon) was retained by The Town of Woodstock (the Town) to complete an Environmental Impact Assessment (EIA) and Water Supply Source Assessment (WSSA) in relation to the Woodstock Water Exploration Program. The assessment work was conducted in accordance with the New Brunswick Department of Environment and Local Government (NBDELG) EIA and WSSA guidelines (dated March, 2014).

The following sections of this report detail a project description, methodologies applied in the WSSA, results of this assessment, as well as conclusions. The initial regulatory applications for the water exploration project are presented in Appendix A. Copies of the Water Well Driller's reports from the observation and production wells completed during the assessment are provided in Appendix B. Laboratory analytical certificates are found in Appendix C. Raw data collected during the 72 hour pumping test is presented in Appendix D. The statements made in this report are subject to and are to be read in conjunction with the limitations detailed in the disclaimer presented in Appendix E.

2.0

Project Description

2.1

Purpose/Rationale

The Town currently has two municipal water supply wells located on a causeway in the Saint John River adjacent to the Town limits. The wells predate the installation of the Mactaquac hydroelectric dam, and therefore the resulting Mactaquac head pond. The wells are constructed to depths of 45 meters below ground surface (mbgs) and provide water to more than 95% of the residents and businesses of the Town. During periods of snow melt and flooding in the spring, ice and flood water pose a significant risk to the Town's water supply and infrastructure.

The purpose for this undertaking is to identify an alternative water supply source for the Town within a reasonable distance from the current municipal infrastructure, such that well commissioning would be feasible.

2.2

Site Description

Three locations were previously identified as potential drill targets based upon initial screening and desktop review studies. Upon NBDELG approval Dillon completed field investigations at those locations. These field investigations included the installation of 100 mm diameter geotechnical boreholes to observe subsurface soil conditions. At each of the three initial locations, shallow bedrock with low yielding water bearing capacities were encountered. Additional assessment was not completed at these locations.

During initial project planning, a fourth potential drill target was identified along the Grafton Shore Road in Grafton, NB (across the Saint John River from the Town limits). The location was omitted from the initial WSSA application (Appendix A) based upon anticipated costs associated with installation of water distribution infrastructure across the Saint John River. Following elimination of other potential options, the Town proceeded with assessment of the fourth drill target along the Grafton Shore Road. An update to the initial WSSA application (Appendix A) to include the Grafton location was submitted to the NBDELG on April 12, 2016, and permission to continue with the assessment at this location was received from the NBDELG on June 3, 2016.

Between June, 2016 and March, 2017 the assessment activities (including installation of 3 observation wells and 1 proposed production well) were continued along the Grafton Shore Road in Grafton, NB (herein "the subject site", see Figure 1). The subject site is located in a vacant/residential area of Grafton between the New Brunswick Department of Transportation and Infrastructure (NB DTI) right-of-way for the Grafton Shore Road and Route 105. The subject site consists of several New Brunswick Power Corporation (NB Power) owned vacant parcels of land identified by property identification (PID) numbers 10223709, 10023489, 10024479, 10023547, 10022945, 10024123, 10022051, and 10165819. Permission granted by NB Power to access the aforementioned properties can be found in Appendix A.

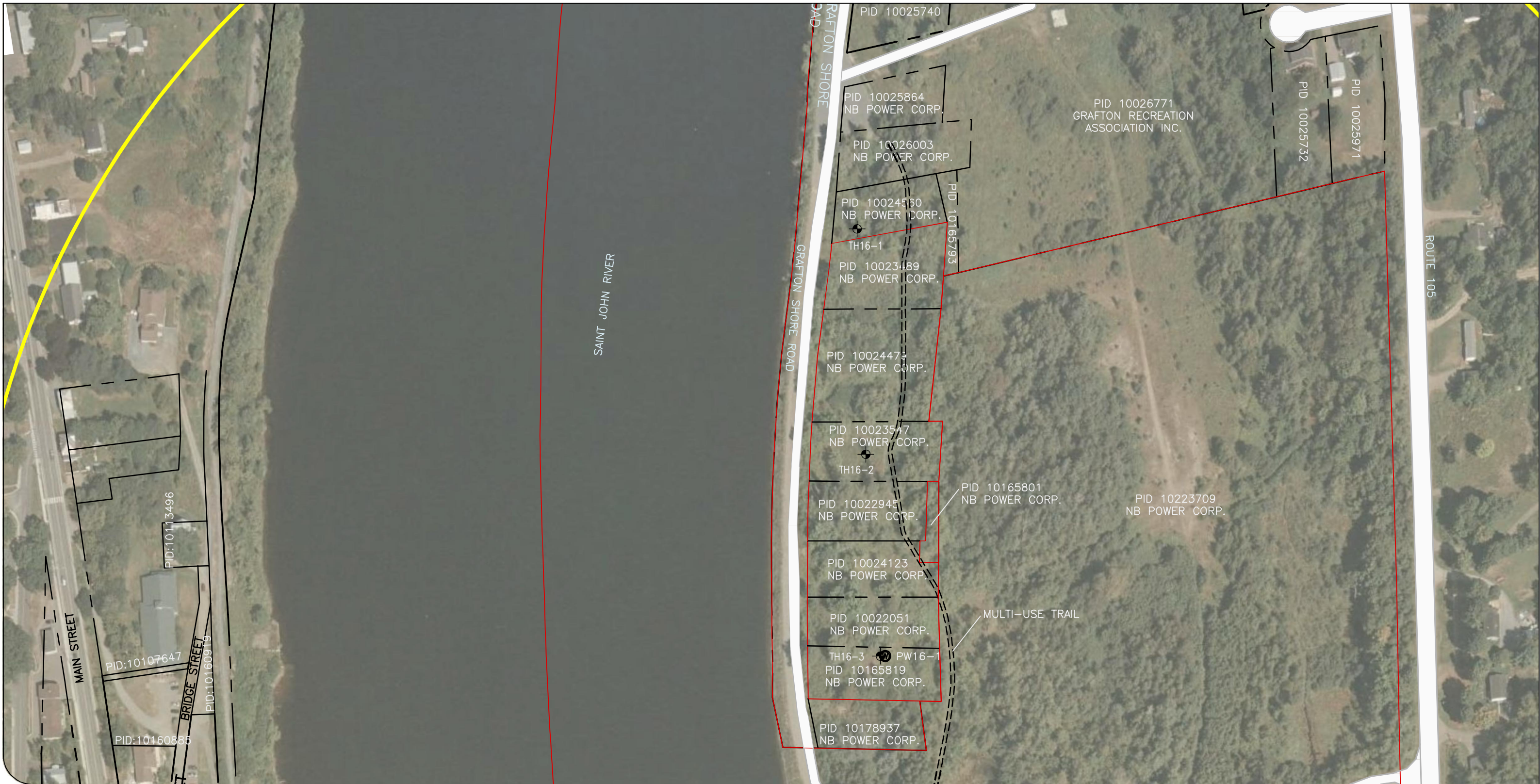
The subject site, as shown on Figure 2, is bordered to the north, east, and south by vacant properties owned by NB Power. To the northeast of the subject property, is a vacant parcel owned by the Grafton Recreation Association Inc., and the west of the subject property is the NB DTI right-of-way for the Grafton Shore Road followed by the Saint John River.

2.3 Current Groundwater Use

Residential properties in the Grafton area source water from individual private wells. Residences located within 500 m of the proposed production well are located along the Route 105 (nearest residences located between 325 m to 500 m away) and along Second Street (nearest residences located between 475 m to 500 m away).

The current municipal water system for the Town of Woodstock undergoes treatment due to the presence of manganese within their water source. The presence of manganese within a water supply in close proximity to a river basin (i.e., the Saint John River) is not uncommon within New Brunswick. Details regarding manganese treatment for the proposed water source are found in Section 3.3.4.2.

No other registered water wells (pre dating the current assessment activities) were located on the subject site. The Town currently has two municipal water supply wells located on a causeway in the Saint John River adjacent to the Town limits. The subject site is not located within a wellfield protect area under the New Brunswick Wellfield Protection Program or a designated watershed under the New Brunswick Watershed Protected Area Designation Order. Further, based on GeoSNB mapping, no wetland areas were located within 500 m of the subject site.



TOWN OF WOODSTOCK
 WATER SOURCE EXPLORATION PROGRAM
 WOODSTOCK WSSA
 WOODSTOCK, NB
 EIA REGISTRATION No. 4561-3-1422
 PID Nos. 10223709, 10023489, 10023547, 10022945, 10024123,
 10022051, 10165819

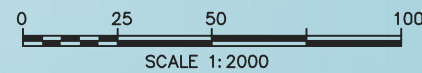
SUBJECT and SURROUNDING PROPERTIES
 FIGURE 2

- PRODUCTION WELL
- OBSERVATION WELL
- 500m FROM PRODUCTION WELL
- SUBJECT SITE AREA
- PROPERTY LINES

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MAP/DRAWING INFORMATION
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 New Brunswick records and may not be exact.
 This is not a legal survey.

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As part of the WSSA, three 150 mm diameter observations wells and one 400 mm diameter production well were installed by a licensed well driller on the subject site. Additional details regarding these wells are provided in Section 3.0 of this report. Approximate locations of the wells are provided on Figure 3.

2.4 Geology, Hydrogeology, Topography, and Drainage

Based on the Generalize Surficial Geology Map of New Brunswick (Rampton 1984; 2002 Ed.), the native surficial geology in the general area consists of a blanket of loamy lodgement till, ablation till, silt, sand and gravel.

Based upon the Granular Aggregate Resources of Woodstock Map (Plate 81-38, 21 J/4, P.Finamore 1979), the subject area consists of glaciofluvial outwash of mainly sand and gravel.

Based on the Department of Natural Resources map of the Bedrock Geology of the Woodstock Area (NTS 21 J/04), the bedrock geology of the subject site is identified as Cambrian to Ordovician aged rocks of the Woodstock Group (Baskahegan Lake formation), which typically consists of light grey to green, medium to thick bedded quartzite; and grey to greenish grey, thin to medium-bedded quartz wacke; olive green silty shale; and, minor red sandstone and shale.

During the assessment activities, the observed stratigraphy generally consisted of the following:

- Sand and Gravel (at depths ranging from 0-13.7 mbgs)
- Silty Sand/Silty Clay (at depths ranging from 13.7-32.0 mbgs)
- Sand, Gravel, and Boulders (at depths ranging from 32.0-43.3 mbgs)
- Quartzite Bedrock (at depths ranging from 43.3-46.0 mbgs)



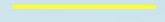
Descriptions of the observed stratigraphy during the assessment can be found on the Water Well Driller's Reports in Appendix B. The general topography and regional groundwater flow direction is assumed to be to the west-southwest towards the Saint John River. Based upon the observed stratigraphy, geological mapping and geomorphology the production well is located within buried glaciofluvial gravel within the Saint John River Valley.

The subject site is situated between 50-100 metres away from the Saint John River and approximately greater than 3.5 m above the elevation of the river. This elevation is above the recorded flood level in 1973. Further, based on proposed wellhouse construction specifications the well head for the production well was raised to approximately 46 metres above sea level (masl), which is 2 metres higher than the highest recorded water level (43.9 masl) in this area.



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SITE PLAN
 FIGURE 3

-  PRODUCTION WELL
-  OBSERVATION WELL
-  500m FROM PRODUCTION WELL

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2.5 Climate Conditions

The nearest Environment Canada weather station to the subject site is the Woodstock (Climate ID: 8105600) station located approximately 2 km northwest of the subject site. The most recent climate data, released by Environment Canada, for the Woodstock station is presented in Table 1-3. A summary of the average daily temperatures by month between 1980 and 2010 is found in Table 1, while monthly precipitation total averages between 1981 and 2010 are found in Table 2. Monthly averages of days with precipitation are displayed in Table 3.

Table 1 - Average Daily Temperature per Month (1981-2010)

Temperature (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Average	-11.5	-9.5	-3.4	3.7	10.9	16.3	19.0	18.4	13.2	6.6	0.3	-7.0	4.8

(Source: Environment Canada, Climate Normals 1981-2010)

The warmest months are generally from June to August, while July being the warmest month with an average daily temperature of 19.0 °C. The coldest months are typically between December and February, with January being the coldest with an average daily temperature of -11.5 °C.

Table 2 - Average Monthly Precipitation (1980-2010)

Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall (mm)	27.5	24.2	36.9	61.6	93.6	91	100.2	100.6	95.6	92.1	81.9	53.2	858.2
Snowfall (cm)	76.6	47.4	54.3	18.8	0.7	0	0	0	0.1	3.2	21.3	50	272.3
Precipitation (mm)	104	71.6	91.2	80.4	94.2	91	100.2	100.6	95.7	95.3	103.2	103.2	1130.6

(Source: Environment Canada, Climate Normals 1981-2010)

Table 3 - Average Number of Days with Precipitation per Month (1980-2010)

Amount of Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
>= 0.2 mm	11.5	10	11.1	11.3	12.4	11.7	11.8	10.9	10.4	10.5	11.4	12	135
>= 5 mm	6.8	4.9	5.8	5.7	5.8	5.4	5.9	5.2	5.3	5.5	5.9	6	68.1
>= 10 mm	4.1	2.6	3.4	2.7	3.3	2.9	3.5	3.1	3.3	3.2	3.7	3.8	39.4
>= 25 mm	0.67	0.38	0.82	0.38	0.64	0.83	0.79	0.88	0.96	0.92	0.78	0.71	8.8

(Source: Environment Canada, Climate Normals 1981-2010)

Over the dataset, monthly averages yielded an annual average of 1130.6 mm of precipitation, with 858.2 mm of rain and 272.3 cm of snow falling per year. Generally, Woodstock says 135 days with precipitation falling per year between 1980 and 2010. The highest monthly average of precipitation was

observed in November and December, each with 103.2 mm, while the lowest monthly average was observed in February with 71.6 mm.

Based on the climate data, the most surficial recharge to the source aquifer in the Woodstock/Grafton area is expected to occur between November and December, while the least amount of recharge would be expected to occur in February. However, the surficial recharge would be deemed negligible when compared to the recharge from the constant head boundary represented by the adjacent Saint John River.

3.0 Water Supply Source Assessment

3.1 Scope

The WSSA completed at the subject site included the following field components:

- the installation of three 150 mm diameter observation wells (TH16-1, TH16-2, and TH16-3) and one 400 mm diameter production well (PW16-1);
- a step-drawdown test;
- a 72 hour constant rate pumping test; and,
- a water sampling program.

3.2 Methodology

3.2.1 Test Well Drilling

Between June 13 and June 16, 2016, the three observation wells were installed on the subject site under the supervision of Dillon personnel. E.R. Steeves Ltd. (ER Steeves) was commissioned to drill the observation wells. Approximate locations of the observations wells are shown on Figure 3.

The wells were drilled using an air rotary drill rig in the areas of interest to assess preliminary yield, observed geologic conditions and to collect representative samples for grain-size analysis. Information collected from these observations wells were used in guiding the well screen design and well construction. Observed stratigraphy during the drilling activities varied between the observation wells, as such, constructions details also varied. In general, the observation wells were advanced until bedrock was encountered. Upon completing the observation wells, each well was developed via air lift for approximately 1-2 hours.

The observation wells remain in place and were used throughout the hydrogeologic testing of the production well. Well construction details of the observation wells are provided in Table 4.

Table 4 - Observation Well Construction Details

Well Construction	TH16-1	TH16-2	TH16-3
150 mm Steel Casing	0-43.3 mbgs	0-44.8 mbgs	0-42.1 mbgs
Perforated Zone (Well Screen)	34.2-43.3 mbgs	N/A	32.9-42.1 mbgs
Open Borehole (Bedrock)	43.3-44.5 mbgs	44.8-46.0 mbgs	42.1-44.2 mbgs

Based on the results of the observation well drilling, the zone of highest potential yield was in the area of TH16-3. Samples of the drill cuttings from TH16-3 were collected and were submitted to Conquest Engineering Ltd. (Conquest) in Fredericton, NB, for grain-size analysis. The grain-size analysis results are summarized below in Table 5.

Table 5 - Grain-Size Analysis Results

Sample	Depth (m)	Percent Passing/Finer Than (%)								
		25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	0.3 mm	0.075 mm
SA1	32.0-33.5	100	100	92	83	55	48	44	39	35.8
SA2	33.5-35.0	100	100	87	73	40	25	18	9	3.3
SA3	35.0-36.5	100	98	90	79	57	52	49	40	36.2
SA4	36.5	100	100	94	87	72	66	59	39	29.0
SA5	36.5-38.0	100	98	83	70	44	30	21	7	2.9
SA6	40.0	100	95	85	75	48	44	42	38	37.2
SA7	40.0-40.9	100	99	91	81	58	55	52	50	49.1

The grain size results were then sent to Johnson Screens a division of Billfinger Water Technologies, Inc. (Johnson Screens) located in Okemos, MI, USA. Johnson Screens reviewed the data and provided a recommended well screen slot size and well screen type for the production well on the subject site. Well screen slot size selection is based upon a screen opening that will allow passage of 60% of the aquifer material while retaining 40%. Johnson Screens recommended a 400 mm diameter telescopic screen with a 2.54 mm (0.100") slot given the hydrogeological and site conditions/requirements.

3.2.2 Production Well Installation

Based on observed geologic conditions the production well was installed adjacent to TH16-3. The drilling and installation of 400 mm diameter well was completed by ER Steeves approximately 3 m northwest of TH16-3 using a heavy duty dual drive air rotary drill rig. Drilling of the production well commenced on October 20, 2016 and was completed with the installation of the screen on October 31, 2016. The telescopic screen was lowered to the bottom of the borehole inside of the well casing. The drill rig retracted the casing using the lower drive unit to expose the screen to the gravel aquifer. The well was then developed utilizing air surging and subsequent purging for a period of three days following screen installation. Following well development, ER Steeves installed a 125 horsepower (hp) pump to a depth of

30.5 mbgs on 200 mm PVC drop pipe connected to a pitless adapter. The production well construction details are shown in Table 6.

Table 6 - Production Well Construction Details

Well Construction	PW16-1
400 mm Steel Casing	0-35.4 mbgs
380 mm Telescopic 100 Slot Well Stainless Steel Screen	32.3-42.4 mbgs
100 Hp Pump Intake Depth	30.5 mbgs
Open Borehole	42.4-42.7 mbgs

3.2.3 Water Elevation Monitoring

During the hydrogeologic testing changes in water elevations were measured in the observation and production wells using Solinst® brand electronic pressure transducers (dataloggers). Dataloggers were installed in TH16-1 and TH16-3 on February 28th prior to the pumping test in order to monitor water level changes under static conditions.

During the step-drawdown test, the pumping test, and recovery period following the pumping test changes in water level measurements were recorded in each of the observation wells and production well using dataloggers. Water levels in the pumping well (production well) were monitored using a datalogger installed on a direct read cable connected to a data acquisition and telemetry unit. The telemetry unit would then report the recorded water level data wirelessly to a home station computer, thusly enabling Dillon staff to monitor the pumping test while away from site (a representative of ER Steeves remained onsite throughout the pumping test).

3.2.4 Step-Drawdown Test

A 125 horsepower (Hp) variable frequency drive (VFD) pump was purchased by the Town for use in the production well, and was utilized for the step-drawdown and pumping test. The VFD pump was designed to operate with a water pressure regulating switch. The pressure switch was bypassed using the pump control box to allow the pump to operate at a constant rate independent of pressure for the step-drawdown and pumping test.

The step-drawdown test commenced at 1600 on March 13, 2017. A gate valve was installed along the water discharge line to regulate flow from the pump. Relative water level observations were observed in real-time during the test and an analog flowmeter was installed along the discharge to monitor flow rate and volume during the step-drawdown and pumping test.

Results of the step-drawdown test are discussed in Section 3.3.2.



3.2.5 **72 Hour Constant Rate Pumping Test**

At approximately 1800 on March 13, 2017, the 72 hour constant rate pumping test (“pumping test”) was initiated. Based upon the results of the step-drawdown test (observed water level drawdowns at maximum pumping capacity), it was determined that the pump would likely be capable of pumping at its full capacity, approximately 6,700 L/min (9,648 m³/day) for the duration of the pumping test.

Technical issues related to the water level recording telemetry system resulted in a change in frequency of water level recordings from the production well during the pumping test; however recordings were still captured from the production well throughout the pumping test.

The analog flow meter and gate valve remained installed along the discharge line throughout the pumping test. This assessment conservatively assumed that the head losses related to the pumping test setup would be less than or equal to the head losses associated with the connection of the production well/pump to the proposed Woodstock water distribution infrastructure. Therefore, results observed were a conservative representation for the proposed water system.

Results of the pumping test are discussed in Section 3.3.3.

3.2.6 **Laboratory Analytical Program**

The laboratory analytical program for this assessment was developed based on the WSSA guidelines sampling requirements and feedback from the NBDELG. Samples were collected, preserved (as directed by the laboratory), and submitted for laboratory analysis. Samples were submitted to Research and Productivity Council Inc. (RPC) in Fredericton, NB, for microbiology analysis (i.e. total coliforms and E.coli), general chemistry, trace metals, and/or petroleum hydrocarbons (as requested by NBDELG). RPC is accredited by the Standards Council of Canada (SCC) for each of the analytical methods utilized and have in-house QA/QC programs to govern sample analysis and analytical data quality assurance. The results of the analytical program are discussed in Section 3.3.4 and laboratory analytical certificates are attached in Appendix C. The laboratory analytical program is summarized below in Table 7.

Table 7 - Laboratory Analytical Program

Parameters	TH16-3	PW16-1
Microbial Analysis	0	2
General Chemistry/Trace Metals	1	4
Petroleum Hydrocarbons	1	0

A sample was collected from TH16-3 (following well development in June, 2016) and was analyzed for general chemistry and trace metals. General chemistry and trace metals samples were collected from PW16-1 in October, 2016 (following well development) and then after 12 hours, 48 hours, and 72 hours of pumping. Microbiology samples were collected from PW16-1 after 12 hours and 48 hours of pumping.



A sample was then collected from TH16-3 on April 26, 2017, and was analyzed for petroleum hydrocarbons.

3.2.7 Groundwater Under the Direct Influence of Surface Water (GUDI)

As part of the *Protocol for Determining Groundwater Under the Direct Influence of Surface Water (Protocol)* a water supply source with the potential to be vulnerable to microbial pathogens from surface water should be reviewed. The protocol suggests that GUDI is defined as “any water beneath the surface of the ground with:

- direct hydraulic connection to the surface or surface water source by way of local geology and well construction; or
- significant and relatively rapid shifts in water characteristics such as temperature, turbidity, conductivity, pH and other parameters which closely correlate with climate or nearby surface waters; or
- significant occurrence of insects or other macro-organisms, algae, organic debris or micro-organisms including large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*”.

The newly constructed PW16-1 is located approximately 60 meters from the edge of the Saint John River. Due to the proximity to a surface water source the GUDI protocol was used to evaluate the GUDI potential of PW16-1. See Section 3.3.5 for results.

3.3 Results

3.3.1 Preliminary Water Elevations – Non Pumping Conditions

Relative water levels from TH16-1 and TH16-3 between February 28 and March 13, 2017, are displayed on Figure 4. Water elevations in both TH16-1 and TH16-3 appear to follow similar trends under non-pumping conditions and appeared to be consistent with changes in atmospheric pressure. This is to be expected as those wells source from similar depths and are located in close proximity to one another.

3.3.2 Step-Drawdown Test

During the step-drawdown test the pump in PW16-1 was operating at its full capacity of 6,700 L/min (9,648 m³/day). An initial drawdown of approximately 3 m was observed in PW16-1 and approximately 2 m was observed in TH16-3 (located 3 m away from PW16-1). While observing water level data in real-time during the step-drawdown test, steady-state drawdown conditions were achieved within 1-2 minutes after the pump in PW16-1 was turned on. These observations were replicated during three power cycles (i.e. turning pump off and on) in the PW16-1 pumping well, with each cycle lasting between 10-30 minutes. Nearly instantaneous recoveries (approximately 10-30 seconds) to static water level were observed in PW16-1 and TH16-3 after turning the pump off.

Drawdowns in TH16-1 and TH16-2 were not observed during the step-drawdown tests. Relative water level observations from the step-drawdown test are provided on Figure 5.

3.3.3 72 Hour Constant Rate Pumping Test

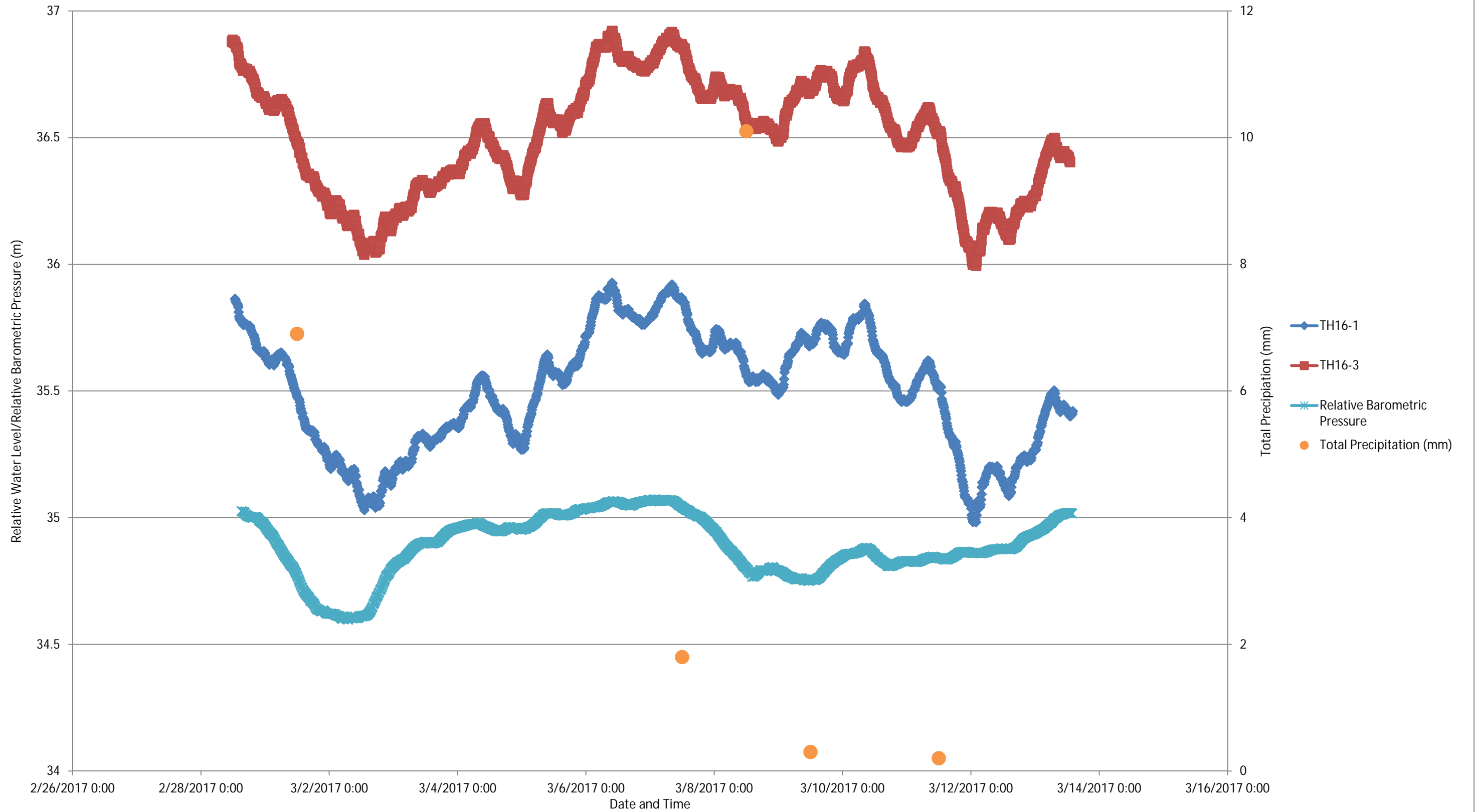
On March 13, 2017, prior to the field activities the static water level in PW16-1 was recorded at 6.7 meters below top of casing (mbtoc). Within minutes of the pump being turned on at its full capacity of 6,700 L/min (9,650 m³/day), the water elevation dropped to roughly 9.7 mbtoc. Water level elevations in PW16-1 ranged between 9.6 and 10.1 mbtoc throughout the pumping test. The static water level in TH16-3 was 4.5 mbtoc, following the pump being turned on in PW16-1 the water level then dropped to 6.2 mbtoc and fluctuated between 6.0-6.5 mbtoc for the duration of the pumping test.

Measurements of flow rate observed throughout the pumping test remained relatively consistent at 6,700 L/min (9,650 m³/day). In general, significant drawdowns were not observed throughout the pumping test and water elevations appeared to change based on variations in atmospheric pressure.

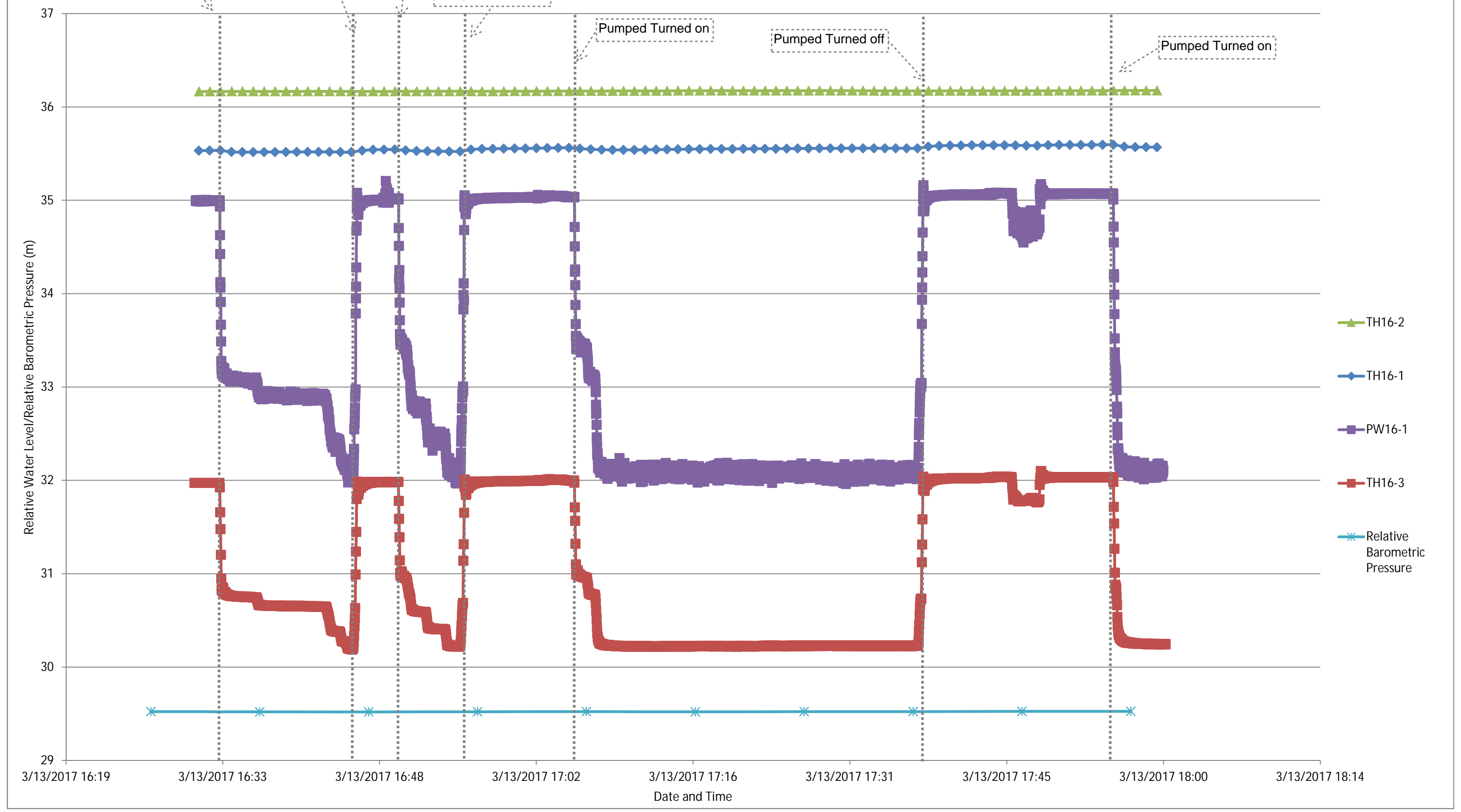
Upon completion of the pumping test, water levels were observed for approximately 12 hours. Instantaneous recoveries (approximately 10-30 seconds) of 3 m in PW16-1 and 2 m in TH16-3 were observed. A return to equilibrium conditions in PW16-1 and TH16-3 was observed within 10-30 seconds of turning the pump off. Drawdown in TH16-1 and TH16-2 from the pumping of PW16-1 was not observed during the step-drawdown and pumping test.

Relative water level observations from the pumping test are shown on Figure 6.

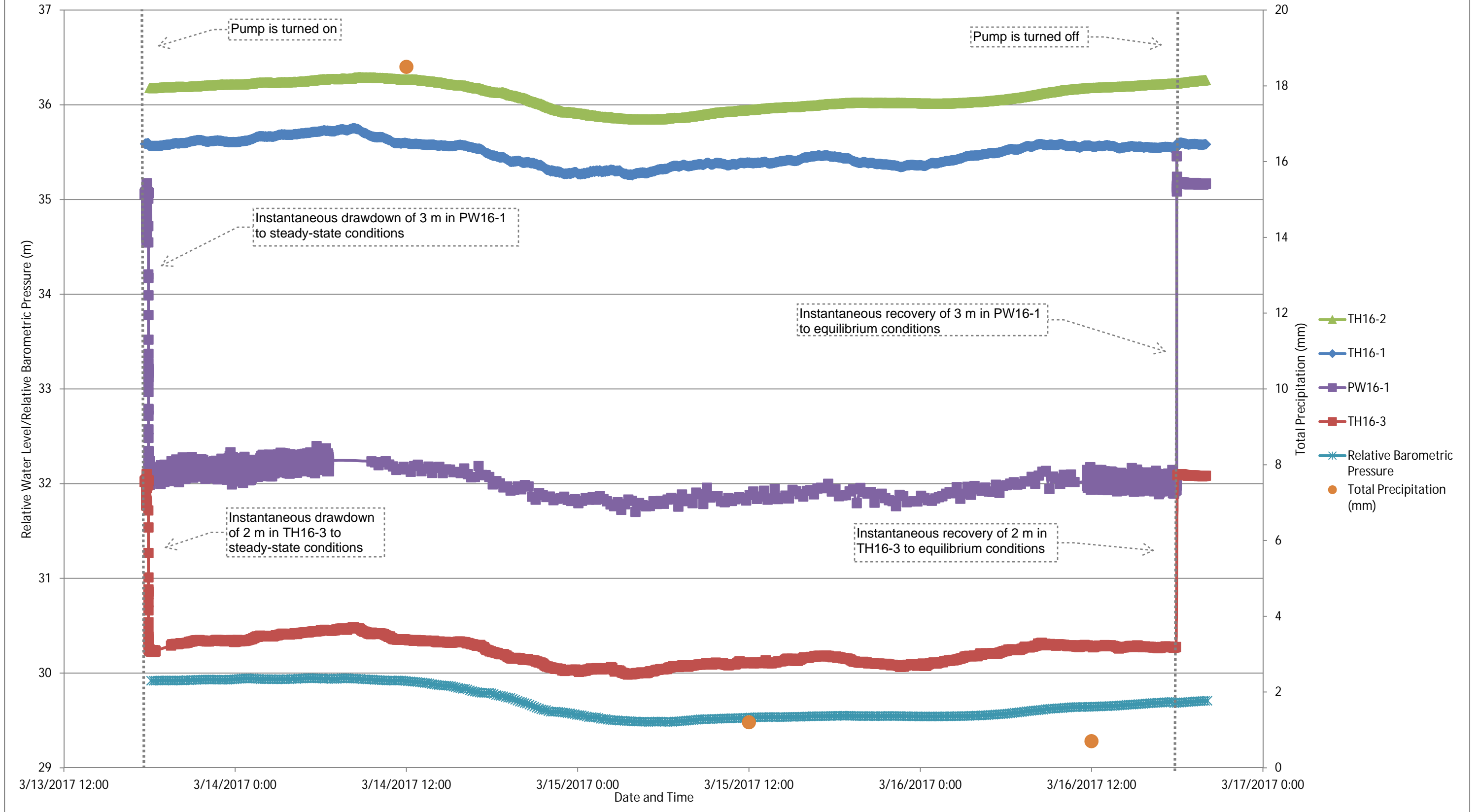
2017 Woodstock WSSA
Figure 4 - Preliminary Water Elevations - Non Pumping Conditions



2017 Woodstock WSSA
Figure 5 - Step-Drawdown Test



2017 Woodstock WSSA
 Figure 6 - 72 Hour Contast Rate Pumping Test



Theoretical Assessment

The WSSA guidelines suggest that an appropriate analysis be completed on the data collected from the pumping test (i.e. Cooper-Jacob, Theis). Following the pumping test, the relative water level data was compiled and reviewed. Various methods of analysis were evaluated based upon the recovered data and hydrogeological conditions. The following is a summary of hydrogeological conditions and assumptions applied to the conceptual site model with respect to data analysis:

- the aquifer is semi-confined and has as “apparent” infinite extent;
- the aquifer is homogenous, isotropic, and has uniform thickness over the area of influence by pumping;
- the piezometric surface was horizontal prior to pumping;
- the wells are partially penetrating and pumped at a constant rate;
- water removed from storage is discharged instantaneously with decline in head; and,
- the discharge volume is high relative to well storage, and therefore well storage is negligible.

Upon reviewing the data and the conceptual site model, it was determined that a value of transmissivity could be estimated; however, storativity would be considered negligible with respect to the volume of water that is being extracted as it would only account for a very small percentage of available yield. The increase in capacity in pumping infrastructure required to further test the limits of the aquifer (i.e. higher discharge rate from the pump) were deemed unnecessary as the pump installed in PW16-1 will be sufficient to meet the water supply demand for the Town. Assessment of the overall capacity and efficiency of the aquifer can be considered conservative with respect to the estimated demand for the Town based upon the following:

Town of Woodstock Water Demand – It is estimated that the Town will require an average of 4,550 L/min (6,550) m³/day of water to be pumped from PW16-1.

Aquifer Transmissivity – Based upon the near instantaneous drawdown and transition to steady-state conditions during the pumping test, additional stress could potentially be applied to the aquifer. Therefore, the available yield from the source aquifer has a greater capacity that the estimated water demand of the Town.

Boundary Condition – PW16-1 is located approximately 65 m from the Saint John River, which is considered to represent a constant head boundary. The presence of gravel, available transmissivity, results from the pumping test, and knowledge of similar aquifers along the Saint John River suggest hydraulic connection to the source aquifer. This hydraulic connection provides a near infinite recharge component to the confined sand and gravel beneath it.

3.3.3.2

Empirical Assessment

Based upon the results of the theoretical assessment, Dillon suggests that a practical approach be taken in the determination of a safe yield for the proposed development. The following describes the evidence for determining the safe yield for the proposed development:

Boundary Condition – The hydrogeological assessment exhibited evidence of recharge to the aquifer from the Saint John River and as such can be considered a constant head boundary. On average the Saint John River at any given time yields a flow rate of approximately 900 m³/s (77.8 x 10⁶ m³/d) which contributes to the source aquifer recharge.

Hydraulic Testing and Pump Capacity – The hydraulic testing demonstrated that the pump in PW16-1 has the capacity to extract water at approximately 6,700 L/min with limited stress on the aquifer. This discharge rate equates to an extraction volume per day (9,650 m³/d) which is forty-seven percent higher than the estimated daily demand from PW16-1 by the Town (6,550 m³/d).

Transmissivity – The results of the pumping test were used to estimate aquifer transmissivity and are considered to be conservative. Selected relative water level data from PW16-1 and TH16-3 was input into Aquifer Test Pro 2015.1. Data from TH16-1 and TH16-2 was not included in this analysis as significant drawdowns were not experienced in these wells during the pumping test, and therefore this data would provide little value in estimating aquifer transmissivity. The assumptions noted in Section 3.3.3.1 were applied to the analysis as well as the following:

- discharge from PW16-1 was constant at a rate of 6,700 L/min;
- aquifer thickness is 9.15 m, and;
- PW16-1 and TH16-3 are fully penetrating.

Limitations with respect to the use of values calculated during this empirical assessment could be expected as significant drawdown was not experience in PW16-1 and TH16-3 during the pumping test. Therefore, Dillon recommends consideration of the theoretical assessment in order to assess the safe yield for the Town. The results of the pumping test analysis are displayed on Figure 7. Calculated values for transmissivity and hydraulic conductivity from PW16-1 and TH16-3 are summarized in Table 8.

Table 8 - Aquifer Test Results

Well ID	Hydraulic Conductivity (m/day)	Transmissivity (m ² /day)
PW16-1	2.47 x 10 ³	2.26 x 10 ⁴
TH16-3	1.11 x 10 ³	1.02 x 10 ⁴
AVERAGE	1.79 x 10 ³	1.64 x 10 ⁴



Dillon Consulting Limited
 1149 Smythe Street, Suite 200
 Fredericton, NB
 E3B 3H4

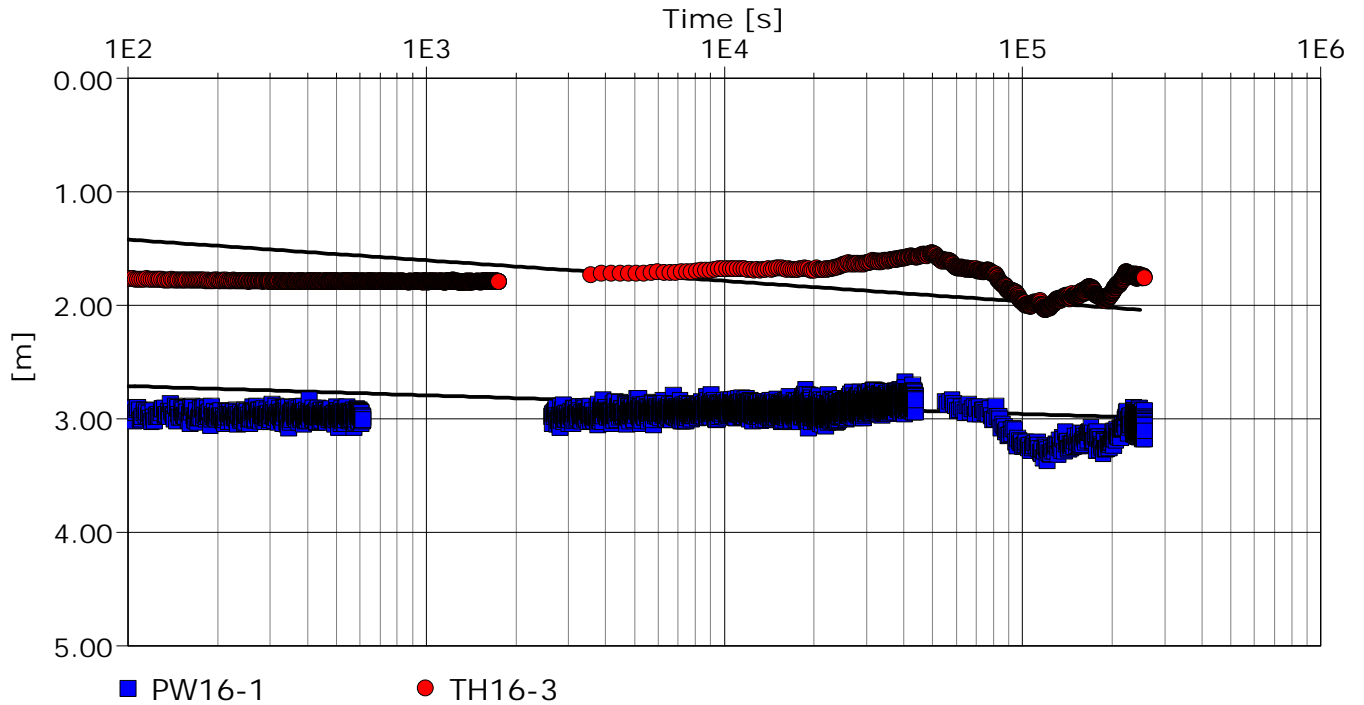
Figure 7 - Pumping Test Analysis

Project: Woodstock WSSA

Number: 16-4843

Client: Town of Woodstock

Location: Woodstock, NB	Pumping Test: 72 Hr CRT	Pumping Well: PW16-1
Test Conducted by: PHA+BCG		Test Date: 3/27/2017
Analysis Performed by: BCG	PW16-1	Analysis Date: 3/27/2017
Aquifer Thickness: 9.15 m	Discharge Rate: 0.1167 [m ³ /s]	



Calculation using Theis

Observation Well	Transmissivity [m ² /d]	Hydraulic Conductivity [m/d]	Storage coefficient	Radial Distance to PW [m]
PW16-1	2.26×10^4	2.47×10^3	1.00×10^{-30}	
TH16-3	1.02×10^4	1.11×10^3	1.00×10^{-7}	2.0
Average	1.64×10^4	1.79×10^3	5.00×10^{-8}	

3.3.4 Laboratory Analytical Results

3.3.4.1 Microbial Analysis (Total Coliforms and E.Coli)

Laboratory analytical results for total coliforms and E. Coli in the groundwater samples collected from PW16-1 are presented in Table 9. Laboratory analytical certificates are attached in Appendix C.

Total coliforms and E. Coli were not detected in the samples collected. Both samples were collected in the absence of equipment and are representative of the natural groundwater conditions.

Total Coliforms and E. Coli – PW16-1

- 2 Submitted (12 and 48 Hour samples)
- 0 Exceeded GCDWQ

3.3.4.2 General Chemistry and Trace Metals

Laboratory analytical results for general chemistry and trace metals are shown in Table 10. Laboratory analytical certificates are presented in Appendix C.

Concentrations of manganese were identified above the GCDWQ in the samples collected from PW16-1 and TH16-3. The remaining analytical results from the samples were within the GCDWQ. As discussed previously, the presence of manganese within a water supply in close proximity to a river basin (i.e., the Saint John River) is not uncommon within New Brunswick.

General Chemistry and Trace Metals – PW16-1

- 4 Submitted (Development, 12, 48, and 72 Hour samples)
- 4 Exceeded GCDWQ in 1 parameter (Manganese)

General Chemistry and Trace Metals – TH16-3

- 1 Submitted (Development sample)
- 1 Exceeded GCDWQ in 1 parameter (Manganese)

The GCDWQ guidelines for manganese are aesthetic objectives, and therefore the manganese exceedances are not an indication of concern with water quality on the subject site. The current town of Woodstock water supply undergoes treatment for the presence of manganese. It is understood that Health Canada is proposing to establish a health based objective for manganese under the GCDWQ. Based on this, the town of Woodstock will establish manganese treatment for water acquired from PW16-1 prior to the commissioning of the well to the Town water system (should it be required).

TABLE 9
TOTAL COLIFORMS AND E.COLI IN GROUNDWATER
Town of Woodstock - 2017 Water Supply Source Assessment
Woodstock, NB
Project No. 16-4843

Parameter	Units	GCDWQ (2012)	PW16-1	
			Mar 14/17 (12 Hour)	Mar 15/17 (48 Hour)
E. Coli	MPN/100 mL	0 per 100 mL	0	0
Total Coliforms	MPN/100 mL	0 per 100 mL	0	0

Health Canada Federal-Provincial-Territorial Committee on Canadian Drinking Water (FTP CDW) Guidelines for Canadian Drinking Water Quality (GCDWQ, August 2012)

1 bold/shaded value denotes concentration exceeds GCDWQ

TABLE 10
GENERAL CHEMISTRY AND TRACE METALS IN GROUNDWATER
Town of Woodstock - 2017 Water Supply Source Assessment
Woodstock, NB
Project No. 16-4843

Parameter	Units	GCDWQ 2014	EQL	TH16-3	PW16-1			
				Jun 16/16	Oct 31/16 (Development)	Mar 14/17 (12 Hour)	Mar 15/17 (48 Hour)	Mar 16/17 (72 Hour)
General Chemistry								
Sodium	mg/L	200**	0.05	16.7	27.5	36.0	37.8	38.4
Potassium	mg/L	NG	0.02	1.03	1.07	1.10	1.18	1.16
Calcium	mg/L	NG	0.05	112	105	110	114	113
Magnesium	mg/L	NG	0.01	20.9	19.9	19.1	19.1	18.6
Iron	mg/L	0.3**	0.02	0.09	0.07	0.10	0.08	0.04
Manganese	mg/L	0.05**	0.001	0.119	0.085	0.098	0.083	0.073
Copper	mg/L	1**	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	5**	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ammonia (as N)	mg/L	NG	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	7-10.5***	-	7.9	8.0	7.9	7.9	8.0
Alkalinity (as CaCO ₃)	mg/L	NG	2	140	150	160	160	160
Chloride	mg/L	250**	0.5	159	183	169	174	184
Sulfate	mg/L	500**	1	32	27	26	23	21
Nitrate + Nitrite (as N)	mg/L	10* ^A	0.05	0.73	1.08	0.97	1.16	0.87
o-Phosphate (as P)	mg/L	NG	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
r-Silica (as SiO ₂)	mg/L	NG	0.1	<0.1	9.8	10.1	9.8	10.1
Total Organic Carbon	mg/L	NG	0.5	0.6	0.5	<0.5	<0.5	<0.5
Turbidity	NTU	1.0**	0.1	2.2	3.6	10.8	4.0	1.4
Conductivity	µS/cm	NG	0.1	871	899	923	933	929
Calculated Parameters								
Bicarbonate as CaCO ₃	mg/L	NG	-	139	149	159	159	158
Carbonate as CaCO ₃	mg/L	NG	-	1.04	1.40	1.19	1.19	1.49
Hydroxide as CaCO ₃	mg/L	NG	-	0.040	0.050	0.040	0.040	0.050
Cation sum	meq/L	NG	-	8.07	8.11	8.66	8.94	8.87
Anion sum	meq/L	NG	-	8.00	8.80	8.58	8.73	8.97
% difference	%	NG	-	0.44	-4.09	0.52	1.23	-0.55
Theoretical Conductivity	µS/cm	NG	-	793	834	838	857	869
Hardness (as CaCO ₃)	mg/L	NG	0.2	366	344	353	363	359
Ion Sum (mg/L)	mg/L	NG	-	430	470	473	484	491
Saturation pH (5°C)	units	NG	-	7.5	7.5	7.4	7.4	7.4
Langelier Index (5°C)	units	NG	-	0.40	0.50	0.45	0.46	0.56
Trace Metals								
Aluminum (Al)	µg/L	100**	1	7	14	31	31	18
Antimony (Sb)	µg/L	6*	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Arsenic (As)	µg/L	10*	1	< 1	< 1	< 1	< 1	< 1
Barium (Ba)	µg/L	1000*	1	243	215	225	231	226
Beryllium (Be)	µg/L	NG	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth (Bi)	µg/L	NG	1	< 1	< 1	< 1	< 1	< 1
Boron (B)	µg/L	5000*	1	7	7	9	8	9
Cadmium (Cd)	µg/L	5*	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Calcium (Ca)	µg/L	NG	50	112000	105000	110000	114000	113000
Chromium (Cr)	µg/L	50*	1	< 1	< 1	1	1	1
Cobalt (Co)	µg/L	NG	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Copper (Cu)	µg/L	1000**	1	< 1	< 1	< 1	< 1	< 1
Iron (Fe)	µg/L	300**	20	90	70	100	80	40
Lead (Pb)	µg/L	10*	0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1
Lithium (Li)	µg/L	NG	0.1	3.6	3.4	3.4	3.4	3.4
Magnesium (Mg)	µg/L	NG	10	20900	19900	19100	19100	18600
Manganese (Mn)	µg/L	50**	1	119	85	98	83	73
Molybdenum (Mo)	µg/L	NG	0.1	< 0.1	< 0.1	< 0.1	0.1	0.4
Nickel (Ni)	µg/L	NG	1	< 1	< 1	< 1	< 1	< 1
Potassium (K)	µg/L	NG	20	1030	1070	1100	1180	1160
Rubidium (Rb)	µg/L	NG	0.1	0.6	0.7	0.7	0.7	0.7
Selenium (Se)	µg/L	50*	1	< 1	< 1	< 1	< 1	< 1
Silver (Ag)	µg/L	NG	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sodium (Na)	µg/L	200000**	50	16700	27500	36000	37800	38400
Strontium (Sr)	µg/L	NG	1	648	636	653	698	704
Tellurium (Te)	µg/L	NG	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Thallium (Tl)	µg/L	NG	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin (Sn)	µg/L	NG	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Uranium (U)	µg/L	20*	0.1	0.2	0.2	0.2	0.2	0.3
Vanadium (V)	µg/L	NG	1	< 1	< 1	< 1	< 1	< 1
Zinc (Zn)	µg/L	5000**	1	< 1	< 1	< 1	< 1	< 1

Notes:

- * Health Canada Federal-Provincial-Territorial Committee on Canadian Drinking Water (FTP CDW) Guidelines for Canadian Drinking Water Quality (GCDWQ, 2014) Health Based Objective (HBO).
- ** Health Canada Federal-Provincial-Territorial Committee on Canadian Drinking Water (FTP CDW) Guidelines for Canadian Drinking Water Quality (GCDWQ, 2014) Aesthetic Based Objective (ABO).
- *** Health Canada Federal-Provincial-Territorial Committee on Canadian Drinking Water (FTP CDW) Guidelines for Canadian Drinking Water Quality (GCDWQ, 2015) Health Based (HBO).
- ^A The GCDWQ does not have a specific guideline for nitrate + nitrite (as N), However, the associated nitrate (as N) guideline is 10 mg/L.

- denotes not applicable/parameter not analyzed.
 NG denotes No Guideline established.
 7,500 BOLD/shaded value denotes concentration exceeds GCDWQ HBO.
 7,500 BOLD/shaded value denotes concentration exceeds GCDWQ ABO.

3.3.4.3

BTEX and Petroleum Hydrocarbons

Laboratory analytical results for BTEX and petroleum hydrocarbons in groundwater are shown in Table 11. Laboratory analytical certificates are attached in Appendix C.

Concentrations of BTEX and petroleum hydrocarbons were not detected in the sample collected from TH16-3, and are therefore below the applicable Atlantic RBCA Tier I Risk-Based Screening Levels. Based on the proximity of TH16-3 to PW16-1 and similarity in depths of the two wells (approximately 44 mbgs), the analytical results of TH16-3 are considered representative of PW16-1 as well.

3.3.5

GUDI Screening Results

The initial GUDI screening for PW16-1 is based upon Step 1 (Screening) of the Protocol for Determining Groundwater Under the Direct Influence of Surface Water (GUDI).

1. Sensitive Settings

PW16-1 is constructed into a locally confined/regionally unconfined sand and gravel aquifer therefore, suggesting that GUDI is possible due to the likely connection to the surface water body (Saint John River) providing a constant head to the aquifer system. The distance to the point of nearest recharge to the well(s) is unknown however; upon commissioning of the well MPA testing will be completed to assess the GUDI sensitivity.

2. Distance to Surface Water

PW16-1 is located approximately 60 meters from the Saint John River which is the limit of the setback under the Draft Protocol for Determining GUDI. PW16-1 is also separated vertically by approximately 20 meters of low permeability clayey silt and sand.

3. Well Construction

PW16-1 meets the current Water Well Regulation (90-70)-Clean Water Act (Section 40) requirements for well construction.

4. Water Quality

The water quality of PW16-1 did not exhibit indicators of GUDI. Based upon the information from the initial screening PW16-1 is at low risk of being GUDI.

3.3.6

Potential Well Interference Effects

Based upon the results of the constant rate pumping test whereby observation wells located between the pumping well and the nearest private potable well did not exhibit any observable drawdown it is unlikely that interference effects will be observed. Additionally, given the conservative high volume extraction rate from PW16-1 (limited steady state drawdown at maximum pump capacity) and the evidence supporting recharge from the adjacent constant head boundary (Saint John River) the capture zone of the pumping well will likely be limited to near the wellhead and extend west to the River.

TABLE 11
 BTEX AND PETROLEUM HYDROCARBONS IN GROUNDWATER
 Town of Woodstock - 2017 Water Supply Source Assessment
 Woodstock, NB
 Project No. 16-4843

Sample Location	Sample Date	BTEX Concentration (mg/L)				Petroleum Hydrocarbons (mg/L)					
		Benzene	Toluene	E. Benzene	Xylenes	Purgeable C6 - C10	Extractable C10-C16	Extractable C16-C21	Extractable C21 - C32	Total	
TH16-3	Apr 26/17	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	0.01	<0.02	ND
ATLANTIC PIRI TIER I RBSLs (Commercial/Residential Receptor, Potable Groundwater Usage, Coarse-Grained Soil)		0.005	0.024	0.0016	0.02					Gasoline 4.4 Fuel Oil 3.2 #6 Oil 7.8	
N/D denotes Not Detected 75000 denotes concentration exceeds applicable Tier I RBSLs											

Conclusions and Recommendations

The results of the pumping test suggest that the aquifer is capable of meeting and exceeding the anticipated demand for the Town. A maximum drawdown of 3 m was observed in the pumping well (PW16-1) while 2 m was observed in the nearest observation well (TH16-3) while pumping PW16-1 at 6,700 L/min (9650 m³/day) for 72 hours. Drawdowns were not observed in TH16-1 and TH16-2 during the testing. Nearly instantaneous recoveries were observed in PW16-1 and TH16-3 to equilibrium conditions approximately 10-30 seconds after turning the pump off.

Testing of PW16-1 was completed at a flow rate of 9,650 m³/day, which is forty-seven percent (47%) higher than the estimated flow requirement for the town (6,550 m³/day). Based on the theoretical and empirical assessments and as a means to maintain a high level of conservatism, Dillon recommends that the allowable total maximum extraction rate from PW16-1 be not less than 9,650 m³/day.

In order to reduce risk of impact from floodwaters and riverbank erosion to the water supply for the proposed Town water infrastructure upgrade, the area surrounding PW16-1 and TH16-3 will be raised to approximately 45.5 masl. Upon receiving an approval to operate, a well house will be constructed adjacent to PW16-1 to accommodate disinfection equipment and electrical system controls.

The Town intends to commission PW16-1 to the municipal water system and integrate it into the existing pumping schedule as an operational back-up well. In the event of damage or required maintenance to the existing wells on the causeway, PW16-1 would then be used as the primary production well. Should one of the existing Town production wells be lost, additional back-up well(s) will be considered in future planning.

As part of their WSSA approval conditions, NBDELG had identified a nearby property (PID Nos. 10026300 and 10163574) with an open NBDELG Remediation File (No. 6515-5-0194). This property is located approximately 350 m from TH16-1; however it is located approximately 550 m from PW16-1. Based on the results of the hydrogeological testing, these properties are not located within the zone of influence from pumping of PW16-1, and likely pose no concern to the water supply.

The remaining WSSA approval conditions enforced by the NBDELG were reviewed throughout the assessment activities and reporting. The applicable WSSA conditions were determined to have been met. The NBDELG conditions can be found in the NBDELG WSSA Approval Letter in Appendix A.

Closing Remarks

This report was prepared by Brennan Gourley, EIT, and reviewed by Parrish Arnott, P. Geo., and by Andrew Blackmer, M. Sc., P. Geo.

Dillon has prepared this report for the exclusive of the Town of Woodstock for specific application to the subject site. The Dillon assessment was conducted in accordance with Dillon's scope of work and accepted environmental practices/regulations. Limitations to this report are included in the disclaimer presented in Appendix E. No other warranty, expressed or implied, is made.

Parrish Arnott, P. Geo.
Project Manager

Appendix A

Initial Regulatory Applications



Énergie NB Power

NBPower
Mactaquac Generating
Station
451 Route 105
Keswick Ridge, N.B.

Ken Harding CAO
Town of Woodstock
824 Main Street
Woodstock NB
E7M 2E8

To: Ken Harding CAO Town of Woodstock

You have recently made application for permission to have Dillon Consulting Limited drill a test/observation well on NB Power Corporation (NB Power) property at Woodstock on the Mactaquac Headpond. The NB Power property is identified as PID 10168714.

NB Power is able to grant you permission to enter onto NB Power property identified as PID 10168714 for the sole purpose of performing work related to drilling a test/observation well and for no other purpose. This permission is subject to the following conditions:

1. All permits required to meet municipal, provincial, federal, environmental and fisheries regulations must be obtained and are the responsibility of the Requestor.
2. The Requestor will assume all risk of, and liability for, damage or injury that might occur for any reason related to the requestor, his employees, contractors, successors and assigns entry of the said NB Power property. The requestor further agrees to indemnify and hold NB Power harmless from and against all manner of actions, contracts, covenants, claims or demands whatsoever, which NB Power may hereafter bear, sustain or suffer for any reason whatsoever on account of injury, loss, damage or death related to the said work.
3. Access to and across the said NB Power property by NB Power, its employees, contractors, successors or assigns, will not be impeded by the Requestor or the performance of the said work.
4. NB Power will not be liable for any damages sustained by or to the Requestor as a result of its operations.

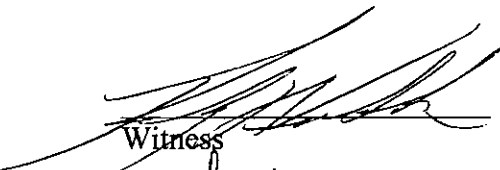
5. All costs associated with the permission herein granted will be the sole responsibility of the Requestor. Any and all costs incurred by NB Power as a result of this request are payable in full by the Requestor as they become due.

6. The Requestor agrees to pay NB Power compensation for all damages to NB Power facilities suffered as a result of the permission herein granted.

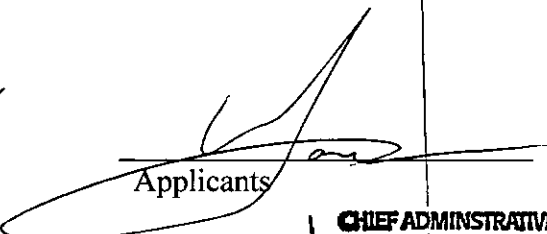
7. NB Power, at its sole and unfettered discretion, may withdraw the above permission at any time and without notice.

Please sign this letter in the spaces provided below. Retain one copy with your and return the other to:

David Purdy
Mactaquac Generating Station
451 Rte 105
Keswick Ridge, NB
E6L 1B2
dpurdy@nbpower.com
Fax: 462-3801


Witness

Sept. 15, 2014
Date


Applicants

**CHIEF ADMINISTRATIVE
OFFICER**

September 28, 2015



New Brunswick Department of Environment and Local Government
20 McGloin Street, Marysville Place
Fredericton, NB
E3B 5H1

Attention: Ms. Lee Swanson

WSSA Initial Application – Woodstock Water Exploration EIA

Dear Ms. Swanson,

Dillon Consulting Limited (Dillon) was retained by the Town of Woodstock (Town) to complete an Environmental Impact Assessment (EIA) including a Water Supply Source Assessment (WSSA) in relation to the Woodstock Water Exploration Program.

This document has been prepared as a means to satisfy the minimum requirements for a WSSA initial application, as per the NBDELG Environmental Impact Assessment WSSA Guidelines (Appendix B).

Name of Proponent

Town of Woodstock

*Mr. Ken Harding
Chief Administration Officer
Town of Woodstock
824 Main Street
Woodstock, NB
E7M 2E8
Email: ken.harding@town.woodstock.nb.ca
Phone: 506-325-4600*

Principle Contact Person

*Parrish Arnott, P. Geo
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Location of drill targets

The Town of Woodstock currently has two municipal water supply wells constructed to a depth of 45 meters below ground surface, located on an island in the middle of the Saint John River adjacent to the Woodstock town limits. These two water supply wells provide potable water to >95% of the residents and businesses of Woodstock. During the snow melt and flooding in the spring, ice and flood water pose a significant risk to the water supply and infrastructure.

The purpose for the undertaking is to identify an alternate water supply source for the Town of Woodstock within a reasonable distance from the current municipal infrastructure such that well commissioning would be feasible.

Option 1

This option is located approximately 1.4 km south of Woodstock town limits along NB Route 165. Proposed location is approximately 60 meters from NB Route 165 and 80 meters from the Saint John River. The drill target location for this option is presented on Figure 1.

Option 2

This option is located within Woodstock town limits on a vacant parcel of land at the bottom of Searle Street adjacent to Riverside Lane. The proposed location is located approximately 100 meters from Meduxnekeag River and is outside the 30 meter setback from a watercourse and wetland. The approximate location of this option is presented on Figure 2.

Option 3

The third option is located within Woodstock town limits at the end of Smith Court, approximately 150 meters from the Saint John River. The approximate location of this option is presented on Figure 3.

Required Water Quantity

The Town of Woodstock requires approximately 2500 m³/day

Alternate Water Supply Sources in Area

An alternative water supply within the area of the Town of Woodstock is the current Woodstock municipal water system.



Hydrogeology as it relates to the project requirements

Well Site Option 1

The drill target area for well site option 1 is located approximately 85 meters from the Saint John River and approximately 100 meters from a small unnamed tributary on a ridge between the river and Route 165. The general topography and regional groundwater flow direction is assumed to be towards the Saint John River. Based upon granular aggregate mapping and the localized geomorphology, it is anticipated that this well site option is located within the area of glacio-fluvial sediments of the Saint John River Valley.

Based upon discussion with Town staff and local well drillers, it was suggested that high volume gravel wells are located down river approximately 1.2 km. It is anticipated that the drill target area is located within a similar river basin deposit as these wells.

Well Site Option 2

The drill target area for well site option 2 is located at the bottom of Searl Street in a grassy flat adjacent to Riverside Lane. The proposed location is located approximately 100 meters from Meduxnekeag River and approximately 45 meters from the associated Meduxnekeag River wetland. The general topography and regional groundwater flow direction is assumed to be towards the Meduxnekeag River. Based upon granular aggregate mapping and the localized geomorphology, it is anticipated that the well site option is located in the area of glacio-fluvial sediments of the Meduxnekeag River Valley.

Based upon discussion with Town staff and local well drillers this site was agreed upon with respect to drill rig access and infrastructure commissioning as a future well site.

Well Site Option 3

The drill target area for well site option 3 is located at the end of Smith Court approximately 130 meters from the Saint John River. The general topography is relatively flat and the regional groundwater flow direction is assumed to be towards the Saint John River. Based upon granular aggregate mapping and the localized geomorphology, well site option 2 is located within the conflux of the Meduxnekeag and Saint John River Valley glacio-fluvial sediments.



Based upon discussion with Town staff and local well drillers this location was determined to be easily accessed with a drill rig and located on Town owned property in close proximity to existing municipal infrastructure .

Outline of the proposed hydrogeological testing and work schedule

Test well drilling and hydraulic testing activities will be carried out by a licensed well driller under the supervision of a qualified professional as per the New Brunswick Clean Water Act.

The following describes the work that is to be completed for the drilling of a new water supply well:

- Complete underground utility clearances prior to completing any drilling activities.
- A temporary access culvert and pad may be required to access the drill target area in well site option 1. Fill material and culvert may be required to bridge from main road to the property for drill rig access.
- Install and maintain sediment and erosion control structures where applicable/required over the course of well construction, development and testing.
- Construction of one 150 mm diameter test well at one or more of the drill target locations with 150 mm steel casing. The geology/hydrostratigraphy will be logged by Dillon staff during the drilling process.
- A preliminary yield assessment will be completed using air lift methods following the construction of the test well. Preliminary groundwater samples will be collected should the initial air lift testing indicate desired results.
- If both the preliminary yield assessment and chemistry results are acceptable, a 200 – 250 mm diameter well including a stainless steel screen will be constructed proximal to the initial test well. An additional observation well will be constructed for observation purposes if the site configuration will permit. The 200 – 250 mm well will undergo step-testing (30 min steps) and a long term pumping test (72 hours) as per the WSSA Guideline. Water levels will be measured in the pumping well as well as the initial test well (observation well) and additional observation well. Pressure transducers will be used in addition to manual water level measurements to record water levels in the pumping and observation wells.
- Water samples will be collected at 0, 24, 48 and 72 hours of pumping and submitted to the Research and Productivity Council (RPC) for analysis of general chemistry and trace metals.



- The results of the pumping test will be presented in a report as per the New Brunswick WSSA.
- The drilling of test/observation wells will be completed during daytime hours.
- Water discharged during the construction, development and testing activities will be managed as necessary to limit erosion and sedimentation.
- Refueling of equipment used during the construction activities will be completed off-site, where possible. Spill management kits will be available throughout construction and testing and authorities will be alerted if necessary.

Potential contamination hazards within 500 m of the proposed drill targets

Well Site Option 1

This option is located in a residential and undeveloped area and the proposed property is bounded in all four directions by undeveloped properties. No other potential contamination hazards are known to exist within 500 meters of drill target location 1.

Well Site Option 2

This option is located in a commercial/residential area of Woodstock. Various commercial businesses and the Carleton Civic Centre located along Connell Road are within a 500 meter radius of the drill target.

Well Site Option 3

This option is located within a residential/commercial area of Woodstock. A summary list providing details on potential contamination hazards within 500 meters of this location is outlined below:

- An NBDTI Regional Office to the north of the drill target, with above ground fuel storage tanks and petroleum dispenser.
- Various commercial enterprises, including but not limited to John Deere Tractor Sales yard, Cummins Building Supplies, Provincial Bandag Tires, and a lumber mill.

An assessment of contamination sources will be completed should a water supply be considered for development in this area.

Groundwater use problems that have occurred in the area

The current municipal water system for the Town of Woodstock undergoes treatment due to the presence of manganese within the water source. The presence of



manganese within a water supply in close proximity to a river basin (i.e. the Saint John River) is not uncommon within the Province of New Brunswick. It is assumed that treatment of manganese would need to be continued for the future town of Woodstock municipal water system.

Watercourse(s) within 60 m of the proposed drill targets

Well Site Option 1

The drill target area is situated 80 meters away from the Saint John River, and it is situated 6.41 meters above the elevation of the Saint John River. It is not expected that flood water would reach the elevation of the drill target area.

Well Site Option 2

The drill target area is located 100 meters away from the Meduxnekeag River and is elevated by 6.6 meters above the Meduxnekeag River. It is not expected that flood water would reach the elevation of the drill target area.

Well Site Option 3

The drill target area is located 150 away from the Saint John River and is elevated 2.8 meters above the Saint John River. It is not expected that flood water would reach the elevation of the drill target area.

Site supervisory personnel

Consultant Field Staff

Mr. Parrish Arnott, P. Geo
Dillon Consulting Limited
1149 Smythe Street, Suite 200
Fredericton, NB
E3B 3H4
Tel: 506-444-8820
Fax: 506-444-8821
Email: PArnott@dillon.ca

NBDELG
Page 7
September 28, 2015



Licensed Well Driller

To be determined.

Site Maps

Site plans showing the proposed well site option locations are attached.

Should you have any questions, please do not hesitate to contact the undersigned.

Yours sincerely,

DILLON CONSULTING LIMITED

Parrish Arnott, P.Geol.
Project Manager

PHA:trw

Enclosure(s)

Our file: 15-2119

April 12, 2016



New Brunswick Department of Environment and Local Government
20 McGloin Street, Marysville Place
Fredericton, NB
E3B 5H1

Attention: Ms. Lee Swanson

*WSSA Initial Application – Woodstock Water Exploration
EIA Registration #4561-3-1422*

Dear Ms. Swanson,

Dillon Consulting Limited (Dillon) was retained by the Town of Woodstock (Town) to complete an Environmental Impact Assessment (EIA) including a Water Supply Source Assessment (WSSA) in relation to the Woodstock Water Exploration Program.

This document has been prepared as a means to satisfy the minimum requirements for a WSSA application, as per the NBDELG Environmental Impact Assessment WSSA Guidelines (Appendix B).

1149 Smythe Street
Suite 200
Fredericton
New Brunswick
Canada
E3B 3H4
Telephone
506.444.8820
Fax
506.444.8821

<i>Name of Proponent</i>	<i>Principle Contact Person</i>
<i>Town of Woodstock Mr. Ken Harding Chief Administration Officer Town of Woodstock 824 Main Street Woodstock, NB E7M 2E8 Email: ken.harding@town.woodstock.nb.ca Phone: 506-325-4600</i>	<i>Dillon Consulting Parrish Arnott, P.Geo Project Manager Dillon Consulting Limited 1149 Smythe Street, Suite 200 Fredericton, NB E3B 3H4 Email: parnott@dillon.ca Phone: 506-444-8820</i>

Introduction

The Town of Woodstock currently has two municipal water supply wells constructed to a depth of 45 meters below ground surface, located on an island in the middle of the Saint John River adjacent to the Woodstock town limits. These two water supply wells provide potable water to >95% of the residents and businesses of Woodstock. During the snow melt and flooding in the spring, ice and flood water pose a significant risk to the water supply and infrastructure.



The purpose for the undertaking is to identify an alternate water supply source for the Town of Woodstock within a reasonable distance from the current municipal infrastructure such that well commissioning would be feasible.

Location of proposed drill target

Three drill site options had originally been proposed based upon initial screening and desktop review. Upon NBDELG approval Dillon proceeded with field investigation at these locations. The results of the field investigation resulted in unfavorable geological conditions (bedrock) at all proposed well site option locations (option 1, 2 and 3). A water well was not installed and hydraulic testing was not completed.

One of the original proposed drill site options not included in the WSSA application in 2015 was in the area of the Grafton Shore Road across the St. John River from Woodstock. This location was originally omitted from the application based upon the anticipated infrastructure cost associated with crossing the St. John River. Upon exhausting other options The Town has decided to explore this area. See Figure 1 for well site location.

Required Water Quantity

The Town of Woodstock requires approximately 2500 m³/day.

Alternate Water Supply Sources in Area

An alternative water supply within the area of the Town of Woodstock is the current Woodstock municipal water system.

Hydrogeology as it relates to the project requirements

The drill target area for well site option 4 is located along the Grafton Shore Road at a minimum of 30 meters from the Saint John River. The proposed potential drilling area (shown on Figure 2) was selected as it is the highest accessible ground above the 1976 flood stage based upon a topographic survey completed by Dillon (April 1, 2016).

The general topography and regional groundwater flow direction is assumed to be towards the Saint John River.

Based upon granular aggregate mapping and the localized geomorphology, it is likely that this well site option is located within the area of glacio-fluvial sediments of the



Saint John River Valley (See Figure 3). An initial geotechnical borehole was completed at the proposed drill site suggesting that a gravel aquifer with a thickness of >9m consisting of sand gravel and boulders exists beneath a clay aquitard with a thickness of >25m.

Based upon the information collected during the preliminary borehole investigation it is anticipated that the zone of influence/wellfield protected areas of a potential future water supply would be limited to the proposed drill target area. The presence and proximity of a constant head boundary (St. John River) and anticipated valley confinement of deep glacio-fluvial sediments (aquifer) the zone of influence would likely be limited to the area surrounding the wellheads and extend towards the River. The potential to impact neighboring potable water users is low based upon the location, distance and construction of surrounding potable wells compared to a potential future water supply well.

Outline of the proposed hydrogeological testing and work schedule

Test well drilling and hydraulic testing activities will be carried out by a licensed well driller under the supervision of a qualified professional as per the New Brunswick Clean Water Act.

The following describes the work that is to be completed for the drilling of a new water supply well:

- Complete underground utility clearances prior to completing any drilling activities.
- Minor grading and/or fill material may be required to facilitate drill rig access to the proposed area.
- Install and maintain sediment and erosion control structures where applicable/required over the course of well construction, development and testing.
- Construction of one 150 mm diameter test well in the area of the geotechnical borehole with 150 mm steel casing. The geology/hydrostratigraphy will be logged by Dillon staff during the drilling process.
- A preliminary yield assessment will be completed using air lift methods following the construction of the test well. Preliminary groundwater samples will be collected should the initial air lift testing indicate desired results.
- If both the preliminary yield assessment and chemistry results are acceptable, a 200 – 250 mm diameter well including a stainless steel screen will be constructed proximal to the initial test well. An additional observation well will be constructed for observation purposes if the site configuration will



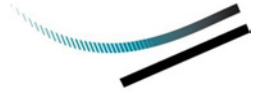
- permit. The 200 – 250 mm well will undergo step-testing (30 min steps) and a long term pumping test (72 hours) as per the WSSA Guideline. Water levels will be measured in the pumping well as well as the initial test well (observation well) and additional observation well. Pressure transducers will be used in addition to manual water level measurements to record water levels in the pumping and observation wells.
- Water samples will be collected at 0, 24, 48 and 72 hours of pumping and submitted to the Research and Productivity Council (RPC) for analysis of general chemistry and trace metals.
 - The results of the pumping test will be presented in a report as per the New Brunswick WSSA.
 - The drilling of test/observation wells will be completed during daytime hours.
 - Water discharged during the construction, development and testing activities will be managed as necessary to limit erosion and sedimentation. (a WAWA permit may be submitted should it be necessary)
 - Refueling of equipment used during the construction activities will be completed off-site, where possible. Spill management kits will be available throughout construction and testing and authorities will be alerted if necessary.

Potential contamination hazards within 500 m of the proposed drill targets

Well Site Option 4 is in a residential and undeveloped area and the proposed property is bounded in all four directions by undeveloped properties. Residential properties are located >200 meters from the drill target area. A former petroleum retail outlet is located approximately 380 meters from the drill target area. No other potential contamination hazards are known to exist within 500 meters of drill target location.

Groundwater use problems that have occurred in the area

The current municipal water system for the Town of Woodstock undergoes treatment due to the presence of manganese within the water source. The presence of manganese within a water supply in close proximity to a river basin (i.e. the Saint John River) is not uncommon within the Province of New Brunswick. It is assumed that treatment of manganese would need to be continued for the future town of Woodstock municipal water system.



Watercourse(s) within 60 m of the proposed drill targets

Well site option 4 is situated 30 to 100 metres away from the Saint John River, and it is situated >3.5 metres above the elevation of the Saint John River. This elevation is also above the recorded flood level in 1973.

Site Supervisory Personnel

<i>Consultant Field Staff</i>	<i>Licensed Well Driller</i>
Mr. Parrish Arnott, P. Geo Dillon Consulting Limited 1149 Smythe Street, Suite 200 Fredericton, NB E3B 3H4 Tel: 506-444-8820 Fax: 506-444-8821 Email: PArnott@dillon.ca	E.R. Steeves Ltd. 93 Loch Lomond Rd Saint John, NB E2J 1X6 Tel: 506-652-8544

Site Maps

Site plans showing the proposed well site option location is attached.

Should you have any questions, please do not hesitate to contact the undersigned.

Yours sincerely,

DILLON CONSULTING LIMITED

Parrish Arnott, P. Geo.
Project Manager

PHA:trw
Enclosure(s)

- Figure 1 – Proposed Well Site Location
- Figure 2 – Proposed Well Site
- Figure 3 – Proposed Well Site Geology

Our file: 15-2119



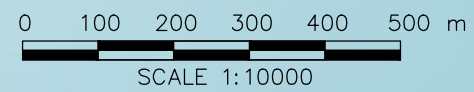
TOWN OF WOODSTOCK
WATER EXPLORATION PROGRAM

PROPOSED WELL SITE LOCATION
FIGURE 1

● GEOTECHNICAL BOREHOLE LOCATION

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MAP/DRAWING INFORMATION
AERIAL PHOTOGRAPHY AND DIGITAL PROPERTY MAPPING OBTAINED
FROM SERVICE NEW BRUNSWICK AND IS APPROXIMATE ONLY.





PROJECT: 15-2119
STATUS: DRAFT
DATE: APRIL 2016



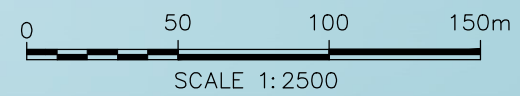
TOWN OF WOODSTOCK
WATER EXPLORATION PROGRAM

PROPOSED WELL SITE
FIGURE 2

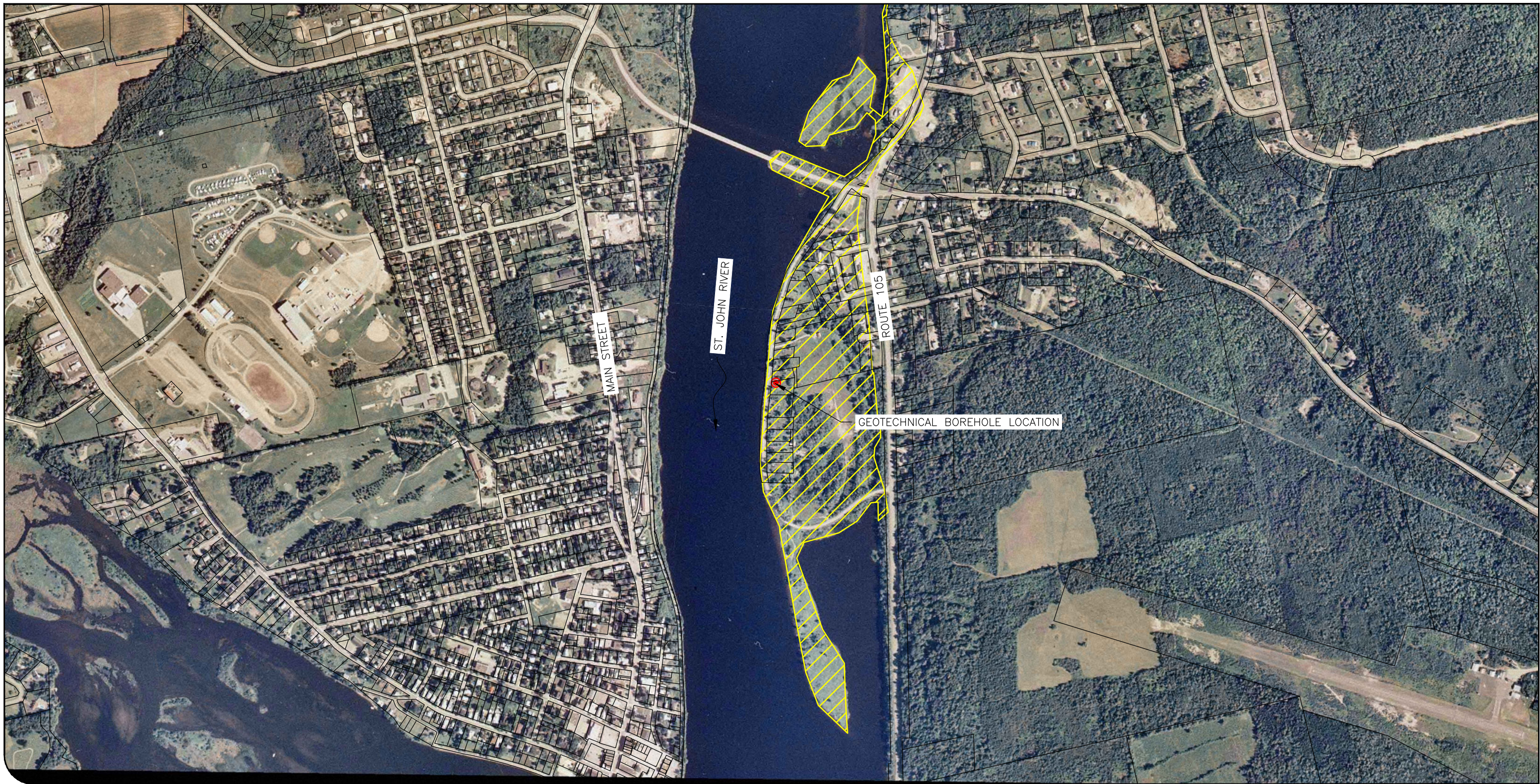
-  GEOTECHNICAL BOREHOLE LOCATOIN
-  EXTENT OF POTENTIAL DRILL AREA (NB POWER OWNED)

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PROJECT: 15-2119
STATUS: DRAFT
DATE: APRIL 2016



TOWN OF WOODSTOCK
WATER EXPLORATION PROGRAM

PROPOSED WELL SITE GEOLOGY
FIGURE 3

-  GEOTECHNICAL BOREHOLE LOCATOIN
-  GLACIAL FLUVIAL OUTWASH

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PROJECT: 15-2119
STATUS: DRAFT
DATE: APRIL 2016

June 3, 2016

Mr. K. Harding
Town of Woodstock
824 Main Street
Woodstock, NB E7M 2E8

Mr. P. Arnott
Dillon Consulting Ltd.
1149 Smythe Street, Suite 200
Fredericton, NB E3B 3H4

Mr. Harding and Mr. Arnott:

RE: EIA Registration #4561-03-1422 Groundwater Exploration Program for the Town of Woodstock, NB. - Water Supply Source Assessment (WSSA) Initial Application Approval for Drill Target Option #4

The Technical Review Committee (TRC) has reviewed your letter (*Woodstock Water Exploration (4561-3-1422) WSSA Application*) dated April 12, 2016 regarding the proposed new Drill Target Option #4. This correspondence hereby constitutes **approval to drill 1 or more, 6" exploratory test holes** in the area outlined on Figure 2 (April 12, 2016 letter - hashed area showing potential extent of drill area that is NB Power owned), **subject to the following conditions.**

Conditions:

- 1) Please ensure that the March 2014 version of the Department of Environment and Local Government (DELG) *Water Supply Source Assessment (WSSA) Guidelines* (available online here: <http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/WaterSupplyAssessmentGuidelines.pdf>) is strictly followed.
- 2) You may conduct any preliminary hydrogeological testing that is necessary to determine the viability of the well and the aquifer.
- 3) If you determine that a well has potential then you must submit a plan for hydrogeological testing (ie: minimum 72-hour pumping test, etc.) to DELG for review and approval along with the proposed location of observation wells before any testing is undertaken. Be aware that a minimum of two observation wells will be required in a future approval for any proposed pumping test. Both of these wells will need to be within the same hydrogeological unit as the pumping well and also need to be located within the drawdown cone of the pumping well.
- 4) If a production well is developed in this area, then the potential water line to connect to the system may need to be included in this EIA review, or may be included as a Condition of Determination.



- 5) As you are aware, the remediation file associated with the contaminated site at the former Grafton Convenience Irving cannot be closed at this time because the petroleum hydrocarbon plume is not considered stable to shrinking on one side. While there does not appear to be a connection between the shallow plume and the deeper sand and gravel aquifer that the municipality is targeting, there is not enough information to definitively make that conclusion. If you eventually get approval from DELG to proceed with Hydrogeological Assessment at this site, you will be required to collect a sample for petroleum hydrocarbons at the end of the pumping test (72 hours).
- 6) Archaeological Services Unit, Department of Tourism, Culture and Heritage has indicated that there are no known archaeological sites in the area. However, any area within 80 m of a watercourse contains elevated archaeological potential. As per Section 9 of the Heritage Conservation Act, any person who discovers an archaeological object, burial object, or human remains is required to report the discovery to the Minister as soon as practicable at (506) 453-2738.
- 7) Recent severe rainfall events in the Woodstock area have resulted in significant damages caused by erosion. In this regard, it is advised that you properly protect any infrastructure against potential erosion from extreme surface water flows caused by severe rain events. You should consult latest rainfall data from Environment Canada and consult the University of Western Ontario site for deriving rainfall Intensity-Duration-Frequency Curves for future climate scenarios (<http://www.idf-cc-uwo.ca/login.aspx?ReturnUrl=%2fMyStationsData.>).
- 8) Based on the information provided and the understanding that the activity will not occur within 30m of any watercourse, the Department of Fisheries and Oceans (DFO) has determined that a *Fisheries Act* authorization is not required for the proposed hydrogeological testing. In order to comply with the Act, it is recommended that you follow DFO guidance tools available at <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html>. Should your plans change or if you have omitted some information in your proposal such that your proposal meets the criteria for a site specific review, as described in DFO's web site (<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>), you should complete and submit the request for review form available on the web site.

Should you have any questions or concerns about the compliance of your proposal with the *Fisheries Act*, you may wish to engage an environmental professional familiar with measures to avoid impacts to fish and aquatic habitat (see <http://www.dfo-mpo.gc.ca/pnw-ppe/env-pro-eng.html>).

- 9) It is your responsibility to ensure that all reasonable measures are conducted to prevent the release of substances deleterious to fish from your proposed activities.
- 10) All spills or leaks, such as those from machinery or storage tanks, must be promptly contained and cleaned up, and reported to the 24-hour environmental emergencies reporting system (Maritime Provinces 1-800-565-1633).
- 11) Direct hydraulic connection between a potential well location and surface water bodies can cause issues with water quality in the well, but also, in the case of a contamination event at the wellhead, the well may become a pathway for contaminants to reach the river. Future water testing and pumping tests should identify any potential issues, and, with proper well construction and a Wellfield Protection Plan, these risks may be minimized. In addition, the proper decommissioning of wells that are not used as production wells will help minimize risk of aquifer contamination.

- 12) Activities within 30m of a watercourse or Regulated wetland may require a *Watercourse and Wetland Alteration (WAWA) Permit*. In addition, please ensure that sediment control techniques are used as required to prevent sediment from reaching the river.
- 13) The table below includes a list of typical permits and legislation under the mandate of the Department of Transportation and Infrastructure (DTI); please note that some contacts have changed. Note that this table is not all inclusive and additional permits and requirements relevant to the project may be required. Please ensure that you review the table and speak with the appropriate contact regarding the permits/legislation which may be relevant to the project.

Permit/Legislation Requirements	DTI Contact	Contact Number
Access Permit/Certificate of Setback	Sébastien Roy	506-453-2611
Highway Usage Permit	Peter McDonald	506-453-6724
Community Planning Act	Norm Cote	506-457-7559
Highway Act - Transfer of Administration and Control	Colleen Brown	506-444-2047
Provincial Motor Vehicle Act	Permit Office	506-453-2982

- 14) Special Permits will be required for any transport on DTI designated roads that does not comply with *Regulation 2001-67* under the Motor Vehicle Act. This Regulation includes the dimensions and mass information for legal operation on DTI designated roads. Please contact the DTI Permit Office as early as possible to discuss the transportation requirements for this project.
- 15) A proactive approach must be taken to ensure that the location of the wells be located away from DTI's infrastructure. This is based on the recognition that new road construction is prohibited under a *Wellfield Protected Area Designation Order* as well as many other construction activities required for road construction, such as future maintenance and upgrade activities. Future Wellfield Protected Areas that are located adjacent to DTI highways could prohibit the future maintenance of existing roads and highways. In an effort to avoid such a circumstance, DTI is willing to meet with you to discuss this concern further, if required.
- 16) The proposed project location has been identified as near or within the vicinity of Routes 105, 585 and Grafton Shore Road. DTI requests that you contact Sébastien Roy, Acting District Engineer, in Fredericton well in advance of beginning the project to ensure that all of DTI's concerns are addressed.
- 17) The *Work Area Traffic Control Manual (WATCM)* provides a uniform set of traffic control guidelines for all work carried out on New Brunswick provincial roads. Any work that occurs within the right-of-way of a provincial road must conform to the guidelines prescribed by this manual. A PDF version of the manual is available at <http://www.gnb.ca/0113/publications/watcm-e.asp>.
- 18) Trucks must adhere to legal load weight limits at all times, including spring weight restrictions when applicable. All loads are to be properly secured during transit according to the Motor Vehicle Act.
- 19) Any spillage of material that occurs during hauling must be kept to a minimum and promptly removed from the highway following appropriate safety procedures.

- 20) A *Highway Usage Permit* is required if the proponent intends to utilize DTI right-of-ways.
- 21) An *Access Road Permit* is required prior to the construction of any access roads off DTI road(s).
- 22) Please contact DTI as early as possible regarding any permits or approvals required. The process required for approvals can take up to several months to complete.

The following points and questions identify items that need to be addressed prior to this project being determined by the Minister and/or are for your information purposes:

- 23) As a reminder for future projects, no invasive work is permitted on site (eg: geotechnical work, etc.) until you submit your WSSA Initial Application and after you receive approval from DELG to proceed with a Hydrogeological Assessment, as per the *WSSA Guidelines*. In this case, the report identified that geotechnical investigations were completed on site in advance of this approval. Please consider this an official warning for future projects.
- 24) Well water must be tested for bacteriological, inorganic and organic parameters. Results will be provided to the Department of Health.
- 25) All water result parameters should meet the New Brunswick Maximum Acceptable Concentrations (MAC). Any parameters in exceedance of the MAC will require appropriate pretreatment to lower levels to acceptable concentrations that are safe for drinking.
- 26) If the drilled well is intended to be used as part of the water distribution system for the Town of Woodstock, it must be added to the Town's sampling plan before it is brought into use.
- 27) Will the municipality install a continuous disinfection system on the new well? Will the continuous disinfection system have an alarm?
- 28) Any newly constructed water mains that connect a new well to the distribution system should be disinfected in accordance with AWWA standards C651.
- 29) Wells should be disinfected in accordance with AWWA standards C654.
- 30) Before a well is brought into use as a potable water supply, you must contact the Department of Health for Approval.
- 31) Potential impacts to agricultural and other lands will be determined once the A, B, and C zones of a potential future designated drinking water wellfield are mapped.
- 32) Numerous potential protected wellfield non-compliances have been identified in the vicinity of the well target locations and the Town of Woodstock should be aware of these issues at each site before moving forward. The following site specific information is provided for your information and consideration:

Nearby PID's: 10026300 & 10163574

Property: Former Irving Oil Limited Retail Outlet

Description: Remediation File # 6515-5-0194, Open Status. June 2008

- Distance to proposed source, 360 meters up-gradient.
- PID 10163574 Petroleum Site ID # 11479, 10 tanks have a Removed Status, 1 furnace oil 1135 liters Active Status.

Nearby PID: 10165587 (E. Cummings Contractors)

Property: Former Grafton NBDTI Property

Description: Remediation File # 6515-5-0166, Closed Status, some remedial work on location, no report available.

- Distance to proposed source, 750 meters up-gradient.
- PID 10165587 Petroleum Site ID # 1977, all 5 tanks have a Removed Status.
- Was this site's historic use taken into consideration?
- NOTE* Not sure about site ownership, DELG Petroleum Database indicates System Owner is Dept. of Transportation while Planet indicates E. Cummings Contractors.

Nearby PID's: 10027522 (Town of Woodstock Maintenance Depot) & 10165587 (E. Cummings Contractors)

Property: Former Grafton NBDTI Property

Description: Remediation File # 6515-5-0809, Closed Status. November 2005. Remediation file was prepared for both properties.

- Distance to proposed source, 750 meters up-gradient.
- PID 10027522 Petroleum Site ID # 7831, 3 petroleum tanks have Active Status.
- PID 10165587 Petroleum Site ID # 1977, all 5 tanks have a Removed Status.
- Was this site's historic use taken into consideration?
- NOTE* Not sure about site ownership but Planet is stating Salt Dome Location.

Source property PID 10023489:

- Since this property is located some 20 meters from the EMO 2008 Flood Map Layer, what will be done in order to prevent damage to the well structure/infiltration?
- This PID is located in areas where private potable wells exist. What will be done in order to ensure safe water supply for these dwellings?

33) Are you aware of any additional transportation issues?

34) If you have any questions regarding the hydrogeological requirements for the assessment you can contact Mallory Gillis, DELG Hydrogeologist, directly at (506) 453-3624.

35) Migratory birds protected by the Migratory Birds Convention Act (MBCA) include all seabirds except cormorants and pelicans, all waterfowl, all shorebirds, and most landbirds (birds with principally terrestrial life cycles).

Under Section 6 of the *Migratory Birds Regulations* (MBR), no person shall disturb, destroy or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird, or its carcass, skin, nest or egg, except under authority of a permit. It is important to note that under the current MBR, no permits can be issued for the incidental take of migratory birds caused by development projects or other economic activities. Furthermore, Section 5.1 of the MBCA describes prohibitions related to deposit of substances harmful to migratory birds:

"5.1 (1) No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

(2) No person or vessel shall deposit a substance or permit a substance to be deposited in any place if the substance, in combination with one or more substances, results in a substance — in waters or an area frequented by migratory birds or in a place from which it may enter such waters or such an area — that is harmful to migratory birds."

It is your responsibility to ensure that activities comply with the MBCA and regulations. In fulfilling your responsibility for MBCA compliance, you should take the following points into consideration:

- Information regarding regional nesting periods can be found at <http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1>. Some species protected under the MBCA may nest outside these timeframes.
- Most migratory bird species construct nests in trees (sometimes in tree cavities) and shrubs, but several species nest at ground level (e.g., Common Nighthawk, Killdeer, sandpipers), in hay fields, pastures or in burrows. Some bird species may nest on cliffs or in stockpiles of overburden material from mines or the banks of quarries. Some migratory birds (including certain waterfowl species) may nest in head ponds created by beaver dams. Some migratory birds (e.g., Barn Swallow, Cliff Swallow, Eastern Phoebe) may build their nests on structures such as bridges, ledges or gutters.
- One method frequently used to minimize the risk of destroying bird nests consists of avoiding certain activities, such as clearing, during the regional nesting period for migratory birds.
- Risk of impacting active nests or birds caring for pre-fledged chicks, discovered during project activities outside the regional nesting period, can be minimized by measures such as the establishment of vegetated buffer zones around nests, and minimization of activities in the immediate area until nesting is complete and chicks have naturally migrated from the area. It is incumbent on the proponent to identify the best approach, based on the circumstances, to complying with the MBCA.

Further information can be found at <http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=C51C415F-1>.

36) The prohibitions under the Species at Risk Act (SARA) are now in force. The complete text of SARA, including prohibitions, is available at www.sararegistry.gc.ca.

37) Please submit your public involvement/consultation plan for review and approval when available. Public involvement is required before the Minister can make a Determination on this project and copies of communications and correspondence must be provided. The Woodstock First Nation should be notified of proposed activities and invited to review the information.

If you have any questions regarding the conditions and information in this letter, please feel free to contact me at (506) 453-7108.

Sincerely,



Lee Swanson
Project Manager

Cc. Technical Review Committee

Appendix B

Water Well Driller's Reports

OFFICE USE ONLY FIELD NO.	HEALTH CODE	LAB NO.	SAMPLE RECEIVED DATE YR MO DAY	SAMPLE RECEIVED BY:
	HEALTH OFFICE	EVENT NO.		

TESTING VOUCHER INFORMATION SEE BACK FOR DETAILS PLEASE PRINT INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF SAMPLING		MANDATORY FOR WATER TEST	P.I.D. NO. <u>10024560</u>	WELL I.D. NO. <u>0035553</u>
FIRST NAME	LAST NAME			

ADDRESS (MAIL RESULTS TO)		FIRST NAME <u>Town of Woodstock</u>			LAST NAME		
CITY/TOWN/VILLAGE	PROV.	POSTAL CODE		ADDRESS <u>824 Main St Woodstock</u>			
DAYTIME PHONE	FAX NO.	CITY/TOWN/VILLAGE <u>Woodstock</u>	PROVINCE	POSTAL CODE <u>NB E7M 2E8</u>			
TEL NO.	SAMPLE COLLECTED YR MO DAY HR MIN AM PM		WELL LOCATION: SAME AS ABOVE OR CIVIC NUMBER STREET NAME <u>Grandview Shore Rd</u>				

DO YOU NEED A SAMPLE FOR YOUR MORTGAGE? IF YOU WISH THE RESULTS TO BE RELEASED TO A MORTGAGE INSTITUTION PLEASE INCLUDE THE FOLLOWING CONTACT INFORMATION:		SEE BACK FOR DETAILS		WELL PAID FOR BY PROVINCIAL DEPT. OF	
ATTENTION OF:		WELL ON RESERVE? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		WELL ALREADY TAGGED? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	
TEL NO.		FAX NO.		OLD WELL I.D.	

SIGNATURE OF WELL OWNER		DRILLER'S LOG *			
		FROM (FT.)	TO (FT.)	COLOUR	ROCK TYPE
		Ground Level	30	Brown	Sand & Gravel
		30	100	Brown & Grey	Silty clay
		100	142	Grey	Sand & Gravel
		142	146	Grey	Gravel
					Industrial Ball Rock

WAS THE COST OF THIS WELL FINANCED BY NB HOUSING? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		WELL / WATER USE:			
INDUSTRIAL	ABANDONED	DOMESTIC			
EXPLORATORY <input checked="" type="checkbox"/>	MUNICIPAL	MONITORING			
HEAT PUMP	OBSERVATION	OTHER			

TYPE OF WORK COMPLETED: NEW WELL <input checked="" type="checkbox"/> DEEPENED <input type="checkbox"/>	
OTHER:	
METHOD:	
CABLE TOOL <input type="checkbox"/> ROTARY <input checked="" type="checkbox"/> OTHER	

CASING INSTALLED:	
LENGTH OF CASING ABOVE GROUND:	<u>1</u> FT. <u>6</u> IN.
STEEL:	<u>6</u> IN DIAM. FROM <u>0</u> FT. TO <u>142</u> FT.
PVC:	IN DIAM. FROM FT. TO FT.
SLOTTED	IN DIAM. FROM FT. TO FT.
SCREENS: TYPE: SLOT SIZE	DRIVE SHOE: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
IN DIAM. FROM FT. TO FT.	

SETBACKS: SEE BACK FOR DETAILS	
SEPTIC TANK (1)	FT.
SEPTIC TANK (2)	FT. FIELD (2) FT. FIELD (1) FT.
*RIGHT OF WAY OF ANY PUBLIC ROAD	(1) <u>160</u> ROAD (2) FT.
CENTER OF ROAD	(1) <u>193</u> (2) FT.
SETBACKS MEASURED (NEW CONSTRUCTION)	
APPROXIMATE SETBACKS AS INDICATED BY HOMEOWNER (EXISTING CONST.)	

FLOWING WELL? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	IF YES - RATE: igpm (approx.)
AQUIFER TEST: METHOD: AIR <input checked="" type="checkbox"/> BAILER <input type="checkbox"/> PUMP <input type="checkbox"/>	
INITIAL WATER LEVEL:	<u>146</u> FT BELOW TOP OF CASING
PUMPING RATE:	<u>300</u> igpm DURATION: <u>2</u> hrs. <u>---</u> min.
FINAL WATER LEVEL:	<u>15</u> FT. BELOW TOP OF CASING
ESTIMATED SAFE YIELD: <u>300</u> igpm	

WELL GROUTED? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	
FROM FT. TO FT.	GROUT TYPE:
DRILLING FLUIDS USED: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	
TYPE:	

TOTAL WELL DEPTH: <u>146</u> FT. DEPTH TO BEDROCK: <u>142</u> FT.	
WATER BEARING: <u>300</u> igpm AT <u>142</u> FT. 2 igpm AT FT.	
FRACTURE ZONES: 3 igpm AT FT. 4 igpm AT FT.	
PUMP INSTALLATION: INSTALLED <input type="checkbox"/> NOT INSTALLED <input checked="" type="checkbox"/>	
PUMP INTAKE SETTING: <u>100</u> FT. BELOW TOP OF CASING (Recommended)	
PUMP TYPE: SUBMERSIBLE <input checked="" type="checkbox"/> JET <input type="checkbox"/> TURBINE <input type="checkbox"/>	
OTHER:	
WELL DISINFECTED? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	
TYPE: <u>Block</u>	

DRILLER'S COMMENTS <u>Exploratory well for Town of Woodstock</u>	
DRILLING COMPANY: <u>ER Stevens</u>	LICENSE NO. <u>100</u>
COMPLETION DATE: <u>11/06/10</u>	YR. MO. DAY

G.P.S. (OPTIONAL)		WHITE - NBELG
I CERTIFY THAT THE WELL HEREIN DESCRIBED HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE WATER WELL REGULATION UNDER THE NEW BRUNSWICK CLEAN WATER ACT.		BLUE - Homeowner / Voucher
Signature of Driller: <u>J Stevens</u>		YELLOW - Homeowner
Signature of Helper: <u>Tom Wadell</u>		PINK - Drilling Company
		KEEP THIS REPORT WITH YOUR IMPORTANT DOCUMENTS

OFFICE USE ONLY FIELD NO.		HEALTH CODE	LAB NO.	SAMPLE RECEIVED DATE YR MO DAY		SAMPLE RECEIVED BY:																																																
		HEALTH OFFICE	EVENT NO.																																																			
TESTING VOUCHER INFORMATION SEE BACK FOR DETAILS PLEASE PRINT INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF SAMPLING			MANDATORY FOR WATER TEST			P.I.D. NO. 10023547	WELL I.D. NO. 0055554																																															
FIRST NAME		LAST NAME		WELL OWNER INFORMATION INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF DRILLING																																																		
ADDRESS (MAIL RESULTS TO)				FIRST NAME		LAST NAME																																																
CITY/TOWN/VILLAGE				ADDRESS Town of Woodstock																																																		
DAYTIME PHONE		FAX NO.		CITY/TOWN/VILLAGE		PROVINCE POSTAL CODE																																																
TEL. NO.		SAMPLE COLLECTED YR MO DAY HR MIN AM PM		Woodstock		N.B. E7M 2E4																																																
DO YOU NEED A SAMPLE FOR YOUR MORTGAGE? IF YOU WISH THE RESULTS TO BE RELEASED TO A MORTGAGE INSTITUTION PLEASE INCLUDE THE FOLLOWING CONTACT INFORMATION:				SEE BACK FOR DETAILS		WELL LOCATION: SAME AS ABOVE OR CIVIC NUMBER STREET NAME Grafton Shore Rd																																																
ATTENTION OF:				CITY/TOWN/VILLAGE Grafton		WELL PAID FOR BY PROVINCIAL DEPT. OF																																																
TEL. NO.				WELL ON RESERVE? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		WELL ALREADY TAGGED? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>																																																
SIGNATURE OF WELL OWNER				OLD WELL I.D.																																																		
WAS THE COST OF THIS WELL FINANCED BY NB HOUSING? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>				<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4" style="text-align: center;">DRILLER'S LOG *</th> </tr> <tr> <th style="width: 15%;">FROM (FT.)</th> <th style="width: 15%;">TO (FT.)</th> <th style="width: 30%;">COLOUR</th> <th style="width: 40%;">ROCK TYPE</th> </tr> </thead> <tbody> <tr> <td>Ground Level</td> <td>25</td> <td>Brown</td> <td>Sand & Gravel</td> </tr> <tr> <td>25</td> <td>105</td> <td>Grey</td> <td>Silty Sand & siltstone</td> </tr> <tr> <td>105</td> <td>145</td> <td>Grey</td> <td>Sand</td> </tr> <tr> <td>145</td> <td>151</td> <td>Grey</td> <td>Quartzite</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Bedrock</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>			DRILLER'S LOG *				FROM (FT.)	TO (FT.)	COLOUR	ROCK TYPE	Ground Level	25	Brown	Sand & Gravel	25	105	Grey	Silty Sand & siltstone	105	145	Grey	Sand	145	151	Grey	Quartzite				Bedrock																				
DRILLER'S LOG *																																																						
FROM (FT.)	TO (FT.)	COLOUR	ROCK TYPE																																																			
Ground Level	25	Brown	Sand & Gravel																																																			
25	105	Grey	Silty Sand & siltstone																																																			
105	145	Grey	Sand																																																			
145	151	Grey	Quartzite																																																			
			Bedrock																																																			
WELL / WATER USE: INDUSTRIAL <input type="checkbox"/> ABANDONED <input type="checkbox"/> DOMESTIC <input type="checkbox"/> EXPLORATORY <input checked="" type="checkbox"/> MUNICIPAL <input type="checkbox"/> MONITORING <input type="checkbox"/> HEAT PUMP <input type="checkbox"/> OBSERVATION <input type="checkbox"/> OTHER <input type="checkbox"/>																																																						
TYPE OF WORK COMPLETED: NEW WELL <input checked="" type="checkbox"/> DEEPEMED <input type="checkbox"/>																																																						
OTHER:																																																						
METHOD: CABLE TOOL <input type="checkbox"/> ROTARY <input checked="" type="checkbox"/> OTHER																																																						
CASING INSTALLED: LENGTH OF CASING ABOVE GROUND: <u>1</u> FT. <u>6</u> IN. STEEL: <u>6</u> IN DIAM. FROM <u>0</u> FT. TO <u>147</u> FT. PVC: _____ IN DIAM. FROM _____ FT. TO _____ FT. SLOTTED _____ IN DIAM. FROM _____ FT. TO _____ FT.																																																						
SCREENS: TYPE: _____ SLOT SIZE: _____ _____ IN DIAM. FROM _____ FT. TO _____ FT. DRIVE SHOE: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>																																																						
SETBACKS: SEE BACK FOR DETAILS SEPTIC TANK (1) _____ FT. SEPTIC TANK (2) _____ FT. FIELD (2) _____ FT. FIELD (1) _____ FT. *RIGHT OF WAY OF ANY PUBLIC ROAD <input type="checkbox"/> (1) <u>513</u> ROAD (2) _____ CENTER OF ROAD <input type="checkbox"/> (1) <u>545</u> (2) _____ SETBACKS MEASURED _____ (NEW CONSTRUCTION) _____ (EXISTING CONST.)																																																						
APPROXIMATE SETBACKS AS INDICATED BY HOMEOWNER _____ (EXISTING CONST.)																																																						
FLOWING WELL? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES - RATE: _____ lpgm (approx.)																																																						
AQUIFER TEST: METHOD: AIR <input checked="" type="checkbox"/> BAILER <input type="checkbox"/> PUMP <input type="checkbox"/> INITIAL WATER LEVEL: <u>151</u> FT. BELOW TOP OF CASING PUMPING RATE: _____ lpgm DURATION: _____ hrs. <u>20</u> min. FINAL WATER LEVEL: <u>75</u> FT. BELOW TOP OF CASING ESTIMATED SAFE YIELD: _____ lpgm																																																						
WELL GROUTED? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> FROM _____ FT. TO _____ FT. GROUT TYPE: _____																																																						
DRILLING FLUIDS USED: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> TYPE: _____																																																						

DRILLER'S COMMENTS Exploratory well for Town of Woodstock		DRILLING COMPANY: E.R. Stevens	LICENSE NO. 100
		COMPLETION DATE: 16/06/14 YR MO DAY	

G.P.S. (OPTIONAL)

I CERTIFY THAT THE WELL HEREIN DESCRIBED HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE WATER WELL REGULATION UNDER THE NEW BRUNSWICK CLEAN WATER ACT.

Signature of Driller: **E.R. Stevens** Signature of Helper: **Tom Walsh**

WHITE - NBELG
BLUE - Homeowner / Voucher
YELLOW - Homeowner
PINK - Drilling Company

KEEP THIS REPORT WITH YOUR IMPORTANT DOCUMENTS

OFFICE USE ONLY FIELD NO.	HEALTH CODE	LAB NO.	SAMPLE RECEIVED DATE YR MO DAY	SAMPLE RECEIVED BY:
	HEALTH OFFICE	EVENT NO.		

TESTING VOUCHER INFORMATION SEE BACK FOR DETAILS PLEASE PRINT INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF SAMPLING	MANDATORY FOR WATER TEST	P.I.D. NO. 10165819	WELL I.D. NO. 0035555
--	--------------------------	------------------------	--------------------------

FIRST NAME	LAST NAME	WELL OWNER INFORMATION INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF DRILLING
------------	-----------	--

ADDRESS (MAIL RESULTS TO)	FIRST NAME	LAST NAME
---------------------------	------------	-----------

CITY/TOWN/VILLAGE	PROV.	POSTAL CODE
-------------------	-------	-------------

DAYTIME PHONE	FAX NO.	CITY/TOWN/VILLAGE	PROVINCE	POSTAL CODE
---------------	---------	-------------------	----------	-------------

TEL. NO.	SAMPLE COLLECTED YR MO DAY HR MIN AM PM	WELL LOCATION: SAME AS ABOVE OR CIVIC NUMBER STREET NAME
----------	--	---

DO YOU NEED A SAMPLE FOR YOUR MORTGAGE? IF YOU WISH THE RESULTS TO BE RELEASED TO A MORTGAGE INSTITUTION PLEASE INCLUDE THE FOLLOWING CONTACT INFORMATION:	SEE BACK FOR DETAILS	CITY/TOWN/VILLAGE	WELL PAID FOR BY PROVINCIAL DEPT. OF
---	----------------------	-------------------	---

ATTENTION OF:	WELL ON RESERVE? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	WELL ALREADY TAGGED? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	OLD WELL I.D.
---------------	--	--	---------------

TEL. NO.	FAX NO.	DRILLER'S LOG *	
----------	---------	-----------------	--

FROM (FT.)	TO (FT.)	COLOUR	ROCK TYPE
Ground Level	45	Brown	Sand & Gravel
45	70	Grey	Silly Sand clay
70	105	Brown	Sand Gravel
105	134	Brown	Gravel with fine sand
134	136	Brown	Gravel with sand
136	140	Grey	Quartzite
140	143	Grey	Fractured Quartzite
143	145	Grey	Quartzite

WAS THE COST OF THIS WELL FINANCED BY NB HOUSING? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
--

WELL / WATER USE:	ABANDONED <input type="checkbox"/>	DOMESTIC <input type="checkbox"/>
INDUSTRIAL <input type="checkbox"/>	MUNICIPAL <input type="checkbox"/>	MONITORING <input type="checkbox"/>
EXPLORATORY <input checked="" type="checkbox"/>	OBSERVATION <input type="checkbox"/>	OTHER <input type="checkbox"/>
HEAT PUMP <input type="checkbox"/>		

TYPE OF WORK COMPLETED: NEW WELL <input checked="" type="checkbox"/> DEEPENED <input type="checkbox"/>
--

OTHER:

METHOD:

CABLE TOOL <input type="checkbox"/> ROTARY <input checked="" type="checkbox"/> OTHER
--

CASING INSTALLED:

LENGTH OF CASING ABOVE GROUND: 1 FT. 6 IN.
--

STEEL: 6 IN DIAM. FROM 0 FT. TO 138 FT.

PVC: IN DIAM. FROM FT. TO FT.

SLOTTED: IN DIAM. FROM FT. TO FT.

SCREENS: TYPE: SLOT SIZE	DRIVE SHOE: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
--------------------------	---

SETBACKS: SEE BACK FOR DETAILS SEPTIC TANK (1) FT.
--

SEPTIC TANK (2) FT. FIELD (2) FT. FIELD (1) FT.

*RIGHT OF WAY OF ANY PUBLIC ROAD (1) 865 ROAD (2)

CENTER OF ROAD (1) 898 (2)

SETBACKS MEASURED (NEW CONSTRUCTION)

APPROXIMATE SETBACKS AS INDICATED BY HOMEOWNER (EXISTING CONST.)
--

FLOWING WELL? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES - RATE: igpm (approx.)

AQUIFER TEST: METHOD: AIR <input checked="" type="checkbox"/> BAILER <input type="checkbox"/> PUMP <input type="checkbox"/>

INITIAL WATER LEVEL: 145 FT. BELOW TOP OF CASING
--

PUMPING RATE: 300 igpm DURATION: 4 hrs min.

FINAL WATER LEVEL: 15 FT. BELOW TOP OF CASING

ESTIMATED SAFE YIELD: 300 igpm

WELL GROUTED? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>

FROM FT. TO FT. GROUT TYPE:

DRILLING FLUIDS USED: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>

TYPE:

DRILLER'S COMMENTS	DRILLING COMPANY: FRS Drilling
--------------------	--------------------------------

Completion Date: 11/6/06	LICENSE NO: 100
--------------------------	-----------------

G.P.S. (OPTIONAL)

I CERTIFY THAT THE WELL HEREIN DESCRIBED HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE WATER WELL REGULATION UNDER THE NEW BRUNSWICK CLEAN WATER ACT.

Signature of Driller: J. Stearns Signature of Helper: Tom Walsh

WHITE - NBELG
BLUE - Homeowner / Voucher
YELLOW - Homeowner
PINK - Drilling Company

KEEP THIS REPORT WITH YOUR IMPORTANT DOCUMENTS

OFFICE USE ONLY FIELD NO.		HEALTH CODE	LAB NO.	SAMPLE RECEIVED DATE
		HEALTH OFFICE	EVENT NO.	YR MO DAY
		SAMPLE RECEIVED BY:		
TESTING VOUCHER INFORMATION SEE BACK FOR DETAILS PLEASE PRINT INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF SAMPLING		MANDATORY FOR WATER TEST		P.I.D. NO. 10165819
FIRST NAME		LAST NAME		WELL I.D. NO. 0055572
ADDRESS (MAIL RESULTS TO)		WELL OWNER INFORMATION INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF DRILLING		
CITY/TOWN/VILLAGE		FIRST NAME		
PROV. POSTAL CODE		LAST NAME		
DAYTIME PHONE		ADDRESS		
FAX NO.		CITY/TOWN/VILLAGE		
TEL NO.		PROVINCE POSTAL CODE		
SAMPLE COLLECTED		WELL LOCATION: SAME AS ABOVE OR		
YR MO DAY HR MIN AM PM		CIVIC NUMBER STREET NAME		
DO YOU NEED A SAMPLE FOR YOUR MORTGAGE?		CITY/TOWN/VILLAGE		
IF YOU WISH THE RESULTS TO BE RELEASED TO A MORTGAGE INSTITUTION PLEASE INCLUDE THE FOLLOWING CONTACT INFORMATION:		WELL PAID FOR BY PROVINCIAL DEPT. OF		
ATTENTION OF:		WELL ON RESERVE? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		
TEL NO.		WELL ALREADY TAGGED? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		
FAX NO.		OLD WELL I.D.		
SIGNATURE OF WELL OWNER		DRILLER'S LOG *		
WAS THE COST OF THIS WELL FINANCED BY NB HOUSING?		FROM (FT.) TO (FT.) COLOUR ROCK TYPE		
YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		Ground Level 45 Brown Sand & Gravel		
WELL / WATER USE:		45 90 Grey Silty Sand & Gravel		
INDUSTRIAL <input type="checkbox"/> ABANDONED <input type="checkbox"/> DOMESTIC <input type="checkbox"/>		90 105 Brown Silty Sand		
EXPLORATORY <input checked="" type="checkbox"/> MUNICIPAL <input type="checkbox"/> MONITORING <input type="checkbox"/>		105 139 Brown Sand with sand		
HEAT PUMP <input type="checkbox"/> OBSERVATION <input type="checkbox"/> OTHER <input type="checkbox"/>		139 136 Brown gravel & Boulders		
TYPE OF WORK COMPLETED: NEW WELL <input checked="" type="checkbox"/> DEEPENED <input type="checkbox"/>		136 139 Grey Boulders		
OTHER:		139 140 Grey		
METHOD:				
CABLE TOOL <input type="checkbox"/> ROTARY <input checked="" type="checkbox"/> OTHER				
CASING INSTALLED:				
LENGTH OF CASING ABOVE GROUND: 4 FT. IN.				
STEEL: 1/2 IN DIAM. FROM 0 FT. TO 116 FT.				
PVC: IN DIAM. FROM FT. TO FT.				
SLOTTED IN DIAM. FROM FT. TO FT.				
SCREENS: TYPE: 35 SLOT SIZE: 100				
1 1/2 IN DIAM. FROM 106 FT. TO 139 FT.				
DRIVE SHOE: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>				
SETBACKS: SEE BACK FOR DETAILS SEPTIC TANK (1) FT.				
SEPTIC TANK (2) FT. FIELD (2) FT. FIELD (1) FT.				
*RIGHT OF WAY OF ANY PUBLIC ROAD (1) 865 ROAD (2) -				
CENTER OF ROAD (1) 898 (2) -				
SETBACKS MEASURED (NEW CONSTRUCTION)				
APPROXIMATE SETBACKS AS INDICATED BY HOMEOWNER (EXISTING CONST.)				
FLOWING WELL? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES - RATE: igpm (approx.)		IF INSUFFICIENT SPACE PLEASE USE ADDITIONAL SHEETS		
AQUIFER TEST: METHOD: AIR <input checked="" type="checkbox"/> BAILER <input type="checkbox"/> PUMP <input type="checkbox"/>		TOTAL WELL DEPTH: 139 FT. DEPTH TO BEDROCK: 139 FT.		
INITIAL WATER LEVEL: 14 FT BELOW TOP OF CASING		WATER BEARING 1 500* igpm AT 106 FT. 2 139 igpm AT FT.		
PUMPING RATE 500 igpm DURATION: 30 hrs. min.		FRACTURE ZONES: 3 igpm AT FT. 4 igpm AT FT.		
FINAL WATER LEVEL: 14 FT. BELOW TOP OF CASING		PUMP INSTALLATION: INSTALLED <input type="checkbox"/> NOT INSTALLED <input checked="" type="checkbox"/>		
ESTIMATED SAFE YIELD: 500* igpm		PUMP INTAKE SETTING: 100 FT. BELOW TOP OF CASING (Recommended)		
WELL GROUTED? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		PUMP TYPE: SUBMERSIBLE <input checked="" type="checkbox"/> JET <input type="checkbox"/> TURBINE <input type="checkbox"/>		
FROM FT. TO FT. GROUT TYPE:		OTHER		
DRILLING FLUIDS USED: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		WELL DISINFECTED? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>		
TYPE:		TYPE Bleach		

DRILLER'S COMMENTS	DRILLING COMPANY: ER Steeles LTD	COMPLETION DATE: 16 10 31
		YR MO DAY
		LICENSE NO. 100

G.P.S. (OPTIONAL)

I CERTIFY THAT THE WELL HEREIN DESCRIBED HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE WATER WELL REGULATION UNDER THE NEW BRUNSWICK CLEAN WATER ACT.

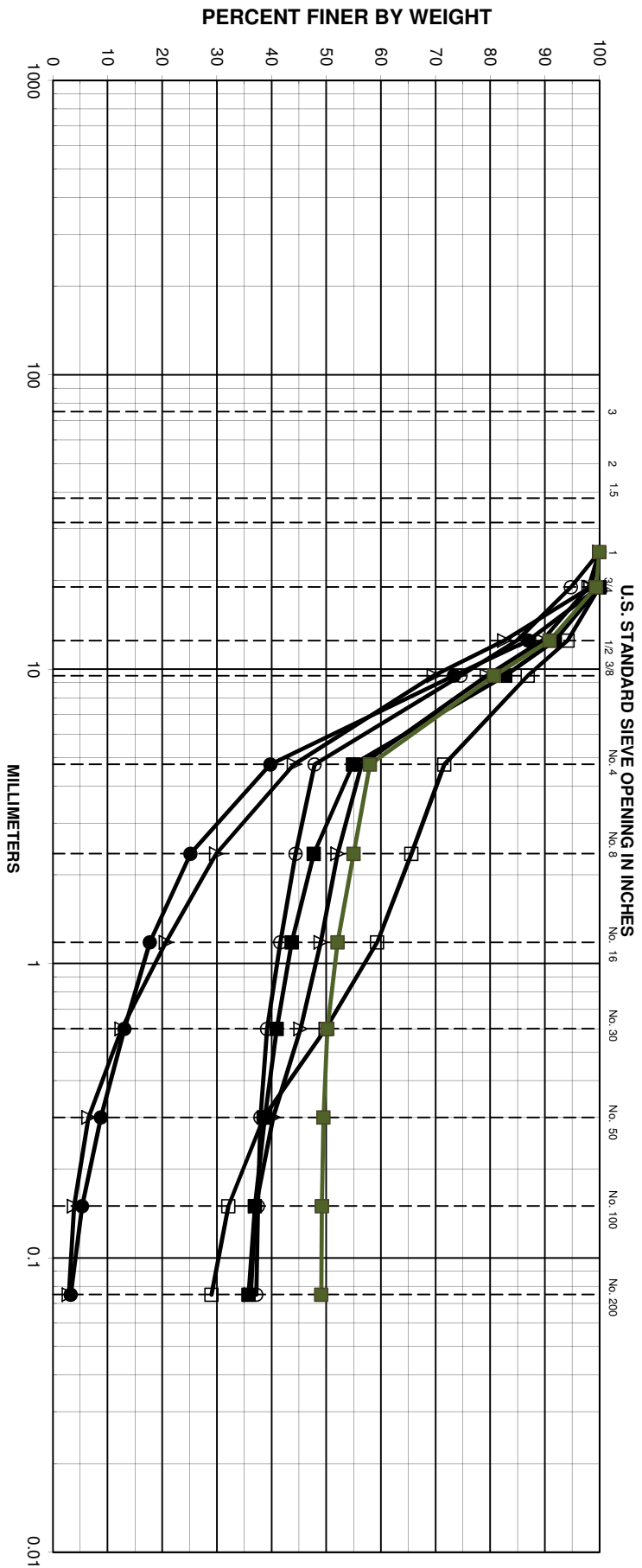
Signature of Driller: *A. Steeles* Signature of Helper: *Tau...*

WHITE - NBELG
BLUE - Homeowner / Voucher
YELLOW - Homeowner
PINK - Drilling Company

KEEP THIS REPORT WITH YOUR IMPORTANT DOCUMENTS

Appendix C

Laboratory Analytical Certificates



Sample	Depth (ft)	25	19	12.5	9.5	4.75	2.36	1.18	0.3	0.075
Sa 1	105 - 110	100	100	92	83	55	48	44	39	35.8
Sa 2	110 - 115	100	100	87	73	40	25	18	9	3.3
Sa 3	115 - 120	100	100	90	79	57	52	49	40	36.2
Sa 4	120	100	100	94	87	72	66	59	39	29.0
Sa 5	120 - 125	100	98	83	70	44	30	21	7	2.9
Sa 6	130	100	95	85	75	48	44	42	38	37.2
Sa 7	130 - 134	100	99	91	81	58	55	52	50	49.1

Project:	Gradations - Well screening, Woodstock Project No. 15-2119	
Job No.:	075 -086	Source: TH 16-1
Date:	24-Jun-16	Notes:



SIEVE ANALYSIS

Report ID: 218650-IAS
Report Date: 14-Nov-16
Date Received: 01-Nov-16

CERTIFICATE OF ANALYSIS

for

Dillon Consulting Limited
1149 Smythe Street, Suite 200
Fredericton, NB E3B 3H4

rpc

921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Parrish Arnott

Project #: 16-2119

Location: Woodstock

Analysis of Water

RPC Sample ID:	218650-1		
Client Sample ID:	PW		
Date Sampled:	31-Oct-16		
Analytes	Units	RL	
Sodium	mg/L	0.05	27.5
Potassium	mg/L	0.02	1.07
Calcium	mg/L	0.05	105.
Magnesium	mg/L	0.01	19.9
Iron	mg/L	0.02	0.07
Manganese	mg/L	0.001	0.085
Copper	mg/L	0.001	< 0.001
Zinc	mg/L	0.001	< 0.001
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	8.0
Alkalinity (as CaCO ₃)	mg/L	2	150
Chloride	mg/L	0.5	183
Sulfate	mg/L	1	27
Nitrate + Nitrite (as N)	mg/L	0.05	1.08
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO ₂)	mg/L	0.1	9.8
Carbon - Total Organic	mg/L	0.5	0.5
Turbidity	NTU	0.1	3.6
Conductivity	µS/cm	1	899
Calculated Parameters			
Bicarbonate (as CaCO ₃)	mg/L	-	149.
Carbonate (as CaCO ₃)	mg/L	-	1.40
Hydroxide (as CaCO ₃)	mg/L	-	0.050
Cation Sum	meq/L	-	8.11
Anion Sum	meq/L	-	8.80
Percent Difference	%	-	-4.09
Theoretical Conductivity	µS/cm	-	834
Hardness (as CaCO ₃)	mg/L	0.2	344
Ion Sum	mg/L	-	470
Saturation pH (5°C)	units	-	7.5
Langelier Index (5°C)	-	-	0.50

This report relates only to the sample(s) and information provided to the laboratory.

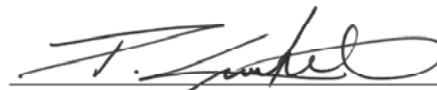
RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.



A. Ross Kean, M.Sc.
Department Head
Inorganic Analytical Chemistry

WATER CHEMISTRY

Page 1 of 3



Peter Crowhurst, B.Sc., C.Chem
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 218650-IAS
 Report Date: 14-Nov-16
 Date Received: 01-Nov-16

CERTIFICATE OF ANALYSIS

for
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Attention: Parrish Arnott

Project #: 16-2119

Location: Woodstock

Analysis of Metals in Water

RPC Sample ID:			218650-1
Client Sample ID:			PW
Date Sampled:			31-Oct-16
Analytes	Units	RL	
Aluminum	µg/L	1	14
Antimony	µg/L	0.1	< 0.1
Arsenic	µg/L	1	< 1
Barium	µg/L	1	215
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	7
Cadmium	µg/L	0.01	< 0.01
Calcium	µg/L	50	105000
Chromium	µg/L	1	< 1
Cobalt	µg/L	0.1	< 0.1
Copper	µg/L	1	< 1
Iron	µg/L	20	70
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	3.4
Magnesium	µg/L	10	19900
Manganese	µg/L	1	85
Molybdenum	µg/L	0.1	< 0.1
Nickel	µg/L	1	< 1
Potassium	µg/L	20	1070
Rubidium	µg/L	0.1	0.7
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	27500
Strontium	µg/L	1	636
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	0.2
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	< 1

Report ID: 218650-IAS
Report Date: 14-Nov-16
Date Received: 01-Nov-16

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Ammonia	4.M47	APHA 4500-NH ₃ G	"Phenate" Colourimetry
pH	4.M03	APHA 4500-H ⁺ B	pH Electrode - Electrometric
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO ₃ H	Hydrazine Red., Derivatization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO ₂)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report ID: 209801-IAS
 Report Date: 27-Jun-16
 Date Received: 21-Jun-16

CERTIFICATE OF ANALYSIS

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Attention: Parrish Arnott

Project #: 15-2119-2000

Location: Grafton, NB

Analysis of Water

RPC Sample ID:		209801-1	
Client Sample ID:		TH16-3	
Date Sampled:		16-Jun-16	
Analytes	Units	RL	
Sodium	mg/L	0.05	16.7
Potassium	mg/L	0.02	1.03
Calcium	mg/L	0.05	112.
Magnesium	mg/L	0.01	20.9
Iron	mg/L	0.02	0.09
Manganese	mg/L	0.001	0.119
Copper	mg/L	0.001	< 0.001
Zinc	mg/L	0.001	< 0.001
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	7.9
Alkalinity (as CaCO ₃)	mg/L	2	140
Chloride	mg/L	0.5	159
Sulfate	mg/L	1	32
Nitrate + Nitrite (as N)	mg/L	0.05	0.73
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO ₂)	mg/L	0.1	< 0.1
Carbon - Total Organic	mg/L	0.5	0.6
Turbidity	NTU	0.1	2.2
Conductivity	µS/cm	1	871
Calculated Parameters			
Bicarbonate (as CaCO ₃)	mg/L	-	139.
Carbonate (as CaCO ₃)	mg/L	-	1.04
Hydroxide (as CaCO ₃)	mg/L	-	0.040
Cation Sum	meq/L	-	8.07
Anion Sum	meq/L	-	8.00
Percent Difference	%	-	0.44
Theoretical Conductivity	µS/cm	-	793
Hardness (as CaCO ₃)	mg/L	0.2	366
Ion Sum	mg/L	-	430
Saturation pH (5°C)	units	-	7.5
Langelier Index (5°C)	-	-	0.40

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

Peter Crowhurst, B.Sc., C.Chem
 Analytical Chemist
 Inorganic Analytical Chemistry

Krista Skinner
 Chemical Technician
 Inorganic Analytical Chemistry

Report ID: 209801-IAS
 Report Date: 27-Jun-16
 Date Received: 21-Jun-16

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 www.rpc.ca

Attention: Parrish Arnott

Project #: 15-2119-2000

Location: Grafton, NB

Analysis of Metals in Water

RPC Sample ID:			209801-1
Client Sample ID:			TH16-3
Date Sampled:			16-Jun-16
Analytes	Units	RL	
Aluminum	µg/L	1	7
Antimony	µg/L	0.1	< 0.1
Arsenic	µg/L	1	< 1
Barium	µg/L	1	243
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	7
Cadmium	µg/L	0.01	< 0.01
Calcium	µg/L	50	112000
Chromium	µg/L	1	< 1
Cobalt	µg/L	0.1	< 0.1
Copper	µg/L	1	< 1
Iron	µg/L	20	90
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	3.6
Magnesium	µg/L	10	20900
Manganese	µg/L	1	119
Molybdenum	µg/L	0.1	< 0.1
Nickel	µg/L	1	< 1
Potassium	µg/L	20	1030
Rubidium	µg/L	0.1	0.6
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	16700
Strontium	µg/L	1	648
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	0.2
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	< 1

Report ID: 209801-IAS
Report Date: 27-Jun-16
Date Received: 21-Jun-16

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Ammonia	4.M47	APHA 4500-NH ₃ G	"Phenate" Colourimetry
pH	4.M03	APHA 4500-H ⁺ B	pH Electrode - Electrometric
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO ₃ H	Hydrazine Red., Derivatization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO ₂)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report ID: 229104-IAS Rev01
 Report Date: 23-Mar-17
 Date Received: 14-Mar-17

CERTIFICATE OF ANALYSIS

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*** Revised Report ***

Attention: Parrish Arnott

Project #: TBD

Location: Woodstock

Analysis of Water

RPC Sample ID:					229104-1
Client Sample ID:					PW16-1 12Hr
Date Sampled:					14-Mar-17
Analytes	Units	RL	MAC	AO	
Sodium	mg/L	0.05	-	200	36.0
Potassium	mg/L	0.02	-	-	1.10
Calcium	mg/L	0.05	-	-	110.
Magnesium	mg/L	0.01	-	-	19.1
Iron	mg/L	0.02	-	0.3	0.10
Manganese	mg/L	0.001	-	0.05	0.098
Copper	mg/L	0.001	-	1.0	< 0.001
Zinc	mg/L	0.001	-	5.0	< 0.001
Ammonia (as N)	mg/L	0.05	-	-	< 0.05
pH	units	-	-	6.5 - 8.5	7.9
Alkalinity (as CaCO ₃)	mg/L	2	-	-	160
Chloride	mg/L	0.5	-	250	169
Sulfate	mg/L	1	-	500	26
Nitrate + Nitrite (as N)	mg/L	0.05	10	-	0.97
o-Phosphate (as P)	mg/L	0.01	-	-	< 0.01
r-Silica (as SiO ₂)	mg/L	0.1	-	-	10.1
Carbon - Total Organic	mg/L	0.5	-	-	< 0.5
Turbidity	NTU	0.1	-	-	10.8
Conductivity	µS/cm	1	-	-	923
Calculated Parameters					
Bicarbonate (as CaCO ₃)	mg/L	-	-	-	159.
Carbonate (as CaCO ₃)	mg/L	-	-	-	1.19
Hydroxide (as CaCO ₃)	mg/L	-	-	-	0.040
Cation Sum	meq/L	-	-	-	8.66
Anion Sum	meq/L	-	-	-	8.58
Percent Difference	%	-	-	-	0.52
Theoretical Conductivity	µS/cm	-	-	-	838
Hardness (as CaCO ₃)	mg/L	0.2	-	-	353
Ion Sum	mg/L	-	-	500	473
Saturation pH (5°C)	units	-	-	-	7.4
Langelier Index (5°C)	-	-	-	-	0.45

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; MAC = Maximum Acceptable Concentration; AO = Aesthetic Objective

Guidelines are from Guidelines for Canadian Drinking Water Quality (October 2014).

A. Ross Kean, M.Sc.
 Department Head
 Inorganic Analytical Chemistry

Peter Crowhurst, B.Sc., C.Chem
 Analytical Chemist
 Inorganic Analytical Chemistry

Report ID: 229104-IAS Rev01
 Report Date: 23-Mar-17
 Date Received: 14-Mar-17

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*** Revised Report ***
 Attention: Parrish Arnott
Project #: TBD
 Location: Woodstock

Analysis of Metals in Water

RPC Sample ID:					229104-1
Client Sample ID:					PW16-1 12Hr
Date Sampled:					14-Mar-17
Analytes	Units	RL	MAC	AO	
Aluminum	µg/L	1	-	-	31
Antimony	µg/L	0.1	6	-	< 0.1
Arsenic	µg/L	1	10	-	< 1
Barium	µg/L	1	1000	-	225
Beryllium	µg/L	0.1	-	-	< 0.1
Bismuth	µg/L	1	-	-	< 1
Boron	µg/L	1	5000	-	9
Cadmium	µg/L	0.01	5	-	< 0.01
Calcium	µg/L	50	-	-	110000
Chromium	µg/L	1	50	-	1
Cobalt	µg/L	0.1	-	-	< 0.1
Copper	µg/L	1	-	1000	< 1
Iron	µg/L	20	-	300	100
Lead	µg/L	0.1	10	-	0.2
Lithium	µg/L	0.1	-	-	3.4
Magnesium	µg/L	10	-	-	19100
Manganese	µg/L	1	-	50	98
Molybdenum	µg/L	0.1	-	-	< 0.1
Nickel	µg/L	1	-	-	< 1
Potassium	µg/L	20	-	-	1100
Rubidium	µg/L	0.1	-	-	0.7
Selenium	µg/L	1	50	-	< 1
Silver	µg/L	0.1	-	-	< 0.1
Sodium	µg/L	50	-	200000	36000
Strontium	µg/L	1	-	-	653
Tellurium	µg/L	0.1	-	-	< 0.1
Thallium	µg/L	0.1	-	-	< 0.1
Tin	µg/L	0.1	-	-	< 0.1
Uranium	µg/L	0.1	20	-	0.2
Vanadium	µg/L	1	-	-	< 1
Zinc	µg/L	1	-	5000	< 1

Report ID: 229104-IAS Rev01
Report Date: 23-Mar-17
Date Received: 14-Mar-17

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Revision Comments

Corrected the units for Conductivity.

Report ID: 229104-IAS Rev01
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<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
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pH	4.M03	APHA 4500-H ⁺ B	pH Electrode - Electrometric
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO ₃ H	Hydrazine Red., Derivatization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO ₂)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report ID: 229104-IAS
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Attention: Parrish Arnott

Project #: TBD

Location: Woodstock

Analysis of Water

RPC Sample ID:					229104-1
Client Sample ID:					PW16-1 12Hr
Date Sampled:					14-Mar-17
Analytes	Units	RL	MAC	AO	
Sodium	mg/L	0.05	-	200	36.0
Potassium	mg/L	0.02	-	-	1.10
Calcium	mg/L	0.05	-	-	110.
Magnesium	mg/L	0.01	-	-	19.1
Iron	mg/L	0.02	-	0.3	0.10
Manganese	mg/L	0.001	-	0.05	0.098
Copper	mg/L	0.001	-	1.0	< 0.001
Zinc	mg/L	0.001	-	5.0	< 0.001
Ammonia (as N)	mg/L	0.05	-	-	< 0.05
pH	units	-	-	6.5 - 8.5	7.9
Alkalinity (as CaCO ₃)	mg/L	2	-	-	160
Chloride	mg/L	0.5	-	250	169
Sulfate	mg/L	1	-	500	26
Nitrate + Nitrite (as N)	mg/L	0.05	10	-	0.97
o-Phosphate (as P)	mg/L	0.01	-	-	< 0.01
r-Silica (as SiO ₂)	mg/L	0.1	-	-	10.1
Carbon - Total Organic	mg/L	0.5	-	-	< 0.5
Turbidity	NTU	0.1	-	-	10.8
Conductivity	NTU	1	-	-	923
Calculated Parameters					
Bicarbonate (as CaCO ₃)	mg/L	-	-	-	159.
Carbonate (as CaCO ₃)	mg/L	-	-	-	1.19
Hydroxide (as CaCO ₃)	mg/L	-	-	-	0.040
Cation Sum	meq/L	-	-	-	8.66
Anion Sum	meq/L	-	-	-	8.58
Percent Difference	%	-	-	-	0.52
Theoretical Conductivity	µS/cm	-	-	-	838
Hardness (as CaCO ₃)	mg/L	0.2	-	-	353
Ion Sum	mg/L	-	-	500	473
Saturation pH (5°C)	units	-	-	-	7.4
Langelier Index (5°C)	-	-	-	-	0.45

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; MAC = Maximum Acceptable Concentration; AO = Aesthetic Objective

Guidelines are from Guidelines for Canadian Drinking Water Quality (October 2014).

A. Ross Kean, M.Sc.
 Department Head
 Inorganic Analytical Chemistry

Peter Crowhurst, B.Sc., C.Chem
 Analytical Chemist
 Inorganic Analytical Chemistry

Report ID: 229104-IAS
 Report Date: 21-Mar-17
 Date Received: 14-Mar-17

CERTIFICATE OF ANALYSIS

for

Dillon Consulting Limited
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 www.rpc.ca

Attention: Parrish Arnott

Project #: TBD

Location: Woodstock

Analysis of Metals in Water

RPC Sample ID:					229104-1
Client Sample ID:					PW16-1 12Hr
Date Sampled:					14-Mar-17
Analytes	Units	RL	MAC	AO	
Aluminum	µg/L	1	-	-	31
Antimony	µg/L	0.1	6	-	< 0.1
Arsenic	µg/L	1	10	-	< 1
Barium	µg/L	1	1000	-	225
Beryllium	µg/L	0.1	-	-	< 0.1
Bismuth	µg/L	1	-	-	< 1
Boron	µg/L	1	5000	-	9
Cadmium	µg/L	0.01	5	-	< 0.01
Calcium	µg/L	50	-	-	110000
Chromium	µg/L	1	50	-	1
Cobalt	µg/L	0.1	-	-	< 0.1
Copper	µg/L	1	-	1000	< 1
Iron	µg/L	20	-	300	100
Lead	µg/L	0.1	10	-	0.2
Lithium	µg/L	0.1	-	-	3.4
Magnesium	µg/L	10	-	-	19100
Manganese	µg/L	1	-	50	98
Molybdenum	µg/L	0.1	-	-	< 0.1
Nickel	µg/L	1	-	-	< 1
Potassium	µg/L	20	-	-	1100
Rubidium	µg/L	0.1	-	-	0.7
Selenium	µg/L	1	50	-	< 1
Silver	µg/L	0.1	-	-	< 0.1
Sodium	µg/L	50	-	200000	36000
Strontium	µg/L	1	-	-	653
Tellurium	µg/L	0.1	-	-	< 0.1
Thallium	µg/L	0.1	-	-	< 0.1
Tin	µg/L	0.1	-	-	< 0.1
Uranium	µg/L	0.1	20	-	0.2
Vanadium	µg/L	1	-	-	< 1
Zinc	µg/L	1	-	5000	< 1

Report ID: 229104-IAS
Report Date: 21-Mar-17
Date Received: 14-Mar-17

CERTIFICATE OF ANALYSIS

for
Dillon Consulting Limited
1149 Smythe Street, Suite 200
Fredericton, NB E3B 3H4



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Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Ammonia	4.M47	APHA 4500-NH ₃ G	"Phenate" Colourimetry
pH	4.M03	APHA 4500-H ⁺ B	pH Electrode - Electrometric
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO ₃ H	Hydrazine Red., Derivatization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO ₂)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

CERTIFICATE OF ANALYSIS / CERTIFICAT D'ANALYSE

for/pour
Dillon Consulting Limited
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Tel: 506.452.1368
Fax: 506.452.1395
www.rpc.ca

Attention: Parrish Arnott / Sarah Robertson

P/O #: DILLON

Project/Job #: TBD

Client Location: Woodstock

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:

Client Sample ID/ID d'échantillon du client:

Date collected/Date du prélèvement
Time sampled/Heure du prélèvement

			229104-1
			PW'16-1 12Hr
			14-Mar-17 11:00:00 AM
Analytes/Paramètre(s)	Method/Méthode	Date Analyzed Date Analysé	Units Unités
Total Coliforms/Coliformes totaux	FFA01	14-Mar-17	MPN/100mL
E. coli	FFA01	14-Mar-17	MPN/100mL

This report relates only to the sample(s) and information provided to the laboratory.

Tests were performed according to the corresponding Compendium of Analytical Methods, Health Protection Branch and/or AOAC Official Methods.

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Les analyses ont été menées conformément au Compendium de méthodes pour l'analyse correspondant ou aux méthodes officielles de la Direction générale de la protection de la santé ou de l'Association of Official Analytical Chemists (AOAC).



Cathy Hay
Micro Supervisor
Food, Fisheries & Aquaculture



Gillian Hodges
Micro Technician
Food, Fisheries & Aquaculture

Report ID: 229206-IAS
 Report Date: 24-Mar-17
 Date Received: 15-Mar-17

CERTIFICATE OF ANALYSIS

for
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 1149 Smythe Street, Suite 200
 Fredericton, NB E3B 3H4



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 Fax: 506.452.0594
 www.rpc.ca

Attention: Parrish Arnott

Project #: TBD

Location: Woodstock

Analysis of Water

RPC Sample ID:					229206-1
Client Sample ID:					PW 16-1 48HR
Date Sampled:					15-Mar-17
Analytes	Units	RL	MAC	AO	
Sodium	mg/L	0.05	-	200	37.8
Potassium	mg/L	0.02	-	-	1.18
Calcium	mg/L	0.05	-	-	114.
Magnesium	mg/L	0.01	-	-	19.1
Iron	mg/L	0.02	-	0.3	0.08
Manganese	mg/L	0.001	-	0.05	0.083
Copper	mg/L	0.001	-	1.0	< 0.001
Zinc	mg/L	0.001	-	5.0	< 0.001
Ammonia (as N)	mg/L	0.05	-	-	< 0.05
pH	units	-	-	6.5 - 8.5	7.9
Alkalinity (as CaCO ₃)	mg/L	2	-	-	160
Chloride	mg/L	0.5	-	250	174
Sulfate	mg/L	1	-	500	23
Nitrate + Nitrite (as N)	mg/L	0.05	10	-	1.16
o-Phosphate (as P)	mg/L	0.01	-	-	< 0.01
r-Silica (as SiO ₂)	mg/L	0.1	-	-	9.8
Carbon - Total Organic	mg/L	0.5	-	-	< 0.5
Turbidity	NTU	0.1	-	-	4.0
Conductivity	µS/cm	1	-	-	933
Calculated Parameters					
Bicarbonate (as CaCO ₃)	mg/L	-	-	-	159.
Carbonate (as CaCO ₃)	mg/L	-	-	-	1.19
Hydroxide (as CaCO ₃)	mg/L	-	-	-	0.040
Cation Sum	meq/L	-	-	-	8.94
Anion Sum	meq/L	-	-	-	8.73
Percent Difference	%	-	-	-	1.23
Theoretical Conductivity	µS/cm	-	-	-	857
Hardness (as CaCO ₃)	mg/L	0.2	-	-	363
Ion Sum	mg/L	-	-	500	484
Saturation pH (5°C)	units	-	-	-	7.4
Langelier Index (5°C)	-	-	-	-	0.46

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; MAC = Maximum Acceptable Concentration; AO = Aesthetic Objective

Guidelines are from Guidelines for Canadian Drinking Water Quality (October 2014).

A. Ross Kean, M.Sc.
 Department Head
 Inorganic Analytical Chemistry

Peter Crowhurst, B.Sc., C.Chem
 Analytical Chemist
 Inorganic Analytical Chemistry

Report ID: 229206-IAS
 Report Date: 24-Mar-17
 Date Received: 15-Mar-17

CERTIFICATE OF ANALYSIS

for
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 Fax: 506.452.0594
 www.rpc.ca

Attention: Parrish Arnott

Project #: TBD

Location: Woodstock

Analysis of Metals in Water

RPC Sample ID:					229206-1
Client Sample ID:					PW 16-1 48HR
Date Sampled:					15-Mar-17
Analytes	Units	RL	MAC	AO	
Aluminum	µg/L	1	-	-	31
Antimony	µg/L	0.1	6	-	< 0.1
Arsenic	µg/L	1	10	-	< 1
Barium	µg/L	1	1000	-	231
Beryllium	µg/L	0.1	-	-	< 0.1
Bismuth	µg/L	1	-	-	< 1
Boron	µg/L	1	5000	-	8
Cadmium	µg/L	0.01	5	-	< 0.01
Calcium	µg/L	50	-	-	114000
Chromium	µg/L	1	50	-	1
Cobalt	µg/L	0.1	-	-	< 0.1
Copper	µg/L	1	-	1000	< 1
Iron	µg/L	20	-	300	80
Lead	µg/L	0.1	10	-	< 0.1
Lithium	µg/L	0.1	-	-	3.4
Magnesium	µg/L	10	-	-	19100
Manganese	µg/L	1	-	50	83
Molybdenum	µg/L	0.1	-	-	0.1
Nickel	µg/L	1	-	-	< 1
Potassium	µg/L	20	-	-	1180
Rubidium	µg/L	0.1	-	-	0.7
Selenium	µg/L	1	50	-	< 1
Silver	µg/L	0.1	-	-	< 0.1
Sodium	µg/L	50	-	200000	37800
Strontium	µg/L	1	-	-	698
Tellurium	µg/L	0.1	-	-	< 0.1
Thallium	µg/L	0.1	-	-	< 0.1
Tin	µg/L	0.1	-	-	< 0.1
Uranium	µg/L	0.1	20	-	0.2
Vanadium	µg/L	1	-	-	< 1
Zinc	µg/L	1	-	5000	< 1

Report ID: 229206-IAS
Report Date: 24-Mar-17
Date Received: 15-Mar-17

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Ammonia	4.M47	APHA 4500-NH ₃ G	"Phenate" Colourimetry
pH	4.M03	APHA 4500-H ⁺ B	pH Electrode - Electrometric
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO ₃ H	Hydrazine Red., Derivatization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO ₂)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

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Tel: 506.452.1368
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Attention: Parrish Arnott / Sarah Robertson

Project/Job #: TBD

Client Location: Woodstock

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:

Client Sample ID/ID d'échantillon du client:

Date collected/Date du prélèvement
Time sampled/Heure du prélèvement

			229206-1
			PW 16-1 48HR
			15-Mar-17 2:00:00 PM
Analytes/Paramètre(s)	Method/Méthode	Date Analyzed Date Analysé	Units Unités
Total Coliforms/Coliformes totaux	FFA01	15-Mar-17	MPN/100mL
E. coli	FFA01	15-Mar-17	MPN/100mL

This report relates only to the sample(s) and information provided to the laboratory.

Tests were performed according to the corresponding Compendium of Analytical Methods, Health Protection Branch and/or AOAC Official Methods.

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Les analyses ont été menées conformément au Compendium de méthodes pour l'analyse correspondant ou aux méthodes officielles de la Direction générale de la protection de la santé ou de l'Association of Official Analytical Chemists (AOAC).



Cathy Hay
Micro Supervisor
Food, Fisheries & Aquaculture



Gillian Hodges
Micro Technician
Food, Fisheries & Aquaculture

Report ID: 229313-IAS
 Report Date: 24-Mar-17
 Date Received: 16-Mar-17

CERTIFICATE OF ANALYSIS

for
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Attention: Parrish Arnott

Project #: TBD

Location: Woodstock

Analysis of Water

RPC Sample ID:					229313-1
Client Sample ID:					PW16-1 72 Hours
Date Sampled:					16-Mar-17
Analytes	Units	RL	MAC	AO	
Sodium	mg/L	0.05	-	200	38.4
Potassium	mg/L	0.02	-	-	1.16
Calcium	mg/L	0.05	-	-	113.
Magnesium	mg/L	0.01	-	-	18.6
Iron	mg/L	0.02	-	0.3	0.04
Manganese	mg/L	0.001	-	0.05	0.073
Copper	mg/L	0.001	-	1.0	< 0.001
Zinc	mg/L	0.001	-	5.0	< 0.001
Ammonia (as N)	mg/L	0.05	-	-	< 0.05
pH	units	-	-	6.5 - 8.5	8.0
Alkalinity (as CaCO ₃)	mg/L	2	-	-	160
Chloride	mg/L	0.5	-	250	184
Sulfate	mg/L	1	-	500	21
Nitrate + Nitrite (as N)	mg/L	0.05	10	-	0.87
o-Phosphate (as P)	mg/L	0.01	-	-	< 0.01
r-Silica (as SiO ₂)	mg/L	0.1	-	-	10.1
Carbon - Total Organic	mg/L	0.5	-	-	< 0.5
Turbidity	NTU	0.1	-	-	1.4
Conductivity	µS/cm	1	-	-	929
Calculated Parameters					
Bicarbonate (as CaCO ₃)	mg/L	-	-	-	158.
Carbonate (as CaCO ₃)	mg/L	-	-	-	1.49
Hydroxide (as CaCO ₃)	mg/L	-	-	-	0.050
Cation Sum	meq/L	-	-	-	8.87
Anion Sum	meq/L	-	-	-	8.97
Percent Difference	%	-	-	-	-0.55
Theoretical Conductivity	µS/cm	-	-	-	869
Hardness (as CaCO ₃)	mg/L	0.2	-	-	359
Ion Sum	mg/L	-	-	500	491
Saturation pH (5°C)	units	-	-	-	7.4
Langelier Index (5°C)	-	-	-	-	0.56

This report relates only to the sample(s) and information provided to the laboratory.

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Guidelines are from Guidelines for Canadian Drinking Water Quality (October 2014).

A. Ross Kean, M.Sc.
 Department Head
 Inorganic Analytical Chemistry

Peter Crowhurst, B.Sc., C.Chem
 Analytical Chemist
 Inorganic Analytical Chemistry

Report ID: 229313-IAS
 Report Date: 24-Mar-17
 Date Received: 16-Mar-17

CERTIFICATE OF ANALYSIS

for
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 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Parrish Arnott

Project #: TBD

Location: Woodstock

Analysis of Metals in Water

RPC Sample ID:					229313-1
Client Sample ID:					PW16-1 72 Hours
Date Sampled:					16-Mar-17
Analytes	Units	RL	MAC	AO	
Aluminum	µg/L	1	-	-	18
Antimony	µg/L	0.1	6	-	< 0.1
Arsenic	µg/L	1	10	-	< 1
Barium	µg/L	1	1000	-	226
Beryllium	µg/L	0.1	-	-	< 0.1
Bismuth	µg/L	1	-	-	< 1
Boron	µg/L	1	5000	-	9
Cadmium	µg/L	0.01	5	-	< 0.01
Calcium	µg/L	50	-	-	113000
Chromium	µg/L	1	50	-	1
Cobalt	µg/L	0.1	-	-	< 0.1
Copper	µg/L	1	-	1000	< 1
Iron	µg/L	20	-	300	40
Lead	µg/L	0.1	10	-	< 0.1
Lithium	µg/L	0.1	-	-	3.4
Magnesium	µg/L	10	-	-	18600
Manganese	µg/L	1	-	50	73
Molybdenum	µg/L	0.1	-	-	0.4
Nickel	µg/L	1	-	-	< 1
Potassium	µg/L	20	-	-	1160
Rubidium	µg/L	0.1	-	-	0.7
Selenium	µg/L	1	50	-	< 1
Silver	µg/L	0.1	-	-	< 0.1
Sodium	µg/L	50	-	200000	38400
Strontium	µg/L	1	-	-	704
Tellurium	µg/L	0.1	-	-	< 0.1
Thallium	µg/L	0.1	-	-	< 0.1
Tin	µg/L	0.1	-	-	< 0.1
Uranium	µg/L	0.1	20	-	0.3
Vanadium	µg/L	1	-	-	< 1
Zinc	µg/L	1	-	5000	< 1

Report ID: 229313-IAS
Report Date: 24-Mar-17
Date Received: 16-Mar-17

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
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pH	4.M03	APHA 4500-H ⁺ B	pH Electrode - Electrometric
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO ₃ H	Hydrazine Red., Derivatization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO ₂)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report ID: 233074-OAS
Report Date: 04-May-17
Date Received: 27-Apr-17

CERTIFICATE OF ANALYSIS

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Attention: Parrish Arnott

Project #: 16-4843

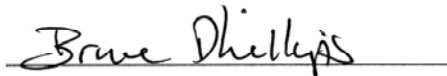
Location: Woodstock

Hydrocarbon Analysis in Water (Atlantic MUST)

RPC Sample ID:		233074-1	
Client Sample ID:		TH16-3	
Date Sampled:		26-Apr-17	
Matrix:		water	
Analytes	Units	RL	
Benzene	mg/L	0.001	< 0.001
Toluene	mg/L	0.001	< 0.001
Ethylbenzene	mg/L	0.001	< 0.001
Xylenes	mg/L	0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01
EPH >C10 - C16	mg/L	0.01	< 0.01
EPH >C16 - C21	mg/L	0.01	< 0.01
EPH >C21-C32	mg/L	0.01	0.01
Modified TPH Tier 1	mg/L	0.02	< 0.02
VPH Surrogate (IBB)	%		102
EPH Surrogate (IBB)	%		96
EPH Surrogate (C32)	%		107
Resemblance			ND
Return to Baseline at C32			Yes

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit



Bruce Phillips
Department Head
Organic Analytical Services

ATLANTIC MUST WATER LEV 1

Page 1 of 4



Angela Colford
Lab Supervisor
Organic Analytical Services

Report ID: 233074-OAS
Report Date: 04-May-17
Date Received: 27-Apr-17

CERTIFICATE OF ANALYSIS

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Method Summary

OAS-HC04: The Determination of Petroleum Hydrocarbons (Atlantic MUST) in Water (VPH)
OAS-HC04: Determination of Petroleum Hydrocarbons (Atlantic MUST) in Water (EPH)

Resemblance Legend

<u>Resemblance Code</u>	<u>Resemblance</u>	<u>Resemblance Code</u>	<u>Resemblance</u>
AG	Aviation Gasoline	PAH	Possible PAHs Detected
COMMENT	See General Report Comments	PG	Possible Gasoline Fraction
FO	Fuel Oil Fraction	PLO	Possible Lube Oil Fraction
FO.LO	Fuel Oil and Lube Oil Fraction	PWFO	Possible Weathered Fuel Oil Fraction
G	Gasoline Fraction	PWG	Possible Weathered Gasoline Fraction
LO	Lube Oil Fraction	TO	Transformer Oil
ND	Not Detected	UP	Unknown Peaks
NR	No Resemblance (not-petrogenic in origin)	WFO	Weathered Fuel Oil Fraction
NRLR	No Resemblance in the lube oil range (>C21-C32).	WG	Weathered Gasoline Fraction
OP	One Product (unidentified)		

General Report Comments

Return to Baseline: Samples are considered to have returned to baseline if the area from C32-C36 is less than 10% of the area from C10-C32.

COMMENTS

Report ID: 233074-OAS
 Report Date: 04-May-17
 Date Received: 27-Apr-17

CERTIFICATE OF ANALYSIS

for
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 Fax: 506.452.0594
 www.rpc.ca

Project #: 16-4843
 Location: Woodstock
QA/QC Report

RPC Sample ID:			BLANKC0132	BLANKC0159	SPIKEC0132	SPIKEC0159
Type:			VPH	EPH	VPH	EPH
Matrix:			water	water	water	water
Analytes	Units	RL			% Recovery	% Recovery
Benzene	mg/L	0.001	< 0.001	-	100%	-
Toluene	mg/L	0.001	< 0.001	-	100%	-
Ethylbenzene	mg/L	0.001	< 0.001	-	99%	-
Xylenes	mg/L	0.001	< 0.001	-	99%	-
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01	-	94%	-
EPH >C10 - C16	mg/L	0.01	-	< 0.01	-	-
EPH >C16 - C21	mg/L	0.01	-	< 0.01	-	-
EPH >C21-C32	mg/L	0.01	-	< 0.01	-	-
EPH >C10-C32	mg/L		-	-	-	106%

RL = Reporting Limit

Report ID: 233074-OAS
Report Date: 04-May-17
Date Received: 27-Apr-17

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Project #: 16-4843

Summary of Date Analyzed

RPC Sample ID	VPH		EPH	
	Extracted	Analyzed	Extracted	Analyzed
233074-1	29-Apr-17	29-Apr-17	3-May-17	3-May-17

DATE ANALYZED SUMMARY

Appendix D

Raw Pumping Test Data

PW16-1		TH16-1		TH16-2		TH16-3		BAROLOGGER		PW16-1		TH16-1		TH16-2		TH16-3		BAROLOGGER	
3/13/2017 16:31	34.9927	2/28/2017 12:47	15.015	3/13/2017 16:31	36.1649	2/28/2017 11:35	16.0297	2/28/2017 14:57	0.9195	3/13/2017 16:51	32.8013	3/8/2017 20:47	14.683	3/14/2017 12:31	36.2665	3/8/2017 19:35	15.6958	3/8/2017 22:57	0.6865
3/13/2017 16:31	34.9977	2/28/2017 12:57	15.0094	3/13/2017 16:32	36.1653	2/28/2017 11:45	16.0324	2/28/2017 15:07	0.9186	3/13/2017 16:51	32.7685	3/8/2017 20:57	14.6821	3/14/2017 12:32	36.2668	3/8/2017 19:45	15.6916	3/8/2017 23:07	0.686
3/13/2017 16:31	34.9948	2/28/2017 13:07	15.0013	3/13/2017 16:33	36.1657	2/28/2017 11:55	16.0373	2/28/2017 15:17	0.9171	3/13/2017 16:51	32.794	3/8/2017 21:07	14.6845	3/14/2017 12:33	36.2671	3/8/2017 19:55	15.6994	3/8/2017 23:17	0.6852
3/13/2017 16:31	34.9949	2/28/2017 13:17	14.9985	3/13/2017 16:34	36.1667	2/28/2017 12:05	16.0289	2/28/2017 15:27	0.9163	3/13/2017 16:51	32.7591	3/8/2017 21:17	14.6822	3/14/2017 12:34	36.2666	3/8/2017 20:05	15.7067	3/8/2017 23:27	0.6845
3/13/2017 16:31	34.9933	2/28/2017 13:27	14.998	3/13/2017 16:35	36.1663	2/28/2017 12:15	16.0255	2/28/2017 15:37	0.9168	3/13/2017 16:51	32.7514	3/8/2017 21:27	14.6799	3/14/2017 12:35	36.2666	3/8/2017 20:15	15.6987	3/8/2017 23:37	0.6858
3/13/2017 16:31	34.9988	2/28/2017 13:37	14.9949	3/13/2017 16:36	36.1664	2/28/2017 12:25	16.0273	2/28/2017 15:47	0.9163	3/13/2017 16:51	32.7174	3/8/2017 21:37	14.6841	3/14/2017 12:36	36.2666	3/8/2017 20:25	15.6977	3/8/2017 23:47	0.685
3/13/2017 16:31	35.0011	2/28/2017 13:47	14.9907	3/13/2017 16:37	36.1663	2/28/2017 12:35	16.0303	2/28/2017 15:57	0.9163	3/13/2017 16:51	32.8377	3/8/2017 21:47	14.6853	3/14/2017 12:37	36.2658	3/8/2017 20:35	15.6963	3/8/2017 23:57	0.6849
3/13/2017 16:31	34.9907	2/28/2017 13:57	14.9822	3/13/2017 16:38	36.1666	2/28/2017 12:45	16.0301	2/28/2017 16:07	0.9154	3/13/2017 16:51	32.7438	3/8/2017 21:57	14.6818	3/14/2017 12:38	36.2657	3/8/2017 20:45	15.6847	3/9/2017 0:07	0.6839
3/13/2017 16:31	34.993	2/28/2017 14:07	14.9627	3/13/2017 16:39	36.1668	2/28/2017 12:55	16.0216	2/28/2017 16:17	0.914	3/13/2017 16:51	32.8135	3/8/2017 22:07	14.6796	3/14/2017 12:39	36.2657	3/8/2017 20:55	15.6842	3/9/2017 0:17	0.6835
3/13/2017 16:31	34.9984	2/28/2017 14:17	14.9454	3/13/2017 16:40	36.1663	2/28/2017 13:05	16.0126	2/28/2017 16:27	0.91	3/13/2017 16:51	32.7871	3/8/2017 22:17	14.6741	3/14/2017 12:40	36.2654	3/8/2017 21:05	15.6849	3/9/2017 0:27	0.682
3/13/2017 16:31	34.9926	2/28/2017 14:27	14.9374	3/13/2017 16:41	36.1669	2/28/2017 13:15	16.0084	2/28/2017 16:37	0.9047	3/13/2017 16:51	32.7919	3/8/2017 22:27	14.6657	3/14/2017 12:41	36.2654	3/8/2017 21:15	15.6813	3/9/2017 0:37	0.681
3/13/2017 16:31	35.0003	2/28/2017 14:37	14.9317	3/13/2017 16:42	36.1665	2/28/2017 13:25	16.0088	2/28/2017 16:47	0.9046	3/13/2017 16:51	32.8044	3/8/2017 22:37	14.6639	3/14/2017 12:42	36.2654	3/8/2017 21:25	15.684	3/9/2017 0:47	0.6803
3/13/2017 16:31	34.9951	2/28/2017 14:47	14.9336	3/13/2017 16:43	36.1667	2/28/2017 13:35	16.0074	2/28/2017 16:57	0.9048	3/13/2017 16:51	32.8311	3/8/2017 22:47	14.6617	3/14/2017 12:43	36.2648	3/8/2017 21:35	15.6856	3/9/2017 0:57	0.6794
3/13/2017 16:31	34.9944	2/28/2017 14:57	14.9373	3/13/2017 16:44	36.1662	2/28/2017 13:45	16.0011	2/28/2017 17:07	0.902	3/13/2017 16:51	32.7813	3/8/2017 22:57	14.6562	3/14/2017 12:44	36.2646	3/8/2017 21:45	15.687	3/9/2017 1:07	0.6782
3/13/2017 16:31	34.9883	2/28/2017 15:07	14.9303	3/13/2017 16:45	36.1663	2/28/2017 13:55	15.9951	2/28/2017 17:17	0.8993	3/13/2017 16:51	32.762	3/8/2017 23:07	14.6487	3/14/2017 12:45	36.2637	3/8/2017 21:55	15.6831	3/9/2017 1:17	0.6786
3/13/2017 16:31	34.9942	2/28/2017 15:17	14.9222	3/13/2017 16:46	36.1659	2/28/2017 14:05	15.9734	2/28/2017 17:27	0.8986	3/13/2017 16:51	32.8239	3/8/2017 23:17	14.6429	3/14/2017 12:46	36.2629	3/8/2017 22:05	15.6819	3/9/2017 1:27	0.6784
3/13/2017 16:31	35.0017	2/28/2017 15:27	14.9213	3/13/2017 16:47	36.1664	2/28/2017 14:15	15.9564	2/28/2017 17:37	0.8978	3/13/2017 16:51	32.8413	3/8/2017 23:27	14.6432	3/14/2017 12:47	36.2627	3/8/2017 22:15	15.6761	3/9/2017 1:37	0.6774
3/13/2017 16:31	34.9928	2/28/2017 15:37	14.9183	3/13/2017 16:48	36.1665	2/28/2017 14:25	15.9464	2/28/2017 17:47	0.8971	3/13/2017 16:51	32.8457	3/8/2017 23:37	14.6448	3/14/2017 12:48	36.2622	3/8/2017 22:25	15.6706	3/9/2017 1:47	0.6759
3/13/2017 16:31	34.9937	2/28/2017 15:47	14.9126	3/13/2017 16:49	36.1668	2/28/2017 14:35	15.9395	2/28/2017 17:57	0.8963	3/13/2017 16:51	32.7886	3/8/2017 23:47	14.642	3/14/2017 12:49	36.2623	3/8/2017 22:35	15.6683	3/9/2017 1:57	0.6743
3/13/2017 16:31	35.0032	2/28/2017 15:57	14.9126	3/13/2017 16:50	36.1671	2/28/2017 14:45	15.9382	2/28/2017 18:07	0.8963	3/13/2017 16:51	32.7996	3/8/2017 23:57	14.6366	3/14/2017 12:50	36.2622	3/8/2017 22:45	15.6669	3/9/2017 2:07	0.6726
3/13/2017 16:31	34.9959	2/28/2017 16:07	14.9142	3/13/2017 16:51	36.1669	2/28/2017 14:55	15.943	2/28/2017 18:17	0.8962	3/13/2017 16:51	32.8205	3/9/2017 0:07	14.6409	3/14/2017 12:51	36.2621	3/8/2017 23:05	15.6597	3/9/2017 2:17	0.6715
3/13/2017 16:31	34.9933	2/28/2017 16:17	14.9142	3/13/2017 16:52	36.1671	2/28/2017 15:05	15.937	2/28/2017 18:27	0.8937	3/13/2017 16:51	32.7842	3/9/2017 0:17	14.6516	3/14/2017 12:52	36.2615	3/8/2017 23:05	15.6492	3/9/2017 2:27	0.6706
3/13/2017 16:31	34.9967	2/28/2017 16:27	14.9147	3/13/2017 16:53	36.1675	2/28/2017 15:15	15.9288	2/28/2017 18:37	0.8935	3/13/2017 16:51	32.7616	3/9/2017 0:27	14.6544	3/14/2017 12:53	36.2615	3/8/2017 23:15	15.6466	3/9/2017 2:37	0.6687
3/13/2017 16:31	34.9948	2/28/2017 16:37	14.9158	3/13/2017 16:54	36.1672	2/28/2017 15:25	15.9288	2/28/2017 18:47	0.8927	3/13/2017 16:51	32.8283	3/9/2017 0:37	14.6551	3/14/2017 12:54	36.2608	3/8/2017 23:25	15.646	3/9/2017 2:47	0.6671
3/13/2017 16:31	35.001	2/28/2017 16:47	14.9152	3/13/2017 16:55	36.1673	2/28/2017 15:35	15.9256	2/28/2017 18:57	0.8932	3/13/2017 16:51	32.7759	3/9/2017 0:47	14.6573	3/14/2017 12:55	36.2608	3/8/2017 23:35	15.6441	3/9/2017 2:57	0.6668
3/13/2017 16:31	35.0013	2/28/2017 16:57	14.9134	3/13/2017 16:56	36.1675	2/28/2017 15:45	15.9152	2/28/2017 19:07	0.8934	3/13/2017 16:51	32.8066	3/9/2017 0:57	14.6527	3/14/2017 12:56	36.2606	3/8/2017 23:45	15.6441	3/9/2017 3:07	0.6648
3/13/2017 16:31	34.9913	2/28/2017 17:07	14.9153	3/13/2017 16:57	36.1671	2/28/2017 15:55	15.9193	2/28/2017 19:17	0.8918	3/13/2017 16:51	32.8257	3/9/2017 1:07	14.6523	3/14/2017 12:57	36.2602	3/8/2017 23:55	15.6365	3/9/2017 3:17	0.6626
3/13/2017 16:31	34.987	2/28/2017 17:17	14.9126	3/13/2017 16:58	36.1672	2/28/2017 16:05	15.9199	2/28/2017 19:27	0.8909	3/13/2017 16:51	32.8019	3/9/2017 1:17	14.6626	3/14/2017 12:58	36.2596	3/9/2017 0:05	15.6407	3/9/2017 3:27	0.6613
3/13/2017 16:31	34.9896	2/28/2017 17:27	14.9086	3/13/2017 16:59	36.1676	2/28/2017 16:15	15.9238	2/28/2017 19:37	0.8927	3/13/2017 16:51	32.7589	3/9/2017 1:27	14.66	3/14/2017 12:59	36.2591	3/9/2017 0:15	15.6504	3/9/2017 3:37	0.6609
3/13/2017 16:31	34.9943	2/28/2017 17:37	14.9072	3/13/2017 17:00	36.1679	2/28/2017 16:25	15.9197	2/28/2017 19:47	0.8952	3/13/2017 16:51	32.7989	3/9/2017 1:37	14.6631	3/14/2017 13:00	36.2588	3/9/2017 0:25	15.6566	3/9/2017 3:47	0.6588
3/13/2017 16:31	34.9949	2/28/2017 17:47	14.9039	3/13/2017 17:01	36.1681	2/28/2017 16:35	15.9237	2/28/2017 19:57	0.8955	3/13/2017 16:51	32.7996	3/9/2017 1:47	14.6657	3/14/2017 13:01	36.2584	3/9/2017 0:35	15.6546	3/9/2017 3:57	0.6604
3/13/2017 16:31	34.9979	2/28/2017 17:57	14.9041	3/13/2017 17:02	36.1683	2/28/2017 16:45	15.9204	2/28/2017 20:07	0.8971	3/13/2017 16:51	32.7376	3/9/2017 1:57	14.6766	3/14/2017 13:02	36.2575	3/9/2017 0:45	15.6576	3/9/2017 4:07	0.6607
3/13/2017 16:31	34.9966	2/28/2017 18:07	14.9085	3/13/2017 17:03	36.1685	2/28/2017 16:55	15.9207	2/28/2017 20:17	0.8957	3/13/2017 16:51	32.8034	3/9/2017 2:07	14.698	3/14/2017 13:03	36.2573	3/9/2017 0:55	15.6505	3/9/2017 4:17	0.6594
3/13/2017 16:31	34.9913	2/28/2017 18:17	14.909	3/13/2017 17:04	36.1686	2/28/2017 17:05	15.9199	2/28/2017 20:27	0.8947	3/13/2017 16:51	32.7662	3/9/2017 2:17	14.7251	3/14/2017 13:04	36.2567	3/9/2017 1:05	15.6524	3/9/2017 4:27	0.6577
3/13/2017 16:31	34.9909	2/28/2017 18:27	14.9026	3/13/2017 17:05	36.1686	2/28/2017 17:15	15.9214	2/28/2017 20:37	0.8954	3/13/2017 16:51	32.7888	3/9/2017 2:27	14.7387	3/14/2017 13:05	36.2563	3/9/2017 1:15	15.6616	3/9/2017 4:37	0.6564
3/13/2017 16:31	34.9979	2/28/2017 18:37	14.8951	3/13/2017 17:06	36.1698	2/28/2017 17:25	15.9147	2/28/2017 20:47	0.8928	3/13/2017 16:51	32.7948	3/9/2017 2:37	14.7462	3/14/2017 13:06	36.2557	3/9/2017 1:25	15.6619	3/9/2017 4:47	0.6554
3/13/2017 16:31	34.9965	2/28/2017 18:47	14.8923	3/13/2017 17:07	36.1699	2/28/2017 17:35	15.9144	2/28/2017 20:57	0.892	3/13/2017 16:51	32.7997	3/9/2017 2:47	14.7488	3/14/2017 13:07	36.2555	3/9/2017 1:35	15.6634	3/9/2017 4:57	0.6583
3/13/2017 16:31	34.9979	2/28/2017 18:57	14.8851	3/13/2017 17:08	36.1699	2/28/2017 17:45	15.9105	2/28/2017 21:07	0.8919	3/13/2017 16:51	32.8193	3/9/2017 2:57	14.7442	3/14/2017 13:08	36.255	3/9/2017 1:45	15.6654	3/9/2017 5:07	0.6579
3/13/2017 16:31	34.9983	2/28/2017 19:07	14.8828	3/13/2017 17:09	36.1704	2/28/2017 17:55	15.9												

PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER	PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER										
3/13/2017 16:33	34.0658	3/1/2017 11:17	14.6511	3/13/2017 18:46	36.1809	3/1/2017 10:05	15.6946	3/1/2017 13:27	0.6254	3/13/2017 16:53	32.4745	3/9/2017 19:17	14.9021	3/14/2017 14:46	36.2237	3/9/2017 18:05	15.9068	3/9/2017 21:27	0.7222
3/13/2017 16:33	33.9104	3/1/2017 11:27	14.6503	3/13/2017 18:47	36.1814	3/1/2017 10:15	15.6892	3/1/2017 13:37	0.62	3/13/2017 16:53	32.3892	3/9/2017 19:27	14.8971	3/14/2017 14:47	36.2226	3/9/2017 18:15	15.9134	3/9/2017 21:47	0.7235
3/13/2017 16:33	33.6676	3/1/2017 11:37	14.6433	3/13/2017 18:48	36.1813	3/1/2017 10:25	15.6831	3/1/2017 13:47	0.6164	3/13/2017 16:53	32.4995	3/9/2017 19:37	14.8977	3/14/2017 14:48	36.2218	3/9/2017 18:25	15.9042	3/9/2017 21:47	0.7239
3/13/2017 16:33	33.4869	3/1/2017 11:47	14.6335	3/13/2017 18:49	36.1817	3/1/2017 10:35	15.6822	3/1/2017 13:57	0.6153	3/13/2017 16:53	32.3838	3/9/2017 19:47	14.8931	3/14/2017 14:49	36.2213	3/9/2017 18:35	15.8981	3/9/2017 21:47	0.7263
3/13/2017 16:33	33.279	3/1/2017 11:57	14.6291	3/13/2017 18:50	36.1822	3/1/2017 10:45	15.6704	3/1/2017 14:07	0.6093	3/13/2017 16:53	32.4642	3/9/2017 19:57	14.8939	3/14/2017 14:50	36.2208	3/9/2017 18:45	15.893	3/9/2017 22:07	0.7265
3/13/2017 16:33	33.2069	3/1/2017 12:07	14.6275	3/13/2017 18:51	36.1822	3/1/2017 10:55	15.6623	3/1/2017 14:17	0.6068	3/13/2017 16:53	32.4395	3/9/2017 20:07	14.884	3/14/2017 14:51	36.2206	3/9/2017 18:55	15.8945	3/9/2017 22:17	0.7266
3/13/2017 16:33	33.1831	3/1/2017 12:17	14.6236	3/13/2017 18:52	36.1819	3/1/2017 11:05	15.6567	3/1/2017 14:27	0.6026	3/13/2017 16:53	32.4613	3/9/2017 20:17	14.8735	3/14/2017 14:52	36.2205	3/9/2017 19:05	15.899	3/9/2017 22:27	0.7281
3/13/2017 16:33	33.1416	3/1/2017 12:27	14.6204	3/13/2017 18:53	36.1822	3/1/2017 11:15	15.656	3/1/2017 14:37	0.5994	3/13/2017 16:53	32.4903	3/9/2017 20:27	14.8573	3/14/2017 14:53	36.2197	3/9/2017 19:15	15.9017	3/9/2017 22:37	0.7285
3/13/2017 16:33	33.2209	3/1/2017 12:37	14.621	3/13/2017 18:54	36.1823	3/1/2017 11:25	15.6518	3/1/2017 14:47	0.5984	3/13/2017 16:53	32.4135	3/9/2017 20:37	14.8407	3/14/2017 14:54	36.2194	3/9/2017 19:25	15.895	3/9/2017 22:47	0.7301
3/13/2017 16:33	33.1582	3/1/2017 12:47	14.6168	3/13/2017 18:55	36.1824	3/1/2017 11:35	15.6456	3/1/2017 14:57	0.5951	3/13/2017 16:53	32.3972	3/9/2017 20:47	14.8255	3/14/2017 14:55	36.2189	3/9/2017 19:35	15.8954	3/9/2017 22:57	0.7323
3/13/2017 16:33	33.1935	3/1/2017 12:57	14.607	3/13/2017 18:56	36.1831	3/1/2017 11:45	15.6378	3/1/2017 15:07	0.5928	3/13/2017 16:53	32.4353	3/9/2017 20:57	14.8277	3/14/2017 14:56	36.2184	3/9/2017 19:45	15.8936	3/9/2017 23:07	0.7335
3/13/2017 16:33	33.1733	3/1/2017 13:07	14.5937	3/13/2017 18:57	36.1838	3/1/2017 11:55	15.6307	3/1/2017 15:17	0.5912	3/13/2017 16:53	32.4995	3/9/2017 21:07	14.8286	3/14/2017 14:57	36.2176	3/9/2017 19:55	15.8923	3/9/2017 23:17	0.7349
3/13/2017 16:33	33.181	3/1/2017 13:17	14.5821	3/13/2017 18:58	36.1845	3/1/2017 12:05	15.6278	3/1/2017 15:27	0.5876	3/13/2017 16:53	32.4166	3/9/2017 21:17	14.8291	3/14/2017 14:58	36.2174	3/9/2017 20:05	15.885	3/9/2017 23:27	0.7345
3/13/2017 16:33	33.1573	3/1/2017 13:27	14.5743	3/13/2017 18:59	36.185	3/1/2017 12:15	15.6312	3/1/2017 15:37	0.5852	3/13/2017 16:53	32.4584	3/9/2017 21:27	14.8234	3/14/2017 14:59	36.2169	3/9/2017 20:15	15.8762	3/9/2017 23:37	0.7345
3/13/2017 16:33	33.14	3/1/2017 13:37	14.5669	3/13/2017 19:00	36.1851	3/1/2017 12:25	15.6214	3/1/2017 15:47	0.5833	3/13/2017 16:53	32.4062	3/9/2017 21:37	14.8213	3/14/2017 15:00	36.2165	3/9/2017 20:25	15.8602	3/9/2017 23:47	0.7367
3/13/2017 16:33	33.1294	3/1/2017 13:47	14.566	3/13/2017 19:01	36.1852	3/1/2017 12:35	15.6257	3/1/2017 15:57	0.5812	3/13/2017 16:53	32.4405	3/9/2017 21:47	14.81	3/14/2017 15:01	36.2167	3/9/2017 20:35	15.8458	3/9/2017 23:57	0.7369
3/13/2017 16:33	33.1723	3/1/2017 13:57	14.5632	3/13/2017 19:02	36.1847	3/1/2017 12:45	15.5935	3/1/2017 16:07	0.5805	3/13/2017 16:53	32.3997	3/9/2017 21:57	14.8061	3/14/2017 15:02	36.2165	3/9/2017 20:45	15.831	3/10/2017 0:07	0.7398
3/13/2017 16:33	33.1667	3/1/2017 14:07	14.5494	3/13/2017 19:03	36.1848	3/1/2017 12:55	15.6106	3/1/2017 16:17	0.5781	3/13/2017 16:53	32.4561	3/9/2017 22:07	14.809	3/14/2017 15:03	36.2168	3/9/2017 20:55	15.8284	3/10/2017 0:17	0.7418
3/13/2017 16:33	33.1315	3/1/2017 14:17	14.5427	3/13/2017 19:04	36.1849	3/1/2017 13:05	15.6106	3/1/2017 16:27	0.5761	3/13/2017 16:53	32.5013	3/9/2017 22:17	14.8081	3/14/2017 15:04	36.2164	3/9/2017 21:05	15.8355	3/10/2017 0:27	0.7419
3/13/2017 16:33	33.2012	3/1/2017 14:27	14.5431	3/13/2017 19:05	36.1847	3/1/2017 13:15	15.5897	3/1/2017 16:37	0.5733	3/13/2017 16:54	32.4586	3/9/2017 22:27	14.8032	3/14/2017 15:05	36.2165	3/9/2017 21:15	15.8299	3/10/2017 0:37	0.7436
3/13/2017 16:33	33.1753	3/1/2017 14:37	14.5371	3/13/2017 19:06	36.1846	3/1/2017 13:25	15.5777	3/1/2017 16:47	0.5687	3/13/2017 16:54	32.4608	3/9/2017 22:37	14.8068	3/14/2017 15:06	36.2163	3/9/2017 21:25	15.8266	3/10/2017 0:47	0.7446
3/13/2017 16:33	33.1299	3/1/2017 14:47	14.5281	3/13/2017 19:07	36.1848	3/1/2017 13:35	15.5724	3/1/2017 16:57	0.5644	3/13/2017 16:54	32.4396	3/9/2017 22:47	14.81	3/14/2017 15:07	36.2158	3/9/2017 21:35	15.8211	3/10/2017 0:57	0.7461
3/13/2017 16:33	33.1329	3/1/2017 14:57	14.5194	3/13/2017 19:08	36.1846	3/1/2017 13:45	15.5709	3/1/2017 17:07	0.5634	3/13/2017 16:54	32.4029	3/9/2017 22:57	14.8061	3/14/2017 15:08	36.2148	3/9/2017 21:45	15.8146	3/10/2017 1:07	0.7473
3/13/2017 16:33	33.1364	3/1/2017 15:07	14.5113	3/13/2017 19:09	36.1849	3/1/2017 13:55	15.5716	3/1/2017 17:17	0.5623	3/13/2017 16:54	32.4491	3/9/2017 23:07	14.806	3/14/2017 15:09	36.2146	3/9/2017 21:55	15.8091	3/10/2017 1:17	0.748
3/13/2017 16:33	33.1208	3/1/2017 15:17	14.5032	3/13/2017 19:10	36.1849	3/1/2017 14:05	15.5499	3/1/2017 17:27	0.5629	3/13/2017 16:54	32.3267	3/9/2017 23:17	14.8049	3/14/2017 15:10	36.2138	3/9/2017 22:05	15.8081	3/10/2017 1:27	0.7481
3/13/2017 16:33	33.1251	3/1/2017 15:27	14.5001	3/13/2017 19:11	36.1851	3/1/2017 14:15	15.5469	3/1/2017 17:37	0.5593	3/13/2017 16:54	32.2701	3/9/2017 23:27	14.801	3/14/2017 15:11	36.2135	3/9/2017 22:15	15.8107	3/10/2017 1:37	0.7478
3/13/2017 16:33	33.1014	3/1/2017 15:37	14.4978	3/13/2017 19:12	36.1851	3/1/2017 14:25	15.5479	3/1/2017 17:47	0.557	3/13/2017 16:54	32.3396	3/9/2017 23:37	14.8017	3/14/2017 15:12	36.2135	3/9/2017 22:25	15.8032	3/10/2017 1:47	0.7474
3/13/2017 16:33	33.0973	3/1/2017 15:47	14.4978	3/13/2017 19:13	36.1851	3/1/2017 14:35	15.5408	3/1/2017 17:57	0.5562	3/13/2017 16:54	32.228	3/9/2017 23:47	14.8037	3/14/2017 15:13	36.2128	3/9/2017 22:35	15.8057	3/10/2017 1:57	0.7486
3/13/2017 16:33	33.1276	3/1/2017 15:57	14.4956	3/13/2017 19:14	36.1848	3/1/2017 14:45	15.5338	3/1/2017 18:07	0.5552	3/13/2017 16:54	32.2482	3/9/2017 23:57	14.8038	3/14/2017 15:14	36.2126	3/9/2017 22:45	15.8086	3/10/2017 2:07	0.7492
3/13/2017 16:33	33.1301	3/1/2017 16:07	14.4968	3/13/2017 19:15	36.185	3/1/2017 14:55	15.5274	3/1/2017 18:17	0.5528	3/13/2017 16:54	32.1568	3/10/2017 0:07	14.7979	3/14/2017 15:15	36.2112	3/9/2017 22:55	15.8097	3/10/2017 2:17	0.7503
3/13/2017 16:33	33.1138	3/1/2017 16:17	14.5026	3/13/2017 19:16	36.1851	3/1/2017 15:05	15.5177	3/1/2017 18:27	0.5485	3/13/2017 16:54	32.2243	3/10/2017 0:17	14.798	3/14/2017 15:16	36.2114	3/9/2017 23:05	15.8053	3/10/2017 2:27	0.7491
3/13/2017 16:33	33.1309	3/1/2017 16:27	14.5012	3/13/2017 19:17	36.1849	3/1/2017 15:15	15.5081	3/1/2017 18:37	0.5451	3/13/2017 16:54	32.2019	3/10/2017 0:27	14.7963	3/14/2017 15:17	36.2106	3/9/2017 23:15	15.8078	3/10/2017 2:37	0.7485
3/13/2017 16:33	33.1171	3/1/2017 16:37	14.4938	3/13/2017 19:18	36.185	3/1/2017 15:25	15.5042	3/1/2017 18:47	0.5406	3/13/2017 16:54	32.0823	3/10/2017 0:37	14.7952	3/14/2017 15:18	36.2103	3/9/2017 23:25	15.802	3/10/2017 2:47	0.7493
3/13/2017 16:33	33.1456	3/1/2017 16:47	14.4906	3/13/2017 19:19	36.1853	3/1/2017 15:35	15.5045	3/1/2017 18:57	0.5358	3/13/2017 16:54	32.162	3/10/2017 0:47	14.8057	3/14/2017 15:19	36.2108	3/9/2017 23:35	15.8048	3/10/2017 2:57	0.7511
3/13/2017 16:33	33.1032	3/1/2017 16:57	14.4897	3/13/2017 19:20	36.1852	3/1/2017 15:45	15.5053	3/1/2017 19:07	0.5344	3/13/2017 16:54	32.1048	3/10/2017 0:57	14.8157	3/14/2017 15:20	36.2103	3/9/2017 23:45	15.8055	3/10/2017 3:07	0.7511
3/13/2017 16:33	33.1274	3/1/2017 17:07	14.4909	3/13/2017 19:21	36.1854	3/1/2017 15:55	15.505	3/1/2017 19:17	0.5335	3/13/2017 16:54	32.1113	3/10/2017 1:07	14.8239	3/14/2017 15:21	36.2102	3/9/2017 23:55	15.8042	3/10/2017 3:17	0.7501
3/13/2017 16:33	33.0984	3/1/2017 17:17	14.4949	3/13/2017 19:22	36.1856	3/1/2017 16:05	15.5004	3/1/2017 19:27	0.5308	3/13/2017 16:54	32.1675	3/10/2017 1:17	14.8342	3/14/2017 15:22	36.21	3/10/2017 0:05	15.8021	3/10/2017 3:27	0.7497
3/13/2017 16:33	33.1096	3/1/2017 17:27	14.4958	3/13/2017 19:23	36.1852	3/1/2017 16:15	15.5085	3/1/2017 19:37	0.5302	3/13/2017 16:54	32.1813	3/10/2017 1:27	14.8388	3/14/2017 15:23	36.2102	3/10/2017 0:15	15.7954	3/10/2017 3:37	0.7501
3/13/2017 16:33	33.0898	3/1/2017 17:37	14.4917	3/13/2017 19:24	36.1854	3/1/2017 16:25	15.5076	3/1/2017 19:47	0.531	3/13/2017 16:54	32.129	3/10/2017 1:37	14.836						

PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER	PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER										
3/13/2017 16:35	33.0855	3/2/2017 9:47	14.3194	3/13/2017 21:01	36.194	3/2/2017 8:35	15.3405	3/2/2017 11:57	0.5036	3/13/2017 16:55	34.9373	3/10/2017 17:47	14.6877	3/14/2017 17:01	36.1738	3/10/2017 16:35	15.7309	3/10/2017 19:57	0.7103
3/13/2017 16:35	33.067	3/2/2017 9:57	14.3139	3/13/2017 21:02	36.1942	3/2/2017 8:45	15.3358	3/2/2017 12:07	0.5037	3/13/2017 16:55	34.9673	3/10/2017 17:57	14.6869	3/14/2017 17:02	36.1737	3/10/2017 16:45	15.7275	3/10/2017 20:07	0.7102
3/13/2017 16:35	33.0924	3/2/2017 10:07	14.2912	3/13/2017 21:03	36.1946	3/2/2017 8:55	15.3301	3/2/2017 12:17	0.501	3/13/2017 16:56	34.9866	3/10/2017 18:07	14.691	3/14/2017 17:03	36.1734	3/10/2017 16:55	15.7152	3/10/2017 20:17	0.7105
3/13/2017 16:35	33.0846	3/2/2017 10:17	14.2843	3/13/2017 21:04	36.1944	3/2/2017 9:05	15.3375	3/2/2017 12:27	0.5043	3/13/2017 16:56	34.9977	3/10/2017 18:17	14.6855	3/14/2017 17:04	36.1737	3/10/2017 17:05	15.7086	3/10/2017 20:27	0.7114
3/13/2017 16:35	33.0834	3/2/2017 10:27	14.2744	3/13/2017 21:05	36.1942	3/2/2017 9:15	15.3464	3/2/2017 12:37	0.5061	3/13/2017 16:56	34.9979	3/10/2017 18:27	14.681	3/14/2017 17:05	36.1738	3/10/2017 17:15	15.7098	3/10/2017 20:37	0.7116
3/13/2017 16:35	33.0689	3/2/2017 10:37	14.2576	3/13/2017 21:06	36.194	3/2/2017 9:25	15.3406	3/2/2017 12:47	0.5045	3/13/2017 16:56	34.9851	3/10/2017 18:37	14.6801	3/14/2017 17:06	36.1737	3/10/2017 17:25	15.7055	3/10/2017 20:47	0.7132
3/13/2017 16:35	33.0614	3/2/2017 10:47	14.2556	3/13/2017 21:07	36.1934	3/2/2017 9:35	15.3226	3/2/2017 12:57	0.504	3/13/2017 16:56	34.9766	3/10/2017 18:47	14.67	3/14/2017 17:07	36.1729	3/10/2017 17:35	15.6973	3/10/2017 20:57	0.7137
3/13/2017 16:35	33.0752	3/2/2017 10:57	14.2599	3/13/2017 21:08	36.1932	3/2/2017 9:45	15.3234	3/2/2017 13:07	0.5025	3/13/2017 16:56	34.9705	3/10/2017 18:57	14.6679	3/14/2017 17:08	36.173	3/10/2017 17:45	15.6922	3/10/2017 21:07	0.7149
3/13/2017 16:35	33.0759	3/2/2017 11:07	14.2628	3/13/2017 21:09	36.1929	3/2/2017 9:55	15.3223	3/2/2017 13:17	0.5058	3/13/2017 16:56	34.9613	3/10/2017 19:07	14.6756	3/14/2017 17:09	36.1722	3/10/2017 17:55	15.692	3/10/2017 21:17	0.7156
3/13/2017 16:35	33.0754	3/2/2017 11:17	14.2423	3/13/2017 21:10	36.1929	3/2/2017 10:05	15.2996	3/2/2017 13:27	0.505	3/13/2017 16:56	34.9623	3/10/2017 19:17	14.6784	3/14/2017 17:10	36.1713	3/10/2017 18:05	15.6915	3/10/2017 21:27	0.717
3/13/2017 16:35	33.058	3/2/2017 11:27	14.2351	3/13/2017 21:11	36.1934	3/2/2017 10:15	15.29	3/2/2017 13:37	0.5058	3/13/2017 16:56	34.9674	3/10/2017 19:27	14.6745	3/14/2017 17:11	36.1704	3/10/2017 18:15	15.6906	3/10/2017 21:37	0.7172
3/13/2017 16:35	33.0727	3/2/2017 11:37	14.2322	3/13/2017 21:12	36.1931	3/2/2017 10:25	15.2851	3/2/2017 13:47	0.5061	3/13/2017 16:56	34.9774	3/10/2017 19:37	14.6747	3/14/2017 17:12	36.1695	3/10/2017 18:25	15.6865	3/10/2017 21:47	0.7183
3/13/2017 16:35	33.0964	3/2/2017 11:47	14.2244	3/13/2017 21:13	36.1931	3/2/2017 10:35	15.2665	3/2/2017 13:57	0.5076	3/13/2017 16:56	34.9853	3/10/2017 19:47	14.6709	3/14/2017 17:13	36.1687	3/10/2017 18:35	15.6832	3/10/2017 21:57	0.7182
3/13/2017 16:35	33.0393	3/2/2017 11:57	14.2139	3/13/2017 21:14	36.1931	3/2/2017 10:45	15.2638	3/2/2017 14:07	0.5081	3/13/2017 16:56	34.9924	3/10/2017 19:57	14.6618	3/14/2017 17:14	36.168	3/10/2017 18:45	15.6762	3/10/2017 22:07	0.7198
3/13/2017 16:35	33.081	3/2/2017 12:07	14.2167	3/13/2017 21:15	36.1934	3/2/2017 10:55	15.2653	3/2/2017 14:17	0.509	3/13/2017 16:56	34.999	3/10/2017 20:07	14.6516	3/14/2017 17:15	36.1675	3/10/2017 18:55	15.6692	3/10/2017 22:17	0.7207
3/13/2017 16:35	33.096	3/2/2017 12:17	14.2095	3/13/2017 21:16	36.1934	3/2/2017 11:05	15.2718	3/2/2017 14:27	0.5111	3/13/2017 16:56	35.0016	3/10/2017 20:17	14.6452	3/14/2017 17:16	36.1665	3/10/2017 19:05	15.6787	3/10/2017 22:27	0.7205
3/13/2017 16:35	33.0685	3/2/2017 12:27	14.1992	3/13/2017 21:17	36.194	3/2/2017 11:15	15.2538	3/2/2017 14:37	0.513	3/13/2017 16:56	34.998	3/10/2017 20:27	14.6374	3/14/2017 17:17	36.166	3/10/2017 19:15	15.6849	3/10/2017 22:37	0.7204
3/13/2017 16:35	33.0757	3/2/2017 12:37	14.2014	3/13/2017 21:18	36.1941	3/2/2017 11:25	15.2444	3/2/2017 14:47	0.5142	3/13/2017 16:56	34.9943	3/10/2017 20:37	14.6305	3/14/2017 17:18	36.1651	3/10/2017 19:25	15.6764	3/10/2017 22:47	0.7194
3/13/2017 16:35	33.0371	3/2/2017 12:47	14.2002	3/13/2017 21:19	36.1948	3/2/2017 11:35	15.2408	3/2/2017 14:57	0.5173	3/13/2017 16:56	34.9932	3/10/2017 20:47	14.6264	3/14/2017 17:19	36.1641	3/10/2017 19:35	15.6799	3/10/2017 22:57	0.7189
3/13/2017 16:35	33.0533	3/2/2017 12:57	14.1902	3/13/2017 21:20	36.1951	3/2/2017 11:45	15.2363	3/2/2017 15:07	0.5202	3/13/2017 16:56	34.9927	3/10/2017 20:57	14.6247	3/14/2017 17:20	36.163	3/10/2017 19:45	15.675	3/10/2017 23:07	0.7198
3/13/2017 16:35	33.0505	3/2/2017 13:07	14.1812	3/13/2017 21:21	36.1955	3/2/2017 11:55	15.2265	3/2/2017 15:17	0.521	3/13/2017 16:56	34.99	3/10/2017 21:07	14.6249	3/14/2017 17:21	36.1621	3/10/2017 19:55	15.6662	3/10/2017 23:17	0.7207
3/13/2017 16:35	33.0843	3/2/2017 13:17	14.1953	3/13/2017 21:22	36.1961	3/2/2017 12:05	15.2261	3/2/2017 15:27	0.5248	3/13/2017 16:56	34.989	3/10/2017 21:17	14.625	3/14/2017 17:22	36.1617	3/10/2017 20:05	15.6582	3/10/2017 23:27	0.722
3/13/2017 16:35	33.0685	3/2/2017 13:27	14.2065	3/13/2017 21:23	36.1964	3/2/2017 12:15	15.2215	3/2/2017 15:37	0.5281	3/13/2017 16:56	34.9933	3/10/2017 21:27	14.6236	3/14/2017 17:23	36.1612	3/10/2017 20:15	15.6498	3/10/2017 23:37	0.7215
3/13/2017 16:35	33.0713	3/2/2017 13:37	14.202	3/13/2017 21:24	36.1961	3/2/2017 12:25	15.2041	3/2/2017 15:47	0.5311	3/13/2017 16:56	34.9968	3/10/2017 21:37	14.6163	3/14/2017 17:24	36.1605	3/10/2017 20:25	15.6432	3/10/2017 23:47	0.7224
3/13/2017 16:35	33.0475	3/2/2017 13:47	14.2018	3/13/2017 21:25	36.1964	3/2/2017 12:35	15.2101	3/2/2017 15:57	0.5364	3/13/2017 16:56	35.0006	3/10/2017 21:47	14.6123	3/14/2017 17:25	36.1586	3/10/2017 20:35	15.637	3/10/2017 23:57	0.7222
3/13/2017 16:35	33.0645	3/2/2017 13:57	14.2089	3/13/2017 21:26	36.1963	3/2/2017 12:45	15.2134	3/2/2017 16:07	0.5393	3/13/2017 16:56	35.0052	3/10/2017 21:57	14.6089	3/14/2017 17:26	36.1574	3/10/2017 20:45	15.6322	3/11/2017 0:07	0.7211
3/13/2017 16:35	33.083	3/2/2017 14:07	14.2147	3/13/2017 21:27	36.1964	3/2/2017 12:55	15.2	3/2/2017 16:17	0.5427	3/13/2017 16:56	35.0056	3/10/2017 22:07	14.6092	3/14/2017 17:27	36.1555	3/10/2017 20:55	15.6298	3/11/2017 0:17	0.722
3/13/2017 16:35	33.0644	3/2/2017 14:17	14.2188	3/13/2017 21:28	36.1965	3/2/2017 13:05	15.1893	3/2/2017 16:27	0.5504	3/13/2017 16:56	35.0081	3/10/2017 22:17	14.6109	3/14/2017 17:28	36.1541	3/10/2017 21:05	15.6304	3/11/2017 0:27	0.7223
3/13/2017 16:35	33.0854	3/2/2017 14:27	14.2256	3/13/2017 21:29	36.1968	3/2/2017 13:15	15.2046	3/2/2017 16:37	0.5525	3/13/2017 16:56	35.0048	3/10/2017 22:27	14.6136	3/14/2017 17:29	36.1527	3/10/2017 21:15	15.6291	3/11/2017 0:37	0.7225
3/13/2017 16:35	33.0933	3/2/2017 14:37	14.2311	3/13/2017 21:30	36.1974	3/2/2017 13:25	15.2145	3/2/2017 16:47	0.5541	3/13/2017 16:56	35.0037	3/10/2017 22:37	14.6134	3/14/2017 17:30	36.1518	3/10/2017 21:25	15.6292	3/11/2017 0:47	0.7225
3/13/2017 16:35	33.0761	3/2/2017 14:47	14.2291	3/13/2017 21:31	36.1976	3/2/2017 13:35	15.2103	3/2/2017 16:57	0.5589	3/13/2017 16:56	34.9994	3/10/2017 22:47	14.6143	3/14/2017 17:31	36.1512	3/10/2017 21:35	15.623	3/11/2017 0:57	0.7221
3/13/2017 16:35	33.0796	3/2/2017 14:57	14.2289	3/13/2017 21:32	36.1976	3/2/2017 13:45	15.2087	3/2/2017 17:07	0.5625	3/13/2017 16:56	34.9994	3/10/2017 22:57	14.619	3/14/2017 17:32	36.1505	3/10/2017 21:45	15.6191	3/11/2017 1:07	0.721
3/13/2017 16:35	33.0691	3/2/2017 15:07	14.2243	3/13/2017 21:33	36.198	3/2/2017 13:55	15.2149	3/2/2017 17:17	0.5655	3/13/2017 16:56	34.9975	3/10/2017 23:07	14.6142	3/14/2017 17:33	36.1499	3/10/2017 21:55	15.6144	3/11/2017 1:17	0.7212
3/13/2017 16:35	33.0498	3/2/2017 15:17	14.2131	3/13/2017 21:34	36.1984	3/2/2017 14:05	15.223	3/2/2017 17:27	0.5704	3/13/2017 16:56	35.0018	3/10/2017 23:17	14.6115	3/14/2017 17:34	36.1498	3/10/2017 22:05	15.6141	3/11/2017 1:27	0.722
3/13/2017 16:35	33.0901	3/2/2017 15:27	14.2097	3/13/2017 21:35	36.1994	3/2/2017 14:15	15.2233	3/2/2017 17:37	0.5754	3/13/2017 16:56	35.0001	3/10/2017 23:27	14.613	3/14/2017 17:35	36.1498	3/10/2017 22:15	15.6164	3/11/2017 1:37	0.721
3/13/2017 16:35	33.0653	3/2/2017 15:37	14.2065	3/13/2017 21:36	36.1993	3/2/2017 14:25	15.2328	3/2/2017 17:47	0.5796	3/13/2017 16:56	35.0039	3/10/2017 23:37	14.6109	3/14/2017 17:36	36.1494	3/10/2017 22:25	15.6182	3/11/2017 1:47	0.7209
3/13/2017 16:35	33.0836	3/2/2017 15:47	14.2058	3/13/2017 21:37	36.1994	3/2/2017 14:35	15.2343	3/2/2017 17:57	0.5814	3/13/2017 16:56	35.0099	3/10/2017 23:47	14.609	3/14/2017 17:37	36.1492	3/10/2017 22:35	15.6152	3/11/2017 1:57	0.7199
3/13/2017 16:35	33.0406	3/2/2017 15:57	14.2055	3/13/2017 21:38	36.1996	3/2/2017 14:45	15.2329	3/2/2017 18:07	0.5846	3/13/2017 16:56	35.0106	3/10/2017 23:57	14.6096	3/14/2017 17:38	36.1487	3/10/2017 22:45	15.6168	3/11/2017 2:07	0.7199
3/13/2017 16:35	33.0386	3/2/2017 16:07	14.2159	3/13/2017 21:39	36.1998	3/2/2017 14:55	15.2362	3/2/2017											

PW16-1		TH16-1		TH16-2		TH16-3		BAROLOGGER		PW16-1		TH16-1		TH16-2		TH16-3		BAROLOGGER	
3/3/2017 16:37	32.9159	3/3/2017 8:17	14.4581	3/3/2017 23:16	36.2124	3/3/2017 7:05	15.4001	3/3/2017 10:27	0.7919	3/3/2017 16:58	35.0257	3/11/2017 16:17	14.4754	3/14/2017 19:16	36.1051	3/11/2017 15:05	15.5219	3/11/2017 18:27	0.7445
3/3/2017 16:37	32.9025	3/3/2017 8:27	14.4581	3/3/2017 23:17	36.2128	3/3/2017 7:15	15.4119	3/3/2017 10:37	0.7917	3/3/2017 16:58	35.0219	3/11/2017 16:27	14.4754	3/14/2017 19:17	36.1004	3/11/2017 15:15	15.5073	3/11/2017 18:37	0.7462
3/3/2017 16:38	32.9141	3/3/2017 8:37	14.4613	3/3/2017 23:18	36.2128	3/3/2017 7:25	15.4187	3/3/2017 10:47	0.7926	3/3/2017 16:58	35.0235	3/11/2017 16:37	14.4732	3/14/2017 19:18	36.1	3/11/2017 15:25	15.5068	3/11/2017 18:47	0.7469
3/3/2017 16:38	32.9524	3/3/2017 8:47	14.4609	3/3/2017 23:19	36.2124	3/3/2017 7:35	15.4266	3/3/2017 10:57	0.7935	3/3/2017 16:58	35.0233	3/11/2017 16:47	14.4688	3/14/2017 19:19	36.0991	3/11/2017 15:35	15.4957	3/11/2017 18:57	0.7487
3/3/2017 16:38	32.9083	3/3/2017 8:57	14.466	3/3/2017 23:20	36.2125	3/3/2017 7:45	15.4232	3/3/2017 11:07	0.7945	3/3/2017 16:58	35.0193	3/11/2017 16:57	14.4664	3/14/2017 19:20	36.0998	3/11/2017 15:45	15.4941	3/11/2017 19:07	0.7513
3/3/2017 16:38	32.9295	3/3/2017 9:07	14.4733	3/3/2017 23:21	36.2119	3/3/2017 7:55	15.4295	3/3/2017 11:17	0.7946	3/3/2017 16:58	35.0247	3/11/2017 17:07	14.4577	3/14/2017 19:21	36.0991	3/11/2017 15:55	15.4897	3/11/2017 19:17	0.7527
3/3/2017 16:38	32.9388	3/3/2017 9:17	14.4694	3/3/2017 23:22	36.2123	3/3/2017 8:05	15.4478	3/3/2017 11:27	0.7946	3/3/2017 16:58	35.024	3/11/2017 17:17	14.4486	3/14/2017 19:22	36.0984	3/11/2017 16:05	15.4827	3/11/2017 19:27	0.7538
3/3/2017 16:38	32.9035	3/3/2017 9:27	14.4668	3/3/2017 23:23	36.2124	3/3/2017 8:15	15.4585	3/3/2017 11:37	0.7955	3/3/2017 16:58	35.0254	3/11/2017 17:27	14.4399	3/14/2017 19:23	36.0982	3/11/2017 16:15	15.4827	3/11/2017 19:37	0.7542
3/3/2017 16:38	32.8957	3/3/2017 9:37	14.4674	3/3/2017 23:24	36.213	3/3/2017 8:25	15.4625	3/3/2017 11:47	0.7972	3/3/2017 16:58	35.0242	3/11/2017 17:37	14.4367	3/14/2017 19:24	36.0984	3/11/2017 16:25	15.4807	3/11/2017 19:47	0.7545
3/3/2017 16:38	32.9147	3/3/2017 9:47	14.4727	3/3/2017 23:25	36.2128	3/3/2017 8:35	15.4612	3/3/2017 11:57	0.7971	3/3/2017 16:58	35.0225	3/11/2017 17:47	14.4299	3/14/2017 19:25	36.0979	3/11/2017 16:35	15.4812	3/11/2017 19:57	0.755
3/3/2017 16:38	32.8893	3/3/2017 9:57	14.4734	3/3/2017 23:26	36.213	3/3/2017 8:45	15.462	3/3/2017 12:07	0.7981	3/3/2017 16:58	35.023	3/11/2017 17:57	14.439	3/14/2017 19:26	36.0973	3/11/2017 16:45	15.479	3/11/2017 20:07	0.7555
3/3/2017 16:38	32.9115	3/3/2017 10:07	14.4718	3/3/2017 23:27	36.2126	3/3/2017 8:55	15.4669	3/3/2017 12:17	0.7978	3/3/2017 16:58	35.0246	3/11/2017 18:07	14.4534	3/14/2017 19:27	36.0965	3/11/2017 16:55	15.4748	3/11/2017 20:17	0.7559
3/3/2017 16:38	32.9237	3/3/2017 10:17	14.4707	3/3/2017 23:28	36.2122	3/3/2017 9:05	15.4717	3/3/2017 12:27	0.7975	3/3/2017 16:58	35.0247	3/11/2017 18:17	14.4498	3/14/2017 19:28	36.0963	3/11/2017 17:05	15.4679	3/11/2017 20:27	0.7568
3/3/2017 16:38	32.9213	3/3/2017 10:27	14.4692	3/3/2017 23:29	36.2119	3/3/2017 9:15	15.473	3/3/2017 12:37	0.7972	3/3/2017 16:58	35.0246	3/11/2017 18:27	14.4373	3/14/2017 19:29	36.0955	3/11/2017 17:15	15.456	3/11/2017 20:37	0.7568
3/3/2017 16:38	32.9094	3/3/2017 10:37	14.4737	3/3/2017 23:30	36.2115	3/3/2017 9:25	15.4682	3/3/2017 12:47	0.7955	3/3/2017 16:58	35.0221	3/11/2017 18:37	14.4304	3/14/2017 19:30	36.0963	3/11/2017 17:25	15.4492	3/11/2017 20:47	0.7572
3/3/2017 16:38	32.9012	3/3/2017 10:47	14.481	3/3/2017 23:31	36.2118	3/3/2017 9:35	15.4692	3/3/2017 12:57	0.7943	3/3/2017 16:58	35.0249	3/11/2017 18:47	14.4158	3/14/2017 19:31	36.0954	3/11/2017 17:35	15.4448	3/11/2017 20:57	0.7574
3/3/2017 16:38	32.9166	3/3/2017 10:57	14.4824	3/3/2017 23:32	36.2114	3/3/2017 9:45	15.4736	3/3/2017 13:07	0.7931	3/3/2017 16:58	35.0263	3/11/2017 18:57	14.4096	3/14/2017 19:32	36.0955	3/11/2017 17:45	15.436	3/11/2017 21:07	0.7579
3/3/2017 16:38	32.8994	3/3/2017 11:07	14.4682	3/3/2017 23:33	36.2117	3/3/2017 9:55	15.4757	3/3/2017 13:17	0.7926	3/3/2017 16:58	35.0264	3/11/2017 19:07	14.4045	3/14/2017 19:33	36.0951	3/11/2017 17:55	15.4417	3/11/2017 21:17	0.758
3/3/2017 16:38	32.8995	3/3/2017 11:17	14.4625	3/3/2017 23:34	36.2121	3/3/2017 10:05	15.4757	3/3/2017 13:27	0.7909	3/3/2017 16:58	35.0241	3/11/2017 19:17	14.3973	3/14/2017 19:34	36.0941	3/11/2017 18:05	15.4592	3/11/2017 21:27	0.7583
3/3/2017 16:38	32.9097	3/3/2017 11:27	14.4659	3/3/2017 23:35	36.2122	3/3/2017 10:15	15.4726	3/3/2017 13:37	0.7915	3/3/2017 16:58	35.0235	3/11/2017 19:27	14.3867	3/14/2017 19:35	36.0945	3/11/2017 18:15	15.4592	3/11/2017 21:37	0.7574
3/3/2017 16:38	32.9033	3/3/2017 11:37	14.467	3/3/2017 23:36	36.2127	3/3/2017 10:25	15.47	3/3/2017 13:47	0.7906	3/3/2017 16:58	35.0221	3/11/2017 19:37	14.3818	3/14/2017 19:36	36.0936	3/11/2017 18:25	15.4488	3/11/2017 21:47	0.758
3/3/2017 16:38	32.9086	3/3/2017 11:47	14.4686	3/3/2017 23:37	36.2131	3/3/2017 10:35	15.474	3/3/2017 13:57	0.7896	3/3/2017 16:58	35.0247	3/11/2017 19:47	14.372	3/14/2017 19:37	36.0935	3/11/2017 18:35	15.4378	3/11/2017 21:57	0.7586
3/3/2017 16:38	32.8761	3/3/2017 11:57	14.4693	3/3/2017 23:38	36.2136	3/3/2017 10:45	15.4835	3/3/2017 14:07	0.79	3/3/2017 16:58	35.0228	3/11/2017 19:57	14.3583	3/14/2017 19:38	36.0924	3/11/2017 18:45	15.4244	3/11/2017 22:07	0.7572
3/3/2017 16:38	32.9337	3/3/2017 12:07	14.4675	3/3/2017 23:39	36.2143	3/3/2017 10:55	15.4828	3/3/2017 14:17	0.7893	3/3/2017 16:58	35.0234	3/11/2017 20:07	14.3482	3/14/2017 19:39	36.0927	3/11/2017 18:55	15.4187	3/11/2017 22:17	0.758
3/3/2017 16:38	32.9182	3/3/2017 12:17	14.4628	3/3/2017 23:40	36.214	3/3/2017 11:05	15.4717	3/3/2017 14:27	0.7909	3/3/2017 16:58	35.0268	3/11/2017 20:17	14.3351	3/14/2017 19:40	36.0912	3/11/2017 19:05	15.4141	3/11/2017 22:27	0.7574
3/3/2017 16:38	32.8843	3/3/2017 12:27	14.4679	3/3/2017 23:41	36.214	3/3/2017 11:15	15.4663	3/3/2017 14:37	0.7917	3/3/2017 16:58	35.023	3/11/2017 20:27	14.3186	3/14/2017 19:41	36.0912	3/11/2017 19:15	15.4076	3/11/2017 22:37	0.7571
3/3/2017 16:38	32.8968	3/3/2017 12:37	14.4679	3/3/2017 23:42	36.2143	3/3/2017 11:25	15.4679	3/3/2017 14:47	0.7905	3/3/2017 16:58	35.0271	3/11/2017 20:37	14.3022	3/14/2017 19:42	36.09	3/11/2017 19:25	15.3982	3/11/2017 22:47	0.7572
3/3/2017 16:38	32.9312	3/3/2017 12:47	14.4632	3/3/2017 23:43	36.2142	3/3/2017 11:35	15.4683	3/3/2017 14:57	0.7898	3/3/2017 16:58	35.0271	3/11/2017 20:47	14.2953	3/14/2017 19:43	36.0899	3/11/2017 19:35	15.3935	3/11/2017 22:57	0.7569
3/3/2017 16:38	32.9307	3/3/2017 12:57	14.4556	3/3/2017 23:44	36.2139	3/3/2017 11:45	15.47	3/3/2017 15:07	0.7919	3/3/2017 16:58	35.0245	3/11/2017 20:57	14.2917	3/14/2017 19:44	36.0893	3/11/2017 19:45	15.3822	3/11/2017 23:07	0.7558
3/3/2017 16:38	32.9353	3/3/2017 13:07	14.4433	3/3/2017 23:45	36.2135	3/3/2017 11:55	15.4678	3/3/2017 15:17	0.7914	3/3/2017 16:58	35.0247	3/11/2017 21:07	14.2796	3/14/2017 19:45	36.0874	3/11/2017 19:55	15.3711	3/11/2017 23:17	0.7548
3/3/2017 16:38	32.9463	3/3/2017 13:17	14.4391	3/3/2017 23:46	36.2133	3/3/2017 12:05	15.471	3/3/2017 15:27	0.7939	3/3/2017 16:58	35.0259	3/11/2017 21:17	14.2694	3/14/2017 19:46	36.0868	3/11/2017 20:05	15.3596	3/11/2017 23:27	0.7547
3/3/2017 16:38	32.9106	3/3/2017 13:27	14.4349	3/3/2017 23:47	36.2134	3/3/2017 12:15	15.463	3/3/2017 15:37	0.7936	3/3/2017 16:58	35.0274	3/11/2017 21:27	14.2569	3/14/2017 19:47	36.0865	3/11/2017 20:15	15.3482	3/11/2017 23:37	0.7547
3/3/2017 16:38	32.9041	3/3/2017 13:37	14.4324	3/3/2017 23:48	36.2138	3/3/2017 12:25	15.4679	3/3/2017 15:47	0.7951	3/3/2017 16:58	35.0257	3/11/2017 21:37	14.2418	3/14/2017 19:48	36.0858	3/11/2017 20:25	15.334	3/11/2017 23:47	0.7539
3/3/2017 16:38	32.8792	3/3/2017 13:47	14.4318	3/3/2017 23:49	36.2136	3/3/2017 12:35	15.4689	3/3/2017 15:57	0.795	3/3/2017 16:58	35.0259	3/11/2017 21:47	14.2328	3/14/2017 19:49	36.0849	3/11/2017 20:35	15.3188	3/11/2017 23:57	0.7533
3/3/2017 16:38	32.9213	3/3/2017 13:57	14.4386	3/3/2017 23:50	36.2135	3/3/2017 12:45	15.4661	3/3/2017 16:07	0.7946	3/3/2017 16:58	35.0252	3/11/2017 21:57	14.2302	3/14/2017 19:50	36.0844	3/11/2017 20:45	15.3078	3/12/2017 0:07	0.7536
3/3/2017 16:38	32.9448	3/3/2017 14:07	14.4395	3/3/2017 23:51	36.2136	3/3/2017 12:55	15.4609	3/3/2017 16:17	0.7954	3/3/2017 16:58	35.0243	3/11/2017 22:07	14.2315	3/14/2017 19:51	36.0841	3/11/2017 20:55	15.3056	3/12/2017 0:17	0.7536
3/3/2017 16:38	32.9011	3/3/2017 14:17	14.4428	3/3/2017 23:52	36.2134	3/3/2017 13:05	15.4496	3/3/2017 16:27	0.7962	3/3/2017 16:58	35.0231	3/11/2017 22:17	14.2314	3/14/2017 19:52	36.0827	3/11/2017 21:05	15.2928	3/12/2017 0:27	0.7537
3/3/2017 16:38	32.8861	3/3/2017 14:27	14.4516	3/3/2017 23:53	36.2131	3/3/2017 13:15	15.4427	3/3/2017 16:37	0.7967	3/3/2017 16:58	35.0266	3/11/2017 22:27	14.2273	3/14/2017 19:53	36.081	3/11/2017 21:15	15.2847	3/12/2017 0:37	0.7531
3/3/2017 16:38	32.9181	3/3/2017 14:37	14.4516	3/3/2017 23:54	36.2125	3/3/2017 13:25	15.4382	3/3/2017 16:47	0.7986	3/3/2017 16:58	35.0268	3/11/2017 22:37	14.2261						

	PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER	PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER									
3/13/2017 16:40	32.8899	3/4/2017 6:47	14.6548	3/14/2017 1:31	36.2312	3/4/2017 5:35	15.6073	3/4/2017 8:57	0.8658	3/13/2017 17:00	35.0306	3/12/2017 14:47	14.2471	3/14/2017 21:31	36	3/12/2017 13:35	15.2639	3/12/2017 16:57	0.7781
3/13/2017 16:40	32.9051	3/4/2017 6:57	14.6653	3/14/2017 1:32	36.2313	3/4/2017 5:45	15.6064	3/4/2017 9:07	0.8649	3/13/2017 17:00	35.0295	3/12/2017 14:57	14.2531	3/14/2017 21:32	36.0012	3/12/2017 13:45	15.2663	3/12/2017 17:07	0.7789
3/13/2017 16:40	32.9153	3/4/2017 7:07	14.6777	3/14/2017 1:33	36.2313	3/4/2017 5:55	15.6172	3/4/2017 9:17	0.8627	3/13/2017 17:00	35.0284	3/12/2017 15:07	14.2723	3/14/2017 21:33	35.9995	3/12/2017 13:55	15.2575	3/12/2017 17:17	0.7797
3/13/2017 16:40	32.8882	3/4/2017 7:17	14.6831	3/14/2017 1:34	36.2315	3/4/2017 6:05	15.6263	3/4/2017 9:27	0.8617	3/13/2017 17:00	35.0273	3/12/2017 15:17	14.2925	3/14/2017 21:34	35.9988	3/12/2017 14:05	15.2491	3/12/2017 17:27	0.7838
3/13/2017 16:40	32.8654	3/4/2017 7:27	14.6865	3/14/2017 1:35	36.2321	3/4/2017 6:15	15.6369	3/4/2017 9:37	0.8613	3/13/2017 17:00	35.0273	3/12/2017 15:27	14.3034	3/14/2017 21:35	35.9979	3/12/2017 14:15	15.2484	3/12/2017 17:37	0.7851
3/13/2017 16:40	32.894	3/4/2017 7:37	14.6934	3/14/2017 1:36	36.2322	3/4/2017 6:25	15.6341	3/4/2017 9:47	0.8611	3/13/2017 17:00	35.0264	3/12/2017 15:37	14.3057	3/14/2017 21:36	35.9985	3/12/2017 14:25	15.2487	3/12/2017 17:47	0.7873
3/13/2017 16:40	32.9333	3/4/2017 7:47	14.6941	3/14/2017 1:37	36.2328	3/4/2017 6:35	15.6437	3/4/2017 9:57	0.8597	3/13/2017 17:00	35.0295	3/12/2017 15:47	14.3081	3/14/2017 21:37	35.9952	3/12/2017 14:35	15.2521	3/12/2017 17:57	0.7894
3/13/2017 16:40	32.8618	3/4/2017 7:57	14.6937	3/14/2017 1:38	36.2326	3/4/2017 6:45	15.655	3/4/2017 10:07	0.8588	3/13/2017 17:00	35.0326	3/12/2017 15:57	14.3067	3/14/2017 21:38	35.9959	3/12/2017 14:45	15.2542	3/12/2017 18:07	0.791
3/13/2017 16:40	32.9215	3/4/2017 8:07	14.6992	3/14/2017 1:39	36.2328	3/4/2017 6:55	15.6583	3/4/2017 10:17	0.8576	3/13/2017 17:00	35.0281	3/12/2017 16:07	14.3082	3/14/2017 21:39	35.9948	3/12/2017 14:55	15.2542	3/12/2017 18:17	0.7927
3/13/2017 16:40	32.8849	3/4/2017 8:17	14.7041	3/14/2017 1:40	36.2331	3/4/2017 7:05	15.6748	3/4/2017 10:27	0.8573	3/13/2017 17:00	35.0282	3/12/2017 16:17	14.3138	3/14/2017 21:40	35.9915	3/12/2017 15:05	15.2778	3/12/2017 18:27	0.7936
3/13/2017 16:40	32.8857	3/4/2017 8:27	14.7067	3/14/2017 1:41	36.2334	3/4/2017 7:15	15.68	3/4/2017 10:37	0.8585	3/13/2017 17:00	35.0298	3/12/2017 16:27	14.3218	3/14/2017 21:41	35.99	3/12/2017 15:15	15.2942	3/12/2017 18:37	0.7964
3/13/2017 16:40	32.8919	3/4/2017 8:37	14.7093	3/14/2017 1:42	36.2335	3/4/2017 7:25	15.6802	3/4/2017 10:47	0.857	3/13/2017 17:00	35.0279	3/12/2017 16:37	14.3321	3/14/2017 21:42	35.9908	3/12/2017 15:25	15.3046	3/12/2017 18:47	0.7982
3/13/2017 16:40	32.9013	3/4/2017 8:47	14.7062	3/14/2017 1:43	36.2335	3/4/2017 7:35	15.6875	3/4/2017 10:57	0.8557	3/13/2017 17:00	35.0298	3/12/2017 16:47	14.3459	3/14/2017 21:43	35.9878	3/12/2017 15:35	15.3122	3/12/2017 18:57	0.801
3/13/2017 16:40	32.8925	3/4/2017 8:57	14.7071	3/14/2017 1:44	36.2336	3/4/2017 7:45	15.6916	3/4/2017 11:07	0.855	3/13/2017 17:00	35.0271	3/12/2017 16:57	14.3508	3/14/2017 21:44	35.9856	3/12/2017 15:45	15.3131	3/12/2017 19:07	0.8031
3/13/2017 16:40	32.8827	3/4/2017 9:07	14.7117	3/14/2017 1:45	36.2341	3/4/2017 7:55	15.6881	3/4/2017 11:17	0.8554	3/13/2017 17:00	35.029	3/12/2017 17:07	14.348	3/14/2017 21:45	35.9846	3/12/2017 15:55	15.3142	3/12/2017 19:17	0.8041
3/13/2017 16:40	32.898	3/4/2017 9:17	14.7112	3/14/2017 1:46	36.2337	3/4/2017 8:05	15.6953	3/4/2017 11:27	0.8532	3/13/2017 17:00	35.029	3/12/2017 17:17	14.3495	3/14/2017 21:46	35.9843	3/12/2017 16:05	15.3097	3/12/2017 19:27	0.8068
3/13/2017 16:40	32.9027	3/4/2017 9:27	14.7075	3/14/2017 1:47	36.234	3/4/2017 8:15	15.6995	3/4/2017 11:37	0.8527	3/13/2017 17:00	35.0289	3/12/2017 17:27	14.3568	3/14/2017 21:47	35.9823	3/12/2017 16:15	15.316	3/12/2017 19:37	0.8084
3/13/2017 16:40	32.8695	3/4/2017 9:37	14.7064	3/14/2017 1:48	36.2339	3/4/2017 8:25	15.7038	3/4/2017 11:47	0.8517	3/13/2017 17:00	35.0313	3/12/2017 17:37	14.3586	3/14/2017 21:48	35.9809	3/12/2017 16:25	15.3244	3/12/2017 19:47	0.8097
3/13/2017 16:40	32.9309	3/4/2017 9:47	14.7092	3/14/2017 1:49	36.234	3/4/2017 8:35	15.7056	3/4/2017 11:57	0.8512	3/13/2017 17:00	35.0301	3/12/2017 17:47	14.3597	3/14/2017 21:49	35.9812	3/12/2017 16:35	15.3348	3/12/2017 19:57	0.8115
3/13/2017 16:40	32.8961	3/4/2017 9:57	14.7094	3/14/2017 1:50	36.2339	3/4/2017 8:45	15.7066	3/4/2017 12:07	0.8514	3/13/2017 17:00	35.0302	3/12/2017 17:57	14.3622	3/14/2017 21:50	35.9804	3/12/2017 16:45	15.3495	3/12/2017 20:07	0.8126
3/13/2017 16:40	32.9136	3/4/2017 10:07	14.7084	3/14/2017 1:51	36.234	3/4/2017 8:55	15.7045	3/4/2017 12:17	0.8504	3/13/2017 17:00	35.0296	3/12/2017 18:07	14.3634	3/14/2017 21:51	35.9778	3/12/2017 16:55	15.3564	3/12/2017 20:17	0.8139
3/13/2017 16:40	32.8738	3/4/2017 10:17	14.6971	3/14/2017 1:52	36.2334	3/4/2017 9:05	15.7081	3/4/2017 12:27	0.8477	3/13/2017 17:00	35.0303	3/12/2017 18:17	14.3644	3/14/2017 21:52	35.9804	3/12/2017 17:05	15.3506	3/12/2017 20:27	0.8134
3/13/2017 16:40	32.8814	3/4/2017 10:27	14.689	3/14/2017 1:53	36.2339	3/4/2017 9:15	15.7071	3/4/2017 12:37	0.8475	3/13/2017 17:00	35.0304	3/12/2017 18:27	14.3755	3/14/2017 21:53	35.9764	3/12/2017 17:15	15.3476	3/12/2017 20:37	0.8165
3/13/2017 16:40	32.914	3/4/2017 10:37	14.6833	3/14/2017 1:54	36.234	3/4/2017 9:25	15.7074	3/4/2017 12:47	0.8465	3/13/2017 17:00	35.0298	3/12/2017 18:37	14.386	3/14/2017 21:54	35.9772	3/12/2017 17:25	15.3592	3/12/2017 20:47	0.8171
3/13/2017 16:40	32.9101	3/4/2017 10:47	14.6794	3/14/2017 1:55	36.234	3/4/2017 9:35	15.7052	3/4/2017 12:57	0.8473	3/13/2017 17:00	35.0263	3/12/2017 18:47	14.386	3/14/2017 21:55	35.9769	3/12/2017 17:35	15.3629	3/12/2017 20:57	0.8176
3/13/2017 16:40	32.8815	3/4/2017 10:57	14.6703	3/14/2017 1:56	36.2341	3/4/2017 9:45	15.7047	3/4/2017 13:07	0.8465	3/13/2017 17:00	35.0274	3/12/2017 18:57	14.3886	3/14/2017 21:56	35.9741	3/12/2017 17:45	15.3598	3/12/2017 21:07	0.8177
3/13/2017 16:40	32.8766	3/4/2017 11:07	14.6615	3/14/2017 1:57	36.2342	3/4/2017 9:55	15.7092	3/4/2017 13:17	0.8459	3/13/2017 17:00	35.0282	3/12/2017 19:07	14.3899	3/14/2017 21:57	35.9722	3/12/2017 17:55	15.3666	3/12/2017 21:17	0.8191
3/13/2017 16:40	32.9045	3/4/2017 11:17	14.6561	3/14/2017 1:58	36.234	3/4/2017 10:05	15.7069	3/4/2017 13:27	0.8449	3/13/2017 17:00	35.0299	3/12/2017 19:17	14.3878	3/14/2017 21:58	35.9713	3/12/2017 18:05	15.3679	3/12/2017 21:27	0.8196
3/13/2017 16:40	32.8948	3/4/2017 11:27	14.6528	3/14/2017 1:59	36.2337	3/4/2017 10:15	15.6986	3/4/2017 13:37	0.8439	3/13/2017 17:01	35.0273	3/12/2017 19:27	14.3892	3/14/2017 21:59	35.97	3/12/2017 18:15	15.3692	3/12/2017 21:37	0.8202
3/13/2017 16:40	32.8961	3/4/2017 11:37	14.6546	3/14/2017 2:00	36.2337	3/4/2017 10:25	15.6892	3/4/2017 13:47	0.8425	3/13/2017 17:01	35.0295	3/12/2017 19:37	14.39	3/14/2017 22:00	35.9691	3/12/2017 18:25	15.3763	3/12/2017 21:47	0.8209
3/13/2017 16:40	32.8825	3/4/2017 11:47	14.6564	3/14/2017 2:01	36.2338	3/4/2017 10:35	15.6835	3/4/2017 13:57	0.8417	3/13/2017 17:01	35.0283	3/12/2017 19:47	14.3935	3/14/2017 22:01	35.9682	3/12/2017 18:35	15.3886	3/12/2017 21:57	0.8218
3/13/2017 16:40	32.8785	3/4/2017 11:57	14.6515	3/14/2017 2:02	36.2337	3/4/2017 10:45	15.6807	3/4/2017 14:07	0.8412	3/13/2017 17:01	35.0285	3/12/2017 19:57	14.3969	3/14/2017 22:02	35.9675	3/12/2017 18:45	15.3881	3/12/2017 22:07	0.8222
3/13/2017 16:40	32.887	3/4/2017 12:07	14.6323	3/14/2017 2:03	36.2342	3/4/2017 10:55	15.6699	3/4/2017 14:17	0.8406	3/13/2017 17:01	35.0287	3/12/2017 20:07	14.3952	3/14/2017 22:03	35.9661	3/12/2017 18:55	15.3918	3/12/2017 22:17	0.8236
3/13/2017 16:40	32.8871	3/4/2017 12:17	14.6265	3/14/2017 2:04	36.2342	3/4/2017 11:05	15.6614	3/4/2017 14:27	0.8403	3/13/2017 17:01	35.0289	3/12/2017 20:17	14.3873	3/14/2017 22:04	35.9683	3/12/2017 19:05	15.393	3/12/2017 22:27	0.8243
3/13/2017 16:40	32.8854	3/4/2017 12:27	14.632	3/14/2017 2:05	36.2345	3/4/2017 11:15	15.6533	3/4/2017 14:37	0.8405	3/13/2017 17:01	35.0274	3/12/2017 20:27	14.3836	3/14/2017 22:05	35.9652	3/12/2017 19:15	15.3905	3/12/2017 22:37	0.825
3/13/2017 16:40	32.8788	3/4/2017 12:37	14.6279	3/14/2017 2:06	36.2349	3/4/2017 11:25	15.6523	3/4/2017 14:47	0.8406	3/13/2017 17:01	35.0318	3/12/2017 20:37	14.3769	3/14/2017 22:06	35.9633	3/12/2017 19:25	15.3914	3/12/2017 22:47	0.8248
3/13/2017 16:40	32.897	3/4/2017 12:47	14.6272	3/14/2017 2:07	36.2349	3/4/2017 11:35	15.655	3/4/2017 14:57	0.8378	3/13/2017 17:01	35.0288	3/12/2017 20:47	14.3727	3/14/2017 22:07	35.9628	3/12/2017 19:35	15.393	3/12/2017 22:57	0.8255
3/13/2017 16:40	32.8833	3/4/2017 12:57	14.6315	3/14/2017 2:08	36.2346	3/4/2017 11:45	15.6562	3/4/2017 15:07	0.8391	3/13/2017 17:01	35.0279	3/12/2017 20:57	14.3722	3/14/2017 22:08	35.9618	3/12/2017 19:45	15.3947	3/12/2017 23:07	0.8261
3/13/2017 16:40	32.876	3/4/2017 13:07	14.6191	3/14/2017 2:09	36.2348	3/4/2017 11:55	15.6517	3/4/2017 15:17	0.8377	3/13/2017 17:01	35.0314	3/12							

PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER	PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER										
3/13/2017 16:42	32.9135	3/5/2017 5:17	14.62	3/14/2017 3:46	36.2391	3/5/2017 4:05	15.5893	3/5/2017 7:27	0.8965	3/13/2017 17:02	35.0416	3/13/2017 13:17	14.5524	3/14/2017 23:45	35.9177	3/13/2017 12:05	15.5805	3/13/2017 17:47	0.9176
3/13/2017 16:42	32.8895	3/5/2017 5:27	14.6304	3/14/2017 3:47	36.2387	3/5/2017 4:15	15.5938	3/5/2017 7:37	0.8981	3/13/2017 17:02	35.0401	3/13/2017 13:27	14.5557	3/14/2017 23:46	35.9177	3/13/2017 12:15	15.5763	3/13/2017 17:57	0.9187
3/13/2017 16:42	32.8782	3/5/2017 5:37	14.6374	3/14/2017 3:48	36.2385	3/5/2017 4:25	15.5981	3/5/2017 7:47	0.9017	3/13/2017 17:02	35.0266	3/13/2017 13:37	14.5587	3/14/2017 23:47	35.9163	3/13/2017 12:25	15.5743		
3/13/2017 16:42	32.8756	3/5/2017 5:47	14.6372	3/14/2017 3:49	36.2388	3/5/2017 4:35	15.6055	3/5/2017 7:57	0.903	3/13/2017 17:02	35.0311	3/13/2017 13:47	14.5598	3/14/2017 23:48	35.9149	3/13/2017 12:35	15.5734	3/13/2017 18:07	0.9203
3/13/2017 16:42	32.8634	3/5/2017 5:57	14.6423	3/14/2017 3:50	36.2385	3/5/2017 4:45	15.6096	3/5/2017 8:07	0.9044	3/13/2017 17:02	35.0449	3/13/2017 13:57	14.5603	3/14/2017 23:49	35.914	3/13/2017 12:45	15.5664	3/13/2017 18:17	0.9201
3/13/2017 16:42	32.8892	3/5/2017 6:07	14.6586	3/14/2017 3:51	36.2386	3/5/2017 4:55	15.6127	3/5/2017 8:17	0.9055	3/13/2017 17:02	35.0356	3/13/2017 14:07	14.5717	3/14/2017 23:50	35.9137	3/13/2017 12:55	15.5582	3/13/2017 18:27	0.9201
3/13/2017 16:42	32.8825	3/5/2017 6:17	14.6661	3/14/2017 3:52	36.2393	3/5/2017 5:05	15.6087	3/5/2017 8:27	0.9074	3/13/2017 17:02	35.0306	3/13/2017 14:17	14.6827	3/14/2017 23:51	35.9147	3/13/2017 13:05	15.5546	3/13/2017 18:37	0.9206
3/13/2017 16:42	32.9029	3/5/2017 6:27	14.6759	3/14/2017 3:53	36.2385	3/5/2017 5:15	15.6147	3/5/2017 8:37	0.9081	3/13/2017 17:02	35.0385	3/13/2017 14:27	14.6836	3/14/2017 23:52	35.9153	3/13/2017 13:13	15.5461	3/13/2017 18:47	0.9206
3/13/2017 16:42	32.8886	3/5/2017 6:37	14.6813	3/14/2017 3:54	36.238	3/5/2017 5:25	15.6267	3/5/2017 8:47	0.9081	3/13/2017 17:02	35.0473	3/13/2017 14:37	14.6845	3/14/2017 23:53	35.9135	3/13/2017 13:21	15.5464	3/13/2017 18:57	0.9236
3/13/2017 16:42	32.8591	3/5/2017 6:47	14.6863	3/14/2017 3:55	36.2379	3/5/2017 5:35	15.6333	3/5/2017 8:57	0.9091	3/13/2017 17:02	35.0354	3/13/2017 14:47	14.6691	3/14/2017 23:54	35.9126	3/13/2017 13:31	15.5465	3/13/2017 19:07	0.9228
3/13/2017 16:42	32.905	3/5/2017 6:57	14.691	3/14/2017 3:56	36.2379	3/5/2017 5:45	15.6387	3/5/2017 9:07	0.9093	3/13/2017 17:02	35.031	3/13/2017 14:57	14.6675	3/14/2017 23:55	35.9132	3/13/2017 13:41	15.5469	3/13/2017 19:17	0.9224
3/13/2017 16:42	32.8731	3/5/2017 7:07	14.7021	3/14/2017 3:57	36.2374	3/5/2017 5:55	15.642	3/5/2017 9:17	0.9082	3/13/2017 17:03	35.0388	3/13/2017 15:07	14.6678	3/14/2017 23:56	35.9117	3/13/2017 13:51	15.5461	3/13/2017 19:27	0.9214
3/13/2017 16:42	32.8688	3/5/2017 7:17	14.7107	3/14/2017 3:58	36.2378	3/5/2017 6:05	15.6555	3/5/2017 9:27	0.9103	3/13/2017 17:03	35.0489	3/13/2017 15:17	14.6674	3/14/2017 23:57	35.9072	3/13/2017 14:01	15.5465	3/13/2017 19:37	0.92
3/13/2017 16:42	32.8819	3/5/2017 7:27	14.7174	3/14/2017 3:59	36.2378	3/5/2017 6:15	15.6633	3/5/2017 9:37	0.9097	3/13/2017 17:03	35.0423	3/13/2017 15:27	14.6685	3/14/2017 23:58	35.9123	3/13/2017 14:11	15.5462	3/13/2017 19:47	0.9209
3/13/2017 16:42	32.8734	3/5/2017 7:37	14.7248	3/14/2017 4:00	36.2382	3/5/2017 6:25	15.669	3/5/2017 9:47	0.909	3/13/2017 17:03	35.0327	3/13/2017 15:37	14.6684	3/14/2017 23:59	35.9111	3/13/2017 14:21	15.5464	3/13/2017 19:57	0.9229
3/13/2017 16:42	32.9077	3/5/2017 7:47	14.7335	3/14/2017 4:01	36.2391	3/5/2017 6:35	15.6789	3/5/2017 9:57	0.9091	3/13/2017 17:03	35.0364	3/13/2017 15:47	14.6688	3/15/2017 0:00	35.9083	3/13/2017 14:31	15.5461	3/13/2017 20:07	0.9225
3/13/2017 16:42	32.8763	3/5/2017 7:57	14.7444	3/14/2017 4:02	36.2401	3/5/2017 6:45	15.6818	3/5/2017 10:07	0.909	3/13/2017 17:03	35.0414	3/13/2017 15:57	14.6694	3/15/2017 0:01	35.9094	3/13/2017 14:41	15.5465	3/13/2017 20:17	0.9216
3/13/2017 16:42	32.8768	3/5/2017 8:07	14.7545	3/14/2017 4:03	36.2404	3/5/2017 6:55	15.6896	3/5/2017 10:17	0.909	3/13/2017 17:03	35.0406	3/13/2017 16:07	14.6697	3/15/2017 0:02	35.9085	3/13/2017 14:51	15.5465	3/13/2017 20:27	0.923
3/13/2017 16:42	32.9284	3/5/2017 8:17	14.7644	3/14/2017 4:04	36.2409	3/5/2017 7:05	15.695	3/5/2017 10:27	0.9092	3/13/2017 17:03	35.038	3/13/2017 16:17	14.6693	3/15/2017 0:03	35.9105	3/13/2017 15:01	15.5462	3/13/2017 20:37	0.9255
3/13/2017 16:42	32.855	3/5/2017 8:27	14.7682	3/14/2017 4:05	36.2413	3/5/2017 7:15	15.7073	3/5/2017 10:37	0.9076	3/13/2017 17:03	35.0413	3/13/2017 16:27	14.6675	3/15/2017 0:04	35.9089	3/13/2017 15:11	15.5465	3/13/2017 20:47	0.9253
3/13/2017 16:42	32.9055	3/5/2017 8:37	14.7746	3/14/2017 4:06	36.2418	3/5/2017 7:25	15.7104	3/5/2017 10:47	0.9083	3/13/2017 17:03	35.0403	3/13/2017 16:37	14.667	3/15/2017 0:05	35.9094	3/13/2017 15:21	15.5465	3/13/2017 20:57	0.9264
3/13/2017 16:42	32.8801	3/5/2017 8:47	14.7786	3/14/2017 4:07	36.242	3/5/2017 7:35	15.7177	3/5/2017 10:57	0.908	3/13/2017 17:03	35.0385	3/13/2017 16:47	14.6843	3/15/2017 0:06	35.9096	3/13/2017 15:31	15.5462	3/13/2017 21:07	0.928
3/13/2017 16:42	32.8872	3/5/2017 8:57	14.7834	3/14/2017 4:08	36.2422	3/5/2017 7:45	15.7292	3/5/2017 11:07	0.9093	3/13/2017 17:03	35.0392	3/13/2017 16:57	14.6922	3/15/2017 0:07	35.9094	3/13/2017 15:41	15.5468	3/13/2017 21:17	0.9286
3/13/2017 16:42	32.8673	3/5/2017 9:07	14.7904	3/14/2017 4:09	36.2418	3/5/2017 7:55	15.7344	3/5/2017 11:17	0.909	3/13/2017 17:03	35.0444	3/13/2017 17:07	14.6944	3/15/2017 0:08	35.9091	3/13/2017 15:51	15.5461	3/13/2017 21:27	0.9288
3/13/2017 16:42	32.8993	3/5/2017 9:17	14.7909	3/14/2017 4:10	36.2414	3/5/2017 8:05	15.7474	3/5/2017 11:27	0.9092	3/13/2017 17:03	35.0422	3/13/2017 17:17	14.696	3/15/2017 0:09	35.9092	3/13/2017 16:01	15.5464	3/13/2017 21:37	0.9288
3/13/2017 16:42	32.8835	3/5/2017 9:27	14.7898	3/14/2017 4:11	36.2414	3/5/2017 8:15	15.7577	3/5/2017 11:37	0.9095	3/13/2017 17:03	35.0397	3/13/2017 17:27	14.6859	3/15/2017 0:10	35.9078	3/13/2017 16:11	15.5462	3/13/2017 21:47	0.931
3/13/2017 16:42	32.8705	3/5/2017 9:37	14.7949	3/14/2017 4:12	36.2418	3/5/2017 8:25	15.7642	3/5/2017 11:47	0.9096	3/13/2017 17:03	35.038	3/13/2017 17:37	14.6791	3/15/2017 0:11	35.9077	3/13/2017 16:21	15.5463	3/13/2017 21:57	0.9324
3/13/2017 16:42	32.8633	3/5/2017 9:47	14.7895	3/14/2017 4:13	36.2422	3/5/2017 8:35	15.7671	3/5/2017 11:57	0.9104	3/13/2017 17:03	35.0429	3/13/2017 17:47	14.6775	3/15/2017 0:12	35.9088	3/13/2017 16:31	15.5464	3/13/2017 22:07	0.9334
3/13/2017 16:43	32.9157	3/5/2017 9:57	14.7824	3/14/2017 4:14	36.2419	3/5/2017 8:45	15.7767	3/5/2017 12:07	0.9103	3/13/2017 17:03	35.041	3/13/2017 17:57	14.6754	3/15/2017 0:13	35.9061	3/13/2017 16:41	15.5462	3/13/2017 22:17	0.9317
3/13/2017 16:43	32.8582	3/5/2017 10:07	14.7628	3/14/2017 4:15	36.2418	3/5/2017 8:55	15.7789	3/5/2017 12:17	0.9101	3/13/2017 17:03	35.0446	3/13/2017 18:07	14.6751	3/15/2017 0:14	35.9053	3/13/2017 16:51	15.5465	3/13/2017 22:27	0.9312
3/13/2017 16:43	32.8827	3/5/2017 10:17	14.7519	3/14/2017 4:16	36.241	3/5/2017 9:05	15.7836	3/5/2017 12:27	0.9092	3/13/2017 17:03	35.047	3/13/2017 18:17	14.6743	3/15/2017 0:15	35.9082	3/13/2017 17:01	15.5464	3/13/2017 22:37	0.9306
3/13/2017 16:43	32.8815	3/5/2017 10:27	14.7436	3/14/2017 4:17	36.2403	3/5/2017 9:15	15.7888	3/5/2017 12:37	0.9092	3/13/2017 17:03	35.0454	3/13/2017 18:27	14.6944	3/15/2017 0:16	35.9072	3/13/2017 17:11	15.5461	3/13/2017 22:47	0.931
3/13/2017 16:43	32.8624	3/5/2017 10:37	14.7325	3/14/2017 4:18	36.2403	3/5/2017 9:25	15.784	3/5/2017 12:47	0.9099	3/13/2017 17:03	35.0402	3/13/2017 18:37	14.7011	3/15/2017 0:17	35.9056	3/13/2017 17:21	15.5465	3/13/2017 22:57	0.9295
3/13/2017 16:43	32.8438	3/5/2017 10:47	14.7339	3/14/2017 4:19	36.2407	3/5/2017 9:35	15.7884	3/5/2017 12:57	0.9087	3/13/2017 17:03	35.0446	3/13/2017 18:47	14.703	3/15/2017 0:18	35.9062	3/13/2017 17:31	15.5466	3/13/2017 23:07	0.9304
3/13/2017 16:43	32.8604	3/5/2017 10:57	14.7283	3/14/2017 4:20	36.2409	3/5/2017 9:45	15.7864	3/5/2017 13:07	0.9083	3/13/2017 17:03	35.0455	3/13/2017 18:57	14.7042	3/15/2017 0:19	35.9048	3/13/2017 17:41	15.5465	3/13/2017 23:17	0.9295
3/13/2017 16:43	32.8565	3/5/2017 11:07	14.725	3/14/2017 4:21	36.2413	3/5/2017 9:55	15.7825	3/5/2017 13:17	0.9068	3/13/2017 17:03	35.044	3/13/2017 19:07	14.7054	3/15/2017 0:20	35.9023	3/13/2017 17:51	15.5468	3/13/2017 23:27	0.9295
3/13/2017 16:43	32.876	3/5/2017 11:17	14.7203	3/14/2017 4:22	36.2418	3/5/20													

PW16-1		TH16-1		TH16-2		TH16-3		BAROLOGGER		PW16-1		TH16-1		TH16-2		TH16-3		BAROLOGGER	
3/13/2017 16.44	32.203	3/6/2017 3:47	15.0135	3/14/2017 6:01	36.2664	3/6/2017 2:35	15.9489	3/6/2017 5:57	0.9401	3/13/2017 17:05	35.0361	3/13/2017 18:40	14.7176	3/15/2017 2:00	35.8699	3/13/2017 16:35	35.2462	3/14/2017 16:07	0.8346
3/13/2017 16.44	32.2271	3/6/2017 3:57	15.0178	3/14/2017 6:02	36.2668	3/6/2017 2:45	15.9507	3/6/2017 6:07	0.9417	3/13/2017 17:05	35.0377	3/13/2017 18:41	14.7183	3/15/2017 2:01	35.8703	3/13/2017 16:35	35.2462	3/14/2017 16:17	0.8275
3/13/2017 16.44	32.1405	3/6/2017 4:07	15.013	3/14/2017 6:03	36.2671	3/6/2017 2:55	15.9589	3/6/2017 6:17	0.9419	3/13/2017 17:05	35.036	3/13/2017 18:42	14.7185	3/15/2017 2:02	35.8679	3/13/2017 16:35	35.2462	3/14/2017 16:27	0.8179
3/13/2017 16.44	32.146	3/6/2017 4:17	15.0173	3/14/2017 6:04	36.2674	3/6/2017 3:05	15.9642	3/6/2017 6:27	0.9413	3/13/2017 17:05	35.0337	3/13/2017 18:43	14.7187	3/15/2017 2:03	35.8678	3/13/2017 16:35	35.244	3/14/2017 16:37	0.8105
3/13/2017 16.44	32.2079	3/6/2017 4:27	15.0213	3/14/2017 6:05	36.268	3/6/2017 3:15	15.9701	3/6/2017 6:37	0.943	3/13/2017 17:05	35.0412	3/13/2017 18:44	14.7188	3/15/2017 2:04	35.869	3/13/2017 16:35	35.2445	3/14/2017 16:47	0.8052
3/13/2017 16.44	32.1757	3/6/2017 4:37	15.0216	3/14/2017 6:06	36.268	3/6/2017 3:25	15.9841	3/6/2017 6:47	0.9438	3/13/2017 17:05	35.0361	3/13/2017 18:45	14.7192	3/15/2017 2:05	35.8682	3/13/2017 16:35	35.2449	3/14/2017 16:57	0.7998
3/13/2017 16.44	32.1304	3/6/2017 4:47	15.0285	3/14/2017 6:07	36.2683	3/6/2017 3:35	15.991	3/6/2017 6:57	0.9448	3/13/2017 17:05	35.0344	3/13/2017 18:46	14.7198	3/15/2017 2:06	35.8683	3/13/2017 16:35	35.2438	3/14/2017 17:07	0.7944
3/13/2017 16.44	32.1903	3/6/2017 4:57	15.0279	3/14/2017 6:08	36.2684	3/6/2017 3:45	16.0034	3/6/2017 7:07	0.9461	3/13/2017 17:05	35.035	3/13/2017 18:47	14.7202	3/15/2017 2:07	35.8698	3/13/2017 16:35	35.2442	3/14/2017 17:17	0.7908
3/13/2017 16.44	32.1308	3/6/2017 5:07	15.0197	3/14/2017 6:09	36.2685	3/6/2017 3:55	16.0105	3/6/2017 7:17	0.9467	3/13/2017 17:05	35.0338	3/13/2017 18:48	14.7206	3/15/2017 2:08	35.8674	3/13/2017 16:35	35.2477	3/14/2017 17:27	0.7896
3/13/2017 16.44	32.1804	3/6/2017 5:17	15.0201	3/14/2017 6:10	36.2691	3/6/2017 4:05	16.0052	3/6/2017 7:27	0.9486	3/13/2017 17:05	35.0336	3/13/2017 18:49	14.7204	3/15/2017 2:09	35.8692	3/13/2017 16:35	35.2473	3/14/2017 17:37	0.7913
3/13/2017 16.44	32.157	3/6/2017 5:27	15.0203	3/14/2017 6:11	36.2692	3/6/2017 4:15	16.0102	3/6/2017 7:37	0.9503	3/13/2017 17:05	35.0343	3/13/2017 18:50	14.7204	3/15/2017 2:10	35.8696	3/13/2017 16:35	35.2444	3/14/2017 17:47	0.7931
3/13/2017 16.45	32.1355	3/6/2017 5:37	15.0163	3/14/2017 6:12	36.269	3/6/2017 4:25	16.014	3/6/2017 7:47	0.9513	3/13/2017 17:05	35.034	3/13/2017 18:51	14.7207	3/15/2017 2:11	35.8672	3/13/2017 16:35	35.2416	3/14/2017 17:57	0.7863
3/13/2017 16.45	32.095	3/6/2017 5:47	15.0219	3/14/2017 6:13	36.2689	3/6/2017 4:35	16.0211	3/6/2017 7:57	0.9525	3/13/2017 17:05	35.0355	3/13/2017 18:52	14.7214	3/15/2017 2:12	35.869	3/13/2017 16:35	35.2439	3/14/2017 18:07	0.7796
3/13/2017 16.45	32.0691	3/6/2017 5:57	15.0193	3/14/2017 6:14	36.2689	3/6/2017 4:45	16.0195	3/6/2017 8:07	0.9531	3/13/2017 17:05	35.0361	3/13/2017 18:53	14.7221	3/15/2017 2:13	35.8678	3/13/2017 16:35	35.2439	3/14/2017 18:17	0.7673
3/13/2017 16.45	32.069	3/6/2017 6:07	15.018	3/14/2017 6:15	36.2688	3/6/2017 4:55	16.0197	3/6/2017 8:17	0.9541	3/13/2017 17:05	35.034	3/13/2017 18:54	14.7223	3/15/2017 2:14	35.8668	3/13/2017 16:35	35.2441	3/14/2017 18:27	0.7638
3/13/2017 16.45	32.0623	3/6/2017 6:17	15.0183	3/14/2017 6:16	36.2689	3/6/2017 5:05	16.0135	3/6/2017 8:27	0.9529	3/13/2017 17:05	35.032	3/13/2017 18:55	14.7231	3/15/2017 2:15	35.8684	3/13/2017 16:35	35.2455	3/14/2017 18:37	0.7603
3/13/2017 16.45	32.0548	3/6/2017 6:27	15.0185	3/14/2017 6:17	36.2685	3/6/2017 5:15	16.0122	3/6/2017 8:37	0.9535	3/13/2017 17:05	35.0352	3/13/2017 18:56	14.7231	3/15/2017 2:16	35.8711	3/13/2017 16:35	35.2474	3/14/2017 18:47	0.7546
3/13/2017 16.45	32.0681	3/6/2017 6:37	15.0176	3/14/2017 6:18	36.2683	3/6/2017 5:25	16.0127	3/6/2017 8:47	0.9531	3/13/2017 17:05	35.0331	3/13/2017 18:57	14.7241	3/15/2017 2:17	35.8705	3/13/2017 16:35	35.2437	3/14/2017 18:57	0.7472
3/13/2017 16.45	31.9771	3/6/2017 6:47	15.0127	3/14/2017 6:19	36.2677	3/6/2017 5:35	16.0105	3/6/2017 8:57	0.9521	3/13/2017 17:05	35.0355	3/13/2017 18:58	14.7254	3/15/2017 2:18	35.8706	3/13/2017 16:35	35.2443	3/14/2017 19:07	0.7401
3/13/2017 16.45	32.0351	3/6/2017 6:57	15.0126	3/14/2017 6:20	36.2675	3/6/2017 5:45	16.0123	3/6/2017 9:07	0.9521	3/13/2017 17:05	35.0343	3/13/2017 18:59	14.7261	3/15/2017 2:19	35.8704	3/13/2017 16:35	35.244	3/14/2017 19:17	0.7377
3/13/2017 16.45	32.0337	3/6/2017 7:07	15.016	3/14/2017 6:21	36.2676	3/6/2017 5:55	16.0134	3/6/2017 9:17	0.954	3/13/2017 17:05	35.0325	3/13/2017 19:00	14.7268	3/15/2017 2:20	35.8732	3/13/2017 16:35	35.2421	3/14/2017 19:27	0.7287
3/13/2017 16.45	31.9793	3/6/2017 7:17	15.0184	3/14/2017 6:22	36.2684	3/6/2017 6:05	16.0131	3/6/2017 9:27	0.9538	3/13/2017 17:05	35.0337	3/13/2017 19:01	14.7273	3/15/2017 2:21	35.87	3/13/2017 16:35	35.2453	3/14/2017 19:37	0.7184
3/13/2017 16.45	32.011	3/6/2017 7:27	15.0127	3/14/2017 6:23	36.2684	3/6/2017 6:15	16.0136	3/6/2017 9:37	0.9551	3/13/2017 17:05	35.0359	3/13/2017 19:02	14.727	3/15/2017 2:22	35.8695	3/13/2017 16:35	35.2432	3/14/2017 19:47	0.7074
3/13/2017 16.45	32.0431	3/6/2017 7:37	15.0135	3/14/2017 6:24	36.2689	3/6/2017 6:25	16.0117	3/6/2017 9:47	0.9551	3/13/2017 17:05	35.0331	3/13/2017 19:03	14.7266	3/15/2017 2:23	35.8683	3/13/2017 16:35	35.2437	3/14/2017 19:57	0.6981
3/13/2017 16.45	32.08	3/6/2017 7:47	15.0139	3/14/2017 6:25	36.2696	3/6/2017 6:35	16.0122	3/6/2017 9:57	0.9563	3/13/2017 17:05	35.0326	3/13/2017 19:04	14.727	3/15/2017 2:24	35.8669	3/13/2017 16:35	35.2445	3/14/2017 20:07	0.6924
3/13/2017 16.45	32.0782	3/6/2017 7:57	15.0288	3/14/2017 6:26	36.27	3/6/2017 6:45	16.0082	3/6/2017 10:07	0.9577	3/13/2017 17:05	35.0337	3/13/2017 19:05	14.7274	3/15/2017 2:25	35.8678	3/13/2017 16:35	35.2444	3/14/2017 20:17	0.6836
3/13/2017 16.45	32.0073	3/6/2017 8:07	15.0525	3/14/2017 6:27	36.2704	3/6/2017 6:55	16.0068	3/6/2017 10:17	0.9583	3/13/2017 17:05	35.0366	3/13/2017 19:06	14.7283	3/15/2017 2:26	35.8659	3/13/2017 16:35	35.2416	3/14/2017 20:27	0.6786
3/13/2017 16.45	32.1012	3/6/2017 8:17	15.0573	3/14/2017 6:28	36.2705	3/6/2017 7:05	16.013	3/6/2017 10:27	0.9573	3/13/2017 17:05	35.0355	3/13/2017 19:07	14.7283	3/15/2017 2:27	35.8631	3/13/2017 16:35	35.2418	3/14/2017 20:37	0.6672
3/13/2017 16.45	31.9871	3/6/2017 8:27	15.0526	3/14/2017 6:29	36.2705	3/6/2017 7:15	16.0139	3/6/2017 10:37	0.9562	3/13/2017 17:05	35.0315	3/13/2017 19:08	14.7289	3/15/2017 2:28	35.8622	3/13/2017 16:35	35.2402	3/14/2017 20:47	0.6558
3/13/2017 16.45	32.0692	3/6/2017 8:37	15.0532	3/14/2017 6:30	36.2704	3/6/2017 7:25	16.0083	3/6/2017 10:47	0.9561	3/13/2017 17:05	35.0326	3/13/2017 19:09	14.7292	3/15/2017 2:29	35.8628	3/13/2017 16:35	35.239	3/14/2017 20:57	0.6445
3/13/2017 16.45	32.0606	3/6/2017 8:47	15.0511	3/14/2017 6:31	36.2703	3/6/2017 7:35	16.0081	3/6/2017 10:57	0.956	3/13/2017 17:05	35.0321	3/13/2017 19:10	14.7294	3/15/2017 2:30	35.8627	3/13/2017 16:35	35.2417	3/14/2017 21:07	0.6357
3/13/2017 16.45	32.0814	3/6/2017 8:57	15.0529	3/14/2017 6:32	36.2701	3/6/2017 7:45	16.0115	3/6/2017 11:07	0.9555	3/13/2017 17:05	35.0331	3/13/2017 19:11	14.7292	3/15/2017 2:31	35.8619	3/13/2017 16:35	35.24	3/14/2017 21:17	0.6268
3/13/2017 16.45	32.1046	3/6/2017 9:07	15.0559	3/14/2017 6:33	36.2697	3/6/2017 7:55	16.0198	3/6/2017 11:17	0.9563	3/13/2017 17:05	35.0343	3/13/2017 19:12	14.7292	3/15/2017 2:32	35.8617	3/13/2017 16:35	35.2404	3/14/2017 21:27	0.6164
3/13/2017 16.45	32.0736	3/6/2017 9:17	15.0599	3/14/2017 6:34	36.27	3/6/2017 8:05	16.0447	3/6/2017 11:27	0.9556	3/13/2017 17:05	35.0359	3/13/2017 19:13	14.7297	3/15/2017 2:33	35.8598	3/13/2017 16:35	35.2404	3/14/2017 21:37	0.6111
3/13/2017 16.45	32.0158	3/6/2017 9:27	15.0604	3/14/2017 6:35	36.2698	3/6/2017 8:15	16.0527	3/6/2017 11:37	0.9545	3/13/2017 17:05	35.0332	3/13/2017 19:14	14.7303	3/15/2017 2:34	35.8591	3/13/2017 16:35	35.238	3/14/2017 21:47	0.6098
3/13/2017 16.45	32.0515	3/6/2017 9:37	15.0695	3/14/2017 6:36	36.2701	3/6/2017 8:25	16.0456	3/6/2017 11:47	0.9552	3/13/2017 17:05	35.0338	3/13/2017 19:15	14.7298	3/15/2017 2:35	35.8585	3/13/2017 16:35	35.2379	3/14/2017 21:57	0.5976
3/13/2017 16.45	32.0096	3/6/2017 9:47	15.0788	3/14/2017 6:37	36.2698	3/6/2017 8:35	16.0475	3/6/2017 11:57	0.9562	3/13/2017 17:05	35.0369	3/13/2017 19:16	14.7296	3/15/2017 2:36	35.8588	3/13/2017 16:35	35.2405	3/14/2017 22:07	0.5911
3/13/2017 16.45	32.0484	3/6/2017 9:57	15.0758	3/14/2017 6:38	36.2703	3/6/2017 8:45	16.0492	3/6/2017 12:07	0.955	3/13/2017 17:05	35.032	3/13/2017 19:17	14.7299	3/15/2017 2:37	35.8578	3/13/2017 16:35	35.2381	3/14/2017 22:17	0.5917
3/13/2017 16.45	32.0121	3/6/2017 10:07	15.0595	3/14/2017 6:39	36.2703	3/6/2017 8:55	16.0474	3/6/2017 12:1											

PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER	PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER										
3/13/2017 16:47	34.9996	3/7/2017 2:17	14.9795	3/14/2017 8:16	36.2825	3/7/2017 1:05	15.9444	3/7/2017 4:27	0.9593	3/13/2017 17:07	33.1357	3/13/2017 20:55	14.7661	3/15/2017 4:15	35.8462	3/13/2017 16:39	35.146	3/15/2017 14:37	0.5368
3/13/2017 16:47	35.0024	3/7/2017 2:27	14.9836	3/14/2017 8:17	36.2833	3/7/2017 1:15	15.9464	3/7/2017 4:37	0.9615	3/13/2017 17:07	33.096	3/13/2017 20:56	14.7665	3/15/2017 4:16	35.8464	3/13/2017 16:39	35.1445	3/15/2017 14:47	0.5382
3/13/2017 16:47	34.9968	3/7/2017 2:37	14.9868	3/14/2017 8:18	36.2845	3/7/2017 1:25	15.958	3/7/2017 4:47	0.9615	3/13/2017 17:07	33.1177	3/13/2017 20:57	14.7666	3/15/2017 4:17	35.8469	3/13/2017 16:39	35.1456	3/15/2017 14:57	0.5392
3/13/2017 16:47	34.9985	3/7/2017 2:47	14.9844	3/14/2017 8:19	36.2849	3/7/2017 1:35	15.9593	3/7/2017 4:57	0.9634	3/13/2017 17:07	33.1025	3/13/2017 20:58	14.7669	3/15/2017 4:18	35.8459	3/13/2017 16:39	35.1474	3/15/2017 15:07	0.5384
3/13/2017 16:47	35	3/7/2017 2:57	14.9855	3/14/2017 8:20	36.2855	3/7/2017 1:45	15.9602	3/7/2017 5:07	0.963	3/13/2017 17:07	33.111	3/13/2017 20:59	14.7675	3/15/2017 4:19	35.8457	3/13/2017 16:39	35.1478	3/15/2017 15:17	0.5386
3/13/2017 16:47	34.9994	3/7/2017 3:07	14.9987	3/14/2017 8:21	36.2856	3/7/2017 1:55	15.9684	3/7/2017 5:17	0.9641	3/13/2017 17:07	33.0876	3/13/2017 21:00	14.7682	3/15/2017 4:20	35.8456	3/13/2017 16:39	35.145	3/15/2017 15:27	0.5394
3/13/2017 16:47	34.9978	3/7/2017 3:17	15.0022	3/14/2017 8:22	36.2864	3/7/2017 2:05	15.9724	3/7/2017 5:27	0.9621	3/13/2017 17:07	33.1329	3/13/2017 21:01	14.7685	3/15/2017 4:21	35.8459	3/13/2017 16:39	35.1469	3/15/2017 15:37	0.5386
3/13/2017 16:47	34.9974	3/7/2017 3:27	15.001	3/14/2017 8:23	36.2866	3/7/2017 2:15	15.9783	3/7/2017 5:37	0.9612	3/13/2017 17:07	33.1368	3/13/2017 21:02	14.7691	3/15/2017 4:22	35.845	3/13/2017 16:39	35.1491	3/15/2017 15:47	0.5404
3/13/2017 16:47	34.9954	3/7/2017 3:37	15.0027	3/14/2017 8:24	36.2871	3/7/2017 2:25	15.9808	3/7/2017 5:47	0.962	3/13/2017 17:07	33.1135	3/13/2017 21:03	14.7699	3/15/2017 4:23	35.845	3/13/2017 16:40	35.1456	3/15/2017 15:57	0.542
3/13/2017 16:47	34.9991	3/7/2017 3:47	15.0041	3/14/2017 8:25	36.2875	3/7/2017 2:35	15.9848	3/7/2017 5:57	0.9621	3/13/2017 17:07	33.0652	3/13/2017 21:04	14.77	3/15/2017 4:24	35.8451	3/13/2017 16:40	35.1461	3/15/2017 16:07	0.5425
3/13/2017 16:47	35.0005	3/7/2017 3:57	15.0073	3/14/2017 8:26	36.2878	3/7/2017 2:45	15.9818	3/7/2017 6:07	0.9608	3/13/2017 17:07	33.1074	3/13/2017 21:05	14.7707	3/15/2017 4:25	35.8456	3/13/2017 16:40	35.1441	3/15/2017 16:17	0.5442
3/13/2017 16:47	35.0001	3/7/2017 4:07	15.0145	3/14/2017 8:27	36.2878	3/7/2017 2:55	15.9832	3/7/2017 6:17	0.9589	3/13/2017 17:07	33.1065	3/13/2017 21:06	14.7713	3/15/2017 4:26	35.8446	3/13/2017 16:40	35.1462	3/15/2017 16:27	0.5456
3/13/2017 16:47	35	3/7/2017 4:17	15.0206	3/14/2017 8:28	36.2876	3/7/2017 3:05	15.9935	3/7/2017 6:27	0.9601	3/13/2017 17:07	33.08	3/13/2017 21:07	14.7714	3/15/2017 4:27	35.8464	3/13/2017 16:40	35.1465	3/15/2017 16:37	0.5456
3/13/2017 16:47	34.9998	3/7/2017 4:27	15.0269	3/14/2017 8:29	36.2873	3/7/2017 3:15	16.0005	3/7/2017 6:37	0.959	3/13/2017 17:07	33.1201	3/13/2017 21:08	14.7717	3/15/2017 4:28	35.8453	3/13/2017 16:40	35.1467	3/15/2017 16:47	0.5444
3/13/2017 16:47	35.0019	3/7/2017 4:37	15.0284	3/14/2017 8:30	36.2874	3/7/2017 3:25	15.9992	3/7/2017 6:47	0.96	3/13/2017 17:07	33.1299	3/13/2017 21:09	14.7725	3/15/2017 4:29	35.8453	3/13/2017 16:40	35.148	3/15/2017 16:57	0.545
3/13/2017 16:47	35.0009	3/7/2017 4:47	15.0332	3/14/2017 8:31	36.2874	3/7/2017 3:35	15.9977	3/7/2017 6:57	0.9616	3/13/2017 17:07	33.1309	3/13/2017 21:10	14.7725	3/15/2017 4:30	35.8444	3/13/2017 16:40	35.1464	3/15/2017 17:07	0.5449
3/13/2017 16:47	35.0016	3/7/2017 4:57	15.0348	3/14/2017 8:32	36.2879	3/7/2017 3:45	16.0022	3/7/2017 7:07	0.961	3/13/2017 17:07	33.1062	3/13/2017 21:11	14.7733	3/15/2017 4:31	35.8447	3/13/2017 16:40	35.146	3/15/2017 17:17	0.5452
3/13/2017 16:47	35	3/7/2017 5:07	15.0316	3/14/2017 8:33	36.2885	3/7/2017 3:55	16.0048	3/7/2017 7:17	0.9603	3/13/2017 17:07	33.1214	3/13/2017 21:12	14.7737	3/15/2017 4:32	35.846	3/13/2017 16:40	35.1434	3/15/2017 17:27	0.5462
3/13/2017 16:47	35.001	3/7/2017 5:17	15.0332	3/14/2017 8:34	36.2886	3/7/2017 4:05	16.0096	3/7/2017 7:27	0.9606	3/13/2017 17:07	33.1092	3/13/2017 21:13	14.7746	3/15/2017 4:33	35.8459	3/13/2017 16:40	35.1441	3/15/2017 17:37	0.5469
3/13/2017 16:47	34.9995	3/7/2017 5:27	15.0347	3/14/2017 8:35	36.2892	3/7/2017 4:15	16.0166	3/7/2017 7:37	0.9618	3/13/2017 17:07	33.0967	3/13/2017 21:14	14.7749	3/15/2017 4:34	35.8445	3/13/2017 16:40	35.1469	3/15/2017 17:47	0.5479
3/13/2017 16:47	35.0007	3/7/2017 5:37	15.0336	3/14/2017 8:36	36.2893	3/7/2017 4:25	16.024	3/7/2017 7:47	0.9611	3/13/2017 17:07	33.1251	3/13/2017 21:15	14.7757	3/15/2017 4:35	35.8456	3/13/2017 16:40	35.1458	3/15/2017 17:57	0.548
3/13/2017 16:47	35.0009	3/7/2017 5:47	15.0365	3/14/2017 8:37	36.2899	3/7/2017 4:35	16.0248	3/7/2017 7:57	0.9617	3/13/2017 17:07	33.1217	3/13/2017 21:16	14.7759	3/15/2017 4:36	35.8453	3/13/2017 16:40	35.1467	3/15/2017 18:07	0.5479
3/13/2017 16:47	34.9988	3/7/2017 5:57	15.0406	3/14/2017 8:38	36.2905	3/7/2017 4:45	16.0272	3/7/2017 8:07	0.9596	3/13/2017 17:07	33.1054	3/13/2017 21:17	14.7764	3/15/2017 4:37	35.8461	3/13/2017 16:40	35.1485	3/15/2017 18:17	0.5481
3/13/2017 16:47	35.0039	3/7/2017 6:07	15.0455	3/14/2017 8:39	36.2904	3/7/2017 4:55	16.0326	3/7/2017 8:17	0.9595	3/13/2017 17:07	33.1029	3/13/2017 21:18	14.7769	3/15/2017 4:38	35.8456	3/13/2017 16:40	35.1495	3/15/2017 18:27	0.5496
3/13/2017 16:47	35.0026	3/7/2017 6:17	15.0457	3/14/2017 8:40	36.2902	3/7/2017 5:05	16.0289	3/7/2017 8:27	0.9604	3/13/2017 17:07	33.0692	3/13/2017 21:19	14.7778	3/15/2017 4:39	35.8463	3/13/2017 16:40	35.1463	3/15/2017 18:37	0.5495
3/13/2017 16:47	35.0044	3/7/2017 6:27	15.0461	3/14/2017 8:41	36.2899	3/7/2017 5:15	16.0303	3/7/2017 8:37	0.9599	3/13/2017 17:07	33.0821	3/13/2017 21:20	14.7785	3/15/2017 4:40	35.8462	3/13/2017 16:40	35.1447	3/15/2017 18:47	0.5493
3/13/2017 16:47	35.0019	3/7/2017 6:37	15.0429	3/14/2017 8:42	36.2899	3/7/2017 5:25	16.0327	3/7/2017 8:47	0.958	3/13/2017 17:07	33.0959	3/13/2017 21:21	14.7791	3/15/2017 4:41	35.8445	3/13/2017 16:40	35.1443	3/15/2017 18:57	0.5497
3/13/2017 16:47	35.0011	3/7/2017 6:47	15.039	3/14/2017 8:43	36.2896	3/7/2017 5:35	16.0333	3/7/2017 8:57	0.9574	3/13/2017 17:07	33.0382	3/13/2017 21:22	14.7796	3/15/2017 4:42	35.845	3/13/2017 16:40	35.1474	3/15/2017 19:07	0.5494
3/13/2017 16:47	35.0046	3/7/2017 6:57	15.0428	3/14/2017 8:44	36.2898	3/7/2017 5:45	16.032	3/7/2017 9:07	0.9574	3/13/2017 17:07	32.9766	3/13/2017 21:23	14.7798	3/15/2017 4:43	35.8455	3/13/2017 16:40	35.1478	3/15/2017 19:17	0.5483
3/13/2017 16:47	35.0033	3/7/2017 7:07	15.0537	3/14/2017 8:45	36.2902	3/7/2017 5:55	16.0375	3/7/2017 9:17	0.9552	3/13/2017 17:07	32.9445	3/13/2017 21:24	14.7798	3/15/2017 4:44	35.8458	3/13/2017 16:40	35.1471	3/15/2017 19:27	0.5471
3/13/2017 16:47	35.0016	3/7/2017 7:17	15.0611	3/14/2017 8:46	36.29	3/7/2017 6:05	16.0447	3/7/2017 9:27	0.9544	3/13/2017 17:07	32.8106	3/13/2017 21:25	14.7798	3/15/2017 4:45	35.8462	3/13/2017 16:40	35.1478	3/15/2017 19:37	0.5461
3/13/2017 16:47	35.0011	3/7/2017 7:27	15.0616	3/14/2017 8:47	36.29	3/7/2017 6:15	16.043	3/7/2017 9:37	0.9532	3/13/2017 17:07	32.7132	3/13/2017 21:26	14.7795	3/15/2017 4:46	35.8455	3/13/2017 16:40	35.1476	3/15/2017 19:47	0.5458
3/13/2017 16:47	35.0003	3/7/2017 7:37	15.0652	3/14/2017 8:48	36.2899	3/7/2017 6:25	16.0436	3/7/2017 9:47	0.9522	3/13/2017 17:07	32.7306	3/13/2017 21:27	14.7793	3/15/2017 4:47	35.845	3/13/2017 16:40	35.1433	3/15/2017 19:57	0.5469
3/13/2017 16:47	34.9995	3/7/2017 7:47	15.0632	3/14/2017 8:49	36.2893	3/7/2017 6:35	16.0404	3/7/2017 9:57	0.9507	3/13/2017 17:07	32.5944	3/13/2017 21:28	14.7792	3/15/2017 4:48	35.8448	3/13/2017 16:40	35.144	3/15/2017 20:07	0.5466
3/13/2017 16:47	35.0007	3/7/2017 7:57	15.0661	3/14/2017 8:50	36.289	3/7/2017 6:45	16.04	3/7/2017 10:07	0.9492	3/13/2017 17:07	32.461	3/13/2017 21:29	14.7792	3/15/2017 4:49	35.8452	3/13/2017 16:40	35.1456	3/15/2017 20:17	0.5468
3/13/2017 16:47	35.0009	3/7/2017 8:07	15.0712	3/14/2017 8:51	36.288	3/7/2017 6:55	16.0351	3/7/2017 10:17	0.947	3/13/2017 17:07	32.4253	3/13/2017 21:30	14.7789	3/15/2017 4:50	35.845	3/13/2017 16:40	35.147	3/15/2017 20:27	0.5463
3/13/2017 16:47	35.0036	3/7/2017 8:17	15.0708	3/14/2017 8:52	36.2874	3/7/2017 7:05	16.0479	3/7/2017 10:27	0.9449	3/13/2017 17:07	32.3564	3/13/2017 21:31	14.7786	3/15/2017 4:51	35.8456	3/13/2017 16:40	35.1464	3/15/2017 20:37	0.5463
3/13/2017 16:47	35.0041	3/7/2017 8:27	15.0632	3/14/2017 8:53	36.2874	3/7/2017 7:15	16.0577	3/7/2017 10:37	0.9434	3/13/2017 17:07	32.2877	3/13/2017 21:32	14.7778	3/15/2017 4:52	35.8454	3/13/2017 16:41	35.1463	3/15/2017 20:47	0.5451
3/13/2017 16:47	35.0033	3/7/2017 8:37	15.059	3/14/2017 8:54	36.2883	3/7/2017 7:25	16.0601	3/7/2017 10:47	0.9408	3/13/2017 17:07	32.2692	3/13/2017 21:33	14.7775	3/15/2017 4:53	35.846	3/13/2017 16:41	35.1474	3/15/2017 20:57	0.5458

PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER	PW16-1	TH16-1	TH16-2	TH16-3	BAROLOGGER										
3/13/2017 16:49	35.0155	3/8/2017 0:47	14.8947	3/14/2017 10:31	36.28	3/7/2017 23:35	15.8332	3/8/2017 2:57	0.8029	3/13/2017 17:09	32.067	3/13/2017 23:09	14.7667	3/15/2017 6:29	35.8588	3/13/2017 16:44	34.8739	3/16/2017 13:07	0.6506
3/13/2017 16:49	35.0172	3/8/2017 0:57	14.8998	3/14/2017 10:32	36.2803	3/7/2017 23:45	15.8428	3/8/2017 3:07	0.8001	3/13/2017 17:09	32.1533	3/13/2017 23:10	14.7659	3/15/2017 6:30	35.8588	3/13/2017 16:44	34.8701	3/16/2017 13:17	0.6513
3/13/2017 16:49	35.0185	3/8/2017 1:07	14.8801	3/14/2017 10:33	36.2806	3/7/2017 23:55	15.8496	3/8/2017 3:17	0.7965	3/13/2017 17:09	32.0983	3/13/2017 23:11	14.7653	3/15/2017 6:31	35.8589	3/13/2017 16:44	34.8725	3/16/2017 13:27	0.6535
3/13/2017 16:49	35.0147	3/8/2017 1:17	14.8817	3/14/2017 10:34	36.2806	3/8/2017 0:05	15.8648	3/8/2017 3:27	0.796	3/13/2017 17:09	32.081	3/13/2017 23:12	14.7645	3/15/2017 6:32	35.8595	3/13/2017 16:44	34.8629	3/16/2017 13:37	0.654
3/13/2017 16:49	35.0207	3/8/2017 1:27	14.888	3/14/2017 10:35	36.2811	3/8/2017 0:15	15.8782	3/8/2017 3:37	0.7924	3/13/2017 17:09	32.1258	3/13/2017 23:13	14.7641	3/15/2017 6:33	35.8596	3/13/2017 16:44	34.856	3/16/2017 13:47	0.6564
3/13/2017 16:49	35.015	3/8/2017 1:37	14.891	3/14/2017 10:36	36.2811	3/8/2017 0:25	15.8868	3/8/2017 3:47	0.7895	3/13/2017 17:09	32.1255	3/13/2017 23:14	14.7637	3/15/2017 6:34	35.8595	3/13/2017 16:44	34.8348	3/16/2017 13:57	0.6587
3/13/2017 16:49	35.0185	3/8/2017 1:47	14.8908	3/14/2017 10:37	36.2808	3/8/2017 0:35	15.8918	3/8/2017 3:57	0.7869	3/13/2017 17:09	32.1268	3/13/2017 23:15	14.7632	3/15/2017 6:35	35.8599	3/13/2017 16:44	34.8115	3/16/2017 14:07	0.6602
3/13/2017 16:49	35.017	3/8/2017 1:57	14.8844	3/14/2017 10:38	36.2807	3/8/2017 0:45	15.8909	3/8/2017 4:07	0.7862	3/13/2017 17:09	32.1076	3/13/2017 23:16	14.7634	3/15/2017 6:36	35.86	3/13/2017 16:44	34.7901	3/16/2017 14:17	0.6619
3/13/2017 16:49	35.0171	3/8/2017 2:07	14.879	3/14/2017 10:39	36.2807	3/8/2017 0:55	15.8894	3/8/2017 4:17	0.783	3/13/2017 17:09	32.0435	3/13/2017 23:17	14.7632	3/15/2017 6:37	35.8598	3/13/2017 16:44	34.7733	3/16/2017 14:27	0.6641
3/13/2017 16:49	35.0155	3/8/2017 2:17	14.8689	3/14/2017 10:40	36.2799	3/8/2017 1:05	15.8816	3/8/2017 4:27	0.7812	3/13/2017 17:09	32.0577	3/13/2017 23:18	14.7628	3/15/2017 6:38	35.86	3/13/2017 16:44	34.7703	3/16/2017 14:37	0.6666
3/13/2017 16:49	35.0176	3/8/2017 2:27	14.864	3/14/2017 10:41	36.2797	3/8/2017 1:15	15.8793	3/8/2017 4:37	0.7809	3/13/2017 17:09	32.1025	3/13/2017 23:19	14.7619	3/15/2017 6:39	35.8605	3/13/2017 16:44	34.7721	3/16/2017 14:47	0.667
3/13/2017 16:49	35.0156	3/8/2017 2:37	14.8574	3/14/2017 10:42	36.2781	3/8/2017 1:25	15.8861	3/8/2017 4:47	0.7776	3/13/2017 17:09	32.0931	3/13/2017 23:20	14.7619	3/15/2017 6:40	35.8609	3/13/2017 16:44	34.7684	3/16/2017 14:57	0.6686
3/13/2017 16:49	35.0203	3/8/2017 2:47	14.8527	3/14/2017 10:43	36.2785	3/8/2017 1:35	15.8894	3/8/2017 4:57	0.7753	3/13/2017 17:09	32.1535	3/13/2017 23:21	14.7617	3/15/2017 6:41	35.8609	3/13/2017 16:44	34.7702	3/16/2017 15:07	0.6704
3/13/2017 16:49	35.0186	3/8/2017 2:57	14.8467	3/14/2017 10:44	36.2768	3/8/2017 1:45	15.8889	3/8/2017 5:07	0.7741	3/13/2017 17:09	32.0959	3/13/2017 23:22	14.7618	3/15/2017 6:42	35.8608	3/13/2017 16:44	34.7692	3/16/2017 15:17	0.6727
3/13/2017 16:49	35.0153	3/8/2017 3:07	14.8416	3/14/2017 10:45	36.2775	3/8/2017 1:55	15.8803	3/8/2017 5:17	0.7713	3/13/2017 17:09	32.1074	3/13/2017 23:23	14.7619	3/15/2017 6:43	35.8599	3/13/2017 16:44	34.7657	3/16/2017 15:27	0.6734
3/13/2017 16:49	35.0192	3/8/2017 3:17	14.8348	3/14/2017 10:46	36.2773	3/8/2017 2:05	15.8781	3/8/2017 5:27	0.7692	3/13/2017 17:09	32.0872	3/13/2017 23:24	14.7615	3/15/2017 6:44	35.8615	3/13/2017 16:44	34.7629	3/16/2017 15:37	0.675
3/13/2017 16:49	35.0189	3/8/2017 3:27	14.83	3/14/2017 10:47	36.2772	3/8/2017 2:15	15.8681	3/8/2017 5:37	0.7665	3/13/2017 17:09	32.0952	3/13/2017 23:25	14.7609	3/15/2017 6:45	35.8616	3/13/2017 16:44	34.7639	3/16/2017 15:47	0.6783
3/13/2017 16:49	35.0186	3/8/2017 3:37	14.8206	3/14/2017 10:48	36.2773	3/8/2017 2:25	15.8624	3/8/2017 5:47	0.7653	3/13/2017 17:09	32.0821	3/13/2017 23:26	14.7605	3/15/2017 6:46	35.8617	3/13/2017 16:44	34.7618	3/16/2017 15:57	0.6797
3/13/2017 16:49	35.0179	3/8/2017 3:47	14.8169	3/14/2017 10:49	36.2775	3/8/2017 2:35	15.8588	3/8/2017 5:57	0.7634	3/13/2017 17:09	32.04	3/13/2017 23:27	14.7599	3/15/2017 6:47	35.861	3/13/2017 16:44	34.7639	3/16/2017 16:07	0.6824
3/13/2017 16:49	35.0181	3/8/2017 3:57	14.8154	3/14/2017 10:50	36.2779	3/8/2017 2:45	15.8526	3/8/2017 6:07	0.7631	3/13/2017 17:09	32.0939	3/13/2017 23:28	14.7587	3/15/2017 6:48	35.8614	3/13/2017 16:44	34.7654	3/16/2017 16:17	0.6833
3/13/2017 16:49	35.0151	3/8/2017 4:07	14.8226	3/14/2017 10:51	36.2776	3/8/2017 2:55	15.8495	3/8/2017 6:17	0.7617	3/13/2017 17:10	32.0952	3/13/2017 23:29	14.7583	3/15/2017 6:49	35.8612	3/13/2017 16:44	34.7544	3/16/2017 16:27	0.6847
3/13/2017 16:49	35.0185	3/8/2017 4:17	14.8257	3/14/2017 10:52	36.2776	3/8/2017 3:05	15.8407	3/8/2017 6:27	0.7609	3/13/2017 17:10	32.1437	3/13/2017 23:30	14.7576	3/15/2017 6:50	35.8605	3/13/2017 16:44	34.7428	3/16/2017 16:37	0.686
3/13/2017 16:49	35.0081	3/8/2017 4:27	14.8277	3/14/2017 10:53	36.2772	3/8/2017 3:15	15.8334	3/8/2017 6:37	0.7599	3/13/2017 17:10	32.2373	3/13/2017 23:31	14.7568	3/15/2017 6:51	35.8608	3/13/2017 16:45	34.7378	3/16/2017 16:47	0.6872
3/13/2017 16:49	34.7031	3/8/2017 4:37	14.8307	3/14/2017 10:54	36.2769	3/8/2017 3:25	15.8318	3/8/2017 6:47	0.7568	3/13/2017 17:10	32.0423	3/13/2017 23:32	14.7561	3/15/2017 6:52	35.8611	3/13/2017 16:45	34.7186	3/16/2017 16:57	0.6889
3/13/2017 16:49	34.5102	3/8/2017 4:47	14.8269	3/14/2017 10:55	36.276	3/8/2017 3:35	15.8225	3/8/2017 6:57	0.754	3/13/2017 17:10	32.1452	3/13/2017 23:33	14.7564	3/15/2017 6:53	35.8605	3/13/2017 16:45	34.7042	3/16/2017 17:07	0.6911
3/13/2017 16:49	34.1588	3/8/2017 4:57	14.8232	3/14/2017 10:56	36.2757	3/8/2017 3:45	15.8188	3/8/2017 7:07	0.751	3/13/2017 17:10	32.1143	3/13/2017 23:34	14.7563	3/15/2017 6:54	35.8606	3/13/2017 16:45	34.6939	3/16/2017 17:17	0.6928
3/13/2017 16:49	34.2519	3/8/2017 5:07	14.8229	3/14/2017 10:57	36.2747	3/8/2017 3:55	15.8145	3/8/2017 7:17	0.7495	3/13/2017 17:10	32.1216	3/13/2017 23:35	14.7566	3/15/2017 6:55	35.8609	3/13/2017 16:45	34.6939	3/16/2017 17:27	0.695
3/13/2017 16:49	34.0553	3/8/2017 5:17	14.8262	3/14/2017 10:58	36.2746	3/8/2017 4:05	15.8211	3/8/2017 7:27	0.7473	3/13/2017 17:10	32.1009	3/13/2017 23:36	14.7567	3/15/2017 6:56	35.8606	3/13/2017 16:45	34.6897	3/16/2017 17:37	0.6973
3/13/2017 16:49	33.9042	3/8/2017 5:27	14.829	3/14/2017 10:59	36.2747	3/8/2017 4:15	15.8261	3/8/2017 7:37	0.7445	3/13/2017 17:10	32.0873	3/13/2017 23:37	14.757	3/15/2017 6:57	35.8602	3/13/2017 16:45	34.6884	3/16/2017 17:47	0.6994
3/13/2017 16:49	33.7156	3/8/2017 5:37	14.8324	3/14/2017 11:00	36.2747	3/8/2017 4:25	15.8278	3/8/2017 7:47	0.7425	3/13/2017 17:10	32.0784	3/13/2017 23:38	14.7574	3/15/2017 6:58	35.8605	3/13/2017 16:45	34.6893	3/16/2017 17:57	0.6994
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3/13/2017 16:49	33.496	3/8/2017 5:57	14.842	3/14/2017 11:02	36.2745	3/8/2017 4:45	15.8255	3/8/2017 8:07	0.7413	3/13/2017 17:10	32.1237	3/13/2017 23:40	14.7575	3/15/2017 7:00	35.8615	3/13/2017 16:45	34.6867	3/16/2017 18:07	0.7028
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3/13/2017 16:49	33.4717	3/8/2017 6:47	14.8323	3/14/2017 11:07	36.2736	3/8/2017 5:35	15.8309	3/8/2017 8:57	0.7295	3/13/2017 17:10	31.9867	3/13/2017 23:45	14.757	3/15/2017 7:05	35.8598	3/13/2017 16:45	34.6827	3/16/2017 18:57	0.7119
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3/13/2017 16:50	33.4876	3/8/2017 7:07	14.8316	3/14/2017 11:09	36.2731	3/8/2017 5:55	15.8431	3/8/2017 9:17	0.7251	3/13/2017 17:10	32.0775	3/13/2017 23:47	14.7572	3/15/2017 7:07	35.8598	3/			

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3/1/2017 17:41	35.0623	3/15/2017 6:25	14.4915	3/16/2017 13:45	36.1894	3/13/2017 17:41	36.2764	3/13/2017 17:41	35.0695	3/15/2017 14:44	14.5671	3/16/2017 17:41	36.2844	3/13/2017 17:41	36.7317	3/13/2017 17:41	32.1011	3/15/2017 22:41	14.5114	3/17/2017 6:21	36.348	3/13/2017 17:41	34.7325
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3/1/2017 17:41	35.0638	3/15/2017 6:30	14.4966	3/16/2017 13:50	36.1908	3/13/2017 17:41	36.2708	3/13/2017 17:41	35.0694	3/15/2017 14:48	14.5684	3/16/2017 17:41	36.2853	3/13/2017 17:41	36.7303	3/13/2017 17:41	32.1401	3/15/2017 22:46	14.5137	3/17/2017 6:26	36.3493	3/13/2017 17:41	34.732
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3/1																							

PW16-1	TH16-1	TH16-2	TH16-3	PW16-1	TH16-1	TH16-2	TH16-3	PW16-1	TH16-1	TH16-2	TH16-3	PW16-1	TH16-1	TH16-2	TH16-3
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3/13/2017 17:44	35.0725	3/15/2017 9:14	14.5283	3/16/2017 16:34	36.2141	3/13/2017 17:52	36.5262	3/13/2017 17:52	35.0691	3/15/2017 17:32	14.6161	3/17/2017 0:52	36.2973	3/13/2017 18:08	34.7338
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3/13/2017 17:44	35.069	3/15/2017 9:19	14.5206	3/16/2017 16:39	36.2148	3/13/2017 17:52	36.5259	3/13/2017 17:52	35.0724	3/15/2017 17:37	14.6098	3/17/2017 0:57	36.298	3/13/2017 18:08	34.732
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3/13/2017 17:44	35.0645	3/15/2017 9:21	14.5214	3/16/2017 16:41	36.2153	3/13/2017 17:52	36.5261	3/13/2017 17:52	35.0727	3/15/2017 17:39	14.6057	3/17/2017 0:59	36.2981	3/13/2017 18:08	34.733
3/13/2017 17:44	35.0708	3/15/2017 9:22	14.5205	3/16/2017 16:42	36.2153	3/13/2017 17:52	36.5261	3/13/2017 17:52	35.0688	3/15/2017 17:40	14.6065	3/17/2017 1:00	36.2981	3/13/2017 18:08	34.7336
3/13/2017 17:44	35.0713	3/15/2017 9:23	14.521	3/16/2017 16:43	36.2158	3/13/2017 17:52	36.5263	3/13/2017 17:52	35.0712	3/15/2017 17:41	14.6062	3/17/2017 1:01	36.2981	3/13/2017 18:08	34.7328
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3/13/2017 17:44	35.0732	3/15/2017 9:25	14.5212	3/16/2017 16:45	36.2165	3/13/2017 17:52	36.5263	3/13/2017 17:52	35.0693	3/15/2017 17:43	14.6051	3/17/2017 1:03	36.2981	3/13/2017 18:08	34.7304
3/13/2017 17:44	35.0748	3/15/2017 9:26	14.5227	3/16/2017 16:46	36.2171	3/13/2017 17:52	36.5262	3/13/2017 17:52	35.0706	3/15/2017 17:44	14.6048	3/17/2017 1:04	36.2982	3/13/2017 18:08	34.733
3/13/2017 17:44	35.0729	3/15/2017 9:27	14.5204	3/16/2017 16:47	36.2172	3/13/2017 17:52	36.5261	3/13/2017 17:52	35.0713	3/15/2017 17:45	14.6044	3/17/2017 1:05	36.2982	3/13/2017 18:08	34.7335
3/13/2017 17:44	35.0721	3/15/2017 9:28	14.5208	3/16/2017 16:48	36.2171	3/13/2017 17:52	36.5261	3/13/2017 17:52	35.0697	3/15/2017 17:46	14.6043	3/17/2017 1:06	36.2983	3/13/2017 18:08	34.7336
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3/13/2017 17:44	35.0701	3/15/2017 9:30	14.526	3/16/2017 16:50	36.2172	3/13/2017 17:52	36.5262	3/13/2017 17:52	35.0744	3/15/2017 17:48	14.6051	3/17/2017 1:08	36.2985	3/13/2017 18:08	34.7353
3/13/2017 17:44	35.071	3/15/2017 9:31	14.5261	3/16/2017 16:51	36.2173	3/13/2017 17:52	36.5258	3/13/2017 17:52	35.0697	3/15/2017 17:49	14.6044	3/17/2017 1:09	36.2985	3/13/2017 18:08	34.7334
3/13/2017 17:44	35.0723	3/15/2017 9:32	14.5247	3/16/2017 16:52	36.2178	3/13/2017 17:52	36.5262	3/13/2017 17:52	35.0716	3/15/2017 17:50	14.6041	3/17/2017 1:10	36.2984	3/13/2017 18:08	34.7343
3/13/2017 17:44	35.0718	3/15/2017 9:33	14.5277	3/16/2017 16:53	36.2175	3/13/2017 17:52	36.5262	3/13/2017 17:52	35.071	3/15/2017 17:51	14.6027	3/17/2017 1:11	36.2989	3/13/2017 18:08	34.7322
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3/13/2017 17:44	35.0738	3/15/2017 9:35	14.532	3/16/2017 16:55	36.2176	3/13/2017 17:52	36.5262	3/13/2017 17:52	35.0728	3/15/2017 17:53	14.6033	3/17/2017 1:13	36.2987	3/13/2017 18:08	34.7343
3/13/2017 17:44	35.0748	3/15/2017 9:36	14.5332	3/16/2017 16:56	36.2177	3/13/2017 17:52	36.5262	3/13/2017 17:52	35.0708	3/15/2017 17:54	14.6029	3/17/2017 1:14	36.299	3/13/2017 18:08	34.735
3/13/2017 17:44	35.0734	3/15/2017 9:37	14.5356	3/16/2017 16:57	36.2179	3/13/2017 17:52	36.5266	3/13/2017 17:52	35.0699	3/15/2017 17:55	14.6031	3/17/2017 1:15	36.2992	3/13/2017 18:08	34.7355
3/13/2017 17:44	35.0722	3/15/2017 9:38	14.535	3/16/2017 16:58	36.2184	3/13/2017 17:52	36.526	3/13/2017 17:52	35.0712	3/15/2017 17:55	14.6037	3/17/2017 1:16	36.2991	3/13/2017 18:08	34.7373
3/13/2017 17:44	35.0776	3/15/2017 9:39	14.5359	3/16/2017 16:59	36.2182	3/13/2017 17:52	36.5263	3/13/2017 17:52	35.0683	3/15/2017 17:57	14.6042	3/17/2017 1:17	36.299	3/13/2017 18:08	34.7329
3/13/2017 17:44	35.0723	3/15/2017 9:40	14.5355	3/16/2017 17:00	36.2183	3/13/2017 17:52	36.5264	3/13/2017 17:52	35.0694	3/15/2017 17:58	14.6054	3/17/2017 1:18	36.2995	3/13/2017 18:08	34.7324
3/13/2017 17:44	35.0815	3/15/2017 9:41	14.5373	3/16/2017 17:01	36.2183	3/13/2017 17:52	36.5261	3/13/2017 17:52	35.0694	3/15/2017 17:59	14.6048	3/17/2017 1:19	36.2992	3/13/2017 18:08	34.7331
3/13/2017 17:44	35.0749	3/15/2017 9:42	14.5392	3/16/2017 17:02	36.2185	3/13/2017 17:52	36.5263	3/13/2017 17:52	35.0713	3/15/2017 18:00	14.6042	3/17/2017 1:20	36.2993	3/13/2017 18:08	34.7298
3/13/2017 17:44	35.0742	3/15/2017 9:43	14.5378	3/16/2017 17:03	36.2188	3/13/2017 17:52	36.5263	3/13/2017 17:52	35.0713	3/15/2017 18:01	14.6042	3/17/2017 1:21	36.2995	3/13/2017 18:08	34.7323
3/13/2017 17:44	35.075	3/15/2017 9:44	14.5366	3/16/2017 17:04	36.2193	3/13/2017 17:52	36.5266	3/13/2017 17:52	35.0712	3/15/2017 18:02	14.6044	3/17/2017 1:22	36.2997	3/13/2017 18:08	34.7334
3/13/2017 17:44	35.0786	3/15/2017 9:45	14.5352	3/16/2017 17:05	36.2193	3/13/2017 17:52	36.5262	3/13/2017 17:52	35.0715	3/15/2017 18:03	14.6038	3/17/2017 1:23	36.2996	3/13/2017 18:08	34.7335
3/13/2017 17:44	35.0722	3/15/2017 9:46	14.5384	3/16/2017 17:06	36.2196	3/13/2017 17:52	36.5263	3/13/2017 17:52	35.0685	3/15/2017 18:04	14.6027	3/17/2017 1:24	36.2999	3/13/2017 18:08	34.7308
3/13/2017 17:44	35.0801	3/15/2017 9:47	14.5388	3/16/2017 17:07	36.2201	3/13/2017 17:52	36.5263	3/13/2017 17:52	35.0717	3/15/2017 18:05	14.6031	3/17/2017 1:25	36.2998	3/13/2017 18:08	34.7298
3/13/2017 17:44	35.0728	3/15/2017 9:48	14.539	3/16/2017 17:08	36.2198	3/13/2017 17:52	36.5261	3/13/2017 17:52	35.0699	3/15/2017 18:06	14.6043	3/17/2017 1:26	36.2993	3/13/2017 18:08	34.7338
3/13/2017 17:44	35.0748	3/15/2017 9:49	14.5362	3/16/2017 17:09	36.2202	3/13/2017 17:52	36.5261	3/13/2017 17:52	35.0681	3/15/2017 18:07	14.6012	3/17/2017 1:27	36.3001	3/13/2017 18:08	34.7321
3/13/2017 17:44	35.0792	3/15/2017 9:50	14.536	3/16/2017 17:10	36.2197	3/13/2017 17:52	36.5264	3/13/2017 17:52	35.072	3/15/2017 18:08	14.6005	3/17/2017 1:28	36.3004	3/13/2017 18:08	34.7337

PW16-1	TH16-1	TH16-3	PW16-1	TH16-1	TH16-3	PW16-1	TH16-1	TH16-3	PW16-1	TH16-1	TH16-3						
3/13/2017 18:01	32.141	3/16/2017 2:41	14.581	3/14/2017 3:00	34.8999	3/13/2017 19:43	32.126301	3/16/2017 9:19	14.7273	3/15/2017 12:10	34.6068	3/13/2017 20:49	32.197899	3/16/2017 15:57	14.7047	3/16/2017 21:15	36.5785
3/13/2017 18:01	32.1181	3/16/2017 2:42	14.5817	3/14/2017 3:05	34.9057	3/13/2017 19:43	32.132698	3/16/2017 9:20	14.7261	3/15/2017 12:15	34.6053	3/13/2017 20:50	32.1553	3/16/2017 15:58	14.703	3/16/2017 21:20	36.5744
3/13/2017 18:01	32.1198	3/16/2017 2:43	14.5824	3/14/2017 3:10	34.9069	3/13/2017 19:43	32.125698	3/16/2017 9:21	14.7268	3/15/2017 12:20	34.6034	3/13/2017 20:50	32.118797	3/16/2017 15:59	14.7026	3/16/2017 21:25	36.5724
3/13/2017 18:01	32.1252	3/16/2017 2:44	14.583	3/14/2017 3:15	34.9162	3/13/2017 19:44	32.124901	3/16/2017 9:22	14.7261	3/15/2017 12:25	34.6151	3/13/2017 20:50	32.1581	3/16/2017 16:00	14.7033	3/16/2017 21:30	36.5726
3/13/2017 18:01	32.1112	3/16/2017 2:45	14.5834	3/14/2017 3:20	34.9149	3/13/2017 19:44	32.094997	3/16/2017 9:23	14.7261	3/15/2017 12:30	34.6054	3/13/2017 20:50	32.101101	3/16/2017 16:01	14.7038	3/16/2017 21:35	36.5691
3/13/2017 18:02	32.0982	3/16/2017 2:46	14.5834	3/14/2017 3:25	34.9091	3/13/2017 19:44	32.1241	3/16/2017 9:24	14.7253	3/15/2017 12:35	34.609	3/13/2017 20:50	32.143101	3/16/2017 16:02	14.7029	3/16/2017 21:40	36.5658
3/13/2017 18:02	32.0717	3/16/2017 2:47	14.5838	3/14/2017 3:30	34.9121	3/13/2017 19:44	32.129601	3/16/2017 9:25	14.7253	3/15/2017 12:40	34.6122	3/13/2017 20:50	32.155701	3/16/2017 16:03	14.7022	3/16/2017 21:45	36.5641
3/13/2017 18:02	32.1294	3/16/2017 2:48	14.5837	3/14/2017 3:35	34.912	3/13/2017 19:44	32.135601	3/16/2017 9:26	14.7252	3/15/2017 12:45	34.6104	3/13/2017 20:51	32.175499	3/16/2017 16:04	14.7014	3/16/2017 21:50	36.5661
3/13/2017 18:02	32.1262	3/16/2017 2:49	14.5842	3/14/2017 3:40	34.9085	3/13/2017 19:44	32.2038	3/16/2017 9:27	14.7258	3/15/2017 12:50	34.6072	3/13/2017 20:51	32.1385	3/16/2017 16:05	14.702	3/16/2017 21:55	36.5655
3/13/2017 18:02	32.1657	3/16/2017 2:50	14.5846	3/14/2017 3:45	34.914	3/13/2017 19:45	32.088699	3/16/2017 9:28	14.7257	3/15/2017 12:55	34.6173	3/13/2017 20:51	32.184498	3/16/2017 16:06	14.7015	3/16/2017 22:00	36.5662
3/13/2017 18:02	32.1091	3/16/2017 2:51	14.5851	3/14/2017 3:50	34.9077	3/13/2017 19:45	32.112698	3/16/2017 9:29	14.7262	3/15/2017 13:00	34.6116	3/13/2017 20:51	32.213699	3/16/2017 16:07	14.7013	3/16/2017 22:05	36.5677
3/13/2017 18:02	32.0902	3/16/2017 2:52	14.5857	3/14/2017 3:55	34.915	3/13/2017 19:45	32.067299	3/16/2017 9:30	14.7261	3/15/2017 13:05	34.6186	3/13/2017 20:51	32.146099	3/16/2017 16:08	14.7009	3/16/2017 22:10	36.5689
3/13/2017 18:02	32.0617	3/16/2017 2:53	14.5863	3/14/2017 4:00	34.9131	3/13/2017 19:45	32.1241	3/16/2017 9:31	14.727	3/15/2017 13:10	34.6352	3/13/2017 20:51	32.134998	3/16/2017 16:09	14.7018	3/16/2017 22:15	36.5675
3/13/2017 18:02	32.0902	3/16/2017 2:54	14.5875	3/14/2017 4:05	34.9164	3/13/2017 19:45	32.027	3/16/2017 9:32	14.7271	3/15/2017 13:15	34.6102	3/13/2017 20:52	32.213501	3/16/2017 16:10	14.7021	3/16/2017 22:20	36.5658
3/13/2017 18:02	32.1211	3/16/2017 2:55	14.5887	3/14/2017 4:10	34.92	3/13/2017 19:45	32.190998	3/16/2017 9:33	14.7281	3/15/2017 13:20	34.605	3/13/2017 20:52	32.116898	3/16/2017 16:11	14.7014	3/16/2017 22:25	36.5644
3/13/2017 18:02	32.1237	3/16/2017 2:56	14.5899	3/14/2017 4:15	34.9189	3/13/2017 19:46	32.190899	3/16/2017 9:34	14.7278	3/15/2017 13:25	34.6042	3/13/2017 20:52	32.1413	3/16/2017 16:12	14.7008	3/16/2017 22:30	36.5647
3/13/2017 18:02	32.1214	3/16/2017 2:57	14.5909	3/14/2017 4:20	34.9125	3/13/2017 19:46	32.113899	3/16/2017 9:35	14.7277	3/15/2017 13:30	34.6083	3/13/2017 20:52	32.266201	3/16/2017 16:13	14.7006	3/16/2017 22:35	36.5682
3/13/2017 18:02	32.0675	3/16/2017 2:58	14.592	3/14/2017 4:25	34.9211	3/13/2017 19:46	32.084198	3/16/2017 9:36	14.728	3/15/2017 13:35	34.6031	3/13/2017 20:52	32.103901	3/16/2017 16:14	14.6999	3/16/2017 22:40	36.5711
3/13/2017 18:02	32.0406	3/16/2017 2:59	14.5928	3/14/2017 4:30	34.9222	3/13/2017 19:46	32.100998	3/16/2017 9:37	14.7283	3/15/2017 13:40	34.6109	3/13/2017 20:52	32.223698	3/16/2017 16:15	14.6993	3/16/2017 22:45	36.5732
3/13/2017 18:02	32.0879	3/16/2017 3:00	14.5941	3/14/2017 4:35	34.9254	3/13/2017 19:46	32.094398	3/16/2017 9:38	14.7292	3/15/2017 13:45	34.6112	3/13/2017 20:53	32.2117	3/16/2017 16:16	14.6982	3/16/2017 22:50	36.5752
3/13/2017 18:02	32.0419	3/16/2017 3:01	14.5957	3/14/2017 4:40	34.925	3/13/2017 19:46	32.117599	3/16/2017 9:39	14.7303	3/15/2017 13:50	34.6136	3/13/2017 20:53	32.185101	3/16/2017 16:17	14.6987	3/16/2017 22:55	36.5746
3/13/2017 18:02	32.1455	3/16/2017 3:02	14.5964	3/14/2017 4:45	34.9274	3/13/2017 19:47	32.081299	3/16/2017 9:40	14.7304	3/15/2017 13:55	34.6133	3/13/2017 20:53	32.091099	3/16/2017 16:18	14.6983	3/16/2017 23:00	36.5737
3/13/2017 18:02	32.1456	3/16/2017 3:03	14.5973	3/14/2017 4:50	34.9285	3/13/2017 19:47	32.183998	3/16/2017 9:41	14.7304	3/15/2017 14:00	34.6223	3/13/2017 20:53	32.086399	3/16/2017 16:19	14.6973	3/16/2017 23:05	36.5738
3/13/2017 18:02	32.0838	3/16/2017 3:04	14.5989	3/14/2017 4:55	34.9331	3/13/2017 19:47	32.143497	3/16/2017 9:42	14.7318	3/15/2017 14:05	34.6255	3/13/2017 20:53	32.184601	3/16/2017 16:20	14.6976	3/16/2017 23:10	36.5724
3/13/2017 18:02	32.1142	3/16/2017 3:05	14.6002	3/14/2017 5:00	34.9285	3/13/2017 19:47	32.050999	3/16/2017 9:43	14.7322	3/15/2017 14:10	34.6261	3/13/2017 20:53	32.1119	3/16/2017 16:21	14.6981	3/16/2017 23:15	36.5715
3/13/2017 18:02	32.1136	3/16/2017 3:06	14.6014	3/14/2017 5:05	34.931	3/13/2017 19:47	32.134899	3/16/2017 9:44	14.7336	3/15/2017 14:15	34.6237	3/13/2017 20:54	32.110699	3/16/2017 16:22	14.6982	3/16/2017 23:20	36.5704
3/13/2017 18:02	32.0824	3/16/2017 3:07	14.6026	3/14/2017 5:10	34.9299	3/13/2017 19:47	32.186501	3/16/2017 9:45	14.7339	3/15/2017 14:20	34.6266	3/13/2017 20:54	32.1824	3/16/2017 16:23	14.6984	3/16/2017 23:25	36.5694
3/13/2017 18:02	32.1637	3/16/2017 3:08	14.6036	3/14/2017 5:15	34.935	3/13/2017 19:48	32.1502	3/16/2017 9:46	14.7348	3/15/2017 14:25	34.6275	3/13/2017 20:54	32.157398	3/16/2017 16:24	14.6979	3/16/2017 23:30	36.5683
3/13/2017 18:02	32.0925	3/16/2017 3:09	14.6047	3/14/2017 5:20	34.9369	3/13/2017 19:48	32.119198	3/16/2017 9:47	14.7341	3/15/2017 14:30	34.6401	3/13/2017 20:54	32.162201	3/16/2017 16:25	14.6989	3/16/2017 23:35	36.5688
3/13/2017 18:02	32.0916	3/16/2017 3:10	14.6053	3/14/2017 5:25	34.9396	3/13/2017 19:48	32.0961	3/16/2017 9:48	14.7345	3/15/2017 14:35	34.6441	3/13/2017 20:54	32.176399	3/16/2017 16:26	14.6984	3/16/2017 23:40	36.5702
3/13/2017 18:02	32.0398	3/16/2017 3:11	14.6064	3/14/2017 5:30	34.9404	3/13/2017 19:48	32.1623	3/16/2017 9:49	14.735	3/15/2017 14:40	34.6525	3/13/2017 20:54	32.232597	3/16/2017 16:27	14.6982	3/16/2017 23:45	36.5722
3/13/2017 18:02	32.1356	3/16/2017 3:12	14.6067	3/14/2017 5:35	34.941	3/13/2017 19:48	32.098198	3/16/2017 9:50	14.7358	3/15/2017 14:45	34.6516	3/13/2017 20:55	32.188801	3/16/2017 16:28	14.6977	3/16/2017 23:50	36.5737
3/13/2017 18:02	32.1081	3/16/2017 3:13	14.6079	3/14/2017 5:40	34.9398	3/13/2017 19:48	32.1231	3/16/2017 9:51	14.7356	3/15/2017 14:50	34.6449	3/13/2017 20:55	32.139	3/16/2017 16:29	14.6972	3/16/2017 23:55	36.5726
3/13/2017 18:02	32.0453	3/16/2017 3:14	14.6082	3/14/2017 5:45	34.9425	3/13/2017 19:49	32.1488	3/16/2017 9:52	14.7355	3/15/2017 14:55	34.6476	3/13/2017 20:55	32.112	3/16/2017 16:30	14.6978	3/17/2017 0:00	36.5709
3/13/2017 18:02	32.1151	3/16/2017 3:15	14.6088	3/14/2017 5:50	34.9442	3/13/2017 19:49	32.139999	3/16/2017 9:53	14.7336	3/15/2017 15:00	34.6529	3/13/2017 20:55	32.1712	3/16/2017 16:31	14.6975	3/17/2017 0:05	36.5688
3/13/2017 18:02	32.1091	3/16/2017 3:16	14.6088	3/14/2017 5:55	34.9438	3/13/2017 19:49	32.169399	3/16/2017 9:54	14.7337	3/15/2017 15:05	34.6338	3/13/2017 20:55	32.1222	3/16/2017 16:32	14.6982	3/17/2017 0:10	36.5685
3/13/2017 18:02	32.1058	3/16/2017 3:17	14.6096	3/14/2017 6:00	34.9515	3/13/2017 19:49	32.102699	3/16/2017 9:55	14.734	3/15/2017 15:10	34.6288	3/13/2017 20:55	32.103798	3/16/2017 16:33	14.6976	3/17/2017 0:15	36.5697
3/13/2017 18:02	32.151	3/16/2017 3:18	14.6098	3/14/2017 6:05	34.9539	3/13/2017 19:49	32.175697	3/16/2017 9:56	14.7352	3/15/2017 15:15	34.6316	3/13/2017 20:56	32.1394	3/16/2017 16:34	14.6982	3/17/2017 0:20	36.574
3/13/2017 18:02	32.0604	3/16/2017 3:19	14.6102	3/14/2017 6:10	34.954	3/13/2017 19:49	32.073498	3/16/2017 9:57	14.7339	3/15/2017 15:20	34.6297	3/13/2017 20:56	32.127399	3/16/2017 16:35	14.697	3/17/2017 0:25	36.5773
3/13/2017 18:02	32.1067	3/16/2017 3:20	14.6109	3/14/2017 6:15	34.9569	3/13/2017 19:50	32.1147	3/16/2017 9:58	14.7337	3/15/2017 15:25	34.6296	3/13/2017 20:56	32.091599	3/16/2017 16:36	14.6961	3/17/2017 0:30	36.5789
3/13/2017 18:02	32.0904	3/16/2017 3:21	14.6107	3/14/2017 6:20	34.9554	3/13/2017 19:50	32.1423	3/16/2017 9:59	14.7315	3/15/2017 15:30	34.6403	3/13/2017 20:56	32.196098	3/16/2017 16:37	14.6962	3/17/2017 0:35	36.5778
3/13/2017 18:02	32.1201	3/16/2017 3:22	14.6111	3/14/2017 6:25	34.9542	3/13/2017 19:50	32.061798	3/16/2017 10:00	14.7297	3/15/2017 15:35	34.6421	3/13/2017 20:56	32.197498				

PW16-1		TH16-1		TH16-3		PW16-1		TH16-1		TH16-3		PW16-1		TH16-1		TH16-3	
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3/13/2017 18:04	32.1219	3/16/2017 4:57	14.6427	3/14/2017 14:20	34.8346	3/13/2017 20:06	32.1562	3/16/2017 11:35	14.7197	3/15/2017 23:30	34.5861	3/13/2017 21:12	32.179398	3/16/2017 18:13	14.7507	3/17/2017 8:35	36.7095
3/13/2017 18:04	32.082	3/16/2017 4:58	14.6424	3/14/2017 14:25	34.8305	3/13/2017 20:06	32.165897	3/16/2017 11:36	14.7201	3/15/2017 23:35	34.5873	3/13/2017 21:12	32.162399	3/16/2017 18:14	14.75	3/17/2017 8:40	36.6974
3/13/2017 18:04	32.1123	3/16/2017 4:59	14.642	3/14/2017 14:30	34.828	3/13/2017 20:06	32.140499	3/16/2017 11:37	14.7194	3/15/2017 23:40	34.5843	3/13/2017 21:12	32.153999	3/16/2017 18:15	14.7504	3/17/2017 8:45	36.684
3/13/2017 18:04	32.1375	3/16/2017 5:00	14.6417	3/14/2017 14:35	34.8285	3/13/2017 20:06	32.148701	3/16/2017 11:38	14.7188	3/15/2017 23:45	34.5783	3/13/2017 21:13	32.209999	3/16/2017 18:16	14.7501	3/17/2017 8:50	36.6703
3/13/2017 18:04	32.1019	3/16/2017 5:01	14.6412	3/14/2017 14:40	34.8301	3/13/2017 20:06	32.116798	3/16/2017 11:39	14.7194	3/15/2017 23:50	34.5866	3/13/2017 21:13	32.166199	3/16/2017 18:17	14.7503	3/17/2017 8:55	36.6617
3/13/2017 18:04	32.0614	3/16/2017 5:02	14.6409	3/14/2017 14:45	34.8305	3/13/2017 20:07	32.108299	3/16/2017 11:40	14.7205	3/15/2017 23:55	34.5897	3/13/2017 21:13	32.210701	3/16/2017 18:18	14.7499	3/17/2017 9:00	36.6502
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3/13/2017 18:04	32.123	3/16/2017 5:04	14.6406	3/14/2017 14:55	34.8236	3/13/2017 20:07	32.152599	3/16/2017 11:42	14.7202	3/16/2017 0:05	34.598	3/13/2017 21:13	32.159901	3/16/2017 18:20	14.749	3/17/2017 9:10	36.629
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3/13/2017 18:04	32.1206	3/16/2017 5:06	14.6407	3/14/2017 15:05	34.8211	3/13/2017 20:07	32.179798	3/16/2017 11:44	14.7225	3/16/2017 0:15	34.5784	3/13/2017 21:14	32.147999	3/16/2017 18:22	14.7479	3/17/2017 9:20	36.6163
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3/13/2017 18:04	32.0633	3/16/2017 5:08	14.6401	3/14/2017 15:15	34.8219	3/13/2017 20:08	32.1203	3/16/2017 11:46	14.722	3/16/2017 0:25	34.5768	3/13/2017 21:14	32.176399	3/16/2017 18:24	14.7469	3/17/2017 9:30	36.6118
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PW16-1		TH16-1		TH16-3		PW16-1		TH16-1		TH16-3		PW16-1	TH16-1	TH16-3
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2017	1	24	15722	15723	15724	15725	15726	15727	15728	15729	15730	15731	15732	15733	15734	15735	15736	15737	15738	15739	15740	15741	15742	15743	15744	15745	15746	15747	15748	15749	15750	15751	15752	15753	15754	15755	15756	15757	15758	15759	15760	15761	
2017	1	25	15762	15763	15764	15765	15766	15767	15768	15769	15770	15771	15772	15773	15774	15775	15776	15777	15778	15779	15780	15781	15782	15783	15784	15785	15786	15787	15788	15789	15790	15791	15792	15793	15794	15795	15796	15797	15798	15799	15800	15801	
2017	1	26	15802	15803	15804	15805	15806	15807	15808	15809	15810	15811	15812	15813	15814	15815	15816	15817	15818	15819	15820	15821	15822	15823	15824	15825	15826	15827	15828	15829	15830	15831	15832	15833	15834	15835	15836	15837	15838	15839	15840	15841	
2017	1	27	15842	15843	15844	15845	15846	15847	15848	15849	15850	15851	15852	15853	15854	15855	15856	15857	15858	15859	15860	15861	15862	15863	15864	15865	15866	15867	15868	15869	15870	15871	15872	15873	15874	15875	15876	15877	15878	15879	15880	15881	
2017	1	28	15882	15883	15884	15885	15886	15887	15888	15889	15890	15891	15892	15893	15894	15895	15896	15897	15898	15899	15900	15901	15902	15903	15904	15905	15906	15907	15908	15909	15910	15911	15912	15913	15914	15915	15916	15917	15918	15919	15920	15921	
2017	1	29	15922	15923	15924	15925	15926	15927	15928	15929	15930	15931	15932	15933	15934	15935	15936	15937	15938	15939	15940	15941	15942	15943	15944	15945	15946	15947	15948	15949	15950	15951	15952	15953	15954	15955	15956	15957	15958	15959	15960	15961	

Appendix E

Disclaimer

DISCLAIMER

The material in this report reflects Dillon's best judgement in light of the information available to Dillon at the time of preparation. Any use which a third party make of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions based on this report.

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Geotechnical Report Grafton Well House Building - Grafton, NB

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Project No: 075-100
August 10, 2017

Summary

Herein are the findings of our Geotechnical Investigation carried out for Dillon Consulting Limited in Fredericton, New Brunswick. The main findings/recommendations from our investigation are as follows:

- The existing fill is not suitable as a bearing layer for foundations. Sub-excavation of existing fills and reinstatement with structural engineered fill (SEF) is recommended.
- Compacted SEF will be required for sub-excavation/replacement and for raising grades under buildings, roadways, and/or parking structures.
- A shallow foundation system with footings founded on compacted SEF over undisturbed existing in-situ native strata is recommended following site work.
- Geotechnical inspection of earthworks is recommended (and is required for building permits).

Greater detail on the site conditions encountered and geotechnical recommendations for foundation design and construction are contained in the body of the following report.

Table of Contents

1.0	INTRODUCTION	2
2.0	PROJECT AND SITE DESCRIPTION.....	2
3.0	FIELD PROCEDURES	2
4.0	SOIL CONDITIONS	3
5.0	GROUNDWATER CONDITIONS	4
6.0	DISCUSSION AND RECOMMENDATIONS	4
6.1	Main Findings	4
6.2	Earthworks	4
6.2.1	Surface Water Control and Erosion Control	4
6.2.2	Excavation/Foundation Preparation.....	4
6.2.3	Dewatering of Excavations	5
6.2.4	Fill Placement and Compaction	5
6.3	Foundations	5
7.0	CLOSURE.....	7

Attachments

Symbols and terms used on Borehole and Test Pit records

Borehole Records

Borehole Location Plan

Gradation Limits for Structural Engineered Fills

Geotechnical Guidelines for Winter Construction

1.0 INTRODUCTION

Conquest Engineering Ltd., (CEL) was engaged by the Dillon Consulting Limited (DILLON) to undertake a geotechnical investigation at the proposed site of the well house building Grafton, New Brunswick. The purpose of the work was to obtain information on subsurface soil and groundwater conditions necessary to provide recommendations for the site preparation, foundation design, and associated earthworks.

This report has been prepared specifically and solely for the area as described herein and should not be extrapolated beyond the limits of the investigation.

2.0 PROJECT AND SITE DESCRIPTION

We understand that the proposed building will be approximately 7 m x 9 m in dimension and will be a lightly loaded structure. It is further understood that the site will be raised by approximately 1.4 m to 1.7 m to Elevation 45.5 m.

The site of the proposed building is located off of the trail which extends from the Grafton Shore Road. The area surrounding the cleared area was vegetated. The site slopes to the southwest.

3.0 FIELD PROCEDURES

The field program consisted of drilling three boreholes in the vicinity of the proposed building. The borehole locations are shown on the Borehole Location Plan - Figure 1 in Appendix B.

A CEL engineer supervised the drilling/sample collection activities and logged the subsurface conditions encountered at the investigation points. The boreholes were drilled from a truck mounted CME style soils drill rig.

Boreholes were advanced using hollow stem augering. Soil samples were collected at close intervals using a 50 mm outside diameter split-spoon sampler. Detailed logs of the soils and bedrock encountered as well as the sampling completed are given on the appended Borehole Records (Appendix A) and summarized in the paragraphs below.

Standard Penetration Tests (SPTs) were performed and N-values recorded for each split-spoon sample. The performance of the Standard Penetration Tests was based on the test method described in ASTM D1586-84. The determination of granular soil sample compactness was based on N-values obtained from the SPT tests.

The boreholes were drilled to depths ranging between 4.3 m and 13.6 m below grade.

All soil samples were stored in moisture tight containers. Soil and rock samples were returned to our Fredericton laboratory for further classification and testing.

All coordinates given on the Borehole Records are with reference to the New Brunswick Stereographic Projection.

4.0 SOIL CONDITIONS

The soil conditions encountered at the site are described in detail in the attached Borehole Records. These conditions are also summarized in the following paragraphs. Soil classification was based on the procedures described in ASTM D 2488 (Standard Practice for Description and Identification of Soils, Visual-Manual Procedure). For explanation of the descriptions used on the Borehole Records, reference should be made to the attached Symbols and Terms used on Borehole and Test Pit Records.

The strata encountered in the boreholes were generally:

- Sand with silt and gravel to sand with gravel: FILL
- Silty fine sand with gravel: FILL
- Compact to very dense SAND with gravel to GRAVEL with sand

Sand with Silt and Gravel to Sand with Gravel: FILL

A 0.2 m to 1.7 m thick stratum of FILL was encountered at the surface of all boreholes. The FILL comprised of grey to brown sand with silt and gravel to sand with gravel. In Borehole BH-2, construction debris such as brick fragments, glass and metal debris was observed as well as black organics.

Sand with Silt and Gravel to Sand with Gravel: FILL

A 0.7 m thick stratum of FILL was encountered below the upper FILL in Borehole BH-3. The FILL comprised of reddish brown silty fine sand with gravel and some organics (rootlets).

Sand with Gravel to Gravel with Sand

A 1.5 m to 5.2 m thick stratum of grey to brown SAND with gravel to GRAVEL with sand was observed underlying the FILL in all boreholes.

N-values from Standard Penetration Tests generally ranged between 12 and 72 which indicates a compact to very dense compactness. All boreholes terminated in this stratum.

Index properties determined from limited testing on one representative sample are as follows.

- Grain Size: Gravel: 58%
 Sand: 38%
 Silt/Clay: 4%
- Natural Moisture: 10%

In Borehole BH-1, a 0.8 m layer of compact medium-grained brown SAND was found toward the bottom of the depth of investigation.

5.0 GROUNDWATER CONDITIONS

Groundwater was observed at depths of 3.7 m during the drilling program which is concurrent with the water level in the adjacent St. John River. Groundwater should be expected to fluctuate due to seasonal trends, with precipitation events, construction activity, or with site usage.

6.0 DISCUSSION AND RECOMMENDATIONS

We understand that the proposed building will be approximately 7 m x 9 m in dimension and will be a lightly loaded structure. It is further understood that the site will be raised by approximately 1.4 m to 1.7 m to Elevation 45.5 m.

6.1 Main Findings

The main findings/recommendations from our investigation are as follows:

- The existing fill is not suitable as a bearing layer for foundations. Sub-excavation of existing fills and reinstatement with structural engineered fill (SEF) is recommended.
- Compacted SEF will be required for sub-excavation/replacement and for raising grades under buildings, roadways, and/or parking structures.
- A shallow foundation system with footings founded on compacted SEF over undisturbed existing in-situ native strata is recommended following site work.
- Geotechnical inspection of earthworks is recommended (and is required for building permits).

6.2 Earthworks

6.2.1 Surface Water Control and Erosion Control

Prior to excavations, surface water drainage controls should be provided on the up-gradient side of the site to minimize run-off onto exposed soils. Suitable erosion and sedimentation control measures should be employed. These may include silt fences, check dams in ditches, and granular working pads.

6.2.2 Excavation/Foundation Preparation

Existing FILL is not a suitable foundation bearing layer and is recommended to be removed and replaced with structural engineered fill as discussed in further detail below.

Temporary excavated side slopes in dry soil should be stable at one horizontal to one vertical (1H:1V) for excavations up to 2.4 m. Temporary slopes in soil excavations should be no steeper than 1.3H:1V for excavations deeper than 2.4 m.

The surface of exposed excavations will potentially soften if subjected to a combination of construction traffic and water from precipitation. To mitigate the potential for surface softening, we recommend providing a 150 mm thick protective cover layer (0-75 mm size) of well graded crushed quarried rock having less than 7% silt and clay size particles. This material should be compacted as directed by geotechnical personnel based on the conditions prevalent at the time of construction.

Under footings and structural slabs, the existing soils should be sub-excavated and replaced with SEF as discussed in the relevant sections of this report.

The surfaces of all subgrades and verification of excavation depths should be reviewed by Conquest Engineering prior to placement of SEF. At the time of the work, the contractor must be prepared to proof roll subgrade surfaces at the discretion and direction of Conquest Engineering. Any weak zones encountered at subgrade level should be replaced with structural engineered fill as directed by Conquest Engineering.

6.2.3 Dewatering of Excavations

The contractor must keep excavations dry in order that SEFs can be placed and compacted as discussed herein. Contractor shall provide appropriate dewatering equipment if and when needed.

6.2.4 Fill Placement and Compaction

Compacted structural engineered fill will be required where raising grades and for reinstatement of sub-excavations.

Structural engineered fill material should be well graded pit run gravel or well graded crushed rock material (NB DTI Tables 201-2 and 201-4). Gradations for structural fill are attached to this report. For general filling, the maximum particle size should be no more than 125 mm and a maximum of 7% passing the 0.075 mm sieve. Footings and slabs on grade are to be placed on SEF as described in the Foundation section of this report.

Backfill adjacent to and within the 1H:1V wedge area of outside walls should be limited to a maximum of 5% passing the 0.075 mm sieve.

The lift thickness used during placement of fills must be compatible with the compaction equipment and the material type to ensure the specified density throughout. The lift thickness should not exceed approximately 300 mm for mass filling using a minimum 10 tonne highway roller and 200 mm for backfilling of foundations and services using 250 kg diesel plate compactors.

SEF materials should be compacted to 98% of maximum Standard Proctor dry density or 100% of maximum density by Vibratory Table method.

6.3 Foundations

Conventional spread footings and slabs on grade can be utilized for the proposed foundation system as per the recommendations given herein.

The footing bearing level of exterior footings should be a minimum of 1.8 m below the outside finished grade to accommodate frost protection. The bearing level of interior footings is recommended to be a minimum of 0.6 m below the finished floor level.

It is recommended that footings be founded on SEF or on undisturbed native strata. SEF is recommended to be used to reinstate sub-excavations of existing fills below the bearing level. Under continuous strip footings, the existing fills must be excavated below the foundation level to a minimum of three times the footing width or until undisturbed native strata is encountered. Under square or rectangular footings, the existing fills must be excavated below the foundation level to a minimum of two times the footing width or until undisturbed native strata is encountered. Where

sub-excavation is required below footing bearing surfaces, the base of the excavation must be extended laterally beyond the edges of the footing perimeter a horizontal distance of one meter for every one meter of depth below the bearing level.

For analysis using Limit States Design, bearing resistances were calculated for strip and square footings of at least 0.6 m wide and 1.5 x 1.5 m, respectively, and for a settlement tolerance of 25 mm. Footings founded on SEF as discussed herein can be proportioned for a factored bearing resistance of 450 kPa at the ultimate limit state and 250 kPa at the serviceability limit state. Anticipated total and differential settlement should not exceed 25 and 20 mm, respectively.

For slab-on-grade construction, the existing grade should be grubbed of any organic or deleterious materials and surface proof rolled (as described above) under the supervision of CEL prior to placement of SEF. The slab-on-grade can be designed using a soil modulus of subgrade reaction of 50 MPa/m. This modulus corresponds to a 300 mm by 300 mm square bearing plate. Directly under the slab, the last 150 mm of SEF should be a 25 mm minus material meeting the DTI gradation limits previously discussed.

In the event of winter construction, care shall be taken to ensure that all bearing surfaces remain free of frost penetration prior to and following the casting of the concrete. Any frozen bearing surfaces should be thawed and the surface should be proof-rolled under geotechnical review prior to concrete placement. Additional considerations for winter construction are attached to this report.

7.0 CLOSURE

This report has been prepared for the sole benefit of the client. Any use or reliance on this report:

- a. where there have been any change in site conditions;
- b. for purposes not intended or delineated in this report ; or
- c. by third parties without express written agreement of Conquest Engineering;

renders this report inapplicable. Any use of or reliance upon this report under such circumstances or by such parties is strictly prohibited and without risk or liability to Conquest.

Conquest Engineering used reasonable care, skill, competence and judgment in the preparation of this report. The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices.

A geotechnical field investigation is a limited sampling of a site, therefore some variation between sampling locations should be expected. The conclusions presented in this report represent the best technical judgment of Conquest Engineering based on the data obtained from the work. The conclusions are based on the site conditions observed by Conquest Engineering at the specific testing and/or sampling locations, and can only be extrapolated to an undefined limited area around these locations. The extent of the limited area depends on the soil and groundwater conditions, as well as the history of the site reflecting natural, construction and other activities. Due to the nature of the investigation and the limited data available, Conquest Engineering cannot warrant against undiscovered environmental liabilities.

We trust this is the information you require at this time. If you have any questions or if we can be of any further assistance please feel free to contact us.

Sincerely,

CONQUEST ENGINEERING LTD.



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Geotechnical and Materials Engineers

SOIL DESCRIPTION

Terminology describing common soil genesis:

- Topsoil* - mixture of soil and humus capable of supporting good vegetative growth
- Peat* - fibrous aggregate of visible and invisible fragments of decayed organic matter
- Till* - unstratified glacial deposit which may range from clay to boulders
- Fill* - any materials below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

- Desiccated* - having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
- Fissured* - having cracks, and hence a blocky structure
- Varved* - composed of regular alternating layers of silt and clay
- Stratified* - composed of alternating successions of different soil types, e.g. silt and sand
- Layer* - >75 mm
- Seam* - 2 mm to 75 mm
- Parting* - < 2 mm
- Well Graded* - having wide range in grain sizes and substantial amounts of all intermediate particle sizes
- Uniformly Graded* - predominantly of one grain size

Terminology describing soils on the basis of grain size and plasticity is based on the ASTM D2488 – Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). The classification excludes particles larger than 76 mm (3 inches). This system provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present:

- Trace, or occasional* Less than 10%
- Some* 10-20%
- Frequent* Greater than 20%

The standard terminology to describe cohesionless soils includes the compactness (formerly “relative density”), as determined by laboratory test or by the Standard Penetration Test ‘N’ – value.

Relative Density	‘N’ Value	Compactness %
<i>Very Loose</i>	<4	<15
<i>Loose</i>	4-10	15-35
<i>Compact</i>	10-30	35-65
<i>Dense</i>	30-50	65-85
<i>Very Dense</i>	>50	>85

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by insitu vane tests, penetrometer tests, unconfined compression tests, or occasionally by standard penetration tests.

Consistency	Undrained Shear Strength (Su)		'N' Value
	Kips/sq.ft.	KPa	
<i>Very Soft</i>	< 0.25	< 12.5	< 2
<i>Soft</i>	0.25 – 0.5	12.5 – 25	2 – 4
<i>Firm</i>	0.5 – 1.0	25 – 50	4 – 8
<i>Stiff</i>	1.0 – 2.0	50 – 100	8 – 15
<i>Very Stiff</i>	2.0 – 4.0	100 – 200	15 – 30
<i>Hard</i>	> 4.0	> 200	> 30

ROCK DESCRIPTION

Rock Quality Designation (RQD)

The classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be done on N-size (45 mm) core; however, it can be used on different core sizes if the bulk of the fractures caused by drilling stresses are easily distinguishable from in situ fractures.

RQD	ROCK QUALITY
90 – 100	Excellent, intact, very sound
75 – 90	Good, massive, moderately jointed or sound
50 – 75	Fair, blocky and seamy, fractured
25 – 50	Poor, shattered and very seamy or blocky, severely fractured
0 – 25	Very poor, crushed, very severely fractured

Terminology describing rock mass:

Spacing (mm)	Bedding, Laminations, Bands	Discontinuities
2000 – 6000	<i>Very Thick</i>	<i>Very Wide</i>
600 – 2000	<i>Thick</i>	<i>Wide</i>
200 – 600	<i>Medium</i>	<i>Moderate</i>
60 – 200	<i>Thin</i>	<i>Close</i>
20 – 60	<i>Very Thin</i>	<i>Very Close</i>
< 20	<i>Laminated</i>	<i>Extremely Close</i>
< 6	<i>Thinly Laminated</i>	

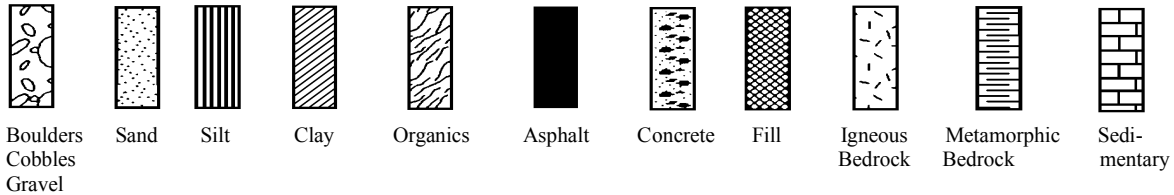
Strength Classification	Uniaxial Compressive Strength (MPa)
<i>Very Weak</i>	1 – 5
<i>Weak</i>	5 – 25
<i>Medium Strong</i>	25 – 50
<i>Strong</i>	50 – 100
<i>Very Strong</i>	100 – 250
<i>Extremely Strong</i>	> 250

Terminology describing weathering:

- Slight* - Weathering limited to the surface of major discontinuities. Typically iron stained.
- Moderate* - Weathering extends throughout rock mass. Rock is not friable.
- High* - Weathering extends throughout rock mass. Rock is friable.

STRATA PLOT

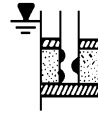
Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:



WATER LEVEL MEASUREMENT



Borehole or
Standpipe



Piezometer

SAMPLE TYPE AND/OR FIELD TESTS

SS	Split Spoon Sample (obtained by performing the Standard Penetration Test)	AS	Auger Sample
ST	Shelby Tube or Thin Wall Tube	BS	Bulk Sample
PS	Piston sample	WS	Wash Sample
DC	Dynamic Cone Penetration	HQ, NQ, BQ, etc.	Rock Core Samples (obtained with the use of standard size diamond drilling bits)
FSV	Field Shear Vane		

N- VALUE

Numbers in this column are the results of the SPT (Standard Penetration Test): the number of blows of a 140 pound (64kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration was achieved and 'N' values cannot be presented, the abbreviation SSR (Split Spoon Refusal) will appear in place of a numerical value.

OTHER TESTS

Symbols in this column indicate that the following laboratory tests have been carried out and the results are presented separately.

S	Sieve analysis	H	Hydrometer analysis
G _s	Specific gravity of soil particles	γ	Unit weight
k	Permeability	C	Consolidation
↓	Single packer permeability test; test interval from depth shown to bottom of borehole	CD	Consolidated drained triaxial
↑	Double packer permeability test; Test interval as indicated	CU	Consolidated undrained triaxial with pore pressure measurements
○↓	Falling head permeability test using casing	UU	Unconsolidated undrained triaxial
▽↓	Falling head permeability test using well point or piezometer	DS	Direct shear
		Q _u	Unconfined compression
		I _p	Point Load Index (I _p on Borehole Records equals I _p (50); the index corrected to a reference diameter of 50 mm)
		MSV	Laboratory Miniature Shear Vane

SPECIFICATION FOR STRUCTURAL ENGINEERED FILL

Crushed Rock Base/Subbase

Sieve Size	Aggregate Base	Aggregate Subbase
	31.5 mm Percent Passing	75 mm Percent Passing
90.0 mm		100
75.0 mm		95 – 100
63.0 mm		85 – 100
50 mm		73 – 95
37.5 mm	100	58 – 87
31.5 mm	95 – 100	
25.0 mm	81 – 100	
19.0 mm	66 – 90	35 – 69
12.5 mm	50 – 77	
9.5 mm	41 – 70	25 – 54
4.75 mm	27 – 54	17 – 43
2.36 mm	17 – 43	12 – 35
1.18 mm	11 – 32	8 – 28
0.300 mm	4 – 19	4 – 16
0.075 mm	0 – 8	0 – 9

Pit Run Gravel Subbase

Sieve Size	Percent Passing
125.0 mm	100
100.0 mm	95 – 100
75.0 mm	82 – 100
50 mm	62 – 100
37.5 mm	52 – 100
19.0 mm	30 – 90
9.5 mm	22 – 79
4.75 mm	16 – 66
2.36 mm	12 – 55
1.18 mm	9 – 44
0.300 mm	4 – 25
0.075 mm	0 – 7

Note

Fill Materials shall be hard, durable pit gravel or quarried rock, free from silt, clay, slate, friable particles, cementation, frozen material, organic matter and other deleterious substances.

Geotechnical and Materials Engineers

The following are general geotechnical recommendations for earthworks for building areas in winter conditions.

General

- Earthworks conducted during freezing conditions are suspect. Special procedures and precautions must be exercised to minimize the risk of future problems.
- A site meeting should be held at project start-up to discuss the schedules of the various contractors in relation to the following geotechnical recommendations.

Excavation

- The rootmat/topsoil layer and any overlying snow will reduce the frost penetration. Conducting only the excavation work required for each day of work is recommended to minimize freezing of the soil in the foundation areas.
- Excavated material to be used as structural fill should not be stockpiled, but should be placed and compacted immediately after excavation.

Fill Placement

Based on our experience, it is generally impractical to place well-graded gravel, sand, or fine-grained soils in temperatures lower than about -5 degrees Celsius. On very cold days, loose material starts to freeze within about 15 minutes. At temperatures below -5 degrees Celsius, clear gravel or clear rockfill is recommended but subject to design considerations governing the work.

The following provides recommendations for all structural fill types.

- Structural fill placement should be conducted in small areas. Depending on the temperature, this may allow for continuous placement of fill lifts during the work day without the requirement for excavation of frozen material prior to placement of the next lift.
- Material containing snow or ice should not be incorporated in the work. During snow events, fill placement should be stopped. When the earthwork restart, all snow and ice should be removed from the fill surface prior to subsequent fill placement. In order to remove all snow and/or ice after a snow event, some of the underlying fill may have to be removed and wasted.
- For intermediate fill lifts, frost protection (e.g.; straw, insulated tarp, etc) should be provided at the end of the work day, or alternatively, fill that freezes overnight should be removed in the morning. Also, any snow or ice should also be removed. Fill surfaces should be sloped to prevent ponding of water during milder weather.

- The final fill surface, the base of footing excavations and slab subgrade should be protected from freezing. If the final fill surface is exposed to freezing temperatures, heat will be required to thaw the soil. Test pits and temperature readings could be completed to determine if the soil is above freezing. Consideration should also be given to the installation of thermocouples in the fill during placement, as a means of reading temperatures at depth. The areas that were frozen should be proof-rolled.
- The moisture content of fill materials should be approximately 2% below optimum. Fill materials with moisture contents above the optimum should not be used.
- Loose edges of the structural fill lifts should be avoided to reduce frost penetration. Edges of fill lifts should be tapered and compacted.
- Regular checks of the temperature of the fill should be made. The soil temperature should be greater than +2°C to allow for compaction to the specified degree.

Footing Construction

- Footings should not be placed on frozen material.
- Where the footing elevation is within approved finer-grained materials, we recommend over-excavation by at least 6 inches and placement of nominal 1 inch stone or other clean gravel. This will reduce disturbance of the bearing surface.
- Following construction of footings, temporary frost protection must be provided to avoid freezing of the bearing surface and for protection of the concrete during curing.
- Consideration should be given to specifying that the footing depth for interior foundations be 1.2 m below slab subgrade for frost protection during construction; or alternatively, fill could be temporary bermed over interior footings to provide insulation.
- Foundations should be backfilled with a free-draining granular material and drainage provided to prevent adfreeze of foundations, particularly during construction.
- Cast-in-place concrete should be protected during colder weather conditions as per CSA A23.1-2009.

Geotechnical Inspection and Testing

The information herein should be reviewed by geotechnical personnel and customized to the specific geotechnical aspects and design considerations of a site. Full-time inspection and testing by experience geotechnical personnel is particularly important during earthworks in winter conditions and is strongly recommended.

Factual Geotechnical Report Grafton Water Transmission Line, Woodstock-Grafton, NB

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Fredericton, NB, E3B 3H4

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Project No: 075-101
August 10, 2017

Main Findings

Herein are the findings of our Geotechnical Investigation carried out for Dillon Consulting Limited in Fredericton, NB.

The investigation consisted of drilling three boreholes advanced near the alignment of the proposed water transmission line (offset approximately 10 m to the south) to determine the soil/bedrock stratigraphy in these locations.

The strata encountered in the boreholes were generally:

- Compact surface layer of SAND with silt and gravel to GRAVEL with sand
- Firm to very stiff layer of grey SILT/CLAY
- Compact to very dense layers of grey silty SAND and SAND with silt and gravel to GRAVEL with sand
- Quartz Wacke BEDROCK (includes upper transition zone)

Greater detail on the site conditions encountered are contained in the body of the following report.

Table of Contents

1.0	INTRODUCTION	2
2.0	SITE DESCRIPTION	2
3.0	PROCEDURES	2
4.0	SOIL CONDITIONS	3
5.0	GROUNDWATER CONDITIONS	5
6.0	CLOSURE.....	6

Attachments

Symbols and terms used on Borehole and Test Pit records

Borehole Records

Rock Core Photographs

Borehole Location Plan

1.0 INTRODUCTION

Conquest Engineering Ltd., (CEL) was engaged by the Dillon Consulting Limited (DILLON) to undertake a geotechnical investigation in the St. John River near the proposed alignment of a water transmission line in Woodstock-Grafton, New Brunswick. We understand that the proposed water transmission line will be 300 mm in diameter and will extend approximately 380 m across the St. John River from the Woodstock shoreline to the Grafton shoreline.

It is understood the line will be directionally drilled through the marine soils throughout the alignment. The purpose of the geotechnical investigation was to define the soil and/or bedrock strata at three points along the proposed marine alignment for input to the design/construction of the proposed transmission line.

This report has been prepared specifically and solely for the area as described herein and should not be extrapolated beyond the limits of the investigation.

2.0 SITE DESCRIPTION

The proposed alignment is located south of the Grafton Bridge and connects the new Grafton well located off of Grafton Shore Road to Woodstock near Civic No. 106 on Bridge Street.

Three boreholes were advanced in the area between the Woodstock shore and the approximate mid-span of the St. John River. The water depth above mudline varied from 4.3 m nearest the Woodstock shore (BH-1), 13.6 m at Borehole BH-2 and 13.0 m near the center of the St. John River (BH-3).

3.0 PROCEDURES

The field program consisted of drilling three boreholes within the St. John River and offset south of the proposed alignment. The borehole locations are shown on the Borehole Location Plan - Figure 1 in Appendix B. During the drilling of Borehole BH-2A, at a depth of approximately 5.3 m to 5.8 m below the mudline, the driller's equipment became disconnected due to suspected hard surface at depth. The equipment was retrieved the following day and Borehole BH-2B was advanced adjacent to Borehole BH-2A to continue to the target depth of exploration.

A CEL engineer supervised the drilling/sample collection activities and logged the subsurface conditions encountered at the investigation points. The boreholes were drilled from a floating barge with a four point anchoring system using a CME style soils drill rig.

Boreholes were advanced using HW size flush joint casing and wash boring techniques. Soil samples were collected at close intervals using a 50 mm outside diameter split-spoon sampler. Detailed logs of the soils and bedrock encountered as well as the sampling completed are given on the appended Borehole Records (Appendix A) and summarized in the paragraphs below.

Standard Penetration Tests (SPTs) were performed and N-values recorded for each split-spoon sample. The performance of the Standard Penetration Tests was based on the test method

described in ASTM D1586-84. The determination of granular soil sample compactness was based on N-values obtained from the SPT tests.

The boreholes were drilled to depths ranging between 4.3 m and 13.6 m below the river bottom. Bedrock was proven by diamond core drilling in two of the boreholes.

All soil samples were stored in moisture tight containers, and recovered rock core was placed in core boxes. Soil and rock samples were returned to our Fredericton laboratory for further classification and testing.

All coordinates given on the Borehole Records are with reference to the New Brunswick Stereographic Projection.

4.0 SOIL CONDITIONS

The soil conditions encountered at the site are described in detail in the attached Borehole Records. These conditions are also summarized in the following paragraphs. Soil classification was based on the procedures described in ASTM D 2488 (Standard Practice for Description and Identification of Soils, Visual-Manual Procedure). For explanation of the descriptions used on the Borehole Records, reference should be made to the attached Symbols and Terms used on Borehole and Test Pit Records.

The strata encountered in the boreholes were generally:

- Compact surface layer of SAND with silt and gravel to GRAVEL with sand
- Firm to very stiff layer of grey SILT/CLAY
- Compact to very dense layers of grey silty SAND and SAND with silt and gravel to GRAVEL with sand
- Quartz Wacke BEDROCK (includes upper transition zone)

SAND with silt and gravel to GRAVEL with sand

A 0.5 m to 0.8 m thick stratum of compact grey SAND with silt and gravel to GRAVEL with silt and sand was observed at the mudline.

N-values from Standard Penetration Tests generally ranged between 25 and 29.

SILT/CLAY

A layer of grey SILT/CLAY was encountered below the surficial SAND/GRAVEL layer in Boreholes BH-2A and BH-3. The SILT/CLAY was 4.9 m and 7.0 m thick at Borehole BH-2A and BH-3, respectively.

Index properties determined from limited testing on representative samples are as follows.

- Grain Size: Gravel: 0% - 3%
 Sand: 1% - 14%
 Silt/Clay: 86% - 96%
- Natural Moisture: 25% - 29%

N-values from Standard Penetration Tests ranged between 6 and 22, indicating the layer is firm to very stiff.

Interlayered silty SAND to SAND with silt and gravel and SAND with silt and gravel to GRAVEL with sand

Layers of silty SAND to SAND with silt and gravel and SAND with silt and gravel to GRAVEL with sand were encountered below the SILT/CLAY in Boreholes BH-2B and BH-3. The combined thickness of this stratum was 1.4 m and 5.9 m thick at Borehole BH-2A and BH-3, respectively.

Index properties determined from limited testing on representative samples are as follows.

- Grain Size: Gravel: 31% - 37%
 Sand: 47% - 52%
 Silt/Clay: 11% - 22%
- Natural Moisture: 9% - 11%

N-values from Standard Penetration Tests ranged between 18 and 37 in the silty SAND to SAND with silt and gravel layers which indicates a compact to dense relative compactness.

N-values from Standard Penetration Tests generally ranged between 32 and 45 in the SAND with gravel to GRAVEL with sand layers which indicates a dense relative compactness. The N-value from the last Standard Penetration Test from Borehole BH-3 was 100 which represents a very dense compactness and practical refusal.

BEDROCK

Bedrock was encountered in Boreholes BH-1 and BH-2B. Bedrock geology maps in the area indicate the bedrock at the site can be placed in the Baskahegan Lake Formation. Local geological maps describes the bedrock formation in the area of the site as follows:

Baskahegan Lake Formation: Light grey to light green, medium- to thick-bedded quartzite: grey to greenish grey, thin- to medium-bedded quartz wacke: olive green silty shale and minor red sandstone and shale.

A transition zone comprising gravel, cobbles, possible boulders and/or very severely fractured bedrock was encountered in both boreholes. Rock Quality Designations (RQD) for the transition zone rock were 0% indicating a very severely fractured rock of very poor quality.

Better quality bedrock underlies the transition zone. The better quality bedrock is characterized as slightly weathered, medium-coarse grained to fine grained, grey quartz wacke bedrock. The RQD

for the lower bedrock generally ranged from 33% to 89% which indicates a severely fractured to very sound rock of poor to good quality. Joints in the bedrock were predominately oriented within 30° to 90° to the vertical core axis. Joint surfaces were smooth to rough. Some surfaces were slightly weathered and quartz veins were present throughout the bedrock. Bedrock was cored at borehole locations BH-1 and BH-2B using an HQ core barrel.

5.0 GROUNDWATER CONDITIONS

Groundwater was not observed during drilling due to the use of wash boring techniques.

6.0 CLOSURE

This report has been prepared for the sole benefit of the client. Any use or reliance on this report:

- a. where there have been any change in site conditions;
- b. for purposes not intended or delineated in this report ; or
- c. by third parties without express written agreement of Conquest Engineering;

renders this report inapplicable. Any use of or reliance upon this report under such circumstances or by such parties is strictly prohibited and without risk or liability to Conquest.

Conquest Engineering used reasonable care, skill, competence and judgment in the preparation of this report. The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices.

A geotechnical field investigation is a limited sampling of a site, therefore some variation between sampling locations should be expected. The conclusions presented in this report represent the best technical judgment of Conquest Engineering based on the data obtained from the work. The conclusions are based on the site conditions observed by Conquest Engineering at the specific testing and/or sampling locations, and can only be extrapolated to an undefined limited area around these locations. The extent of the limited area depends on the soil and groundwater conditions, as well as the history of the site reflecting natural, construction and other activities. Due to the nature of the investigation and the limited data available, Conquest Engineering cannot warrant against undiscovered environmental liabilities.

We trust this is the information you require at this time. If you have any questions or if we can be of any further assistance please feel free to contact us.

Sincerely,

CONQUEST ENGINEERING LTD.



Jessica Fredericks, M.A.Sc., P. Eng.
Geotechnical Engineer
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Geotechnical and Materials Engineers

SOIL DESCRIPTION

Terminology describing common soil genesis:

- Topsoil* - mixture of soil and humus capable of supporting good vegetative growth
- Peat* - fibrous aggregate of visible and invisible fragments of decayed organic matter
- Till* - unstratified glacial deposit which may range from clay to boulders
- Fill* - any materials below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

- Desiccated* - having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
- Fissured* - having cracks, and hence a blocky structure
- Varved* - composed of regular alternating layers of silt and clay
- Stratified* - composed of alternating successions of different soil types, e.g. silt and sand
- Layer* - >75 mm
- Seam* - 2 mm to 75 mm
- Parting* - < 2 mm
- Well Graded* - having wide range in grain sizes and substantial amounts of all intermediate particle sizes
- Uniformly Graded* - predominantly of one grain size

Terminology describing soils on the basis of grain size and plasticity is based on the ASTM D2488 – Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). The classification excludes particles larger than 76 mm (3 inches). This system provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present:

- Trace, or occasional* Less than 10%
- Some* 10-20%
- Frequent* Greater than 20%

The standard terminology to describe cohesionless soils includes the compactness (formerly “relative density”), as determined by laboratory test or by the Standard Penetration Test ‘N’ – value.

Relative Density	‘N’ Value	Compactness %
<i>Very Loose</i>	<4	<15
<i>Loose</i>	4-10	15-35
<i>Compact</i>	10-30	35-65
<i>Dense</i>	30-50	65-85
<i>Very Dense</i>	>50	>85

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by insitu vane tests, penetrometer tests, unconfined compression tests, or occasionally by standard penetration tests.

Consistency	Undrained Shear Strength (Su)		'N' Value
	Kips/sq. ft.	KPa	
<i>Very Soft</i>	< 0.25	< 12.5	< 2
<i>Soft</i>	0.25 – 0.5	12.5 – 25	2 – 4
<i>Firm</i>	0.5 – 1.0	25 – 50	4 – 8
<i>Stiff</i>	1.0 – 2.0	50 – 100	8 – 15
<i>Very Stiff</i>	2.0 – 4.0	100 – 200	15 – 30
<i>Hard</i>	> 4.0	> 200	> 30

ROCK DESCRIPTION

Rock Quality Designation (RQD)

The classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be done on N-size (45 mm) core; however, it can be used on different core sizes if the bulk of the fractures caused by drilling stresses are easily distinguishable from in situ fractures.

RQD	ROCK QUALITY
90 – 100	Excellent, intact, very sound
75 – 90	Good, massive, moderately jointed or sound
50 – 75	Fair, blocky and seamy, fractured
25 – 50	Poor, shattered and very seamy or blocky, severely fractured
0 – 25	Very poor, crushed, very severely fractured

Terminology describing rock mass:

Spacing (mm)	Bedding, Laminations, Bands	Discontinuities
2000 – 6000	<i>Very Thick</i>	<i>Very Wide</i>
600 – 2000	<i>Thick</i>	<i>Wide</i>
200 – 600	<i>Medium</i>	<i>Moderate</i>
60 – 200	<i>Thin</i>	<i>Close</i>
20 – 60	<i>Very Thin</i>	<i>Very Close</i>
< 20	<i>Laminated</i>	<i>Extremely Close</i>
< 6	<i>Thinly Laminated</i>	

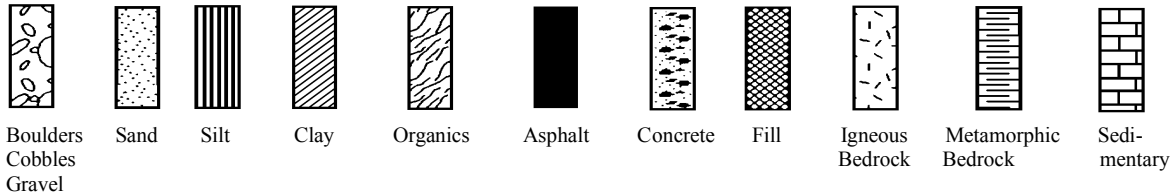
Strength Classification	Uniaxial Compressive Strength (MPa)
<i>Very Weak</i>	1 – 5
<i>Weak</i>	5 – 25
<i>Medium Strong</i>	25 – 50
<i>Strong</i>	50 – 100
<i>Very Strong</i>	100 – 250
<i>Extremely Strong</i>	> 250

Terminology describing weathering:

- Slight* - Weathering limited to the surface of major discontinuities. Typically iron stained.
- Moderate* - Weathering extends throughout rock mass. Rock is not friable.
- High* - Weathering extends throughout rock mass. Rock is friable.

STRATA PLOT

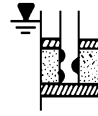
Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:



WATER LEVEL MEASUREMENT



Borehole or
Standpipe



Piezometer

SAMPLE TYPE AND/OR FIELD TESTS

SS	Split Spoon Sample (obtained by performing the Standard Penetration Test)	AS	Auger Sample
ST	Shelby Tube or Thin Wall Tube	BS	Bulk Sample
PS	Piston sample	WS	Wash Sample
DC	Dynamic Cone Penetration	HQ, NQ, BQ, etc.	Rock Core Samples (obtained with the use of standard size diamond drilling bits)
FSV	Field Shear Vane		

N- VALUE

Numbers in this column are the results of the SPT (Standard Penetration Test): the number of blows of a 140 pound (64kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration was achieved and 'N' values cannot be presented, the abbreviation SSR (Split Spoon Refusal) will appear in place of a numerical value.

OTHER TESTS

Symbols in this column indicate that the following laboratory tests have been carried out and the results are presented separately.

S	Sieve analysis	H	Hydrometer analysis
G _s	Specific gravity of soil particles	γ	Unit weight
k	Permeability	C	Consolidation
⌋	Single packer permeability test; test interval from depth shown to bottom of borehole	CD	Consolidated drained triaxial
⌋	Double packer permeability test; Test interval as indicated	CU	Consolidated undrained triaxial with pore pressure measurements
⊙	Falling head permeability test using casing	UU	Unconsolidated undrained triaxial
⊙	Falling head permeability test using well point or piezometer	DS	Direct shear
		Q _u	Unconfined compression
		I _p	Point Load Index (I _p on Borehole Records equals I _p (50); the index corrected to a reference diameter of 50 mm)
		MSV	Laboratory Miniature Shear Vane



BOREHOLE RECORD

Project Name: Grafton Water Transmission Line
Project No.: 075-101
Client: Dillon Consulting Limited
Location: Grafton, NB
Water Level Date: --
Borehole Location: 7462467.17 N, 2417225.77 E

Borehole No.: BH-1
Page: 1 of 1
Date Drilled: July 18, 2017
Datum: Geodetic
Coord. System: NAD83

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%)				
									Wp	WL	5	15	25
									SPT (N)				
									5	15	25	35	45
0							River Bottom	34.1					
		SS	1	355	62		SAND: Very dense grey sand with silt and gravel - some cobbles and fractured rock	33.6					
		HQ	1	485	0%		Cobbles and Gravel or Highly Weathered, Very Severely Fractured BEDROCK: Transition Zone						
1		HQ	2	305	42%		BEDROCK: Grey quartz wacke - fractured to severely fractured - strong to very strong - slightly weathered surfaces	32.9					
2		HQ	3	965	54%								
3		HQ	4	1220	33%								
							End of Borehole at 3.7 m	30.4					
4													
5													
6													
7													
8													
9													
10													

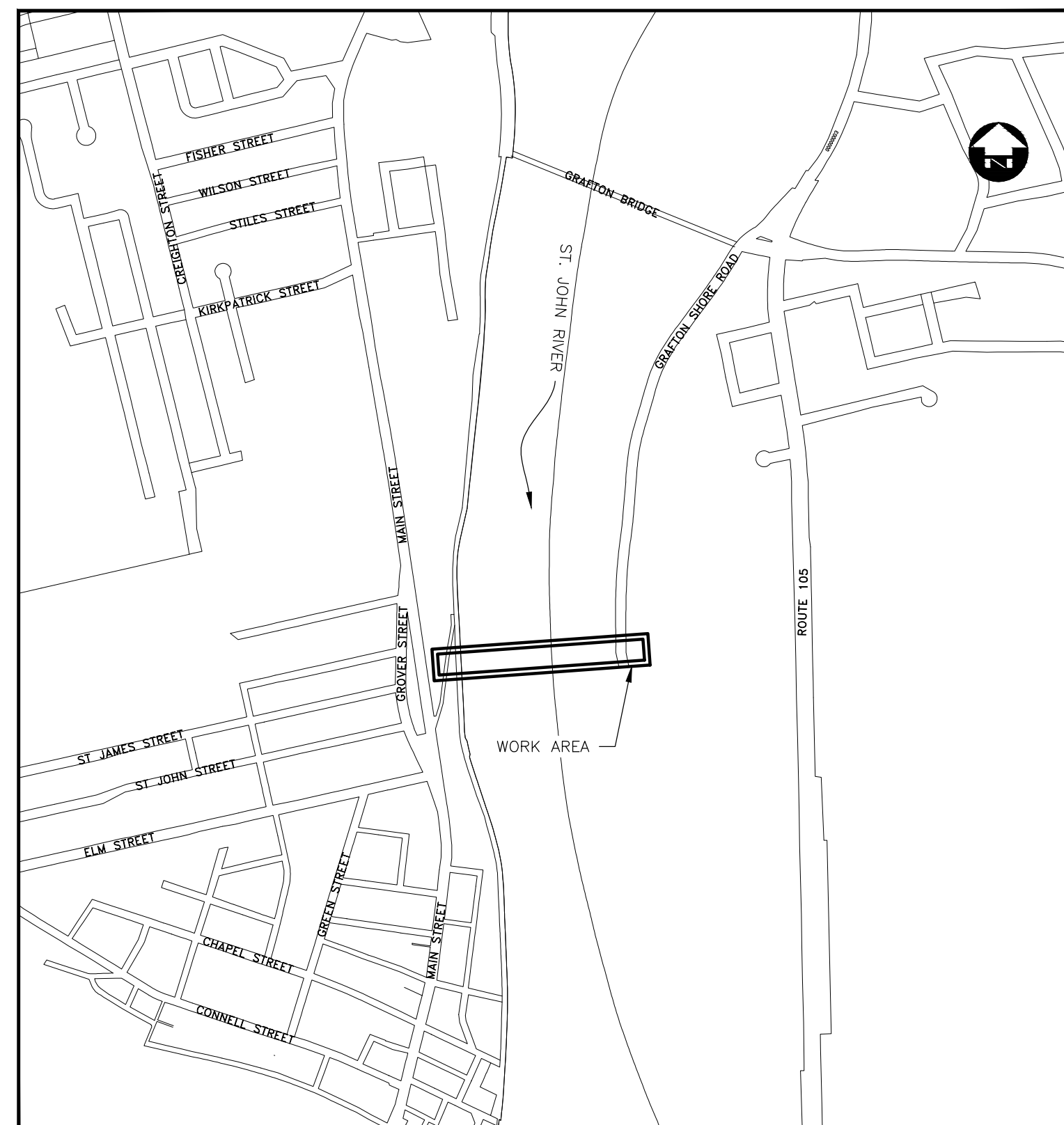


Photograph 1 – Rock Core BH-1 – 1.75 ft to 12.25 ft below mudline



Photograph 2 – Rock Core BH-2B - 22 ft to 36 ft below mudline

TOWN OF WOODSTOCK WATER TRANSMISSION LINE BRIDGE STREET & GRAFTON SHORE ROAD



KEY PLAN 1:10000

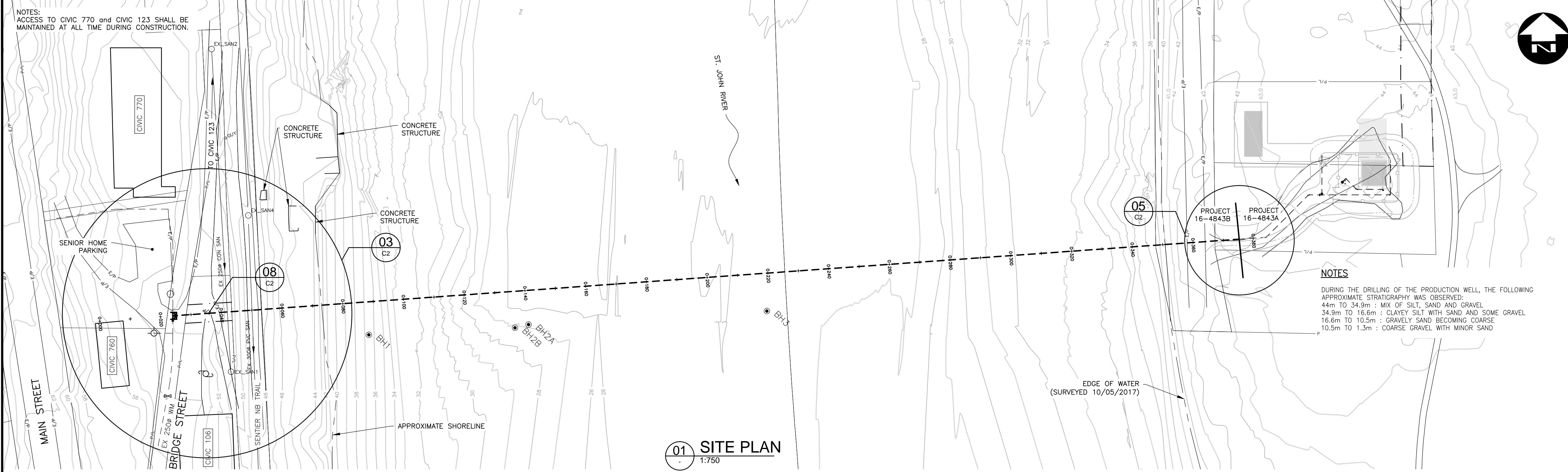


KEY PLAN 1:2500

DRAWING INDEX	
DWG.	DESCRIPTION
C1	SITE PLAN & PROFILE
C2	CONNECTION DETAILS

DILLON PROJECT: 16-4843B
DATE: NOVEMBER 2017



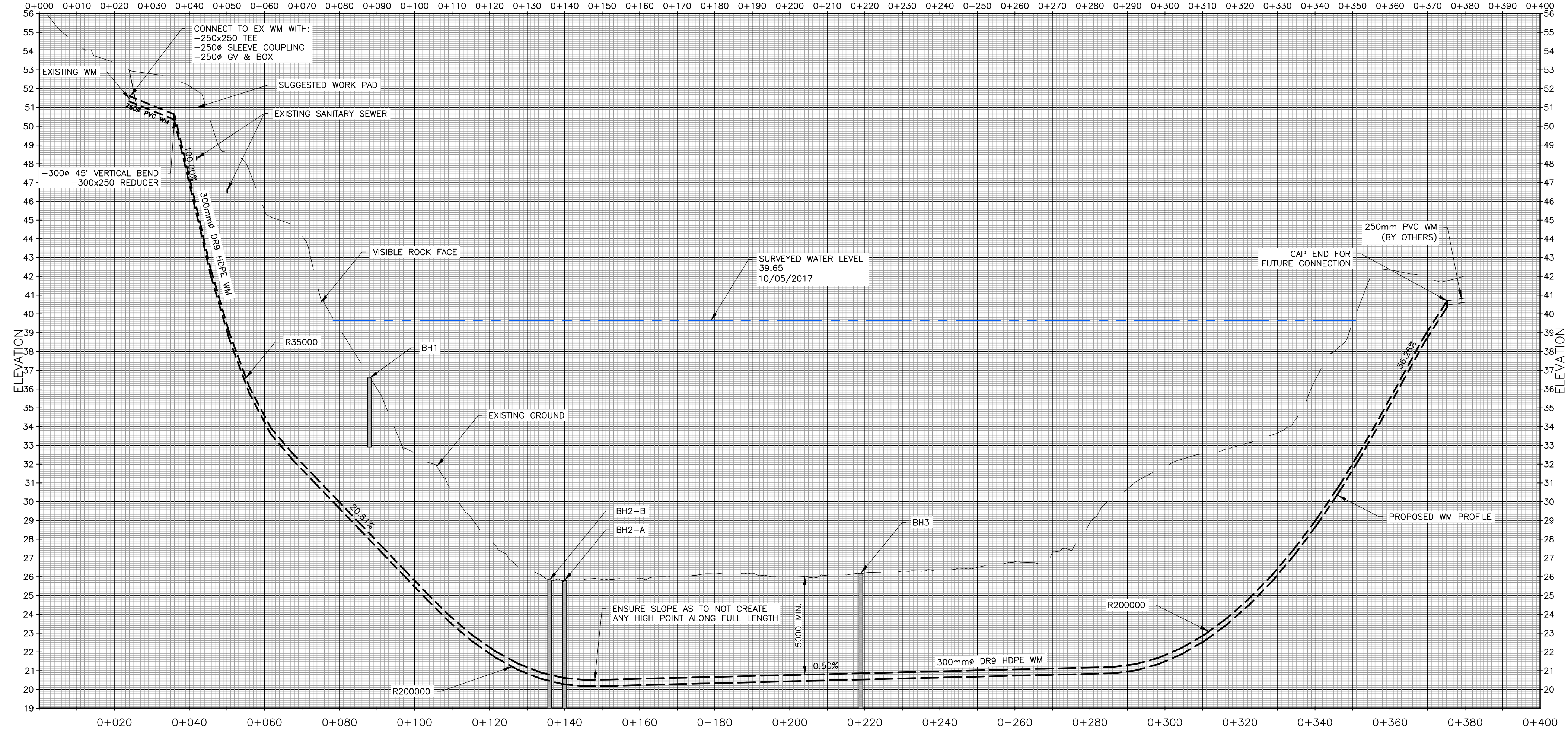


01 SITE PLAN
1:750

NOTES
 DURING THE DRILLING OF THE PRODUCTION WELL, THE FOLLOWING APPROXIMATE STRATIGRAPHY WAS OBSERVED:
 44m TO 34.9m : MIX OF SILT, SAND AND GRAVEL
 34.9m TO 16.6m : CLAYEY SILT WITH SAND AND SOME GRAVEL
 16.6m TO 10.5m : GRAVELY SAND BECOMING COARSE
 10.5m TO 1.3m : COARSE GRAVEL WITH MINOR SAND

LEGEND	
---	EXISTING WATERMAIN
---	PROPOSED WATERMAIN
⌵	EXISTING/PROPOSED WATERVALVE
⊕	EXISTING/PROPOSED HYDRANT
]	EXISTING/PROPOSED END CAP
---	EXISTING STORM SEWER
---	PROPOSED STORM SEWER
---	EXISTING SANITARY SEWER
---	PROPOSED SANITARY SEWER
○	EXISTING/PROPOSED MAINTENANCE HOLE
□	EXISTING/PROPOSED CATCHBASIN
---	PROPERTY LINE
⊕	EXISTING WATER SERVICE BOX
---	EXISTING GUY WIRE
---	EXISTING CULVERT
---	EXISTING/PROPOSED UTILITY POLE
---	EXISTING EDGE OF PAVEMENT
WXX	PROPOSED XX# WATER SERVICE
SANXX	PROPOSED XX# SEWER SERVICE
STMXX	PROPOSED XX# STORM SERVICE
CIVIC XXX	CIVIC NUMBER
UT	UNDERGROUND UTILITY (ELEC./COMM.)
GAS	UNDERGROUND GAS
---	PROPOSED SANITARY SERVICE PIPE
ASP D/W	EXISTING ASPHALT DRIVEWAY
GR D/W	EXISTING GRAVEL/CRUSHED ROCK DRIVEWAY
WLK	EXISTING CONCRETE WALKWAY
---	EXISTING CURB & GUTTER
---	PROPOSED CURB & GUTTER
---	EXISTING HEDGE
---	PROPOSED HEDGE
●	BOREHOLE
---	OVERHEAD UTILITY (ELEC./COMM.)
---	EASEMENT BOUNDARY
9.0	MAJOR/MINOR CONTOURS
---	APPROXIMATE SHORELINE
---	PROPOSED FENCE

- GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS IN GEODETIC METERS (CGVD 1928) AND CHAINAGES IN METERS.
 - LOCATION OF EXISTING SERVICES, UNDERGROUND INFRASTRUCTURE, STRUCTURES AND BUILDINGS ARE APPROXIMATE ONLY AND ARE TO BE CONFIRMED IN THE FIELD PRIOR TO CONSTRUCTION.
 - ALL PROPERTY LINE INFORMATION OBTAINED FROM SERVICE NEW BRUNSWICK AND IS APPROXIMATE ONLY.
 - CONTRACTOR RESPONSIBLE FOR COORDINATING FIELD LOCATES AND CLEARANCE CERTIFICATES FROM NB POWER, ALANT, ROGERS, ENBRIDGE AND ANY OTHER UTILITIES PRIOR TO COMMENCING CONSTRUCTION.
- PROJECT NOTES**
- WATER VALVE MANIPULATION TO BE DONE BY THE TOWN OF WOODSTOCK PUBLIC WORKS STAFF ONLY.
 - WHERE TRENCHING IS ADJACENT TO EXISTING UTILITY POLES, POLES MUST BE SUPPORTED TO SATISFACTION OF NB POWER DURING THE WORK.
 - THE PROJECT IS UNDERGOING AN ENVIRONMENTAL IMPACT ASSESSMENT. A COPY OF THE PERMIT WILL BE PROVIDED TO THE CONTRACTOR PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOT COMMENCE WORK WITHIN 30m OF THE WATERCOURSE UNTIL THE PERMIT HAS BEEN PROVIDED.
 - WHERE COVER OVER WATER MAIN IS LESS THAN 1800mm INSULATE ABOVE PIPES.
 - SILTATION FENCE TO BE INSTALLED ALONG DOWNSLOPE BOUNDARY OF WORK AREA WHERE SANITARY IS CONSTRUCTED BY OPEN TRENCH ALONG ROAD SHOULDER ADJACENT TO EXISTING DITCHES, SLOPES, WATERCOURSES AND WETLANDS AND/OR AS DIRECTED IN THE FIELD BY THE ENGINEER.
 - LOCATION OF EROSION CONTROL STRUCTURES, IF REQUIRED, TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
 - RESTORATION TO CONSIST OF:
 LAWN:
 -100mm TOPSOIL AND HYDROSEED OVER ALL DISTURBED VEGETATED AREAS ON BRIDGE STREET SIDE.
 ROAD:
 -40mm NBD11 TYPE "D" SURFACE COURSE ASPHALT CONCRETE.
 -75mm NBD11 TYPE "B" BASE COURSE ASPHALT CONCRETE.
 -150mm CRUSHED GRAVEL
 -450mm PIT RUN GRAVEL SUBBASE



02 WATER TRANSMISSION PROFILE
H: 1:750 V: 1:150

FILENAME: C:\PROJECTS\WORKING DIRECTORY\ACTIVE\164843B-02-19-PR-CON-01.DWG PLOTTED BY: PAULIN, DOMINIC
 DILLON CONSULTING LIMITED 1140 SMITH STREET, FREDERICTON, NB, E3B 3H4, PHONE (506) 444-8800, FAX (506) 444-8821
 PLOT DATE: 2017-11-16 @ 3:18:39 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

FOR REVIEW

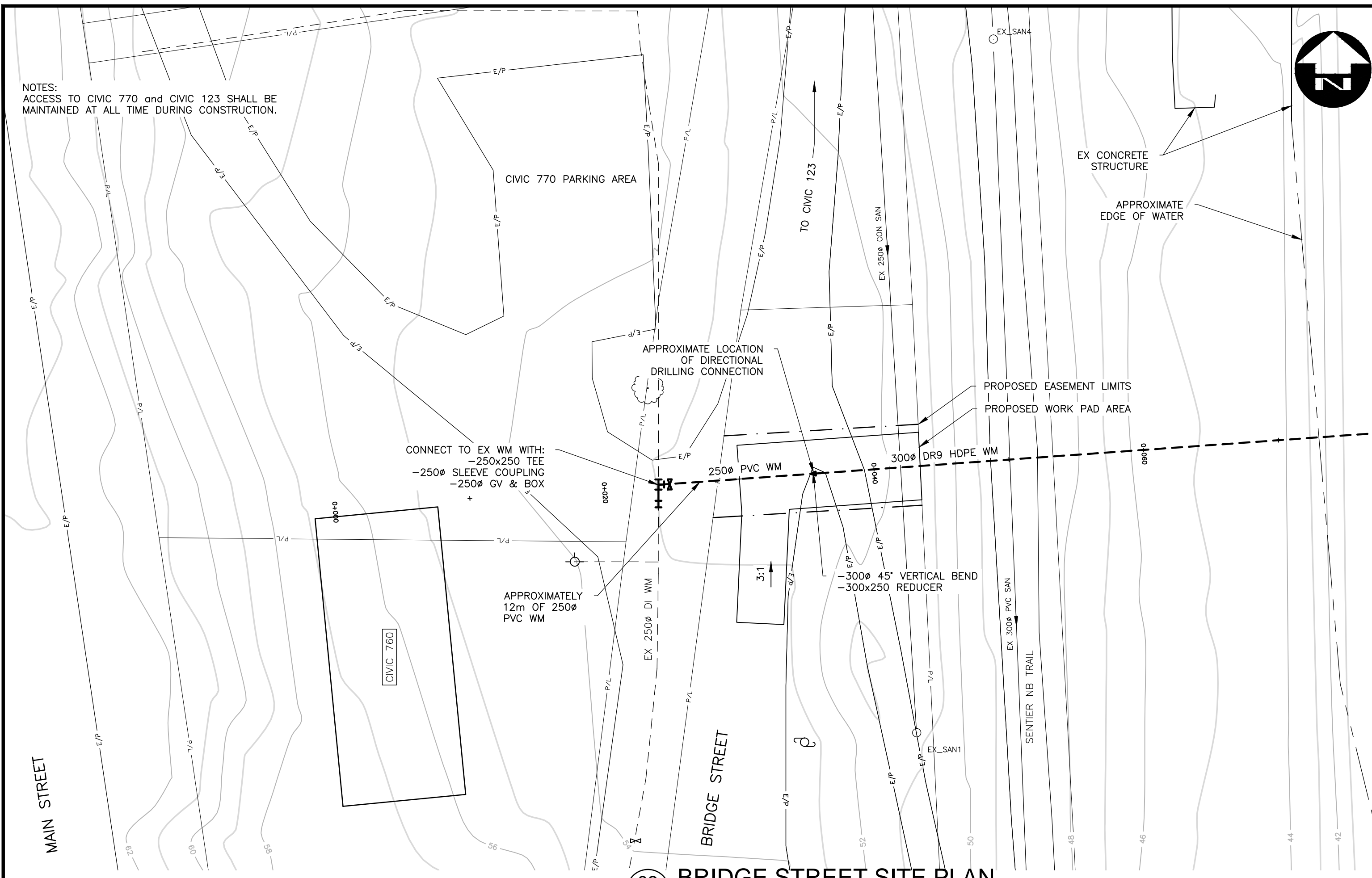
NOT FOR CONSTRUCTION



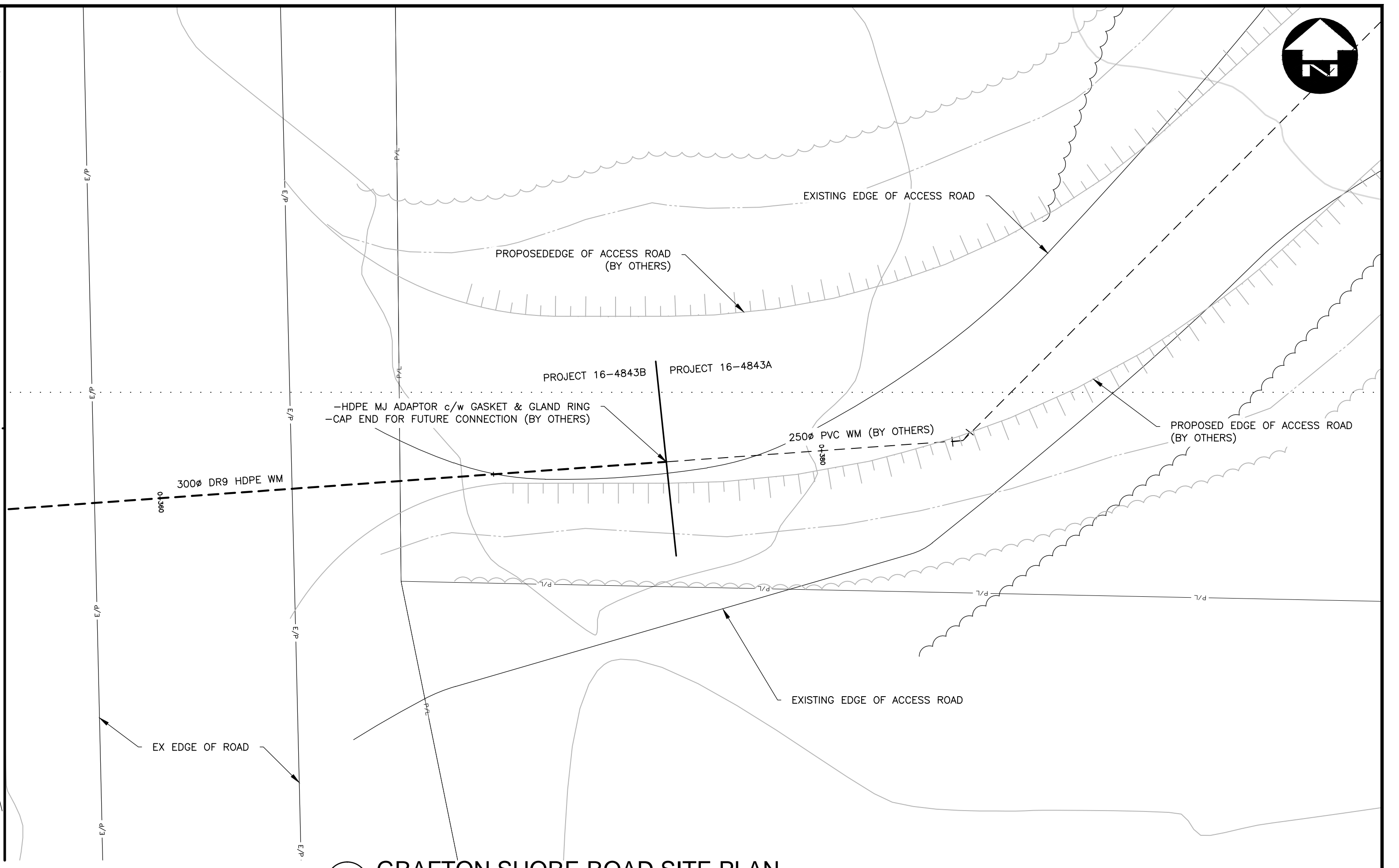
No.	ISSUED FOR REVIEW	DATE	BY
1	ISSUED FOR REVIEW	15/11/2017	DP

DESIGN: DP	REVIEWED BY: RCP	WATER TRANSMISSION LINE TOWN OF WOODSTOCK	PROJECT NO. 16-4843B
DRAWN: DP	CHECKED BY: RCP		SHEET NO. C1
DATE: NOVEMBER 2017	SCALE: AS NOTED	SITE PLAN & PROFILE	

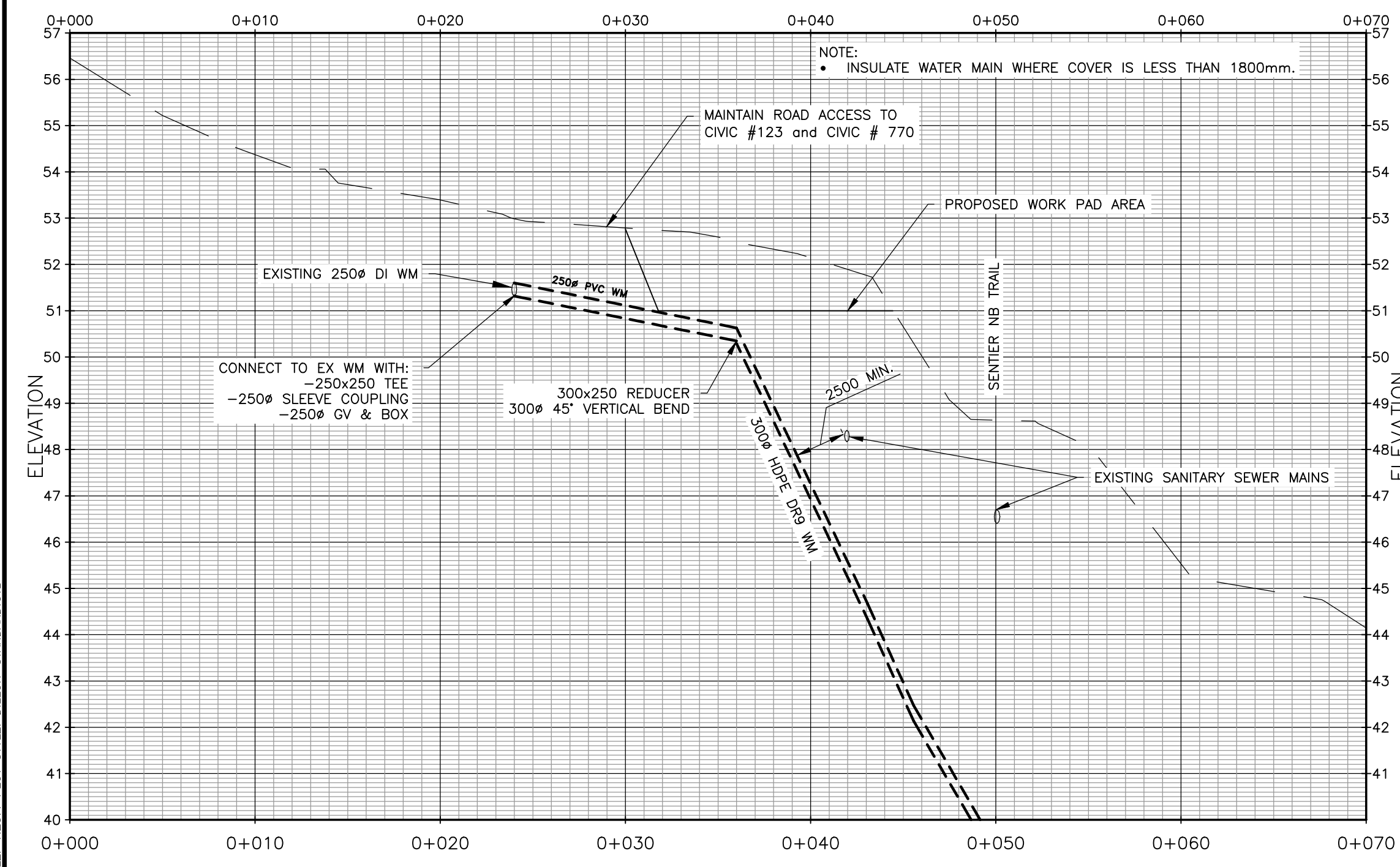
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 DILLOX CONSULTING LIMITED 1140 SMITH STREET, FREDERICTON, NB, E3B 3H4, PHONE (506) 444 8800, FAX (506) 444 8821



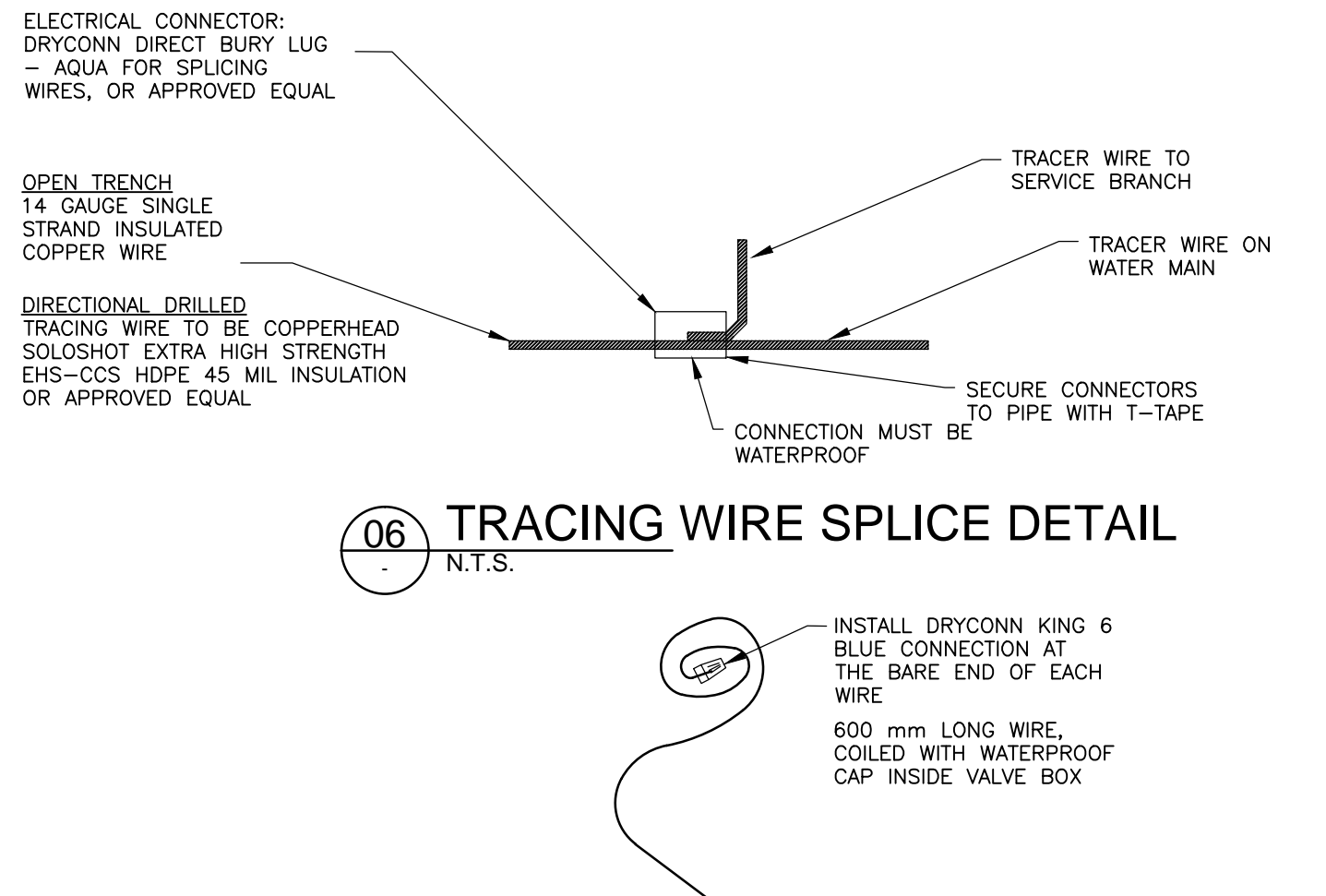
03 BRIDGE STREET SITE PLAN
1:250



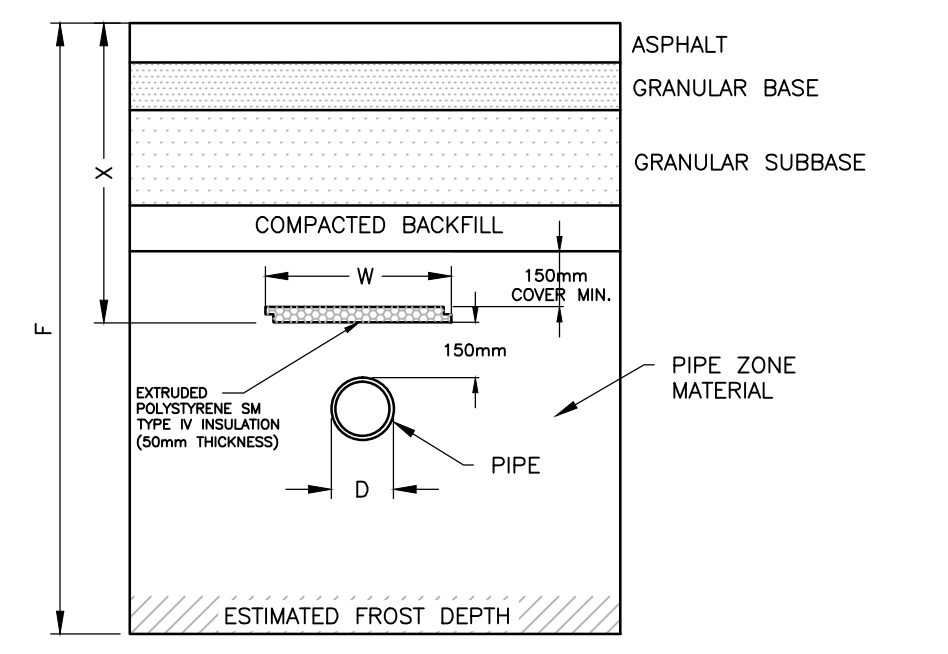
05 GRAFTON SHORE ROAD SITE PLAN
1:100



04 BRIDGE STREET PROFILE
H: 1:250 V: 1:100



06 TRACING WIRE SPLICE DETAIL
N.T.S.

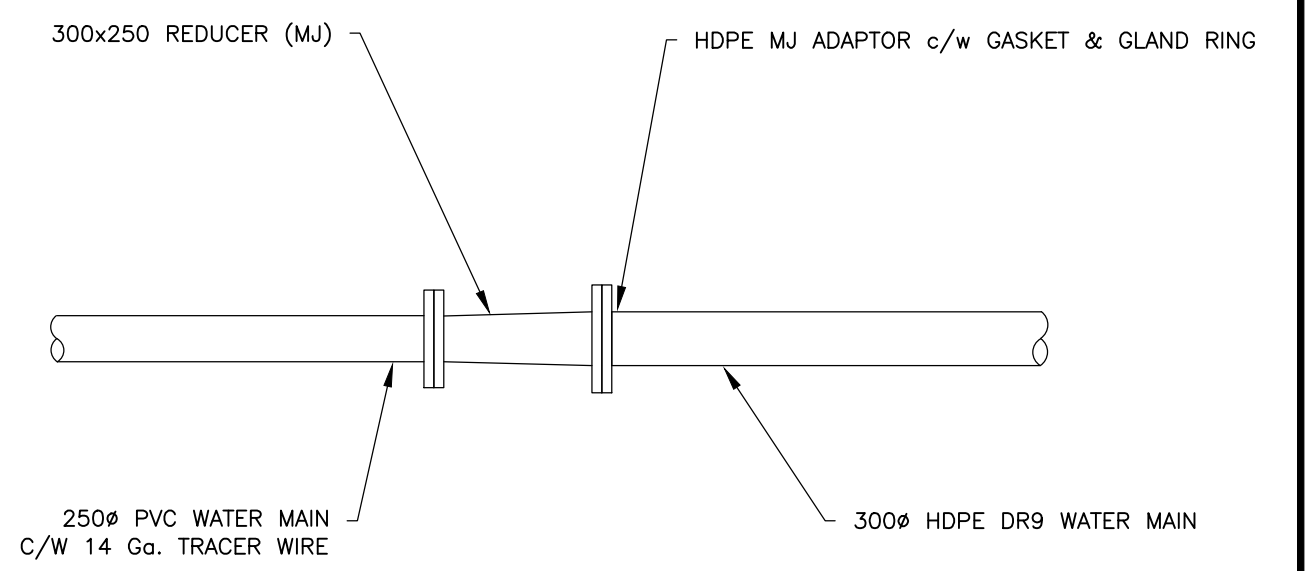


FORMULA
 $W = D + 2(F - X) - 0.3$
 (DIMENSIONS IN METERS)
 METRIC EQUATION

LEGEND
 F - ESTIMATED FROST DEPTH (1.8m)
 X - DIFFERENCE IN ELEVATION OF FINISH GRADE TO TOP OF PIPE MINUS 0.15m OF PIPE COVER.
 W - WIDTH OF INSULATION REQUIRED
 D - DIAMETER OF PIPE

NOTE:
 1. WHEN DEPTH OF COVER IS LESS THAN 1200mm, A 100mm THICKNESS OF INSULATION IS REQUIRED
 2. FOR MORE THAN ONE PIPE, "D" WILL BE EQUAL TO THE TOTAL DIAMETER OF ALL PIPES, PLUS THE SPACING BETWEEN PIPES

07 INSULATION DETAILS
N.T.S.



08 HDPE-PVC CONNECTION DETAIL
N.T.S.

Conditions of Use
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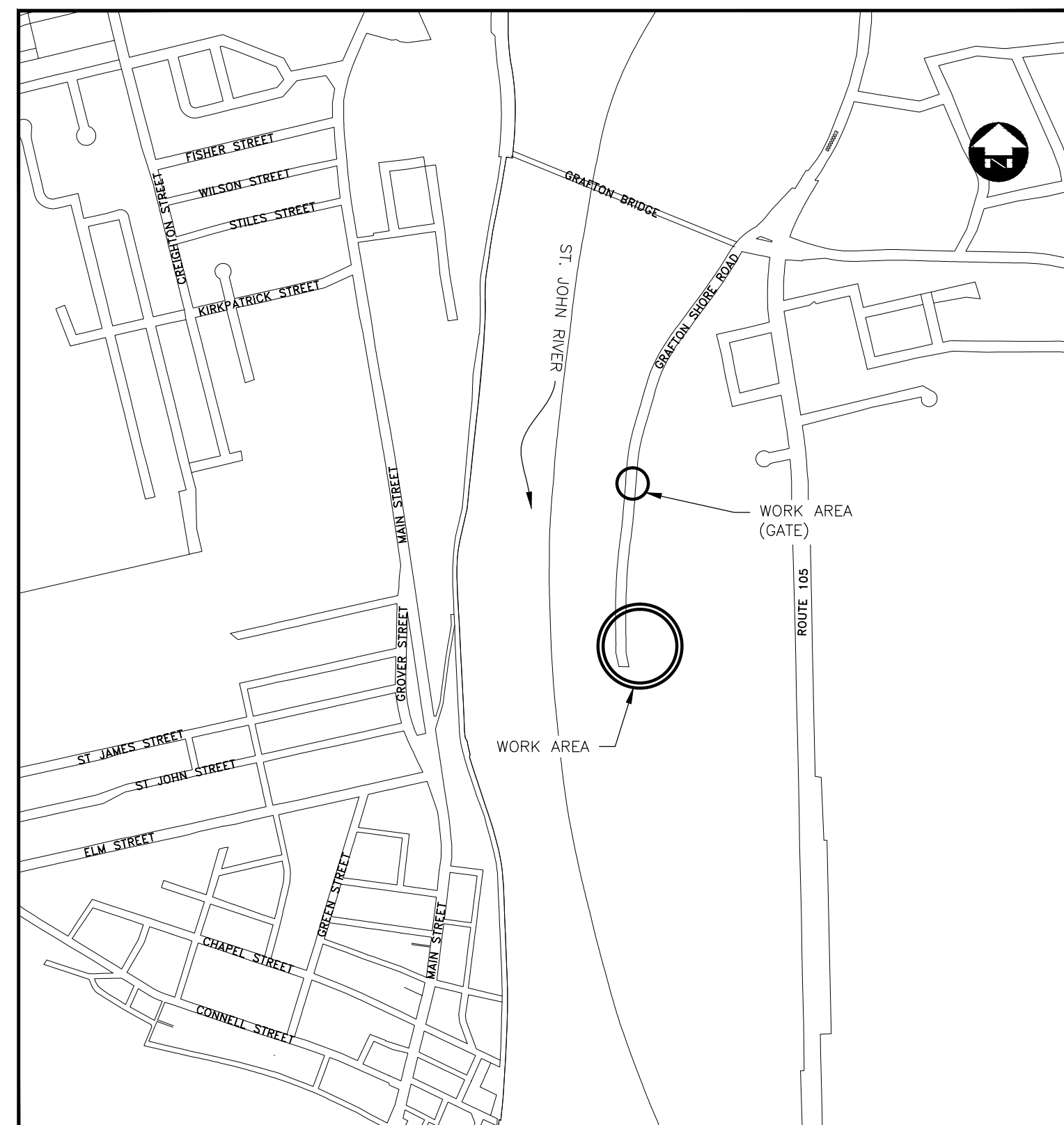
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DATE	NOVEMBER 2017		
SCALE	50/100		
ISSUED FOR REVIEW	15/11/2017	DP	
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WATER TRANSMISSION LINE TOWN OF WOODSTOCK		PROJECT NO. 16-4843B
CONNECTION DETAILS		SHEET NO. C2

TOWN OF WOODSTOCK WATER TREATMENT FACILITY GRAFTON SHORE ROAD



KEY PLAN 1:10000



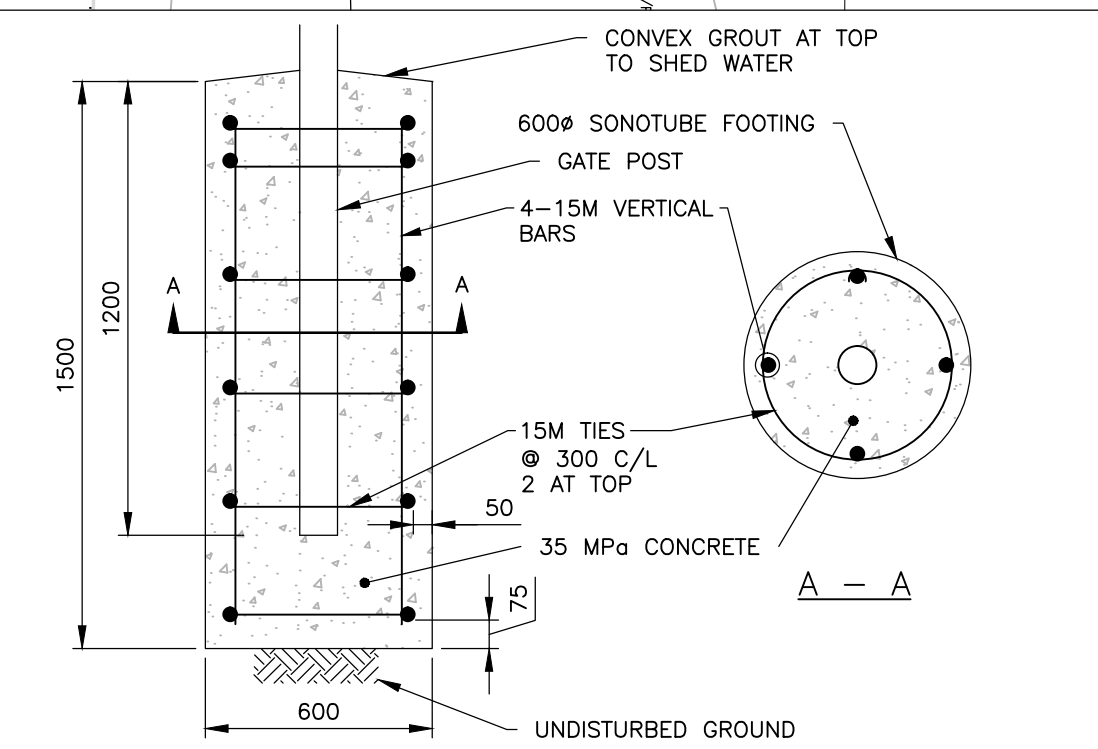
KEY PLAN 1:2500

DRAWING INDEX	
DWG.	DESCRIPTION
C1	SITE PLAN
C2	DETAILS
C3	PROFILES

DILLON PROJECT: 16-4843A
DATE: NOVEMBER 2017



NOTES:
 PROVIDE 1200mm HIGH x 600mm (20") WIDE TUBULAR DOUBLE BARRIER GATE BY HOOVER FENCE COMPANY (S-SERIES). GATE SHALL BE GALVANIZED STEEL COMPLETE WITH 100mm O.D. GATE POSTS GALVANIZED HF40 AND ALL HINGES AND ACCESSORIES. GATE SHALL BE LOCATED AT THE ENTRANCE OF THE ROAD NEAR THE CUL-DE-SAC APPROXIMATELY 255m NORTH OF THE WATER TREATMENT FACILITY ACCESS DRIVEWAY. EXACT LOCATION OF GATE TO BE CONFIRMED IN THE FIELD BY THE ENGINEER. SEE BARRIER GATE POST FOOTING DETAIL.



02 BARRIER GATE POST FOOTING DETAIL
 1:20

APPROXIMATE LOCATION OF PROPOSED SEPTIC TANK/FIELD. SEPTIC FIELD TO BE SIZED TO SUIT FACILITY NEEDS AND BE IN ACCORDANCE WITH THE NEW BRUNSWICK TECHNICAL GUIDELINES FOR ON-SITE SEWAGE DISPOSAL SYSTEMS (LATEST VERSION)

POTENTIAL MANGANESE TREATMENT
 25m SETBACK FROM SEPTIC FIELD

FIRE HYDRANT C/W:
 -12.8m OF 150# PVC WM
 -250x150 TEE
 -150# GV & BOX

100# PVC DR35 SAN SERVICE (2% MIN.)

REMOVE CAP FROM PITLESS ADAPTER FLANGE AND CONNECT NEW 200# WM WITH 200# FLANGE ADAPTER

PROPOSED WATER TREATMENT FACILITY (8400 X 8280) FFE = 45.5m

PROPOSED UTILITY POLE

10000 PROPOSED OVERHEAD UTILITY EASEMENT

CHAIN LINK GATE

CHAIN LINK FENCE

ALL AREAS BETWEEN TOP OF SLOPE AND LIMIT OF CLEARING TO BE FINISHED WITH 100mm TOPSOIL AND HYDROSEED

PROPOSED LIMIT OF CLEARING/GRUBBING. 1.5m FROM TOE OF SLOPE (TYP.)

PROPOSED ACCESS DRIVEWAY (SEE C3)

01 WELL HOUSE SITE PLAN
 1:150

LEGEND	
---	EXISTING WATERMAIN
---	PROPOSED WATERMAIN
⊕	EXISTING/PROPOSED WATERVALVE
⊕	EXISTING/PROPOSED HYDRANT
]	EXISTING/PROPOSED END CAP
EX 375# PVC STM	EXISTING STORM SEWER
375 # PVC STM	PROPOSED STORM SEWER
EX 200# PVC SAN	EXISTING SANITARY SEWER
200 # PVC SAN	PROPOSED SANITARY SEWER
EX MH1	EXISTING/PROPOSED MAINTENANCE HOLE
EX CB1	EXISTING/PROPOSED CATCHBASIN
P/L	PROPERTY LINE
⊕	EXISTING WATER SERVICE BOX
⊕	EXISTING GUY WIRE
EX 300# RC CULVERT	EXISTING CULVERT
⊕	EXISTING/PROPOSED UTILITY POLE
E/P	EXISTING EDGE OF PAVEMENT
WXX	PROPOSED XX# WATER SERVICE
SANXX	PROPOSED XX# SEWER SERVICE
STMXX	PROPOSED XX# STORM SERVICE
CIVIC XXX	CIVIC NUMBER
UT	UNDERGROUND UTILITY (ELEC./COMM.)
GAS	UNDERGROUND GAS
ASP D/W	PROPOSED SANITARY SERVICE PIPE
GR D/W	EXISTING ASPHALT DRIVEWAY
WLK	EXISTING GRAVEL/CRUSHED ROCK DRIVEWAY
---	EXISTING CONCRETE WALKWAY
---	EXISTING CURB & GUTTER
---	PROPOSED CURB & GUTTER
---	EXISTING HEDGE
---	PROPOSED HEDGE
---	BOREHOLE
---	OVERHEAD UTILITY (ELEC./COMM.)
---	EASEMENT BOUNDARY
---	MAJOR/MINOR CONTOURS
---	APPROXIMATE SHORELINE
---	PROPOSED FENCE
---	PROPOSED TOE OF SLOPE

- GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS IN GEODETIC METERS (CGVD 1928) AND CHAINAGES IN METERS.
 - LOCATION OF EXISTING SERVICES, UNDERGROUND INFRASTRUCTURE, STRUCTURES AND BUILDINGS ARE APPROXIMATE ONLY AND ARE TO BE CONFIRMED IN THE FIELD PRIOR TO CONSTRUCTION.
 - ALL PROPERTY LINE INFORMATION OBTAINED FROM SERVICE NEW BRUNSWICK AND IS APPROXIMATE ONLY.
 - CONTRACTOR RESPONSIBLE FOR COORDINATING FIELD LOCATES AND CLEARANCE CERTIFICATES FROM NB POWER, ALANT, ROGERS, ENBRIDGE AND ANY OTHER UTILITIES PRIOR TO COMMENCING CONSTRUCTION.

- PROJECT NOTES**
- WATER VALVE MANIPULATION TO BE DONE BY THE TOWN OF WOODSTOCK PUBLIC WORKS STAFF ONLY.
 - WHERE TRENCHING IS ADJACENT TO EXISTING UTILITY POLES, POLES MUST BE SUPPORTED TO SATISFACTION OF NB POWER DURING THE WORK.
 - THE PROJECT IS UNDERGOING AN ENVIRONMENTAL IMPACT ASSESSMENT. A COPY OF THE PERMIT WILL BE PROVIDED TO THE CONTRACTOR PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOT COMMENCE WORK WITHIN 30m OF THE WATERCOURSE UNTIL THE PERMIT HAS BEEN PROVIDED.
 - WHERE COVER OVER WATER MAIN IS LESS THAN 1800mm INSULATE ABOVE PIPES.
 - SILTATION FENCE TO BE INSTALLED ALONG DOWNSLOPE BOUNDARY OF WORK AREA WHERE SANITARY IS CONSTRUCTED BY OPEN TRENCH ALONG ROAD SHOULDER ADJACENT TO EXISTING DITCHES, SLOPES, WATERCOURSES AND WETLANDS AND/OR AS DIRECTED IN THE FIELD BY THE ENGINEER.
 - LOCATION OF EROSION CONTROL STRUCTURES, IF REQUIRED, TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
 - LAWN RESTORATION TO CONSIST OF:
 - 100mm TOPSOIL AND HYDROSEED OVER ALL DISTURBED VEGETATED AREAS ON BRIDGE STREET SIDE
 - 100mm TOPSOIL AND HYDROSEED FROM TOP OF SLOPE TO LIMITS OF CLEARING AND GRUBBING.

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 DILLON CONSULTING LIMITED 1140 SMITH STREET, FREDERICTON, NB, E3B 3H4, PHONE (506) 444 8800, FAX (506) 444 8821

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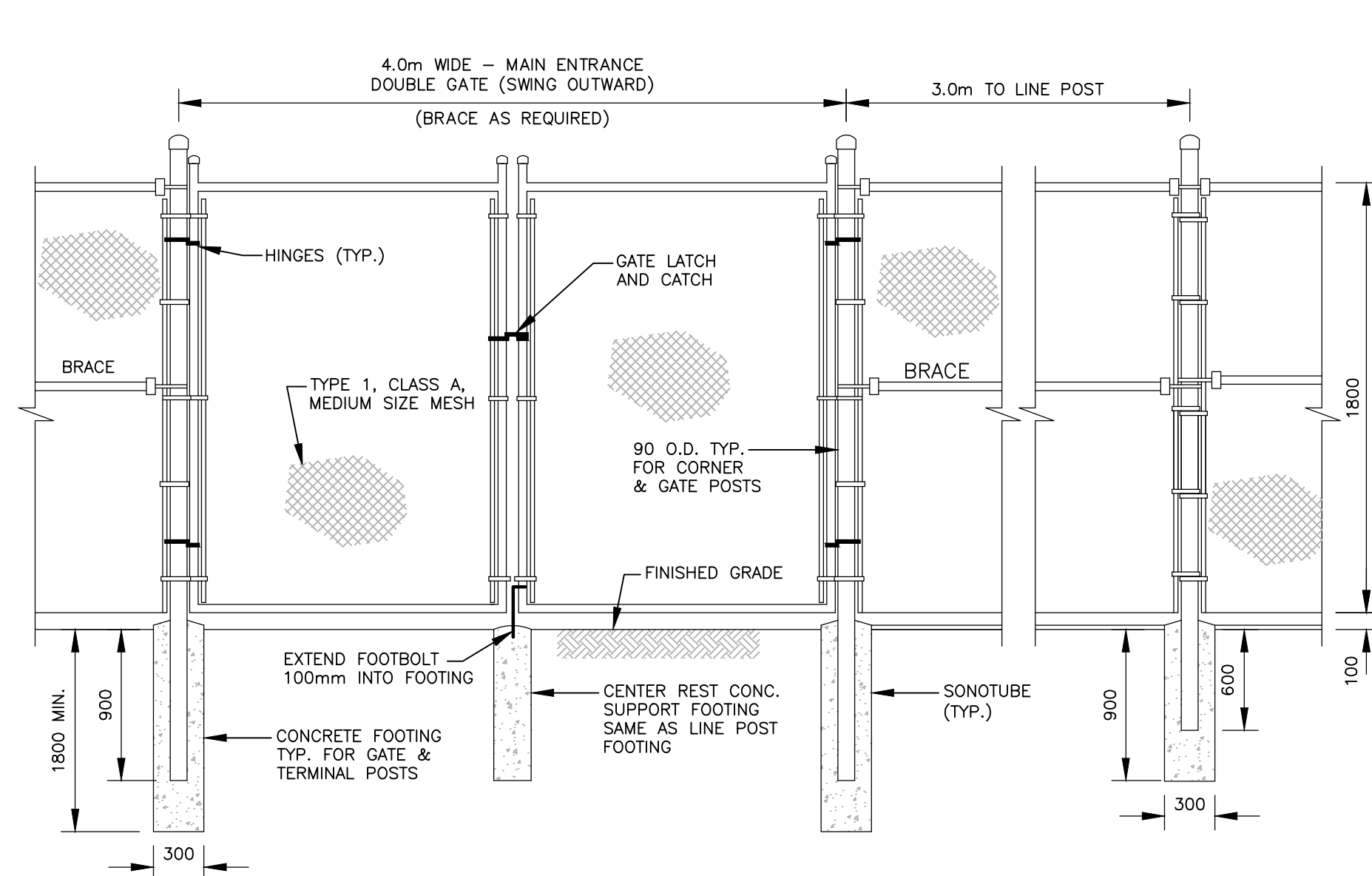
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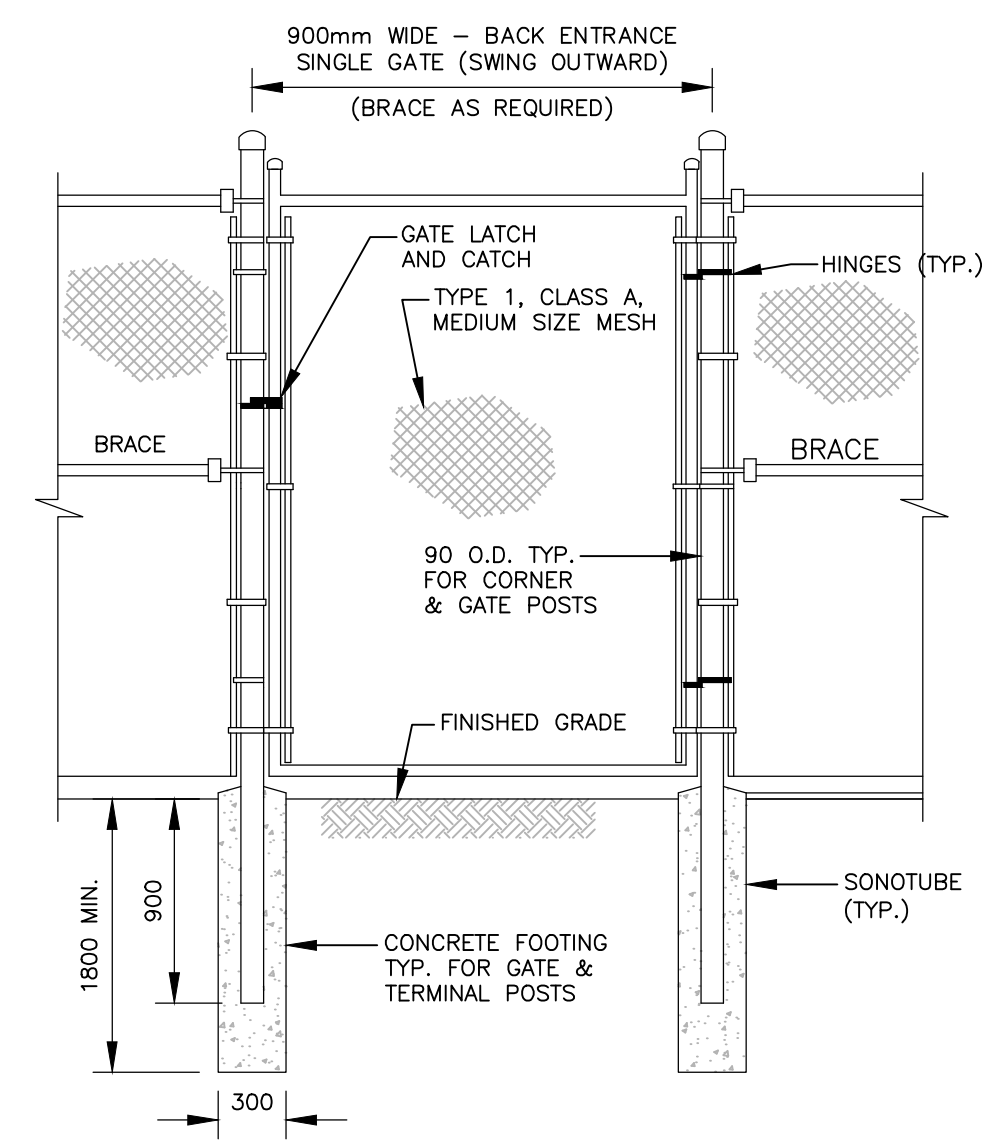
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1	ISSUED FOR REVIEW	15/11/2017	DP	50%BCH8

WATER TREATMENT FACILITY GRAFTON SHORE ROAD		PROJECT NO. 16-4843A
SITE PLAN		SHEET NO. C1

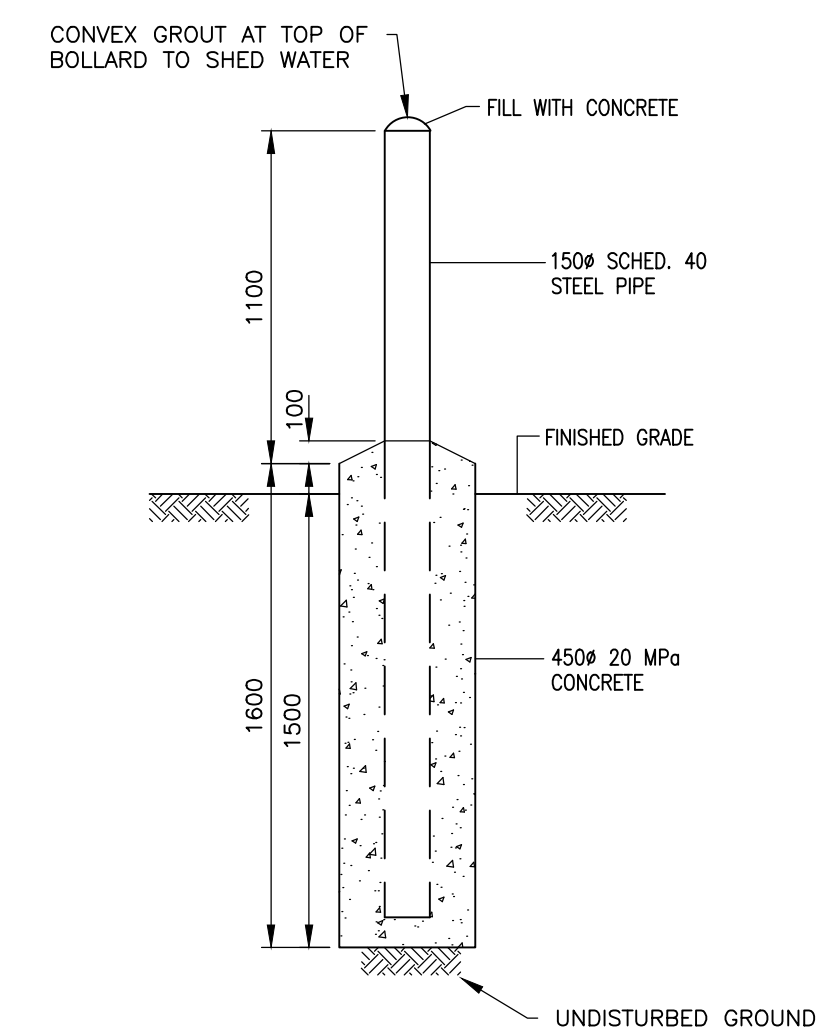
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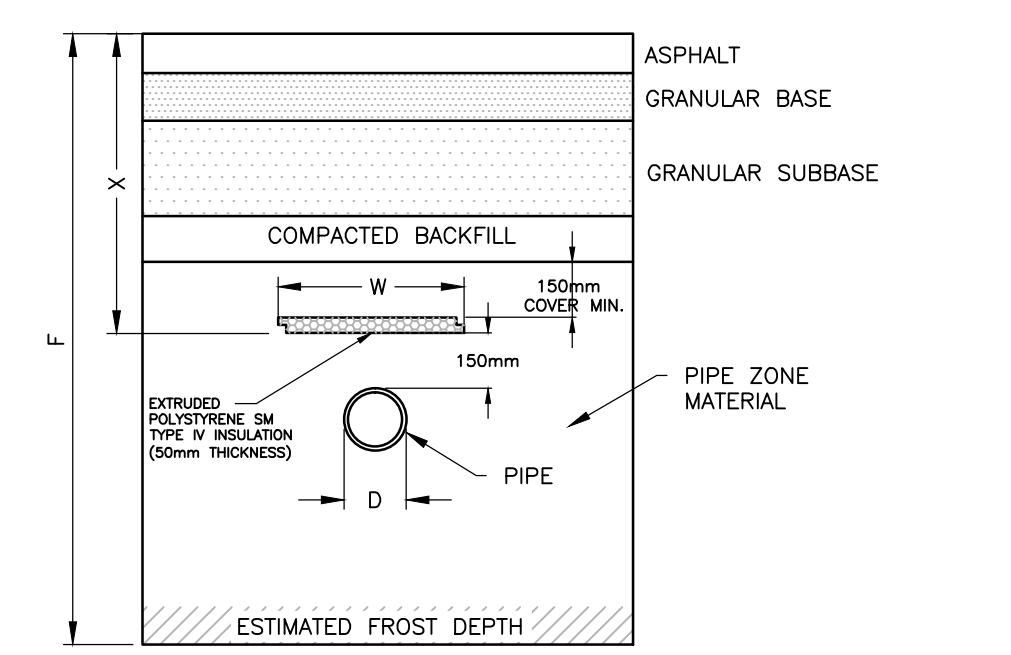
03 TYPICAL CHAIN LINK FENCE AND GATES
N.T.S.



04 TYPICAL BOLLARD
N.T.S.



05 HDPE-PVC CONNECTION DETAIL
N.T.S.

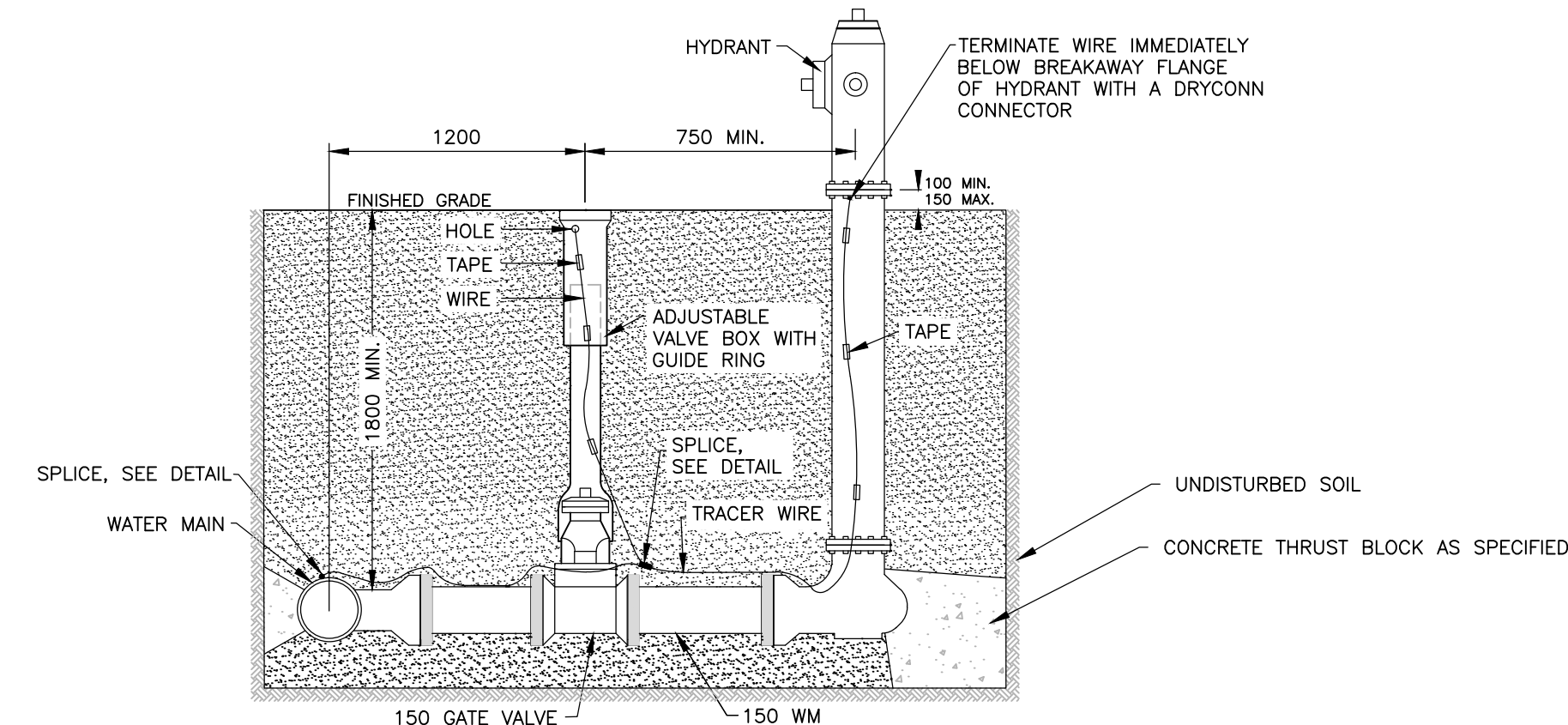


FORMULA
 $W = D + 2(F - X) - 0.3$
 (DIMENSIONS IN METERS)
METRIC EQUATION

LEGEND
 F - ESTIMATED FROST DEPTH (1.8m)
 X - DIFFERENCE IN ELEVATION OF FINISH GRADE TO TOP OF PIPE MINUS 0.15m OF PIPE COVER.
 W - WIDTH OF INSULATION REQUIRED
 D - DIAMETER OF PIPE

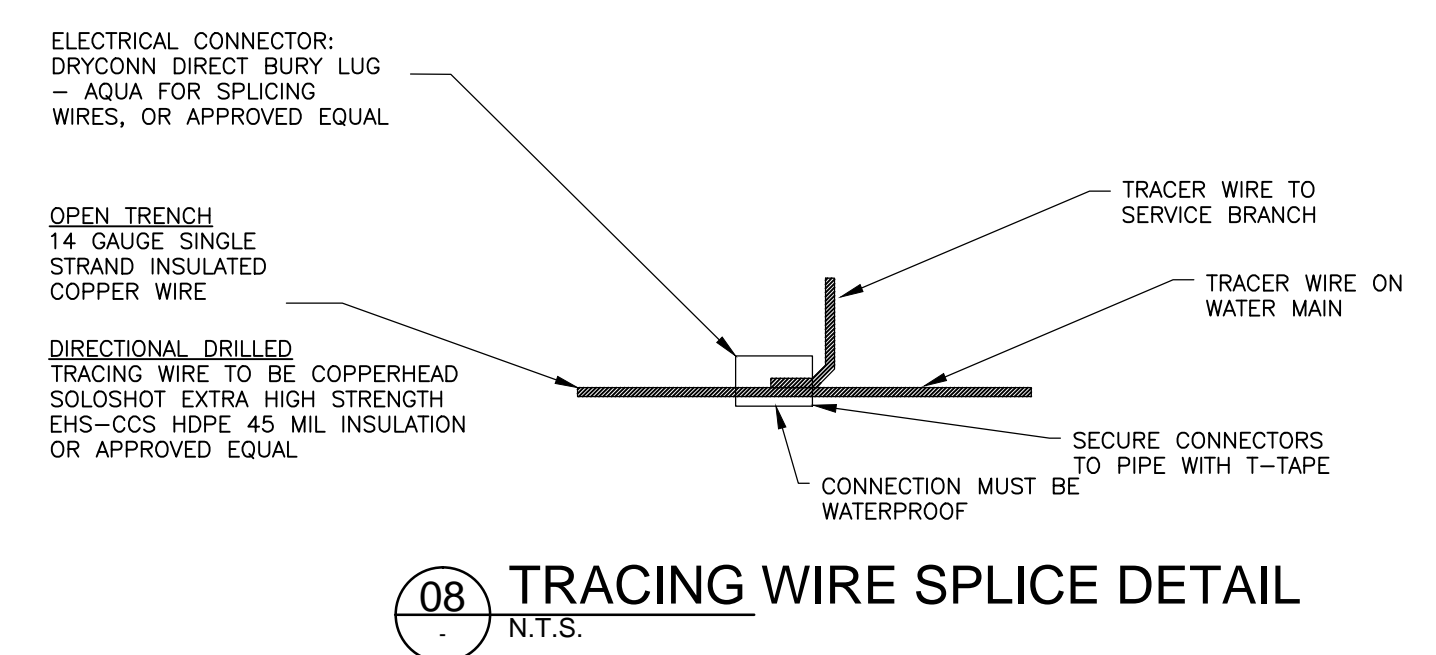
NOTE: 1. WHEN DEPTH OF COVER IS LESS THAN 1200mm, A 100mm THICKNESS OF INSULATION IS REQUIRED
 2. FOR MORE THAN ONE PIPE, "D" WILL BE EQUAL TO THE TOTAL DIAMETER OF ALL PIPES, PLUS THE SPACING BETWEEN PIPES

06 INSULATION DETAILS
N.T.S.



NOTES: ALL JOINTS TO BE RESTRAINED WITH MEGALUG, OR APPROVED EQUAL, RETAINER GLANDS

07 HYDRANT & VALVE DETAILS
N.T.S.



08 TRACING WIRE SPLICE DETAIL
N.T.S.

INSTALL DRYCONN KING 6 BLUE CONNECTION AT THE BARE END OF EACH WIRE
 600 mm LONG WIRE, COILED WITH WATERPROOF CAP INSIDE VALVE BOX

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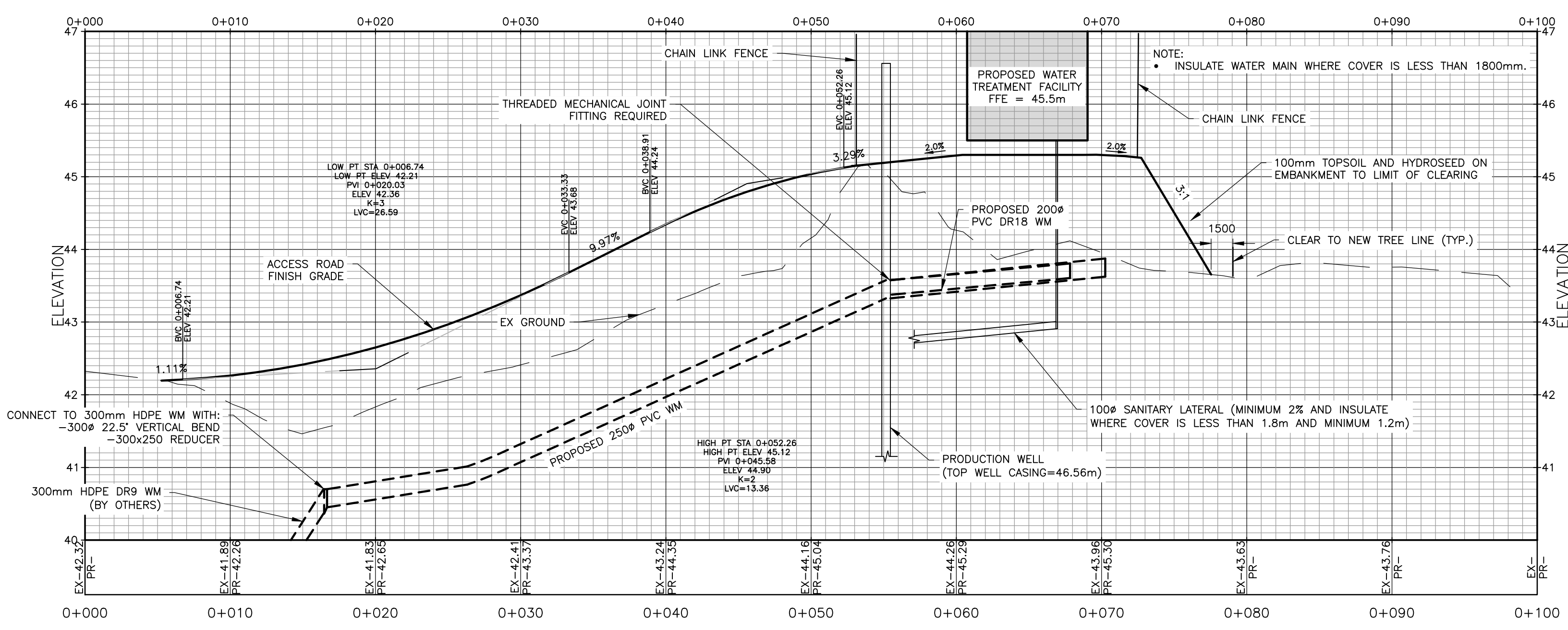
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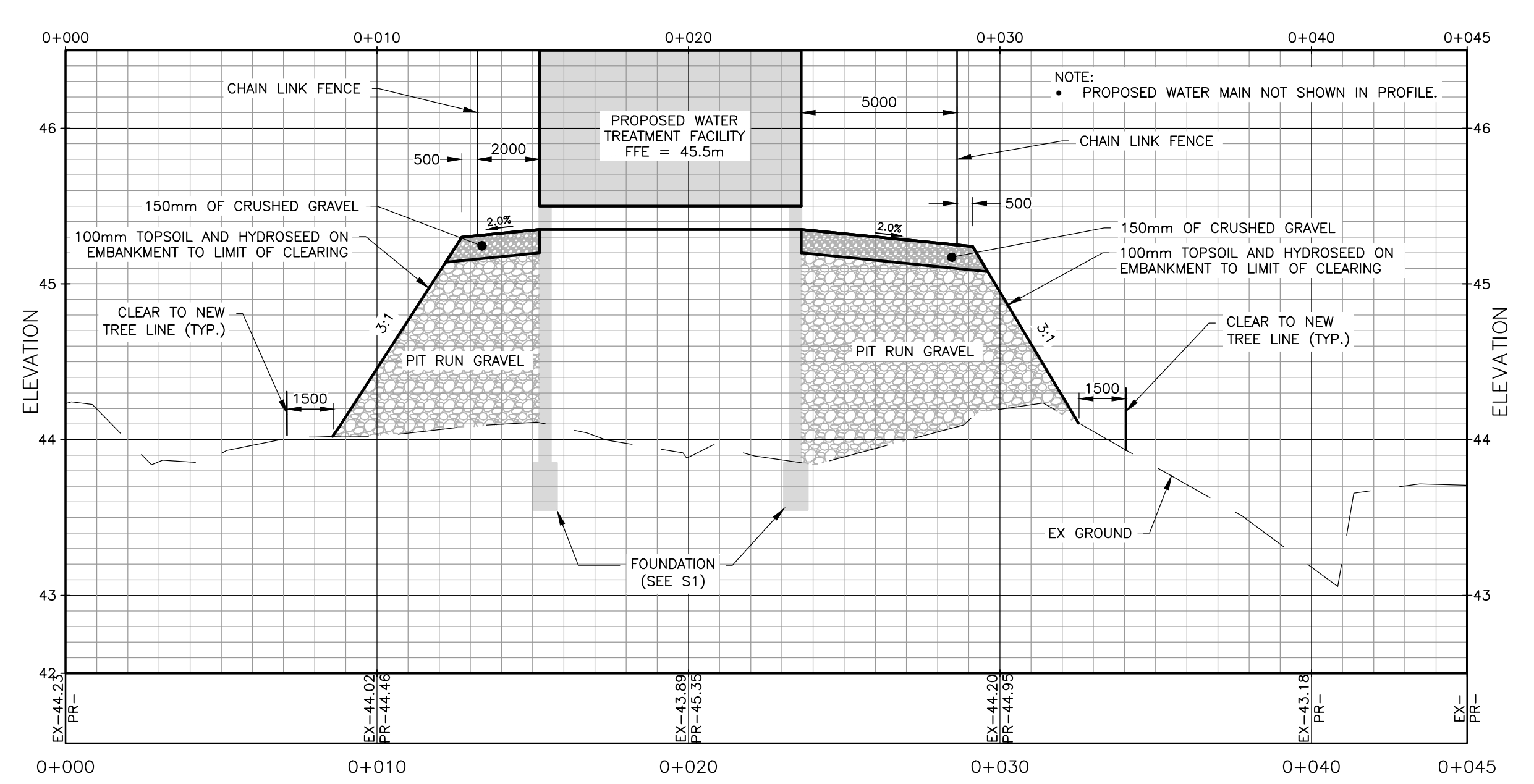
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WATER TREATMENT FACILITY GRAFTON SHORE ROAD		PROJECT NO.	16-4843A
DETAILS		SHEET NO.	C2

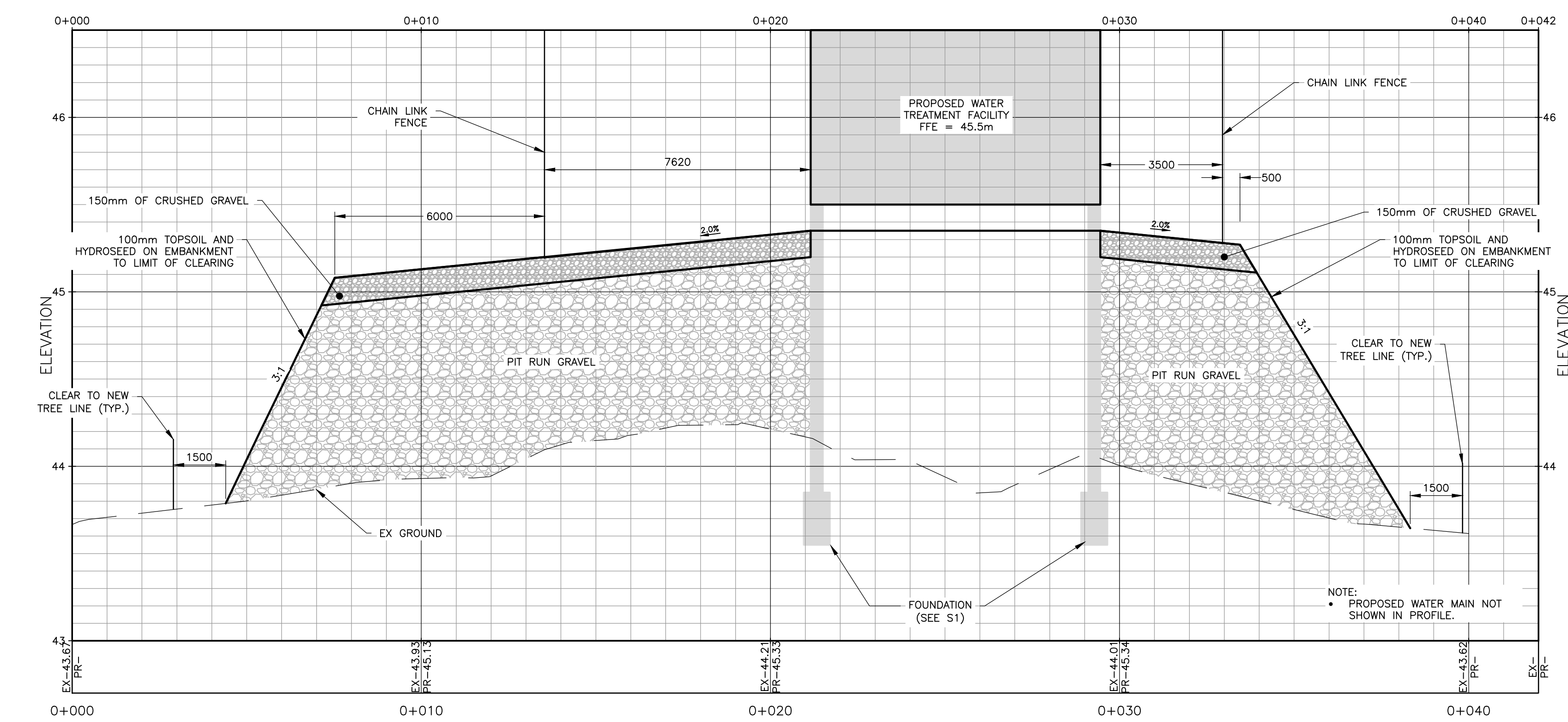
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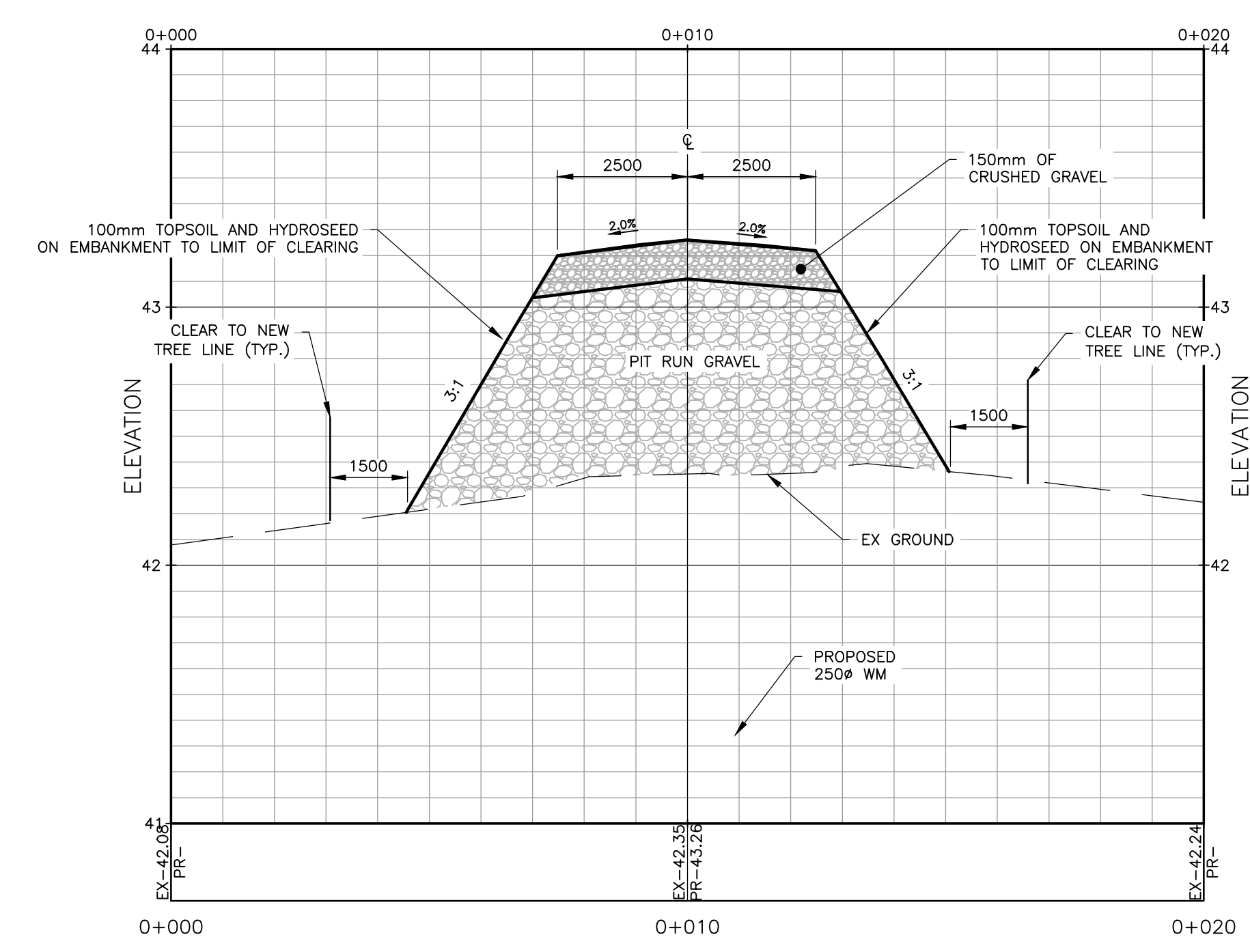
09 ACCESS ROAD PROFILE
H: 1:250 V: 1:50



10 SECTION A-A
H: 1:150 V: 1:30



11 SECTION B-B
H: 1:100 V: 1:20



12 TYPICAL ROAD - SECTION C-C
H: 1:100 V: 1:20

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WATER TREATMENT FACILITY
TOWN OF WOODSTOCK

PROFILES

PROJECT NO.
16-4843A

SHEET NO.
C3

