June 23, 2017 Project No. 17-095-57E

VIA EMAIL: (john.s@formarchitecture.ca)

Mr. John Stephenson
FORM Architecture Engineering
131 Court Street North
Thunder Bay, ON P7A 4V1

Dear Mr. John Stephenson.

Re: Rainy River District Social Services Board Proposed 8-Plex Apartment Building
Site Servicing and Stormwater Management Design Brief
Fort Frances, Ontario

True Grit Engineering (TGE) was retained by FORM Architecture Engineering (FORM) to prepare a site servicing and stormwater management (SWM) design for the Rainy River District Social Services Board (RRDSSB) proposed 8-Plex Apartment project, located in Fort Frances, Ontario.

This report summarizes the design initiatives required to provide the proposed development with the following site services:

- Water Supply
- Sanitary Servicing
- Stormwater Management
- Erosion and Sediment Control
- Lot Grading
- Facility Maintenance

This report assists in the attainment of the minimum requirements set out by the Ministry of the Environment and Climate Change (MOECC), the American Water Works Associations (AWWA), and the Ontario Building Code (OBC). This report shall be read in conjunction with the attached drawing set (Appendix A).

Water Supply

A 300 mm diameter watermain is located within 5th Street East adjacent to the proposed site. The Water Treatment Plant (WTP) is located at the corner of Colonization Road East and 5th Street East approximately 100 metres from the proposed site. Based on the size of the existing watermain adjacent to the site and location of the WTP, TGE does not anticipate concerns with available flow for the proposed fire and domestic cold water (DCW) services for the proposed 8-Plex apartment. Hydraulic modelling of the distribution system shall be completed by others to ensure the new demands generated by the proposed development can be achieved.

The proposed apartment will be provided with a new 50 mm ø DCW service connecting to the existing 300 mm ø main within 5th Street East. Based on the total fixtures proposed for the apartment building and AWWA *Sizing Water Service Lines and Meters*, *Third Edition* (2014), the total Fixture Value (FV) is estimated to be approximately 195 (attached). Based on the FV estimate and Figure 4-3 from the aforementioned manual, the probable water demand is estimated to be 2.30 L/s. To achieve the new demands, while maintaining a single water meter, a new DCW service is proposed. Sizing for this service is detailed in the following table.

Table 1 Water Service Sizing	
Fixture Value	195
Probable Demand	2.3 L/s
Length of New DCW Service	75 m
Proposed DCW Service Size	50 mm
Proposed Fire Line Size	150 mm

Fire Protection

Sizing for the fire line is based on NFPA *Standard for installation of Private Fire Service Main and Their Appurtenances* (2016 Edition). In order to ensure adequate flow is available to the sprinkler system, a 150 mm ø pipe will be connected to the existing 300 mm ø main within 5th Street East. The length of the proposed fire line is estimated to be 77 metres. The fire flow for the 8-Plex apartment building is estimated to be 117 L/s based on the methodology stipulated in Fire Underwriters Survey (FUS) *Water Supply for Public Fire Protection* (1999). See attached FUS design sheet for a detailed breakdown of the fire flow requirements.

In order to ensure backflow prevention, the fire service will be provided with a double check detector assembly in a chamber located within 3.0 metres of the property line. Backflow from fire protection systems shall be in accordance with Section 7.6.2.4 of the OBC (2012).

Fire Coverage

In accordance to Section 3.2.5.7 of the OBC (2012), any portion of a buildings perimeter facing a street is to be within 90 metres horizontally of the nearest hydrant. Also, according to Section 3.2.5.5 of the OBC (2012), access routes shall be provided to a building so that the unobstructed path of travel from the vehicle to one entrance of the building is not more than 45 metres. To achieve these two requirements, a new hydrant will be located north of the proposed parking lot facility.

Sanitary Servicing

The proposed apartment building will receive a new 150 mm ø sanitary service that will be connected to the existing 300 mm ø sanitary main within 5th Street East. To satisfy Section 7.4.7.2 of the OBC (2012), a manhole is required not more than 30 metres from the building. The first section of pipe extends 15.2 metres east at 2.0% to a new manhole (MH1). Subsequent to MH1, the sanitary service extends 46.0 metres south at 4.0% connecting to the existing sanitary main. The proposed service does not exceed 4.0% of its available capacity. The service is sized to achieve desirable velocities between 0.6 – 3.0 m/s. See attached sanitary hydraulic design sheet for capacity requirements.

Stormwater Management

TGE understands that the 5th Street East experiences frequent flooding during larger rain events and the spring freshet; therefore, TGE has delineated the majority of the impervious area generating an increase in runoff in the post-development conditions towards an existing swale located in the northeast corner of the subject site. This swale eventually discharges runoff to Elizabeth Street and subsequent storm sewer system. The subject site is divided into two catchment areas (Post-201 and Post-202).
The appended drawing set delineates the pre-development and post-development catchment areas (Appendix B). Catchment Post-201 is 1359 m^2 and consists of the east portion of the proposed apartment rooftop, sidewalk, parking lot and landscape surfaces.

Runoff for this area is directed towards the proposed bioretention swale. The bioretention swale is oriented south-to-north, ultimately discharging runoff towards the existing drainage swale located in the northeast corner of the site. Catchment Post-202 is 394 m^2 and consists of the west portion of the proposed apartment rooftop, sidewalk and landscape surfaces. Runoff for this area mimics the existing drainage patterns, ultimately discharging runoff towards 5th Street East.

The bioretention swale consists of a sod/mulch surface, overlying a 500 mm engineered soil mixture, followed by a 100 mm pea gravel layer, situated on top of a 300 mm clear stone infiltration gallery. The engineered soil mixture provides a planting medium for native trees, shrubs, and perennials. Minimum slope is provided for the bioretention swale to encourage infiltration. Rock flow checks dams located at regular intervals, interrupts flow which reduces the velocity, allowing for increased infiltration into the bioretention practice. Based on the borehole logs and geotechnical analysis (Appendix C), the native soil appears to be a silty sand type soil. The percolation rate is estimated to be greater than 25 mm/hr, which is suitable for a bioretention practice.

Table 2 summarizes the composite runoff coefficient for the individual land-use types and for the overall site conditions for the pre-development and post-development conditions.

Table 2
Pre-Development and Post-Development Runoff Coefficients

	Pre-Development		Post-Development		Post-201		Post-202	
	A	C	A	C	A	C	A	C
Landscape	1497.7	0.2	785.4	0.2	524.9	0.2	260.5	0.2
Rooftop	0.0	0.9	195.0	0.9	97.5	0.9	97.5	0.9
Sidewalk	85.7	0.9	151.3	0.9	115.3	0.9	36.0	0.9
Asphalt	170.0	0.9	621.7	0.9	621.7	0.9	0.0	0.9
Total	1753.4	-	1753.4	-	1359.4	-	394.0	-
Composite C	**-**	**0.30**	**-**	**0.59**	**-**	**0.63**	**-**	**0.44**

Overall, the pre-development runoff coefficient increases in the post-development conditions (0.30-pre vs. 0.59-post); therefore, quantity control considerations are required. The proposed site achieves pre-development levels for all events from the 2-year event up to the 100-year storm event, matching or reducing the existing peak flows. Catchment Post-202 is discharged off-site without attenuation. The total runoff for the subject site is the net total of Post-201 and Post-202.

Table 3 summarizes the flow generated by the 2-year up to the 100-year storm event for the pre-development, post-development, and Post-201 and Post-202 sub-catchment areas.

Table 3 Pre, Post and Controlled Development Conditions						
	2-year	**5-year**	**10-year**	**25-year**	**50-year**	**100-year**
Pre-Development[1] (m^3)	6.938	9.321	10.857	12.870	14.353	15.783
Pre-Development[1] (m^3/s)	0.012	0.016	0.018	0.021	0.024	0.026
Post-201 (m^3)	11.214	15.066	17.549	20.801	23.198	25.510
Post-202 (m^3)	2.256	3.032	3.531	4.186	4.668	5.133
Storage Volume (m^3)	13.530	13.530	13.530	13.530	13.530	13.530
Post-Development[1] (m^3)	2.256	4.568	7.550	11.457	14.336	17.113
Post-Development[1] (m^3/s)	0.004	0.008	0.013	0.019	0.024	**0.029[2]**

Notes:
1. Entire Development (1753 m^2).
2. Exceeds the Pre-Development Peak Flow.
3. Time of Concentration (t_c) = 10 minutes

It should be noted that Catchment Post-201 is directed towards the existing drawing swale located in the northeast corner of the site and not 5th Street East. Catchment Post-201 will encounter an increase in asphalt surfaces, which increases the amount of contaminants, such as oil and grit, which can be discharged into the environment. As a result, quality control considerations are required. The proposed development will treat stormwater runoff for catchment Post-201 to a level that is identified by the MOECC *Stormwater Management Planning and Design Manual* (2003), as being enhanced to the point that the total suspended solids removal rate is greater than 80%. This will involve a bioretention swale located along the east side of the development. Table 4 summarizes the volumetric sizing requirements.

Table 4 Volumetric Quality Control Sizing Requirements	
Catchment Post-201	
Total Drainage Area Contributing to the Practice	0.14 ha
Total Impervious Percentage (TIMP)[1]	61%
Storage Volume (m^3/ha) for Impervious Level[2]	32 m^3/ha
Required Bioretention Swale Storage Volume = 32*0.14 = 4.48 m^3	
Minimum Bioretention Volume Proposed[3] = 5.04 m^3	

Notes:
1. TIMP = (C-0.2)/0.7
2. MOECC *Stormwater Management Planning and Design Manual* (2003), Table 3.2
3. Porosity of clear stone layer and pea gravel layer = 0.4

It should be noted that stormwater runoff from Post-202 is generated by rooftop, landscape and minimum sidewalk surfaces; therefore, does not require quality control.

Erosion and Sediment Control

During the construction phase, a number of erosion and sediment control measures will be implemented to maintain the quality of stormwater discharge at various locations throughout the facility. The proposed measures for sediment control include the covering of catch basin inlets with filter cloth, using the existing landscaped areas for ponding, the installation of a silt fence and the placement of mud mats. These devices are to be installed prior to construction.

Construction and maintenance requirements are outlined in the *Ministry of Transportation Ontario Provincial Standard Specification 805* (OPSS 805). Regular maintenance and inspection of the applied sediment control measures shall be conducted during the construction phase to ensure structures are functioning as intended.

Lot Grading

The proposed apartment building will be encompassed by landscape surfaces on the north, south and west sides and asphalt surface to the east. The elevation of the proposed building is to be higher than the surrounding area to ensure runoff is not directed towards the building. The perimeter of the subject site is designed to match existing grades to mimic the existing drainage patterns of the site. The parking lot facility slopes east towards the bioretention swale, where runoff is encourage to infiltrate; runoff exceeding the capacity of the bioretention swale is directed south towards municipal property.

Facility Maintenance

The proposed stormwater management plan and bioretention practices are subject to degradation if the appropriate practices are not followed.

Snow clearing work and winter road sand applications may impact the efficiency of the practice. The thawing of snow piles will also deposit sediment that will accumulate over time and potentially clog the infiltration capacity of the site reducing efficiency. It is important that the snow piles be located at least 15 metres away from the practice.

Seasonality of the site may result in the accumulation of sand, leaves, and other debris in the bioretention practice. Clearing debris from the practice will ensure that the stormwater management of the site is working as intended.

Limitations

- The existing swale and ditch network is being assessed by TGE staff subsequent to this letter brief submission to ensure existing elevations are suitable to convey runoff generated by the proposed development. Based on the site assessment, the proposed design is subject to minor changes.

Closure

The information and data contained in this report, including without limitation, the results of any assessment, sampling and analyses conducted by TGE pursuant to its Agreement with the client, have been developed or obtained through the exercise of TGE's professional judgment and are set forth to the best of TGE's knowledge, information and belief. Although efforts have been made to confirm that this information is factual, complete and accurate, TGE makes no guarantees or warranties whatsoever, whether expressed or implied, with respect to such information or data.

The information and data presented in this report are based on the purpose and scope of the project and form the basis for any conclusions and recommendations presented herein. Any conclusions and recommendations presented herein do not preclude the existence of environmental or engineering concerns other than those that may have been identified.

Work performed by TGE personnel employed sound engineering principles. TGE cannot guarantee the accuracy and reliability of information provided by others or third parties. Therefore, TGE does not claim responsibility for undisclosed concerns or conditions that may result in costs for exceedances and/or remediation. This report is intended for information purposes only.

Sincerely,

TRUE GRIT ENGINEERING

LICENSED PROFESSIONAL ENGINEER
A. F. ROSE
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23/06/17
PROVINCE OF ONTARIO

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LV/AR:ls

Enclosures:
Table 5: Water Demand and Water Service Sizing
Table 6: Fire Underwriters Survey
Table 7: Sanitary Hydraulic Design Sheet
Appendix A: Drawing Set
Appendix B: Pre and Post Development Catchment Areas
Appendix C: Geotechnical Laboratory Results

Tables

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Table 5 Water Demand and Service Sizing Requirements				
FORM Architecture Engineering				
Rainy River DSSB - 8 Plex Apartment			**Project No. 17-095-57E**	
Site Servicing and SWM Design			**9-May-17**	
AWWA Manual M22				
Fixture Type	**Fixture Value**	**No. of Fixtures**	**Subtotal Fixtures Value**	**Unit**
Water Closet	6	8	48	FV
Shower/Bathtub	8	8	64	FV
Lavatory	1.5	8	12	FV
Kitchen Sink	1.8	8	14.4	FV
Washing Machine	6	8	48	FV
Hose Bib	9	1	9	FV
Combined Fixture Value			195.4	FV
Other Demands (e.g. Irrigation, sprinklers etc.)			0.0	FV
Total Number Fixtures Served			195.4	FV
Water Flow Demand (Figure 4-2)			2.3	L/s
Estimate Length From Curb to Furthest Fixture			75	m
Pipe Size Based on the No. of Fixtures Served			50	mm

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Table 6
Fire Underwriters Survey

FORM Architecture Engineering | **Project No.** 17-095-57E
Rainy River DSSB - 8 Plex Apartment | **Date:** 9-May-17
Fort Frances, Ontario

Note: This estimate of required fire flow for the proposed development is based on 1999 ed. of "Water Supply for Public Fire Protection" as developed by the Fire Underwriters Survey (FUS).

Outline of Procedure (FUS, 1999)

A. Determine the type of construction.
B. Determine the ground floor area.
C. Determine the height in storeys.
D. Using the fire flow formula, determine the required fire flow to the nearest 1,000L
E. Determine the increase or decrease for occupancy and apply to the value obtained in Table D (FUS, 1999). Do not round
F. Determine the decrease,if any, for automatic sprinkler protection. Do not round off the value.
G. Determine the total increase for exposures. Do not round off the value.
H. To the answer obtained in E, subtract the value obtained in F and add the value obtained in G.
*The final figure is customarily rounded off to the nearest 1000 L/min. (FUS, 1999)

1.0 <u>24 Unit 3 Story Apartment - Royston Ct</u>

A. Combustible construction		**C**	**1**	
B. Groundfloor area			195	sq.m
C. Storeys			2	
		Total Area, A	**390**	
D. **F = 220 C A$^{1/2}$**		F =	4345	L/min
		Fire Flow, F	**4345**	**L/min**
E. Occupancy, entertainment complex		Adjustment	0%	
F. Automatic sprinkler protection, proposed		Adjustment	-30%	
G. Increase for exposure	3.1m to 10m	Adjustment, N	25%	
	30.1m to 45m	Adjustment, E	5%	
	3.1m to 10m	Adjustment, S	25%	
	3.1m to 10m	Adjustment, W	25%	
H. Overall adjustments to fire flow estimates		Total Adjustments:	50%	6516.977827 L/min
Therefore the final F_F estimate is:		**Final Fire Flow, F_F =**	**<u>7000</u>**	**<u>L/Min</u>**
			<u>117</u>	**<u>L/s</u>**
With a corresponding required duration of fire flow of:			**<u>2</u>**	**<u>Hours</u>**

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Table 7
Sanitary Hydraulic Design Sheet

FORM Architecture Engineering
Rainy River DSSB - 8 Plex Apartment
Fort Frances, Ontario
Project No. 17-095-57E

Smooth Wall Pipe, n = 0.013
Design Flow for Residential, q= 450 L/capita/d
Extraneous, E = 0.28 L/ha/s

I = unit of peak extraneous flow
Q(p) = peak population flow (L/s)
Q(I) = peak extraneous flow (L/s)
Q(d) = peak design flow (L/s)

Peaking Factor (Harmon):
$M = 1 + 14 / (4 + (P/1000)^{0.5})$
Q(p) = (P/1000)qM/86.4
Q(I) = IA (L/s); Area in ha.
Q(d) = Q(p) +Q(I) (L/s)

Mannings Equation
Qcap=(D/1000)^2.667*(S/100)^0.5(3.211*n)*1000 L/s
D: pipe size (mm)
S: slope (grade) of pipe (%)
n: roughness coefficient

Location			Individual		Accumulative		Peaking	Avg	Peak	Extran.	Total	Length	Size	Slope	Capacity	Velocity	Q(d) /
Street/Lot	From	To	P, cap	Area, ha	P, cap	Area, ha	Factor, M	Q(A), L/s	Q(p), L/s	Q(I), L/s	Q(d), L/s	L , m	D, mm	S, m/m	Qcap(full),L/s	V(full),m/s	Qcap
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
8-Plex	Onsite	MH1	32	0.18	32	0.18	4.35	0.17	0.73	0.0504	0.78	15.2	150	0.02	21.51	1.22	4%
											0.78	46	150	0.04	30.41	1.72	3%

Appendix A: Drawing Set

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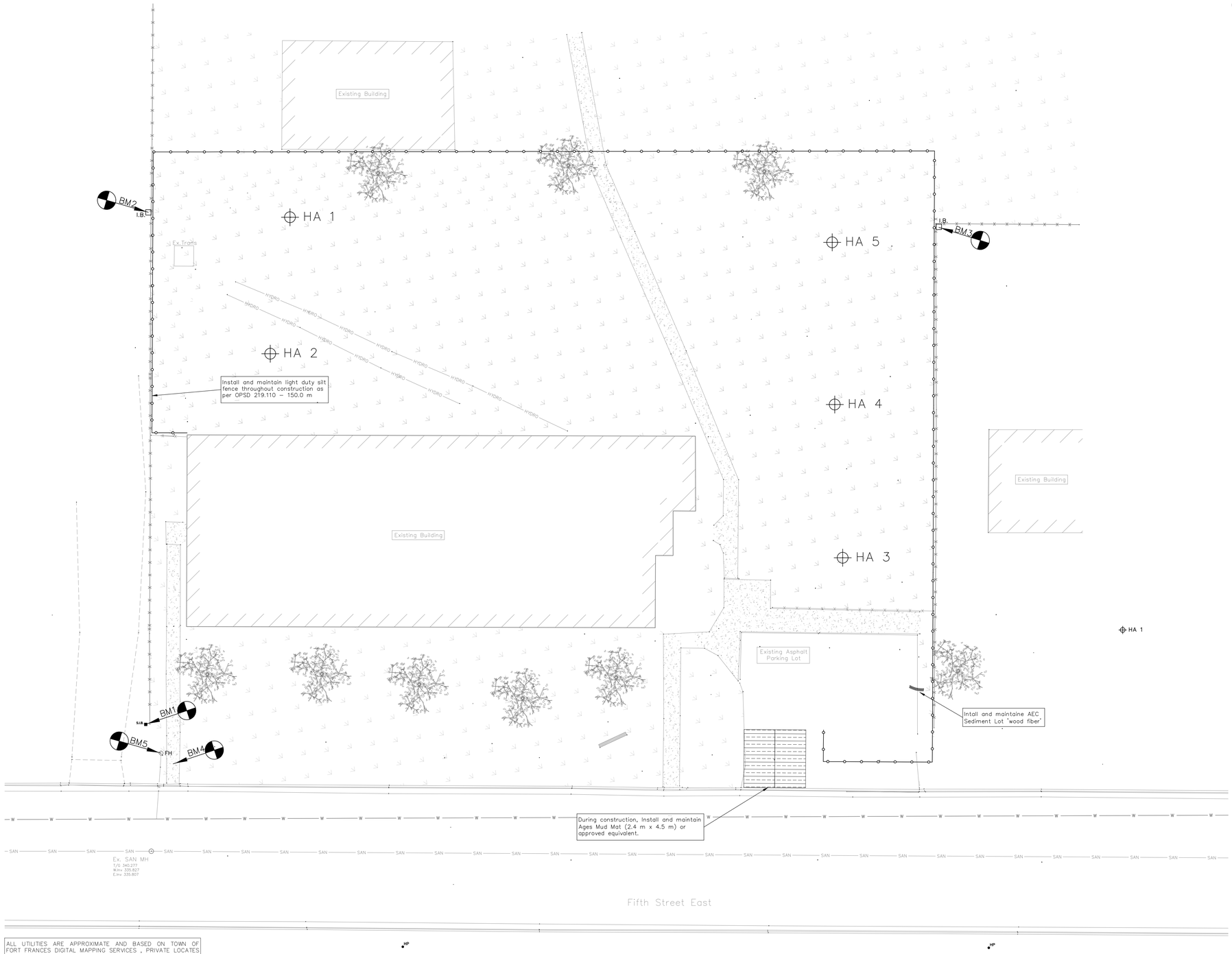
Plot Size: ARCH D (24.00 X 36.00 INCHES)



13: INSTALL BACK FLOW PREVENTER AS PER OBC

EROSION AND SEDIMENT CONTROL:

1: CONTRACTOR SHALL INSTALL EROSION AND SEDIMENTATION CONTROLS AS ILLUSTRATED IN THE CIVIL DRAWING SET PRIOR TO CONSTRUCTION AND SHALL MAINTAIN IN GOOD CONDITION UNTIL CONSTRUCTION IS COMPLETED AND VEGETATED COVER HAS BEEN ESTABLISH

2: ALL SILT FENCING TO BE INSTALLED PRIOR TO ANY AREA GRADING, EXCAVATING OR DEMOLITION WORK.

3: SILT FENCING TO BE INSTALLED AROUND BASE OF ALL STOCK PILES.

4: EROSION CONTROL PROTECTION TO BE PROVIDED AROUND ALL STORM MANHOLES AND CATCHBASINS AS INDICATED IN THE DRAWING SET.

5: ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES MAY BE IDENTIFIED AND REQUIRED ONSITE WHILE CONSTRUCTION IS IN PROGRESS. CONTRACTOR TO PROVIDE ADDITIONAL STRUCTURE AS DIRECTED.

6: EROSION AND SEDIMENTATION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACE HAS BEEN STABILIZED BY VEGETATED COVER.

7: ALTERNATIVE EROSION AND SEDIMENTATION CONTROL STRUCTURES MUST FIRST RECEIVE THE APPROVAL OF THE ENGINEER AND THE CITY BEFORE BEING CONSTRUCTED.

8: CONTRACTOR TO CLEAN ROADWAY AND SIDEWALKS OF SEDIMENTS RESULTING FROM CONSTRUCTION TRAFFIC FROM THE SITE EACH DAY.

9: CONTRACTOR TO INSTALL MUD MAT AS SPECIFIED IN THE CONTRACT DRAWINGS. THE SUBJECT SITE IS TO HAVE ONLY ONE POINT OF INGRESS/EGRESS VIA THE MUD MAT.

Hand Auger Identification Chart

Hand Auger No.	Depth (m)	Material
HA #1	0.0 – 0.5	Silty Sand
	0.5 – 1.0	Sand
	1.0 – 1.5	Silt/Clay
	1.5 – 2.0	Sand
HA #2	0.0 – 0.5	Silty Sand
	0.5 – 1.0	Sand
	1.0 – 1.5	Silt/Clay
	1.5 – 2.0	Sand
HA #3	0.0 – 0.5	Silty Sand
	0.5 – 1.5	Coarse Sand/Gravel
	1.5	Refusal
HA #4	0.0 – 0.5	Silty Sand
	0.5 – 1.0	Coarse Sand
	1.0 – 1.5	Silt/Clay
	1.5 – 2.0	Sand/Silt
HA #5	0.0 – 0.5	Silty Sand
	0.5 – 1.0	Coarse Sand
	1.0 – 1.5	Silt/Clay
	1.5 – 2.0	Sand

Legend

MH	New Manhole	W	Proposed Watermain
MH	Existing Manhole	W	Existing Watermain
FH	New Fire Hydrant	SAN	Proposed Sanitary Sewer
FH	Existing Fire Hydrant	SAN	Existing Sanitary Sewer
WV	New Water Valve	ST	Proposed Storm Sewer
WV	Existing Water Valve	ST	Existing Storm Sewer
CB	New Catch Basin		Existing Building
CB	Existing Catch Basin		New Building Addition
CS	New Curb Stop		New Topsoil and Sod
CS	Existing Curb Stop		Existing Grass
HA 1	Hand Auger Location (TGE 2017)		

ALL UTILITIES ARE APPROXIMATE AND BASED ON TOWN OF FORT FRANCES DIGITAL MAPPING SERVICES , PRIVATE LOCATES AND TGE SURVEY. THE POSITION OF POLE LINES CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS. CONTRACTOR RESPONSIBLE TO LOCATE, PROTECT AND MAINTAIN SURVEY AND PROPERTY MARKER MONUMENTS ON THE PROPERTY.ALL DIMENSIONS AND ELEVATIONS ARE IN METERS UNLESS OTHERWISE NOTED.

File No. 17-095-57E-07-01

Rainy River District Social Services Administration Board

Client

CONTROL – UTM ZONE 15 NAD 83 (CSRS) CBNv6–2010.0

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
BM 1	5384694.655	472806.126	340.384	S.I.B
BM 2	5384734.414	472806.334	340.400	I.B
BM 3	5384733.253	472867.672	340.364	I.B
BM 4	5384691.588	472808.246	340.289	PK Nail
BM 5	5384692.422	472806.563	341.011	Top Nut FH

Note

Contractor responsible for confirming all benchmarks prior to starting construction.

N

Scale

0 1.5 3 m SCALE 1:150

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DD.MM.YY	Issue.Revision.Description	Drn	Chk	Des	Eng
03.05.17	Issued for Site Plan Control	TR	AR	LV	AR
23.06.17	Re-Issued for Site Plan Control	TR	AR	LV	AR

LICENSED PROFESSIONAL ENGINEER
A.F. ROSE
100087516
23/06/17
PROVINCE OF ONTARIO

TRUE GRIT ENGINEERING

Civil Sub Consultant

Rainy River District Social Services Board
Proposed 8-Plex Residence
1300 Fifth Street East,
Fort Frances, On.

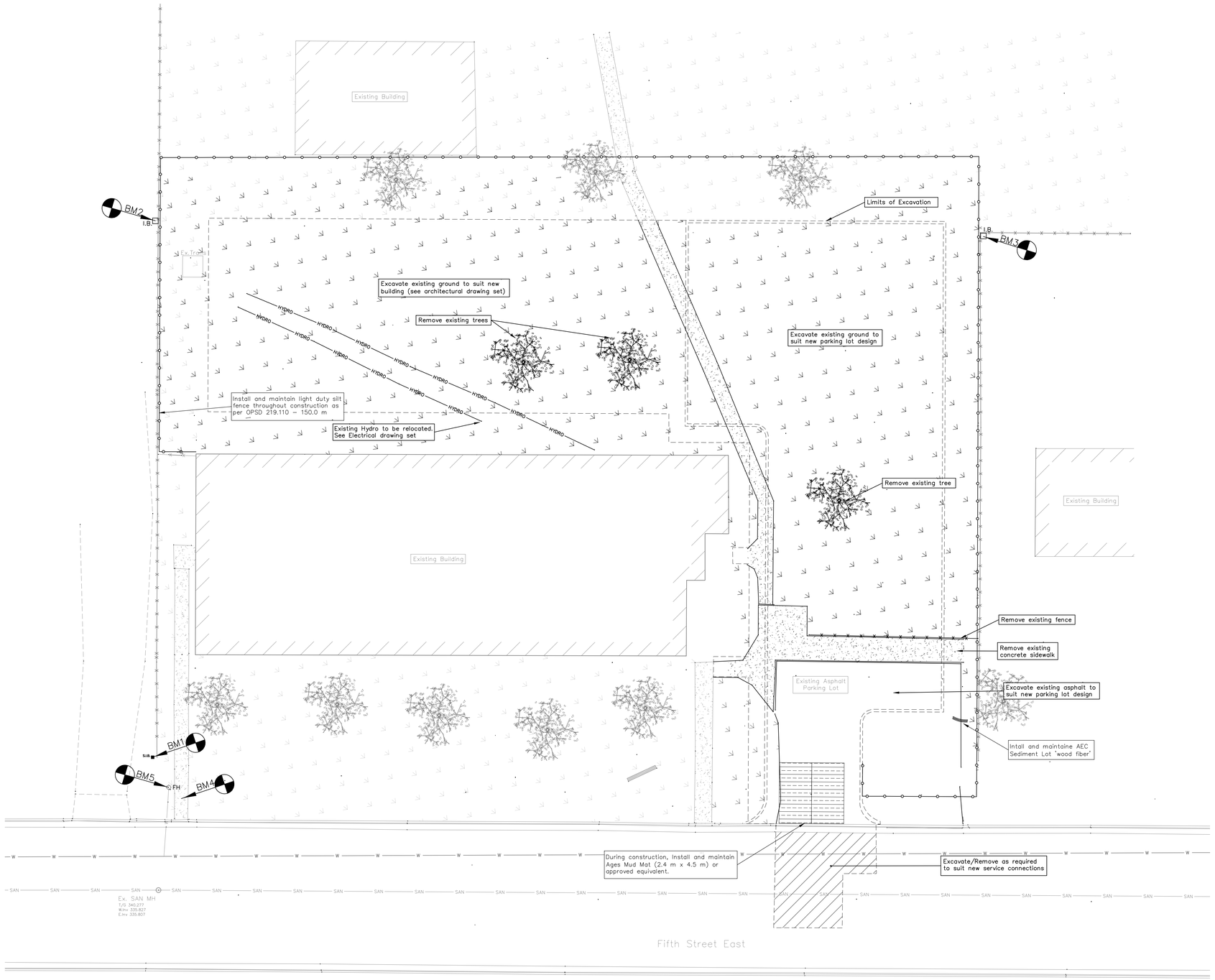
Existing Conditions

Project No. 17–095–57E

Revision 02

Drawing No. 01

Plot Size: ARCH D (24.00 X 36.00 INCHES)



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GENERAL NOTES AND DEFINITIONS:

1. THE ENTAILED SITE SERVICING AND STORMWATER MANAGEMENT DRAWING SET IS NOT FOR CONSTRUCTION UNTIL SIGNED AND SEALED BY AN ENGINEER AND APPROVED BY THE TOWN OF FORT FRANCES.
2. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE DESIGN ENGINEER 48 HOURS PRIOR TO COMMENCING WORK TO ARRANGE FOR INSPECTION. THE ENGINEER SHALL DETERMINE THE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION. FAILURE TO NOTIFY THE DESIGN ENGINEER WILL RESULT IN EXTENSIVE POST CONSTRUCTION INSPECTION AT THE CONTRACTORS EXPENSE.
3. SITE PLAN INFORMATION SUPPLIED BY FORM ARCHITECTURE.
4. THESE PLANS ARE FOR SITE SERVICING AND GRADING USE ONLY; ANY OTHER INFORMATION PROVIDED HEREIN IS FOR ILLUSTRATION PURPOSES ONLY. THESE PLANS MUST NOT BE USED TO SITE THE PROPOSED BUILDING.
5. NO CHANGES ARE TO BE MADE WITHOUT THE WRITTEN APPROVAL OF THE DESIGN ENGINEER.
6. THESE PLANS ARE NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE WRITTEN PERMISSION OF TRUE GRIT ENGINEERING.
7. THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO EXISTING INFRASTRUCTURE.
8. ALL WORKS ON A MUNICIPAL RIGHT–OF–WAY OR CONNECTION TO TOWN SERVICES SHALL BE INSTALLED BY THE TOWN OF FORT FRANCES UPON APPLICATION BY THE OWNER AT THE OWNER'S EXPENSE. THE CONTRACTOR IS TO CONNECT TO THESE SERVICES AND RESTORE ALL AFFECTED PROPERTY TO ITS ORIGINAL CONDITION.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUPPLY, SAFE STORAGE, HANDLING, AND QUALITY CONTROL OF ALL MATERIALS SET FORTH IN THIS CONTRACT.
10. THE CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING ALL LINES, GRADES, AND SLOPES TO PRODUCE THE INTENT OF THE WORK.
11. ALL MATERIALS SUPPLIED IN THIS DRAWING SHALL BE SUBJECT TO INSPECTION AND TESTING BY THE ENGINEER AND/OR BY THE TESTING LABORATORY DESIGNATED BY THE ENGINEER.
12. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES WITHIN THE CONSTRUCTION ZONE PRIOR TO COMMENCING WORK AND SHALL EXERCISE THE NECESSARY CARE AND PRECAUTIONS TO SAFEGUARD UTILITIES FROM DAMAGE.
13. CONTRACTOR RESPONSIBLE TO LOCATE, PROTECT AND MAINTAIN SURVEY AND PROPERTY MARKER MONUMENTS ON THE PROPERTY.
14. CONTRACTOR TO MAINTAIN A 'CONFINED TRENCH CONDITION' IN ALL SEWER AND SERVICE TRENCHES.
15. ALL WORK SHALL BE IN ACCORDANCE WITH THE ONTARIO HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
16. ANY WORK OCCUPYING ROAD SPACE TO FOLLOW MTO OTM BOOK7.
17. WATERMAIN, SANITARY SEWER, STORM SEWER UTILITIES AND INFRASTRUCTURE LOCATIONS ARE APPROXIMATE ONLY. CONTRACTOR TO CONFIRM LOCATION OF PIPE, SEWER AND INFRASTRUCTURE PRIOR TO WORK START.
18. MINIMUM INCONVENIENCE TO THE PUBLIC IS PRIORITY; THEREFORE, CONTRACTOR SHALL LEAVE EXTERNAL ROUTES AVAILABLE FOR PEDESTRIAN AND VEHICULAR TRAFFIC.
19. THE CONTRACTOR SHALL KEEP THE SITE CLEAN, SWEEPING EQUIPMENT MAY BE REQUIRED FOR PUBLIC ROADS.
20. FOR EXCAVATIONS THAT EXPOSE INFRASTRUCTURE, ALL PIPE AND SEWER WORK IS TO BE SUPPORTED SUCH THAT STRUCTURAL INTEGRITY IS ACHIEVED AND THAT THERE IS NO LEAKAGE.
21. PROPERTY LIMIT VERIFICATION IS THE RESPONSIBILITY OF THE CONTRACTOR, WHO IS TO ENSURE ALL NEW CONSTRUCTION IS WITHIN THE PROPERTY LIMITS. IN ADDITION, CONTRACTOR IS RESPONSIBLE TO ENSURE REQUIRED SETBACKS ARE ACHIEVED AS ILLUSTRATED IN THE ARCHITECTS DRAWING.
29. PROPOSED BUILDING FOOTPRINT IS APPROXIMATE ONLY, CONTRACTOR SHALL REFER TO ARCHITECTURAL DRAWINGS FOR ACTUAL LOCATION.
30. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE MINIMUM EROSION AND SEDIMENTATION CONTROLS PRESCRIBED BY THE MINISTRY OF ENVIRONMENT AND SPECIFICATIONS OF THE CONTRACT.
31. DEWATER AS PER OPSS 517 AND 518. IF INDICATIONS OF CONTAMINATED WATER, IMMEDIATELY CONTACT THE ENGINEER. ALL POTENTIALLY CONTAMINATED SOURCES OF WATER TO DISPOSED OF IN ACCORDANCE WITH MINISTRY OF ENVIRONMENT REGULATIONS, OFFSITE BY A LICENSED CONTRACTOR.
32. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE OWNER (OR THEIR CONTRACTOR) TO OBTAIN THE VARIOUS PERMITS / APPLICATIONS NORMALLY REQUIRED TO COMPLETE A CONSTRUCTION PROJECT SUCH AS, BUT NOT LIMITED TO:
   - 32.1. ENTRANCE PERMIT.
   - 32.2. ROAD CLOSURE / SIDEWALK CLOSURE PERMIT.
   - 32.3. BUILDING PERMIT.
   - 32.4. ENCROACHMENT / LICENSE AGREEMENTS.
   - 32.5. SEWER AND WATER CONNECTION APPLICATIONS.

33. ALL DIMENSIONS AND ELEVATIONS IN METERS UNLESS OTHERWISE NOTED.
34. LICENSED PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR CERTIFICATION.

ANY DISTURBED AREAS ARE TO BE REINSTATED WITH TOPSOIL AND SOD TO THE SATISFACTION OF THE MUNICIPALITY

EQUIPMENT / DEMOLITION NOTES:

1. THE TYPE OF EQUIPMENT USED SHALL BE SUITED TO THE MATERIAL TO BE COMPACTED, EXCAVATED, GRADED, AND PLACED TO THE DEGREE REQUIRED AND SPACE AVAILABLE.
2. EXCESS MATERIALS REMOVED AND NOT INCORPORATED INTO THE WORK, AS INDICATED IN THE CONTRACT DOCUMENTS, SHALL BECOME THE PROPERTY AND RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE MANAGED AND DISPOSED OF IN ACCORDANCE WITH OPSS 180 OFF PROPERTY.
3. DURING EXCAVATION WORK, THE CONTRACTOR SHALL BE CAREFUL NOT TO UNDERMINE EXISTING STRUCTURE OR DAMAGE UTILITIES.

Legend

MH	New Manhole	W	Proposed Watermain
MH	Existing Manhole	W	Existing Watermain
FH	New Fire Hydrant	SAN	Proposed Sanitary Sewer
FH	Existing Fire Hydrant	SAN	Existing Sanitary Sewer
WV	New Water Valve	ST	Proposed Storm Sewer
WV	Existing Water Valve	ST	Existing Storm Sewer
CB	New Catch Basin		Existing Building
CB	Existing Catch Basin		New Building Addition
CS	New Curb Stop		New Topsoil and Sod
CS	Existing Curb Stop		Existing Grass
HA 1	Hand Auger Location (TGE 2017)		

File No. 17-095-57E-07-01

Rainy River District Social Services Administration Board

Client

Scale

N

0 1.5 3 m SCALE 1:150

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DD.MM.YY	Issue.Revision.Description	Drn	Chk	Des	Eng
03.05.17	Issued for Site Plan Control	TR	AR	LV	AR
23.06.17	Re-Issued for Site Plan Control	TR	AR	LV	AR

LICENSED PROFESSIONAL ENGINEER A. F. ROSE 100087510 23/06/17 PROVINCE OF ONTARIO

TRUE GRIT ENGINEERING

Civil Sub Consultant

Rainy River District Social Services Board
Proposed 8-Plex Residence
1300 Fifth Street East,
Fort Frances, On.

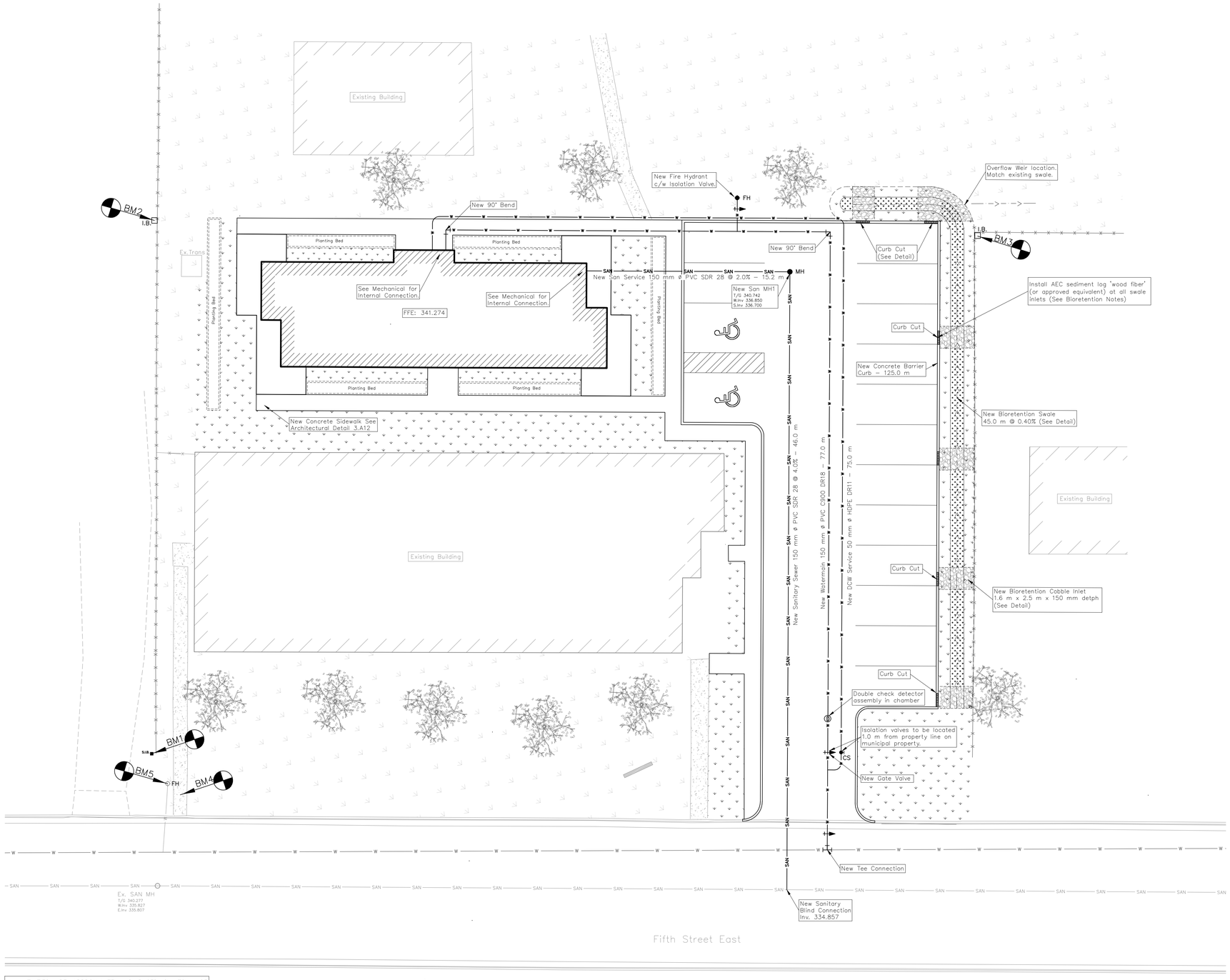
Removals and Excavation Plan

Project No. 17–095–57E

Revision 02

Drawing No. 02

Plot Size: ARCH D (24.00 X 36.00 INCHES)



ALL UTILITIES ARE APPROXIMATE AND BASED ON TOWN OF FORT FRANCES DIGITAL MAPPING SERVICES , PRIVATE LOCATES AND TGE SURVEY. THE POSITION OF POLE LINES CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS. CONTRACTOR RESPONSIBLE TO LOCATE, PROTECT AND MAINTAIN SURVEY AND PROPERTY MARKER MONUMENTS ON THE PROPERTY.ALL DIMENSIONS AND ELEVATIONS ARE IN METERS UNLESS OTHERWISE NOTED.

NOTES FOR SERVICES INSTALLATION

1: WATER, SANITARY AND STORM INFRASTRUCTURE ARE TO BE CONSTRUCTED IN ACCORDANCE TO OPSS STANDARDS: 401, 410, 441, 517, 518, 1010, AND 1841.
2: EXISTING ELEVATIONS NOTED ARE APPROXIMATE ONLY. CONTRACTOR TO CONFIRM AND ADJUST TO SUIT ACTUAL ELEVATIONS.
3: ALL WATERMAIN, SANITARY AND STORM SEWER INFRASTRUCTURE SHALL BE INSPECTED BY THE ENGINEER PRIOR BACKFILLING EXCAVATION.
4: ALL WATERMAIN, SANITARY AND STORM SEWER INFRASTRUCTURE SHALL BE THE CURRENT MODEL YEAR.
5: ALL PIPE AND SEWERS ARE TO BE CLEAN INSIDE PRIOR TO INSTALLATION.
6: WATERMAIN, SANITARY AND STORM SEWER WITHIN PRIVATE PROPERTY TO FOLLOW SPATIAL (JOINT) SEPARATION AS PER OBC (2012) SECTION 7.3.5.7.
7: WATERMAIN, STORM AND SANITARY SEWERS TO BE 2.5m APART WHERE POSSIBLE, WITH A MINIMUM VERTICAL SEPARATION OF 0.5m. VARIATIONS FROM THESE REQUIREMENTS ARE SUBJECT TO THE APPROVAL OF THE ENGINEER.
8: MINIMUM DEPTH OF COVER FOR THE WATER LINE SHALL BE 2.2m. DEPTHS LESS THAN 2.2m SHALL BE INSULATED IN ACCORDANCE WITH OPSD 1109.030.
9: A MINIMUM CLEARANCE BETWEEN PIPE CROSSINGS OF 75mm IS TO BE ACHIEVED.
10: FACTORY FABRICATED WYES SHALL BE USED FOR ALL PRIVATE STORM AND SANITARY SERVICE CONNECTIONS.
11: UNDER NO CIRCUMSTANCES SHALL THE BUILDING FOUNDATION DRAINS BE CONNECTED DIRECTLY TO THE STORM SEWER SYSTEM.
12: IF REQUIRED, EXISTING COPPER WATER SERVICE CONNECTIONS SHALL BE RECONNECTED TO EXISTING WATERMAIN USING 50mm TYPE 'K' COPPER AND APPROVED COUPLINGS TEES AND SADDLES. VERIFY SIZES OF ALL CONNECTIONS THAT ARE LARGER THAN 50mm. MATCH TO EXISTING SIZE USING SIMILAR MATERIALS.
13: THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING FIELD LOCATES TO DETERMINE THE PIPE TYPE, LOCATION AND DEPTH OF EXISTING WATER CONNECTIONS.
14: THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOWERING, RAISING AND RECONNECTION OF EXISTING SERVICES AS REQUIRED TO SUIT THE NEW CONSTRUCTION.

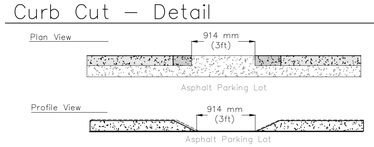
SANITARY AND STORM SEWER

1: TYPE OF SEWER PIPE, CLASS, ORIENTATION, SLOPE AND LENGTH ARE OUTLINED IN THE CONTRACT DRAWING.
2: EXISTING SEWER CONNECTIONS TYPE AND SIZE TO BE CONFIRMED PRIOR TO ORDERING NEW MATERIALS TO ENSURE COMPATIBILITY.
3: NEW SEWERS TO BE CONSTRUCTED AS SHOWN ON THIS DRAWING AND IN ACCORDANCE WITH OPSS 410, 1010, AND 1841.
4: ALL CHANGES IN DIRECTION OR INTERSECTION OF SEWER PIPE SHALL OCCUR IN A MANHOLE UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
5: NEW SANITARY SERVICE AND MANHOLE CONNECTIONS TO HAVE CLASS "B" BEDDING.
6: NEW SANITARY MANHOLES SHALL BE CONSTRUCTED AS PER OPSD 700.032, UNLESS DIRECTED OTHERWISE BY THE ENGINEER. FINAL COVER ELEVATION TO SUIT FINAL ASPHALT GRADES
6: ALL SANITARY SEWER WITH LESS THAN 2.5m OF COVER SHALL BE INSULATED IN ACCORDANCE WITH OPSD 1109.030.
7: ENDS OF SANITARY STUBS SHALL BE MARKED WITH A 4"X4"X10' BOARD PAINTED RED.
8: ALL MANHOLE FRAMES AND COVERS SHALL BE RESET TO NEW FINAL GRADE.

WATERMAIN CONSTRUCTION:

1: EXISTING WATERMAIN PIPE CONNECTION FOR SERVICE CONNECTION SHALL BE CONFIRMED FOR PIPE TYPE AND SIZE PRIOR TO ORDER OF NEW MATERIALS TO ENSURE COMPATIBILITY.
2: NEW WATERMAIN TO BE CONSTRUCTED AS SHOWN ON THIS DRAWING AND APPLICABLE OPSD'S.
3: NEW WATER LINE TO HAVE CLASS B BEDDING. BACKFILL TO BE GRANULAR B TYPE I. BEDDING, HAUNCHES AND BACKFILL COMPACTED TO 95% SPDD. SHOVEL MATERIAL INTO HAUNCHES. HAND HELD PLATE PACKERS UP TO HAUNCHES. MATERIAL SPECIFICATIONS AS PER OPSS 1010.
4: NEW SERVICE SHALL HAVE NO. 2/7 STRAND RWU–90 COPPER THAW/TRACER WIRE. THE THAW/TRACER WIRE SHALL BE CAD WELDED TO METALLIC FITTINGS, VALVES AND HYDRANT BOOTS.
5: FLUSHING AND CHLORINATION METHOD TO FOLLOW AWWA C651 STANDARDS AND MOECC DESIGN OF DRINKING WATER SYSTEMS (2008).
6: FIELD DE–CHLORINATION METHOD TO FOLLOW AWWA C655 STANDARDS AND MOECC DESIGN OF DRINKING WATER SYSTEMS (2008).
7: ALL PRIVATE FIRE LINES SHALL HAVE ONE (1) SWAB INSTALLED IN THE SYSTEM FOR FLUSHING PURPOSES.
8: NEW WATERMAIN WORK SHALL BE PHYSICALLY SEPARATED FROM THE EXISTING DISTRIBUTION SYSTEM UNTIL AFTER DISINFECTION IS SUCCESSFULLY COMPLETED.
9: CONTRACTOR IS RESPONSIBLE FOR ANY POINTS WITHIN THE EXISTING WATER DISTRIBUTION SYSTEM TO ENSURE SUITABLE WATER QUALITY AS A RESULT OF ANY ISOLATION ON DEAD ENDS DURING THE WORK.
10: CONTRACTOR TO PROVIDE TEMPORARY WATER SUPPLY TO ALL HOMES/BUSINESSES THAT WILL BE AFFECTED BY THE NEW WATERMAIN CONSTRUCTION. THE CONTRACTOR MAY CHOOSE TO RETAIN THE EXISTING WATERMAIN IN SERVICE DURING THE CONSTRUCTION OR PROVIDE OTHER TEMPORARY DISTRIBUTION.
11: THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING FIELD LOCATES TO DETERMINE THE PIPE TYPE, LOCATION AND DEPTH OF INFRASTRUCTURE.
12: THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOWERING, RAISING AND RECONNECTION OF EXISTING SERVICES AS REQUIRED TO SUIT THE NEW CONSTRUCTION.

Curb Cut – Detail



File No. 17-095-57E-07-01

Rainy River District Social Services Administration Board

Client

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DD.MM.YY	Issue.Revision.Description	Drn	Chk	Des	Eng
03.05.17	Issued for Site Plan Control	TR	AR	LV	AR
23.06.17	Re-Issued for Site Plan Control	TR	AR	LV	AR

LICENSED PROFESSIONAL ENGINEER A.F. ROSE 100087516 23/06/17 PROVINCE OF ONTARIO

TRUE GRIT ENGINEERING

Civil Sub Consultant

Rainy River District Social Services Board
Proposed 8-Plex Residence
1300 Fifth Street East,
Fort Frances, On.

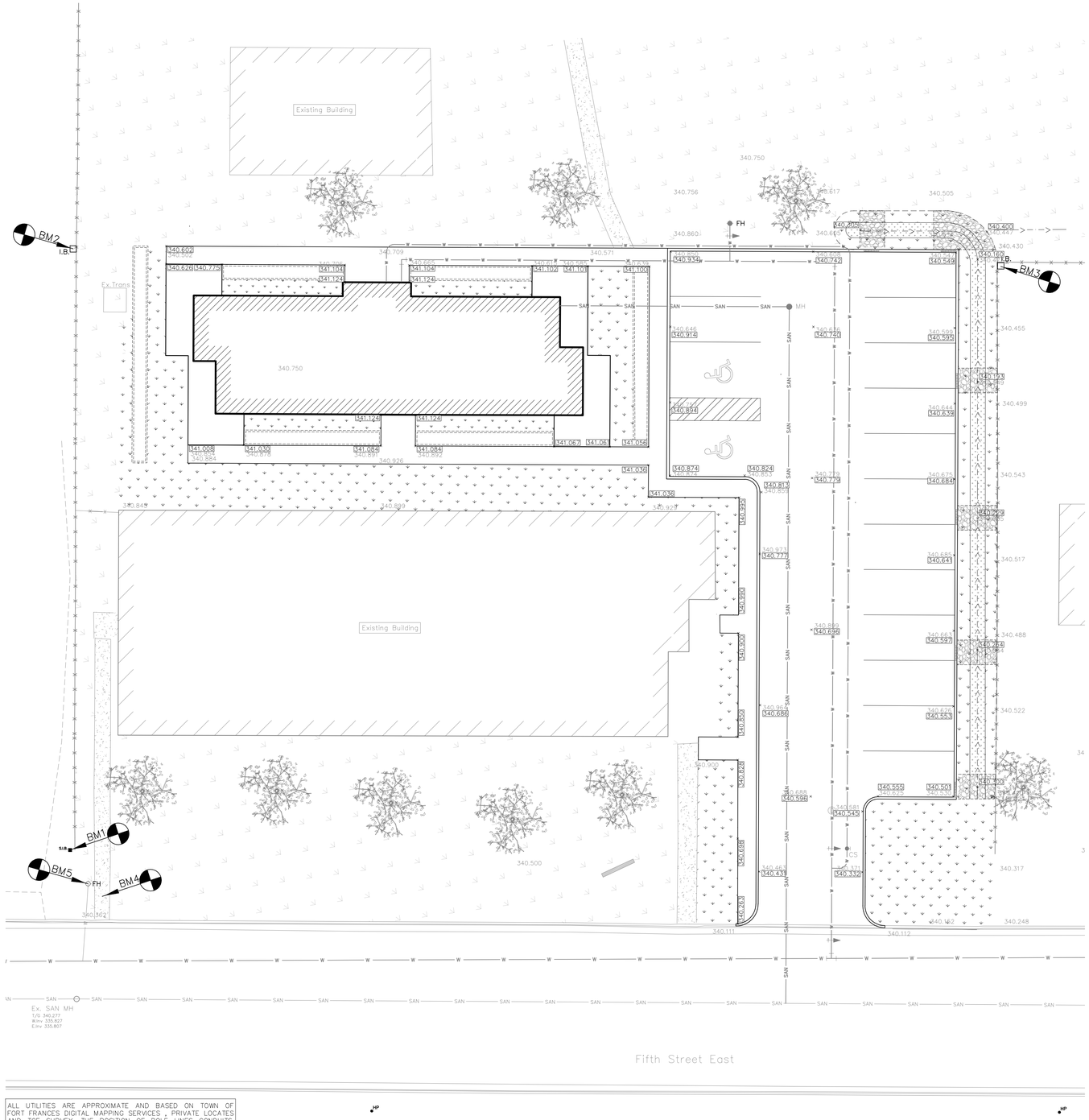
New Construction

Project No. 00–000–00E

Revision 00

Drawing No. 03

Plot Size: ARCH D (24.00 X 36.00 INCHES)



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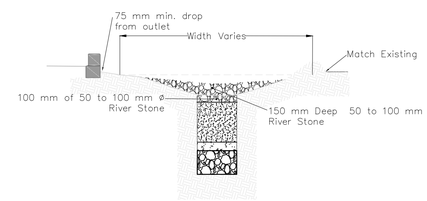
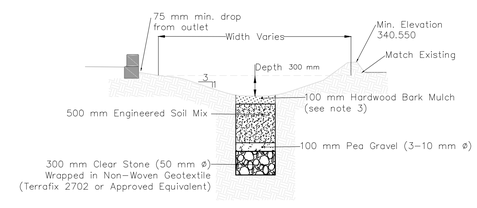
APPLICABLE ONTARIO STANDARD DRAWINGS (OPSD'S)

219.110	LIGHT–DUTY SILT FENCE BARRIER
400.001	HOISTING HOOK RIB FOR CAST IRON FRAMES FOR CATCH BASINS, MAINTENANCE HOLES, AND VALVE CHAMBERS
701.010	PRECAST CONCRETE MAINTENANCE HOLE (1200MM DIA.)
701.030	PRECAST CONCRETE MAINTENANCE HOLE COMPONENTS (1200MM DIA. TAPERED TOP AND FLAT CAP)
701.031	PRECAST CONCRETE MAINTENANCE HOLE COMPONENTS (1200MM DIA. RISER AND MONOLITHIC BASE)
700.032	PRECAST CONCRETE MAINTENANCE HOLE COMPONENTS (1200MM DIA. BASE SLAB)
802.030	RIGID PIPE BEDDING, COVER, AND BACKFILL TYPE 1 OR 2 SOIL – EARTH EXCAVATION
802.031	RIGID PIPE BEDDING, COVER, AND BACKFILL TYPE 3 SOIL – EARTH EXCAVATION
802.032	RIGID PIPE BEDDING, COVER, AND BACKFILL TYPE 4 SOIL – EARTH EXCAVATION
802.033	RIGID PIPE BEDDING, COVER, AND BACKFILL ROCK EXCAVATION
802.030	RIGID PIPE BEDDING, COVER IN EMBANKMENT RIGIC=NAL GROUND: EARTH OR ROCK
1006.010	SEWER SERVICE CONNECTIONS FOR RIGID MAIN PIPE SEWER
1006.020	SEWER SERVICE CONNECTIONS FOR FLEXIBLE MAIN PIPE SEWER
1103.010	CONCRETE THRUST BLOCKS FOR TEES, PLUGS, AND HORIZONTAL BENDS
1103.020	CONCRETE THRUST BLOCKS FOR VERTICAL BENDS
1103.021	DIMENSION TABLES FOR CONCRETE THRUST BLOCKS FOR VERTICAL BENDS
1104.010	WATER SERVICE CONNECTION 19 AND 25MM DIA. SIZES
1104.020	WATER SERVICE CONNECTION 32, 38, AND 50MM DIA. SIZES
1104.030	BLOW OFF INSTALLATION
1105.010	HYDRANT INSTALLATION
1109.010	CATHODIC PROTECTION FOR METALLIC WATERMAIN SYSTEMS
1109.011	CATHODIC PROTECTION FOR PVC WATERMAIN SYSTEMS
1109.013	ANODE INSTALLATION OVER PIPE METHOD FOR EXISTING METALLIC WATERMAINS

Bioretention Cobble Inlet – Detail



Bioretention Swale – Detail



Notes:
1. Contractor to ensure positive drainage.
2. Contractor to place cobbles at inlet. location as specified on the drawing. See cobble inlet detail.
3. 100 mm Hardwood Bark Mulch to be used if planting will occur in swale. If no planting is to occur, replace Hardwood Bark Mulch with Sod.

GRADING NOTES:

1. EXISTING ASPHALT/CONCRETE, BASE, SUBBASE, AND SUBGRADE TO BE REMOVED TO THE DEPTH AND WIDTH SPECIFIED.
2. GRANULAR MATERIALS SHALL BE COMPACTED IN 150mm LIFTS AND BE COMPACTED TO 100% OF A STANDARD PROCTOR IN ACCORDANCE WITH OPSS STANDARDS 314, 501, AND 1010.
3. VERTICAL ELEVATIONS SHALL BE WITHIN +/– 15mm, WHILE MAINTAINING THE INTENT OF FLOWS AND POSITIVE DRAINAGE.
4. ASPHALT/CONCRETE WALKWAY SHALL BE CONSTRUCTED WITH POSITIVE GRADING WITH NO AREAS OF PONDING WATER PERMITTED IN ACCORDANCE WITH OPSS 311.
5. ALL MANHOLE COVERS TO BE FIELD FIT TO MATCH EXISTING GRADES OF ASPHALT. GRADES PROVIDED ARE APPROXIMATE ONLY.
6. THE ELEVATIONS AND GRADES ON THE CONTRACT DRAWINGS ARE FOR GENERAL GRADING PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR SETTING FINAL GRADES AND ELEVATIONS TO ENSURE THE INTENT OF THE WORK IS CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE SPECIFICATIONS AND TYPICAL DRAWINGS INCLUDED IN THE CONTRACT DOCUMENTS. ANY ADJUSTMENTS MADE TO THE GRADES OR ELEVATIONS ON THE CONTRACT DRAWINGS SHALL BE PROVIDED TO THE CONSULTANT A MINIMUM OF 48 HOURS PRIOR TO ANY PLACEMENT OF MATERIALS INTO THE WORK.
7. IN THE EVENT SUBDRAINS ARE ENCOUNTERED, CONTRACTOR SHALL REPAIR/REPLACE TO ORIGINAL CONDITION.
8. BOULEVARDS TO BE RESTORED WITH 75mm OF TOPSOIL AND SEED/MULCH. LIMITS SHALL BE DETERMINED AT THE TIME OF CONSTRUCTION. TOPSOIL SHALL BE IN ACCORDANCE WITH OPSS 802 AS REQUIRED TO MATCH INTO EXISTING FEATURES AND MATCHING INTO GRASSED YARDS OR AREAS. THE EXISTING SURFACE SHALL BE STRIPPED, AND GRADED WITH 75mm OF TOPSOIL AND SEED/MULCH. SEED AND MULCH SHALL BE PLACED IN ALL AREAS OF TOPSOIL PLACEMENT IN ACCORDANCE WITH OPSS 804.

BIORETENTION SWALE:

1. BIORETENTION ENGINEERED SOIL MIX COMPOSITION:
   1.1. SAND (2.0 TO 0.050 MM DIA. – 85 TO 88% BY WEIGHT.
   1.2. FINES (<0.050 MM DIA.) – 8 TO 12% BY WEIGHT.
   1.3. ORGANIC MATTER – 3 TO 5% BY WEIGHT.
   1.4. ENGINEERED SOIL SHALL HAVE THE FOLLOWING PROPERTIES;
      1.4.1. PHOSPHORUS SOIL TEST (P–INDEX) VALUE BETWEEN 10 TO 30 PPM.
      1.4.2. CATIONIC EXCHANGE CAPACITY (CEC) EXCEEDIGN 10 MILLIEQUIVALENTS PER 100 GRAMS (MEQ/100G).
      1.4.3. THE MIXTURE SHOULD BE FREE OF STONES,STUMPS,ROOTS, OR OTHER SIMILAR OBJECTS LARGER THAN 50 MM.
      1.4.4. PH BETWEEN 5.5 TO 7.5.
      1.4.5. THE MEDIA SHOULD HAVE AN INFILTRATION RATE OF GREATER THAN 25MM/HR.
2. GEOTEXTILE TO CONFORM TO OPSS 1860 FOR CLASS II GEOTEXTILE FABRIC.
3. PEA GRAVEL: 100 MM DEEP LAYER OF 3 – 10 MM DIA. WASHED CLEAR STONE. NO FINES.
4. GRAVEL STORAGE LAYER TO BE 50 MM DIA. WASHED CLEAR STONE. NO FINES.
5. BIORETENTION AREAS SHOULD BE FULLY PROTECTED BY SILT FENCE OR CONSTRUCTION FENCING TO PREVENT SEDIMENT FROM ENTERING THE AREAS AND TO PREVENT COMPACTION BY CONSTRUCTION TRAFFIC AND EQUIPMENT.
6. INSTALLATION MAY ONLY BEGIN AFTER ENTIRE CONTRIBUTING DRAINAGE AREA HAS BEEN EITHER STABILIZED OR FLOWS HAVE BEEN SAFELY ROUTED AROUND THE AREA.
7. EXCAVATORS OR BACKHOES WORKING ADJACENT TO THE PROPOSED BIORETENTION AREA SHOULD EXCAVATE CELL TO THE APPROPRIATE DESIGN DEPTH.
8. IT MAY BE NECESSARY TO RIP/SCARIFY THE BOTTOM SOILS TO PROMOTE GREATER INFILTRATION OR EXCAVATE ANY SEDIMENT THAT MAY HAVE BUILT UP DURING CONSTRUCTION.
9. SUBMIT SOIL TEST REPORT FOR BIORETENTION ENGINEERED SOIL FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
10. BIORETENTION ENGINEERED SOIL SHOULD BE OBTAINED PREMIXED FROM A VENDOR, APPLY IN 200 MM LIFTS UNTIL DESIRED TOP ELEVATION OF BIORETENTION AREA IS ACHIEVED. THOROUGHLY WET BIORETENTION AREA AS DIRECTED BY ENGINEER. CHECK FOR SETTLEMENT AFTER 48 HOURS AND ADD ADDITIONAL MEDIA AS NEEDED.
11. PREPARE PLANTING HOLES FOR ANY TREES AND SHRUBS, INSTALL VEGETATION AND WATER ACCORDINGLY.
12. PLANT LANDSCAPING MATERIAL AS SHOWN AND WATER WEEKLY IN THE FIRST TWO MONTHS.

Legend

MH	New Manhole	W	Proposed Watermain
MH	Existing Manhole	W	Existing Watermain
FH	New Fire Hydrant	SAN	Proposed Sanitary Sewer
FH	Existing Fire Hydrant	SAN	Existing Sanitary Sewer
WV	New Water Valve / Existing Water Valve	ST	Proposed Storm Sewer
CB	New Catch Basin	ST	Existing Storm Sewer
CB	Existing Catch Basin		Existing Building
CS	New Curb Stop		New Building Addition
CS	Existing Curb Stop		New Topsoil and Sod
HA 1	Hand Auger Location (TGE 2017)		Existing Grass

File No. 17-095-57E-07-01

Rainy River District Social Services Administration Board

Client

Scale
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DD.MM.YY	Issue.Revision.Description	Drn	Chk	Des	Eng
03.05.17	Issued for Site Plan Control	TR	AR	LV	AR
23.06.17	Re–Issued for Site Plan Control	TR	AR	LV	AR

LICENSED PROFESSIONAL ENGINEER A.F. ROSE 100087516 23/06/17 PROVINCE OF ONTARIO

TRUE GRIT ENGINEERING

Civil Sub Consultant

Rainy River District Social Services Board
Proposed 8-Plex Residence
1300 Fifth Street East,
Fort Frances, On.

Proposed Grading and Stormwater Management Plan

Project No. 17–095–57E

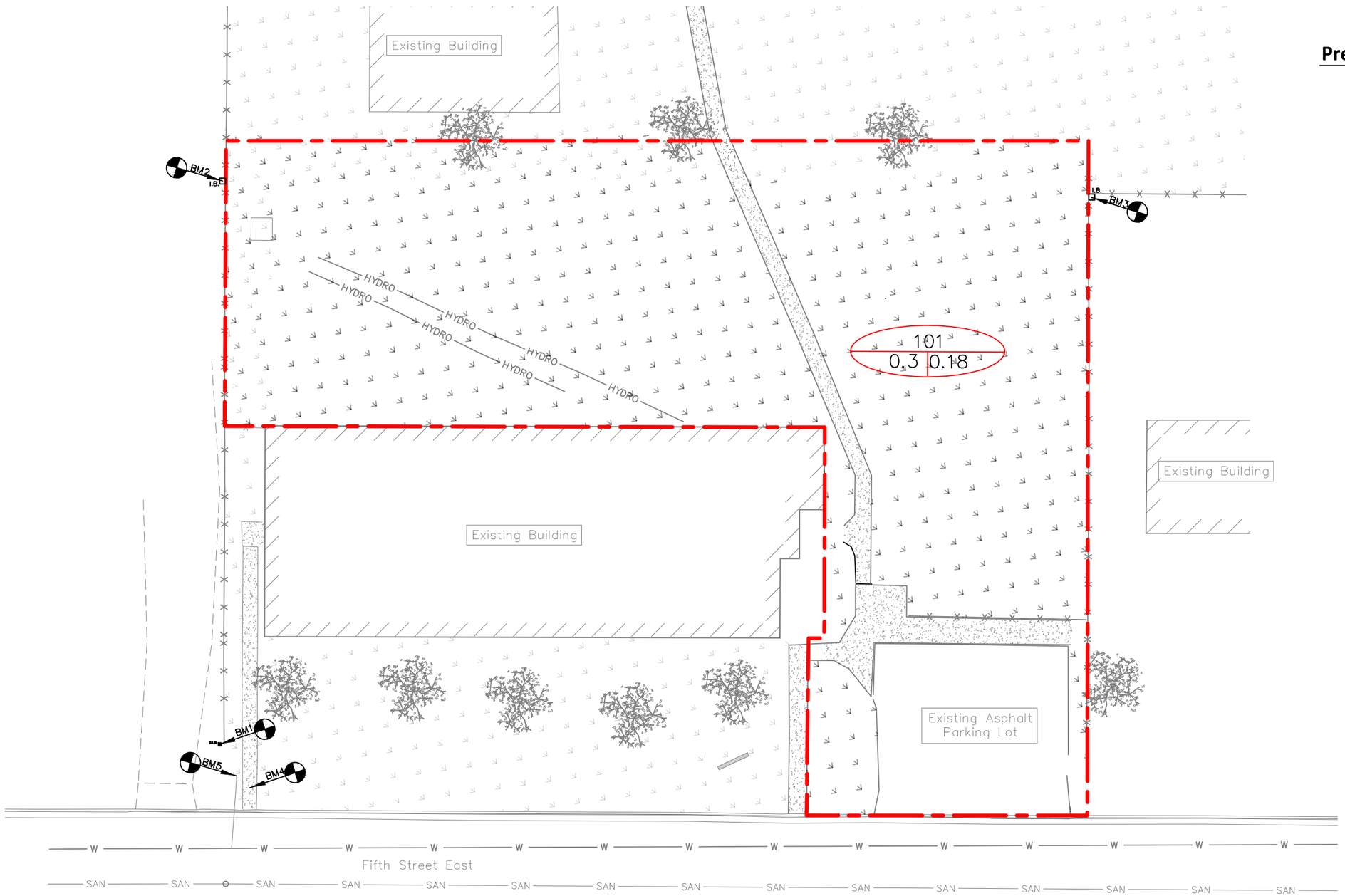
Revision 02

Drawing No. 04

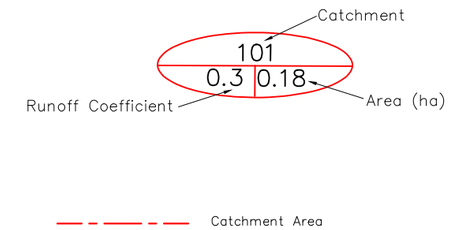
Appendix B: Pre and Post Development Catchment Areas

1263 Innovation Drive, Thunder Bay, ON, P7B 0A2
Tel: (807) 626-5640 | Fax: (807) 623-5690
www.truegriteng.com

Plot Size: ANSI EXPAND B (11.00 X 17.00 INCHES)



Pre-Development Catchment Area



Scale

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Note

This drawing is for conceptual purposes only and shall not be used for construction.

File No. 17-095-57E-05-01 - CATCHMENT AREA-

Rainy River District Social Services Administration Board

CLIENT

YY/MM/DD	ISSUE/REVISION DESCRIPTION	DRN	CHK	DES	ENG
17.05.09	Issued for Civil Design Brief	TR	AR	LV	AR

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TRUE GRIT ENGINEERING

CIVIL SUB CONSULTANT

Rainy River District Social Services Board
Proposed 8-Plex Residence
1300 Fifth Street East, Fort Frances, Ontario

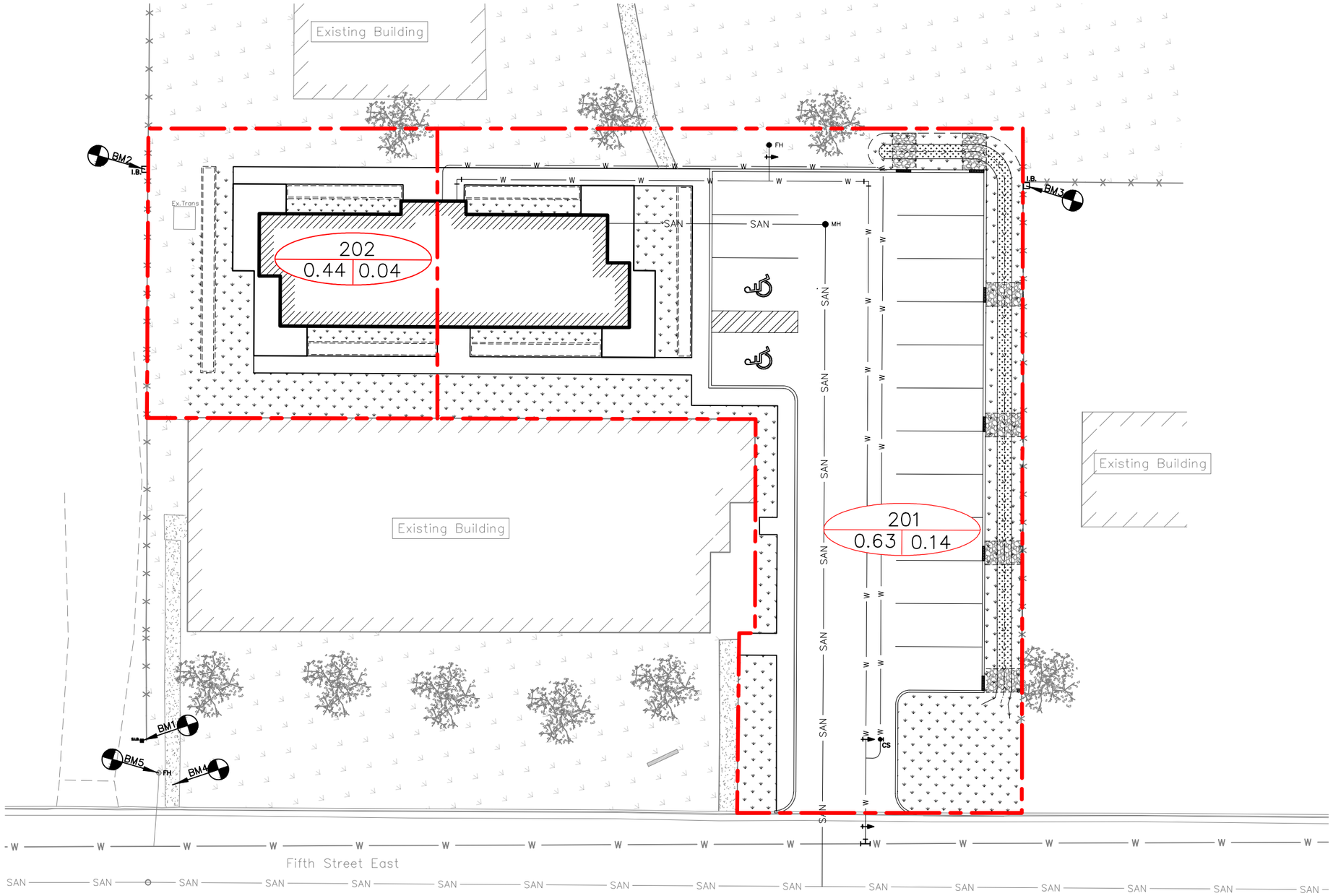
Pre-Development Catchment Area

PROJECT NUMBER 17-095-57E

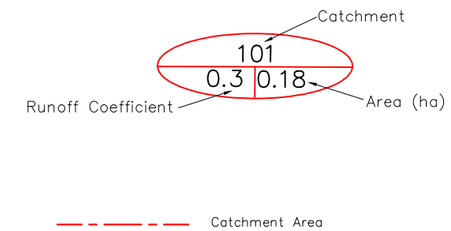
ISSUE/REVISION 01

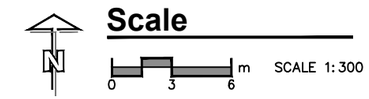
DRAWING NUMBER 01

Plot Size: ANSI EXPAND B (11.00 X 17.00 INCHES)



Post-Development Catchment Area





Note

This drawing is for conceptual purposes only and shall not be used for construction.

Rainy River District Social Services Administration Board

CLIENT

YY/MM/DD	ISSUE/REVISION DESCRIPTION	DRN	CHK	DES	ENG
17.05.08	Issued for Civil Design Brief	TR	AR	LV	AR
17.06.08	Re-Issued for Catchment Update	TR	AR	LV	AR

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TRUE GRIT ENGINEERING

CIVIL SUB CONSULTANT

Rainy River District Social Services Board
Proposed 8-Plex Residence
1300 Fifth Street East, Fort Frances, Ontario

Post-Development Catchment Area

PROJECT NUMBER 17-095-57E

ISSUE/REVISION 02

DRAWING NUMBER 01

File No. 17-095-57E-05-01 - CATCHMENT AREA-

TRUE GRIT ENGINEERING

Appendix C: Geotechnical Laboratory Results

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TRUE GRIT ENGINEERING

1263 Innovation Drive
Thunder Bay, ON P7B 0A2
T 807.626.5640 F 807.623.5690

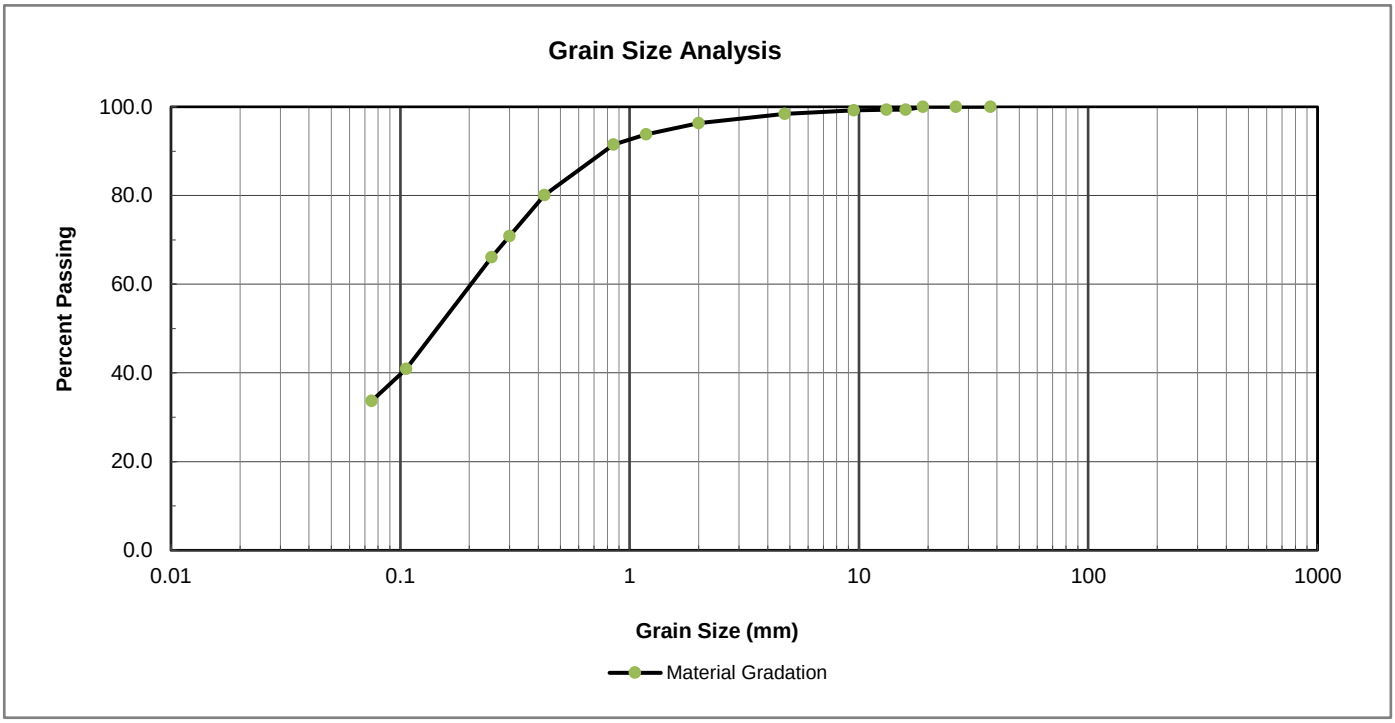
Grain Size Analysis Test Report

Client: FORM Architecture
Project Description: Rainy River DSSAB - 8 Plex Studio Apartment
True Grit Project No. 17-095-57E
Client Project No.:

Material Type: Silt/clayey sand, traces gravel
Source: Rainy River
Sample Location: HA03 S-1 0.0 - 0.5 m
Sampled By: BW
Date Sampled: 26-Apr-17

Lab No.: 1252 A
Date Received: 01-May-17
Tested By: AR
Date Tested: 02-May-17

Grain Size Analysis		
Sieve	**Percent Passing**	
Sizes,mm	**Sample**	**Specification**
37.5	100.0	
26.5	100.0	
19	100.0	
16	99.3	
13.2	99.3	
9.5	99.2	
4.75	98.4	
2	96.3	
1.18	93.8	
0.85	91.5	
0.425	80.1	
0.3	70.8	
0.25	66.1	
0.106	40.9	
0.075	33.7	



Remarks: -Tested in accordance with LS-601/602

- Gravel % = 1.6
- Sand % = 64.7
- Silt/Clay % = 33.7

Results reviewed by:

Erika Endaya
Supervisor, Materials Testing

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TRUE GRIT ENGINEERING

1263 Innovation Drive
Thunder Bay, ON P7B 0A2
T 807.626.5640 F 807.623.5690

Grain Size Analysis Test Report

Client: FORM Architecture
Project Description: Rainy River DSSAB - 8 Plex Studio Apartment
True Grit Project No.: 17-095-57E
Client Project No.:

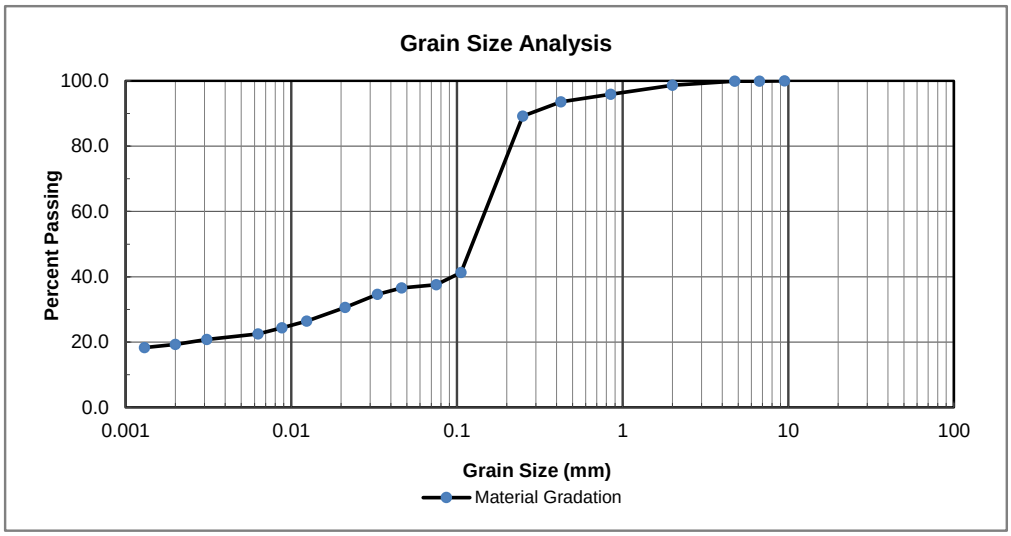
Material Type: Sand some clay, some silt, trace gravel
Source: Rainy River
Sample Location: HA05 S-3 1.0 - 1.5 m
Sampled By: BW
Date Sampled: 26-Apr-17

Lab No.: 1252 B
Date Received: 01-May-17
Tested By: AR
Date Tested: 03-May-17

Sieve Analysis	
Sieve Sizes,mm	**Percent Passing**
53.0	
37.5	
26.5	
19	
16	
13.2	
9.5	100.0
6.7	99.9
4.75	99.9
2	98.7
0.85	95.9
0.425	93.6
0.25	89.2
0.106	41.3
0.075	37.6

- % Gravel = 0.1
- % Sand = 62.3
- % Silt = 18.3
- % Clay-sized particles = 19.3

Hydrometer Analysis	
Particle Sizes,mm	**Percent Smaller**
0.0465	36.6
0.0331	34.6
0.0212	30.6
0.0124	26.4
0.0088	24.4
0.0063	22.5
0.0031	20.8
0.002	19.3
0.0013	18.3



Remarks: Sieve analysis combined with hydrometer analysis on the soil fraction passing 75 µm sieve to obtain the complete grain size distribution data.

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Results reviewed by: **Erika Endaya**
Materials Testing Supervisor