

**SERVICING & STORMWATER MANAGEMENT
IMPLEMENTATION REPORT**

31 HURON STREET INC. (STREETCAR)

HARBOUR HOUSE DEVELOPMENT

PREPARED BY:

**CROZIER CONSULTING ENGINEERS
40 HURON STREET, SUITE 301
COLLINGWOOD, ONTARIO
L9Y 4R3**

AUGUST 2021

CFCA FILE NO. 1838-5493



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1.0 INTRODUCTION

Crozier Consulting Engineers (Crozier) has been retained by 31 Huron Street Inc. (Streetcar) ("Developer") to complete a Servicing and Stormwater Management Implementation Report and engineering design to support the Zoning Bylaw Amendment and Site Plan applications for a proposed mixed-use residential/commercial development known as Harbour House referred to hereafter as the (Subject Development). The Subject Development is in The Shipyards Development Area in the Town of Collingwood and the general location of the subject development is shown on Figure 1.

The approximately 0.47 ha (1.2 ac) proposed development is comprised of one six-story mid-rise building with 130 residential units and 1530 sqm (16,469 SF) of retail space. The development also incorporates open landscaped areas, and underground/above ground parking facilities. Refer to Figure 2 for the proposed Site Plan.

Contained within this report is a description of the existing site conditions (Section 2.0); the proposed sanitary servicing and water distribution strategies (Sections 3.0 and 4.0); stormwater management and water quality control elements (Section 5.0); and a summary of the recommended erosion and sediment controls to be implemented prior to and during construction (Section 6.0).

2.0 SITE DESCRIPTION

The Shipyards Development Area in which the Subject Development is located is at the north end of downtown Collingwood at the Georgian Bay shoreline. The Shipyards Development Area is bounded by Heritage Drive to the east, Huron Street to the south and an open municipally owned block to the west. A detailed legal description of the overall Shipyards Development is provided in Appendix A.

The Harbour House development block currently is characterized by vacant land and is bounded by Side Launch Way to the north, an open municipal lot to the west, Heritage Drive to the east and Huron Street to the south. The Subject Development is legally described as Part of Lot 44 Concession 11, Registered Plan 51M-936.

It is noted that the open municipal block adjacent to the site is currently intended to be an overland flow route for the Pretty River Spillway as shown in the Regional Flood Flow Conveyance figure included in Appendix E of this report.

The former owner of the property, CSL Equity Investments Limited, completed extensive remediation works on the property, including removal of all existing building foundations, removal of impacted soil, and importation of clean fill material. The MECP granted clearance of the remediation works, and ownership of the property was officially transferred to the Developer.

3.0 SANITARY SERVICING

Existing Infrastructure

Existing sanitary infrastructure in the vicinity of the proposed development includes the following:

- 200mm diameter sanitary sewer along Side Launch Way, including a 200mm diameter sanitary stub to the proposed development, and a 200mm stub at the adjacent municipal block.

Proposed Servicing Strategy

The sanitary servicing strategy of the Harbour House Development will rely upon the existing 200mm diameter sewer along Side Launch Way. The buildings plumbing/sewerage systems will be routed internally to the existing 200 mm diameter sanitary stub provided to the property. Refer to Drawing 101 for the General Site Servicing Plan.

Based on preliminary calculations, the anticipated peak sanitary flow rates from the development will be approximately 7.30L/s. Previous design considerations for sanitary capacity of The Shipyards Development had anticipated a combined peak flow of 10.1L/s from the development and the adjacent municipal block. Based on lower flow rates than originally accounted for, sufficient capacity exists within the existing sewer network. This will be verified through Town modelling. Flow calculations and sanitary design sheets are available in Appendix B.

Sanitary sewer systems located downstream in the boundary road network were sized during the master servicing process to accommodate development in this area. Refer to Appendix C for the MOECC Certificate of Approval for the sanitary sewers located within the adjacent roadway.

4.0 DOMESTIC WATER SERVICING

A 400mm diameter watermain was constructed along Side Launch Way as part of the Shipyards Development, and two 150mm stubs were provided from Side Launch Way to provide service to the subject development and the adjacent municipal block. Refer to Drawing 101 for the General Servicing Plan.

Preliminary estimates of domestic water demands are approximately 8.0L/s for peak hour flow, and 4.9L/s for daily peak flow. Fire flow demands of the proposed development are estimated to be 266.7L/s per the Fire Underwriters Survey and 150L/s per the OBC Fire Protection Water Supply Guideline. Water demand calculations are available in Appendix D. Confirmation of the capacity of the watermain and existing stubs to meet development needs will be subject to the Town completing a distribution analysis and updating their municipal model.

5.0 STORMWATER MANAGEMENT & SITE DRAINAGE

5.1 Design Criteria

The stormwater management design of the proposed development will incorporate the policies and criteria of several agencies including the Ministry of Environment, Conservation and Parks (MECP), Nottawasaga Valley Conservation Authority (NVCA), and the Town of Collingwood. The agency stormwater management design criteria for the development is summarized below:

1. Development Standards (Town)
 - Minor and major drainage system to convey frequent and infrequent rainfall/runoff events, respectively, with 5-year events accommodated within the storm sewer system.
 - Lot grading 2% optimum.
2. Water Quality (MOECC & NVCA)
 - "Enhanced" quality control
3. Pretty River Flood Waters (NVCA)
 - Conveyance of spill waters to Georgian Bay.

Due to the proximity of the subject lands to Georgian Bay, water quantity control in the form of peak flow attenuation is not required for this development. Likewise, erosion control (from a stream protection standpoint) is not warranted as all drainage will discharge directly to Georgian Bay via a storm drainage network (storm sewers / road allowances / drainage channels).

The water quality control measures implemented with the development will meet municipal, provincial and federal requirements. This is in keeping with the recommendations of the Remedial Action Plan (RAP) for Collingwood Harbour.

During previous development application processes for The Shipyards Development Area, the following criteria were included in the Subdivision Agreements in order to obtain NVCA clearance:

1. All building openings must be at or above 178.30 masl unless special exemption is granted by the NVCA.
2. All roads and buildings internal to the future development blocks must be set at or above the grade of the adjacent public roadways with positive drainage. The associated site grading for the development blocks must respect this condition.
3. Positive outlets to Georgian Bay or public roadways must be provided for all overland drainage routes through the future development blocks.
4. Confirmation from qualified structural and/or geotechnical engineer that underground structures can and will be designed to respect the following conditions:
 - a. Structures can withstand hydrostatic pressures from lake based on sustained high lake level of 178.0 masl;
 - b. Flood proofing of entrance ramps to underground structures to the satisfaction of the NVCA; and
 - c. Provision of contingency plan for each structure's dewatering system in the event of a power or pump failure.
5. All future shoreline protection works are designed to the satisfaction of the NVCA.

The proposed development will conform to the applicable criteria outlined above.

5.2 Pre-Development Drainage Conditions

Generally the site drains in a northward direction, towards Georgian Bay in the existing condition. The site topography also resembles a slightly depressed bowl, and as such, drainage is generally retained and infiltrated onsite.

5.3 Pretty River Flood Waters

The lands west of and including Heritage Drive are located within Spill Zone 2 of the Pretty River flood plain (Stantec, 2000). In the event of a Regional Storm event, floodwaters of Pretty River are expected to enter the downtown area, passing through the lands along the shoreline, including the Harbour House site, and enter Georgian Bay. Accordingly, the area is Fill Regulated per the NVCA. Flow conveyance mapping for the Regional Storm event through the Shipyards development is shown in Appendix E.

Based on extensive modeling and reporting completed as part of the original Shipyards development application, it was demonstrated that the Pretty River Spill waters can be safely conveyed to Georgian Bay through the Shipyards development via the public roadways and drainage channels (Crozier, October 2007). As such, these models display that the Subject Development will not adversely impact the conveyance of the Pretty River Spill to Georgian Bay.

To ensure adequate flood protection, for the south and east property lines site grades are to be constructed above an elevation of 179.22 masl. This elevation corresponds to the modelled regional flood elevation near to the subject site, as detailed within the Pretty River Flood Hazard Delineation Study (Stantec, 1999). Relevant excerpts from this report are included in Appendix E. North property line grades were based on a maximum boulevard slope of 4% which to maximize floodproofing elevation this results in property line grades being 0.14m to 0.33m above centerline of Side Launch Way.

5.4 Proposed Drainage Conditions

During the previous construction of Side Launch Way as part of the Shipyards Development, a storm sewer was constructed which included a 300mm storm stub for the Subject Development. This stub will be removed and replaced with a 375mm dia. sewer to service the proposed development. Stormwater will drain from the Subject Development through this stub and surrounding storm sewers ultimately discharging to Outlet #5 of the Shipyards Master drainage Plan located at the south end of the Dry Dock. Refer to Appendix E for the Storm Area Drainage Plan. The existing sewers along Side Launch Way are sized to convey 1.55 ha of contributing area at a runoff coefficient of 0.9 which includes the open municipal block.

The Harbour House Development will use a split stormwater conveyance strategy. The internal drainage system will include grade level catch basins and building plumbing/storm sewers to provide necessary stormwater conveyance for all minor storm events (up to and including the five-year return period). Internal roadways and parking areas will act as overland flow routes designed to safely convey storm runoff from the major events (up to the 100 year and regional events).

All portions of the site will be graded such that runoff is directed via overland flow to the adjacent roadways and collected by existing storm sewers.

5.5 Stormwater Quality Control

Georgian Bay, considered a Level 1 fishery, is the ultimate receiver of drainage from the subject lands; therefore, the development will incorporate measures to provide "enhanced protection" to treat runoff before entering the harbour.

In support of earlier Shipyards development blocks, 5 Stormceptor units were installed in-line upstream of each of the 5 stormwater outfalls serving the Shipyards Development Area. One of these units, an STC 6000 Stormceptor designated as STC#5 installed at outlet #5 exists at the south end of the existing dry dock. This Stormceptor unit was sized to accommodate runoff from the Subject Development.

The design of STC#5 accounted for a developed area 1.51 ha at 90% imperviousness and as such the Stormceptor unit will have capacity to treat site runoff to enhanced treatment levels. Previous Stormceptor sizing sheets for STC#5 are included in this report enclosed in Appendix F.

The public end-of-pipe treatment units of the Shipyards development, including STC#5 were previously approved by the Town, NVCA, and MOECC. A Certificate of Approval was issued by the MOECP for STC#5 in the fall 2007 (enclosed in Appendix C).

The Stormceptor unit is eligible for the Quality Assurance Program (QAP) provided by the supplier, Hanson Pipe, and administered by Minotaur Guardian Service Ltd. Maintenance of most O/G separators is performed using vacuum trucks at regular intervals, typically bi-annual inspection and cleaning as required. Details on the QAP are enclosed in Appendix F.

6.0 EROSION & SEDIMENTATION CONTROLS DURING CONSTRUCTION

Erosion and sediment controls will be implemented on-site prior to construction where required and as directed by the Developer and their site representative. See Drawing C103 for the site's Sediment Control Plan.

- Dust Suppression

During earthwork activities, the Contractor will ensure that measures for dust suppression are provided as required, such as the application of water or lime.

- Silt Sacks

The silt sacks will be installed in all catch basins prior to and maintained during construction.

7.0 CONCLUSIONS & RECOMMENDATIONS

The proposed servicing and stormwater management strategies for the Harbour House development are consistent with the recommendations of the Master Stormwater Management Implementation Report (Crozier, March 2008) and Functional Servicing Report (Burnside, 2003), which was prepared for the entire Shipyards residential development.

1. Harbour House will be serviced by connecting to the existing sanitary service stub provided at the property limits on Side Launch Way.
2. Harbour House will be serviced by connecting to the existing water main service stub provided at the property line within Side Launch Way.
3. A storm sewer system will be provided to convey minor flows to existing storm infrastructure. Major flows from infrequent events will utilize overland flow route channels to provide safe conveyance of flows to Georgian Bay.
4. Enhanced treatment levels will be provided by End of Pipe Water quality control via an existing stormceptor OGS prior to discharge into Georgian Bay).

Based on the detailed design of the infrastructure for these developments, all servicing and stormwater management objectives will be met.

Respectfully Submitted,

C.F. Crozier & Associates Inc.



Brendan Hummelen, P.Eng.
Project Engineer



C.F. Crozier & Associates Inc.



Justin L'Abbe, E.I.T.
Engineering Intern

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APPENDIX A

Legal Description of FSCD The Shipyards
Registered Plan Site Map

Legal Description for FSCD The Shipyards

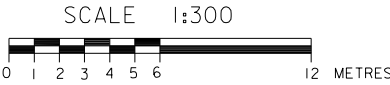
That this approval applies to the draft plan of subdivision located at Part of lot 44, Concessions 8 and Part of lot 44, Concession 9 and Part of the Water Lot in front of Lot 44, Concessions 8 and 9 and Part of the bed of Georgian Bay of Lake Huron (Collingwood Harbour – federal) in front of Lot 44, Concession 9 and Part of the original road allowance between Concessions 8 and 9 (geographic township of Nottawasaga) and Part of Bay Street (patented to the town of Collingwood July 8, 1904, (51363cls)) (closed by By-law 604 and 616) and Part of the Water Lot in front of Hurontario Street (patented to the town of Collingwood July 8, 1904, (51363cls)) Part of Lot 7, east of Beech Street, Registered Plan 373, Lots b and e and Part of Lots a, c and d, Registered Plan 224 and the 12.19 lane adjacent thereto (closed by By-law 604 and 616) and St. Paul Street lying north of Huron Street (closed by By-law 604 and 616) and Lots g, h, i, j and Part of Lot f, north of Huron Street, Registered Plan 282 and Part of the wharf reserve and Lots 1, 2, 3, 4, 75 and 76 west of the wharf reserve and Lots 5 and 6 and Part of Lots 7 and 8 west of Hurontario Street and Lots 1, 2, 3, 4, 5, 6, 7, 75, 76, 77, 78 and 79 and Part of Lot 8 east of Pine Street and Lots 1, 2, 3, 4, 5, 6, 75, 76, 77, 78 and 79 and Part of Lots 7 & 8 west of Pine Street and Lots 1, 2, 3, 4, 5, 6, 75, 76, 77, 78 and 79 and Part of Lot 7 east of Maple Street and Lots 1, 2, 3, 4, 5, 75, 76, 77, 78 and 79 and Part of Lots 6 and 7 west of Maple Street and Lots 1, 2, 3, 4, 5, 75, 76, 77, 78 and 79 and Part of Lot 6 east of Beech Street and Part of Pine Street and Part of Maple Street (closed by By-law 2340, inst. 196647) and Part of Beech Street (closed by By-law 82-81, inst. 784703) and Part of Manitou Street (closed by By-law 2336, inst. 196646), Registered Plan 489, Town of Collingwood, County of Simcoe prepared by Zubek, Emo, Patten & Thomsen Limited dated October 31, 2005, and showing a total of:

- a. Two Blocks for Medium Density Residential (Blocks 4 & 10)
- b. One Block for Townhouses (Block 3)
- c. Four Blocks for Commercial/Residential (Blocks 6, 8, 11 & 13)
- d. Two Blocks for Existing Industrial (Blocks 5 & 15)
- e. Three Blocks for Parks (Blocks 1, 7 & 9)
- f. One Block for Open Space (Block 2)
- g. One Block for Roads (Block 14)
- h. One Block for Road Widening (Block 12)

Notes:

- 1. Mackinaw Village is designated as Block 3 Townhouses in Draft Plan.
- 2. Side Launch Buildings 1 & 2 are designated as Block 4 Medium Density Residential in Draft Plan.

PLAN OF SURVEY AND
TOPOGRAPHICAL PLAN OF
BLOCK 11
REGISTERED PLAN 5 IM-926
AND PART OF LOT 44
CONCESSION 11
(FORMERLY TOWNSHIP OF NOTTAWASAGA)
TOWN OF COLLINGWOOD
COUNTY OF SIMCOE



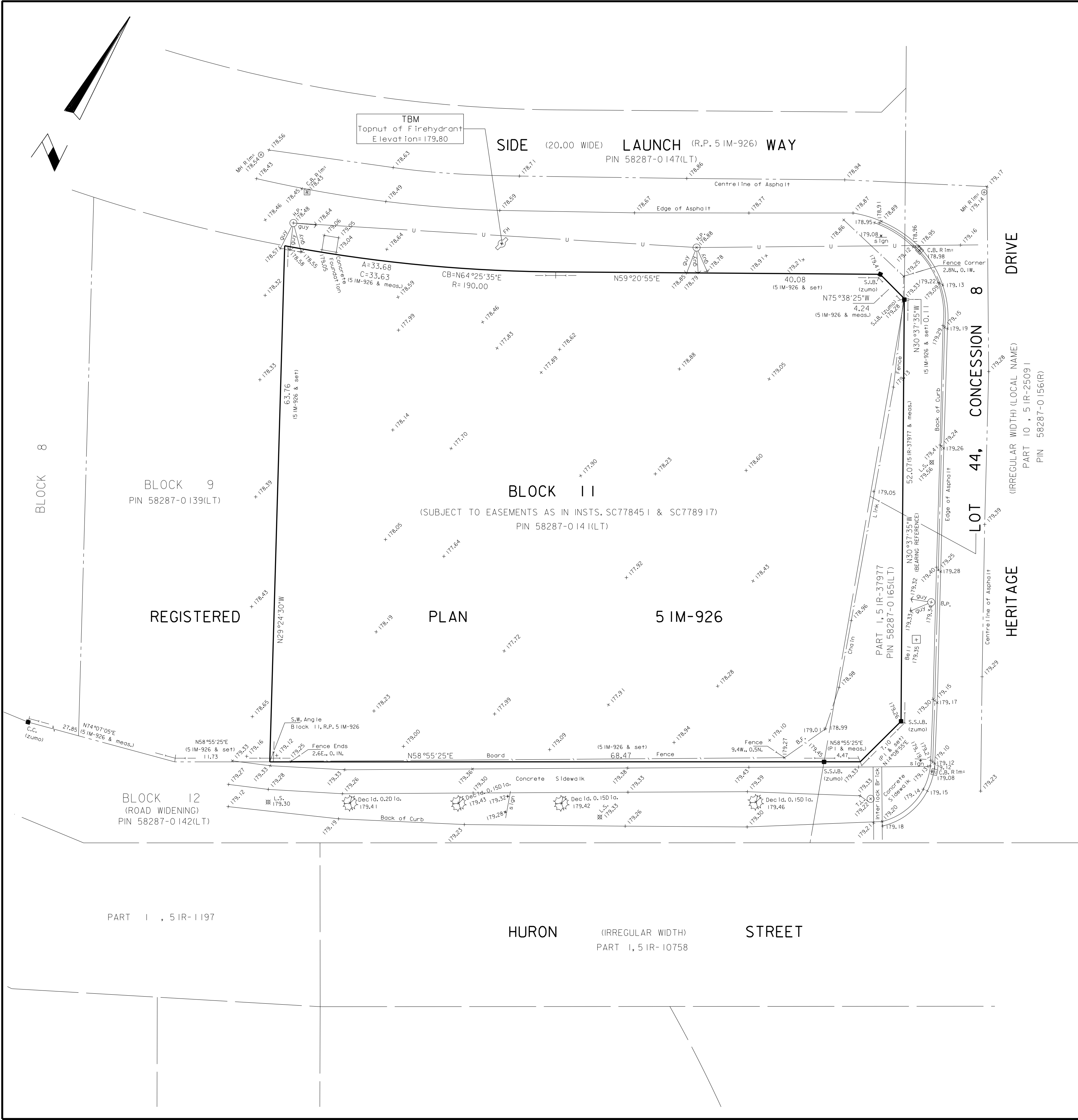
METRIC
DISTANCES ON THIS PLAN ARE IN METRES AND CAN
BE CONVERTED TO FEET BY DIVIDING BY 0.3048

NOTES:
BEARINGS HEREON ARE UTM GRID, ZONE 17, NAD 83 AND ARE
REFERRED TO THE BEARING OF THE EASTERLY LIMIT OF PART 1
BEING N30°37'35"W IN ACCORDANCE WITH PLAN 5 IR-37977.

- ⊕ DENOTES SET
- ⊕ DENOTES FOUND
- ⊕ S.I.B. DENOTES STANDARD IRON BAR
- ⊕ I.B. DENOTES IRON BAR
- ⊕ S.S.I.B. DENOTES SHORT STANDARD IRON BAR
- ⊕ C.C. DENOTES CUT CROSS
- P I REFERES TO 5 IR-37977
- U — DENOTES AERIAL UTILITY LINE
- CB DENOTES CATCH BASIN
- HP DENOTES HYDRO POLE
- guy DENOTES GUY WIRE
- Be II DENOTES BELL BOX
- sign DENOTES SIGN
- MH DENOTES SANITARY MANHOLE
- L.S. DENOTES LIGHT STANDARD
- FH DENOTES FIREHYDRANT
- T.L. DENOTES TRAFFIC LIGHT
- B.P. DENOTES BRACE POLE
- B.F. DENOTES BOARD FENCE
- Dec id. DENOTES DECIDUOUS TREE
- Con if. DENOTES CONIFEROUS TREE

CAUTION
UNDERGROUND SERVICES WERE NOT LOCATED AND MUST
BE VERIFIED ON SITE PRIOR TO EXCAVATION.

BENCH MARK
ELEVATIONS HEREON ARE GEODETIC AND ARE REFERRED TO
THE GEODETIC MONUMENT No. 72U313 HAVING AN ELEVATION
OF 179.633 METRES (CGVD 28:78).



APPENDIX B

Preliminary Sanitary Flow Rate Calculations Sanitary Sewer Design Sheet



File: 1838-5493
Date: 11-Aug-21
By: JL'A
Check By: BH

Harbour House - Equivalent Population

Developed Site Area	0.45	ha
Number of Residential Units	130	units
Persons Per Residential Unit	2.40	persons/unit
Residential Population	312	persons

Equivalent Daily Flow Calculations

Retail	$R = 1,530 \text{ sq.m} \times 5 \text{ L/day/sq.m}$	$R =$	7650 L/day
Amenity/Lobby	$A/L = 1009 \text{ sq.m} \times 5 \text{ L/day/sq.m}$	$A/L =$	5045 L/day
Total	$T = R + LWL + A/L$	$T =$	12695 L/day

Equivalent Persons Calculation

Per Capital Flow	450	L/C-day
Equivalent Persons		
$Peq = \text{Total} / \text{Per Capital Flow}$		
$Peq = (35389 \text{ L/day}) / (450 \text{ L/C-day})$	$Peq =$	28.21 Persons
	$Peq =$	29 Persons

Total Design Sewage Flows

Equivalent Mixed Use Population (See Appendix B)	29	persons
Residential Population	312	persons
Total Population	341	persons



File: 1838-5493
Date: 11-Aug-21
By: JL'A
Check By: BH

Harbour House Hotel- Sanitary Flow Requirements

Developed Site Area		0.45	ha
Number of Residential Units		130	units
Persons Per Residential Unit	Per DC Background Study (Watson & Associates)	2.40	persons/unit
Residential Population		312	persons
Equivalent Mixed Use Population	(See Appendix B)	29	persons
Total Population		341	persons

Unit Sewage flows

Per Capital Flow		450	L/C-day
Infiltration (typical)		0.23	L/s/ha

Total Design Sewage Flows

Infiltration/Inflow		0.10	L/sec
Average Daily Flow		1.78	L/sec
Peak Factor	(Harmon Formula)	4.1	
Peak Flow		7.20	L/sec

Total Peak Daily Flow		7.30	L/sec
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FSCD THE SHIPYARDS
SANITARY SEWER DESIGN MODEL

DESIGN: K. Morris
CHECK: K. Morris & J. O'Neill

N = 0.013
Population = 3.5 p.p.u.
Peak Factor (M) = $1 + (14/4 + (P/1000)^{0.5})$
Avg. Daily/Capita Flow = 450 L/cap.d
Q infiltration = 0.28 L/ha.s

Flows from Block B North Garage = 7 L/s
Flows from Block C Garage = 10 L/s

Location	FROM MH	TO MH	Length (m)	Area (Ha)	Units	Pop.	TOTAL trib pop	Peak Factor	Avg. Flow (l/s)	Max Flow (l/s)	Infilt. (l/s)	TOTAL Infilt.	Combined (l/s)	Pipe Diam (mm)	Upper Inv. El.	Lower Inv. El.	Slope (%)	Cap. (l/s)	Vel. (m/s)	FROM MH	TO MH	Ground Upper	Ground Lower	Cover Upper	Cover Lower
Side Launch Way																									
Town Trunk Sewer (Huronario)	10T	9T	90.2			0.0	0	4.50	0.00	0.00	0.00	0.00	0.00	900	176.242	176.117	0.1%	673.91	1.06	10T	9T	178.480	178.020	1.34	1.00
	9T	8T	64.9			0.0	0	4.50	0.00	0.00	0.00	0.00	0.00	900	176.112	176.057	0.1%	527.00	0.83	9T	8T	178.020	178.210	1.01	1.25
	8T	7T	65.3			0.0	0	4.50	0.00	0.00	0.00	0.00	0.00	900	176.057	175.985	0.1%	601.12	0.94	8T	7T	178.210	178.410	1.25	1.52
(Pine)	7T	6T	60.3			0.0	585	3.94	3.04	11.99	0.00	1.15	30.13	900	175.985	175.915	0.1%	616.80	0.97	7T	6T	178.410	179.000	1.52	2.19
	6T	5T	61.3			0.0	669	3.91	3.48	13.60	0.00	1.30	31.90	900	175.905	175.847	0.1%	556.85	0.88	6T	5T	179.000	178.570	2.20	1.82
(Maple)	5T	4T	25.1			0.0	851	3.84	4.43	17.03	0.00	1.89	35.92	900	175.837	175.818	0.1%	498.07	0.78	5T	4T	178.570	178.400	1.83	1.68
	4T	3T	96.9			0.0	851	3.84	4.43	17.03	0.00	1.89	35.92	900	175.813	175.716	0.1%	572.77	0.90	4T	3T	178.400	178.500	1.69	1.88
	8A	8	80.9	0.54	24	84.0	84	4.26	0.44	1.87	0.15	0.15	2.02	200	177.520	176.711	1.00%	32.80	1.04	8A	8	179.700	179.000	1.98	2.09
	8	6T	14.1	0.00	0	0.0	84	4.26	0.44	1.87	0.00	0.15	2.02	200	176.661	176.605	0.40%	20.74	0.66	8	6T	179.700	179.000	2.84	2.19
Maple	7A	7	102.1	0.45	12	42.0	42	4.33	0.22	0.95	0.13	0.13	1.07	200	178.878	177.857	1.00%	32.80	1.04	7A	7	180.850	179.900	1.77	1.84
	7	6	64.8	0.23	6	21.0	63	4.29	0.33	1.41	0.06	0.19	1.60	250	177.777	177.595	0.28%	31.47	0.64	7	6	179.900	179.600	1.87	1.75
	6	5	66.5	0.20	3	10.5	74	4.28	0.38	1.64	0.06	0.25	1.88	250	177.515	177.329	0.28%	31.47	0.64	6	5	179.600	179.900	1.83	2.32
	5	4	67.3	0.20	3	10.5	84	4.26	0.44	1.87	0.06	0.30	2.17	250	177.299	177.111	0.28%	31.47	0.64	5	4	179.900	179.750	2.35	2.39
	4A	4	64.3	0.19	6	21.0	21	4.38	0.11	0.48	0.05	0.05	0.53	200	177.804	177.161	1.00%	32.80	1.04	4A	4	180.600	179.750	2.60	2.39
	4	3	33.7	0.05	0	0.0	105	4.24	0.55	2.32	0.01	0.37	2.69	250	177.081	176.986	0.28%	31.47	0.64	4	3	179.750	179.450	2.42	2.21
	3A	3	63.4	0.34	10	35.0	35	4.34	0.18	0.79	0.10	0.10	0.89	200	177.670	177.036	1.00%	32.80	1.04	3A	3	179.950	180.300	2.08	3.06
	3	2	61.3	0.17	4	14.0	154	4.19	0.80	3.36	0.05	0.51	3.87	250	176.956	176.785	0.28%	31.47	0.64	3	2	180.300	179.450	3.09	2.42
	2	1	61.3	0.26	8	28.0	182	4.16	0.95	3.95	0.07	0.59	4.53	250	176.755	176.583	0.28%	31.47	0.64	2	1	179.450	178.800	2.45	1.97
	1	5T	16.5	0.02	0	0.0	182	4.16	0.95	3.95	0.01	0.59	4.54	250	176.533	176.484	0.28%	31.47	0.64	1	5T	178.800	178.570	2.02	1.84
Pine																									
Flows from Block C Garage	7	15	63.3	0.24	6	21.0	21	4.38	0.11	0.48	0.07	0.07	10.55	250	177.874	177.697	0.28%	31.47	0.64	7	15	179.950	180.300	1.83	2.35
	15	14	85.5	0.30	5	17.5	39	4.34	0.20	0.87	0.08	0.15	11.02	250	177.617	177.378	0.28%	31.47	0.64	15	14	180.600	180.300	2.73	2.67
	Stub	14	10.0	0.54	72	252.0	252	4.11	1.31	5.39	0.15	0.15	5.55	200	177.528	177.428	1.00%	32.80	1.04	Stub	14	179.800	180.100	2.07	2.47
	14	13	48.0	0.12	1	3.5	294	4.08	1.53	6.25	0.03	0.34	16.59	250	177.348	177.213	0.28%	31.47	0.64	14	13	180.300	180.100	2.70	2.64
	4A	13	62.5	0.19	6	21.0	21	4.38	0.11	0.48	0.05	0.05	0.53	200	177.888	177.263	1.00%	32.80	1.04	4A	13	179.800	180.100	1.71	2.64
	13	12	33.7	0.06	0	0.0	315	4.07	1.64	6.68	0.02	0.41	17.08	250	177.183	177.089	0.28%	31.47	0.64	13	12	180.100	180.000	2.67	2.66
	3A	12	63.4	0.38	10	35.0	35	4.34	0.18	0.79	0.11	0.11	0.90	200	177.773	177.139	1.00%	32.80	1.04	3A	12	180.300	180.000	2.33	2.66
	12	11	23.2	0.04	0	0.0	350	4.05	1.82	7.38	0.01	0.52	17.90	250	177.059	176.994	0.28%	31.47	0.64	12	11	180.000	179.800	2.69	2.56
	11	10	77.0	0.31	8	28.0	378	4.03	1.97	7.94	0.09	0.61	18.55	250	176.964	176.748	0.28%	31.47	0.64	11	10	179.800	179.300	2.59	2.30
	10	9	27.4	0.12	4	14.0	585	3.94	3.04	11.99	0.03	1.15	30.13	300	176.698	176.638	0.22%	45.36	0.64	10	9	179.300	179.600	2.30	2.66
	9	7T	10.5	0.00	0	0.0	585	3.94	3.04	11.99	0.00	1.15	30.13	300	176.608	176.585	0.22%	45.36	0.64	9	7T	179.600	178.410	2.69	1.52
Flows from Block B North Garage	22	21	90.6	0.54	18	63.0	63	4.29	0.33	1.41	0.15	0.15	8.56	200	178.132	177.226	1.00%	32.80	1.04	22	21	180.300	179.850	1.97	2.42
	Stub	21	23.5	0.36	38	133.0	133	4.21	0.69	2.91	0.10	0.10	3.02	200	177.411	177.176	1.00%	32.80	1.04	Stub	21	179.700	179.850	2.09	2.47
	21	11	36.3	0.00	0	0.0	196	4.15	1.02	4.24	0.00	0.25	11.49	250	177.146	177.044	0.28%	31.47	0.64	21	11	179.850	179.850	2.45	2.56
	20	19	65.0	0.38	12	42.0	42	4.33	0.22	0.95	0.11	0.36	1.31	250	177.143	176.961	0.28%	31.47	0.64	20	19	179.900	179.250	2.51	2.04
	Stub	19	23.5	0.41	40	140.0	140	4.20	0.73	3.06	0.11	0.11	13.18	200	177.166	176.931	1.00%	32.80	1.04	Stub	19	179.550	179.250	2.18	2.12
	19	10	36.5	0.10	3	10.5	193	4.15	1.00	4.16	0.03	0.50	14.67	250	176.881	176.778	0.28%	31.47	0.64	19	10	179.250	178.900	2.12	1.87
Heritage Way	18	17	54.4	0.20	50	175.0	175	4.17	0.91	3.80	0.06	0.06	3.86	250	177.863	177.656	0.38%	36.66	0.75	18	17	179.400	179.200	1.29	1.29
	17	16	35.5	0.15	50	175.0	350	4.05	1.82	7.38	0.04	0.10	7.48	250	177.626	177.491	0.38%	36.66	0.75	17	16	179.200	179.100	1.32	1.36
	16	15	55.8	0.20	0	0.0	350	4.05	1.82	7.38	0.06	0.15	7.54	250	177.411	177.199	0.38%	36.66	0.75	16	15	179.100	178.900	1.44	1.45
	15	14	33.8	0.10	50	175.0	525	3.96	2.73	10.84	0.03	0.18	11.02	250	177.169	177.041	0.38%	36.66	0.75	15	14	178.900	178.700	1.48	1.41
Proposed Rec Centre	14	10T	31.3	0.10	100	350.0	875	3.84	4.56	17.48	0.03	0.21	17.69	250	177.011	176.892	0.38%	36.66	0.75	14	10T	178.700	178.480	1.44	1.34
Minnesota Block	6	4	26.8	0.14	3	10.5	11	4.41	0.05	0.24	0.04	0.04	0.28	200	176.75	176.55	0.75%	28.40	0.90	6	4	178.93	179.00	1.98	2.25
	5	4	22.1	0.16	2	7.0	7	4.43	0.04	0.16	0.04	0.04	0.21	200	176.72	176.55	0.75%	28.40	0.90	5	4	179.13	179.00	2.21	2.25
	4	3	91.3	0.68	18	63.0	81	4.27	0.42	1.79	0.19	0.27	2.06	250	176.47	176.12	0.38%	36.66	0.75	4	3	179.00	179.42	2.28	3.05
	3	2	42.1	0.05	0	0.0	81	4.27	0.42	1.79	0.01	0.29	2.08	250	176.04	175.88	0.38%	36.66	0.75	3	2	179.42	178.95	3.13	2.82
	2	1 (F)	14.3	0.00	0	0.0	81	4.27	0.42	1.79	0.00	0.29	2.08	250	175.80	175.75	0.38%	36.66	0.75	2	1 (F)	178.95	179.20	2.90	3.20

APPENDIX C

Approvals and Permits

MDE



Ontario

Ministry
of the
Environment

Ministère
de
l'Environnement

CERTIFICATE OF APPROVAL
MUNICIPAL AND PRIVATE SEWAGE WORKS
NUMBER 3673-797Q65
Issue Date: November 23, 2007

F.S. Collingwood Development Ltd.
141 Lakeshore Road East
Mississauga, Ontario
L5G 1E8

Site Location: The Shipyards Development
Lot 44, Concession 8 and 9
Collingwood Town, County of Simcoe, Ontario

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

sanitary and storm sewers, and a stormwater management system to be constructed to service The Shipyards Development, located at the north end of downtown Collingwood at the Georgian Bay shoreline in the Town of Collingwood, County of Simcoe, comprising the following:

- **storm and sanitary sewers** to be constructed on North Maple Street, Wheelhouse Crescent, North Pine Street and Side Launch Way;
- **sanitary sewers** to be constructed on Heritage Drive; and
- Four (4) **oil/grit interceptors** located on Side Launch Way and Wheelhouse Crescent, each of three (3) oil/grit interceptors no. 1, 3 and 5 (single chamber) has a treatment flow rate of 70 L/s, a sediment capacity of 26,945 L, an oil capacity of 3,930 L and a total holding capacity of 31,285 L, and one (1) oil/grit interceptor no. 2 (dual chamber) has a treatment flow rate of 100 L/s, a sediment capacity of 32,980 L, an oil capacity of 10,555 L and a total holding capacity of 44,355 L, discharging to the Georgian Bay;

all in accordance with the application from F.S. Collingwood Development Ltd., dated July 16, 2007 and received on July 20, 2007, and all supporting documentation and information, including 'Master Stormwater Management Implementation Report' and revised design sheets, dated September, 2007, final plans and specifications prepared by C.F. Crozier & Associates Inc.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

- (1) "Certificate " means this entire Certificate of Approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act* , and includes any schedules;

RC 11/27/07

- (2) "Owner " means F.S. Collingwood Development Ltd. and includes its successors and assignees; and
- (3) "Works " means the sewage works described in the *Owner 's* application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate* .

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITIONS

- 1.1 The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.
- 1.2 Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate* , the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate* .
- 1.3 Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate* , the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.
- 1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.
- 1.5 The requirements of this *Certificate* are severable. If any requirement of this *Certificate* , or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

2. EXPIRY OF APPROVAL

- 2.1 The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate* .

3. OPERATION AND MAINTENANCE

- 3.1 The *Owner* shall design, construct and operate the oil/grit interceptor with the objective that no visible oil sheens occur in the effluent discharged from the oil/grit interceptor.
- 3.2 The *Owner* shall carry out and maintain an annual inspection and maintenance program on the operation of the oil/grit interceptor in accordance with the manufacturer's recommendation.

- 3.3 After a two (2) year period, the District Manager of the MOE District Office may alter the frequency of inspection of the oil/grit interceptor if he/she is requested to do so by the *Owner* and considers it acceptable upon review of information submitted in support of the request.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No.1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the *Owners* their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.
2. Condition No.2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.
3. Condition No.3 is imposed to ensure that the oil/grit interceptor is operated and maintained without any adverse impact on the environment.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 23rd day of November, 2007



Mansoor Mahmood, P.Eng.
Director
Section 53, Ontario Water Resources Act

AA/

c: District Manager, MOE Barrie
Kevin Morris, P.Eng., C.F. Crozier & Associates Inc.

APPENDIX D

Preliminary Domestic Water Flow Rate Calculations
Fire Suppression Flow Rate Calculations

Harbour House - Water Flow Requirements

Site Area		0.45 ha
Number of Residential Units		130 unit
Person Per Residential Unit	Per DC Background Study (Watson & Associates)	2.40 persons/unit
Residential Population		312 persons
Equivalent Mixed Use Population	(See Appendix B)	29 persons
Total Population		341 persons

Water Design Flows

Per Capita Flow	450 L/C-day
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Total Domestic Water Design Flows

Average Daily Flow	1.8 L/s
--------------------	---------

Max Day Peak Factor	2.75
Max Day Demand Flow	4.9 L/s

Peak Hour Factor	4.5
Peak Hour Flow	8.0 L/s

Fire Flow (per Fire Underwriters Survey) (note minimum fire flow per Town Standard is 57 L/sec)	267 L/s
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<u>Peak Design Flow</u>	271.6 L/s
--------------------------------	------------------

**Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey**

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

$$F = 220 * C * \sqrt{A}$$

where

F = the required fire flow in litres per minute
C = coefficient related to the type of construction
= 1.5 for wood frame construction (structure essentially all combustible)
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
= 0.8 for non-combustible construction (unprotected metal structural components)
= 0.6 for fire-resistive construction (fully protected frame, floors, roof)
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building considered.

7 number of floors

Ordinary Construction
0.8 C

14870.804 sq.m. total floor area

Therefore F= 21,000 L/min (rounded to nearest 1000 L/min)

Fire flow determined above shall not exceed:

30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	No Charge		

Low fire Hazard occupancy for dwellings	15% reduction
---	---------------

3,150 L/min reduction

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above maybe reduce by up to 50% for complete automatic sprinkler protection.

Automatic Sprinklers (30% Reduction)
5,355 L/min surcharge / reduction

Harbour House
Fire Protection Volume Calculation
CFCA File: 1838-5493

* Based on Site Plan

Page 2

Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 45 metres by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation	Charge	Separation	Charge
0 to 3 m	25%	20.1 to 30 m	10%
3.1 to 10 m	20%	30.1 to 45 m	5%
10.1 to 20 m	15%		

Exposed buildings

Name	Distance			
North	N/A			0
South	N/A			0
East	Town Houses	40	10%	1564.5
West	BMO	40	10%	1785
				3,350 L/min Surcharge

Determine Required Fire Flow

No.1	21,000		
No. 2	3,150 reduction		
No. 3	5,355 reduction		
No. 4	<u>3,350</u> surcharge		
Required Flow:	15,845 L/min		
Rounded to nearest 1000l/min:	16,000 L/min	or	266.7 L/s 4,227 USGPM

Determine Required Fire Storage Volume

Flow from above	16,000 L/min
Required duration	3.50 hours
Therefore:	3,360,000 Litres or 3,360 cu.m. is the required fire storage volume.

Required Duration of Fire Flow

Flow Required L/min	Duration (hours)
2,000 or less	1.0
3,000	1.25
4,000	1.5
5,000	1.75
6,000	2.0
8,000	2.0
10,000	2.0
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

Harbour House
Fire Protection Volume Calculation
CFCA File: 1838-5493

Page 3

* Based on Site Plan

Calculation Check

Office of the Fire Marshall - Fire Protection Water Supply Guideline for Part 3 in the OBC (October 2006)

$$Q = KVS_{TOT}$$

Q = minimum supply of water in litres (L)
K = water supply coefficient
V = total building volume in cubic metres
 S_{TOT} = total of spatial coefficient values from property line exposures on all sides

First Floor

K = 27 Group E building with noncombustible construction (Table 1 Row 2)
V = 12751.57934
 S_{TOT} = 1 S_{TOT} Need Not Exceed 2.0

$$Q = 344292.642$$

Floors 2-6

K = 16 Group C building with noncombustible construction (Table 1 Row 2)
V = 36580 h=3.1 m area= 2360 m2
 S_{TOT} = 1 S_{TOT} Need Not Exceed 2.0

$$Q = 585280 \text{ L}$$

Floors 7(Loft+Mechanical)

K = 16 Group C building with noncombustible construction (Table 1 Row 2)
V = 2375 h=3.1 m area= 766 m2
 S_{TOT} = 1 S_{TOT} Need Not Exceed 2.0

$$Q = 38000 \text{ L}$$

$$\text{Total } Q = 967572.642 \text{ L}$$

Table 2

9000 L/min

150 L/s

APPENDIX E

Regional Flood Flow Conveyance Figure
Storm Area Drainage Plan
Storm Sewer Design Sheet

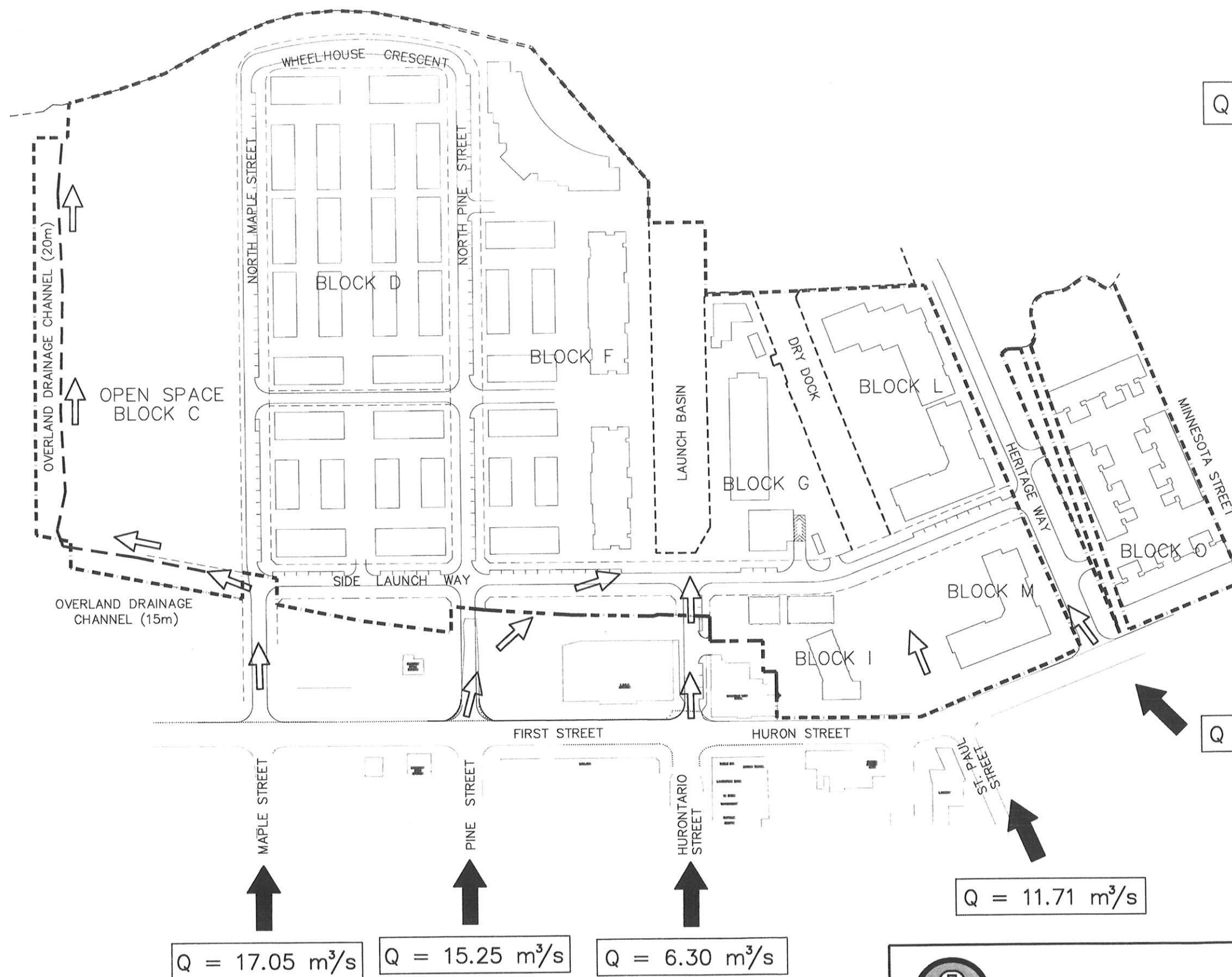
LEGEND

PEAK FLOW (REGIONAL)
(IBI GROUP, 2002)

$Q = 11.71 \text{ m}^3/\text{s}$

FLOW PATH (REGIONAL)

PROPERTY BOUNDARY



CF CROZIER & ASSOCIATES INC
LAND DEVELOPMENT ENGINEERS

110 PINE STREET
COLLINGWOOD ON
L9Y 2N9
T. 705-446-3510
F. 705-446-3520
CFCROZIER.CA

PROJECT
FSCD THE SHIPYARDS
TOWN OF COLLINGWOOD

DRAWN BY:
K.A.M.

DATE:
09/04/2007

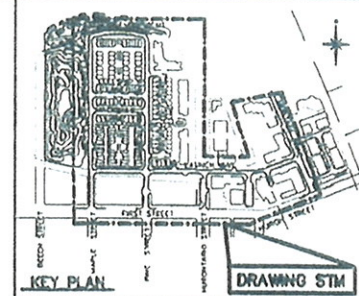
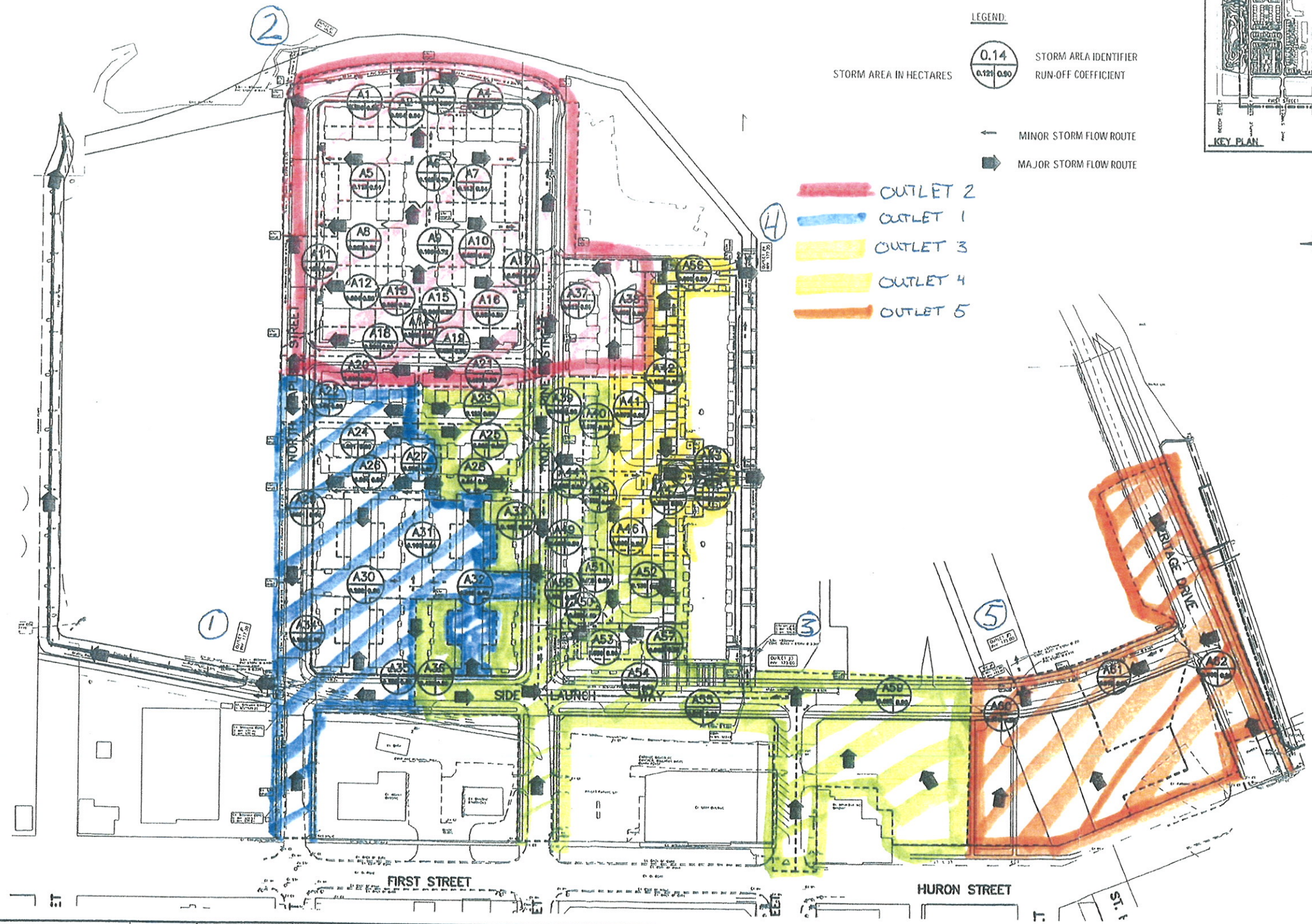
PROJECT No.:
103-2595

SCALE:
1:2500

TITLE
REGIONAL FLOOD
FLOW CONVEYANCE

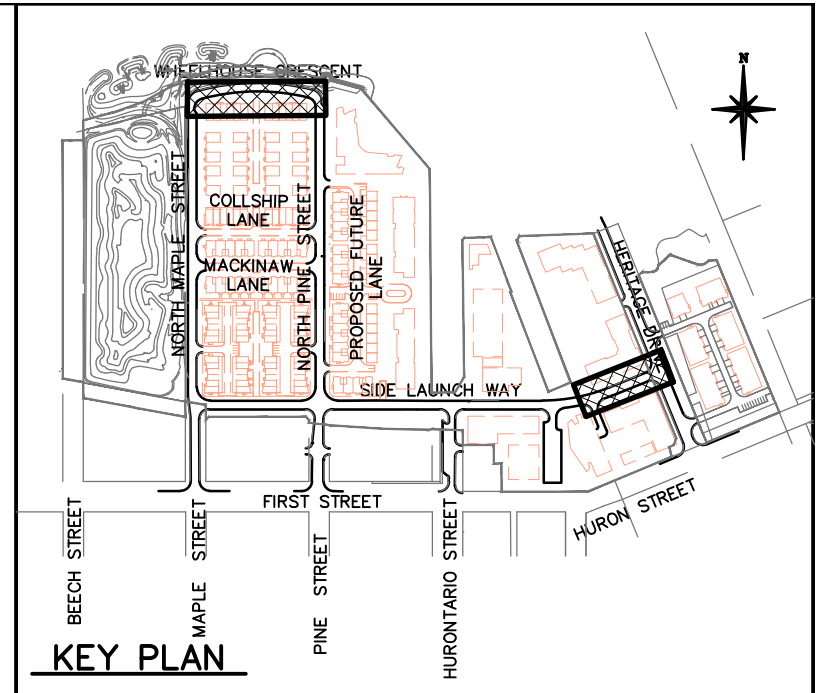
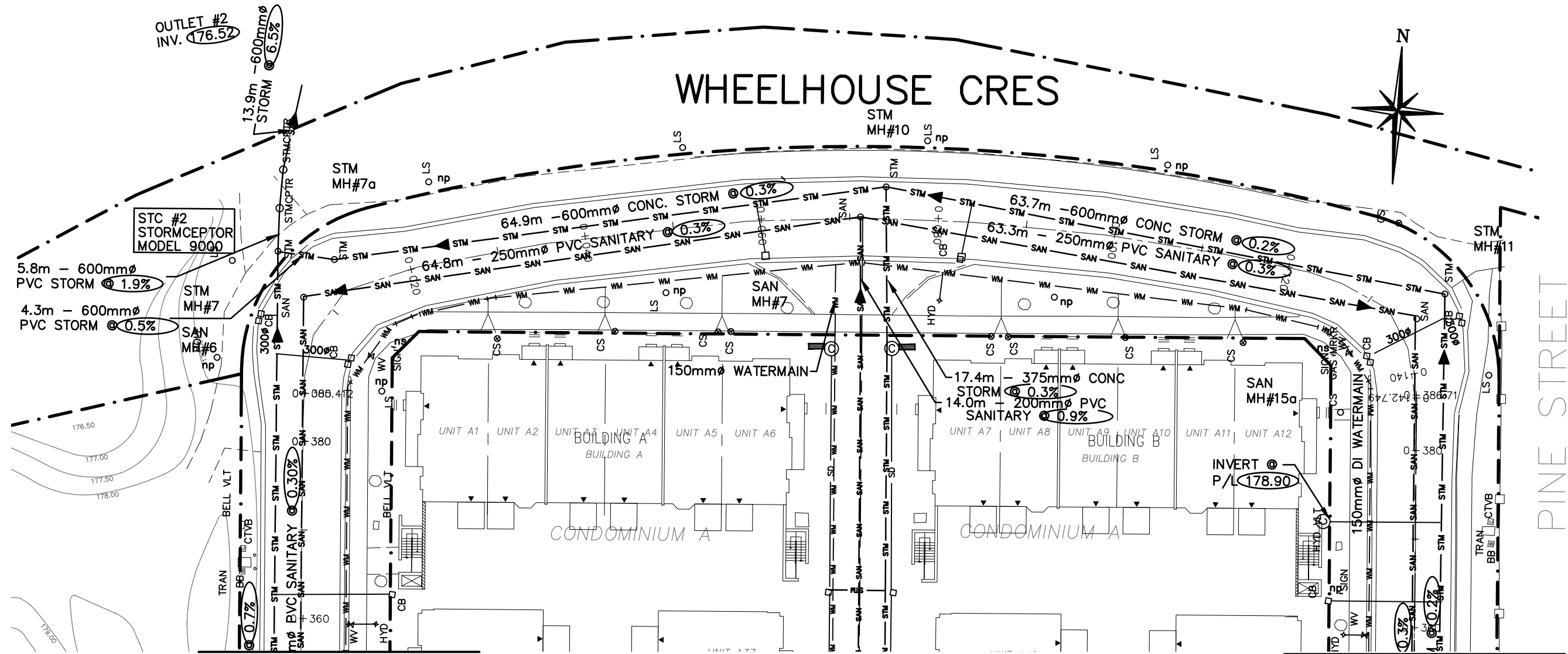
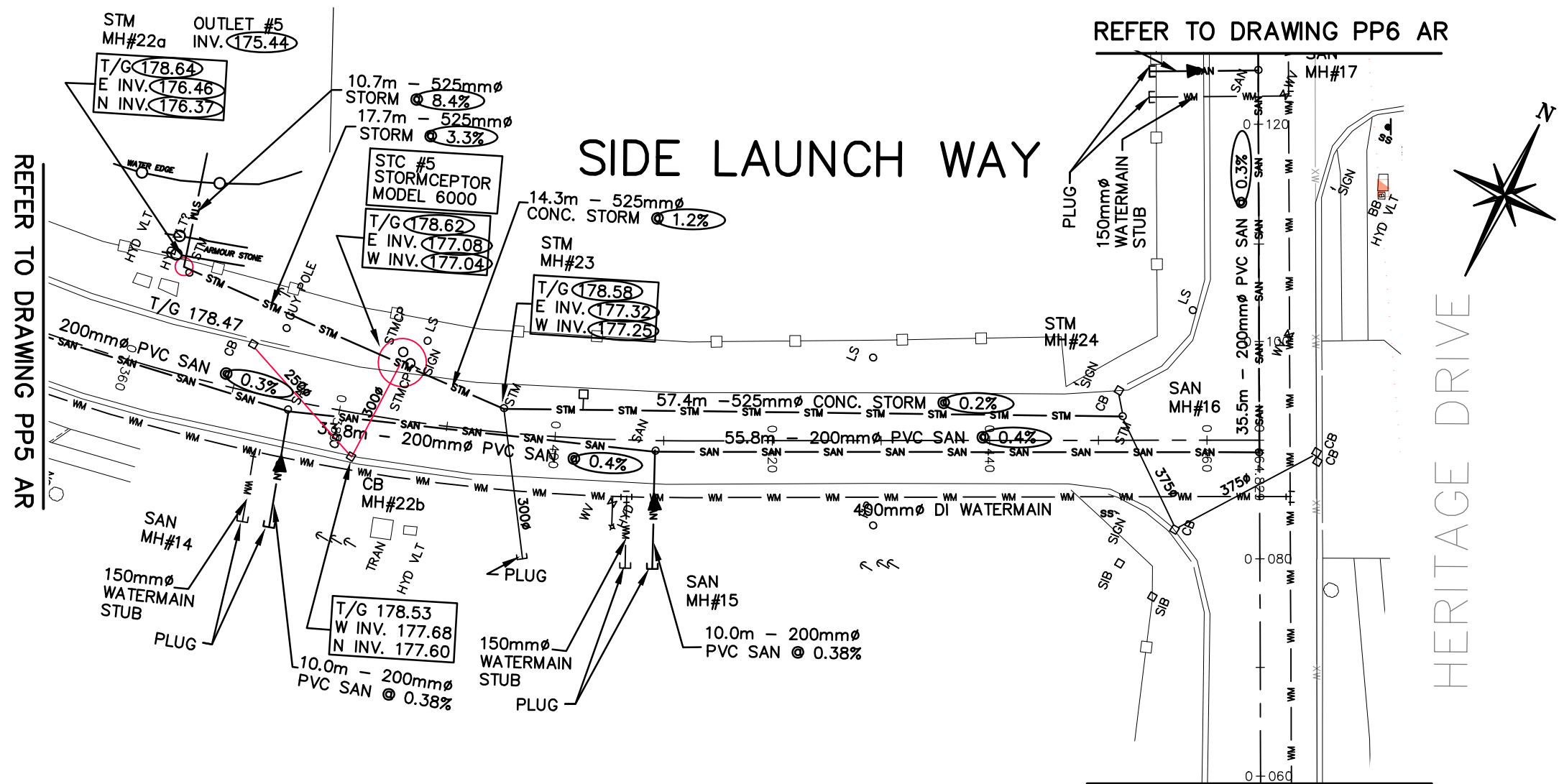
DRAWING No.:
FIGURE 3

FIGURE 6



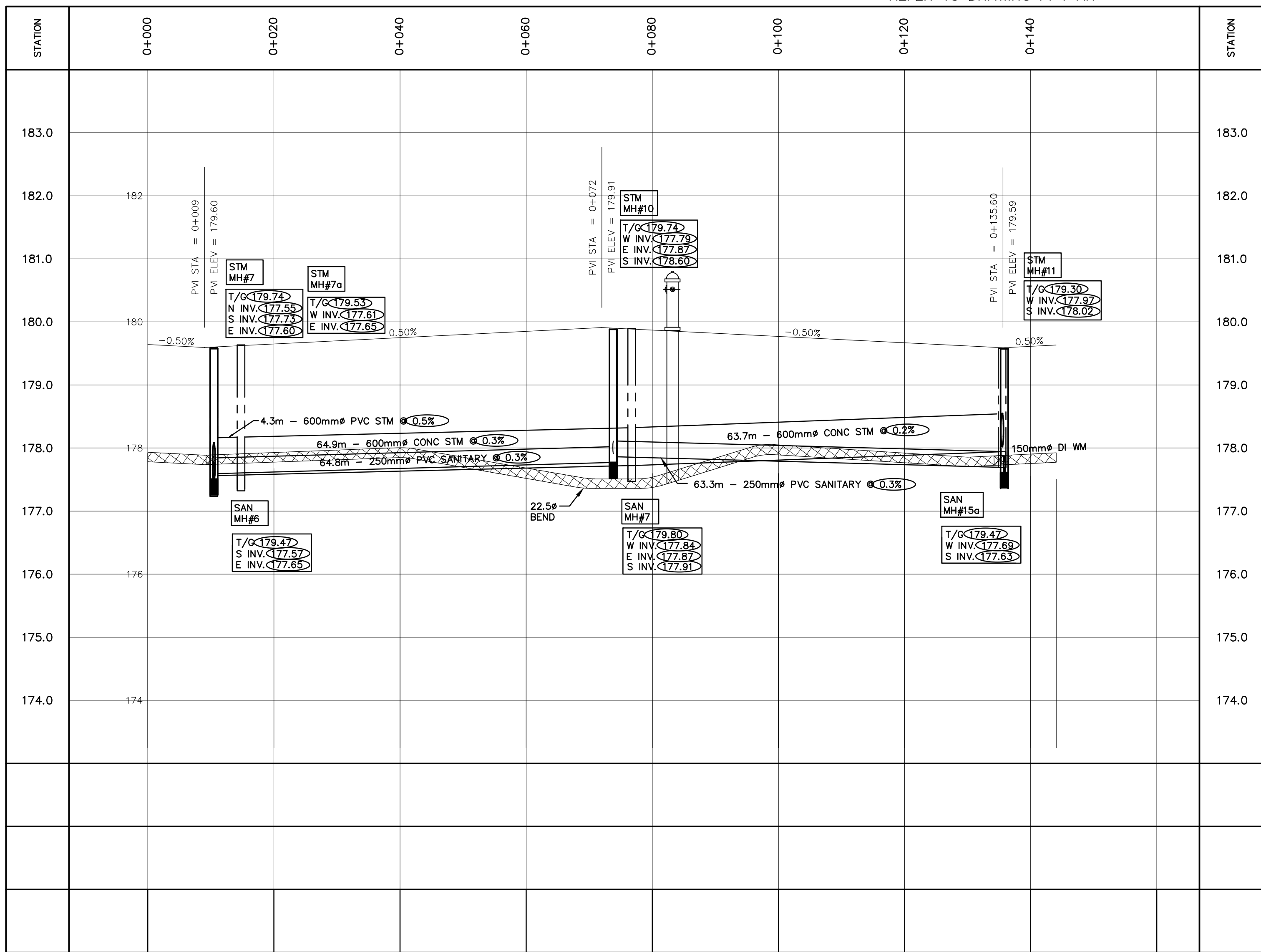
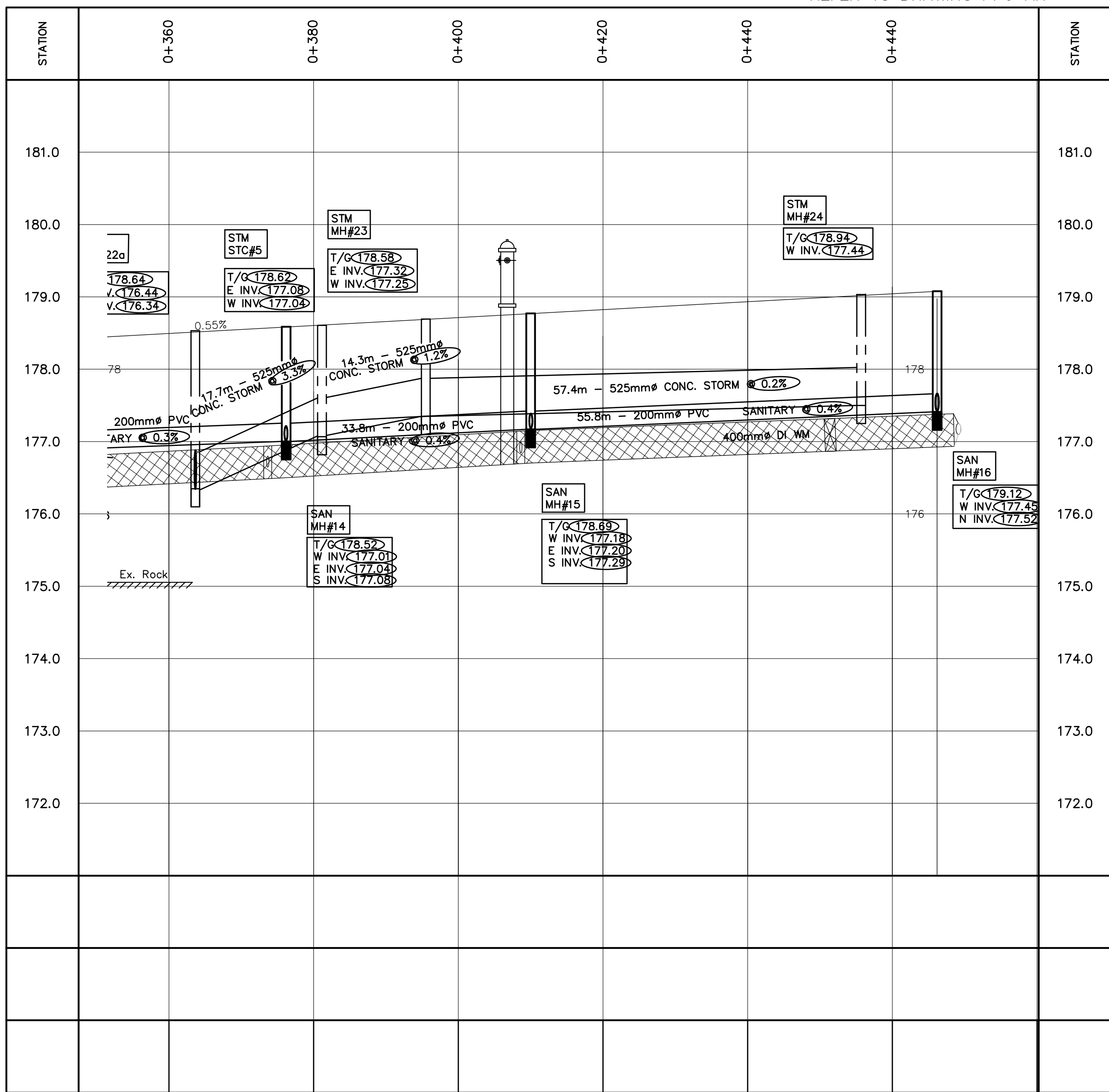
1. This drawing is the exclusive property of R. J. Burnside & Associates Limited and the reproduction of any part without prior written consent of this office is strictly prohibited. 2. The contractor shall verify all dimensions, levels, and details on site and report any discrepancies or omissions to this office prior to construction. 3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project. 4. Do not scale the drawings.	<table border="1"> <thead> <tr> <th>No.</th> <th>Issue / Revision</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Issued for Review</td> <td>Dec 21, 2006</td> </tr> <tr> <td>2.</td> <td>Revised per Town comments</td> <td>June 4, 2007</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No.	Issue / Revision	Date	1.	Issued for Review	Dec 21, 2006	2.	Revised per Town comments	June 4, 2007													BENCHMARKS GEODETIC BM ELEV. 170.140 BRASS CAP #010840871 IN SIDEWALK AT NORTH EAST CORNER OF HURON STREET (HWY. 26) AND HURONTARIO STREET. LOCAL BM ELEV. 170.71 CUT-CROSS ON TOP OF CONE WALL ON W SIDE HERITAGE DRIVE AT WATER'S EDGE, APPROX 250M N. OF HURON ST. (2UMD) LOCAL BM ELEV. 170.876 SPIKE IN NORTH FACE HPLS ON SOUTH SIDE HURON STREET AT HERITAGE DRIVE	BURNSIDE R. J. Burnside & Associates Limited 3 Huron Crescent, Collingwood, Ontario Telephone (705) 446-0515 Fax (705) 446-2200 web: www.burnside.com	CP CROZIER & ASSOCIATES INC. 1111 SHEPPARD AVENUE EAST SUITE 100 SCARBOROUGH, ONTARIO M1B 3Y9 Tel: (416) 291-1111 Fax: (416) 291-1112 www.crozier.ca	Client: THE SHIPYARDS FRAM SLOKKER COLLINGWOOD DEVELOPMENT LTD.	STORM DRAINAGE AREA PLAN <table border="1"> <tr> <td>Drawn By: J.O.</td> <td>Checked By: K.M.</td> <td>Drawing No: STM</td> </tr> <tr> <td>Scale: 1:1000</td> <td>Date: 01/10/06</td> <td>Project No: PG-03-4783</td> </tr> <tr> <td colspan="3"> Project: 1:1000 Date: 01/10/06 Project No: PG-03-4783 Date Printed: Jan 04, 2007 at 4:30pm Printed by: STM </td> </tr> </table>	Drawn By: J.O.	Checked By: K.M.	Drawing No: STM	Scale: 1:1000	Date: 01/10/06	Project No: PG-03-4783	Project: 1:1000 Date: 01/10/06 Project No: PG-03-4783 Date Printed: Jan 04, 2007 at 4:30pm Printed by: STM		
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	2.	Revised per Town comments	June 4, 2007																																	
Drawn By: J.O.	Checked By: K.M.	Drawing No: STM																																		
Scale: 1:1000	Date: 01/10/06	Project No: PG-03-4783																																		
Project: 1:1000 Date: 01/10/06 Project No: PG-03-4783 Date Printed: Jan 04, 2007 at 4:30pm Printed by: STM																																				

31 HURON STREET - STORM SEWER DESIGN SHEET																							
C CROZIER CONSULTING ENGINEERS				FREQUENCY 5 YEARS - Owen Sound IDF Coef. A=28.5 Coef. B=-0.726														PROJECT: 31 Huron Street PROJECT No.: 1838-4593 FILE: Storm Sewer Design Sheet DATE: 11-Aug-21					
By: N.Sroule Check: B.Hummellen Issued For: 2nd Submission				TIME OF CONCENTRATION 10.00 MANNINGS "n" 0.013																			
Location	FR MH NO	TO MH NO	Contributing Areas	AREA (A) Ha	RUN- OFF COEFF	A x C	Cummul. A x C	TIME OF CONC. min	I mm/hr	Q l/sec	SLOPE %	PIPE DIA. mm	VEL. m/sec	LENGTH m	TIME OF FLOW min	CAPACITY l/sec	FALL m	GROUND ELEV.		PIPE INV. ELEV.		COVER	
																		UPPER END	LOWER END	UPPER END	LOWER END	UPPER END	LOWER END
Outlet #5 South side	24	23	62	0.45	0.95	0.43	0.428	10.00	104.66	124.38	0.2	525	0.91	57.4	1.05	196.64	0.12	178.94	178.58	177.44	177.32	0.98	0.74
	23	STC5	61	0.24	0.95	0.23	0.656	11.05	97.32	177.35	1.2	525	2.17	14.3	0.11	468.91	0.17	178.58	178.62	177.25	177.08	0.81	1.01
	STC5	22a	60	0.67	0.95	0.64	1.292	11.16	96.62	347.05	3.3	525	3.60	17.7	0.08	778.50	0.58	178.62	178.64	177.04	176.46	1.06	1.65
	22a	Outlet 5		0.00	0.95	0.00	1.292	11.25	96.11	345.21	8.7	525	5.86	10.7	0.03	1267.89	0.93	178.64	176.50	176.37	175.44	1.74	0.54



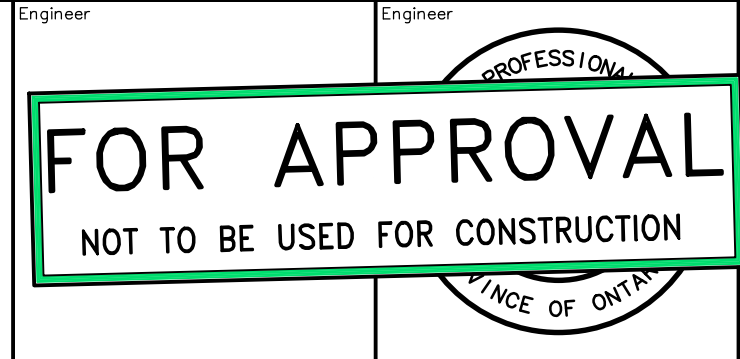
KEY PLAN

NOTE: THIS DRAWING HAS BEEN PREPARED BY "OF CROZIER ASSOCIATES INC." TO REFLECT CONSTRUCTION RECORD INFORMATION AND IS BELIEVED TO BE CORRECT, HOWEVER, THOSE RELYING ON THIS INFORMATION ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION AS TO ITS ACCURACY BEFORE APPLYING IT FOR ANY PURPOSE.



No.	Issue / Revision	Date
1.	Issued for Review	Dec 21, 2006
2.	Revised per Town comments	June 6, 2007
3.	3rd Submission	July 31, 2007
4.	4th Submission	Sept 13, 2007
5.	Issued for Approval	May 30, 2008
6.	As Recorded	Nov 16, 2018

BENCHMARKS
GEODETIC BM ELEV. 179.140 BRASS CAP #010840971 IN SIDEWALK AT NORTH EAST CORNER OF HURON STREET (HWY. 26) AND HURONTARIO STREET. LOCAL BM ELEV. 177.71 CUT-CROSS ON TOP OF CONC. WALL ON W.SIDE HERITAGE DRIVE AT WATER'S EDGE, APPROX. 250M N. OF HURON ST. (ZUMO) LOCAL BM ELEV. 179.876 SPIKE IN NORTH FACE HPLS ON SOUTH SIDE HURON STREET AT HERITAGE DRIVE.



THE SHIPYARDS FRAM
SLOKKER COLLINGWOOD
DEVELOPMENT LTD.

SIDE LAUNCH WAY
STA. 0+380 TO STA. 0+467
WHEELHOUSE CRESCENT
STA. 0+000 TO STA. 0+145

CROZIER
CONSULTING ENGINEERS

THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	J.O.	Design By		Project	103-2503
Check By	K.M.	Check By		Scale	H=1:500 V=1:50
				Drawing	PP3 AR

APPENDIX F

Stormceptor Analysis

Stormceptor Maintenance Program

1.4	Quantity Control (L/s) The maximum release rate of any flow control devices located upstream of the SC unit.	1.4.1. Does quantity control exist? ☐ Yes, continue to 1.4.2; or ☒ No, continue to 1.5 1.4.2. Is the control upstream of the SC unit? ☐ Yes, continue to 1.4.3 ☐ No, continue to 1.4.3 1.4.3. Does the restrictor control flows from all upstream area (i.e. is there uncontrolled surface flow combined with rooftop controlled flows)? ☐ Yes, continue to 1.4.5 ☐ No, continue to 1.4.4 1.4.4. Does the hydraulic grade line (HGL) exceed the elevation of the outlet invert when Q=0? ☐ Yes, contact manufacturer ☐ No, continue to 1.4.4 1.4.5. Maximum release rate (L/s): _____, continue to 1.4
1.5	Particle Size Distribution Select the particle size distribution that most closely represents the target pollutants in the runoff.	☒ Fine particle size distribution (20 um to 2000 um) ☐ Coarse particle size distribution (150 um to 2000 um) Continue to 1.6
1.6	Stormceptor Model Based on simulations using the Expert System sizing program or sizing tables.	Stormceptor Model STC <u>6000</u> Annual Flow Capture: <u>96</u> Annual TSS Removed (%) <u>82</u> Continue to 3.1
2 STORMCEPTOR® SIZING (SPILLS ONLY)		
2.1	Drainage Area (ha) Calculate the total impervious drainage area in hectares (includes rooftops, asphalt parking, concrete sidewalks, etc.)	Drainage Area (ha): _____ % Impervious _____ Total impervious Area (ha): _____ Continue to 2.2

STC #5

Stormceptor® Design Worksheet



2.2	Storage Volume (L) The required storage volume for hydrocarbons. To be determined by the designer based on the site risk assessment.	Storage volume required (L): _____ Continue to 2.3
2.3	Physical properties of hydrocarbon Most common hydrocarbon prone to be spilled at location (to be determined by designer based on the site risk assessment). Recommended CPI SG for oil water separators.	Specific Gravity: _____ Oil globule size: _____ Continue to 2.4
2.4	Model Number Sizing of units to be determined by the designer. Provide information in items 2.1, 2.2 and 2.3 to the manufacturer for sizing.	Stormceptor Model: STC _____ Annual Flow Capture: _____ Annual TSS Removed (%): _____ Total oil storage volume (L): _____ Continue to 3.1
3 STORMCEPTOR® SITING CONSIDERATIONS		
3.1	Distance from top of grade to inlet invert elevation (m) For units with less than 1.5 m of headroom, a twin inlet flat cap and two MH frame and covers will be provided. This provides easy access to the by-pass chamber for maintenance.	☒ If > 1.2 m, OK ☐ If < 1.2 m, please contact Hanson Continue to 3.2
3.2	Number of inlet pipe Maximum slope of any incoming pipe to prevent high velocities in flows.	Refer to Figure 9 in Technical Manual, Pipe Diameter: <u>525mm</u> Max Slope (Fig. 9): <u>0.3%</u> Continue to 3.3
3.3	Inlet and outlet pipe invert elevations	☒ 25 mm (Single inlet Inline and Submerged units) ☐ 75 mm (Multiple inlet Inline and Submerged units, Inlet Stormceptor System, Series Stormceptor System) Continue to 3.4

3.4	Inlet and outlet pipe diameter The pipe diameter and orientation of the pipe will dictate the diameter of the lower chamber. If pipe diameters are greater than 825 mm, please contact the manufacturer to determine the feasibility.	☒ 1050 mm inlet/outlet pipe straight through or 825 mm with 90 degree bend: 1800 mm by-pass chamber. ☐ 1500 mm inlet/outlet pipe straight through or 1050 mm with 90 degree bend: 2400 mm by-pass chamber. ☐ 2400 mm inlet/outlet pipe straight through or 1500 mm with 90 degree bend: 3000 mm by-pass chamber. Continue to 3.5
3.5	Bends Change in horizontal alignment can be no less than 90 degrees.	☐ Bend is from 90 to 180 degree horizontal deflection. Continue to 3.6 ☐ Other, contact Hanson
3.6	Submerged Conditions A submerged condition exists only if there is a standing water elevation in the sewer system during zero flow conditions. Downstream receiving waters should be reviewed to ensure that tailwater from high water levels do not submerge the unit.	☒ No submerged unit is required ☐ Yes, submerged conditions exist. The design tailwater elevation is _____. Contact the manufacturer for design. Continue to 3.7
3.7	Catch basin covers	The STC 300i is the only unit adaptable for a catch basin frame and cover. A CB or DCB should be located upstream of the unit and tee into the main pipeline.

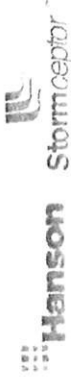
DISCLAIMER

This worksheet is provided as a guide to assist designers in properly sizing, selecting and siting a Stormceptor unit. All selections considered should be based on the designer's risk assessment for the site. Hanson should be consulted to address any special needs for a project or when a question arises.

DESIGN SUMMARY

Model Number:	STC <u>6000</u>	MOEE water quality objective: Level <u>1</u>
Annual flow capture:	<u>96</u> %	Total volume of storage: _____ L
Annual TSS removal:	<u>82</u> %	Oil capacity: _____ L
Total drainage area:	<u>1.55</u> ha	No. of inlet pipes: <u>1</u>
% Impervious:	<u>0.9</u> %	Upstream quantity control maximum release rate: _____ L/s
Impervious drainage area:	<u>1.4 ha</u>	

Ontario Stormceptor Sizing Table



Hanson Pipe & Products Canada, Inc.
p 1.888.888.3222 f 519.621.8233

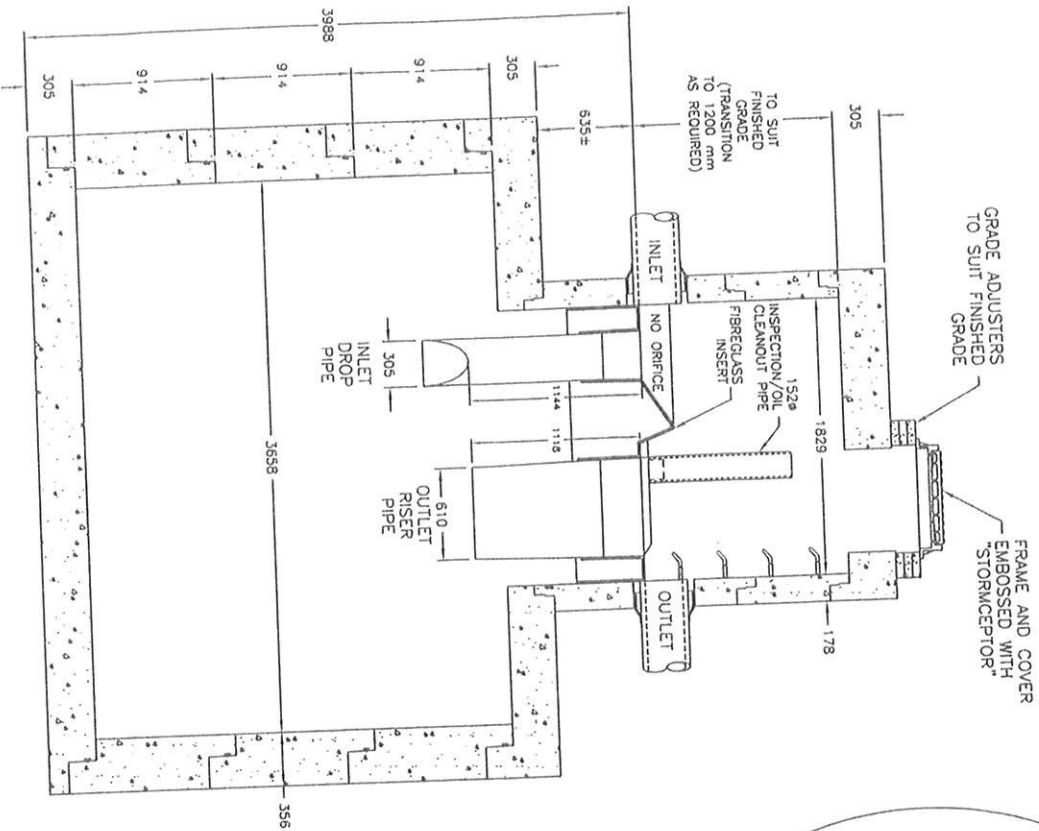
Legend

80% or greater
70% to 79%
60% to 69%
Less than 60%

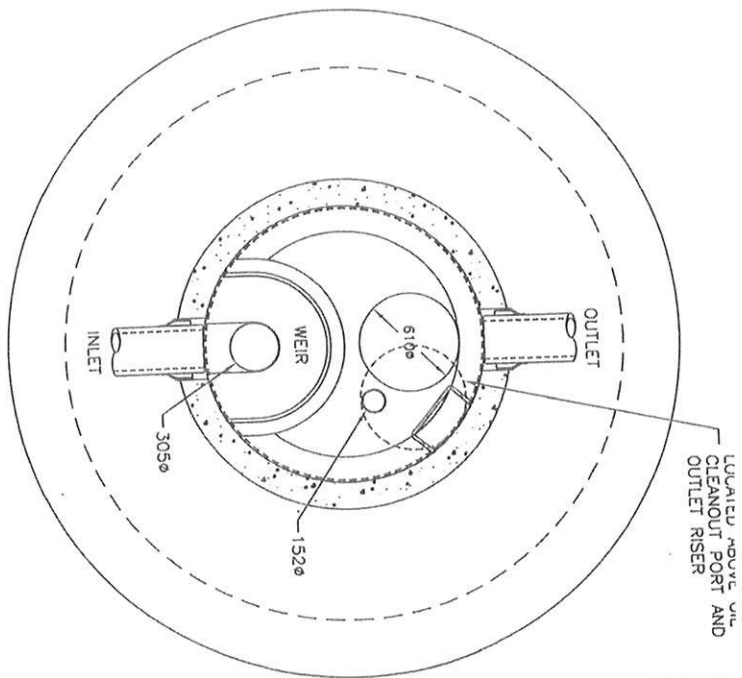
Estimates obtained from simulations using the Expert System Version sizing program
Toronto Central Rain Gauge, 1986 to 1996
All drainage areas are 100% impervious
No flow control has been assumed

Drainage Area (ha)	ESTIMATED ANNUAL % RUNOFF TREATED																ESTIMATED ANNUAL % TSS REMOVED																Drainage Area (ha)
	Stormceptor Model																Stormceptor Model																
	300	750	1000	1500	2000	3000	4000	5000	6000	9000	10000	14000	300	750	1000	1500	2000	3000	4000	5000	6000	9000	10000	14000									
0.1	95	99	99	99	100	100	100	100	100	100	100	100	85	91	91	92	94	95	96	96	97	98	98	98	0.1								
0.2	88	96	96	96	99	99	100	100	100	100	100	100	78	86	87	88	90	91	93	94	95	96	96	97	0.2								
0.3	83	97	97	97	99	99	99	100	100	100	100	100	73	83	84	87	88	91	91	93	94	95	95	96	0.3								
0.4	78	95	95	95	98	98	99	99	99	100	100	100	70	80	81	82	85	86	89	90	91	93	94	95	0.4								
0.5	74	93	93	93	97	97	99	99	99	99	99	100	67	78	79	80	83	84	87	88	90	92	93	94	0.5								
0.6	70	91	91	91	95	96	96	98	98	99	99	100	64	76	77	78	81	83	86	87	89	91	91	93	0.6								
0.7	66	89	89	89	94	94	96	96	98	98	99	99	62	74	75	76	80	81	85	86	88	90	91	92	0.7								
0.8	63	86	86	86	93	93	97	97	98	98	99	99	60	73	74	75	79	80	84	84	87	89	90	91	0.8								
0.9	60	87	87	87	92	92	96	96	96	98	98	99	58	71	72	73	77	79	83	83	86	88	89	91	0.9								
1.0	57	85	85	85	91	91	95	95	95	97	97	98	56	70	71	72	76	78	82	82	85	87	88	90	1.0								
1.1	55	84	84	84	91	91	95	95	95	97	97	98	55	69	70	71	75	77	81	82	84	87	88	90	1.1								
1.2	53	83	83	83	90	90	95	95	95	97	97	98	53	68	69	70	74	76	80	81	83	86	87	89	1.2								
1.3	51	81	81	81	89	89	94	94	94	96	96	98	52	67	68	69	73	75	79	80	82	85	86	88	1.3								
1.4	49	80	80	80	86	86	93	93	93	95	95	97	51	66	67	68	72	74	78	78	81	84	85	87	1.4								
1.5	47	79	79	79	87	87	93	93	93	95	95	97	50	65	67	67	71	73	77	78	81	84	84	87	1.5								
1.6	45	78	78	78	86	86	92	92	92	94	94	96	49	64	65	66	70	72	76	77	80	83	84	86	1.6								
1.7	44	76	76	76	85	85	92	92	92	94	94	96	48	63	64	65	69	71	75	76	79	82	83	85	1.7								
1.8	42	75	75	75	85	85	91	91	91	94	94	96	47	62	63	64	68	70	74	75	78	81	82	84	1.8								
1.9	41	74	74	74	84	84	91	91	91	94	94	96	46	61	62	63	67	69	73	74	77	80	81	82	1.9								
2.0	40	73	73	73	83	83	90	90	90	93	93	95	45	60	61	62	66	68	72	73	76	79	80	82	2.0								
2.1	39	72	72	72	82	82	89	89	89	92	92	94	44	59	60	61	65	67	71	72	75	78	79	82	2.1								
2.2	38	71	71	71	82	82	88	88	88	91	91	94	43	58	59	60	64	66	70	71	74	77	78	81	2.2								
2.3	37	70	70	70	81	81	88	88	88	91	91	94	42	57	58	59	63	65	69	70	73	76	77	80	2.3								
2.4	36	69	69	69	80	80	86	86	86	89	89	92	41	56	57	58	62	64	68	69	72	75	76	79	2.4								
2.5	35	68	68	68	79	79	86	86	86	89	89	92	40	55	56	57	61	63	67	68	71	74	75	78	2.5								
2.6	34	67	67	67	78	78	85	85	85	88	88	91	39	54	55	56	60	62	66	67	70	73	74	77	2.6								
2.7	33	66	66	66	77	77	84	84	84	87	87	90	38	53	54	55	59	61	65	66	69	72	73	76	2.7								
2.8	32	65	65	65	76	76	83	83	83	86	86	89	37	52	53	54	58	60	64	65	68	71	72	75	2.8								
2.9	31	64	64	64	75	75	82	82	82	85	85	88	36	51	52	53	57	59	63	64	67	70	71	74	2.9								
3.0	30	63	63	63	74	74	81	81	81	84	84	87	35	50	51	52	56	58	62	63	66	69	70	73	3.0								
3.1	29	62	62	62	73	73	80	80	80	83	83	86	34	49	50	51	55	57	61	62	65	68	69	72	3.1								
3.2	28	61	61	61	72	72	79	79	79	82	82	85	33	48	49	50	54	56	60	61	64	67	67	70	3.2								
3.3	27	60	60	60	71	71	78	78	78	81	81	84	32	47	48	49	53	55	59	60	63	66	67	70	3.3								
3.4	26	59	59	59	70	70	77	77	77	80	80	83	31	46	47	48	52	54	58	59	62	65	66	69	3.4								
3.5	25	58	58	58	69	69	76	76	76	79	79	82	30	45	46	47	51	53	57	58	61	64	65	68	3.5								
3.6	24	57	57	57	68	68	75	75	75	78	78	81	29	44	45	46	50	52	56	57	60	63	64	67	3.6								
3.7	23	56	56	56	67	67	74	74	74	77	77	80	28	43	44	45	49	51	55	56	59	62	63	66	3.7								
3.8	22	55	55	55	66	66	73	73	73	76	76	79	27	42	43	44	48	50	54	55	58	61	62	65	3.8								
3.9	21	54	54	54	65	65	72	72	72	75	75	78	26	41	42	43	47	49	53	54	57	60	61	64	3.9								
4.0	20	53	53	53	64	64	71	71	71	74	74	77	25	40	41	42	46	48	52	53	56	59	60	63	4.0								
4.1	19	52	52	52	63	63	70	70	70	73	73	76	24	39	40	41	45	47	51	52	55	58	59	62	4.1								
4.2	18	51	51	51	62	62	69	69	69	72	72	75	23	38	39	40	44	46	50	51	54	57	58	61	4.2								
4.3	17	50	50	50	61	61	68	68	68	71	71	74	22	37	38	39	43	45	49	50	53	56	57	60	4.3								
4.4	16	49	49	49	60	60	67	67	67	70	70	73	21	36	37	38	42	44	48	49	52	55	56	59	4.4								
4.5	15	48	48	48	59	59	66	66	66	69	69	72	20	35	36	37	41	43	47	48	51	54	55	58	4.5								
4.6	14	47	47	47	58	58	65	65	65	68	68	71	19	34	35	36	40	42	46	47	50	53	54	57	4.6								
4.7	13	46	46	46	57	57	64	64	64	67	67	70	18	33	34	35	39	41	45	46	49	52	53	56	4.7								
4.8	12	45	45	45	56	56	63	63	63	66	66	69	17	32	33	34	38	40	44	45	48	51	52	55	4.8								
4.9	11	44	44	44	55	55	62	62	62	65	65	68	16	31	32	33	37	39	43	44	47	50	51	54	4.9								
5.0	10	43	43	43	54	54	61	61	61	64	64	67	15	30	31	32	36	38	42	43	46	49	50	53	5.0								
Drainage Area (ha)	300	750	1000	1500	2000	3000	4000	5000	6000	9000	10000	14000	300	750	1000	1500	2000	3000	4000	5000	6000	9000	10000	14000	Drainage Area (ha)								
ESTIMATED ANNUAL % RUNOFF TREATED													ESTIMATED ANNUAL % TSS REMOVED																				
Stormceptor Model													Stormceptor Model																				

SECTION VIEW



PLAN VIEW



STC # 5

FOR CLEANOUT ACCESS TO THE STORMCEPTOR CHAMBER.

1. ACCESS WAY IS OFFSET TO ALLOW ACCESS TO THE FIBREGLASS BYPASS SLAB AND TO ALLOW FOR INSPECTION AND MAINTENANCE FROM THE SURFACE.
2. PIPE INSTALLATION BY NON-SHRINK GROUT OR FLEXIBLE BOOTS.
3. SAFETY GRATES FOR THE 610 mm OUTLET RISER PIPE ARE PROVIDED.
4. NITRILE GASKETS ARE PROVIDED FOR THE JOINTS.
5. TWIN INLET FLAT CAPS ARE PROVIDED FOR UNITS WITH TOP OF GRADE TO INVERT ELEVATIONS OF 2.134 m OR LESS FOR INSPECTION AND MAINTENANCE.
6. DIFFERENCE BETWEEN INLET AND OUTLET INVERT ELEVATIONS TO BE 25 mm FOR SINGLE INLET UNITS AND 76 mm FOR MULTIPLE INLET UNITS.

DESIGN SPECIFICATIONS:

1. MANUFACTURED TO CSA A257.4
2. CONCRETE STRENGTH: 30 MPa
3. REINFORCING STEEL: 448 MPa
4. WELDED WIRE FABRIC TO CSA G30.5
5. CONCRETE COVER TO STEEL: 25 mm MIN.
6. DESIGNED TO OHBC '91, 3rd EDITION

LOADING

THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS:

CANADIAN PATENT NO. 2,009,208
CANADIAN PATENT NO. 2,137,942
CANADIAN PATENT NO. 2,175,277
CANADIAN PATENT NO. 2,180,305



Hanson

Stormceptor

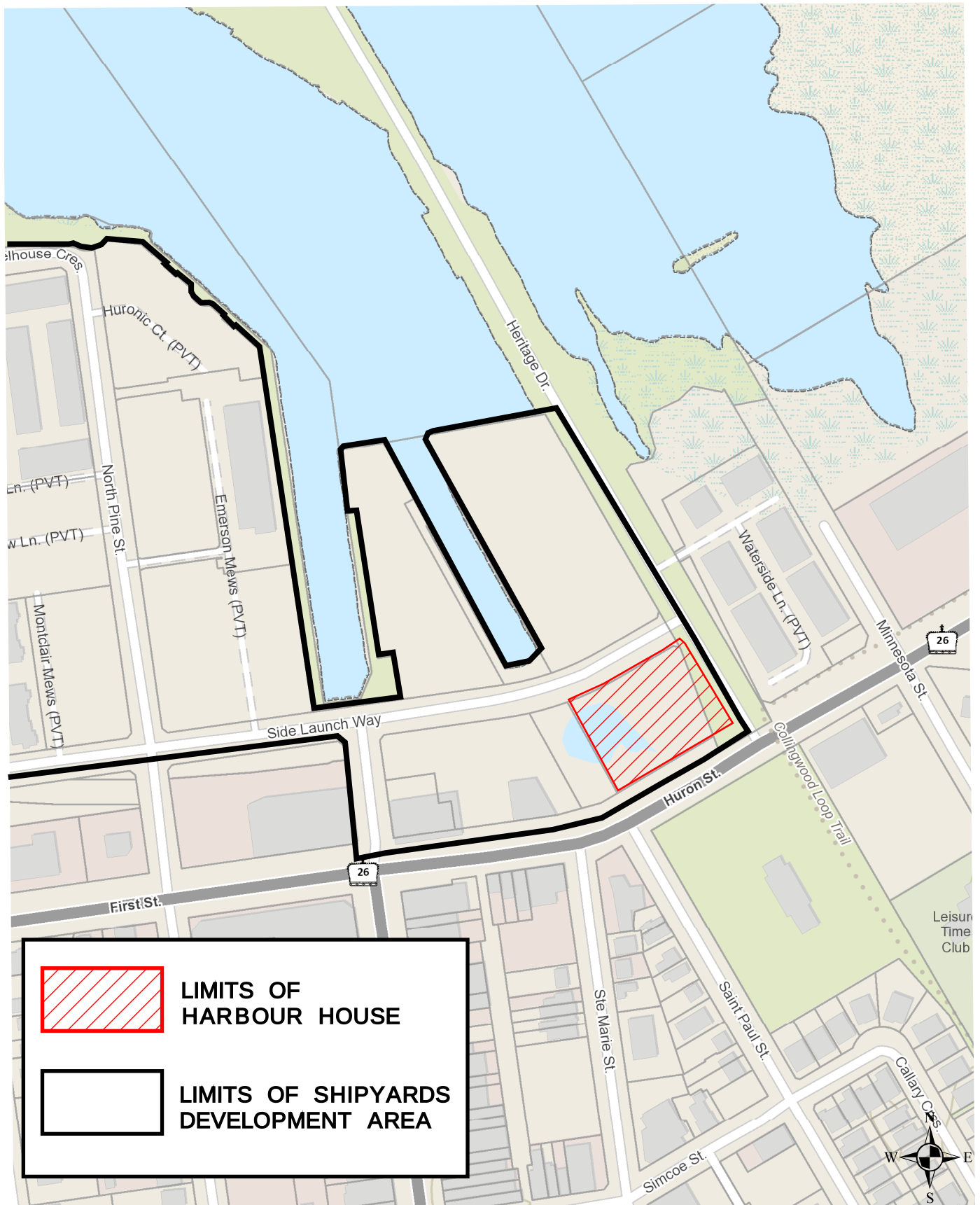
STC - 6000
IN-LINE STORMCEPTOR
6000 GALLON CAPACITY

DATE:	5 FEB 01
D.S.	B.L.
UNITS:	METRIC
SCALE:	1:50

B.L.	UNITS:	METRIC	SCALE:	1:50
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FIGURES

Figure 1:	Site Location Plan
Figure 2:	Site Plan
Figure 3:	Storm Outlet Plan
Figure 4:	Storm Area Drainage Plan
Drawing C101:	General Site Servicing Plan
Drawing C102:	Site Grading Plan
Drawing C103:	Sediment Control Plan



THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

PROJECT	HARBOUR HOUSE TOWN OF COLLINGWOOD	DRAWN BY:	PROJECT No.:
		J.L'A	1838 - 5493
TITLE	SITE LOCATION PLAN	DATE:	SCALE:
		JULY 31, 2020	NTS
		DRAWING No.:	FIG. 1

SITE LOCATION

TOWN OF COLLINGWOOD
97 HURONTARIO STREET
COLLINGWOOD, ONTARIO, L9Y 2L8

31 HURON STREET INC. (STREETCAR)
1230 DUNDAS STREET EAST
TORONTO, ONTARIO, M4M 1S3



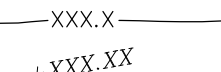
CROZIER
CONSULTING ENGINEERS



CROZIER
CONSULTING ENGINEERS

town

EXISTING FEATURES (EX.)



 EX. XXX, X

 EX. GRADE

 EX. TREELINE

 EX. WATERCOURSE

 EX. DITCH

 EX. WATERMAIN

 EX. WATER SERVICE

 EX. FIRE HYDRANT & VALVE

 EX. SANITARY SEWER & MANHOLE

 EX. SANITARY FORCEMAIN

 EX. SANITARY SERVICE

 EX. STORM SEWER & MANHOLE

 EX. STORM CATCHBASIN

 EX. STORM DOUBLE CATCHBASIN

 EX. STORM CATCHBASIN MANHOLE

 EX. STORM DOUBLE CATCHBASIN MANHOLE

 EX. GAS MAIN

 EX. BELL LINE

 EX. BELL PEDESTAL

 EX. CABLE TELEVISION PEDESTAL

 EX. HYDRO POLE

 EX. LIGHT STANDARD

 EX. SIGN

 EX. BUILDING

 EX. BENCHMARK NUMBER & LOCATION

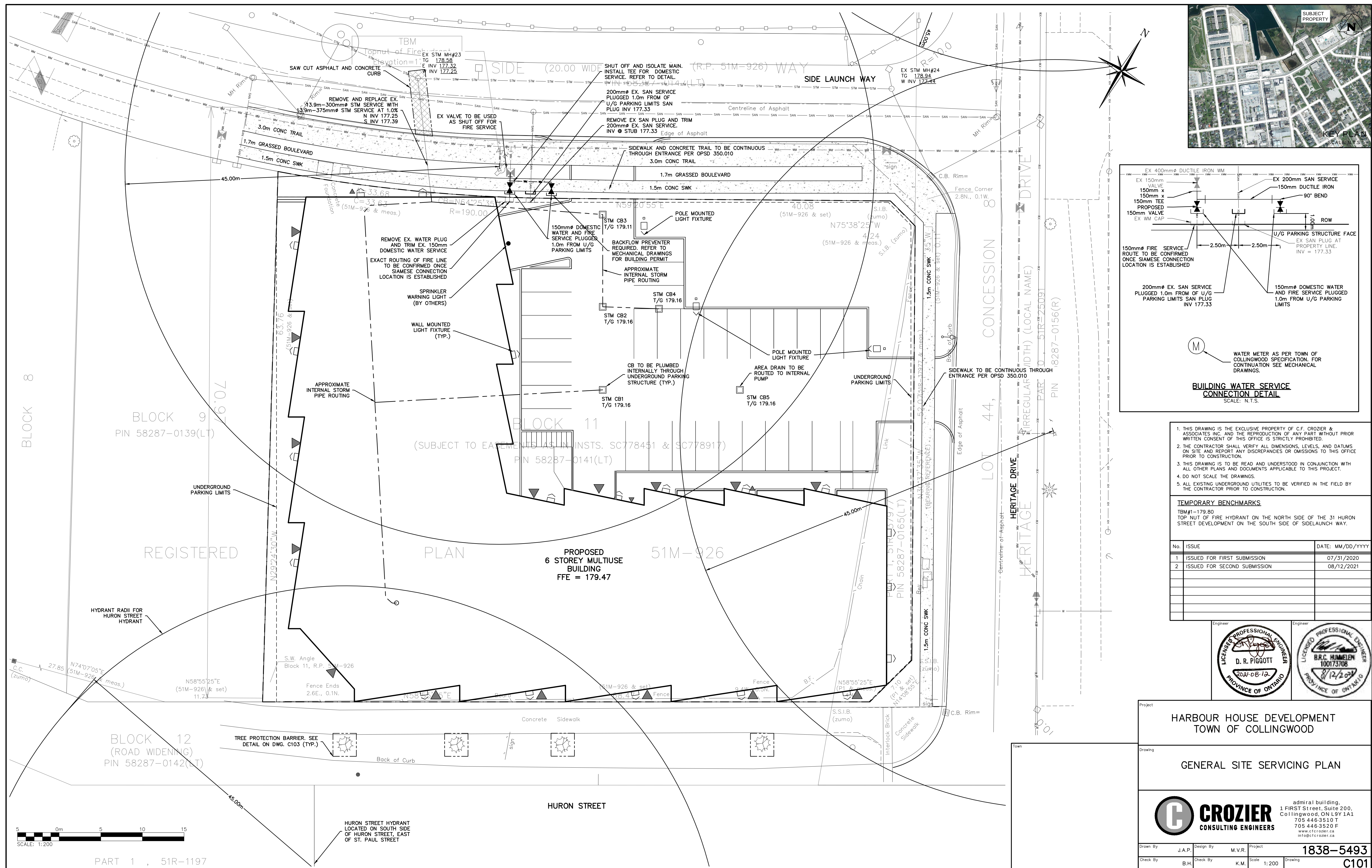
 EX. BOREHOLE NUMBER & LOCATION

PROPOSED FEATURES (PR.)

	PR. ELEVATION
	PR. ELEVATION (MATCH EX. ELEVATION)
	PR. SWALE & SLOPE
	PR. DITCH DRAINAGE
	PR. WATERMAIN & VALVE
	PR. WATER SERVICE
	PR. FIRE HYDRANT & VALVE
	PR. WATER VALVE CHAMBER
	PR. WATER QUALITY TESTING STATION
	PR. SANITARY SEWER & MANHOLE
	PR. SANITARY FORCEMAIN
	PR. SANITARY SERVICE
	PR. SANITARY CATCHMENT
	PR. CATCHMENT AREA ID
	PR. AREA (ha)
	PR. POPULATION (3.5 p.p.u.)
	PR. STORM SEWER & MANHOLE
	PR. CATCHBASIN
	PR. DOUBLE CATCHBASIN
	PR. CATCHBASIN MANHOLE
	PR. DOUBLE CATCHBASIN MANHOLE
	PR. STORM CATCHMENT
	PR. CATCHMENT AREA ID
	PR. RUNOFF COEFFICIENT
	PR. DRAINAGE AREA (ha)
	PR. CURB CUT
	PR. CANADA POST COMMUNITY MAIL BOX
	PR. TRANSFORMER
	PR. STOP SIGN
	PR. NAME SIGN
	PR. NO PARKING SIGN
	PR. FENCE
	PR. BUILDING ENVELOPE
	PR. LIGHT DUTY SILT FENCE
	PR. HEAVY DUTY SILT FENCE
	PR. STRAW BALE CHECK FLOW
	PR. ROCK CHECK DAM
	PR. SLOPE (3:1 MAX.)
	PR. TREE PRESERVATION AREA
	PR. TOPSOIL STOCKPILE LOCATION
	PR. MODULAR TRFF PROTECTION FENCE

C100	TITLE PAGE
C101	GENERAL SITE SERVICING PLAN
C102	OVERALL SITE GRADING PLAN & SEDIMENT & EROSION CONTROL PLAN
C103	CONSTRUCTION NOTES & DETAILS

PROJECT No.: 1838-5493
 SECOND Submission



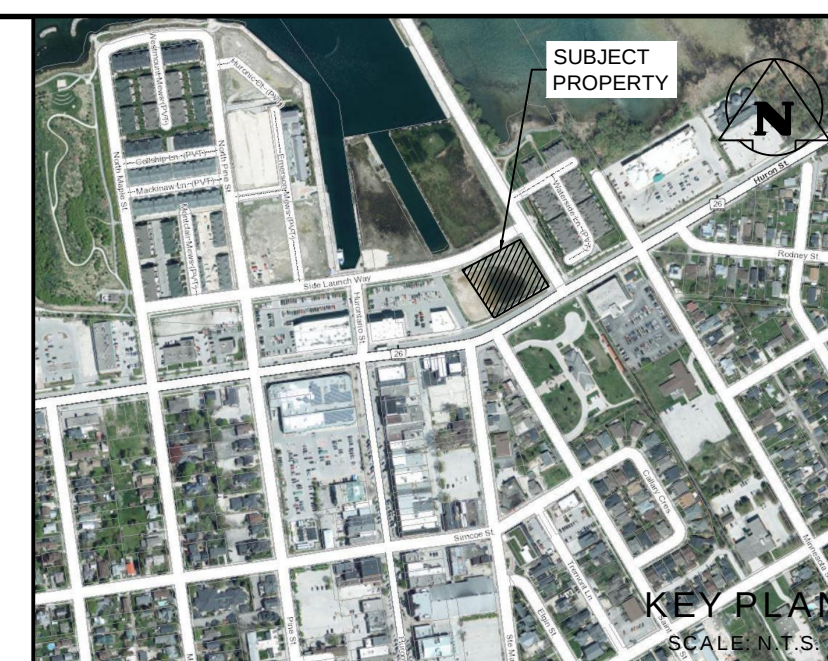
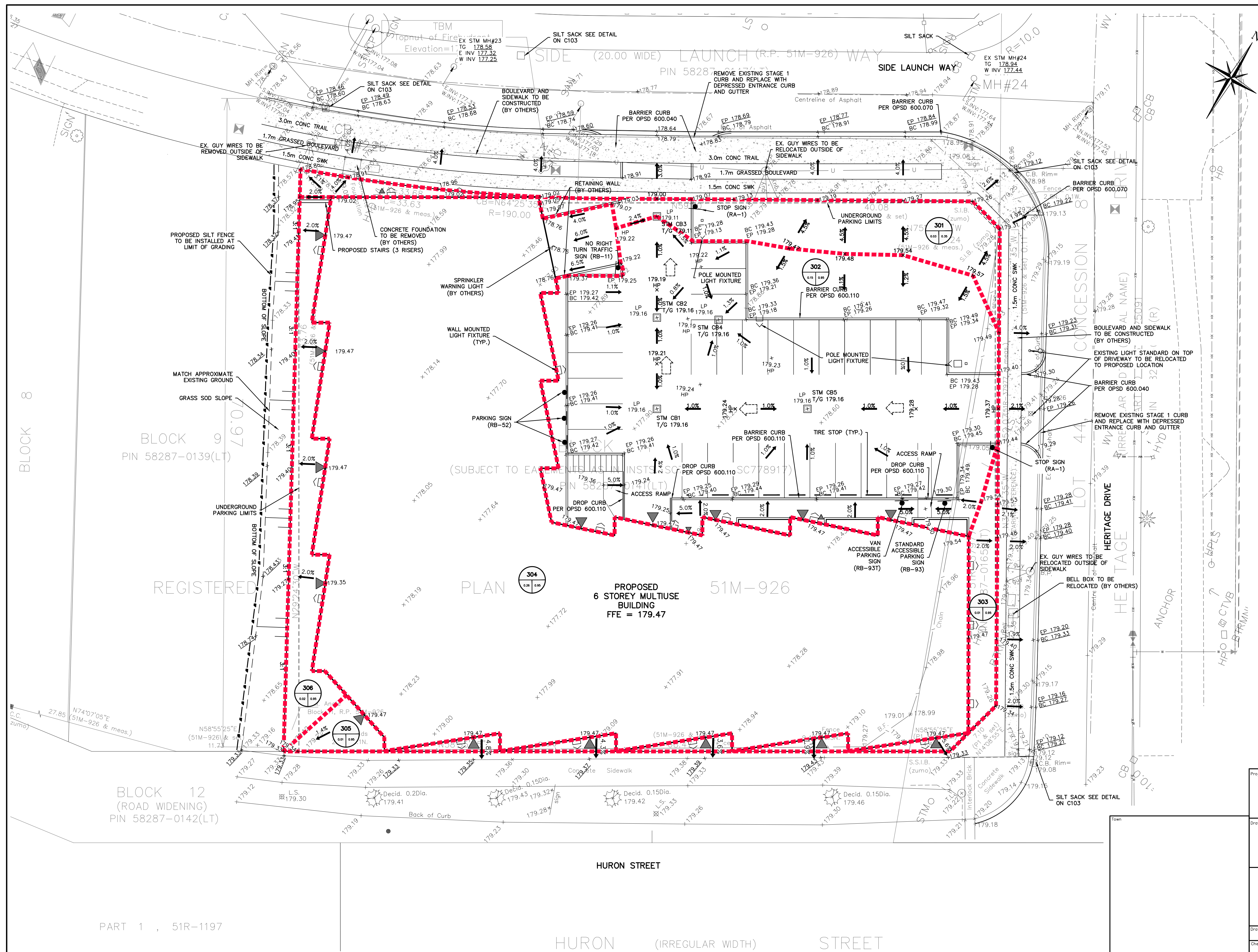
HARBOUR HOUSE DEVELOPMENT
TOWN OF COLLINGWOOD

GENERAL SITE SERVICING PLAN



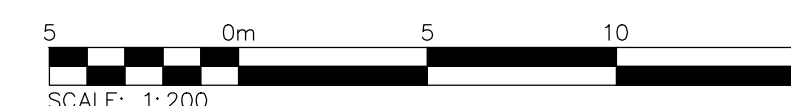
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Check By B.H.	Check By K.M.	Scale 1: 200	Drawing C101



- | | |
|---|--|
| BC XXX.XX | BACK OF CURB ELEVATION |
| EP XXX.XX | EDGE OF PAVEMENT ELEVATION |
| ×215.00 | PROPOSED GRADE |
| × <u>215.00</u> | PROPOSED GRADE (TO MATCH EXISTING) |
| <u>2.0%</u>  | PROPOSED MINOR FLOW DIRECTION |
|  | BUILDING ENTRANCE (PERSONNEL DOOR) |
|  | BUILDING ENTRANCE (OVERHEAD DOOR) |
|  | PROPOSED MAJOR OVERLAND FLOW DIRECTION |
|  | PROPOSED SLOPE (3:1 MAX.) |
|  | STORM DRAINAGE CATCHMENT |

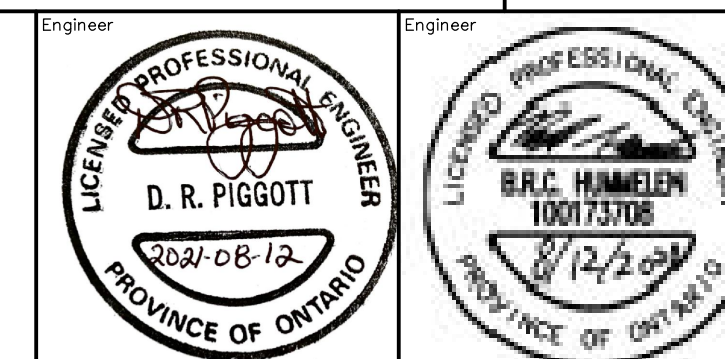
REFER TO LANDSCAPE PLAN
FOR PAVING MATERIAL



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3. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
4. DO NOT SCALE THE DRAWINGS.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

TEMPORARY BENCHMARKS

TBM#1-179.80
TOP NUT OF FIRE HYDRANT ON THE NORTH SIDE OF THE 31 HURON
STREET DEVELOPMENT ON THE SOUTH SIDE OF SIDE LAUNCH WAY

[illegible]

Project

HARBOUR HOUSE DEVELOPMENT
TOWN OF COLLINGWOOD

OVERALL SITE GRADING PLAN
& SEDIMENT & EROSION CONTROL PLAN



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Check By	B.H.	Check By	K.M.	Scale 1: 200	Drawing C102

CONSTRUCTION NOTES

A) GENERAL – CONSTRUCTION

- ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH TOWN OF COLLINGWOOD STANDARDS (2007), OPSPD AND OPSS. WHERE CONFLICT OCCURS, TOWN OF COLLINGWOOD STANDARDS (2007) TO GOVERN.
- TRENCH BACKFILL (OPSPD 802.010 & 802.013) TO BE SELECT NATIVE MATERIAL OR IMPORTED SELECT SUBGRADE TO OPSS 1010. BACKFILL TO BE PLACED IN MAXIMUM 200mm THICK LIFTS AND COMPACTED TO 95% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD).
- PIPE COVER AND BEDDING TO BE GRANULAR 'A'. MINIMUM 150mm DEPTH COMPACTED TO A MINIMUM 95% SPMDD.
- ALL TOPSOIL AND EARTH EXCAVATION TO BE STOCK PILED OR REMOVED TO AN APPROVED SITE AS DIRECTED BY ENGINEER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DETAILED LAYOUT OF THE WORK. THE OWNER'S ENGINEER WILL CONFIRM ALL BENCH MARK ELEVATIONS AND HORIZONTAL ALIGNMENT FOR THE CONTRACTOR.
- ALL PROPERTY BARS TO BE PRESERVED AND REPLACED BY O.L.S. AT CONTRACTOR'S EXPENSE IF REMOVED DURING CONSTRUCTION.
- THE CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR THE SUPPLY OF TEMPORARY WATER AND POWER.
- DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS-517 AND 518 TO MAINTAIN ALL TRENCHES IN A DRY CONDITION.
- ALL ENGINE DRIVEN PUMPS TO BE ADEQUATELY SILENCED, SUITABLE FOR OPERATION IN A RESIDENTIAL DISTRICT.
- DISTURBED AREAS OUTSIDE THE PROJECT LIMITS TO BE REINSTATED TO PREVIOUS CONDITION OR BETTER.
- THE CONTRACTOR IS RESPONSIBLE TO NOTIFY ALL UTILITY COMPANIES PRIOR TO COMMENCING WORK AND CO-ORDINATE CONSTRUCTION ACCORDINGLY.
- ALL ROCK EXCAVATION PER OPSS-206.
- ALL EXCAVATION MUST BE CARRIED OUT IN FULL COMPLIANCE WITH MOST RECENT GUIDELINES OF OHSA.

B) PARKING LOT AND ENTRANCES

- SUBGRADE TO BE COMPACTED TO A MINIMUM DRY DENSITY OF AT LEAST 95% SPMDD.
- SUBGRADE TO BE PROOF ROLLED AND CERTIFIED PRIOR TO PLACING GRANULAR 'B'.
- GRANULAR 'A' AND 'B' BASE MATERIALS TO BE COMPACTED TO 100% OF THE MATERIAL'S RESPECTIVE SPMDD AND PLACED IN MAX. 150mm LIFTS.
- REFER TO PAVEMENT STRUCTURE DETAILS FOR INTERNAL ROADWAY, DRIVEWAYS AND PARKING AREAS.
- SELECT SUBGRADE MATERIAL, OR IMPORTED GRANULAR MATERIAL APPROVED BY THE ENGINEER, COMPACTED TO 98% SPMDD TO BE USED AS FILL IN ALL AREAS WHERE PROPOSED PIPE INVERTS ARE HIGHER THAN EXISTING GRADE OR AS INSTRUCTED BY THE ENGINEER.
- ALL GRANULARS AND ASPHALT MATERIALS PLACEMENT TO BE IN ACCORDANCE WITH OPSS 314 AND OPSS 310.
- JOINTS WITH EXISTING ASPHALT TO BE SAW CUT STRAIGHT PRIOR TO PLACING NEW ASPHALT AND TACK COAT APPLIED TO EXISTING ASPHALT.
- CONCRETE CURB TO OPSPD 600.110 AND OPSS 353. CONCRETE CURB AND GUTTER TO OPSPD 600.040 AND OPSS 353.
- CONCRETE SIDEWALK TO OPSPD 310.010, 310.030, 350.010 AND OPSS 351. SUBBASE TO CONSIST OF MIN. 150mm OF GRANULAR 'A' UNLESS THROUGH DRIVEWAYS.

C) SANITARY SEWERS

- M.H.'S TO OPSPD – 701.010, 701.030 & 704.010.
- BENCHING TO OPSPD – 701.021.
- STEPS TO OPSPD – 405.010.
- BACKFILL AND EMBEDMENT TO OPSPD – 802.010, GRANULAR 'A' BEDDING.
- TRENCH BACKFILL TO BE SELECT NATIVE MATERIAL AS APPROVED BY ENGINEER OR IMPORTED GRANULAR MATERIAL.
- FRAMES AND COVERS TO OPSPD – 401.01 TYPE 'A' (CLOSED COVER).
- MANHOLES FRAMES TO BE SET TO BASE COURSE ASPHALT AND RAISED BY ADDING RISER RINGS AS REQUIRED.
- PIPE SUPPORT AT MAINTENANCE HOLES AS PER OPSPD 708.020.
- GENERAL INSTALLATION AND TESTING OF SEWERS AND APPURTENANCES TO BE IN ACCORDANCE WITH OPSS 407, 408, 409 (CCTV), 410, 421 AND ALL SPECIFICATIONS REFERENCED WITHIN THESE SECTIONS. CONTRACTOR SHALL BE REQUIRED TO PERFORM LEAKAGE & DEFLECTION TESTING ACCORDING TO THE APPROPRIATE OPSS.
- SANITARY SEWER – SDR 28 PVC GREEN COLOUR.
- FROST STRAPS PER OPSPD 701.100.

D) WATERMAINS

- BACKFILL AND EMBEDMENT TO OPSPD – 802.010, GRANULAR 'A' EMBEDMENT.
- TRENCH BACKFILL TO BE SELECT NATIVE MATERIAL AS APPROVED BY ENGINEER OR IMPORTED GRANULAR MATERIAL.
- THRUST BLOCKS TO OPSPD – 1103.010 AND 1103.020 WHERE SUITABLE SOILS ARE ENCOUNTERED.
- SERVICE CONNECTIONS TO OPSPD – 1104.010, 100mm GRANULAR 'A' EMBEDMENT AND COVER OVER PIPE.
- MINIMUM COVER ON WATERMAIN AND SERVICES TO BE 1.7m.
- GATE VALVES, BENDS AND FITTINGS TO BE CONNECTED WITH ROMAC GRIPPER RING RESTRAINING CLAMP.
- CLEARANCE BETWEEN WATERMAINS AND SEWERS TO BE A MINIMUM OF 0.5m VERTICAL (CLEAR) C/W RIGID INSULATION AND 2.5m MINIMUM (CLEAR) HORIZONTAL SEPARATION.
- FOLLOWING TESTING, CONTRACTOR SHALL OPERATE EACH WATER SERVICE TO VERIFY FULL FLOW AND PRESSURE AT THE GATE VALVE AND/OR CURB STOP TO THE SATISFACTION OF THE ENGINEER.
- GENERAL INSTALLATION AND TESTING OF WATERMAIN AND APPURTENANCES TO BE IN ACCORDANCE WITH OPSS 701 AND ALL SPECIFICATIONS REFERENCED WITHIN THESE SECTIONS. WORK MUST BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF THE ONTARIO BUILDING CODE, ONTARIO FIRE CODE AND LOCAL CODES. WATER LINES ARE TO BE TESTED TO THE SATISFACTION OF THE LOCAL PLUMBING INSPECTOR. COMPLETE WATER SYSTEM SHALL BE DISINFECTED IN ACCORDANCE WITH REQUIREMENTS OF AWWA STANDARD C651-99. ALL WATERMAIN TESTING & CHLORINATION WILL BE CONDUCTED BY TOWN OF COLLINGWOOD WATER DEPARTMENT AT CONTRACTOR'S COST. WATERMAINS ARE NOT TO BE CONNECTED TO EXISTING WATERMAINS UNTIL BACTERIOLOGICAL TESTING HAS BEEN SUCCESSFULLY COMPLETED & CERTIFIED BY TOWN OF COLLINGWOOD WATER DEPARTMENT.
- COMPLETE WATER SERVICE SHALL BE DISINFECTED IN ACCORDANCE WITH REQUIREMENTS OF O. REG. 459/00 & SATISFACTION OF TOWN OF COLLINGWOOD WATER DEPARTMENT.
- WATERMAIN – CLASS 52 OR PRESSURE CLASS 350 CEMENT LINED DUCTILE IRON. CONDUCTIVITY CONNECTORS TO BE USED ON ALL JOINTS.
- WATERMAIN SERVICES – 25mmø/50mmø/64mmø TYPE 'K' SOFT COPPER PIPE AS NOTED.
- SERVICE BOXES TO NUMBER 7, D-1 CLOW OR MUELLER, 24" STAINLESS STEEL RODS STRAIGHT C/W CAP PAINTED BLUE.
- ALL SERVICES SHALL BE METERED. METERS TO BE COMPLETE WITH REMOTE READOUT OR RADIO READ AS DETERMINED BY THE TOWN OF COLLINGWOOD WATER DEPARTMENT. WATER METER TO BILL FOR ENTIRE PROPERTY. ADDITIONAL METERS CAN BE ADDED INTERNALLY FOR EACH APARTMENT IF REQUIRED.
- VALVES – RESILIENT SEAT, RSGV MECHANICAL JOINT, OPEN LEFT CLOW OR MUELLER WITH 5-SL-48 SLIDING VALVE BOX C/W CAP PAINTED BLUE.
- MECHANICAL JOINT DUCTILE FITTINGS – AWWA/ANSI C153/A21.53.
- ALL WATERMAIN FITTINGS TO BE LEAD FREE.
- MECHANICAL JOINT RESTRAINTS TO BE USED DURING TRANSITION OF WATERMAIN INSTALLATION IN NATIVE SOILS TO ENGINEERED FILL. MECHANICAL JOINT RESTRAINTS TO BE MEAL-LUC OR APPROVED EQUIVALENT.
- ALL VALVES TO BE OPERATED BY THE TOWN OF COLLINGWOOD WATER DEPARTMENT. CONTRACTOR TO PROVIDE MIN. 48hr NOTIFICATION FOR REQUEST.
- ALL CONNECTIONS TO EXISTING MUNICIPAL WATERMAINS MUST BE INSPECTED BY TOWN OF COLLINGWOOD WATER DEPARTMENT OR REPRESENTATIVE AND GIVING 48 HOURS NOTICE PRIOR TO BACKFILLING OPERATIONS.
- EACH BUILDING TO INSTALL MEASURES FOR BACKFLOW PROTECTION SUITABLE TO TOWN OF COLLINGWOOD WATER DEPARTMENT IN ACCORDANCE WITH ONTARIO BUILDING CODE & C.S.A. B64 AND THE TOWN WATER BY-LAW.
- BACKFLOW PREVENTORS AT EACH BUILDING TO BE TESTABLE & CERTIFIED ANNUALLY, WITH ALL ASSOCIATED COSTS THE RESPONSIBILITY OF THE OWNER.

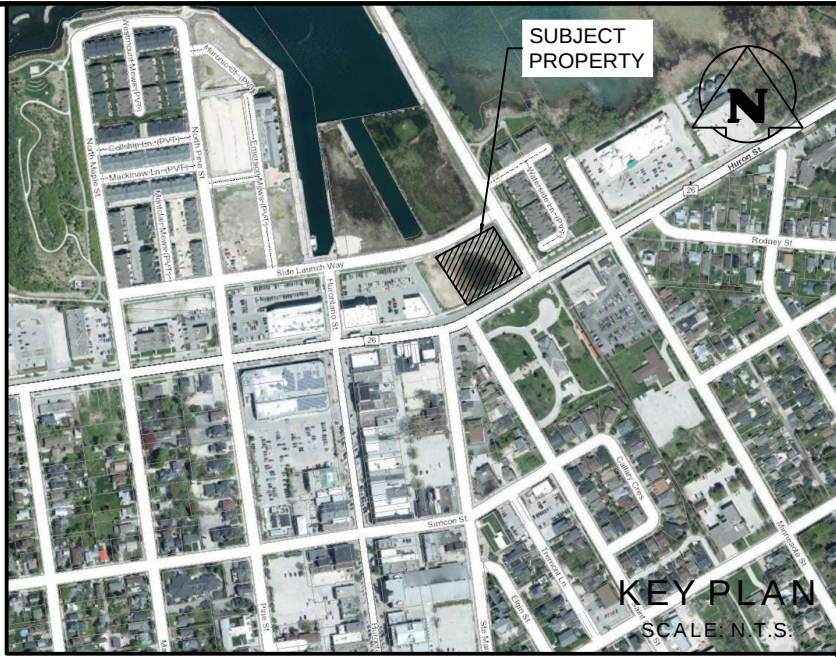
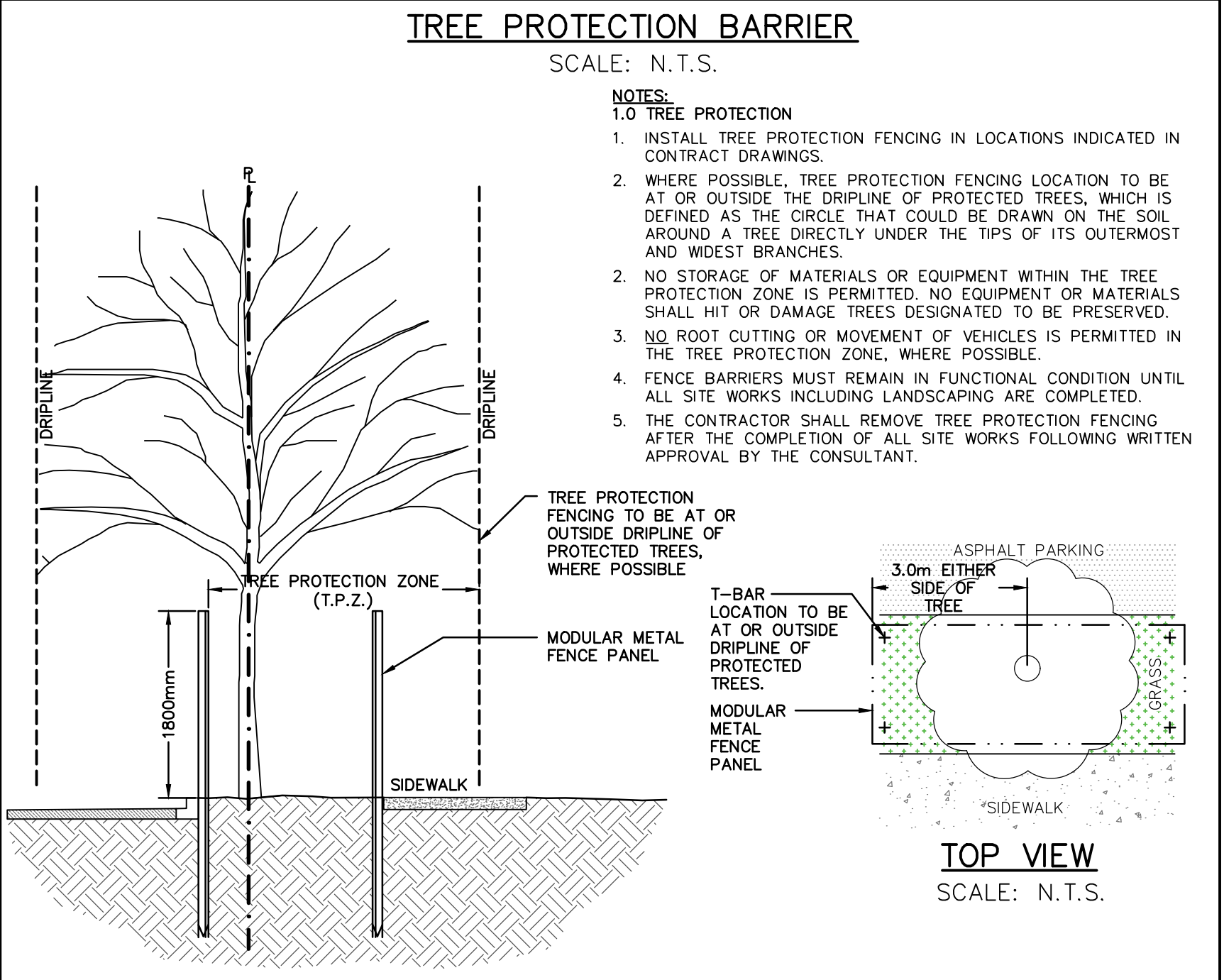
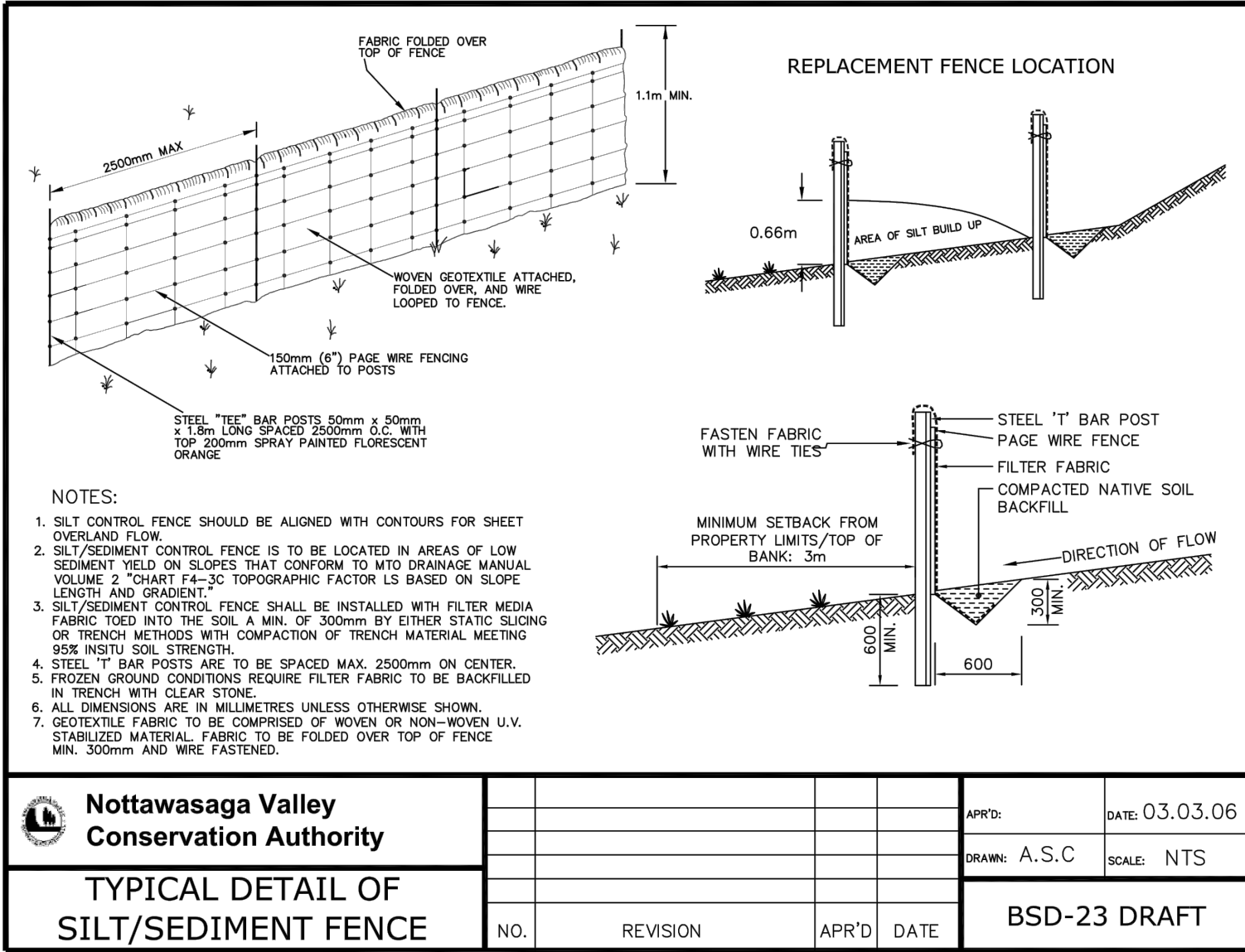
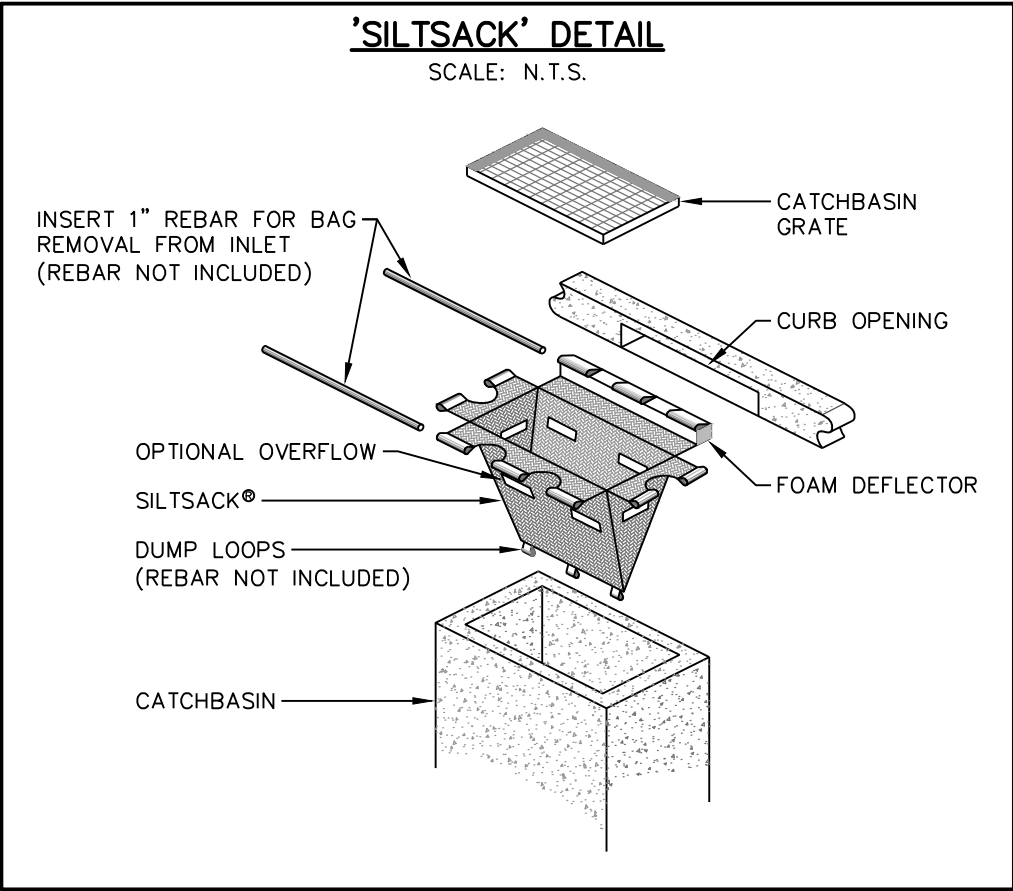
E) STORM SEWERS

- MH AND CBMH TO OPSPD – 701.012, 701.030, 701.100, 704.010, C/W SUMP UNLESS NOTED OTHERWISE.
- STEPS TO OPSPD 405.010.
- M.H. FRAMES AND GRATES TO OPSPD – 401.01 OPEN COVER.
- CB'S TO ZURN Z537 HEAVY-DUTY PARKING DECK DRAIN.
- CB AND CBMH FRAMES AND GRATES TO OPSPD – 400.020.
- PIPE SUPPORT AT MH'S, CB'S, CBMH'S AND CDBMH'S TO OPSPD – 708.020.
- PROTECTION DURING CONSTRUCTION TO OPSPD – 808.010.
- BACKFILL AND EMBEDMENT TO OPSPD – 802.010 (FLEXIBLE PIPE) GRANULAR 'A' EMBEDMENT OR OPSPD – 802.030, 802.031 AND 802.032 (RIGID PIPE) GRANULAR 'A' EMBEDMENT.
- BACKFILL AND EMBEDMENT MATERIAL TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S SPMDD.
- STORM SEWERS SHALL BE PVC SMOOTH WALL RIBBED PIPE. MINIMUM STIFFNESS (320kPa). ALL PIPE TO BE JOINED WITH A GASKETTED BELL AND SPIGOT SYSTEM. CATCHBASIN LEADS TO BE 300mmø CONCRETE PIPE (CLASS IV).

SEDIMENT AND EROSION CONTROL

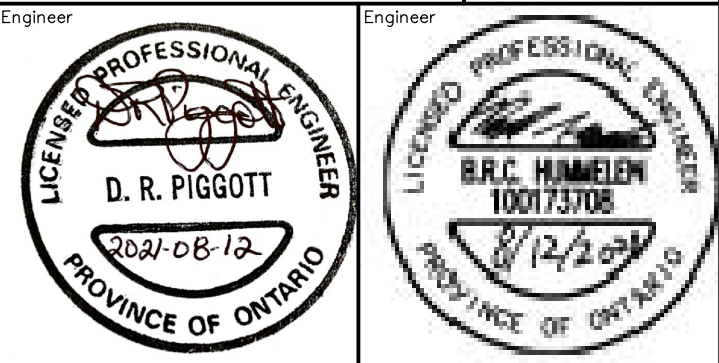
A) GENERAL – CONSTRUCTION

- ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED. SEDIMENT AND EROSION CONTROL MEASURES THAT ARE DESIGNED TO CONTROL RUNOFF FROM SPECIFIC AREAS MUST BE INSTALLED PRIOR TO ANY DISTURBANCE TO SITE.
- THE CONTRACTOR MAY CONSIDER ALTERNATIVE SEDIMENT AND EROSION CONTROL MEASURES. SUCH MEASURES MUST BE PRESENTED IN WRITING FOR APPROVAL OF THE CONTRACT ADMINISTRATOR AND THE TOWN.
- THE CONTRACTOR SHALL HAVE MATERIALS AVAILABLE ON-SITE TO REPAIR SEDIMENT AND EROSION CONTROL MEASURES IN THE EVENT OF UNFORESEEN CONDITIONS: HIGHWATER, EXTREME RAINFALL EVENTS, ETC.
- MUD MAT TO BE CONSTRUCTED AT ACCESS POINT.
- NO MAINTENANCE OR REPAIR WORK ON CONSTRUCTION EQUIPMENT IS ALLOWED WITHIN 20m OF AN EXISTING WATERCOURSE OR DITCH EXCEPT AS NOTED.
- ALL TEMPORARY SOIL OR DIRT STOCKPILES ARE TO BE PROVIDED WITH THE NECESSARY SEDIMENT AND EROSION CONTROL FEATURES. IF STOCKPILES ARE TO REMAIN FOR A PERIOD LONGER THAN 30 DAYS, STOCKPILES SHALL BE HYDROSEEDDED AND SURROUNDED WITH SILT FENCE.
- CONTRACTOR TO ENSURE POSITIVE DRAINAGE THROUGH SITE SUCH THAT NO UPSTREAM OR DOWNSTREAM IMPACT OCCURS DURING CONSTRUCTION ACTIVITIES.
- THE CONTRACTOR WILL BE RESPONSIBLE TO CLEAN ALL ADJACENT ROADWAYS AS REQUIRED OR AS DIRECTED BY THE SITE ENGINEER OR TOWN.



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TEMPORARY BENCHMARKS		
TBW#1-179.80 TOP NUT OF FIRE HYDRANT ON THE NORTH SIDE OF THE 31 HURON STREET DEVELOPMENT ON THE SOUTH SIDE OF SIDE LAUNCH WAY.		
No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR FIRST SUBMISSION	07/31/2020
2	ISSUED FOR SECOND SUBMISSION	08/12/2021



Project	HARBOUR HOUSE DEVELOPMENT TOWN OF COLLINGWOOD			
Drawing	CONSTRUCTION NOTES AND DETAILS			
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1838-5493				C103