

**SERVICING & STORMWATER MANAGEMENT
IMPLEMENTATION REPORT**

**F.S. COLLINGWOOD DEVELOPMENTS LTD.
THE SHIPYARDS DEVELOPMENT**

BLOCK 6

PREPARED BY:

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

August 2021

CFCA FILE NO. 103-5778



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1.0 INTRODUCTION

Crozier Consulting Engineers (Crozier) has been retained by F.S. Collingwood Developments Ltd. ("Developer") to complete a Servicing and Stormwater Management Implementation Report and engineering design to support the Zoning Bylaw and Official Amendment applications for a proposed mixed-use residential/commercial development known as Block 6 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 is shown on Figure 1.

The approximately 0.72 ha (1.8 ac) proposed development is comprised of one six-story mid-rise building with 101 residential units and 355 sqm (3,825 SF) of retail space. The development also incorporates open landscaped areas, and underground/above ground parking facilities.

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 Block 6 development area currently is characterized by vacant land and is bounded by Side Launch Way to the south, historical launch basin and dry dock to the west and east, and the Collingwood Harbour to the North. The Subject Development is legally described as Part of Lot 44 Concession 9, Town of Collingwood, County of Simcoe.

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.

Proposed Servicing Strategy

The sanitary servicing strategy of the Harbour House Development will rely upon the existing 900mm diameter trunk sewer along Side Launch Way. The buildings plumbing/sewerage systems will be routed internally and connect to the Side Launch Way sewer through the existing 200 mm diameter sanitary stub provided to the property. Refer to Figure 2 for the General Site Servicing Plan.

To determine an approximate peak sanitary flow rate, equivalent population calculations were completed to incorporate the retail space on the ground floor and added to the residential population, yielding an equivalent population of 256 persons. The equivalent population calculations are available in Appendix B. Based on previous sanitary calculations the Side Launch Way Trunk Sewer has capacity to convey in excess of 673 L/s, the anticipated peak sanitary flow rates from the development will be approximately 5.65L/s. Based on the trunk sewer capacity, 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 C.

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 D 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 a 150mm stub along Side Launch Way is provided to service the subject development. Refer to Figure 2 for the General Servicing Plan.

Preliminary estimates of domestic water demands are approximately 6.0L/s for peak hour flow, and 3.7L/s for daily peak flow. Fire flow demands of the proposed development are estimated to be 253.7L/s per the Fire Underwriters Survey and 150L/s per the OBC Fire Protection Water Supply Guideline. Water demand calculations are available in Appendix E. Confirmation of the capacity of the watermain and the existing stub 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.

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 a 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. Refer to Figure 3 for the proposed Grading and Drainage Plan.

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 onsite.

5.3 Pretty River Flood Waters and Erosion

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, discharging into the Side launch Basin and Dry Dock adjacent to the Subject Development. 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 F.

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.

As the development is adjacent to Georgian Bay the only impacts from the erosion the development will experience will be from Georgian Bay. As such the shore wall design prepared for the development will address any erosion related issues for the development.

5.4 Proposed Drainage Conditions

The internal drainage systems within the Block 6 Development consisting of plumbing, storm sewers and catch basins will convey flows generated from minor storm events (up to and including the five-year return period) to an end of pipe treatment system prior to discharging to Georgian Bay. Overland flow routes have been designed to safely convey major event flows including the 100 year and regional events directly to adjacent Georgian Bay.

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.

To provide the "enhanced protection" required an end of pipe treatment unit will be specified to provide 80% Total Suspended Solid removal at the Site Plan Application stage.

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.

- 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 Block 6 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. Block 6 will be serviced by connecting to the existing sanitary service stub provided at the property limits on Side Launch Way.
2. Block 6 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 an end of pipe treatment system prior to discharging to Georgian Bay. Major flows from infrequent events will utilize overland flow routes 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 end of pipe treatment unit.

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.

APPENDIX B

Equivalent Population Calculations



File: 103-5778
Date: 16-Aug-21
By: JL'B/BE
Check By: BH

Shipyards Block 6 - Equivalent Population

Developed Site Area	0.72	ha
Number of Residential Units	101	units
Persons Per Residential Unit	2.40	persons/unit
Residential Population	242	persons

Equivalent Daily Flow Calculations

Retail		
$R = 352 \text{ sq.m} \times 5\text{L/day/sq.m}$	$R =$	1760 L/day
Amenity/Lobby		
$A/L = 466 \text{ sq.m} \times 5\text{L/day/sq.m}$	$A/L =$	2330 L/day
Storage/Loading Dock		
$S = 425 \text{ sp.m} \times 5\text{L/day/sq.m}$	$S =$	2125 L/day
Total		
$T = R + A/L + S$	$T =$	6215 L/day

Equivalent Persons Calculation

Per Capital Flow	450	L/C-day
Equivalent Persons		
$Peq = \text{Total} / \text{Per Capital Flow}$		
$Peq = (2410\text{L/day}) / (450 \text{ L/C-day})$	$Peq =$	13.81 Persons
	$Peq =$	14.00 Persons

Total Design Sewage Flows

Equivalent Mixed Use Population	14	persons
Residential Population	242	persons
Total Population	256	persons

APPENDIX C

Preliminary Sanitary Flow Rate Calculations



File: 103-5778
Date: 16-Aug-21
By: JL'B/BE
Check By: BH

Shipyards Block 6 - Sanitary Flow Requirements

Developed Site Area	0.72 ha
Number of Residential Units	101 units
Persons Per Residential Unit	2.40 persons/unit
Residential Population	242 persons
Equivalent Mixed Use Population (See Appendix B)	14 persons
Total Population	256 persons

Unit Sewage flows

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

Total Design Sewage Flows

Infiltration/Inflow	0.17 L/sec
Average Daily Flow	1.34 L/sec
Peak Factor (Harmon Formula)	4.1
Peak Flow	5.48 L/sec

Total Peak Daily Flow	5.65 L/sec
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APPENDIX D

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

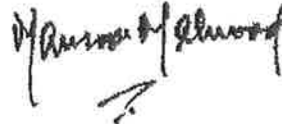
AND

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 E

Preliminary Domestic Water Flow Rate Calculations
Fire Suppression Flow Rate Calculations

Shipyards Block 6 - Water Flow Requirements

Site Area	0.72 ha
Number of Residential Units	101 unit
Person Per Residential Unit	2.40 persons/unit
Residential Population	242 persons
Equivalent Mixed Use Population (See Appendix B)	14 persons
Total Population	256 persons

Water Design Flows

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

Average Daily Flow	1.3 L/s
Max Day Peak Factor	2.75
Max Day Demand Flow	3.7 L/s
Peak Hour Factor	4.5
Peak Hour Flow	6.0 L/s
Fire Flow (per Fire Underwriters Survey) (note minimum fire flow per Town Standard is 57 L/sec)	250 L/s

Peak Design Flow

253.7 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

16563.26 sq.m. total floor area

Therefore F= 23,000 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
3,450 L/min reduction	

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

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

Automatic Sprinklers (30% Reduction)
5,865 L/min surcharge / reduction

Shipyards Block 6
Fire Protection Volume Calculation
CFCA File: 103-5778

* Based on Site Plan

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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 Georgian Bay	0%	0	
South Commercial Buildings	50	0%	0
East Future Development	30	5%	856.75
West Town Houses	47.5	0%	0
857 L/min Surcharge			

Determine Required Fire Flow

No. 1	23,000		
No. 2	3,450 reduction		
No. 3	5,865 reduction		
No. 4	<u>857</u> surcharge		
Required Flow:	14,542 L/min		
Rounded to nearest 1000l/min:	15,000 L/min	or	250.0 L/s 3,963 USGPM

Determine Required Fire Storage Volume

Flow from above	15,000 L/min
Required duration	3.00 hours
Therefore:	2,700,000 Litres or 2,700 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

Shipyards Block 6
Fire Protection Volume Calculation
CFCA File: 103-5778

* Based on Site Plan

Page 3

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 = 16 Group C/D building with noncombustible construction (Table 1 Row 2)
V = 6806.267 h = 3.1m area = 2195.57 m²
 S_{TOT} = 1 S_{TOT} Need Not Exceed 2.0

$$Q = 108900.272$$

Floors 2-5

K = 16 Group C building with noncombustible construction (Table 1 Row 2)
V = 5306.115 h=3.1 m area= 1711.65 m²
 S_{TOT} = 1 S_{TOT} Need Not Exceed 2.0

$$Q = 84897.84 \text{ L}$$

Floor 6

K = 16 Group C building with noncombustible construction (Table 1 Row 2)
V = 4805.434 h=3.1 m area= 1550.14 m²
 S_{TOT} = 1 S_{TOT} Need Not Exceed 2.0

$$Q = 76886.944 \text{ L}$$

Floor P1 (Parking)

K = 16 Group C building with noncombustible construction (Table 1 Row 2)
V = 18509.945 h=3.1 m area= 766 m²
 S_{TOT} = 1 S_{TOT} Need Not Exceed 2.0

$$Q = 296159.12 \text{ L}$$

Total 489957.232 L

Table 2

9000 L/min
150 L/s

APPENDIX F

Regional Flood Flow Conveyance Figure

LEGEND



PEAK FLOW (REGIONAL)
(IBI GROUP, 2002)

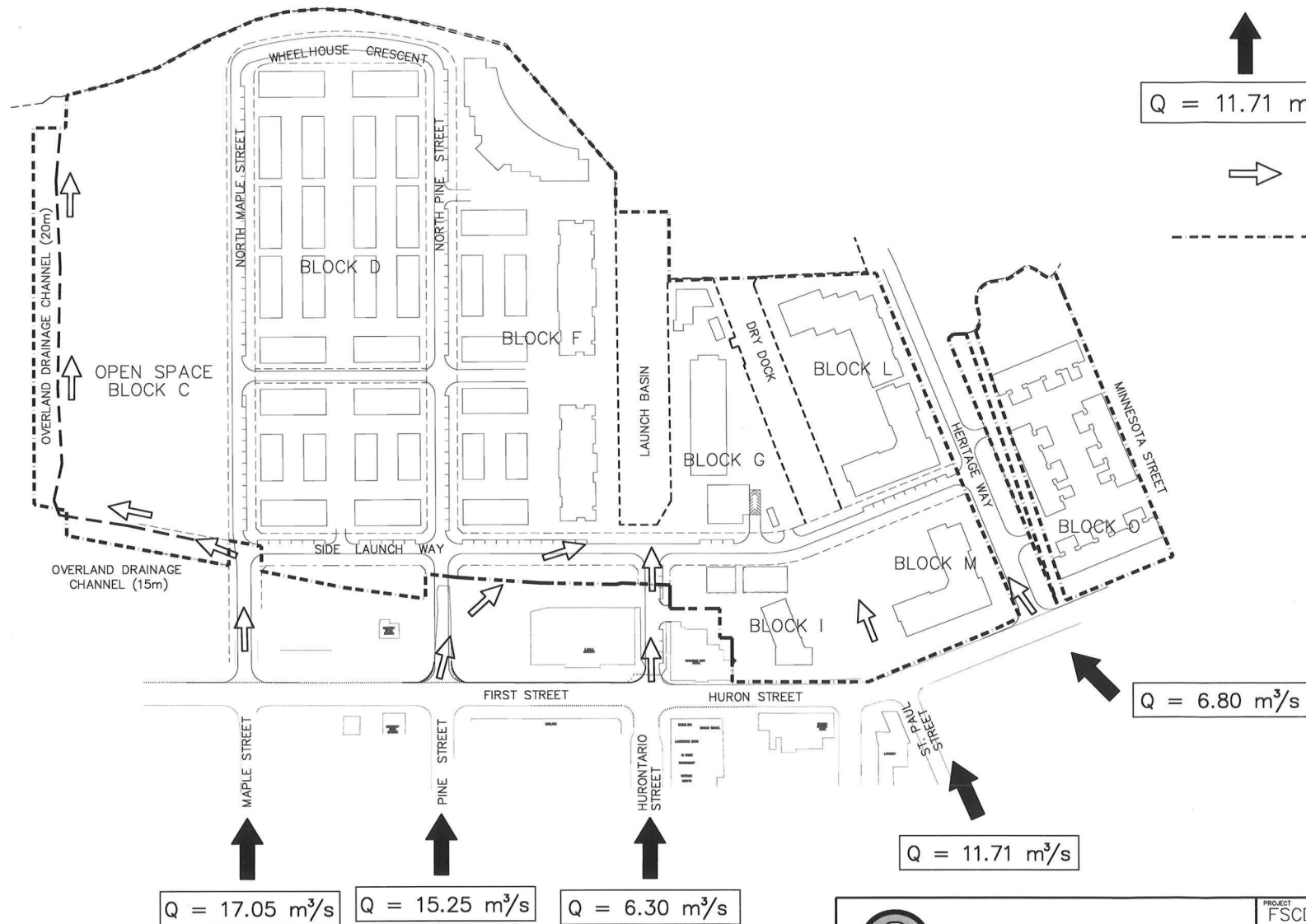
$Q = 11.71 \text{ m}^3/\text{s}$



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.	PROJECT No.: 103-2595
	DATE: 09/04/2007	SCALE: 1:2500
TITLE REGIONAL FLOOD FLOW CONVEYANCE	DRAWING No.: FIGURE 3	

FIGURES

Figure 1:	Site Location Plan
Figure 2:	General Servicing Plan
Figure 3:	Grading and Drainage Plan



Legend	Project	<	
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