REGIONAL SANITARY SERVICING REPORT

LINKSVIEW RESIDENTIAL DEVELOPMENT
TOWN OF COLLINGWOOD

LANDEX CAPITAL CORPORATION

PREPARED BY:

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1.0 INTRODUCTION

CF Crozier & Associates Inc. (Crozier) has been retained by Landex Capital Corporation (LCC) to prepare a Regional Sanitary Sewage Study to support the planning applications for a proposed residential development (Linksview) located west of the existing Georgian Meadows Subdivision in the Town of Collingwood. The site location is illustrated on Figure 1. The 40.8 ha site is bounded by Tenth Line to the east, Blue Mountain Golf and Country Club (BMGCC) to the north, agricultural lands to the west, and Fisher Field and agricultural lands to the south.

The subject lands are currently designated in the Town Collingwood Official Plan as Recreational and located within the Mountain West Secondary Plan. As such, to realize this development, Official Plan Amendment (OPA), Zoning Bylaw Amendment (ZBA) and Draft Plan Approval (DPA) applications will be required by the Town of Collingwood.

To meet the test mandated by the Town to support Linksview ***being that the development will not inhibit the development of the remaining Secondary Plan lands,*** there are four main engineering components that must be analyzed. Each of the four engineering components will require strategies to be developed to present how these engineering issues will be addressed on a regional and long-term basis. These components are: Transportation, Sanitary Sewage, Stormwater Management and Potable Water. This report addresses the Sanitary Sewage component of the land re-designation work plan.

In addition to this report, several other reports have been prepared for the subject lands, including:

- Functional Servicing & Stormwater Management Report (Crozier) [FSR];
- Traffic Impact Study (Crozier);
- Collector Alignments Letter (Crozier);
- Regional Sanitary Servicing Report (Crozier) [Regional Sanitary Report];
- Regional Stormwater Management Report (Crozier) [Regional SWM Report];
- Geotechnical Report (Peto MacCallum Limited);
- Phase 1 Environmental Site Assessment (Azimuth);
- Air Quality & Odour Study (Ortech Environmental);
- Golf Spray Analysis (Baker-Turner);
- Environmental Impact Study (Azimuth);
- Preliminary Hydrogeological Assessment (SPL Consultants) and
- Planning Justification Report (Travis & Associates).

The proposed Draft Plan of subdivision for the site was produced by Patten & Thompson Limited (December, 2014), and is illustrated on Figure 2. The anticipated range in the number of residential units is between 650 and 1000. In order to provide the proponent with flexibility with respect to unit types we have incorporated a total of 1000 equivalent residential units into this study.

2.0 STUDY OBJECTIVES & LIMITS

The study limits and objectives have been determined via multiple pre-consultation meetings with Town staff (refer to Appendix A for a copy of the meeting minutes).

Given that the subject development is located within the Harbourview trunk sewer catchment area, the study limits encompass the entire tributary area. In addition to the Harbourview trunk sewer, the catchment area includes the following trunk sanitary sewers:

1. Mountain Road;
2. Black Ash Creek; and,
3. Balsam Street Forcemain.

Save and except the above noted trunk sanitary sewers, the Harbourview trunk sewer has no additional existing inputs.

The objectives of the study are noted below and include:

1) Evaluate the existing residual capacity of the Mountain Road, Black Ash Creek and Harbourview sanitary sewers;

2) Determine the unit thresholds for future developments within the Mountain West Secondary Plan Area that triggers the need to upgrade any of the trunk sanitary sewers within the Harborview sewer catchment area;

3) Present the Linksview Interim and Ultimate Sanitary Servicing Strategy;

4) Determine the sizing of any required trunk sanitary sewer upgrades to facilitate the future development lands, with consideration of the external sanitary servicing strategy for the Linksview Development; and,

5) Evaluate the unit thresholds and development scenarios that triggers the need to employ the Ultimate external sanitary servicing strategy for the Linksview Development.

3.0 BACKGROUND

3.1 Previous Engineering Studies

Previous engineering studies have been completed within the Harbour Street trunk sewer catchment area. Studies that have been referenced in this study include the following:

- *'Servicing Study for Lands Acquired Under County Restructuring in the Town of Collingwood'* (Tatham, 1994) [Tatham 1994 Study]

  As a result of the County of Simcoe restructuring plan, the Town of Collingwood increased in size by approximately 1,134 hectares (2,800 acres) along its southern and eastern boundaries. The Tatham 1994 Study reviewed the servicing implications to future development within the expanded areas

including sanitary sewage collection. An analysis of the sanitary sewage collection system was undertaken including the Harbourview sanitary catchment area that included the following:

- A review of the existing collection and treatment works;
- Calculations of potential sewage flows from the newly acquired areas, and analyses of the impacts on the existing collection works; and,
- An assessment of options for collecting and pumping sewage from the acquired areas, with recommended solutions including cost estimates.

- *'Harbourview Sanitary Trunk Sewer Design Brief'* (Tatham, 1994) [Harbourview Design Brief]

  The design brief investigates the technical aspects of constructing the Harbourview trunk sewer from the intersection of Mountain Road and Balsam Street to the sewage treatment plant at Birch Street. The Harbourview trunk sewer was designed to divert flows away from the First Street trunk sewer and collect flows from future development lands within a specified catchment area. Anticipated flows from future development lands as well as current (as of 1994) flows were determined and a 'Sanitary Sewage Drainage Plan' was produced, illustrating the various sub-drainage areas to the subject trunk sewers (refer to Appendix B).

- *'Black Ash Creek Trunk Sanitary Design Sheet'* (Burnside 2002)

  As part of the design of the Georgian Meadows development, Burnside completed the design of the Black Ash Creek trunk sanitary sewer [BAC sewer]. This was completed as part of the approvals process for Phases 1 to 3 of Georgian Meadows. Crozier amended the Burnside BAC sewer design sheet to support the approval of Phases 4 to 6 of Georgian Meadows.

- *'Mair Mills Village – Preliminary Servicing Report'* (Tatham, 2006) [Mair Mills Study]

  This report outlines the servicing requirements for the proposed 300 unit residential subdivision referred to as Mair Mills Village, located at the southwest corner of the Tenth Line and Mountain Road intersection. To demonstrate that the receiving Mountain Road trunk sanitary sewer has adequate capacity to handle the projected wastewater flows from Mair Mills Village, a capacity assessment of the trunk sewer between Tenth Line and Balsam Street (Highway 26) was undertaken. A trunk sewer design sheet was completed, which was sealed on February 22, 2013 (refer to Appendix B for a copy of the design sheet). The design sheet considered flows from existing industrial, commercial and residential developments as well as future residential developments. Refer to Appendix B for the Tatham Sanitary Servicing Plan for the sanitary catchment areas. The main conclusion was that the entire length of the trunk has sufficient capacity to the anticipated flows. It is understood that the Town has accepted this finding.

4.0 TASK #1: EXISTING RESIDUAL SEWER CAPACITY ASSESSMENT

A residual sewer capacity assessment for the trunk sewers within the Harbourview catchment area was undertaken.

4.1 Base Scenario Development

A Base Scenario has been developed to establish the existing and allocated wastewater flow rates to the subject trunk sewers. To quantify the capacity of the subject trunk sewers, a Base Scenario sanitary design sheet has been completed. The methodology used to develop the design sheet is described below. Refer to Drawing 701 for the Base Scenario Sanitary Drainage Plan and the location of various manholes.

4.1.1 Mountain Road & Black Ash Creek Trunk Sewers

The Mountain Road design sheet completed as part of the Mair Mills Study has been amended per consultation with Town staff. Pertinent updates to the Mair Mills Study design sheet are listed below. It is noted that the flow criteria used in the Base Scenario design sheet development are consistent with the flow criteria used in the Mair Mills Study save and except where noted below. The applicable sanitary catchment area has been noted in brackets below.

A. Allocation Methodology

To establish the Base Scenario, an allocation methodology is required to determine the number and extent of developments to be included. Per consultation with Town staff, the Base Scenario is based on a sanitary conveyance allocation methodology whereby residential units (or equivalent residential units in cases of non-residential developments) are given allocation upon lot registration and not upon Draft Plan Approval save and except the exceptions noted below. Therefore, the proposed Mair Mills Village and Red Maple Subdivision (Consar) have been excluded from the Base Scenario.

B. Georgian Meadows – Pipe Infiltration Calculations (MTN 7)

To determine the infiltration rate into the BAC sewer, the Mairs Mills Study used a residential infiltration flow per area rate of 0.23 L/s/ha applied across the entire Georgian Meadows parcel. Per the approved BAC design sheet within Georgian Meadows, infiltration was determined via a combination of the flow per area and pipe length methodologies. This study has applied the infiltration values per the approved Georgian Meadows design sheet. Refer to Appendix D for a plan view of the trunk sewer within Georgian Meadows.

C. Future Tenth Line Sewage Pumping Stations (MTN 3 & 3A)

The maximum pumping station flow rate has been updated from a total peak flow of 8.23 L/s per the Mair Mills Study to 13.3 L/s per Town staff email correspondence (refer to Appendix C).

D. Agnora Site (MTN 5) & Goodyear Plant Site (MTN 9)

In developing the Mountain Road sanitary design sheet, the Mair Mills Study used actual flow data from the Agnora and Goodyear Plant Sites. In light of the fact that the Goodyear site is no longer in operation,

the flow from MTN 9 has been determined via the use of the average industrial flow per area value of 45,000 L/ha.d, The industrial flow per area value is consistent with the Mair Mills Study, was applied over the entire site areas and represents the average value between heavy industry (55,000 L/ha.d) and light industry (35,000 L/ha.d).

The average industrial flow per area methodology has also been applied to the Agnora Site (MTN 5) to produce a more conservative peak flow value as compared to the actual flow data per the Mair Mills Study. This enable flexibility in case the industrial use is modified in the future.

E. Mountain View Mall Improvements

The proposed RIO-CAN Collingwood Centre Site Plan (April 28, 2014) was reviewed and the proposed shopping floor areas were used in the Base Scenario design sheet.

F. Black Ash Creek Trunk Sewer Re-alignment

The BAC sewer is currently located within an Environmental Protection area along the west side of the creek The BAC sewer is subject to re-alignment thru the future Red Maple Subdivision (refer to Drawing 703). The proposed realigned portion of the BAC sewer has been included in the Base Scenario.

4.1.2 Balsam Street Forcemain

The Balsam Street Forcemain conveys the wastewater outflow from the Black Ash Creek Pumping Station (BACPS) south along Balsam Street (Highway 26) and discharges to the upper end of the Harbourview Trunk Sewer. Per email correspondence with Tatham staff (refer to Appendix C), the BACPS has two pumps in operation with a firm capacity of 98 L/s per the MOE Certificate of Approval No. 5925-6LMP88. Furthermore, the maximum daily flow noted from 2012 to 2013 was 4989 m3/day (57.7 L/s). To be conservative in this assessment, the outflow from the BACPS has been inputted into the Harbourview Trunk Sewer at a maximum flow rate of 100 L/s.

4.2 Base Scenario Residual Capacity Results

The Base Scenario residual capacity results are presented in Table 1 below for each trunk sanitary sewer. Refer to Drawing 701 for the manhole locations. Refer to Appendix D for the sanitary design sheets of the various trunk sewers.

Table 1: Base Scenario Residual Capacities for Various Trunk Sewers

Location		Peak Flow at D/S MH	Residual Capacity		Available Capacity (Y/N)
Pipe Reach	Description	(L/s)	Flow (L/s)	Critical Pipe Reach	
Mountain Road Trunk Sewer					
Ex. MH 3-1 to Ex. MH 3-7A	Tenth Line to BAC Sewer Input	45.1	89.6	MH 3-6 to MH 3-7	Y
Ex. MH 3-7A to Ex. H26N-31	BAC Sewer Input to Balsam Street	105.8	35.4	MH 3-7A to H26N-31[1]	Y
Black Ash Creek Trunk Sewer					
Ex. MH 26 to Ex. MH 39	Georgian Meadows (6th Line to S. Limits of Red Maple Subdivision)	27.0	115.6	MH 37 to MH 38	Y
MH 39 to Pr. MH 44A	Red Maple Subdivision (proposed sanitary sewer between S. Limits of Red Maple Subdivision to connection with Pr. MH A)	27.0	263.0[2]	MH A to MH 44A	Y
Pr. MH 44a to Ex. MH 3-7A[4]	Existing Sanitary Sewer between N. Limit of Red Maple Subdivision to Mountain Road Connection	27	100.5	MH 49 to MH 3-7A	Y
Harbourview Trunk Sewer					
Ex. MH 1 to Ex. MH 12	Between Balsam Street and Birch Street	205.8[3]	146.1	MH 6 to MH 7	Y

1. Per the Mairs Mills Study and as indicated on the design sheet, some pipe sections have a negative slope. As consistent with the Mair Mills Study, the overall pipe slope within this reach was found to be 0.14%. Based on a pipe diameter of 500 mm within the reach and a slope of 0.14%, the free flow pipe capacity is 141.3 L/s.
2. Per Drawing 708, the existing invert at MH#39 is 185.6 and the proposed invert at SAN MH A is 182.90, which equates to a pipe slope of 1.0%. The pipe slope between MH A and MH 44 A is 0.9%. Q(capacity) of a 450 mm ø SAN at 0.9% = 290.0 L/s. Refer to Drawing 708 for the location of the manholes.
3. The peak flow is based on the peak flow in the Mountain Road Sewer at Balsam Street and 100 L/s from the BACPS.
4. Refer to Appendix D for the BAC Trunk Sewer 'As-Constructed' Drawings.

As indicated in Table 1, all existing trunk sewers have residual capacity available.

5.0 TASK #2: MOUNTAIN ROAD WEST CORRIDOR UNIT THRESHOLD DETERMINATION

Based on the residual capacities noted in Table 1, the residential unit threshold to trigger the twinning for each trunk sewer has been determined and is provided in Table 2. The thresholds noted include wastewater generated from individual units as well as flow from infiltration. Refer to Appendix E for the Unit Threshold Design Sheet.

The unit threshold is based on 17 units per hectare, which equates to 50 persons per hectare when using the Town engineering standard of 2.9 people per unit. This achieves the objectives of the Growth Plan of 50 persons per hectare.

Table 2: Residential Unit Thresholds for Various Trunk Sewers

Location		Residual Capacity	Additional Residential Unit Threshold for Twinning
Pipe Reach	**Description**	**Flow (L/s)**	
Mountain Road Trunk Sewer			
Ex. MH 3-1 to Ex. MH 3-7A	Tenth Line to BAC Sewer Input	89.6	**1400**
Ex. MH 3-7A to Ex. H26N-31	BAC Sewer Input to Balsam Street	35.4	**510**
Black Ash Creek Trunk Sewer			
Ex. MH 26 to Ex. MH 39	Georgian Meadows (6th Line to S. Limits of Red Maple Subdivision)	115.6	**1860**
Ex. MH 39 to Pr. MH 44 A	Red Maple Subdivision (proposed sanitary sewer between S. Limits of Red Maple Subdivision to connection with Pr. MH A)	263.0	**4500**
Pr. MH 44A to Ex. MH 3-7A	Existing Sanitary Sewer between N. Limit of Red Maple Subdivision to Mountain Road Connection	100.5	**1600**
Harbourview Trunk Sewer			
Ex. MH 1 to Ex. MH 12 MH 12	Between Balsam Street and Birch Street	146.1	**2400**

Per Table 2, the Mountain Road trunk sewer between the BAC sewer input and Balsam Street has the lowest residential unit threshold to trigger twinning of all existing trunk sewers. With a residential unit threshold of 510 and wastewater generated from all proposed developments (regardless of location), within the Mountain Road sewer catchment area required to be conveyed through this pipe reach, this pipe reach is the critical pipe reach.

The critical pipe reach for the BAC sewer is the existing sanitary sewer between the north limit of the Red Maple Subdivision and the Mountain Road connection, which is 1600 residential units.

Based on the allocation methodology employed to develop the base scenario, the Mountain Road trunk sewer between the BAC sewer input and Balsam Street will be required to be twinned after the 510th residential lot is registered. It is noted that this figure is theoretical and is recommended that the Town initiate sanitary flow monitoring when the lot count is nearing 510 (say 85%). Per review of the Town Development Charge Report, it is understood that twinning of the Mountain Road sewer is a DC item.

Since the residual capacity of the Harbourview Trunk Sewer indicated in Table 2 incorporates the maximum flow rate of 100 L/s from the BACPS, growth within the BACPS catchment area has been accounted for up to the capacity of the BACPS. Therefore, the unit threshold for twinning is assumed to be based on development growth in the Mountain Road sewer catchment area only.

6.0 TASK #3 LINKSVIEW EXTERNAL SANITARY SERVICING STRATEGY

The proposed external sanitary servicing strategy for the Linksview development involves the conveyance of flows from the subject lands to the Mountain Road sewer via the use of the existing BAC sewer. The strategy will involve the installation of 350 m of sanitary sewer between the proposed intersection of Linksview Street 'A' and Tenth Line to the proposed sanitary sewer system within the proposed Street 'A' of the Red Maple Subdivision. Sanitary flows will be conveyed to the BAC Sewer via the proposed sanitary sewer system within the Red Maple Subdivision. Flows would then be conveyed to the Mountain Road trunk sewer. Refer to Drawing 703 for the proposed external sanitary sewer route.

Given that the BAC sewer has a unit count threshold of 1600 and the proposed Linksview development has a full build-out unit count (maximum) of 1000, the BAC sewer has sufficient capacity to handle the Linksview Development under full build-out conditions. However, the proposed Linksview external sanitary servicing strategy will use residual capacity in the BAC sewer, which has implications on the external sanitary servicing strategies for future developments.

Per the Tatham 1994 study and the Harbourview Design Brief, wastewater flows emanating from future development lands within sub-drainage area B1 (Currie Lands) (refer to Drawing 102 for location) were intended to be tributary to the BAC sewer. As per consultation meetings with the Town, it was agreed that the sanitary drainage plan for the Currie Lands should be maintained if and when this area is developed. Per the said studies, the gross population of the Currie Lands is 3925, which equates to 1353 units (2.9 P.P.U). Per Table 1, the residual capacity of the BAC sewer is 1600 units. Given that the combined unit count from Linksview and Currie Lands is equal to 2353, the unit threshold of the BAC sewer is exceeded when the full build-out of both sites is realized. Flows from other future developments including the Red Maple Subdivision and developments located west of the subject lands would also need to be accommodated in the BAC sewer under the proposed Linksview external sanitary servicing strategy. Therefore, once the unit

threshold is exceeded, there are two options available to resolve the insufficient capacity of the BAC sewer. Namely,

- Twin the BAC sewer; or,
- Develop an Ultimate sanitary servicing strategy for the Linksview Development to redirect flows away from the BAC sewer.

Per the July 8th, 2014 pre-consultation meeting, given that a portion of the BAC sewer is located within an Environmental Protection area, it is understood that the Town disfavours the option of twinning of the BAC sewer. Therefore, to not impede future developments (Currie Lands, etc.), the use of an Interim and Ultimate sanitary servicing strategy for the Linksview Development is the preferred solution.

6.1 Interim & Ultimate Sanitary Servicing Strategy

The Interim servicing strategy for the Linksview Development would follow the previously noted external servicing route to the BAC sewer. Once tributary lands to the BAC sewer are developed to the extent that the unit threshold in the BAC sewer is realized (1600 units per Table 2), a sanitary sewer will need to be extended along Tenth Line from the proposed sanitary stub, which is to be constructed as part of the Mair Mills development, to Street A of the Red Maple Subdivision. Sizing and depth of the proposed Tenth Line sanitary stub will need to incorporate the findings made in Section 7.0 below. This would enable wastewater generated from the Linksview Development to be diverted away from the BAC sewer, allowing residual capacity in the BAC sewer to be made available to the Currie Lands. The trigger to implement the Ultimate strategy is discussed in Section 7.3.

Discussion of the Linksview internal sanitary system design requirements to not impede future developments can be found in the FSR.

7.0 TASK #4: SIZING OF PROPOSED TWINNED TRUNK SEWERS

7.1 Design Flows

To undertake Task#4, design flows to each existing and proposed trunk sewer under future development conditions within the Harbourview Trunk Sewer drainage area are required. The design flows and trunk sewer sizing have been determined based on the Linksview Ultimate Sanitary Servicing Strategy. Further discussion on the Interim Servicing Strategy is found in Section 7.3.

To determine the design flows, sanitary drainage areas as well as horizon year build-out limits need to be determined to represent both existing (Base Scenario) conditions and future development conditions. As previously noted, Tatham produced a 'Sanitary Sewage Drainage Plan' drawing as part of the Harbourview Design Brief, which discretized sub-drainage area boundaries to be able to quantify flow emanating from current (as of 1994) and future development flows that would be tributary to the subject trunk sewers. For the purposes of this assessment, the 'Sanitary Sewage Drainage Plan' has been refined as a result of more detailed studies through the course of various development applications.

Various sub-drainage areas identified in the 'Sanitary Sewage Drainage Plan' that represented future development lands have been refined during the Base Scenario development process. Additionally, Area

A1 per the 'Sanitary Sewage Drainage Plan' has been further discretized in light of the proposed Linksview development as well as the Mair Mills Estates and Village developments. Refer to Drawing 702 for the sanitary drainage plan under future development conditions.

It is understood that the proponent for the proposed Consar Development [Red Maple Subdivision] is seeking approval to increase the residential unit count from 260 units assumed in the Mair Mills Study to approximately 300 units. The increased unit count has been incorporated into the future design flow calculations.

To facilitate the determination of design flows, horizon year build-out limits have been applied. The horizon year 2030 limit has been assumed to encompass the proposed Red Maple Subdivision and lands located west of Tenth Line. The west limits are located approximately mid-way between Tenth Line and Grey Road 19, south limits being Sixth Street, and the north limits set at the Mountain Road catchment area boundary per the 1994 Tatham Study. In addition to the Red Maple Subdivision, these lands include the subject development, Mair Mills Village, and Mair Mills Estates.

The horizon year 2045 limit includes the remainder of the lands west of the horizon year 2030 limit to Grey Road 19 as well as the Currie Lands. This horizon year also includes the provision for a sanitary service connection to the existing residential dwellings between Grey Road 19/21 and Silver Creek.

The Linksview Development will be required to provide a gravity outlet for wastewater generated from future development lands. More specifically, wastewater flows emanating from future development lands located west and south of the subject lands (herein referred to as Catchments W.EXT and A1c) will be intercepted via a trunk sewer to be installed within the proposed Linksview local collector road. Sanitary stubs will be provided at the west terminus of the local collector road at the Linksview property line as well as at the local road terminus along the south property line.

To quantify the wastewater flow rates emanating from W. EXT and A1c, the delineation of these catchments are required. Rather than delineating the limits of W.EXT based on existing topographical contours, the delineation was based on the extent of lands that can be reasonably serviced via a gravity sewer system. From the west limits of Linksview, a sanitary sewer system was extended westward using a pipe slope of 0.5% and a starting sewer depth of 3.0 m below grade. The boundary was then established based on either the Secondary Plan limits or where fill depths greater than approximately 0.5 m would be required to provide sanitary servicing to a proposed development. Refer to Drawing 702 for the W.EXT delineation.

As per the Regional SWM Study report, the SWM strategy for Catchment A1c (labelled as 3504 in the Regional SWM Report) involves outleting flows to the proposed Linksview drainage system, ultimately discharging to the Linksview SWM pond. Similarly, it is proposed to discharge the wastewater emanating from Catchment A1c to the proposed Linksview sanitary sewer system.

Where unit count data is not available for a specific catchment area or for the Currie Lands, the design flows are based on 17 units per hectare, which equates to 50 persons per hectare when applying the Town engineering standard of 2.9 people per unit. As stated in Section 5.0, this methodology achieves the objectives of the Growth Plan of 50 persons per hectare. As stated previously, the design flows for the Currie Lands (Catchment B1) are based on the per the Tatham 1994 Study.

7.1.1 Horizon Year 2030 Design Flows

The Horizon Year 2030 design flows for the subject trunk sewers are provided in Table 3 below. Where unit counts are not available for a specific development, the design flows for future development lands are based on 50 persons per hectare (17 units per hectare at 2.9 people per unit). Refer to Appendix E for the design flow calculations for the future development lands. As previously noted, the Linksview Ultimate Servicing Strategy requires a trunk sewer to be constructed along Tenth Line; as a result, the design flows for this sewer have also been provided in Table 3. Refer to Drawing 702 for the pipe reach locations for the various trunk sewers.

Table 3: Horizon Year 2030 Design Flows to the Various Trunk Sewers

Location		Design Inputs		
		Total Peak Flow (A)	Capacity of Ex. Sewer (B)	Required Capacity of Proposed Sewer (A-B)
Pipe Reach	Description	(L/s)	(L/s)	(L/s)
Mountain Road Trunk Sewer				
Ex. MH 1A to Ex. MH 3-7A (660 m)	Tenth Line to BAC Sewer Input (To be twinned)	280.4	**134.7**	**145.7**
Ex. MH 3-7A to Ex. H26N-31 (712 m)	BAC Sewer Input to Balsam Street (To be twinned)	355.2	**141.3**	**213.9**
Proposed Tenth Line Trunk Sewer				
Pr. MH 1 to Pr. MH 2 (400 m)	6th Street Intersection to Pr. Linksview Entrance	39.7	**n/a**	**39.7**
Pr. MH 2 to Pr. MH 3 (350 m)	Pr. Linksview Entrance to Pr. Red Maple Subdivision Street 'A' Intersection	102.2	**n/a**	**102.2**
Pr. MH 3 to Ex. MH 1A (450 m)	Pr. Red Maple Subdivision Street 'A' Intersection to Mountain Road Intersection	167.4[2]	**n/a**	**167.4**
Black Ash Creek Trunk Sewer				
Ex. MH 26 to Ex. MH 39 (810 m)	Georgian Meadows (6th Line to S. Limits of Red Maple Subdivision)	33.4	**142.6**	**Not Required**
Ex. MH 39 to Pr. MH 44 A (305 m)	Red Maple Subdivision (proposed sanitary sewer between S. Limits of Red Maple Subdivision to connection with Ex. MH #44)	52.5	**220.8**	**Not Required**
Pr. MH 44A to Ex. MH 3-7A (415 m)	Existing Sanitary Sewer between N. Limit of Red Maple Subdivision to Mountain Road Connection	52.5	**127.5**	**Not Required**
Harbourview Trunk Sewer				
Ex. MH 1 to Ex. MH 12 (900 m)	Between Balsam Street and Birch Street (To be twinned)	455.2[3]	**351.9**	**103.3**

1. Refer to Drawing 702 for Sanitary Tributary Area.
2. Flow from the proposed Mair Mills Village has been assumed to be tributary to the proposed Tenth Line sanitary sewer.
3. Black Ash Creek Pumping Station flow of 100 L/s included.

7.1.2 Horizon Year 2045 Design Flows

The Horizon Year 2045 design flows for the subject trunk sewers are provided in Table 4 below based on the Linksview Ultimate Servicing Strategy. Refer to Appendix E for the design flow calculations for the future development lands.

Table 4: Horizon Year 2045 Design Flows to the Various Trunk Sewers

Location		Design Inputs		
		Total Peak Flow (A)	Cap. of Ex. Sewer (B)	Required Cap. of Proposed Sewer (A-B)
Pipe Reach	**Description**	**(L/s)**	**(L/s)**	**(L/s)**
Mountain Road Trunk Sewer				
Ex. MH 1A to Ex. MH 3-7A (660 m)	Tenth Line to BAC Sewer Input (To be twinned)	428.1	**134.7**	**293.4**
Ex. MH 3-7A to Ex. H26N-31 (712 m)	BAC Sewer Input to Balsam Street (To be twinned)	500.7	**141.3**	**359.4**
Proposed Tenth Line Trunk Sewer				
Pr. MH 1 to Pr. MH 2 (400 m)	6th Street Intersection to Pr. Linksview Entrance	39.7	**n/a**	**39.7**
Pr. MH 2 to Pr. MH 3 (350 m)	Pr. Linksview Entrance to Pr. Red Maple Subdivision Street 'A' Intersection	206.1	**n/a**	**206.1**
Pr. MH 3 to Ex. MH 1A (450 m)	Pr. Red Maple Subdivision Street 'A' Intersection to Mountain Road Intersection	266.1[2]	**n/a**	**266.1**
Black Ash Creek Trunk Sewer				
Ex. MH 26 to Ex. MH 39 (810 m)	Georgian Meadows (6th Line to S. Limits of Red Maple Subdivision)	125.8	**142.6**	**Not Required**
Ex. MH 39 to Pr. MH 44 A (305 m)	Red Maple Subdivision (proposed sanitary sewer between S. Limits of Red Maple Subdivision to connection with Ex. MH #44)	148.9	**220.8**	**Not Required**
Pr. MH 44A to Ex. MH 3-7A (415 m)	Existing Sanitary Sewer between N. Limit of Red Maple Subdivision to Mountain Road Connection	148.9	**127.5**	**Not Required[4]**
Harbourview Trunk Sewer				
Ex. MH 1 to Ex. MH 12 (900 m)	Between Balsam Street and Birch Street (To be twinned)	600.7 [3]	**351.9**	**248.8**

1. Refer to Drawing 702 for Sanitary Tributary Area.
2. Flow from the proposed Mair Mills Village will be tributary to the proposed Tenth Line sanitary sewer.
3. Black Ash Creek Pumping Station flow of 100 L/s added.

4. Refer to Section 7.2.2 for further discussion.

7.2 Trunk Sewer Sizing

7.2.1 Horizon Year 2030 Design Flows

Based on the results shown in Table 3, preliminary sizing of the proposed trunk sewers has been determined below. As noted in Section 7.1, the BAC Sewer does not require twinning; therefore, the BAC sewer has been excluded from Table 4. The preliminary pipe sizing results have been presented in Table 4 have been shown on Drawing 702. Refer to Drawing 702 for the pipe reach locations for the various trunk sewers.

As presented in the FSR, a stormwater outlet option for the Linksview development is to construct a storm sewer between the Linksview SWM pond and the Black Ash Creek, which would follow the alignment of Tenth Line and Street A of the proposed Red Maple Subdivision. The proposed Tenth Line and Red Maple Subdivision trunk sanitary sewer has been preliminary sized based on a preliminary pipe design that incorporates crossing constraints associated with the stormwater outlet pipe. Refer to Drawing 703 for the preliminary sanitary sewer design.

Table 5: Horizon Year 2030 – Trunk Sewer Sizing

Location		Design Inputs				Pipe Size
		Required Capacity of Proposed Sewer	Length	Slope	Invert/ (Cover) at D/S MH	Min. Pipe Diameter
Pipe Reach	Description	(L/s)	(m)	(%)	(m)	(mm)
Mountain Road Trunk Sewer						
Ex. MH 1A to Ex. MH 3-7A	Tenth Line to BAC Sewer Input	**145.7 (Twinned)**	660	1.0	**178.60[1] (3.9)**	**375**
Ex. MH 3-7A to Ex. H26N-31	BAC Sewer Input to Balsam Street	**213.9 (Twinned)**	710	0.15	**177.50[2] (3.2)**	**600**
Proposed Tenth Line Trunk Sewer						
Pr. MH 1 to Pr. MH 2	6th Street Intersection to Pr. Linksview Entrance	**39.7**	400	0.5	**193.3 (4.6)**	**250**
Pr. MH 2 to Pr. MH 3	Pr. Linksview Entrance to Pr. Red Maple Subdivision Street 'A' Intersection	**94.2**	350	1.0	**189.80 (5.0)**	**300**
Pr. MH 3 to Ex. MH 1A	Pr. Red Maple Subdivision Street 'A' Intersection to Mountain Road Intersection	**167.4**	450	1.0	**185.21 (5.9)**	**375**
Harbourview Trunk Sewer						
Ex. MH 1 to Ex. MH 12	Between Balsam Street and Birch Street	**103.3 (Twinned)**	900	0.2	**175.77 (2.4)**	**600[3]**

1. Invert set equal to Ex. MH 3-7A to enable the BAC Sewer to outlet to proposed twin sewer.
2. Invert set equal to existing 750 mm diameter Harbourview Trunk Sewer at Balsam Street
3. Pipe diameter set equal to proposed Mountain Road Sewer to match pipe sizes.

7.2.2 Horizon Year 2045 Design Flows

Based on the results shown in Table 4, preliminary sizing of the proposed trunk sewers has been determined below. Refer to Drawing 702 for the pipe reach locations for the various trunk sewers.

Table 6: Horizon Year 2045 – Trunk Sewer Sizing

Location		Design Inputs				Pipe Size
		Required Capacity of Proposed Sewer	Length	Slope	Invert/ (Cover) at D/S MH	Min. Pipe Diameter
Pipe Reach	**Description**	**(L/s)**	**(m)**	**(%)**	**(m)**	**(mm)**
Mountain Road Trunk Sewer						
Ex. MH 1A to Ex. MH 3-7A	Tenth Line to BAC Sewer Input	**293.4 (Twinned)**	660	1.0	**178.60[1] (3.9)**	**450**
Ex. MH 3-7A to Ex. H26N-31	BAC Sewer Input to Balsam Street	**359.4 (Twinned)**	710	0.15	**177.50[2] (3.2)**	**750**
Proposed Tenth Line Trunk Sewer						
Pr. MH 1 to Pr. MH 2	6th Street Intersection to Pr. Linksview Entrance	**33.7**	400	0.5	**193.3 (4.6)**	**250**
Pr. MH 2 to Pr. MH 3	Pr. Linksview Entrance to Pr. Red Maple Subdivision Street 'A' Intersection	**206.1**	350	1.0	**189.8 (5.0)**	**450**
Pr. MH 3 to Ex. MH 1A	Pr. Red Maple Subdivision Street 'A' Intersection to Mountain Road Intersection	**266.1**	450	1.0	**185.21 (5.9)**	**450**
Harbourview Trunk Sewer						
Ex. MH 1 to Ex. MH 12	Between Balsam Street and Birch Street	**248.8 (Twinned)**	900	0.2	**175.77 (2.4)**	**750[3]**

1. Invert set equal to Ex. MH 3-7A to enable the BAC Sewer to outlet to proposed twin sewer.
2. Invert set equal to existing 750 mm diameter Harbourview Trunk Sewer at Balsam Street
3. Pipe diameter set equal to proposed Mountain Road Sewer to match pipe sizes.

The results presented in Table 4 indicate that the BAC sewer between the north limit of the proposed Red Maple Subdivision and the connection to the Mountain Road Sewer will be slightly overcapacity in the 2045 horizon year. It is recommended that flow monitoring take place as the Currie Lands approaches full build-out to confirm the need for sewer twinning.

7.3 Unit Thresholds to Trigger the Linksview Ultimate Sanitary Servicing Strategy

The unit threshold to trigger the implementation of the Ultimate sanitary servicing strategy is based on the following:

- The unit threshold of the BAC Sewer; and/or,

- The capacity of the proposed sanitary sewer system between Linksview and the BAC sewer (interim external sanitary sewer system). The proposed sewer system consists of the Tenth Line reach and the Red Maple Subdivision reach.

BAC Sewer Unit Threshold

As noted in Section 5.0, the unit threshold of the critical BAC sewer pipe reach (between the Red Maple Subdivision (MH 44A) to the Mountain Road sewer connection) is 1600 units.

Tenth Line

Per the capacity of the proposed 300 mm ø sanitary sewer between MH 2 and 3, the unit threshold is approximately 1,600 units.

Street 'A' – Red Maple Subdivision

Per Drawing 703, a 450 mm ø pipe has been preliminary sized within Street A of the Red Maple Subdivision to match the size of the receiving BAC sewer. This will be subject to change at the detailed design stage of the Red Maple Subdivision. Based on the pipe reach with the minimum pipe slope, which is 0.9 %, the unit threshold is 4500. Conservatively assuming that the proposed full build-out of the Red Maple Subdivision (300 units) is tributary to this pipe reach, the remaining unit threshold for the upstream contributing area is 4,200.

Therefore, it is concluded that the governing trunk sewer system for the Linksview Interim sanitary servicing strategy is either the BAC sewer or the proposed Tenth Line sewer. Therefore, once the 1600th lot is registered within the BAC sewer catchment area, the implementation of the Ultimate Sanitary Servicing Strategy will be required. As per the Mountain Road sewer, once the unit count nears the unit threshold, ongoing examination of the residual capacity of the external sanitary system will be required via flow monitoring prior to the implementation of the Ultimate strategy.

8.0 CONCLUSIONS & RECOMMENDATIONS

Based on the Regional Sanitary Servicing Study that has been undertaken for the Harbourview Trunk Sewer System, the main findings of the study demonstrate that the proposed external sanitary servicing strategy for the Linksview Development will not impede future developments. The main findings of the study are presented below.

- To assess the residual capacity and unit thresholds of the existing trunk sewers, a Base Scenario development conditions has been developed that incorporates only existing developments (with certain exceptions) and not draft plan approved subdivisions. This scenario is premised on the allocation methodology whereby allocation to a particular development is given upon lot registration and not upon receiving draft plan approval.

- Per the Base Scenario, all existing trunk sewers have residual capacity available for future developments.

  - The Mountain Road Trunk Sanitary Sewer between the input location of the Black Ash Creek Trunk Sewer and Balsam Street has the lowest unit threshold to trigger twinning. This sewer has the capacity to handle an additional 510 residential units.
  - The 510 residential units can be comprised of any future lots that are within the Mountain Road sewer system catchment area including lots from the Linksview Development.
- The Mountain Road trunk sewer between Tenth Line and Balsam Street and the Harbourview Trunk Sewer are expected to have to be twinned for the 2030 Horizon Year.

- The Linksview external sanitary servicing strategy will consist of a connection to the BAC sewer via the installation of a 350 m sewer along Tenth Line and a 560 m sewer within Street A of the Red Maple Subdivision.

- Wastewater generated from the Linksview Development will be required to be diverted away from the BAC sewer once 1600 units (over and above existing conditions) become tributary to the BAC sewer. The diversion will be accomplished via the extension of the proposed Tenth Line sewer from Street A of the Red Maple Subdivision to the proposed Tenth Line stub (to be constructed as part of Mair Mills Village works).

Respectfully Submitted,

C.F. CROZIER & ASSOCIATES INC.

Darrin Tone, P.Eng.
Project Engineer

C.F. CROZIER & ASSOCIATES INC.

Kevin Morris, P. Eng.
Project Manager/Partner

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APPENDIX A

Meeting Minutes

CROZIER &ASSOCIATES
Consulting Engineers

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40 Huron Street, Suite 301
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MINUTES – LINKSVIEW PRE-CONSULTATION MEETING

DATE OF MEETING: April 29, 2014
PROJECT NAME: Linksview Development
PROJECT NO: 183-2687
LOCATION: Town of Collingwood

ATTENDEES:

NAME	COMPANY	EMAIL ADDRESS
Brian MacDonald	Town of Collingwood	bmacdonald@collingwood.ca
Darrin Tone	Crozier & Associates	dtone@cfcrozier.ca
Kevin Morris	Crozier & Associates	kmorris@cfcrozier.ca
Alex Fleming	Crozier & Associates	afleming@cfcrozier.ca

1.0 10th Line Urbanization

	DESCRIPTION	ACTION BY
1.1	Tenth Line will be a collector road c/w 2 lane capacity	Town
1.2	It is the Town's intention to add this work as a Development Charge item under the new by-law; limits of work to extend from Sixth Street to Mountain Road.	
1.3	Town prefers a wider ROW width to accommodate active transportation facilities.	

2.0 External Sanitary Servicing Study

	DESCRIPTION	ACTION BY
2.1	The downstream study limit shall be the treatment plant. - Therefore, Harbour St. trunk sewer capacity is to be assessed as part of study. - Harbour St. trunk sewer has no inputs east of Highway 26 - Harbour sewer drawings are available from the Town	Town & CFCA
2.2	Black Ash Creek pump station outlets to Node 30 (Highway 26/Water Street/Mountain Road). - BACS can be treated as a fixed flow input into the Harbour St. sewer system. - Noted that the BACS flow study indicates higher inflows to pump station than actual inflows.	Town & CFCA
2.3	Town criteria would be to select the servicing solution that results in the shortest length of sanitary sewer twinning.	CFCA
2.4	The Mair Mills Study excluded future development lands (i.e. TODCO). Twining of the Mountain Road sewer may be required when future development lands (excluding Linksview) are factored into the capacity calculations.	CFCA
2.5	It is proposed that leachate from the County Landfill will be pumped into the Mountain Road sewer. Town can provide inflows (expected to be relatively small).	Town
2.6	CFCA inquired into what the appropriate development densities should be assumed in the study. According to MacDonald there is no clear cut answer; current value used on past files is 50 p/ha. - CFCA to examine growth plan, current development densities (i.e. Georgian Meadows) and Tatham 1994 study and determine a reasonable density average. - Town to provide copy of current sanitary sewer system map.	Town & CFCA

2.7 CFCA inquired about the extents of future development lands west of Linksview. CFCA
- Examined Official Plan and excluded hazard/natural heritage lands from flow calculations.
- CFCA to meet with Planning staff to review planning/development status of lands within study area.

2.8 Study to provide recommendations on the future trunk sanitary sewer alignment to convey flows from the west future development lands (i.e. trunk sewer through Linksview or along future Local Collector road). CFCA

2.9 Study will determine approximate sanitary catchments based on the use of gravity systems and the existing topography. CFCA

3.0 Concept Plan & Traffic Issues (External & Internal)

	DESCRIPTION	ACTION BY
	Following is a list of talking points raised about current concept plan & associated connectivity	
3.1	Review horizontal layout of internal roadways to reduce speeds; traffic calming options in lieu of long straight roadways (i.e. roundabouts, park blocks, etc.).	CFCA
3.2	New local collector through development; similar to Consar	CFCA
3.3	Emergency access. Examine possible options to gain access from Tenth Line.	CFCA
3.4	Transit service to development. Short-term and long term service to the site recognizing future road connections to the west.	CFCA
3.5	Trails and bike lanes needed within development.	CFCA
3.6	Review connections to north and south to accommodate Blue Mountain GC and Bygone days	CFCA

4.0 Stormwater Management

	DESCRIPTION	ACTION BY
	Town suggested that the Master SWM study will require review and approval of the NVCA, and it was recommended CFCA pre-consult with NVCA staff to ensure that scope of work is acceptable to all. CFCA acknowledged this recommendation. However it was explained that it is our intent to follow and adhere to the conclusions and recommendations contained within the Black Ashe Creek Subwatershed study, so it was decided that a pre-consultation meeting with the NVCA was not necessary.	

These minutes are a record of the above noted meeting. If there are any additions or revisions, please contact the undersigned these minutes will be accepted as correct. Thank you.

Yours truly,

C.F. CROZIER & ASSOCIATES INC.

Kevin Morris, P.Eng.
Partner
KM/ch

Distribution: All attendees
Mark Bryan & Nancy Farrer
Ken Hale

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MINUTES – LINKSVIEW PRE-CONSULTATION MEETING

DATE OF MEETING: July 8, 2014
DATE OF ISSUE: July 25, 2014
PROJECT NAME: Linksview Development
PROJECT NO: 183-2687
LOCATION: Town of Collingwood

ATTENDEES:

NAME	COMPANY	EMAIL ADDRESS
Brian MacDonald	Town of Collingwood	bmacdonald@collingwood.ca
Darrin Tone	Crozier & Associates	dtone@cfcrozier.ca
Kevin Morris	Crozier & Associates	kmorris@cfcrozier.ca
Herb Lemon	Town of Collingwood	hlemon@collingwood.ca

1.0 External Sanitary Servicing Study

DESCRIPTION — **ACTION BY**

1.1 CFCA presented the BASE Scenario sanitary spreadsheet and map. This includes the full build-out of Red Maple Subdivision (280 units). Currie Lands are excluded from the BASE scenario.

a) Town indicated that the methodology used by Tatham to assess the capacity of the Mountain Road sanitary sewer from MH 3-8 to High Street (average slope of pipe) is an acceptable approach.

b) Town indicated that there is more up-to-date data for the Landfill Site flows. Crozier to request data from the Town. — Crozier

c) The Black Ash Creek sanitary pump station is subject to a potential upgrade in 2015/16. BM noted that there is updated flow data. Crozier to obtain data from Allan Brownridge (Tatham). — Crozier

d) BM accepts the use of 2.9 ppu in the sanitary spreadsheets.

e) CFCA noted that the Mtn Rd. sanitary sewer is at or slightly above free flow capacity from MH 3-7 to High Street under the BASE scenario. Town is in agreement with this finding.

f) The general consensus is that the Linksview development will probably result in twinning of the Mtn Rd sanitary sewer from MH 3-7 to High Street.

g) CFCA to confirm if the industrial flows used in the BASE Scenario save and except actual flow data are based on Wet or Dry flow per area values. — Crozier

1.2 CFCA presented the Linksview servicing option (Option #1) whereby the strategy would involve an Interim and Ultimate condition. In the Interim condition, sanitary flows would be routed to the existing Black Ash Sanitary Sewer through the proposed Red Maple Subdivision development. This would result in twinning of the Mtn Rd sanitary sewer from MH 3-7 to High Street. Upon development of the Currie Lands, the Linksview sanitary flows will be conveyed along a proposed Tenth Line sanitary sewer extension (Ultimate condition). The Tenth Line sanitary sewer would need to be extended from the pipe

installed as part of the Mair Mills development and/or pipe installed to service the Blue Mountain Golf & Country Club. Residual capacity of the Mtn Rd. sanitary sewer between Tenth Line and MH 3-7 will need to be assessed under the Ultimate Condition.

a) Town agreed with Option #1 (both Interim and Ultimate) and noted the Town would not support twinning of the Black Ash sanitary sewer that is within an EP zone.

1.3 Town indicated that the challenge with funding the twinning of the Mountain Road sanitary sewer is that all development within the current urban boundary can be serviced by the existing Mountain Road sanitary sewer. The issue is how and if development charges will cover the cost of twinning the Mountain Road sewer when Linksview the trigger and this twinned sanitary sewer will need to be sized for all future upstream development. Crozier and Town to review Town Development Charge Material to confirm was included and the horizon period. — Crozier/Town

a) CFCA suggested a possible funding methodology whereby the developer would be responsible for the pipe costs based on the minimum size pipe required to service Linksview while the Town would be responsible for the pipe oversizing costs to handle the future development wastewater flows. This could possibly take the form of a front-end agreement.

1.4 Sizing Considerations: BM noted the study should include the following:

a) Determine the Tenth Line sanitary sewer sizing;

b) Mountain Road twinned pipe sizing from Tenth Line to High Street;

c) future developments should be incorporated into the study via the use of the Tatham (1994) study save and except the sanitary tributary area located west of the Linksview property that is required to be conveyed through Linksview; and,

d) Harbour Street Sewer Sizing.

2.0 Internal Subdivision Design: Groundwater - Third Pipe Option & FDC

DESCRIPTION	ACTION BY
2.1 CFCA presented the option of using a third pipe complete with a foundation drain collector (FDC) to enable the construction of basements below the seasonal high groundwater table.	
a) Town does not have experience with FDC and the use of a third pipe. Town will look into this option. CFCA to provide support and current examples. Barrie engineering staff may be a valuable resource since the Barrie standards allow for the use of FDCs.	Town/CFCA
b) Town indicated the presence of artesian wells in the surrounding properties including Fisher Field. Perhaps a deeper aquifer is separated from the shallow aquifer by a confining layer (clay).	
c) Town is satisfied with the current foundation drainage systems used in Georgian Meadows.	

These minutes are a record of the above noted meeting. If there are any additions or revisions, please contact the undersigned. If no feedback is received by **July 31, 2014**, these minutes will be considered as final. Thank you.

Yours truly,

C.F. CROZIER & ASSOCIATES INC.

Kevin Morris, P.Eng.
Partner
KM/dt

Distribution: All attendees
Mark Bryan & Nancy Farrer
Ken Hale

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MINUTES

NAME OF MEETING: Linksview Draft Plan Approval Pre-Submission
DATE OF MINUTES: October 6, 2014
DATE OF MEETING: September 30, 2014
PROJECT NAME: Linksview Development
PROJECT NO: 183-2687
LOCATION: CFCA Boardroom

ATTENDEES:

NAME	COMPANY	EMAIL ADDRESS
Brian MacDonald	Town of Collingwood	bmacdonald@collingwood.ca
John Velick	Town of Collingwood	jvelick@collingwood.ca
Herb Lemon	Town of Collingwood	hlemon@collingwood.ca
Ken Hale	LANDEX Capital Corporation	khale@landex.ca
Darrin Tone	C.F. Crozier & Associates	dtone@cfcrozier.ca
Kevin Morris	C.F. Crozier & Associates	kmorris@cfcrozier.ca

1.0 SUBMISSION OBJECTIVES & TIMING

	DESCRIPTION	ACTION BY
1.1	LANDEX presented the submission objective: To obtain a Zoning By-Law Amendment, Official Plan Amendment, and Draft Plan Approval as well as transfer the subject lands from Service Area 3 to Service Area 2.	
1.2	LANDEX presented the submission timing: Lafe fall 2014 with a January 2015 Public Meeting	

2.0 TRAFFIC

	DESCRIPTION	ACTION BY
2.1	CFCA noted that per the Tatham Traffic Study, Tenth Line will require improvements regardless of whether Linksview, Mair Mills, and/or Red Maple Subdivision proceeds.	

a) CFCA summarized the Linksview Traffic Impact Statement (TIS) to date. Although the background scenario used in the Tatham study did not include Linksview, the subject development does not result in Tenth Line improvements above and beyond the scheduled improvements. The Sixth Line intersection will require signalization in horizon year 2020 and the Mountain Road intersection will require turning lane improvements in horizon year 2025.

b) Town confirmed that the Tenth Line improvements are DC items (schedule for 2018).

c) Town noted that the County will provide comment on the 6th Street and Tenth Line intersection improvements analysis and future design.

d) Town noted that all Tenth Line Improvements will have to follow the Municipal EA process.

2.2 Town inquired about the unit triggers for the Tenth Line Improvements.

a) CFCA to discuss unit triggers in the TIS report (% build out for a given horizon year). — CFCA

b) LCC is prepared to participate in this project with the Town and adjacent developers; however further discussions are required on any potential cost sharing mechanisms. Currently developers are responsible to contribute to the urbanization based on their frontage onto Tenth Line.

3.0 STORMWATER MANAGEMENT

DESCRIPTION	ACTION BY
3.1 CFCA presented two SWM outlet options for the Linksview Development: 1) Taylor's Creek via Tenth Line roadside ditches. 2) Black Ash Creek via a dedicated storm sewer ('3rd Pipe') through the Red Maple Subdivision.	
3.2 CFCA noted that the 3rd Pipe would be sized to handle flows from the following lands: i) Linksview (Regional 'Post-to-Pre' peak flows), ii) Tenth Line (under future improvement conditions) and iii) future development area adjacent to the Linksview southwest property line.	
3.3 CFCA to examine pipe sizing/constraints to convey flow from the future development area within the south Blue Mountain Golf Course Lands.	CFCA
3.4 Discharge from the SWM pond up to and including the Regional event flows would be conveyed to BAC via the 3rd pipe. Taylor's Creek would not receive any flows from the Linksview SWM pond save and except for a scenario whereby the outlet structure failed (i.e. clogging).	
3.5 Town questioned why Linksview does not view Taylor's Creek as a preferred outlet option. Town expressed concern with future obligations with a dedicated storm sewer and the fact that the Town would, upon assumption, be responsible for two drainage systems; namely, Taylor's Creek Channel Improvements and the 3rd Pipe.	
3.6 Town indicated that the 3rd Pipe would not be considered a DC Item. LANDEX noted that the 3rd Pipe would be funded entirely by LANDEX as part of the Linksview Development.	
3.7 LANDEX noted that the Linksview funding obligations between the two outlet options is essentially equal, however there are unknowns associated with the use of the Taylor's Creek outlet, including: i) cost sharing methodology between the parties (see Note 3.2); and, ii) concerns over the estimated budget for the creek improvements.	
3.8 LANDEX is requesting that the Draft Plan Conditions not be tied to a specific SWM outlet and instead allow for the flexibility to examine the two SWM outlet options at the detailed design stage.	

3.9 CFCA explained the rationale behind the SWM Strategy whereby the proposed Linksview SWM facility will provide Regional 'post-to-pre' water quantity control. Given that the BAC Subwatershed Study did not account for any development within the Linksview site, the proposed SWM strategy is intended to not release increased peak flows to the BAC channel and thus avoid the need to re-open the BAC study.

3.10 Town requests that the Linksview FSR should note the impacts to functionality of the foundation drain collector under the two SWM outlet options. — CFCA

4.0 REGIONAL SANITARY STUDY

DESCRIPTION	ACTION BY
4.1 LANDEX/CFCA presented the Linksview external sanitary strategy whereby sanitary flows would be routed to the existing Black Ash Creek Sanitary Sewer through the proposed Red Maple Subdivision development. Upon the development of the Currie Lands, the Currie Lands developer would provide funds to extend a sanitary sewer along Tenth Line from the Mair Mills sewer south towards Linksview to re-direct the Linksview flows.	
4.2 Town inquired about which party funds the upsizing of the trunk sanitary sewer though the Red Maple Subdivision. Town indicated that per the Town Development Charge Study, sanitary sewer pipes <=300 mm ø are considered local and sanitary pipes greater than 300 mm ø can be eligible for a DC credit.	
a) CFCA noted that a Draft Plan Condition for Red Maple Subdivision is to upsize the sanitary sewer within the development to accommodate external future developments.	
b) As part of the Regional Sanitary Study Report, CFCA to provide the preliminary trunk sanitary sewer sizing within the Red Maple Subdivision to enable the proposed Linksview external servicing strategy.	CFCA
4.3 LANDEX/CFCA presented the preliminary findings of the Mountain Road Trunk Sewer capacity study and indicated that the Mountain Road Trunk Sanitary Sewer will be required to be twinned when approximately 600 residential units are constructed that are tributary to the said trunk sewer. This is based on the sanitary conveyance allocation methodology whereby residential units are given allocation upon registration and not upon Draft Plan Approval. The formal Goodyear plant parcel is provided with industrial flow allocation. Therefore, the 600 units can be from any future registered units within the Mountain Road West Corridor. When the 601st unit is registered, Mountain Road sanitary sewer will be required to be twinned.	
a) LANDEX indicated that this sanitary conveyance allocation methodology provides a level playing field between the developments to access the 600 unit threshold.	
b) Town noted that the Mair Mills Village Draft Plan Condition indicates the conveyance allocation is on first-come/first serve basis upon Registration and that allocation is not guaranteed regardless of Draft Plan Approval status.	
c) CFCA noted that per the Town DC Report, Mountain Road sanitary twinning is a DC Item scheduled for 2020.	
d) Town indicated that it will be necessary to complete flow monitoring when the unit count nears 600 to re-assess the need for twinning.	

These minutes are a record of the above noted meeting. If there are any additions or revisions, please contact the undersigned. If no feedback is received by **October 13, 2014**, these minutes will be considered as final. Thank you.

Yours truly,

C.F. CROZIER & ASSOCIATES INC.

Kevin Morris, P.Eng.
Partner
KM/DT/ch

Distribution: All attendees
Mark Bryan & Nancy Farrer

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APPENDIX B

Background Studies

- Harbourview Sanitary Trunk Sewer Design Brief
- Mair Mills Village – Mountain Road Sanitary Design Sheet

HARBOURVIEW SANITARY
TRUNK SEWER
DESIGN BRIEF
TOWN OF COLLINGWOOD

C.C. TATHAM & ASSOCIATES LTD.
CONSULTING ENGINEERS
115 HURONTARIO STREET
SUITE 201
COLLINGWOOD, ONTARIO
L9Y 2L9

SEPTEMBER, 1994
FILE NO. 94037

TABLE OF CONTENTS

TABLES

FIGURES AND DRAWINGS

APPENDIX

1. INTRODUCTION

C.C. Tatham & Associates Ltd. was retained by the Town of Collingwood to design a trunk sanitary sewer from Old Mountain Road and High Street to the sewage treatment plant at Birch Street. Refer to Drawing No. SAN1 in the rear pouch. The sewer is required to permit future development in the west end of Collingwood.

This Design Brief investigates the technical aspects of constructing the sanitary sewer and selects a preferred alignment from two alternatives.

2. BACKGROUND

At present sanitary sewage from three development areas to the west of High Street drains to the First Street sanitary sewer and these areas are identified on Drawing SAN1 as the north, central and south drainage areas. The First Street sewer also services a significant area to the south and a small area to the north and is shown on the drawing as the Oak/High Street drainage area. The First Street sewer drains eastward from High Street and north along Birch Street to the sewage treatment plant.

The First Street sewer has insufficient capacity to convey future flows. The sewer has a capacity of 162 L/s and the projected future flows over the next 50 years from the west end alone are estimated at 506 L/s.

3. SERVICE AREAS AND DESIGN FLOWS

3.1 Design Criteria

A summary of design criteria used in the analysis is provided in Appendix 1.

3.2 Existing Conditions

At present, based on the number of existing units, the north and central drainage areas service a permanent and seasonal population of approximately 4,782 assuming 90% overall occupancy. The flow from these areas is pumped from the Black Ash pumping station via a 300 mm dia. forcemain. The estimated theoretical peak flow for the area is 96.5 L/s.

The forcemain is located on High Street north of Old Mountain Road. It discharges to a sanitary sewer which in turn drains to a manhole at the intersection of Old Mountain Road and High Street. From this point it flows south along High Street and east along First Street.

The Black Ash Creek pumping station is equipped with a variable speed duty pump and a constant speed standby pump. Both pumps have a rated capacity of 79.5 L/s. The Town reported that the variable speed pump operates typically at 60% capacity for six hours a day. Therefore the minimum flow from the pumping station is 47.7 L/s. This suggests that the theoretical peak flow estimated using MOEE criteria is probably conservative (ie. 96.5 L/s vs. 47.7 L/s), however installation of a flow meter and recorder is recommended to properly measure and record flow rates.

The existing land use in the southern drainage area is primarily industrial/commercial. The peak flow based on actual water consumption records is estimated to be 28.2 L/s and is conveyed down Old Mountain Road to the High Street sewer.

The estimated total existing flow to the First Street sewer from the north, central and south drainage areas is therefore 75.9 L/s as summarized in Table 1.

TABLE 1
EXISTING FLOWS

	AREA (ha)	POPULATION	FLOW (L/S)
Residential	72.5	4,782*	47.7**
Industrial	---	---	28.2
Total	---	---	75.9

* based on 90% occupancy
** based on discharge from Black Ash pumping station

3.3 Ultimate Condition/Design Period

The theoretical ultimate flow from the north, central and south drainage areas is 1,012 L/s as shown on the flow sheet overleaf. The residential and industrial components are as follows:

TABLE 2 ULTIMATE FLOWS			
	AREA (ha)	POPULATION	FLOW (L/S)
Residential	1,282	42,749	788
Industrial	189	---	224
Total	---	---	1,012

Since it is difficult to project growth rates so far into the future a simplifying assumption was made that the 50 year design flow for the system is equal to half the ultimate flow or 506 L/s. This provides capacity for a total population of 21,375 persons (50% of ultimate) and 95 ha. of commercial/industrial development. Deducting existing development the growth allowed for is 16,593 persons and 71 ha. of commercial industrial development as shown in Table 3.

TABLE 3 50 YEAR (DESIGN FLOWS)			
	AREA (ha)	POPULATION	FLOW (L/S)
Residential	641	21,375	394
Industrial	95	---	112
Total	736	---	506

4. ALIGNMENTS

The potential alignments and profiles are shown on Drawing No. AL-1 in the rear pouch. These alignments utilize siphons at two storm water drainage ditches. Alternatively, it may be possible to avoid siphons by running the sewer through the drainage outlets. This would require concrete encasing of the sewers, approximately 700 mm above the inverts of the ditches. A backwater would be created in the ditches when they are flowing however this could be reduced, and the ditch drained during no flow conditions, by constructing a storm sewer siphon under the sanitary sewer.

If siphons on the sanitary sewer are not used the available slope for the sewer is 0.18%. The required pipe is a 750 mm dia. which conveys 506 L/s at a velocity of 1.11 m/s. This exactly matches the 50 year design flow.

Conversely, if siphons are used the available slope decreases to 0.148% to allow for hydraulic losses in the siphon. As a result, a 825 mm dia. pipe would be required which conveys 580 L/s at 1.06 m/s.

The MNR have been contacted regarding the possibility of running the sanitary sewer through the outlets, resulting in a slight damming of water upstream. They do not feel this will negatively effect fish migration up the ditches since this does not likely occur anyway. Algae growth may be increased due to the ponding and as well the ponded water might also be slightly warmer than the water in the harbour. This could potentially affect fish habitat however this satisfaction.

Aside from the MNR concerns it must be determined if the damming will have any effect on drainage of the surrounding lands and/or erosion of the ditches. A field inspection noted several storm outlets from adjacent properties outletting into the ditches. Damming may create submergence of the outlets possibly reducing their effectiveness however we believe the times of concentration for flows from these outlets will be shorter than those of the sub-watersheds and thus flooding should not be a problem.

The CN Rail Right-of-Way alignment will intercept three existing sanitary sewers on Elm, Spruce and Hickory Streets. The existing sewers on Elm and Hickory Streets will intercept the trunk sewer at approximately the obvert and could be connected to the new sewer. Surcharging of the existing sewers should not occur. Manholes will be required south of the Harbourview sewer to allow cleaning of the existing sewers.

The sewer on Hickory Street intercepts the trunk sewer below the spring line. To prevent surcharging it is proposed to siphon the Hickory Street sewer.

The Water Street/Harbourview Park Alignment will encounter watermains along Water Street. It may be necessary to lower services or mains to permit the installation of the sewer.

5. IMPLEMENTATION

Consideration must be given to the diverting flows from the north, central and south drainage areas from the High Street sewer to the Harbourview sewer to maintain minimum flows and avoid creating septic conditions in either sewer. Velocities of 0.60 m/s are desirable.
To achieve 0.6 m/s in the Harbourview trunk sewer a flow of 34.5 L/s is needed if a 750 mm dia. sewer is used and 42.8 L/s is required if an 825 mm dia. is installed. The First Street sewer requires a flow of about 41.0 L/s to achieve a velocity of 0.6 m/s.

As noted in Section 3.2 the existing peak flows from the north/central drainage areas (as discharged from the Black Ash pumping station) and south drainage area are 47.7 L/s and 28.2 L/s respectively.

It is proposed to initially divert only the flow from the north/central drainage areas (Black Ash pumping station) to the Harbourview trunk sewer. This will provide sufficient flow to prevent septic conditions regardless of whether a 750 mm dia. or 825 mm dia. sewer is installed.

The flow from the south drainage area will continue to drain south along High Street to First Street. The peak flow from the south drainage area is less than the desired flow of 41.0 L/s however the Oak/High Street drainage area contributes additional flow to the First Street sewer. If septic conditions occur it will be limited to the upper reaches of the sewer. This condition will improve with time once there is increased development along High Street and in the south drainage area.

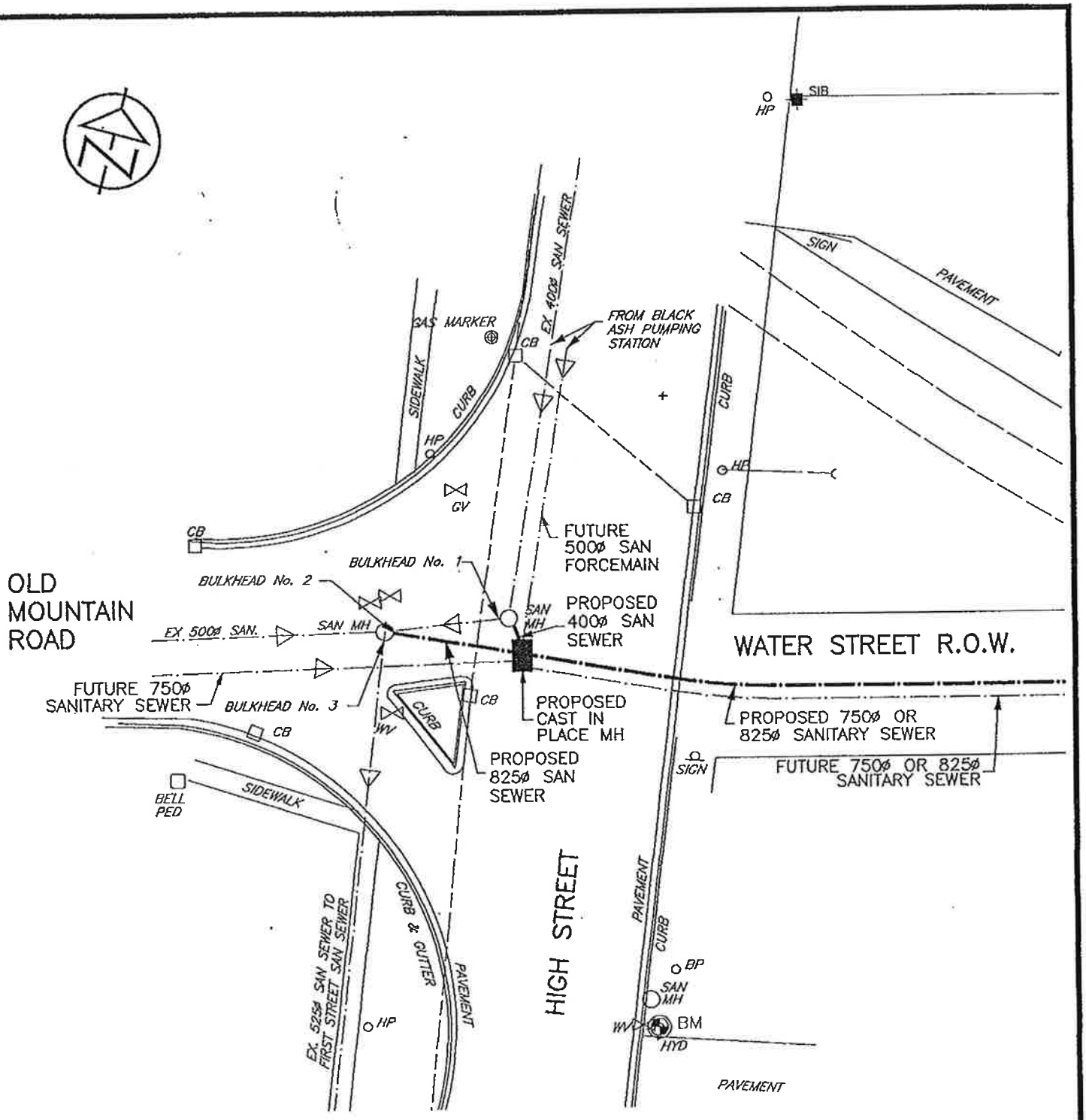
Once flows increase to the point that the First Street sewer reaches its capacity, the flow from the south drainage area will need to be diverted to the Harbourview trunk main.

The diversions will be accomplished by installing a manhole and sanitary sewer at the intersection of High Street and Old Mountain Road and installing bulkheads in the existing sanitary sewers along High Street as shown in Figure No. 1 overleaf.

The proposed cast in place manhole will be sized to accommodate the proposed sanitary trunk sewer required for the 50 year design flow. Ultimately another trunk main of equal size will be required to convey the remaining 506 L/s. At that time the manhole will need to be upgraded to accommodate the second sewer.

On Birch Street, at the east limit of the Harbour Sewer, two new manholes will be required as shown in Figure 2, overleaf.

Manhole No. 1 and No. 2 will be designed to accommodate the proposed sanitary sewer and will be upgraded when the future sewer is required. The invert of the existing 600 mm dia. sanitary sewer approximately matches the obvert of the Harbourview Sewer. Once the Harbour sewer is installed the section north of MH No. 1 will no longer receive flow (or only a minimal amount). For this reason the downstream section of the 600 mm dia. sewer will be abandoned following the installation of the Harbourview sewer.



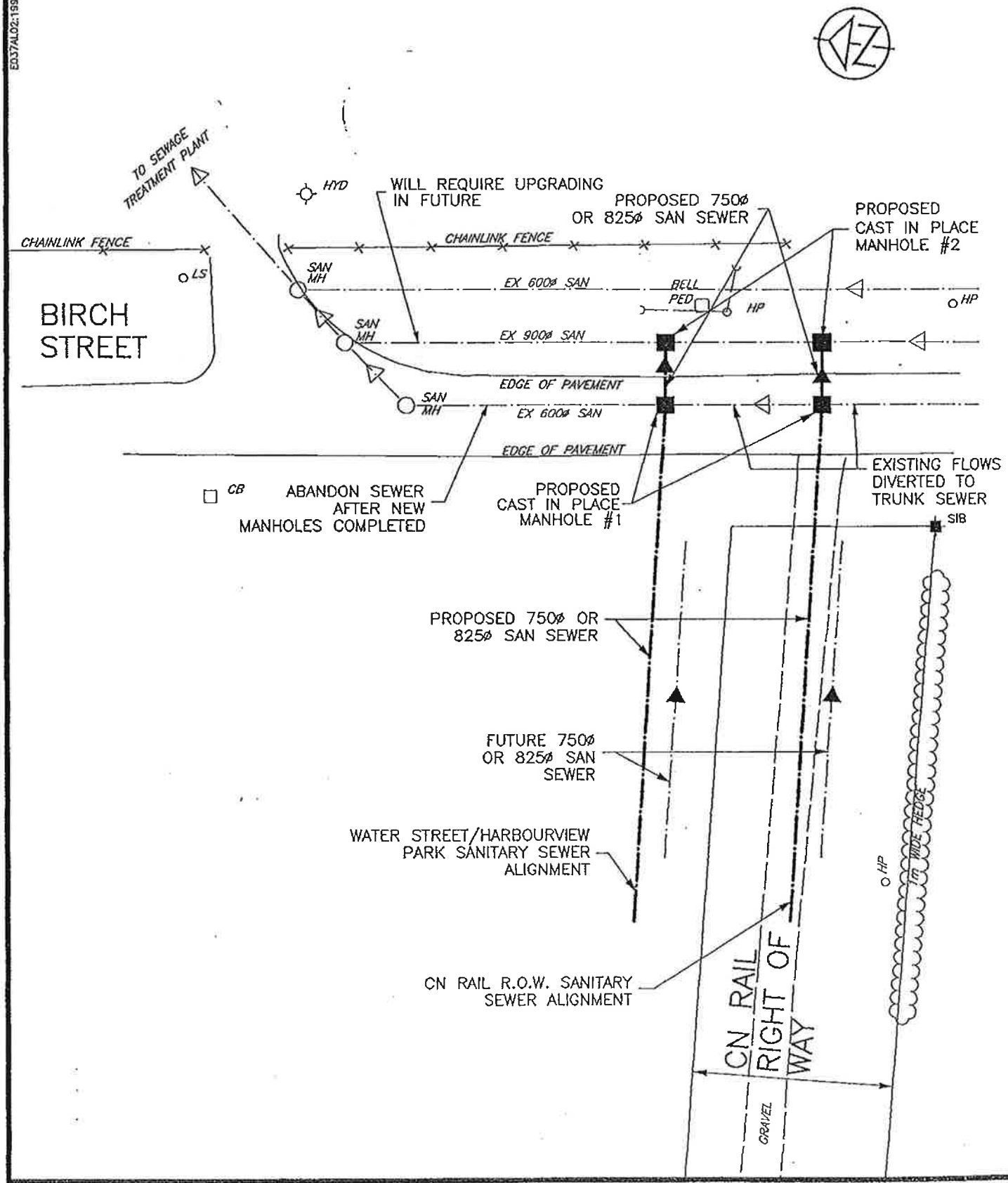
NOTES:

1. BULKHEADS No. 1 AND 2 INSTALLED INITIALLY FOLLOWING CONSTRUCTION.
2. BULKHEAD No. 2 REMOVED AND No. 3 INSTALLED WHEN FIRST STREET SEWER CAPACITY IS REACHED.

C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers

TOWN OF COLLINGWOOD
HARBOURVIEW TRUNK SEWER
EAST END OF ALIGNMENT

SCALE: NTS	DATE: AUG 1994	DWG. No. FIGURE 1



C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers

TOWN OF COLLINGWOOD
HARBOURVIEW TRUNK SEWER
WEST END OF ALIGNMENT

SCALE: NTS	DATE: AUG 1994	DWG. No. FIGURE 2

The existing 900 mm dia. sanitary sewer downstream of Manhole No. 2 will have to be upgraded at some point within the 50 year period, to handle the larger flows. We suggest this be delayed until required. Also, once the future sanitary sewer is installed upgrading to the existing sewers draining to the treatment plant will be required.

6. SOILS

Boreholes have been drilled by Terraprobe Ltd. along the two potential alignments. Rock and water table elevations are shown on Drawing No. AL-1.

The rock elevations represent auger refusal. Approximately 660 m^3 and 493 m^3 of rock excavation will be required for the CN Rail R.O.W. and Water Street/Harbourview Park alignments, respectively. Dewatering during construction will be required for both alignments.

Trace amounts of coal, slag, and wood were encountered in boreholes 12, 13, 16 and 17 along the CN Rail R.O.W. alignment. Slag, wood and glass was encountered in boreholes 2, 7 and 8, along the Water Street/Harbourview Park alignment in the former landfill site.

The debris encountered along the CN Rail R.O.W. alignment would probably not present a significant problem in achieving compaction considering only trace amounts were found. Therefore the native backfill could probably be used. Relatively more deleterious material was encountered along the Water Street/Harbourview Park alignment due to the crossing of the site of a former landfill. If significant quantities of unsatisfactory materials were encountered it

might be necessary to import backfill material and dispose of the excavated material at a landfill site. This could add to the cost of the project. Should this latter alignment be selected, further exploration digging and testing would be required.

7. INVERTED SIPHONS

Along either alignment two creek crossings will be encountered. Inverted siphons may be used to transmit flows under the creeks as shown on Drawing No. AL-1. Because of the large variation in flows over the design period three pipe siphon is proposed to discourage septic conditions from occurring in the siphon by maintaining periodic flushing of the siphon barrels.

Chambers are required at each end of the siphon. Lateral overflow weirs within the chambers direct flows to the larger siphon pipes as flows increase. The pipes proposed are 300 mm, 450 mm and 600 mm in diameter.

The initial minimum flow in the Harbourview Sewer will be 47.7 L/s originating from the Black Ash pumping station. This flow will be conveyed by the 300 mm diameter siphon pipe at a velocity of 0.69 m/s. As the flow increases and the weir to the 450 mm diameter pipe is overtopped routinely, the 300 mm diameter pipe can be flushed and bulkheaded. The 450 mm diameter pipe can then be used to convey flows up to 150 L/s. The velocity at this flow is 0.91 m/s.

Similarly as the weir to the 450 mm pipe is routinely overtopped, the 450 mm pipe can be flushed and bulkheaded directing all flow through the 600 mm siphon pipe. It has a capacity of 306 L/s at a velocity of 1.04 m/s.

In succession as the flows increase the bulkheads for the 300 mm and 450 mm diameter pipes can be removed. The design flow of the sewer of 506 L/s can be achieved when all three siphon pipes are open.

8. MATERIALS

The following lists the materials which may be used for the sanitary sewer and siphon construction.

Sanitary Sewer:

825 mm dia.	-	Concrete
	-	P.E.
	-	PVC
750 mm dia.	-	Concrete
	-	P.E.
	-	PVC

Siphon Pipes:

300 mm, 450 mm	-	Concrete Pressure Pipe
and 600 mm dia.	-	Ductile Iron
	-	P.E.
	-	PVC

9. LAND REQUIREMENTS

Water Street/Harbourview Park Alignment

The Water Street/Harbourview Park alignment will most likely require an easement and/or agreement from/with Simcoe County to cross the former landfill site. The remaining alignment is within Town owned lands.

CN Rail R.O.W. Alignment

The CN Rail R.O.W. alignment utilizes City owned lands and CN property. The Town is in the process of purchasing the CN property.

To reduce construction costs it would be advantageous to construct the siphons around the two existing bridges. Depending on whether the siphons are constructed to the north or south of the bridge, an easement may be required from Simcoe County or from the land owners to the south. It however has not been determined at this stage if encroachment on the adjacent properties is required.

In any event the easements, if required, would be relatively small and if for any reason they became unattainable the bridges could be removed and replaced or the pipes could be installed in borings under the bridges.

10. APPROVALS

Water Street/Harbourview Park Alignment

Under the Environmental Protection Act a Section 45 approval from the MOEE will be required since the sanitary sewer will be constructed in a landfill which has not been out of service for more than 25 years. This procedure is arduous and time consuming. Because the work through the park is not through an existing utility corridor the sewer construction would be a Schedule B project as defined in the Class Environmental Assessment requiring a screening process and two open houses to be conducted.

Approval from Simcoe County and the MNR would also be required. The MNR approval is required for the ditch crossings and would take the form of a Work Permit. A Certificate of Approval from the MOEE will be required as well.

CN Rail R.O.W. Alignment

The CN Rail R.O.W. is an existing utility corridor since it is used by Collingwood PUC and Bell Canada, and therefore would be considered to be a MOEE Schedule A project.

Approval from Simcoe County would only be required if encroachment was necessary for siphon construction. MNR approval in the form of a Work Permit and an MOEE Certificate of Approval would also be required.

11. COST ESTIMATES

Cost estimates for each alignment are shown overleaf. The estimates have been prepared based on using an 825 mm diameter pipe and siphons. If a 750 mm diameter sewer without siphons is ultimately chosen the cost will be slightly lower. Therefore these cost estimates represent the more costly alternatives.

The cost for the Water Street/Harbourview Park and CN Rail R.O.W. alignments are $861,177.50 and $647,910.00, respectively. The estimates contain a provisional item for the removal and disposal of unsatisfactory materials excavated and imported backfill material. It is more likely that unsatisfactory material would be encountered along the Water Street/Harbourview Park alignment then the CN Rail R.O.W. alignment and therefore a larger provisional quantity has been assumed for the former alignment.

12. CONCLUSIONS AND RECOMMENDATIONS

Below is a summary of the advantages and disadvantages for each alignment.

A. Water Street/Harbourview Park Alignment

ADVANTAGES

- No conflicts with existing sanitary sewers.

DISADVANTAGES

- Alignment route longer by approximately 40 m.

COST ESTIMATE
WATER STREET/HARBOURVIEW PARK
SANIARY SEWER ALIGNMENT
(BASED ON USING SIPHONS)

ITEM NO.	DESCRIPTION	TOTAL PRICE
1	PIPE: 830 M X $ 300.00	$249,000.00
2	MANHOLES: 9 X $ 2,100.00	$18,900.00
3	CAST IN PLACE MANHOLES: 3 X $10,000.00	$30,000.00
4	SIPHON CHAMBERS: 4 X $ 10,000.00	$40,000.00
5	SIPHON PIPING FOR CREEK CROSSING: 125 M X $640.00 (3-PIPE SYSYTEM)	$80,000.00
6	ROCK EXCAVATION: 493 CU.M X $100.00	$49,300.00
7	REINSTATEMENT	$26,500.00
8	DISPOSE OF UNSATISFACTORY EXCAVATED MATERIAL AND IMPORT GRANULAR BACKFILL: 1215 CU.M. X 210.00 (PROVISIONAL)	$255,150.00
	SUB-TOTAL	$748,850.00
	ENGINEERING AND CONTINGENCY (15%)	$112,327.50
	TOTAL	$861,177.50

COST ESTIMATE
C.N. RAIL R.O.W. SANITARY SEWER ALIGNMENT
(BASED ON USING SIPHONS)

ITEM NO.	DESCRIPTION	TOTAL PRICE
1	PIPE: 862 M X $ 300.00	$258,600.00
2	MANHOLES: 9 X $ 2,100.00	$18,900.00
3	CAST IN PLACE MANHOLES: 3 X $10,000.00	$30,000.00
4	SIPHON CHAMBERS: 4 X $ 10,000.00	$40,000.00
5	SIPHON PIPING FOR CREEK CROSSING: 50 M X $640.00 (3-PIPE SYSYTEM)	$32,000.00
6	ROCK EXCAVATION: 660 CU.M X $100.00	$66,000.00
7	REINSTATEMENT	$15,000.00
8	DISPOSE OF UNSATISFACTORY EXCAVATED MATERIAL AND IMPORT GRANULAR BACKFILL: 490 CU.M. X $210.00 (PROVISIONAL)	$102,900.00
	SUB-TOTAL	$563,400.00
	ENGINEERING AND CONTINGENCY (15%)	$84,510.00
	TOTAL	$647,910.00

- May be necessary to dispose of significant unsuitable material encountered during construction and import clean fill.
- Approval required from Simcoe County (and probably an easement).
- EPA Section 45 approval required.
- MOEE Schedule B project requiring two public meetings.
- Construction cost is estimated to be approximately $210,000.00 higher than CN Rail R.O.W. alignment.

B. CN Rail R.O.W. Alignment

ADVANTAGES

- MOEE Schedule A project.
- Shorter alignment by approximately 40 m.

DISADVANTAGES

- May require easement for siphons.

- All lands owned or soon to be owned by Town (except for possible easements to facilitate siphons)

- Construction cost is estimated to be at approximately $210,000.00 lower than Water Street/Harbourview Park alignment.

The Water Street/Harbourview Park alignment has a number of significant disadvantages related to timing and costs. The approvals process would definitely delay construction, assuming approvals could be achieved at all. The cost of such a process would be significant and is not included in our estimates. In addition the construction cost has a potential to escalate if significant unsuitable native material is encountered during excavation.

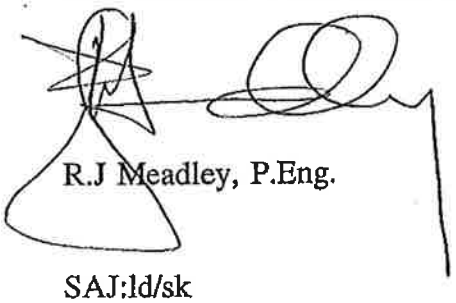
In comparison the approval process for the CN Rail R.O.W. alignment is much simpler and should be achievable in a much shorter time.

For these reasons the CN Rail R.O.W. alignment is preferred.

The possibility of eliminating the sanitary sewer siphons by installing the sewer through the drainage ditches should be further investigated to determine if it is a feasible option from a technical and economic perspective. If so, the MNR should be contacted to discuss the option further.

Respectfully submitted,

C.C. TATHAM & ASSOCIATES LTD.



R.J Meadley, P.Eng.

SAJ:ld/sk

APPENDIX 1

DESIGN CRITERIA

HARBOURVIEW SANITARY TRUNK SEWER
DESIGN CRITERIA

INDIVIDUAL AREA CRITERIA

1. RESIDENTIAL FLOWS :

A.) North Drainage Area
(AREAS A TO O, and W)

- Unit counts based on prorating existing units/ha over the ultimate development area
- 3 p.p.u.
- 450 l/cap/day
- 0.21 l/ha/s Infiltration
- 90% seasonal population occupancy for areas A to O (based on Collingwood Water Supply and Distribution Study,1988,Ainley and Associates Ltd.)
- 100% permanent population occupancy for area W
- Harmon Peaking Factor

B.) Collingwood Annexation Lands
(AREAS A1,B1,G1,G2,and G3)

- Based on Collingwood Annexation Report,1994,C.C. Tatham and Associates Ltd.
- 25 persons/ha
- 450 l/cap/day
- 0.21 l/ha/s Infiltration
- 90% seasonal population occupancy for area G1
- 100% permanent population occupancy for remaining areas
- Harmon Peaking Factor

C.) Mountain Road
(AREAS R,and V)

- Based on Mountain Road Sanitary Trunk Sewer Design Sheets,1987,Ainley and Associates Ltd.
- 44 persons/ha
- 363 l/cap/day
- 0.20 l/ha/s Infiltration
- 100% permanent population occupancy
- Harmon Peaking Factor

INDIVIDUAL AREA CRITERIA (CONT'D)

2. INDUSTRIAL FLOWS:

A.) North and Central Drainage Areas
(AREAS Q , and P)

- 35 cu.m./day/ha
- 0.21 l/ha/s Infiltration
- Peaking Factor from Appendix B,MOEE Design Guidelines

B.) Mountain Road
(AREAS S,Tand U)

- Based on Mountain Road Sanitary Trunk Sewer Design Sheets,1987,Ainley and Associates Ltd.
- 35 cu.m./ha/day for areas S and T
- 227 cu.m./day for area U
- 0.20 l/ha/s Infiltration
- Peaking Factor from Appendix B,MOEE Design Guidelines

ULTIMATE DESIGN CRITERIA FOR THE NORTH,CENTRAL, AND SOUTH AREAS

1. RESIDENTIAL FLOWS : (ALL AREAS)

- populations calculated using the individual area criteria described in section 1,above.
- 450 l/cap/day
- 0.21 l/ha/s Infiltration
- Harmon Peaking Factor

2. INDUSTRIAL FLOWS: (ALL AREAS)

- 35 cu.m./ha/day
- 0.21 l/ha/s Infiltration
- Peaking Factor from Appendix B,MOEE Design Guidelines

SANITARY SEWER DESIGN SHEET
ULTIMATE FLOWS

MUNICIPALITY: Town of Collingwood
CLIENT: Town of Collingwood
JOB TITLE: Harbourview Trunk Sewer
CONSULTANT: C.C. Tatham & Associates Ltd.

Project No. 94037
Designed by: W.K.
Version Date: SEPT/1994

LOCATION			INDIVIDUAL				CUMULATIVE						PROPOSED SEWER					
AREA DESIGNATION	FROM	TO	Gross Pop.	Area (ha)	Percent Occupancy	Design Pop.	Area (ha)	Pop.	PEAKING FACTOR M	PEAK POP. FLOW Q(p) (L/sec)	PEAK EXTRANEOUS FLOW Q(I) (L/sec)	PEAK DESIGN FLOW Q(d) (L/sec)	LENGTH (m)	NOMINAL PIPE SIZE (mm)	GRADIENT (%)	CAPACITY ERR (m3/sec)	FULL FLOW VELOCITY (m/sec)	ACTUAL VELOCITY (m/sec)
PRINCETON SHORES	AREA K		1383	14.0	90.0%	1245	14.0	1245	3.74	24.22	2.94	27.16						
	AREA G1		5925	237.0	90.0%	5333	251.0	6577	3.13	107.31	52.71	160.02						
	AREA I		1464	28.3	90.0%	1318	279.3	7895	3.06	125.65	58.65	184.31						
	AREA J		612	7.0	90.0%	551	286.3	8446	3.03	133.16	60.12	193.28						
VACATION INN	AREA H		570	5.3	90.0%	513	291.6	8959	3.00	140.07	61.24	201.31						
LISA/DOCKSIDE	AREA G		856	9.3	90.0%	772	300.9	9731	2.97	150.34	63.19	213.53						
	AREA F		90	4.0	90.0%	81	304.9	9812	2.96	151.41	64.03	215.44						
LIGHTHOUSE POINT	AREA E		1638	9.7	90.0%	1474	314.6	11286	2.90	170.60	66.07	236.67						
	AREA C		2040	16.2	90.0%	1836	330.8	13122	2.84	193.87	69.47	263.34						
RUPERT'S LANDING	AREA D		618	4.0	90.0%	556	334.8	13678	2.82	200.80	70.31	271.10						
	AREA L		1974	60.7	90.0%	1777	395.5	15455	2.77	222.58	83.06	305.63						
	AREA B		459	4.0	90.0%	413	399.5	15868	2.75	227.57	83.90	311.47						
	AREA A		1470	18.2	90.0%	1323	417.7	17191	2.72	243.41	87.72	331.13						
										NORTHERN AREA TOTAL		331.13						

MUNICIPALITY:	Town of Collingwood																		
CLIENT:	Town of Collingwood																		
JOB TITLE:	Harbourview Trunk Sewer																		
CONSULTANT:	C.C. Tatham & Associates Ltd.																		

SANITARY SEWER DESIGN SHEET
ULTIMATE FLOWS

Project No. 94037
Designed by: W.K.
Version Date: SEPT/1994

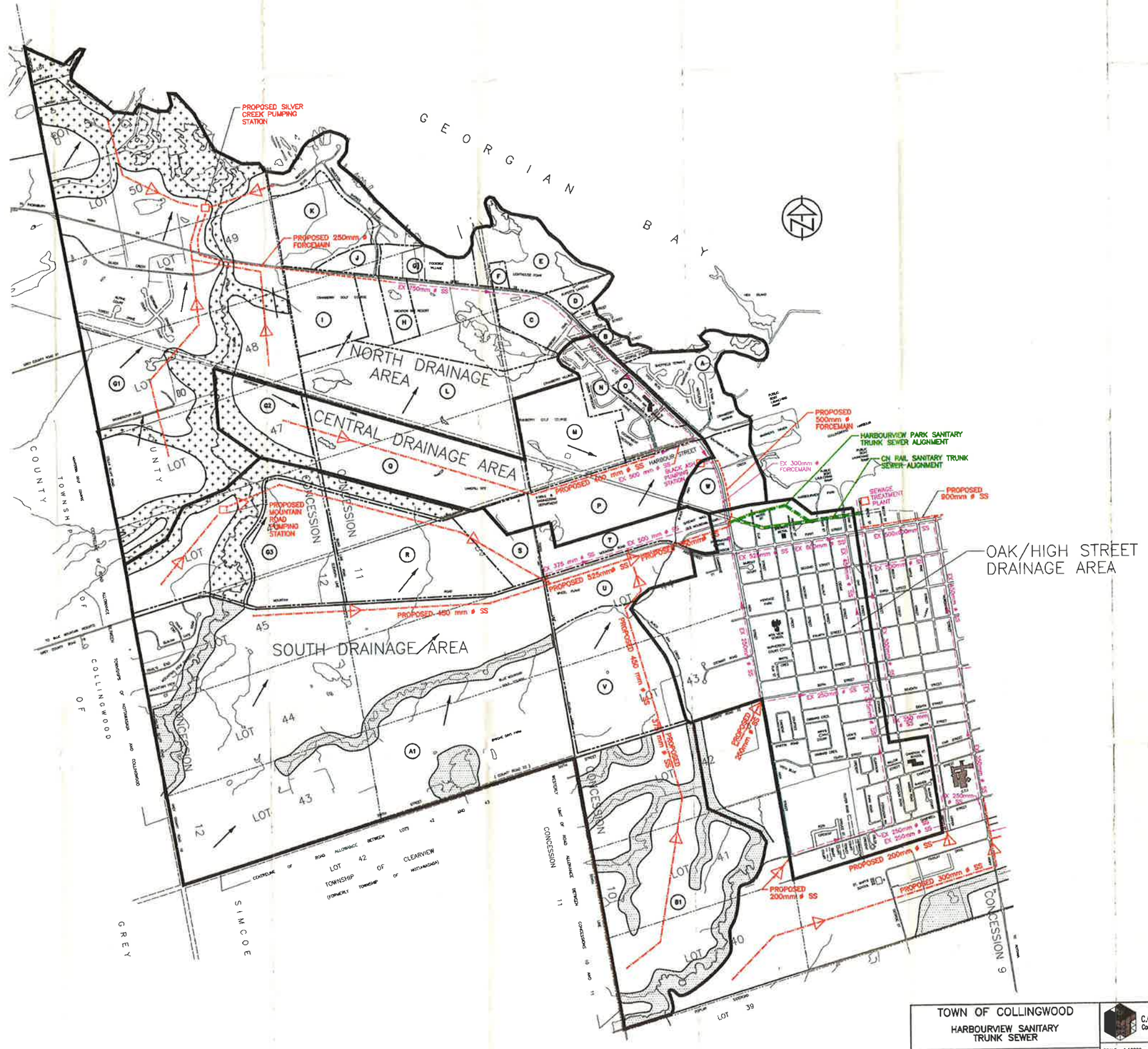
LOCATION			INDIVIDUAL				CUMULATIVE						PROPOSED SEWER					
AREA DESIGNATION	FROM	TO	Gross Pop.	Area (ha)	Percent Occupancy	Design Pop.	Area (ha)	Pop.	PEAKING FACTOR M	PEAK POP. FLOW Q(p) (L/sec)	PEAK EXTRANEOUS FLOW Q(i) (L/sec)	PEAK DESIGN FLOW Q(d) (L/sec)	LENGTH (m)	NOMINAL PIPE SIZE (mm)	GRADIENT (%)	CAPACITY ERR (m3/sec)	FULL FLOW VELOCITY (m/sec)	ACTUAL VELOCITY (m/sec)
	AREA G2		450	18.0	100.0%	450	18.0	450	4.00	9.37	3.78	13.15						
INDUSTRIAL	AREA Q			60.0			60.0		2.95	71.69	12.60	97.43						
INDUSTRIAL	AREA P			55.0			115.0		2.60	121.10	24.15	158.39						
	AREA M		450	12.0	90.0%	405	30.0	855	3.84	17.11	6.30	168.66						
CRANBERRY (719 UNITS)	AREA N		2156	19.0	90.0%	1940	49.0	2795	3.47	50.50	10.29	206.03						
CRANBERRY INN	AREA O		250	7.0	90.0%	225	56.0	3020	3.44	54.11	11.76	211.12						
	AREA W		525	21.0	100.0%	525	70.0	3545	3.38	62.41	14.70	222.35						
								CENTRAL AREA TOTAL				222.35						
TOTAL RESIDENTIAL BLACK ASH CREEK PS							494.7	20737	2.64	284.78	103.89	388.66						
TOTAL INDUSTRIAL BLACK ASH CREEK PS							115.0		2.60	121.10	24.15	145.25						
								TOTAL FLOW INTO BLACK ASH CREEK PUMPING STATION				533.91						
	AREA G3		2175	87.0	100.0%	2175	87.0	2175	3.56	40.30	18.27	58.57						
RESIDENTIAL	AREA R		3080	70.0	100.0%	3080	157.0	5255	3.22	88.27	32.97	121.24						
INDUSTRIAL	AREA S			17.4	100.0%		17.4		4.00	28.19	3.65	153.08						
	AREA A1		10500	420.0	100.0%	10500	577.0	15755	2.76	226.21	121.17	379.23						
								SOUTHERN AREA SUBTOTAL				379.23						

MUNICIPALITY: Town of Collingwood
CLIENT: Town of Collingwood
JOB TITLE: Harbourview Trunk Sewer
CONSULTANT: C.C. Tatham & Associates Ltd.

SANITARY SEWER DESIGN SHEET
ULTIMATE FLOWS

Project No. 94037
Designed by: W.K.
Version Date: SEPT/1994

LOCATION			INDIVIDUAL				CUMULATIVE						PROPOSED SEWER					
AREA DESIGNATION	FROM	TO	Gross Pop.	Area (ha)	Percent Occupancy	Design Pop.	Area (ha)	Pop.	PEAKING FACTOR M	PEAK POP. FLOW Q(p) (L/sec)	PEAK EXTRANEOUS FLOW Q(i) (L/sec)	PEAK DESIGN FLOW Q(d) (L/sec)	LENGTH (m)	NOMINAL PIPE SIZE (mm)	GRADIENT (%)	CAPACITY ERR (m3/sec)	FULL FLOW VELOCITY (m/sec)	ACTUAL VELOCITY (m/sec)
	AREA B1		3925	157.0	100.0%	3925	157.0	3925	3.34	68.29	32.97	101.26						
RESIDENTIAL	AREA V		2332	53.0	100.0%	2332	210.0	6257	3.15	102.76	44.10	146.86						
INDUSTRIAL	AREA U			27.0	100.0%		27.0		3.40	37.18	5.67	189.71						
INDUSTRIAL	AREA T			30.0	100.0%		57.0		3.00	69.26	11.97	228.09						
									SOUTHERN AREA SUBTOTAL			228.09						
TOTAL SOUTHERN RESIDENTIAL							944.0	22012	2.61	299.31	198.24	497.55						
TOTAL SOUTHERN INDUSTRIAL							74.4		2.70	81.36	15.62	96.98						
									TOTAL FLOW FROM HARBOUR STREET			594.53						
TOTAL RESIDENTIAL							1281.7	42749	2.33	518.44	269.16	787.60						
TOTAL INDUSTRIAL							189.4		2.40	184.10	39.77	223.87						
									TOTAL FLOW INTO HARBOURVIEW SANITARY TRUNK SEWER			1011.47						



LEGEND

- (D) DRAINAGE AREA
- EXISTING SANITARY SEWER
- EXISTING FORCEMAIN
- OVERLAND DRAINAGE FLOW
- PROPOSED SANITARY SEWER
- PROPOSED FORCEMAIN
- SEWER FLOW DIRECTION
- DRAINAGE AREA BOUNDARY
- SUB DRAINAGE AREA BOUNDARY
- ENVIROMENTAL PROTECTION AREA TOWN OF COLLINGWOOD OFFICAL PLAN
- NVCA FILL LINE MAPPING (DRAFT) MARCH 1991
- PROPOSED HARBOURVIEW SANITARY TRUNK SEWER

NOTE: BASE MAP FROM TOWN OF COLLINGWOOD OBM MAPPING, COMPILED BY ZUBEK, EMO AND PATTEN LTD. ONTARIO LAND SURVEYOR'S

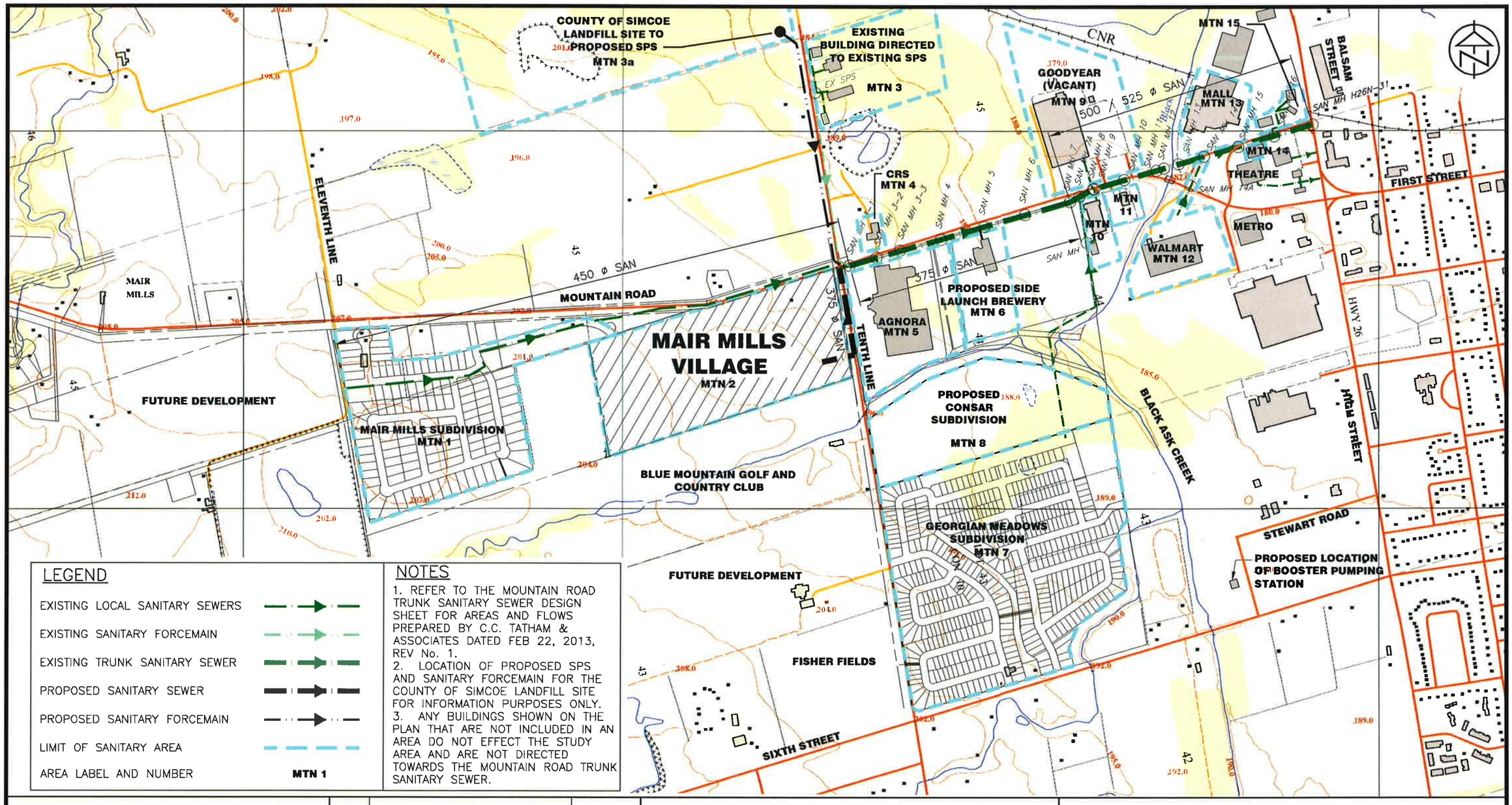
TOWN OF COLLINGWOOD

HARBOURVIEW SANITARY TRUNK SEWER

SANITARY SEWAGE DRAINAGE PLAN

C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers
115 Hurontario St.
Suite 201
Collingwood, Ontario
L9Y 2L9
(705) 444-2565

SCALE: 1:10000		JOB NO. 94037
DESIGN: WLK	CHECKED: RJN	DWG. SAN1
DRAWN: SMH	DATE: JULY 1994	



LEGEND

- EXISTING LOCAL SANITARY SEWERS
- EXISTING SANITARY FORCEMAIN
- EXISTING TRUNK SANITARY SEWER
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY FORCEMAIN
- LIMIT OF SANITARY AREA
- AREA LABEL AND NUMBER — MTN 1

NOTES

1. REFER TO THE MOUNTAIN ROAD TRUNK SANITARY SEWER DESIGN SHEET FOR AREAS AND FLOWS PREPARED BY C.C. TATHAM & ASSOCIATES DATED FEB 22, 2013, REV No. 1.
2. LOCATION OF PROPOSED SPS AND SANITARY FORCEMAIN FOR THE COUNTY OF SIMCOE LANDFILL SITE FOR INFORMATION PURPOSES ONLY.
3. ANY BUILDINGS SHOWN ON THE PLAN THAT ARE NOT INCLUDED IN AN AREA DO NOT EFFECT THE STUDY AREA AND ARE NOT DIRECTED TOWARDS THE MOUNTAIN ROAD TRUNK SANITARY SEWER.

NO.	REVISIONS	DATE
1.	TOWN COMMENTS	FEB/13

MAIR MILLS VILLAGE
TOWN OF COLLINGWOOD
FUNCTIONAL SERVICING REPORT

SANITARY SERVICING PLAN

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

SCALE:	1 : 10,000		JOB NO. 111042-7
DESIGN:	PM	CHECKED: AEB	DWG. **FIG-3**
DRAWN:	PM	DATE: JUN/12	

MOUNTAIN ROAD SANITARY TRUNK SEWER DESIGN SHEET

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

FLOW CRITERIA

Average Residential Flow Rate	450	L/cap/d	(8)
Average Proposed Commercial Flow Rate	28000	L/ha/d	(8)
Average Industrial Flow Rate:	45000	L/ha/d	(11)
Residential Infiltration Rate	0.23	L/ha/s	
Com / Ind Infiltration Rate	0.11	L/ha/s	
Population:	2.9	people per unit	
Residential Peaking Factor:	Harmon		
Com / Ind Peaking Factor	2.0		

Project Name:	Mair Mills Village
Project Number:	111042-7
Municipality:	Town of Collingwood
Designed By:	PM
Date	August 23, 2012
Checked By	AEB
Date	February 22, 2013
Revision Number	1

Approved:

LICENSED PROFESSIONAL ENGINEER
A. E. BROWNRIDGE
100120565
FEB 22 '13
PROVINCE OF ONTARIO

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NUMBER OF UNITS	POPULATION	ACCUMULATED POPULATION	RESIDENTIAL PEAKING FACTOR	COM / IND PEAKING FACTOR	RESIDENTIAL AREA	COM / IND AREA OF SITE	ACCUMULATED AREA	AVERAGE FLOW				PEAK FLOW				SEWER					
												RESIDENTIAL	INDUSTRIAL / COMMERCIAL	INFILTRATION	TOTAL	RESIDENTIAL	INDUSTRIAL / COMMERCIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY	PEAK FLOW VELOCITY (ZERO INFILTRATION)
		MH No	MH No		cap.	cap.			ha	ha	ha	L/s	L/s	L/s	L/s	L/s	L/s	L/s	L/s	m	mm	%	L/s	m/s	m/s
EX MAIR MILLS ESTATES	MTN 1		EX MH	143	414.7	414.7	4.01	N/A	22.020		22.02	2.16	0.00	5.06	7.22	8.67	0.00	5.06	13.74	633.0	450	N/A	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH	EX MH 2A	0	0	414.7	4.01	N/A	1.481		23.50	2.16	0.00	5.41	7.57	8.67	0.00	5.41	14.08	740.5	450	N/A	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 2A	EX MH 1A	0	0	414.7	4.01	N/A	0.033		23.53	2.16	0.00	5.41	7.57	8.67	0.00	5.41	14.08	16.5	375	1.30%	199.89	1.81	0.89
MAIR MILLS VILLAGE	**MTN 2**		**PR MH**	**302**	**875.8**	**875.8**	**3.84**	**2.0**	**19.800**	**0.43**	**20.23**	**4.56**	**0.14**	**4.65**	**9.35**	**17.50**	**0.28**	**4.65**	**22.43**	N/A	**200**	**0.50%**	**23.19**	**0.74**	**0.74**
TENTH LINE		PR MH	EX MH 1A	0	0	875.8	3.84	N/A	0.480		20.71	4.56	0.14	4.76	9.46	17.50	0.28	4.76	22.54	240.0	375	0.50%	123.97	1.12	0.76
LEGENDARY LOGCRAFTERS (7 Employees)	MTN 3	EX SPS & EX FORCEMAIN	EX MH 3-1	0	0	0	N/A	2.0	N/A	8.00	8.00	0.00	0.01	0.88	0.01	0.00	0.01	0.88	0.01	N/A		N/A	N/A	N/A	N/A
TOWN OF COLLINGWOOD PARKS & REC OFFICE (5 Permanent + 20 Summer Employees)				0	0	0	N/A	2.0	N/A			0.00	0.01		0.01	0.00	0.03		0.03	N/A		N/A	N/A	N/A	N/A
COLLINGWOOD PUBLIC WORKS OFFICE (30 Employees)				0	0	0	N/A	2.0	N/A			0.00	0.03		0.03	0.00	0.05		0.05	N/A		N/A	N/A	N/A	N/A
GEORGIAN TRIANGLE HUMANE SOCIETY (20 Volunteers)				0	0	0	N/A	2.0	N/A			0.00	0.01		0.89	0.00	0.02		0.90	N/A	100	N/A	N/A	N/A	N/A
FUTURE COUNTY OF SIMCOE LANDFILL SITE (proposed SPS) (14)	MTN 3a	PROPOSED FORCEMAIN	EX MH 3-1	0	0	0	N/A	3.0	N/A	46.70	46.70	0.00	1.03	5.14	6.17	0.00	3.09	5.14	8.23	N/A	100	N/A	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 1A	EX MH 3-1	0	0	1,290.50	3.73	N/A	0.048		98.99	6.72	1.22	22.77	30.71	25.04	3.48	22.77	51.29	23.8	375	0.30%	96.02	0.87	0.70
MOUNTAIN ROAD / TENTH LINE		EX MH 3-1	EX MH 3-2	0	0	1,290.50	3.73	N/A	0.151		99.14	6.72	1.22	22.80	30.75	25.04	3.48	22.80	51.32	75.5	375	0.69%	145.63	1.32	0.94
CRS RENTAL SUPPLY (existing commercial) (Floor Area = 1,000 m²)	MTN 4		EX MH 3-2	0	0	0.00	N/A	2.0	N/A	0.59	0.59	0.00	0.06	12.00	12.06	0.00	0.12	0.06	0.18	N/A	200	N/A	N/A	N/A	N/A
EXISTING INDUSTRIAL (AGNORA) (9)	MTN 5	EX MH 3-2A	EX MH 3-2	0	0	0.00	N/A	2.0	N/A	9.00	9.00	0.00	1.40	0.99	2.39	0.00	2.80	0.99	3.79	N/A	200	N/A	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-2	EX MH 3-3	0	0	1,290.50	3.73	N/A	0.130		108.86	6.72	2.68	25.04	34.44	25.04	6.39	25.04	56.47	64.8	375	0.79%	155.82	1.41	0.99
MOUNTAIN ROAD		EX MH 3-3	EX MH 3-4	0	0	1,290.50	3.73	N/A	0.223		109.09	6.72	2.68	25.09	34.49	25.04	6.39	25.09	56.52	111.7	375	0.84%	160.68	1.45	1.01
MOUNTAIN ROAD		EX MH 3-4	EX MH 3-5	0	0	1,290.50	3.73	N/A	0.239		109.32	6.72	2.68	25.14	34.55	25.04	6.39	25.14	56.58	119.4	375	3.16%	311.65	2.82	1.64
PROPOSED INDUSTRIAL (Side Launch Brewery) (12)	MTN 6		EX MH 3-5	0	0	0.00	N/A	3.0	N/A	4.00	4.00	0.00	1.80	0.44	2.24	0.00	5.40	0.44	5.84	N/A	200	N/A	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-5	EX MH 3-6	0	0	1,290.50	3.73	N/A	0.239		113.56	6.72	4.48	26.12	37.32	25.04	11.79	26.12	62.95	119.3	375	2.25%	262.98	2.38	1.45
MOUNTAIN ROAD		EX MH 3-6	EX MH 3-7	0	0.0	1,290.50	3.73	N/A	0.248		113.81	6.72	4.48	26.18	37.38	25.04	11.79	26.18	63.01	123.9	375	0.59%	134.66	1.22	0.89
MOUNTAIN ROAD		EX MH 3-7	EX MH 3-7A	0	0	1,290.50	3.73	N/A	0.058		113.87	6.72	4.48	26.19	37.39	25.04	11.79	26.19	63.02	29.1	525	0.48%	297.94	1.38	0.81
EX GEORGIAN MEADOWS	MTN 7		EX MH	460	1,334.0	1,334.00	3.72	N/A	38.400		38.40	6.95	0.00	8.83	15.78	25.82	0.00	8.83	34.65	N/A	450	N/A	N/A	N/A	N/A
PROPOSED CONSAR DEVELOPMENT (2)	MTN 8	EX MH	EX MH 3-7A	260	754.0	2,088.00	3.57	N/A	14.600		53.00	10.88	0.00	12.19	23.07	38.84	0.00	12.19	51.03	N/A	450	N/A	N/A	N/A	N/A

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NUMBER OF UNITS	POPULATION	ACCUMULATED POPULATION	RESIDENTIAL PEAKING FACTOR	COM / IND PEAKING FACTOR	RESIDENTIAL AREA	COM / IND AREA OF SITE	ACCUMULATED AREA	AVERAGE FLOW				PEAK FLOW				SEWER					
												RESIDENTIAL	INDUSTRIAL / COMMERCIAL	INFILTRATION	TOTAL	RESIDENTIAL	INDUSTRIAL / COMMERCIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY	PEAK FLOW VELOCITY (ZERO INFILTRATION)
		MH No.	MH No.		cap.	cap			ha	ha	ha	L/s	L/s	L/s	L/s	L/s	L/s	L/s	L/s	m	mm	%	L/s	m/s	m/s
MOUNTAIN ROAD		EX MH 3-7A	EX MH 3-8	0	0	3,378.50	3.40	N/A	0.081		166.95	17.60	4.48	38.40	60.48	59.79	11.79	38.40	109.98	40.4	525	0.15%	166.55	0.77	0.67
EXISTING INDUSTRIAL (formerly Goodyear) (10)	MTN 9		EX MH 3-8	0	0	0.00	N/A	2.0	N/A	10.20	10.20	0.00	8.90	1.12	10.02	0.00	17.80	1.12	18.92	N/A	350	N/A	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-8	EX MH 3-9	0	0	3,378.50	3.40	N/A	0.007		177.16	17.60	13.38	40.75	71.72	59.79	29.59	40.75	130.13	3.7	500	-0.27%	N/A	N/A	N/A
100 MOUNTAIN ROAD (existing industrial) (Floor Area = 3,000 m²)	MTN 10		EX MH 3-9	0	0	0.00	N/A	2.0	N/A	1.30	1.30	0.00	0.16	0.14	0.30	0.00	0.31	0.14	0.46	N/A	200	N/A	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-9	EX MH 3-10	0	0	3,378.50	3.40	N/A	0.165		178.62	17.60	13.54	41.08	72.22	59.79	29.90	41.08	130.78	82.6	500	0.19%	164.58	0.84	0.73
90 MOUNTAIN ROAD (existing industrial) (Floor Area = 650 m²)	MTN 11		EX MH 3-9	0	0	0.00	N/A	2.0	N/A	0.83	0.83	0.00	0.03	0.09	0.12	0.00	0.07	0.09	0.16	N/A	200	N/A	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-10	EX MH 3-11	0	0	3,378.50	3.40	N/A	0.177		179.62	17.60	13.57	41.31	72.48	59.79	29.90	41.31	131.01	88.4	500	0.42%	244.69	1.25	0.98
MOUNTAIN ROAD		EX MH 3-11	EX MH 3-12	0	0	3,378.50	3.40	N/A	0.042		179.67	17.60	13.57	41.32	72.49	59.79	29.90	41.32	131.02	20.9	500	0.05%	84.43	0.43	0.43
MOUNTAIN ROAD		EX MH 3-12	EX MH 3-13	0	0	3,378.50	3.40	N/A	0.080		179.75	17.60	13.57	41.34	72.51	59.79	29.90	41.34	131.04	40.1	500	-0.05%	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-13	EX MH 3-14	0	0	3,378.50	3.40	N/A	0.141		179.89	17.60	13.57	41.37	72.54	59.79	29.90	41.37	131.07	70.4	500	0.16%	151.03	0.77	0.69
WALMART (Floor Area = 12,200 m²)	MTN 12	EX MH 3-14A	EX MH 3-14	0	0	0.00	N/A	2.0	N/A	4.65	4.65	0.00	0.71	0.51	1.22	0.00	1.41	0.51	1.92	N/A	250	N/A	N/A	N/A	N/A
MOUNTAIN VIEW MALL (Floor Area = 15,900 m²)	MTN 13		EX MH 3-14	0	0	0.00	N/A	2.0	N/A	3.10	3.10	0.00	0.92	12.00	12.92	0.00	1.84	0.34	2.18	N/A	200	N/A	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-14	EX MH 3-15	0	0	3,378.50	3.40	N/A	0.189		187.826	17.60	15.20	43.20	75.99	59.79	33.16	43.20	136.15	94.7	500	-0.02%	N/A	N/A	N/A
CRYSTAL BUFFET RESTAURANT (250 seats)	MTN 14		EX MH 3-16	0	0	0.00	N/A	2.0	N/A	0.22	0.22	0.00	0.36	0.02	0.39	0.00	0.72	0.02	0.75	N/A	250	N/A	N/A	N/A	N/A
MONTANA'S RESTAURANT (268 seats)	MTN 15	EX MH	EX MH 3-16	0	0	0.00	N/A	2.0	N/A	1.00	1.00	0.00	0.39	0.11	0.39	0.00	0.78	0.11	0.78	N/A		N/A	N/A	N/A	N/A
CANADIAN TIRE GAS STATION (8 fuel outlets)				0	0	0.00	N/A	2.0	N/A			0.00	0.05		0.05	0.00	0.10		0.10	N/A		N/A	N/A	N/A	N/A
CANADIAN TIRE CAR WASH				0	0	0.00	N/A	2.0	N/A			0.00	0.09		0.09	0.00	0.17		0.17	N/A		N/A	N/A	N/A	N/A
MARK'S WORK WAREHOUSE (Floor Area = 850 m²)				0	0	0.00	N/A	2.0	N/A			0.00	0.05		0.16	0.00	0.10		0.21	N/A	250	N/A	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-15	EX MH 3-16	0	0	3,378.50	3.40	N/A	0.199		189.245	17.60	16.13	43.53	77.26	59.79	35.03	43.53	138.35	99.5	500	0.09%	113.27	0.58	0.56
MOUNTAIN ROAD		EX MH 3-16	EX H26N-31	0	0	3,378.50	3.40	N/A	0.174		189.420	17.60	16.13	43.57	77.30	59.79	35.03	43.57	138.39	87.2	500	0.15%	146.23	0.74	0.67
MOUNTAIN ROAD (12)		**EX MH 3-8**	**EX H26N-31**	**0**	**0**	**3,378.50**	**3.40**	**N/A**	**1.175**		**189.420**	**17.60**	**16.13**	**43.57**	**77.30**	**59.79**	**35.03**	**43.57**	**138.39**	**587.5**	**500**	**0.14%**	**141.29**	**0.72**	**0.66**

Notes:

1. Refer to FIG 3 (Rev. 1 - Feb 2013): Sanitary Servicing Plan for location of Area Labels.
2. Number of lots for the proposed Consar Development based on a draft Plan of Subdivision prepared by Lucas & Associates dated April 12, 2012.
3. Areas for infiltration along Mountain Road are based on the right-of-way width (20 m).
4. Existing pipe slopes based on sewer inverts surveyed by CCTA in February 2005.
5. Various lengths and slopes of existing services and sewers connecting to the Mountain Road sanitary trunk sewer are unknown.
6. The proposed 375 Dia sanitary sewer on the Tenth Line has been designed to accommodate future development along the Tenth Line, south of the Blue Mountain Golf and Country Club.
7. The composite slope in the 500 mm dia Sanitary trunk sewer along Mountain Road between SAN MH 3-8 and SAN MH H26N-31 is 0.14%, which has a full flow capacity of 141.29 L/s.
8. Average flow for residential and commercial lands based on MOE Design Guidelines for Sewage Works.
9. Average flow for the Agnora industrial lands (formerly occupied by Alcoa) is based on actual data collected for Alcoa between 2000 to 2003 by COLLUS Power Corp and provided to CCTA in September 2003.
10. Average flow for the industrial lands formerly occupied by Goodyear is based on actual data collected between 2000 to 2003 by COLLUS Power Corp and provided to CCTA in September 2003.
11. Average flow for industrial lands (where historical data is not available) based on 35 m^3/ha/d for light industry & 55 m^3/ha/d for heavy industry. We have assumed an average of 45 m^3/ha/d for this assessment.
12. Average flow and peaking factor for proposed Side Launch Brewery based on Functional Servicing Report, prepared by CCTA dated July 2012.
13. Average flow for the Canadian Tire Car Wash based on 300 l/wash. We have assumed an average of 25 washes per day.
14. Average flow and peaking factor of the County of Simcoe Landfill Site provided in letter dated October 28, 2011 to Town of Collingwood.
15. Average flow for the following usages based on flows provided in Division B of Part 8 of the OBC:
    Restaurant = 125 L / seat
    Gas station = 560 L / fuel outlet
    Stores/Shopping Centre = 5 L / sq.m for floor area
    Office = 75 L / employee for Legendary Logcrafters, Town of Collingwood Parks & Rec and Public Works Building.
    Veterinery Clinic = 75 L / employee for Georgian Triangle Humane Society

APPENDIX C

Base Scenario Development

- Tenth Line Sewage Pumping Station Email Correspondence
- Balsam Street Forcemain Email Correspondence

Darrin Tone

From: Allan Brownridge <ABROWNRIDGE@cctatham.com>
Sent: Thursday, July 10, 2014 3:41 PM
To: Brendan Hummelen
Cc: Kevin Morris; Darrin Tone; bmacdonald@collingwood.ca; hlemon@collingwood.ca
Subject: Re: Request for Black Ash Creek Pumping Station Flows

Good afternoon Brendan,

It's our understanding the Black Ash Creek SPS has two pumps in operation (on "in duty" and one "standby") with a firm capacity of 98 L/s (MOE Certificate of Approval No. 5925-6LMP88). Based on our discussions with the Town of Collingwood and CPU, the maximum daily flow noted in 2012-2013 was 4,989 cu.m/day, which occurred on April 19, 2013.

If you have any further questions, please call.

Regards,

Allan E. Brownridge, B.E.Sc., P.Eng.
Project Manager
C.C. Tatham & Associates Ltd.
115 Sandford Fleming Drive, Suite 200
Collingwood, ON L9Y 5A6
Office: (705) 444-2565 ext. 294
Cell: (705) 888-7526
email: abrownridge@cctatham.com
website: www.cctatham.com

>>> Brendan Hummelen <bhummelen@cfcrozier.ca> 7/10/2014 2:15 PM >>>
Good afternoon Allan,

Our office is currently conducting a sanitary servicing study for the Mountain Road sanitary sewer in the Town of Collingwood. Brian MacDonald from the Town indicated that the Black Ash Creek pumping station is subject to an upgrade in 2015, and that you could provide us with the most updated flow data. Previous estimates completed by our office indicated a design flow of approximately 100L/s.

Thank you,

Brendan

Darrin Tone

From: Herb Lemon <hlemon@collingwood.ca>
Sent: Tuesday, July 22, 2014 8:45 AM
To: Kevin Morris
Cc: Brendan Hummelen; Darrin Tone; Brian Macdonald
Subject: RE: Landfill Site Sanitary Flows

Kevin,

The maximum pumping rate from the Landfill Site with both PS1 & PS2 on is estimated at 13.3 L/s

Hope this provides clarification and satisfies item 1.1 b) of the meeting minutes,

A separate email will be sent regarding the meeting minutes correspondence.

Regards

Herb lemon

Herb Lemon
Engineering Technologist
Town of Collingwood
P.O. Box 157, 545 Tenth Line North
Collingwood, ON L9Y 3Z2
T. 705-445-1292 Ext. 4202 | F. 705-445-1286
www.collingwood.ca

From: Kevin Morris [mailto:kmorris@cfcrozier.ca]
Sent: Thursday, July 10, 2014 2:14 PM
To: Herb Lemon
Cc: Brendan Hummelen
Subject: FW: Landfill Site Sanitary Flows

Herb,

FYI. Thought this request should be better directed to you.

Cheers, Kevin

CROZIER
&ASSOCIATES
Consulting Engineers

Check out our new responsive technology website design ... at cfcrozier.ca.

| **Kevin Morris, P.Eng.**
| Partner
| The HarbourEdge Building
| 40 Huron Street, Suite 301
| Collingwood, ON L9Y 4R3
| tel 705 446 3510 | fax 705 446 3520
| cfcrozier.ca | kmorris@cfcrozier.ca

From: Brendan Hummelen
Sent: Thursday, July 10, 2014 2:04 PM
To: Kris Wiszniak
Cc: bmacdonald@collingwood.ca; Kevin Morris; Darrin Tone
Subject: Landfill Site Sanitary Flows

Good afternoon Kris,

Per our recent meeting with Brian MacDonald, Brian indicated that the Town is in possession of more recent Landfill Site flows than those used in the C.C. Tatham Mair Mills servicing study (Moutain Road sanitary design sheet). As such could you please provide us with the most recent Landfill Site flows.

Thank you,

Brendan

CROZIER
&ASSOCIATES
Consulting Engineers

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| **BRENDAN HUMMELEN**
| E.I.T.
| The HarbourEdge Building
| 40 Huron Street, Suite 301
| Collingwood, ON L9Y 4R3
| tel 705 446 3510 | fax 705 446 3520
| cfcrozier.ca | bhummelen@cfcrozier.ca

APPENDIX D

Base Scenario Residual Capacity Results

- Georgian Meadows – BAC Trunk Sewer Plan View Drawing
- Mountain Road Trunk Sewer Design Sheet
- BAC Trunk Sewer 'As-Constructed' Drawing
- Harbourview Trunk Sewer Design Sheet & As-Constructed Drawings

CROZIER & ASSOCIATES
Consulting Engineers

Project No.: 183-2687
Project Name: Linksview Development
Date: 20-Nov-2014
FILE: MasterSaniSpreadsheet

Black Ash Trunk Sewer Design Sheet

SANITARY SEWER DESIGN MODEL

DESIGN: D.Tone, P. Eng.
CHECK:
UPDATED:

Manning's N = 0.013
Population = 2.9 p.p.u.

Average Residential Flow Rate = 450 L/cap/d

Residential Infiltration Rate = 0.23 L/ha/s
Pipe Infiltration Rate = 80 l/day/dia. of pipe (mm)/km

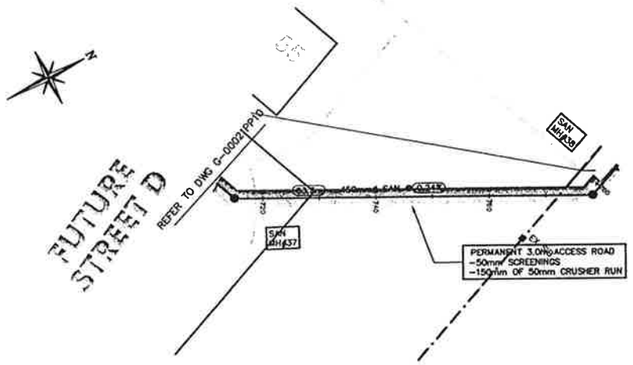
Residential Peaking Factor = M = 1+(14/4+(P/1000)^0.5) (Harmon)
Com/Ind Peaking Factor = 2

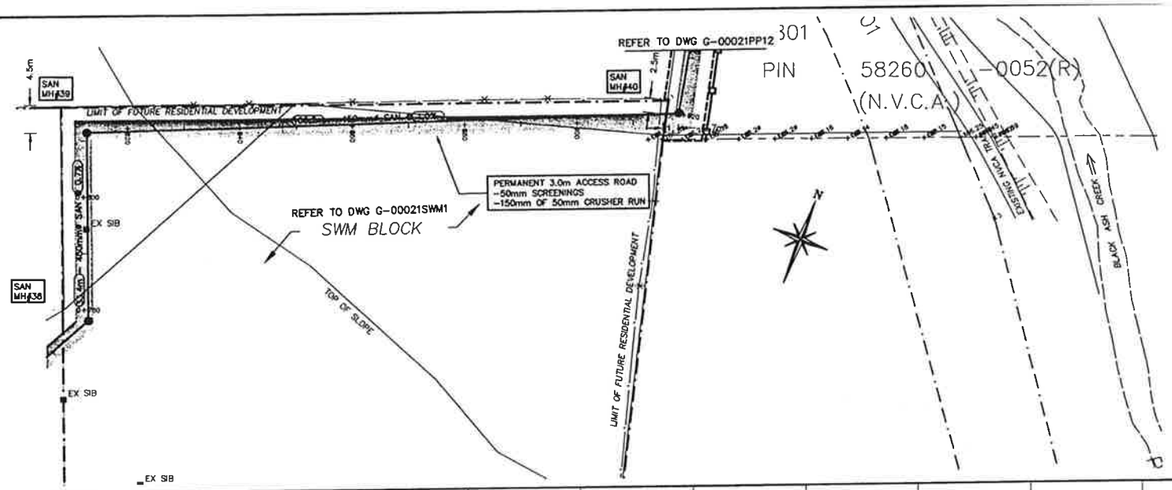
Subdivision	LOCATION STREET	FROM MH	TO MH	TRIB. AREA	UNITS	Adjusted UNITS(1)	INDIVIDUAL POPULATION	CUMULATIVE POPULATION	PEAKING FACTOR M	AVG. FLOW Q(a) (L/S)	MAX. FLOW Q(p) (L/S)	INFILTRATION DUE TO PIPE SURFACE AREA (L/S)	INFILTRATION DUE TO TRIB. AREA (L/S)	NET INFILTRATION FLOW (L/S)	ACCUM. INFILTRATION FLOW Q(i) (L/S)	PEAK DESIGN FLOW Q(d) (L/S)	PROPOSED SANITARY SEWER							
																	LENGTH (m)	PIPE SIZE DIAMETER (mm)	TYPE 0.013	GRADE %	CAPACITY (L/S)	FULL FLOW VELOCITY (m/s)	INV U/S	INV D/S
		Ext	26		0		0	0	4.50	0.00	0.00	0.000		0.00	0.00	0.00	1900	375	PVC	0.5	124.0	1.12		
Georgian Meadows		26	27		6		25	25	4.37	0.13	0.57	0.022		0.02	0.02	0.59	64.5	375	PVC	0.5	124.0	1.12		
		27	28		6		17.4	42.4	4.33	0.22	0.96	0.029		0.03	0.05	1.01	68.5	450	PVC	0.25	142.6	0.9		
	ALYSSA DRIVE	28	29		1		2.9	74.3	3.14	0.39	1.22	0.01		0.01	0.25	1.46	13	450	PVC	0.25	142.6	0.9		
		29	Ex 30		5		14.5	88.8	3.14	0.46	1.45	0.02		0.02	0.27	1.72	43	450	PVC	0.25	142.6	0.9		
		Ex 30	Ex 31		6		17.4	570.2	3.11	2.97	9.24	0.02		0.02	0.57	9.81	56.1	450	PVC	0.25	142.6	0.9		
		Ex 31	Ex 32		4		11.6	581.8	3.11	3.03	9.42	0.01		0.01	0.59	10.01	32.5	450	PVC	0.25	142.6	0.9		
		Ex 32	Ex 33		2		5.8	607.9	3.1	3.17	9.82	0.04		0.04	0.62	10.44	87	450	PVC	0.25	142.6	0.9		
		Ex 33	Ex 34		0		0	634	3.1	3.30	10.24	0.04		0.04	0.67	10.90	87	450	PVC	0.25	142.6	0.9		
	Alyssa Drive & Brooke Avenue	Ex 34	Ex 35		0		0	793.5	3.86	4.13	15.96	0.04		0.04	0.81	16.77	87	450	PVC	0.25	142.6	0.90		
		Ex 35	Ex 36		11		31.9	909.5	3.83	4.74	18.12	0.04		0.04	0.88	19.01	92	450	PVC	0.26	144.3	0.91		
		Ex 36	Ex 37		9		26.1	935.6	3.82	4.87	18.61	0.04		0.04	0.92	19.52	85	450	PVC	0.27	148.3	0.93		
		Ex. 37	Ex. 38		0		0	1263.3	3.73	6.58	24.56	0.03		0.03	2.36	26.92	63.4	450	PVC	0.25	142.6	0.90		
Georgan Meadows / Consar Easement		Ex. 38	Ex. 39		0		0	1263.3	3.73	6.58	24.56	0.01		0.01	2.38	26.94	33.3	450	PVC	0.7	238.5	1.50	185.86	185.628
		Ex. 39	MH 40		0		0	1263.3	3.73	6.58	24.56	0.01		0.01	2.39	26.95	30	450	PVC	0.5	201.6	1.27	185.55	185.40
Black Ash Creek	Red Maple Subdivision	MH A	Ex. 44		0		0	1263.3	3.73	6.58	24.56		0.00	0.00	2.39	26.95	37.0	450	PVC	1.6	360.6	2.27	182.65	182.06
		Ex. 44	Ex. 45		0		0	1263.3	3.73	6.58	24.56		0.00	0.00	2.39	26.95	74.4	450	PVC	0.31	158.7	1.00	181.98	181.75
		Ex. 45	Ex. 46		0		0	1263.3	3.73	6.58	24.56		0.00	0.00	2.39	26.95	81	450	PVC	1.37	333.7	2.10	181.69	180.59
		Ex. 46	Ex. 47		0		0	1263.3	3.73	6.58	24.56		0.00	0.00	2.39	26.95	101.4	450	PVC	1.26	320.0	2.01	180.51	179.22
		Ex. 47	Ex. 48		0		0	1263.3	3.73	6.58	24.56		0.00	0.00	2.39	26.95	76.5	450	PVC	0.2	127.5	0.80	179.18	179.02
		Ex. 48	Ex. 49		0		0	1263.3	3.73	6.58	24.56		0.00	0.00	2.39	26.95	22.3	450	PVC	0.2	127.5	0.80	178.99	178.93
		Ex. 49	Ex. MH 3-7A		0	0	0	1263.3	3.73	6.58	24.56	0.00	0.00	0.00	2.39	26.95	22.30	450.00	PVC	0.24	139.7	0.80	178.89	178.65
				21.73	433	0	1263.3										812.3							

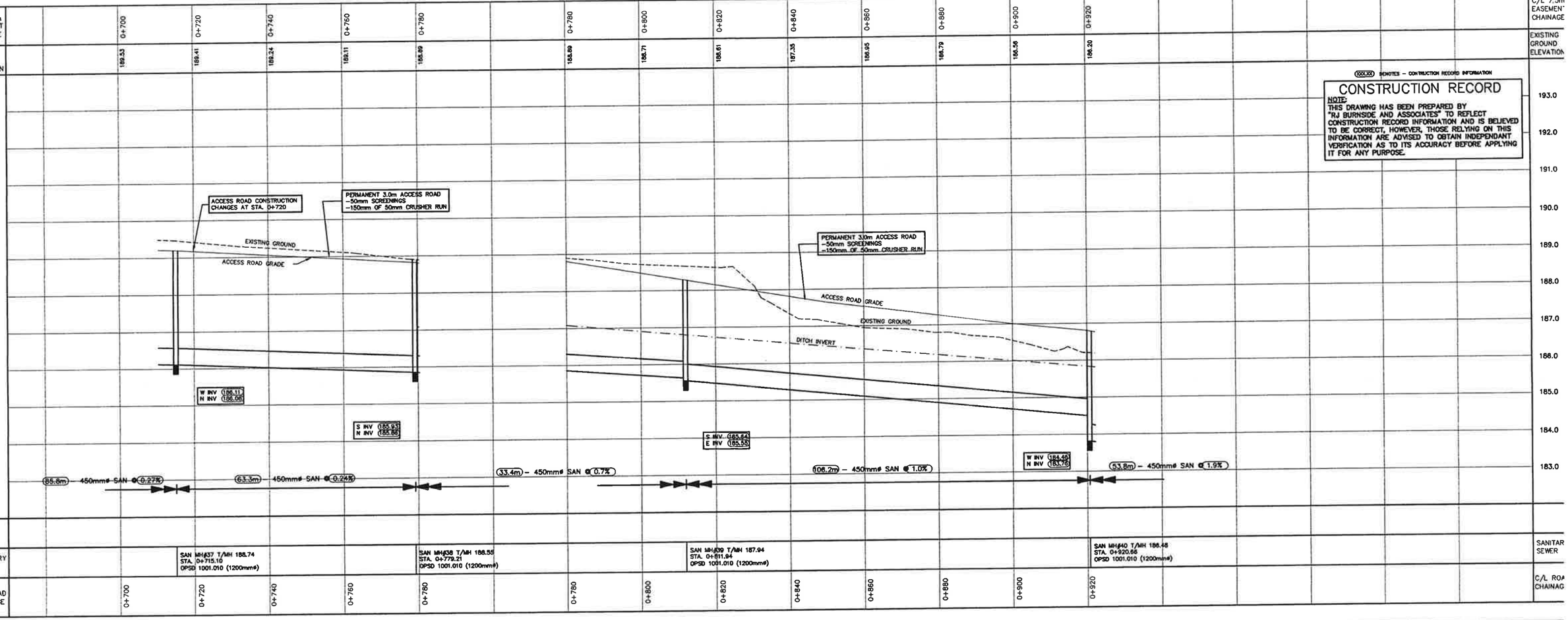
Notes:

1. Spreadsheet based on 183-2748 GMP 5 & 6 San Swr Design Updated Final 03112010.xls.
2. Excludes Linksview and Curry Lands Input.
3. Matches total flow per said spreadsheet for G. Meadows flows.

hard coded per Burnside spreadsheet







(000.00) DENOTES - CONSTRUCTION RECORD INFORMATION

CONSTRUCTION RECORD

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BENCHMARKS

1) RAILWAY SPIKE, NORTH FACE OF HPLS @ SOUTH WEST CORNER OF 6TH STREET AND 10TH LINE — ELEV. 200.975
2) RAILWAY SPIKE IN HPLS ON NORTH WEST CORNER OF 6th STREET AND STEWART ROAD — ELEV. 190.014
3) SQUARE BOLT, NORTH FACE OF HSP, SOUTH SIDE OF SIXTH STREET @ #560 — ELEV. 193.146
4) SPIKE IN EAST FACE OF HP, WEST SIDE OF 10th LINE, 1st POLE NORTH OF #788 — ELEV. 199.234
5) TOP NUT OF FIRE HYDRANT AT ENTRANCE TO GOODYEAR — ELEV. 182.416

LICENSED PROFESSIONAL ENGINEER S.R. MORASH PROVINCE OF ONTARIO

NO.	REVISIONS	DATE	APP'D
1	ISSUED FOR APPROVAL	11/30/01	K.A.M.
2	CONSTRUCTION RECORD	03/22/04	K.A.M.

TOWN of COLLINGWOOD

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CRAIGLEITH LAND CORPORATION
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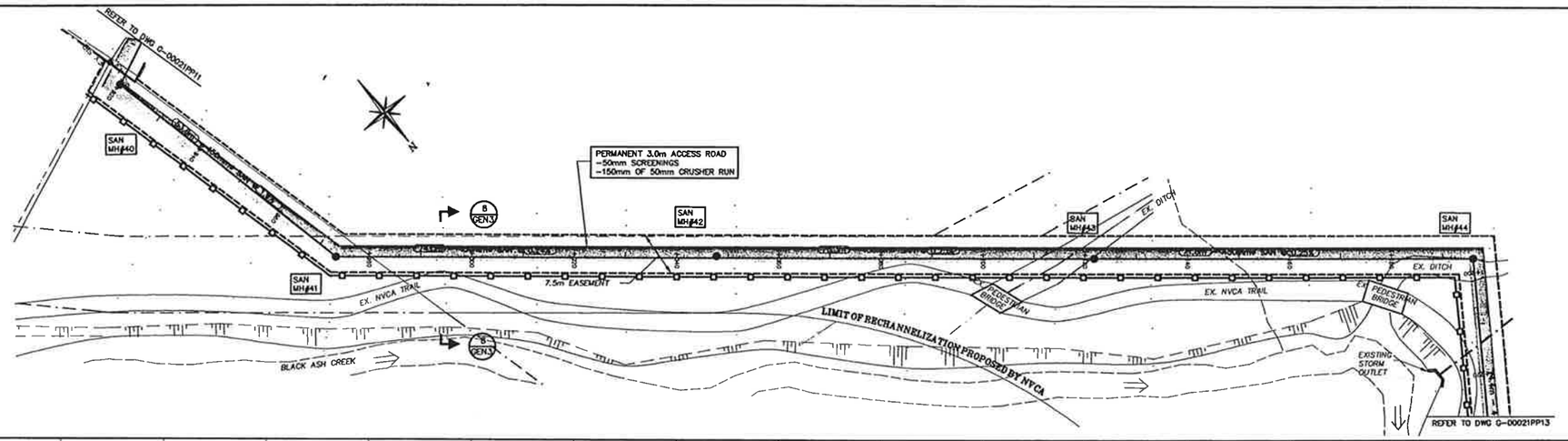
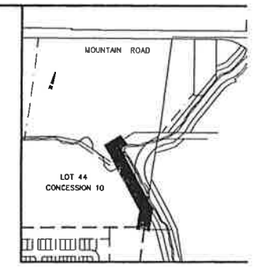
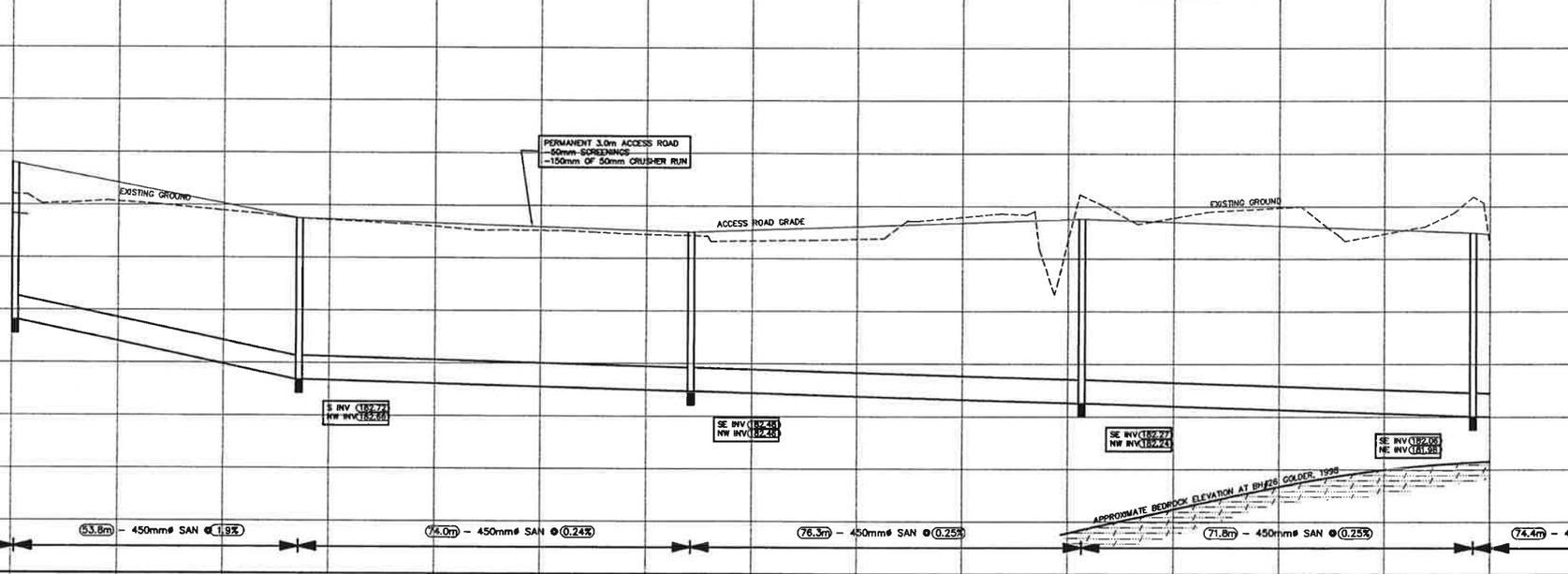
ENGINEERS - HYDROGEOLOGISTS - ENVIRONMENTAL CONSULTANTS
GEORGIAN BAY OFFICE, 3 ROWELL CRESCENT, COLLINGWOOD, ONTARIO L9Y 4J6
TELEPHONE: (705) 445-0615 FAX: (705) 445-2369
E-MAIL: collingwood@rjburnside.com

DRAWN J.O.	DRAWING NO. G-00021PP11AC
DESIGNED K.M.	SCALE HORIZ. 1:500 VERT. 1:50
REVIEWED S.M.	DATE AUG 15, 2001





C/L 7.5m EASEMENT CHAINAGE				0+920	0+940	0+960	0+980	1+000	1+020	1+040	1+060	1+080	1+100	1+120	1+140	1+160	1+180	1+200				C/L 7.5m EASEMEN CHAINAG
EXISTING GROUND ELEVATION				186.20	186.06	185.89	185.72	185.60	185.52	185.45	185.33	185.37	185.79	185.34	185.78	185.97	185.47	185.29				EXISTING GROUND ELEVATIO



SANITARY SEWER				SAN MH#40 T/MH 186.49 STA. 0+920.66 OPSD 1001.010 (1200mmø)			SAN MH#41 T/MH 185.35 STA. 0+974.36 OPSD 1001.010 (1200mmø)				SAN MH#42 T/MH 185.15 STA. 1+048.51 OPSD 1001.010 (1200mmø)			SAN MH#43 T/MH 185.34 STA. 1+122.66 OPSD 1001.010 (1200mmø)				SAN MH#44 T/MH 185.10 STA. 1+196.80 OPSD 1001.010 (1200mmø)			SANITARY SEWER
C/L ROAD CHAINAGE				0+920	0+940	0+960	0+980	1+000	1+020	1+040	1+060	1+080	1+100	1+120	1+140	1+160	1+180	1+200				C/L ROAD CHAINAGE

(XXX.XX) DENOTES – CONTRUCTION RECORD INFORMATION

CONSTRUCTION RECORD

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BENCHMARKS

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3) SQUARE BOLT, NORTH FACE OF HBP, SOUTH SIDE OF SIXTH STREET @ #660 — ELEV. 193.146

4) SPIKE IN EAST FACE OF HP, WEST SIDE OF 10th LINE, 1st POLE NORTH OF #788 — ELEV. 199.234

5) TOP NUT OF FIRE HYDRANT AT ENTRANCE TO GOODYEAR — ELEV. 182.416

LICENSED PROFESSIONAL ENGINEER S.R. MORASH PROVINCE OF ONTARIO

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1	ISSUED FOR APPROVAL	11/30/01	K.A.M.
2	CONSTRUCTION RECORDS	03/22/04	S.R.M.

TOWN of COLLINGWOOD

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CRAIGLEITH LAND CORPORATION
BLEVINS DEVELOPMENT LTD.

TITLE
SANITARY TRUNK SEWER
0+920 TO 1+200

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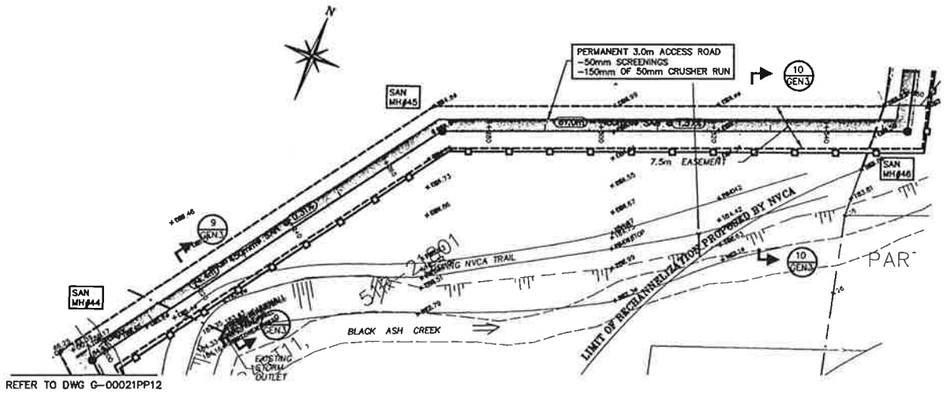
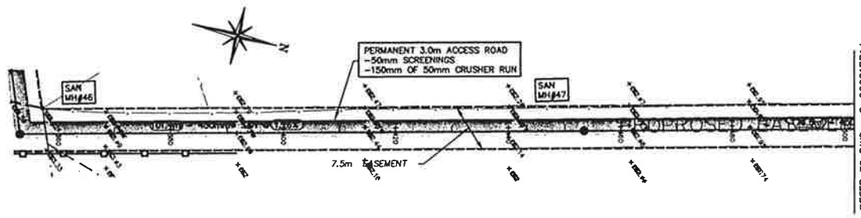
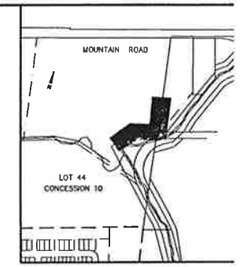
E-MAIL: collingwood@rjburnside.com

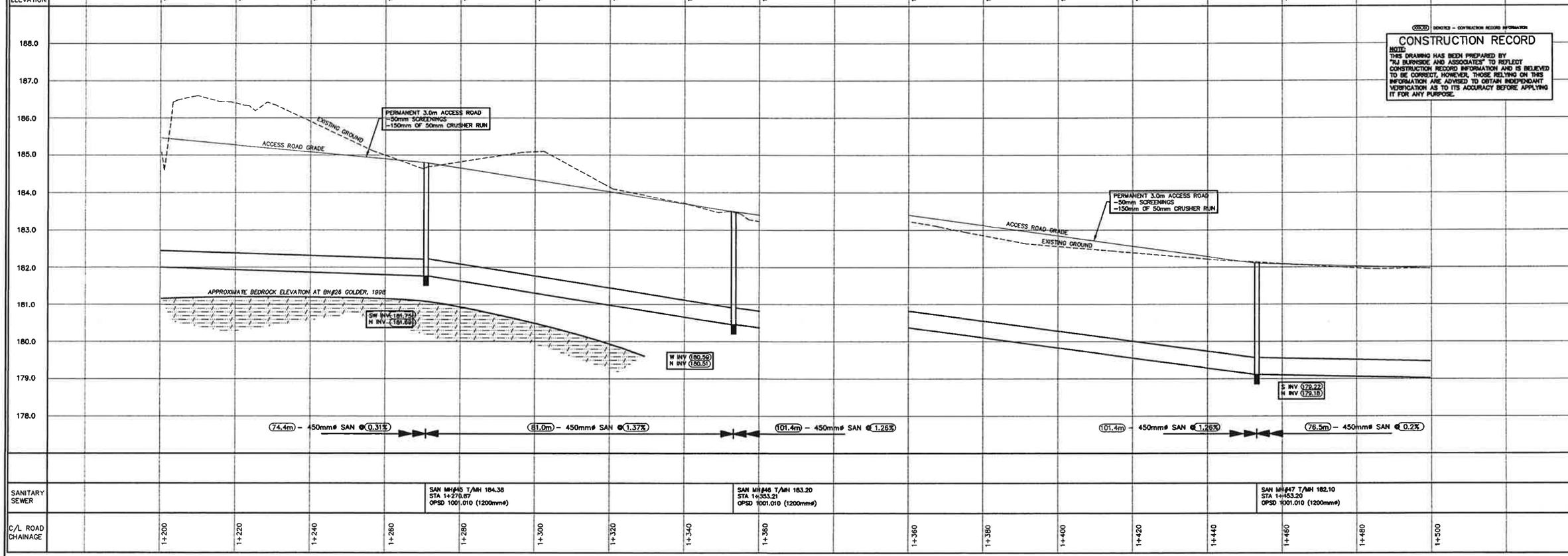
DRAWN	J.O.	DRAWING NO.	G-00021PP12AC
DESIGNED	K.M.	SCALE	HORIZ. 1:500 VERT. 1:50
REVIEWED		DATE	







C/L 7.5m EASEMENT CHAINAGE	1+200	1+220	1+240	1+260	1+280	1+300	1+320	1+340	1+360	1+360	1+380	1+400	1+420	1+440	1+460	1+480	1+500
EXISTING GROUND ELEVATION	185.29	186.40	185.80	185.00	184.62	185.09	184.14	183.72	183.23	183.23	182.85	182.56	182.39	182.21	182.09	181.97	181.86



SANITARY SEWER	SAN MH#45 T/MH 184.38 STA 1+270.67 OPSD 1001.010 (1200mmø)	SAN MH#46 T/MH 183.20 STA 1+353.21 OPSD 1001.010 (1200mmø)	SAN MH#47 T/MH 182.10 STA 1+453.20 OPSD 1001.010 (1200mmø)

C/L ROAD CHAINAGE	1+200	1+220	1+240	1+260	1+280	1+300	1+320	1+340	1+360	1+360	1+380	1+400	1+420	1+440	1+460	1+480	1+500

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LICENCED PROFESSIONAL ENGINEER S. R. MORASH May 11/04 PROVINCE OF ONTARIO

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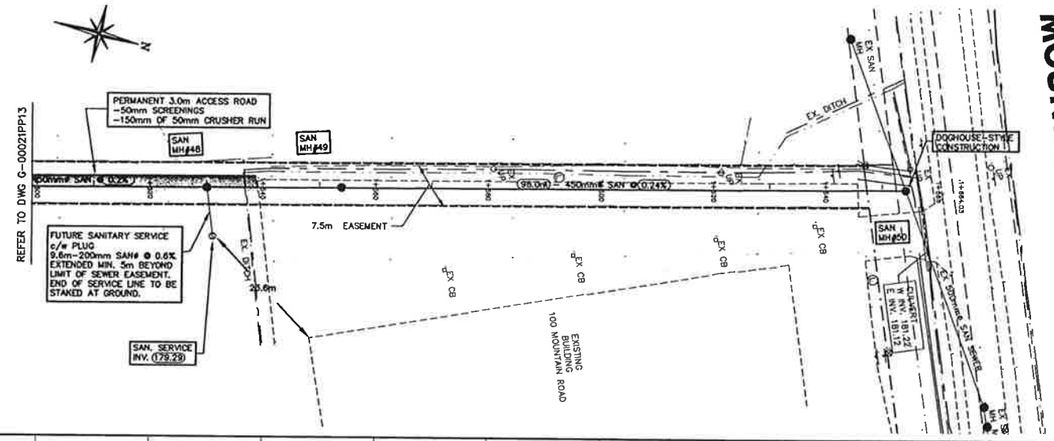
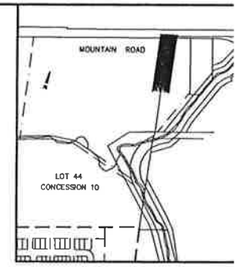
DRAWN	J.O.	DRAWING NO.	G-00021PP13AC
DESIGNED	K.M.	SCALE	HORIZ. 1:500 VERT. 1:50
REVIEWED		DATE	AUG 15, 2001





C/L 7.5m EASEMENT CHAINAGE						1+500	1+520	1+540	1+560	1+580	1+600	1+620	1+640	1+660								C/L 7. EASEME CHAINA
EXISTING GROUND ELEVATION						181.96	182.27	181.82	181.74	181.69	181.66	181.82	181.57	182.19								EXISTIN GROUN ELEVATI
186.0																						186.0
185.0																						185.0
184.0																						184.0
183.0																						183.0
182.0																						182.0
181.0																						181.0
180.0																						180.0
179.0																						179.0
178.0																						178.0
177.0																						177.0
176.0																						176.0
SANITARY SEWER						SAN MH#48 T/G 181.80 STA. 1+530.00 OPSD 1001.010 (1200mmø)			SAN MH#49 T/G 181.80 STA. 1+553.60 OPSD 1001.010 (1200mmø)					SAN MH#50 T/G 181.80 STA. 1+654.00 OPSD 1001.020 (1500mmø) DOGHOUSE-STYLE							SANITAR SEWER
C/L ROAD CHAINAGE						1+500	1+520	1+540	1+560	1+580	1+600	1+620	1+640	1+660								C/L ROA CHAINAG

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2. THE CURRENT TOWN OF COLLINGWOOD STANDARDS APPLY TO THIS CONTRACT. IN THE EVENT THE TOWN OF COLLINGWOOD STANDARDS DO NOT APPLY THEN THE CURRENT ONTARIO PROVINCIAL STANDARDS & SPECIFICATIONS AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS SHALL APPLY TO THIS CONTRACT.
3. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
4. MATERIAL SPECIFICATIONS AND CONSTRUCTION NOTES ARE ON DRAWING C-00021DT1.

BENCHMARKS

1) RAILWAY SPIKE, NORTH FACE OF HPLS @ SOUTH WEST CORNER OF 8TH STREET AND 10TH LINE — ELEV. 200.975
2) RAILWAY SPIKE IN HPLS ON NORTH WEST CORNER OF 6th STREET AND STEWART ROAD — ELEV. 190.014
3) SQUARE BOLT, NORTH FACE OF HBP, SOUTH SIDE OF SIXTH STREET @ #660 — ELEV. 193.148
4) SPIKE IN EAST FACE OF HP, WEST SIDE OF 10th LINE, 1st POLE NORTH OF #788 — ELEV. 199.234
5) TOP NUT OF FIRE HYDRANT AT ENTRANCE TO GOODYEAR — ELEV. 182.416

LICENSED PROFESSIONAL ENGINEER
S. R. MORASH
PROVINCE OF ONTARIO

NO.	REVISIONS	DATE	APP'D
1	ISSUED FOR APPROVAL	11/30/01	K.A.M.
2	CONSTRUCTION RECORD	03/22/04	K.A.M.

TOWN of COLLINGWOOD

CLIENT
GEORGIAN MEADOWS
CRAIGLEITH LAND CORPORATION
BLEVINS DEVELOPMENT LTD.

TITLE
SANITARY TRUNK SEWER
1+500 TO 1+664

R.J. BURNSIDE & ASSOCIATES LIMITED
ENGINEERS – HYDROGEOLOGISTS – ENVIRONMENTAL CONSULTANTS
GEORGIAN BAY OFFICE, 3 ROWELL CRESCENT, COLLINGWOOD, ONTARIO L9Y 4J6
TELEPHONE: (705) 446-0515 FAX: (705) 446-2396
E-MAIL: collingwood@rjburnside.com

DRAWN	J.O.	DRAWING NO.	G-00021PP14AC
DESIGNED	K.M.	SCALE	HORIZ. 1:500 VERT. 1:50

CROZIER & ASSOCIATES
Consulting Engineers

Project No.: 183-2687
Project Name: Linksview Development
Date: 20-Nov-2014
FILE: MasterSaniSpreadsheet

Mountain Road Sanitary Trunk Sewer Design Sheet (Base Scenario)

SANITARY SEWER DESIGN MODEL

DESIGN: D.Tone, P. Eng.
CHECK:
UPDATED:

Manning's N = 0.013
Population = 2.9 p.p.u.

Average Residential Flow Rate = 450 L/cap/d
Average Proposed Commercial Flow Rate = 28000 L/ha/d
Average Industrial Flow Rate = 45000 L/ha/d
Residential Infiltration Rate = 0.23 L/ha/s

Residential Peaking Factor = M = 1+(14/4+(P/1000)^0.5) (Harmon)
Com/Ind Peaking Factor = 2
Com/Ind Infiltration Rate = 0.11 L/ha/s

Crozier Design Criteria (Residential - G. Meadows/Consar): Infiltration per Black Ash SS (Crozier) spreadsheet

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NUMBER OF UNITS	POPULATION	ACCUMULATED POPULATION	RESIDENTIAL PEAKING FACTOR	COM/IND PEAKING FACTOR	RESIDENTIAL AREA	COM/IND AREA OF SITE	ACCUMULATED AREA	AVERAGE FLOW				PEAK FLOW				SEWER				
												RESIDENTIAL	INDUSTRIAL/ COMMERCIAL	INFILTRATION	TOTAL	RESIDENTIAL	INDUSTRIAL/ COMMERCIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY
		MH No.	MH No.		cap.	cap.			ha	ha	ha	L/s	L/s	L/s	L/s	L/s	L/s	L/s	L/s	m	mm	%	L/s	m/s
EX MAIR MILLS ESTATES	MTN 1		EX MH	143	414.7	414.7	4.01	N/A	22.02	0	22.02	2.16	0.00	5.06	7.22	8.67	0	5.06	13.74	633.00	450	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH	EX MH 2A	0	0	414.7	4.01	N/A	1.481	0	23.50	2.16	0.00	5.41	7.57	8.67	0	5.41	14.08	740.50	450	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 2A	EX MH 1A	0	0	414.7	4.01	N/A	0.033	0	23.53	2.16	0.00	5.41	7.57	8.67	0	5.41	14.08	16.50	375	1.30%	199.91	1.81
LEGENDARY LOGCRAFTERS (7 Employees)	MTN 3	EX SPS & EX FORCEMAIN	EX MH 3-1	0	0	0	N/A	2.0	N/A	8.00	8.00	0.00	0.01	0.88	0.89		0.02	0.88	0.90	N/A		N/A	N/A	N/A
TOWN OF COLLINGWOOD PARKS & REC OFFICE (5 Permanent + 20 Summer Employees)				0	0	0	N/A	2.0	N/A			0.00	0.01		0.01		0.02	0.00	0.02	N/A		N/A	N/A	N/A
COLLINGWOOD PUBLIC WORKS OFFICE (30 Employees)				0	0	0	N/A	2.0	N/A			0.00	0.03		0.03		0.06	0.00	0.06	N/A		N/A	N/A	N/A
GEORGIAN TRIANGLE HUMANE SOCIETY (20 Volunteers)				0	0	0	N/A	2.0	N/A			0.00	0.01		0.01		0.02	0.00	0.02	N/A	100	N/A	N/A	N/A
FUTURE COUNTY OF SIMCOE LANDFILL SITE (PS1 & PS2) (10)	MTN 3a	PROPOSED FORCEMAIN	EX MH 1A	0	0	0	N/A	0.0	N/A	0.00	0.00	0.00	6.65	0.00	6.65		13.3	0.00	13.30	N/A	100	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 1A	EX MH 3-1	0	0	414.7	4.01	N/A	0.048	0	31.58	2.16	6.71	6.30	15.17	8.67	13.42	6.30	28.40	23.80	375	0.30%	96.03	0.87
MOUNTAIN ROAD/TENTH LINE		EX MH 3-1	EX MH 3-2	0	0	414.7	4.01	N/A	0.151	0	31.73	2.16	6.71	6.34	15.21	8.67	13.42	6.34	28.43	75.50	375	0.69%	145.64	1.32
CRS RENTAL SUPPLY (existing commercial) (Floor Area = 1,000 m2)	MTN 4		EX MH 3-2	0	0	0	N/A	2.0	N/A	0.59	0.59	0.00	0.06	0.06	0.12		0.12	0.06	0.18	N/A	200	N/A	N/A	N/A
EXISTING INDUSTRIAL Currently AGNORA (7)	MTN 5	EX MH 3-2A	EX MH 3-2	0	0	0	N/A	2.0	N/A	9.00	9.00	0.00	4.69	0.99	5.68		9.375	0.99	10.37	N/A	200	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-2	EX MH 3-3	0	0	414.7	4.01	N/A	0.13	0	41.45	2.16	11.46	7.42	21.04	8.67	22.915	7.42	39.01	64.80	375	0.79%	155.84	1.41
MOUNTAIN ROAD		EX MH 3-3	EX MH 3-4	0	0	414.7	4.01	N/A	0.223	0	41.68	2.16	11.46	7.47	21.09	8.67	22.915	7.47	39.06	111.70	375	0.84%	160.69	1.45
MOUNTAIN ROAD		EX MH 3-4	EX MH 3-5	0	0	414.7	4.01	N/A	0.239	0	41.92	2.16	11.46	7.53	21.15	8.67	22.915	7.53	39.12	119.40	375	3.16%	311.67	2.82
PROPOSED INDUSTRIAL (Side Launch Brewery) (8)	MTN 6		EX MH 3-5	0	0	0	N/A	3.0	N/A	4.00	4.00	0.00	1.8	0.44	2.24		5.4	0.44	5.84	N/A	200	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-5	EX MH 3-6	0	0	414.7	4.01	N/A	0.239	0	46.15	2.16	13.26	8.02	23.44	8.67	28.315	8.02	45.01	119.30	375	2.25%	263.00	2.38
MOUNTAIN ROAD		EX MH 3-6	EX MH 3-7	0	0	414.7	4.01	N/A	0.248	0	46.40	2.16	13.26	8.08	23.50	8.67	28.315	8.08	45.07	123.90	375	0.59%	134.67	1.22
MOUNTAIN ROAD		EX MH 3-7	EX MH 3-7A	0	0	414.7	4.01	N/A	0.058	0	46.46	2.16	13.26	8.10	23.51	8.67	28.315	8.10	45.08	29.10	525	0.48%	297.96	1.38

CROZIER & ASSOCIATES
Consulting Engineers

Project No.: 183-2687
Project Name: Linksview Development
Date: 20-Nov-2014
FILE: MasterSaniSpreadsheet

Mountain Road Sanitary Trunk Sewer Design Sheet (Base Scenario)

SANITARY SEWER DESIGN MODEL

DESIGN: D.Tone, P. Eng.
CHECK:
UPDATED:

Manning's N = 0.013
Population = 2.9 p.p.u.

Average Residential Flow Rate = 450 L/cap/d
Average Proposed Commercial Flow Rate = 28000 L/ha/d
Average Industrial Flow Rate = 45000 L/ha/d
Residential Infiltration Rate = 0.23 L/ha/s

Residential Peaking Factor = M = 1+(14/4+(P/1000)^0.5) (Harmon)
Com/Ind Peaking Factor = 2

Com/Ind Infiltration Rate = 0.11 L/ha/s

Crozier Design Criteria (Residential - G. Meadows/Consar):
Infiltration per Black Ash SS (Crozier) spreadsheet

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NUMBER OF UNITS	POPULATION	ACCUMULATED POPULATION	RESIDENTIAL PEAKING FACTOR	COM/IND PEAKING FACTOR	RESIDENTIAL AREA	COM/IND AREA OF SITE	ACCUMULATED AREA	AVERAGE FLOW				PEAK FLOW				SEWER				
												RESIDENTIAL	INDUSTRIAL/ COMMERCIAL	INFILTRATION	TOTAL	RESIDENTIAL	INDUSTRIAL/ COMMERCIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY
		MH No.	MH No.		cap.	cap.			ha	ha	ha	L/s	L/s	L/s	L/s	L/s	L/s	L/s	L/s	m	mm	%	L/s	m/s
BLACK ASH SANITARY INLET	MTN 7 & 8	EX MH	EX MH 3-7A	433	1263.3	1263.3	3.73	N/A	38.40	0	38.40	6.58	0	2.39	8.97	24.56	0	2.39	26.95	N/A	450	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-7A	EX MH 3-8	0	0	1678	3.64	N/A	0.081	0	84.94	8.74	13.26	10.50	32.50	31.85	28.315	10.50	70.66	40.40	525	0.15%	166.56	0.77
EXISTING INDUSTRIAL (Formally Goodyear) (7)	MTN 9		EX MH 3-8	0	0	0	N/A	2.0	N/A	24.90	24.90	0.00	12.97	2.74	15.71		25.9375	2.74	28.68	N/A	350	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-8	EX MH 3-9	0	0	1678	3.64	N/A	0.007	0	109.85	8.74	26.23	13.24	48.21	31.85	54.2525	13.24	99.34	3.70	500	-0.27%	#NUM!	#NUM!
100 MOUNTAIN ROAD (existing industrial) (Floor Area = 3,000 m2)	MTN 10		EX MH 3-9	0	0	0	N/A	2.0	N/A	1.30	1.30	0.00	0.16	0.14	0.30		0.32	0.14	0.46	N/A	200	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-9	EX MH 3-10	0	0	1678	3.64	N/A	0.165	0	111.31	8.74	26.39	13.43	48.55	31.85	54.5725	13.43	99.84	82.60	500	0.19%	164.59	0.84
90 MOUNTAIN ROAD (existing industrial) (Floor Area = 650 m2)	MTN 11		EX MH 3-10	0	0	0	N/A	2.0	N/A	0.83	0.83	0.00	0.03	0.09	0.12		0.06	0.09	0.15	N/A	200	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-10	EX MH 3-11	0	0	1678	3.64	N/A	0.177	0	112.32	8.74	26.42	13.56	48.71	31.85	54.6325	13.56	100.04	88.40	500	0.42%	244.71	1.25
MOUNTAIN ROAD		EX MH 3-11	EX MH 3-12	0	0	1678	3.64	N/A	0.042	0	112.36	8.74	26.41625	13.57	48.72	31.85	54.6325	13.57	100.05	20.90	500	0.05%	84.43	0.43
MOUNTAIN ROAD		EX MH 3-12	EX MH 3-13	0	0	1678	3.64	N/A	0.08	0	112.44	8.74	26.41625	13.59	48.74	31.85	54.6325	13.59	100.06	40.10	500	-0.05%	#NUM!	#NUM!
MOUNTAIN ROAD		EX MH 2-13	EX MH 3-14	0	0	1678	3.64	N/A	0.141	0	112.58	8.74	26.41625	13.62	48.77	31.85	54.6325	13.62	100.10	70.40	500	0.16%	151.04	0.77
WALMART (Floor Area = 12,200 m2)	MTN 12	EX MH 3-14A	EX MH 3-14	0	0	0	N/A	2.0	N/A	4.65	4.65	0.00	0.71	0.51	1.22		1.42	0.51	1.93	N/A	250	N/A	N/A	N/A
COLLINGWOOD CENTRE - RIO-CAN (Floor Area = 10,430 m2)	MTN 13		EX MH 3-14	0	0	0	N/A	2.0	N/A	3.10	3.10	0.00	0.60	0.34	0.94		1.207176	0.34	1.55	N/A	200	N/A	N/A	N/A
JOURNEY'S BLEND CAFÉ	MTN 13		EX. MH 3-14	0	0	0	N/A	2.0	N/A	0.00	0.00	0.00	0.06	0.00	0.06		0.121528	0.00	0.12					
MOUNTAIN ROAD		EX MH 3-14	EX MH 3-15	0	0	1678	3.64	N/A	0.189	0	120.52	8.74	27.7906	14.51	51.04	31.85	57.3812	14.51	103.74	94.70	500	-0.02%	#NUM!	#NUM!
CRYSTAL BUFFET RESTAURANT (250 Seats)	MTN 14		EX MH 3-16	0	0	0	N/A	2.0	N/A	0.22	0.22	0.00	0.36169	0.02	0.39		0.72338	0.02	0.75	N/A	250	N/A	N/A	N/A
MONTANA'S RESTAURANT (268 Seats)	MTN 15	EX MH	EX MH 3-16	0	0	0	N/A	2.0	N/A	1.00	1.00	0.00	0.39	0.11	0.39		0.78	0.11	0.78	N/A		N/A	N/A	N/A
CANADIAN TIRE GAS STATION (8 Fuel Outlets)				0	0	0	N/A	2.0	N/A			0.00	0.05		0.05		0.1		0.10	N/A		N/A	N/A	N/A
CANDIAN TIRE CAR WASH				0	0	0	N/A	2.0	N/A			0.00	0.09		0.09		0.18		0.18	N/A		N/A	N/A	N/A

CROZIER & ASSOCIATES
Consulting Engineers

Project No.: 183-2687
Project Name: Linksview Development
Date: 20-Nov-2014
FILE: MasterSaniSpreadsheet

Mountain Road Sanitary Trunk Sewer Design Sheet (Base Scenario)

SANITARY SEWER DESIGN MODEL

DESIGN: D.Tone, P. Eng.
CHECK:
UPDATED:

Manning's N = 0.013
Population = 2.9 p.p.u.

Average Residential Flow Rate = 450 L/cap/d
Average Proposed Commercial Flow Rate = 28000 L/ha/d
Average Industrial Flow Rate = 45000 L/ha/d
Residential Infiltration Rate = 0.23 L/ha/s

Residential Peaking Factor = M = 1+(14/4+(P/1000)^0.5) (Harmon)
Com/Ind Peaking Factor = 2
Com/Ind Infiltration Rate = 0.11 L/ha/s

Crozier Design Criteria (Residential - G. Meadows/Consar):
Infiltration per Black Ash SS (Crozier) spreadsheet

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NUMBER OF UNITS	POPULATION	ACCUMULATED POPULATION	RESIDENTIAL PEAKING FACTOR	COM/IND PEAKING FACTOR	RESIDENTIAL AREA	COM/IND AREA OF SITE	ACCUMULATED AREA	AVERAGE FLOW				PEAK FLOW				SEWER				
												RESIDENTIAL	INDUSTRIAL/ COMMERCIAL	INFILTRATION	TOTAL	RESIDENTIAL	INDUSTRIAL/ COMMERCIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY
		MH No.	MH No.		cap.	cap.			ha	ha	ha	L/s	L/s	L/s	L/s	L/s	L/s	L/s	L/s	m	mm	%	L/s	m/s
MARK'S WORK WAREHOUSE (Floor Area = 850 m2)				0	0	0	N/A	2.0	N/A			0.00	0.05		0.16		0.1		0.21	N/A	250	N/A	N/A	N/A
MOUNTAIN ROAD		EX MH 3-15	EX MH 3-16	0	0	1678	3.64	N/A	0.199	0	121.94	8.74	28.73229	14.69	52.17	31.85	59.26458	14.69	105.80	99.50	500	0.09%	113.28	0.58
MOUNTAIN ROAD		EX MH 3-16	EX H26N-31	0	0	1678	3.64	N/A	0.174	0	122.12	8.74	28.73229	14.73	52.21	31.85	59.26458	14.73	105.84	87.20	500	0.15%	146.24	0.74
MOUNTAIN ROAD (5)		EX MH 3-8	EX H26N-31	0	0	1678	3.64	N/A	1.175	0	122.12	8.74	28.73229	14.73	52.21	31.85	59.26458	14.73	105.84	587.50	500	0.14%	141.28	0.72

commercial/industrial flows inputted into spreadsheet based on actual flow data/Town input

Notes:
1. Refer to Drawing 701: Harbourview Trunk Sanitary Drainage Plan - Base Scenario.
2. Areas for infiltration along Mountain Road are based on the ROW width (20 m).
3. Existing pipe slopes based on sewer inverts surveyed by CCTA in February 2005.
4. Various lengths and slopes of existing services connecting to the Mountain Road sanitary trunk sewer are unknown.
5. The composite slope in the 500 mm dia. sanitary trunk sewer along Mountain Road between SAN MG 3-8 and SAN MH H26N-31 is 0.14%, which has a full flow capacity of 141.3 L/s.
6. Average flow for residential and commercial lands based on MOE Design Guidelines for Sewage Works.
7. Average flow for the Agnora Lands as well as the former Goodyear site based, and all other industrial lands (where historical data is not available), based on 35 m3/ha/d for light industry and 55 m3/ha/d for heavy industry. We have assumed an average of 45 m3/ha/d for this assessment.
8. Average flow and peaking factor for proposed Side Launch Brewery based on Functional Servicing Report, prepared by CCTA dated July 2012.
9. Average flow for the Canadian Tire Car Wash based on 300 L/wash. We have assumed an average of 25 washes a day.
10. Average flow and peaking factor of the County of Simcoe Landfill Site provided by Town staff.
11. Average flow for the following usages based on flows provided in Division B of Part 8 of the OBC:
    - Restaurant = 125 L/seat
    - Gas Station = 560 L/fuel outlet
    - Stores/Shopping Centre = 5 L/sq.m for floor area
    - Office = 75 L/employee for Legendary Logcrafters, Town of Collingwood Parks & Rec and Public Works Building
    - Veterinery Clinic = 75 L/employee for Georgian Triangle Humane Society.

CROZIER & ASSOCIATES
Consulting Engineers

Project No.: 183-2687
Project Name: Linksview Development
Date: 20-Nov-2014
FILE: MasterSaniSpreadsheet

Harbourview Trunk Sewer

SANITARY SEWER DESIGN MODEL

DESIGN: D.Tone, P. Eng.
CHECK:
UPDATED:

Manning's N = 0.013
Population = 2.9 p.p.u.

Average Residential Flow Rate = 450 L/cap/d
Residential Infiltration Rate = 0.075 L/pipe diam./hr/100m of Length
Total Max. Inflow = 205.84 L/s
Residential Peaking Factor = M = 1+(14/4+(P/1000)^0.5) (Harmon)

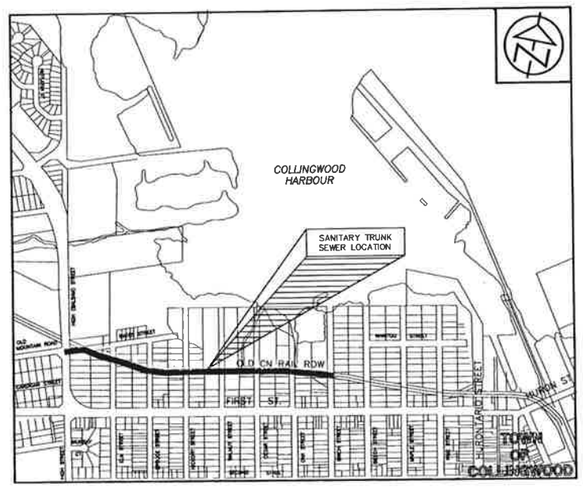
Location	FROM MH	TO MH	Length (m)	Max Flow (l/s)	Infilt. Pipe (l/s)	TOTAL Infilt.	Combined (l/s)	Pipe Diam (mm)	Upper Inv. El.	Lower Inv. El.	Slope (%)	Cap. (l/s)	Vel. (m/s)
Water Street	SAN MH#1	SAN MH#2	62.1	205.84	0.01	0.01	**205.85**	750			0.20%	**497.87**	1.13
CNR ROW	SAN MH#2	SAN MH#3	105.6	205.84	0.02	0.03	**205.87**	750			0.29%	**599.52**	1.36
CNR ROW & Elm Street	SAN MH#3	SAN MH#4	126.3	205.84	0.02	0.05	**205.89**	750			0.21%	**510.17**	1.15
CNR ROW & Spruce Street	SAN MH#4	SAN MH#5	119.6	205.84	0.02	0.06	**205.91**	750			0.19%	**485.27**	1.10
CNR ROW & Hickory Street	SAN MH#5	SAN MH#6	92.7	205.84	0.01	0.08	**205.92**	750			0.13%	**401.40**	0.91
CNR ROW	SAN MH#6	SAN MH#7	87.9	205.84	0.01	0.09	**205.94**	750			0.10%	**352.05**	0.80
W/C Crossing	SAN MH#7	SAN MH#8	16.9	205.84	0.00	0.09	**205.94**	600			0.18%	**521.01**	0.92
CNR ROW	SAN MH#8	SAN MH#9	88.2	205.84	0.01	0.11	**205.95**	750			0.18%	**472.32**	1.07
CNR ROW	SAN MH#9	SAN MH#10	81.5	205.84	0.01	0.12	**205.97**	750			0.10%	**352.05**	0.80
CNR ROW & Oak Street	SAN MH#10	SAN MH#11	13.1	205.84	0.00	0.12	**205.97**	600			0.53%	**894.01**	1.58
CNR ROW & Birch Street	SAN MH#11	#REF!	111.8	205.84	0.02	0.14	**205.98**	750			0.13%	**401.40**	0.91

Notes: 1. Pipe data as per 'Harbourview Sanitary Trunk Sewer 'As-Constructed' Drawings (Tatham, 1995)

TOWN OF COLLINGWOOD

HARBOURVIEW
SANITARY TRUNK SEWER

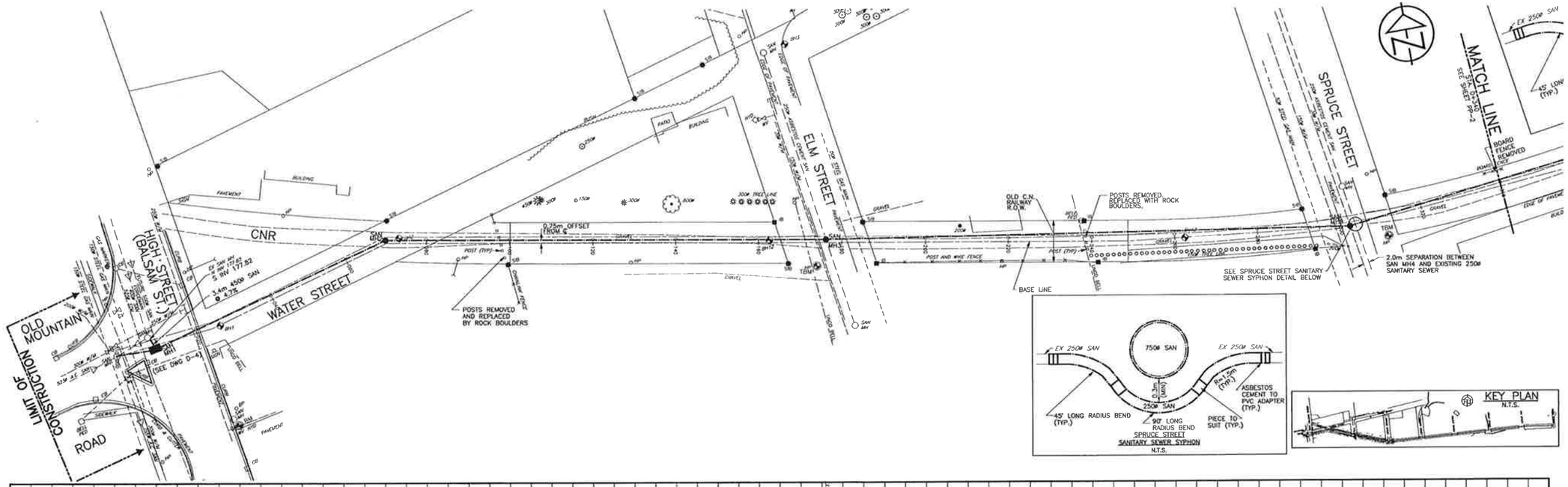
Dwg.No.	Description
	TITLE SHEET / INDEX / LOCATION PLAN
PP-1	PLAN AND PROFILE STA. 0+000 TO STA. 0+340
PP-2	PLAN AND PROFILE STA. 0+340 TO STA. 0+680
PP-3	PLAN AND PROFILE STA. 0+680 TO STA. 0+920
D-1	WALNUT STREET/GOODYEAR CREEK CROSSING DETAIL
D-2	OAK STREET CREEK CROSSING DETAIL
D-3	DETAILS
D-4	DETAILS AND NOTES

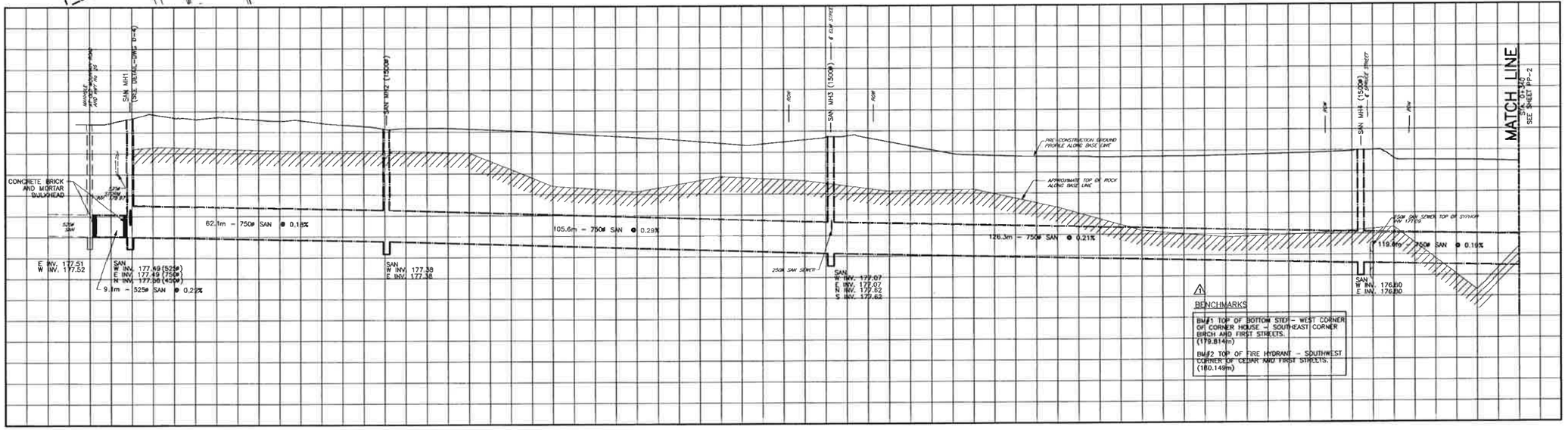


C.C. Tatham & Associates Ltd.
Consulting Engineers
115 Hurontario St.,Suite 201 ,Collingwood ,Ontario ,L9Y 2L9

Project No. 94037

AS CONSTRUCTED





BENCHMARKS

BM#1 TOP OF BOTTOM STEP – WEST CORNER OF CORNER HOUSE – SOUTHEAST CORNER BIRCH AND FIRST STREETS. (179.814m)

BM#2 TOP OF FIRE HYDRANT – SOUTHWEST CORNER OF CEDAR AND FIRST STREETS. (180.149m)

CHAINAGE	EXISTING ℄ ELEV	PROPOSED ℄ ELEV
0+000	180.20	
0+010	180.30	
0+020	180.35	
0+040	180.30	
0+060	180.17	
0+070	180.07	
0+080	180.09	
0+100	180.03	
0+120	179.92	
0+140	179.79	
0+160	179.70	
0+176	179.85	
0+180	179.88	
0+200	179.54	
0+220	179.39	
0+240	179.36	
0+260	179.37	
0+280	179.42	
0+300	179.48	
0+302.1	179.48	
0+320	179.26	
0+340	179.22	

LEGEND:

- SANITARY FORCEMAIN
- SANITARY SEWER
- STORM SEWER
- WATERMAIN
- PROPERTY LINE
- REVISION INDICATOR

PROPOSED/EXISTING MANHOLE; PROPOSED/EXISTING CATCHBASIN; PROPOSED/EXISTING CATCHBASIN MANHOLE; PROPOSED/EXISTING DITCH INLET CATCHBASIN; PROPOSED/EXISTING DOUBLE CATCHBASIN; PROPOSED/EXISTING HYDRANT; PROPOSED/EXISTING VALVE

PROPOSED/EXISTING LIGHT STANDARD; PROPOSED/EXISTING CATCHBASIN; PEDESTAL; GUYWIRE; TRANSFORMER; SURVEY IRON BAR; IRON BAR; ROUND IRON BAR; SIGN

DECIDUOUS TREE; CONIFEROUS TREE; EDGE OF BUSH; BENCHMARK LOCATION

NO.	REVISIONS	DATE	INITIAL
3.	AS CONSTRUCTED	02/08/95	PFC
2.	PRE-TENDER REVISIONS	14/03/95	SAJ
1.	REVISE BENCHMARKS	08/03/95	SAJ

APPROVED

REGISTERED PROFESSIONAL ENGINEER R.J. MEADLEY PROVINCE OF ONTARIO

HARBOURVIEW SANITARY TRUNK SEWER

TOWN OF COLLINGWOOD

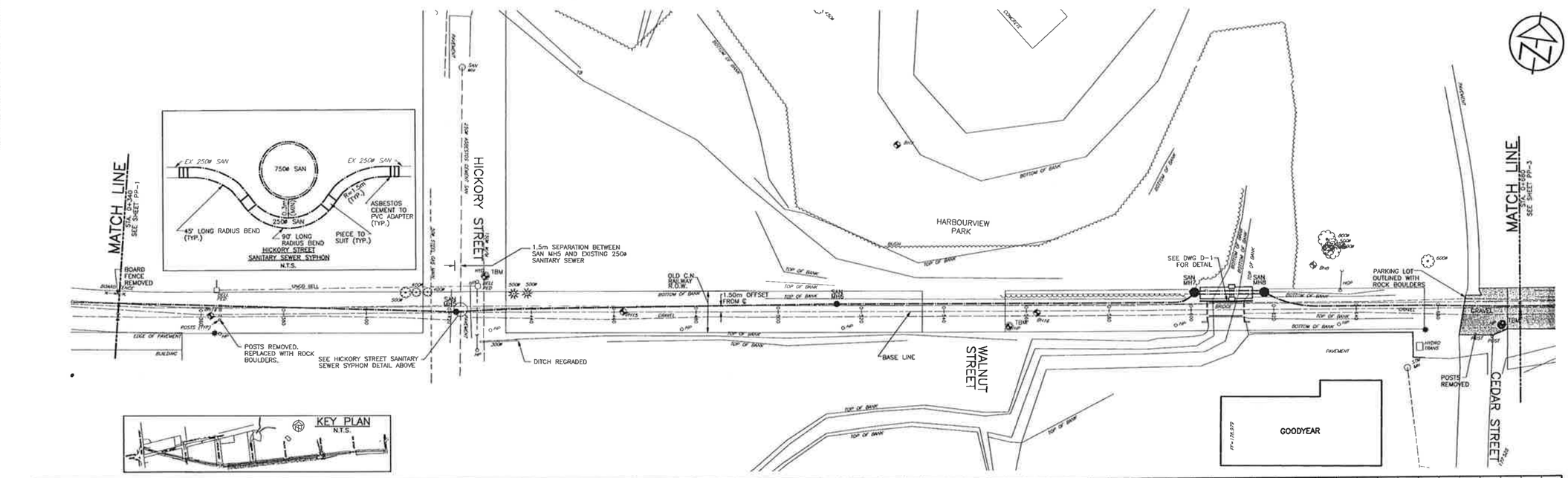
PLAN & PROFILE

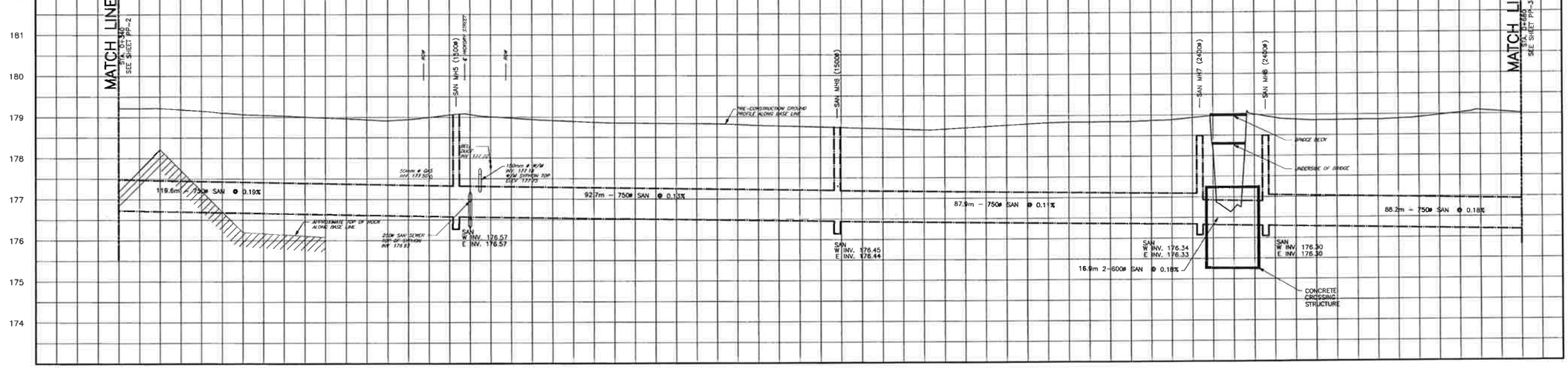
STA. 0+000 TO STA. 0+340

C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers
115 Hurontario St.
Suite 201
Collingwood, Ontario
L9Y 2L9
(705) 444-2565

SCALE: HORZ. 1:500 VERT. 1:50		JOB NO.	94037
DESIGN: WK/SAJ	CHECKED: RJM	DWG.	PP-1
DRAWN: MCP/SBU	DATE: FEB 1995		

94-0944





CHAINAGE	0+340	0+360	0+380	0+400	0+420 / 0+421.6	0+440	0+460	0+480	0+500	0+514	0+520	0+540	0+560	0+580	0+600 / 0+600.8	0+618 / 0+620	0+640	0+660	0+680	CHAINAGE
EXISTING ℄ ELEV	179.22	179.15	179.03	178.94	179.05 / 179.05	178.94	178.85	178.83	178.77	178.73	178.71	178.88	178.80	178.84	178.93 / 178.93	178.97 / 178.93	178.87	178.98	179.02	EXISTING ℄ ELEV
PROPOSED ℄ ELEV																				PROPOSED ℄ ELEV

LEGEND:
- SANITARY FORCEMAIN
- SANITARY SEWER
- STORM SEWER
- WATERMAIN
- PROPERTY LINE
- REVISION INDICATOR (2)

PROPOSED/EXISTING MANHOLE (MH) · PROPOSED/EXISTING CATCHBASIN (CB) · PROPOSED/EXISTING CATCHBASIN MANHOLE (CBMH) · PROPOSED/EXISTING DITCH INLET CATCHBASIN (DICB) · PROPOSED/EXISTING DOUBLE CATCHBASIN (DCB) · PROPOSED/EXISTING HYDRANT (HYD) · PROPOSED/EXISTING VALVE

PROPOSED/EXISTING LIGHT STANDARD (LS) · PROPOSED/EXISTING CATCHBASIN (HP) · PEDESTAL (PED) · GUYWIRE · TRANSFORMER (TRANS) · SURVEY IRON BAR (SIB) · IRON BAR (IB) · ROUND IRON BAR (RIB) · SIGN (SIGN)

DECIDUOUS TREE · CONIFEROUS TREE · EDGE OF BUSH · BENCHMARK LOCATION (BM)

NO.	REVISIONS	DATE	INITIAL
2	AS CONSTRUCTED	02/08/95	PFC
1	PRE-TENDER REVISIONS	14/03/95	SAJ

APPROVED
PROFESSIONAL ENGINEER PROVINCE OF ONTARIO R.J. MEADLEY

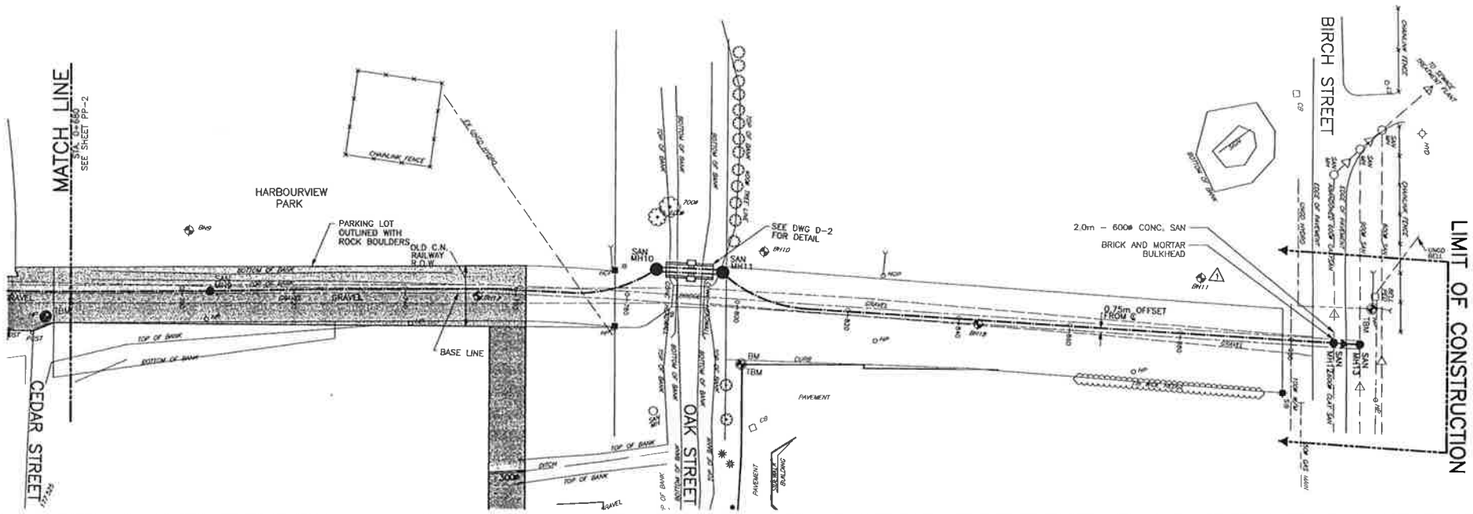
HARBOURVIEW SANITARY TRUNK SEWER
TOWN OF COLLINGWOOD

PLAN & PROFILE
STA. 0+340 TO STA. 0+680

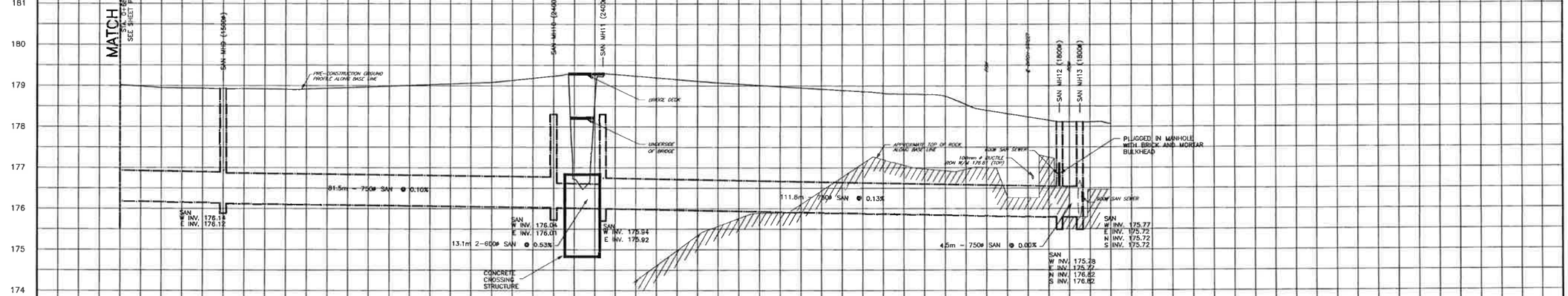
C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers
115 Hurontario St.
Suite 201
Collingwood, Ontario
L9Y 2L9
(705) 444-2565

SCALE: HORZ. 1:500 VERT. 1:50		JOB NO.	94037
DESIGN: WK/SAJ	CHECKED: RJM	DWG.	PP-2
DRAWN: WEP/SBU	DATE: FEB 1995		

NSN - 5780



KEY PLAN
N.T.S.



PROPOSED ℄ ELEV																								
EXISTING ℄ ELEV	179.02	178.84	178.83	178.82	178.87	179.04	179.18	179.23	179.30	179.28	179.11	178.98	178.88	178.75	178.23	178.10	178.10	178.05						
CHAINAGE	0+680	0+700	0+705	0+720	0+740	0+760	0+780	0+785	0+797	0+800	0+820	0+840	0+860	0+880	0+900	0+907.6	0+912.5	0+920						

LEGEND:
- SANITARY FORCEMAIN
- SANITARY SEWER
- STORM SEWER
- WATERMAIN
- PROPERTY LINE
- REVISION INDICATOR

MH PROPOSED/EXISTING MANHOLE
CB PROPOSED/EXISTING CATCHBASIN
CBMH PROPOSED/EXISTING CATCHBASIN MANHOLE
DICB PROPOSED/EXISTING DITCH INLET CATCHBASIN
DCB PROPOSED/EXISTING DOUBLE CATCHBASIN
HYD PROPOSED/EXISTING HYDRANT
PROPOSED/EXISTING VALVE
LS PROPOSED/EXISTING LIGHT STANDARD
HP PROPOSED/EXISTING CATCHBASIN
PED PEDESTAL
GUYWIRE
TRANS TRANSFORMER
SIB SURVEY IRON BAR
IB IRON BAR
RIB ROUND IRON BAR
SIGN SIGN
DECIDUOUS TREE
CONIFEROUS TREE
EDGE OF BUSH
BM BENCHMARK LOCATION

NO	REVISIONS	DATE	INITIAL
2.	AS CONSTRUCTED	02/08/95	PFC
1.	PRE-TENDER REVISIONS	14/03/95	SAJ

APPROVED
PROFESSIONAL ENGINEER
R.J. MEADLEY
PROVINCE OF ONTARIO

HARBOURVIEW SANITARY TRUNK SEWER
TOWN OF COLLINGWOOD

PLAN & PROFILE
STA. 0+680 TO STA. 0+920

C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers
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Suite 201
Collingwood, Ontario
L9Y 2L9
(705) 444-2565

SCALE: HORZ. 1:500 VERT. 1:50
JOB NO. 94037
DESIGN: WK/SAJ
CHECKED: RJM
DRAWN: MEP/SBU
DATE: FEB 1995
DWG. PP-3

DSA- 0996

APPENDIX E

Mountain Road West Corridor Unit Threshold

CROZIER & ASSOCIATES
Consulting Engineers

Project No.: 183-2687
Project Name: Linksview Development
Date: 20-Nov-2014
FILE: MasterSaniSpreadsheet

Unit Threshold - Trunk Sewer Design Sheet

SANITARY SEWER DESIGN MODEL

DESIGN: D.Tone, P. Eng.
CHECK:
UPDATED:

Manning's N = 0.013
Population = 2.9 p.p.u.

Average Residential Flow Rate = 450 L/cap/d
Residential Peaking Factor = M = 1+(14/4+(P/1000)^0.5) (Harmon)

Residential Infiltration Rate = 0.23 L/ha/s

LOCATION OF SECTION	NUMBER OF UNITS	THRESHOLD POPULATION	RESIDENTIAL PEAKING FACTOR	RESIDENTIAL AREA	AVERAGE FLOW			PEAK FLOW	
					RESIDENTIAL	INFILTRATION	TOTAL	RESIDENTIAL	TOTAL
		cap.		ha	L/s	L/s	L/s	L/s	L/s
Mountain Road Trunk Sewer									
Ex. MH 3-1 to Ex. MH 3-7A	1400	4060	3.33	82.35	21.15	18.94	40.09	70.36	89.30
Ex. MH 3-7A to Ex. H26N-31	510	1479	3.68	30.00	7.70	6.90	14.60	28.38	35.28
Black Ash Creek Trunk Sewer									
Ex. MH 26 to Ex. MH 39	1860	5394	3.21	109.41	28.09	25.16	53.26	90.30	115.47
MH 39 to MH 44 A	4500	13050	2.84	264.71	67.97	60.88	128.85	192.97	253.85
Pr. MH 44A to Ex. MH 3-7A	1600	4640	3.27	94.12	24.17	21.65	45.81	79.14	100.79
Harbourview Trunk Sewer									
Ex. MH 1 to MH 12	2400	6960	3.11	141.18	36.25	32.47	68.72	112.70	145.17

Notes: 1. Refer to Drawing 701: Harbourview Trunk Sanitary Drainage Plan - Base Scenario.
2. Areas for infiltration are based on a residential density of 17 units/ha.

APPENDIX F

Future Development Design Flows

CROZIER & ASSOCIATES
Consulting Engineers

Project No.: 183-2687
Project Name: Linksview Development
Date: 20-Nov-2014
FILE: MasterSaniSpreadsheet

Future Development - Individual Catchments

SANITARY SEWER DESIGN MODEL

DESIGN: D.Tone, P. Eng.
CHECK:
UPDATED:

Manning's N = 0.013
Population = 2.9 p.p.u.
17 Units/ha
50 Persons/ha

Average Residential Flow Rate = 450 L/cap/d
Residential Infiltration Rate = 0.23 L/s/ha

Residential Peaking Factor = M = 1+(14/4+(P/1000)^0.5) (Harmon)

Horizon Year	Area Designation	FROM	Area (ha)	Units	Gross Pop.	Res. Peaking Factor	Peak Flow (L/s)	Infiltration (L/s)	Peak Flow (L/s)
2030	Residential	Area R	70	1190	3451	3.39	60.9	14.7	75.6
2030	Industrial	Area S	17.4	n/a	n/a	4.00	28.2	3.7	31.8
2030	Residential	Area Golf	52	884	2564	3.50	46.7	10.9	57.6
2030	Residential	Area Link[2]	41	1000	2900	3.45	52.2	8.6	60.8
2030	Residential	Area 3504	6.9	117	340	4.05	7.2	1.4	8.6
2030	Residential	Area A1a	34.1	580	1681	3.64	31.9	7.2	39.1
2030	Residential	Area A1c	6.9	117	340	4.05	7.2	1.4	8.6
2030	Residential	Area MAIR[3]	19.8	302	876	3.84	17.5	4.2	21.7
2030	Residential	Area CONSAR	17.6	300	870	3.84	17.4	3.7	21.1
2045	Residential	Area G3[1]	87	1142	3312	3.41	58.7	18.3	77.0
2045	Residential	Area A1b[5]	127	1695	4914	3.25	83.2	26.7	109.9
2045	Residential	Area W. EXT	114	1938	5620	3.20	93.6	23.9	117.5
2045	Residential	Area B1[4]	157	1353	3925	3.34	68.3	33.0	101.3

Notes:

1. Unit count accounts for 37 existing residential units west of Silver Creek.
2. Population based on a total of 1000 units at 2.9 P.P.U.
3. Population based on a total of 302 units at 2.9 P.P.U. per Mair Mills Village - FSR (Tatham, Sept 2012).
4. Population per CCTA 1994 Study
5. Unit count accounts for 105 existing residential units west of Silver Creek.

CROZIER & ASSOCIATES
Consulting Engineers

Project No.: 183-2687
Project Name: Linksview Development
Date: 20-Nov-2014
FILE: MasterSaniSpreadsheet

Harbourview Trunk Sewer (2030)

SANITARY SEWER DESIGN MODEL

DESIGN: D.Tone, P. Eng.
CHECK:
UPDATED:

Manning's N = 0.013
Population = 2.9 p.p.u.

Average Residential Flow Rate = 450 L/cap/d
Average Proposed Commercial Flow Rate = 28000 L/ha/d
Average Industrial Flow Rate = 45000 L/ha/d
Residential Infiltration Rate = 0.23 L/ha/s

Residential Peaking Factor = M = 1+(14/4+(P/1000)^0.5) (Harmon)
Com/Ind Peaking Factor = 2
Com/Ind Infiltration Rate = 0.11 L/ha/s

			BASE SCENARIO						FUTURE DEVELOPMENT				TOTAL								DESIGN
			Residential				Commercial		Residential				Residential					Commercial			
Location	FROM MH	TO MH	Total Units	Total Population	Total Area (ha)	Average Flow (L/s)	Total Area (ha)	Peak Flow (L/s)	Total Units	Total Population	Total Area (ha)	Average Flow (L/s)	Total Population	Res. Peaking Factor	Area (ha)	Infiltration (L/s)	Peak Flow (L/s)	Total Area (ha)	Peak Flow (L/s)	Infiltration (L/s)	Peak Flow (L/s)
Pr. Tenth Line Trunk Sewer																					
Tenth Line to Linksview Entrance	Pr. MH 1	Pr. MH 2	0	0	0	0	0	0	580	1681.13	34.1	9	1681	3.64	34.1	7.8	31.9	0.0	0.0	0.0	39.7
Linksview Entrance to Consar Street A	Pr. MH 2	Pr. MH 3	0	0	0	0	0	0	1697	4921.3	82	26	4921	3.25	82.0	18.9	83.3	0.0	0.0	0.0	102.2
Consar Street A to Mountain Road	Pr. MH 3	Ex. MH 1A	0	0	0	0	0	0	2883	8360.7	153.8	44	8361	3.03	153.8	35.4	132.0	0.0	0.0	0.0	167.4
Black Ash Creek Trunk Sewer																					
	Ex. MH 26	Ex. MH 39	433	1263.3	38.40	6.6	0.0	0.0	0	0	0	0	1263	3.73	38.4	8.8	24.6	0.0	0.0	0.0	33.4
	Ex. MH 39	Pr. MH 44A	433	1263.3	38.4	6.6	0	0	300	870	17.6	5	2133	3.56	56.0	12.9	39.6	0.0	0.0	0.0	52.5
	Pr. MH 44A	Ex. MH 3-7A	433.0	1263.3	38.4	6.6	0.0	0.0	300	870.0	17.6	4.5	2133.3	3.56	56.0	12.9	39.6	0.0	0.0	0.0	52.5
Mountain Road Trunk Sewer																					
	Ex. MH 1A	Ex. MH 3-7A	143	414.7	24.9	2.2	21.6	28.3	4190	12152	248.1	63	12567	2.86	273.0	62.8	186.9	21.6	28.3	2.4	280.4
	Ex. MH 3-7A	Ex. MH H26N-31	576	1678	65.7	8.7	57.6	59.3	4490	13022	265.7	68	14700	2.79	331.4	76.2	213.4	57.6	59.3	6.3	355.2
Harbourview Trunk Sewer																					
	Ex. MH 1	Ex. MH 12	576	1678	65.7	8.7	57.6	59.3	4490	13022	265.7	68	14700	2.79	331.4	76.2	213.4	57.6	59.3	6.3	455.2

Notes: Refer to Drawing 702.

CROZIER & ASSOCIATES
Consulting Engineers

Project No.: 183-2687
Project Name: Linksview Development
Date: 20-Nov-2014
FILE: MasterSaniSpreadsheet

Harbourview Trunk Sewer (2045)

SANITARY SEWER DESIGN MODEL

DESIGN: D.Tone, P. Eng.
CHECK:
UPDATED:

Manning's N = 0.013
Population = 2.9 p.p.u.

Average Residential Flow Rate = 450 L/cap/d
Average Proposed Commercial Flow Rate = 28000 L/ha/d
Average Industrial Flow Rate = 45000 L/ha/d
Residential Infiltration Rate = 0.23 L/ha/s

Residential Peaking Factor = M = 1+(14/4+(P/1000)^0.5) (Harmon)
Com/Ind Peaking Factor = 2
Com/Ind Infiltration Rate = 0.11 L/ha/s

			BASE SCENARIO						FUTURE DEVELOPMENT				TOTAL								DESIGN
			Residential				Commercial		Residential				Residential					Commercial			
Location	FROM MH	TO MH	Total Units	Total Population	Total Area (ha)	Average Flow (L/s)	Total Area (ha)	Peak Flow (L/s)	Total Units	Total Population	Total Area (ha)	Average Flow (L/s)	Total Population	Res. Peaking Factor	Area (ha)	Infiltration (L/s)	Peak Flow (L/s)	Total Area (ha)	Peak Flow (L/s)	Infiltration (L/s)	Peak Flow (L/s)
Pr. Tenth Line Trunk Sewer																					
Tenth Line to Linksview Entrance	Pr. MH 1	Pr. MH 2	0	0	0	0	0	0	580	1681.13	34.1	9	1681	3.64	34.1	7.8	31.9	0.0	0.0	0.0	39.7
Linksview Entrance to Consar Street A	Pr. MH 2	Pr. MH 3	0	0	0	0	0	0	3635	10541.5	196	55	10542	2.93	196.0	45.1	161.0	0.0	0.0	0.0	206.1
Consar Street A to Mountain Road	Pr. MH 3	Ex. MH 1A	0	0	0	0	0	0	4821	13980.9	267.8	73	13981	2.81	267.8	61.6	204.5	0.0	0.0	0.0	266.1
Black Ash Creek Trunk Sewer																					
	Ex. MH 26	Ex. MH 39	433	1263.3	38.40	6.6	0.0	0.0	1353	3925	157	20	5188	3.23	195.4	38.5	87.3	0.0	0.0	0.0	125.8
	Ex. MH 39	Pr. MH 44A	433	1263.3	38.4	6.6	0	0	1653	4795	174.6	25	6058	3.17	213.0	49.0	99.9	0.0	0.0	0.0	148.9
	Pr. MH 44A	Ex. MH 3-7A	433.0	1263.3	38.4	6.6	0.0	0.0	1653	4795.0	174.6	25.0	6058.3	3.17	213.0	49.0	99.9	0.0	0.0	0.0	148.9
Mountain Road Trunk Sewer																					
	Ex. MH 1A	Ex. MH 3-7A	143	414.7	24.9	2.2	21.6	28.3	7027	20378	462.1	106	20792	2.64	487.0	112.0	285.4	21.6	28.3	2.4	428.1
	Ex. MH 3-7A	Ex. MH H26N-31	576	1678	65.7	8.7	57.6	59.3	7327	21248	479.7	111	22926	2.59	545.4	125.4	309.6	57.6	59.3	6.3	500.7
Harbourview Trunk Sewer																					
	Ex. MH 1	Ex. MH 12	576	1678	65.7	8.7	57.6	59.3	7327	21248	479.7	111	22926	2.59	545.4	125.4	309.6	57.6	59.3	6.3	600.7

Notes: Refer to Drawing 702.

FIGURES

Figure 1: Site Plan

Drawing 701: Harbourview Sanitary Drainage Plan – Base Scenario

Drawing 702: Harbourview Sanitary Drainage Plan – Future Development Conditions

Drawing 708: External Servicing Plan

Legend

= SUBJECT LANDS

Project

LINKSVIEW DEVELOPMENT
TOWN OF COLLINGWOOD

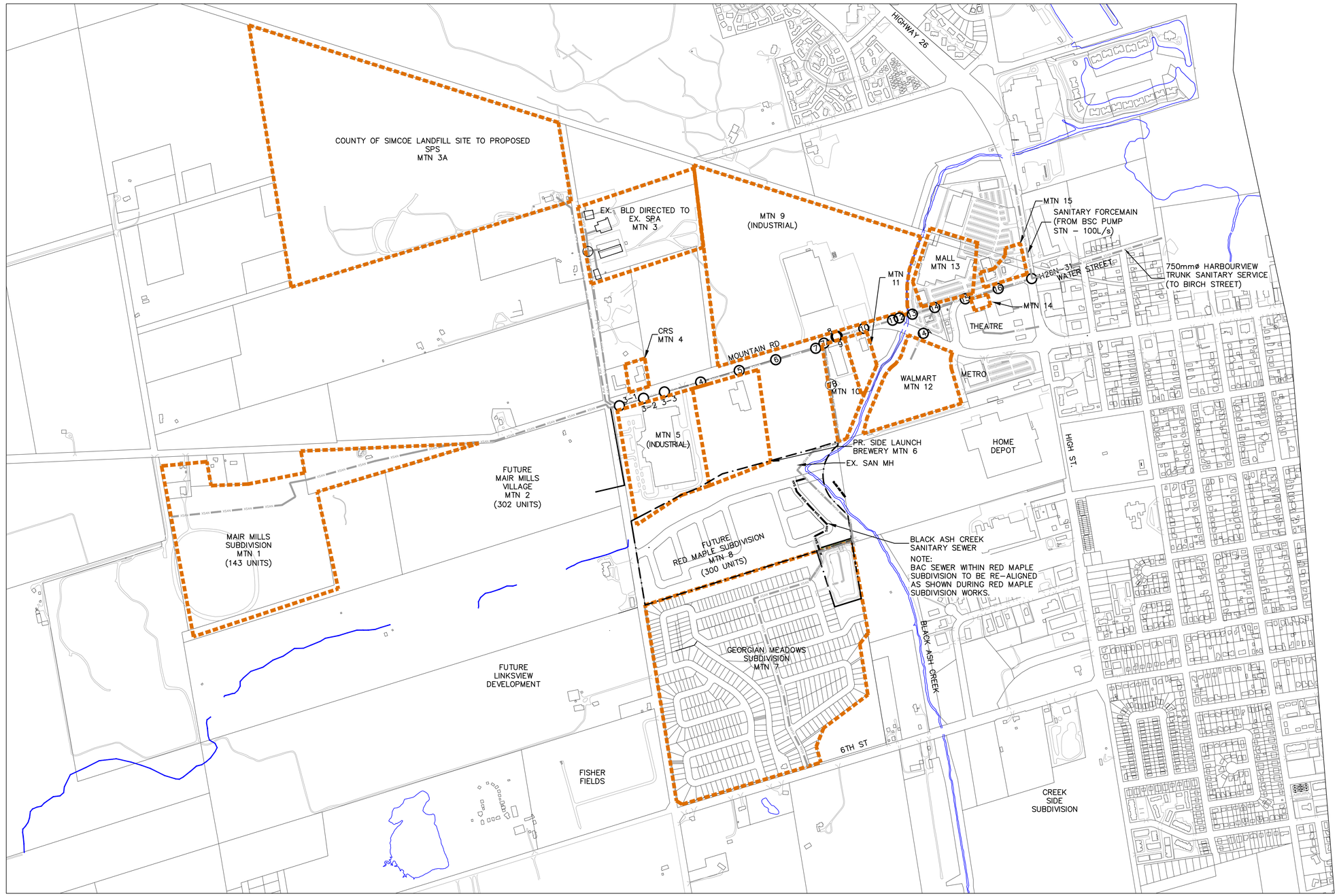
Drawing

SITE LOCATION

CROZIER & ASSOCIATES 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	Design By	Project
L.W.	L.W.	183-2687

Scale	Date	Check By	Drawing
N.T.S.	05/28/2014	D.T.	FIG. 1



LEGEND

MAIR MILLS VILLAGE MTN 2 (302 UNITS)	BASE SCENARIO AREA LABEL
	BASE SCENARIO SANITARY CATCHMENT AREA
XSAN XSAN XSAN	EXISTING SANITARY SEWER
STM STM STM	EXISTING SANITARY FORCEMAIN
SAN SAN SAN	PROPOSED SANITARY SEWER

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TEMPORARY BENCHMARKS

TBM#1–
TBM#2–
TBM#3–

Town

No.	ISSUE / REVISION	DATE: MM/DD/YYYY
0	ISSUED FOR REVIEW	MM/DD/2012

Engineer

Engineer

Project

LINKSVIEW DEVELOPMENT
TOWN OF COLLINGWOOD

Drawing

HARBOURVIEW SANITARY DRAINAGE PLAN
BASE SCENARIO

CROZIER & ASSOCIATES Consulting Engineers
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
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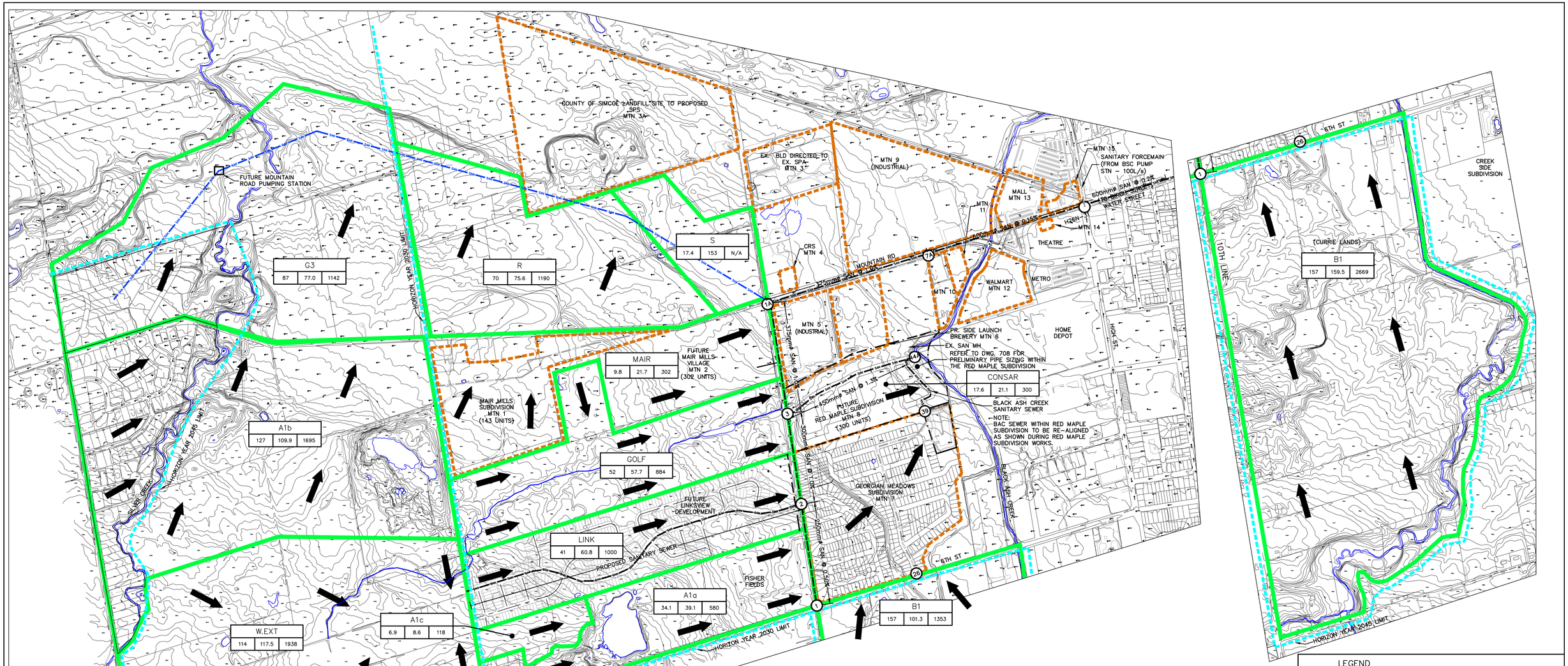
Drawn By	Design By	Project
R.C.G.	R.C.G.	183–2687
Scale: 1:6000	Date: 05/28/2014	Check By: D.T.
		Drawing: 701



NOTES:
1. ALL FUTURE DEVELOPMENT PEAK DESIGN FLOWS INCLUDE EXTRANEOUS FLOWS.
2. SANITARY PEAKS FLOWS FROM MORE THAN ONE CATCHMENT AREA CANNOT BE SUMMED DUE TO THE REDUCTION OF PEAK FLOW FACTOR AS THE CONTRIBUTING POPULATION INCREASES.

LEGEND

- MAIR MILLS VILLAGE MTN 2 (302 UNITS) — BASE SCENARIO AREA LABEL
- BASE SCENARIO SANITARY CATCHMENT AREA
- FUTURE DEVELOPMENT SCENARIO CATCHMENT AREA
- ESTIMATED HORIZON YEAR LIMIT
- XSAN XSAN XSAN — EXISTING TRUNK SANITARY SEWER
- XFM XFM XFM — EXISTING SANITARY FORCEMAIN
- SAN SAN SAN — FUTURE SANITARY SEWER PER TATHAM 1994 STUDY
- SAN SAN SAN — PROPOSED TRUNK SANITARY SEWER
- (2) — SANITARY MANHOLE
- SANITARY FLOW DIRECTION
- LINK / 41 / 52.1 / 816 — SANITARY AREA ID; RESIDENTIAL UNITS; PEAK DESIGN FLOW (L/S) RESIDENTIAL, INDUSTRIAL; AREA (ha)

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2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS 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.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

TEMPORARY BENCHMARKS
TBM#1–
TBM#2–
TBM#3–

Town

No.	ISSUE / REVISION	DATE: MM/DD/YYYY
0	ISSUED FOR REVIEW	MM/DD/2012

Engineer

Engineer

Project
LINKSVIEW DEVELOPMENT
TOWN OF COLLINGWOOD

Drawing
HARBOURVIEW SANITARY DRAINAGE PLAN
FUTURE DEVELOPMENT CONDITIONS

CROZIER & ASSOCIATES Consulting Engineers
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
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Drawn By	L.W.	Design By	D.T.	Project	183-2687
Scale	1: 7500	Date	05/28/2014	Check By	D.T.	Drawing	702

STREET 'A'

LINKSVIEW ULTIMATE SANITARY SERVICING STRATEGY

STORM INV. 190.76
SAN MH#3
INV. 189.80

CROSSING:
SANITARY OBV. 190.25
STORM INV. 190.76

975mmø STM SWR @ 1.3%
975mmø STM SWR @ 1.2%
975mmø STM SWR @ 1.7%
450mmø SAN SWR @ 1.2%
450mmø SAN SWR @ 1.7%
STORM INV. 190.17
SANITARY INV. 189.20
194.40
194.60

STORM INV. 189.00
SANITARY INV. 188.00
192.95

STORM INV. 187.89
SANITARY INV. 186.90
191.95

STORM INV. 186.78
SANITARY INV. 185.75
190.75

450mmø SAN SWR @ 1.3%

STORM INV. 184.76
SANITARY INV. 183.75
189.95

STORM INV. 183.92
SANITARY INV. 182.90
189.65

975mmø STM SWR @ 1.4%
450mmø SAN SWR @ 1.4%

SAN MH A
450mmø SAN SWR @ 0.9%

EX. 450mmø SAN SWR @ 0.31%

EX. SAN MH#44
SE INV. 182.06
NE INV. 181.98

EX. SAN MH#45
SW INV. 181.75
N INV. 181.69

EX. SAN MH#46
W INV. 180.59
N INV. 180.59

EX. 450mmø SAN SWR @ 1.37%

PER BAC FLOOD STUDY:
STA. 11+200
CHANNEL INV. 182.29
FLOOD LEVELS
2-YR 183.20±
5-YR 183.42
REG. 184.44

STORM INV. 183.20
SAN MH 44A
CONNECT TO EXISTING SANITARY SEWER
INV. 182.15±

EX. 450mmø SAN SWR @ 0.25%

EX. SAN MH
SE INV. 182.27
NW INV. 182.24

BLACK ASH CREEK

450mmø SAN SWR BETWEEN EX. SAN MH#39 AND SAN MH A IS 1.0%

189.80
189.35
188.90
188.65
SAN MH#40

SERVICE CORRIDOR

CONNECT TO EXISTING SANITARY SEWER. SAN INV. 185.60±

EX. SAN MH#39
S INV. 185.64

EX. SAN MH#38
S INV. 185.93
N INV. 185.86

TENTH LINE

300mmø SAN SWR @ 1.0%
975mmø STM SWR @ 1.3%

CROSSING:
SANITARY OBV. 192.15
STORM INV. 193.30

LINKSVIEW SWM FACILITY

RED MAPLE DEVELOPMENT

GEORGIAN MEADOWS

GEORGAIN MEADOWS/ RED MAPLE SWM FACILITY

LEGEND

- LINKSVIEW 975mmø STM SWR (OPTION 2 PER FSR)
- PROPOSED TRUNK SANITARY SEWER (INTERIM LINKSVIEW SERVICING STRATEGY)
- BAC TRUNK SANITARY SWR RE-ALIGNMENT (RED MAPLE SUBDIVISION WORKS)
- FUTURE SANITARY SEWER (BY OTHERS)
- EXISTING TRUNK SANITARY SEWER
- PROPERTY LINE
- PRELIMINARY & ROAD GRADE (PER CROZIER DESIGN)

TEMPORARY BENCHMARKS

TBM#1–
TBM#2–
TBM#3–

Town

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Engineer

Engineer

Project

LINKSVIEW DEVELOPMENT
TOWN OF COLLINGWOOD

Drawing

EXTERNAL SERVICING PLAN

CROZIER & ASSOCIATES Consulting Engineers
THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3
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Drawn By	Design By	Project
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Scale	Date	Check By	Drawing
1:1000	05/28/2014	D.T.	703

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