C.C. Tatham & Associates Ltd.
Consulting Engineers

BLUE VISTA

Town of The Blue Mountains

Functional Servicing Report

prepared by:

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prepared for

Royalton Homes Inc.

February 27, 2019

CCTA File 117159

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1 Introduction

This functional servicing report has been prepared in support of the Blue Vista residential development which is located on the west side of Grey Road 21 (Osler Bluff Road), north of Grey Road 19/Mountain Road, in the Town of The Blue Mountains, as illustrated in Figure 1.

The purpose of this report is to address the servicing requirements of the Town of The Blue Mountains and Grey County with respect to the existing and proposed condition of the sanitary servicing, water supply for domestic use, drainage and stormwater management (SWM), safe vehicular access to the site and utilities common to support a residential development (phone, hydro, cable, TV, gas, etc.). Several other reports as well as engineering drawings have been prepared in conjunction with this report in support of the proposed residential development and are summarized below:

- *Preliminary Stormwater Management Report*, prepared by C.C. Tatham & Associates Ltd. (February 27, 2019);
- *Traffic Impact Study*, prepared by C.C. Tatham & Associates Ltd. (February 27, 2019);
- *Preliminary Infiltration Assessment*, prepared by Peto MacCallum Ltd. (August 20, 2018); and
- *Grey County Road 21 Trunk Sanitary Sewer Technical Summary*, prepared by C.C. Tatham & Associates Ltd. (March 13, 2012).

Chapter 2 of this report presents the proposed Blue Vista development and existing site conditions. Chapters 3 and 4 address the sanitary sewer system and water supply distribution plans respectively. Chapter 5 summarizes the stormwater management plan and Chapter 6 highlights the key findings of the Traffic Impact Study. Servicing of common utilities is discussed in Chapter 7, and finally Chapter 9 provides an overall summary.

2 Blue Vista Development

2.1 Site Location & Description

As previously noted, the Blue Vista residential development is located on the west side of Grey Road 21 (Osler Bluff Road), north of Grey Road 19/Mountain Road, in the Town of The Blue Mountains (refer to Figure 1). It is bordered by Osler Bluff Road to the east, the Scandinave Spa and the Windfall Development Lands to the south, the Second Nature Phase 3 Development Lands to the west, and the Monterra golf course to the north. The legal description of the site refers to Part Lot 17, Concession 1, Town of The Blue Mountains (formerly the Township of Collingwood), in the County of Grey. The Blue Vista property consists of approximately 20.4 ha of undeveloped land.

Existing site topography, ground cover, land use and drainage patterns were established through site visitation, interpretation of topographic maps, aerial photography and a site survey. The development site generally slopes from southwest to the northeast with approximately 15 m of fall across the property. An intermittent tributary watercourse wetland feature bisects the property into a west and east portion. The central and west portions have predominantly woodland ground cover and the east portion has predominantly pasture ground cover. Under existing conditions, drainage is conveyed as overland flow to two outlet locations; to the roadside ditch along Osler Bluff Road and continuing north to connect with an unnamed tributary watercourse within Grey Sauble Conservation Authority (GSCA) jurisdiction, and to the 600 mm diameter culvert that crosses under Osler Bluff Road and continuing east to connect with Silver Creek within Nottawasaga Valley Conservation Authority (NVCA) jurisdiction.

Ontario Soil Survey Report No. 17 (Grey County North) defines the site to be a mix of Kemble silty clay (Ksc) and Brighton sand (Brs).

2.2 Proposed Land Use

Residential Units

The proposed development, as shown on the Overall Site Plan (Figure 2), is for 133 single detached residential dwellings units. The proposed units will have a minimum lot size depth of 30 m with 15 m of frontage. A secondary development plan, to increase the unit count to 180 residential units (accomplished through changing select single-detached units to semi-detached units), will be considered should the Town require an increased lot density.

Other Amenities

The proposed development will also include park areas, an open space area, two stormwater management blocks, and community trails with connection to the existing Town community trail system.

As noted in the site plan, a 5.2 m widening along Grey Road 21 (Osler Bluff Road) has been dedicated to Grey County for future development and expansion of Grey Road 21.

Area Land Uses

Historically, land use in the surrounding area has been a mix of woodland, residential as well as recreational and agricultural activities. Residential development of the surrounding areas has increased in recent years resulting in required upgrades to municipal infrastructure to service the area appropriately.

2.3 Site Access & Internal Road System

The proposed development will be serviced by municipal roads within 20.0 m rights-of-way, to be constructed to urban standards. The primary site access will be via Grey Road 21 (Osler Bluff Road), from which Street A will extend through the development and connect to Crosswinds Boulevard, providing access to the Second Nature development. This will entail a road crossing of the intermittent tributary watercourse wetland feature to provide a secondary means of access and connectivity between the adjacent developments. Furthermore, the crossing is required to provide municipal services to the proposed development (i.e. sanitary, water, stormwater and utilities).

3 Sanitary Servicing

3.1 Existing Infrastructure

Grey Road 21 Sanitary Sewer

In 2012, a trunk sanitary sewer was designed along Grey Road 21 (Osler Bluff Road) to collect and convey wastewater from existing and proposed development lands located within the Town of The Blue Mountains adjacent to and upstream of Grey Road 21 (Osler Bluff Road). The sewer was designed to be extended from Highway 26 south for approximately 6.5 km to the Osler Bluff Ski Club then west approximately 3.0 kms to the proposed Castle Glen development on Grey Road 19, and accommodate a total of 4,622 residential units having a contributing drainage area of approximately 1,094 hectares. A total of 180 residential units were allocated to the Blue Vista development lands in the design process.

Construction of approximately 2.5 km of the 450 mm trunk sewer was completed in 2012 extending from Highway 26 to approximately 300 m south of the Blue Vista development (to provide service to the Mountain House and Windfall developments). At its downstream end, the sewer was connected to an existing 300 mm diameter sanitary sewer located on the south side of Highway 26 (as in interim measure). In the future, the trunk sewer will be extended across Highway 26 and run north directly to a new lift station at the Craigleith Sewage Treatment Plant. Refer to Appendix A for additional information.

Highway 26 Sanitary Sewer

As previously noted, there is an existing 300 mm diameter sanitary sewer located on the south side of Highway 26. This sewer directs flows west for a distance of approximately 1.3 km, at which point it is increased in size to 750 mm diameter and continues west for another 240 m where it outlets to an existing sanitary sewage pumping station located at Lakeshore Road East. Until the future extension of the trunk sewer across Highway 26 to the new lift station at the Craigleith Sewage Treatment Plant is constructed, the "short term sewage servicing alternative – 4B" as described in Section 8.2.2 of the *Combined EA Master Plan for Craigleith, Castle Glen and Osler* [1] relies on the existing 300 mm diameter sewer on Highway 26 to convey flows to the sewage pumping station at Lakeshore Road East and ultimately to the Craigleith Sewage Treatment Plant.

An assessment of the capacity of the existing 300 mm diameter sewer between Grey Road 21 (Osler Bluff Road) and the sewage pumping station was completed in March 2012 and is included in Appendix A for information. The assessment concluded the existing sewer had capacity to convey peak flows from a total of 840 to 1,260 residential units (the lower capacity is based on a theoretical peak flow of 0.054L/unit/s, whereas the higher capacity is based on historical flow data at the plant of 0.036 L/unit/s).

[1] *Combined EA Master Plan for Craigleith, Castle Glen and Osler. MacViro Consultants Inc.*, June 2006.

Lakeshore Road East Pumping Station & Highway 26 Forcemain

The sewage pumping station at Lakeshore Road East pumps wastewater to the Craigleith Sewage Treatment Plant via 2 - 300 mm diameter forcemains via a crossing to the north side of Highway 26 then east approximately 1.5 km to Long Point Road then north approximately 450 m to the STP.

Information regarding the capacity of the pumping station and the existing forcemains was not readily available at the time of this report. The Town should provide confirmation that there is available capacity to receive and convey wastewater flows generated by the connected sewers including existing and proposed residences and developments.

Craigleith Sewage Treatment Plant

The 2017 Annual Performance Report for the Craigleith Wastewater Treatment Plant and Associated Collection System prepared by Town Wastewater Operation Staff for the reporting period of January 1 to December 31, 2017 was reviewed to confirm available capacity of the treatment plant to handle additional wastewater flows.

The report demonstrated the treatment plant has an average design capacity of 8,133 m^3/d and a peak design capacity of 19,640 m^3/d. In 2017 the average day flow was 3,383 m^3/d and the peak day flow was 8,956 m^3/d. The plant operated at approximately 39% of the capacity based on a 5 year rolling average of daily flows.

3.2 Proposed Blue Vista Infrastructure

An internal sanitary sewer collection system has been designed to convey all sewage flows generated from the development to the existing 450 mm diameter trunk sewer on Grey Road 21 (Osler Bluff Road). There will be two connections to the trunk sewer on Grey Road 21 (Osler Bluff Road) as follows:

1. one connection at the proposed road access at Grey Road 21 (Osler Bluff Road) and Street A; and
2. one connection at the proposed servicing easement at Grey Road 21 (Osler Bluff Road) to the cul-de-sac on Street B.

The preliminary sanitary sewer design sheet (refer to Appendix A) has been developed to support the maximum density of 180 residential units within the development lands which is considered as conservative given the current development proposal includes a total of 133 residential units. The sanitary flows resulting from the maximum 180 units conforms with the original Master Servicing Plan and can be conveyed to the 450 mm diameter trunk sewer via a 200 mm diameter sanitary main.

The sanitary sewer servicing plan is denoted in Figure 3.

3.3 Assessment

Sewage Demands

Since construction of the trunk sanitary sewer on Grey Road 21 was completed, several surrounding developments have connected to and now contribute flows to this sewer. These developments are at various stages with some being completed while others are still under construction. Table 1 summarizes known completed or active surrounding developments (including existing development and that of Blue Vista) and associated timelines for sewer connections. As noted, a total of 1258 units are anticipated.

Table 1: Area Development Sewer Demands

Development	Anticipated Number of Residential Connections within Sanitary Drainage Area							
	2018	2019	2020	2021	2022	2023	2024	2025
Existing on Highway 26	75							
Blue Vista			180					
Monterra Phase 2						40		
Plateau East	39							
Le Scandinave Spa	15							
Mountain House Ph 1	70							
Mountain House Ph 2		75						
Mountain House Ph3			85					
Windfall Phase 1	37							
Windfall Phase 2	167							
Windfall Phase 3	69							
Windfall Phase 4A		70						
Windfall Phase 4B			92					
Windfall Phase 5A				74				
Windfall Phase 5B					50			
Windfall Phase 6A						66		
Windfall Phase 6B							54	
Annual Total	472	145	357	74	50	106	54	0
Cumulative Total	472	617	974	1048	1098	1204	1258	1258

Capacity Assessment

The sanitary sewer on Grey Road 21 (Osler Bluff Road) has been designed to convey flow from 4,622 units and therefore has capacity to convey the anticipated flows generated by the existing and proposed connections noted in Table 1, including those of Blue Vista.

The existing 300 mm diameter sanitary sewer on Highway 26 was estimated to have capacity to convey flow from approximately 840 units (based on theoretical peak flow demands) to 1260 units (based on historic peak flow demands) In considering the application of actual observed data within the existing sanitary infrastructure, as opposed to theoretical data, the system has capacity to accommodate all of the noted development, including Blue Vista. If however, the theoretical demands are adopted (which are 50% greater than the actual demands), capacity will be reached in 2020 based on the development timelines presented in Table 1.

Flow Monitoring

Given the range of remaining capacity identified within the system and recognizing the number of variables that impact peak flow demands (occupancy rate, per capita flows, peaking factors, and sewer design coefficients), it is recommended that a sewer flow monitoring program be initiated by the Town as soon as possible to measure and record actual flows within the system during the peak spring period to fully assess the available capacity of the system. Measures should be taken at the treatment plant (to capture all demand and infiltration) and just downstream of the Windfall development (from which actual demands can be derived with little infiltration given the age of the infrastructure).

Infrastructure Improvements

Depending on the realization of actual flow demands through flow monitoring, infrastructure improvements including the extension of the Grey Road 19 (Osler Bluff Road) trunk sanitary sewer across Highway 26 to the Craigleith Sewage Treatment Plant and construction of a lifting station may be required as early as the next several years, or not at all. It is recommended the Town initiate the engineering studies, design and approvals for this work (as may be required) such that construction could proceed when deemed necessary to service the existing developments under construction and/or proposed within the sanitary drainage area. It is understood the cost for the required infrastructure improvements would be addressed through development charges.

3.4 Summary

- There is a trunk sanitary sewer on Grey Road 21 (Osler Bluff Road) with excess available capacity to collect and convey flows from existing and proposed residential units including those within Blue Vista and other surrounding developments within the sanitary drainage area.

- There is a 300 mm diameter sewer on Highway 26 that is being utilized as a “short term sewage servicing alternative” until such time as the proposed extension of the trunk sewer and lifting station at the sewage treatment plant are constructed.

- There is a potential for the 300 mm diameter sewer on Highway 26 to reach capacity in 2020 based on the projected number and timing of new connections from existing/proposed developments under construction, and considering conservative, theoretical peak flow demands (based on actual demands, capacity will be reached after all noted developments are complete).

- It is recommended a flow monitoring program be implemented to confirm the actual flow within and upstream of the 300 mm diameter sewer on Highway 26 to fully assess the capacity of the system and to determine timing for infrastructure improvements.

- It is recommended the Town initiate the engineering studies, design and approvals such that construction of required infrastructure improvements can be completed to meet future demands (without hindering development).

4 Water Supply and Distribution

4.1 Existing Infrastructure

Grey Road 19 & 21 Watermains

An existing 300 mm diameter trunk watermain located along Grey Road 21 (Osler Bluff Road) supplies water from the Collingwood water distribution system to a booster pumping station (BPS) at the intersection of Grey Road 19 and Grey Road 21. The BPS is at an elevation of 215.0 metres and currently pumps at a rate of 4,000 m^3/day with an agreement in place between the Town of Collingwood and the Town of The Blue Mountains to potentially increase the rate to 8,000 m^3/day as demands warrant.

A 350 mm diameter trunk watermain on the south and west side of Grey Road 19 delivers water from the BPS to a reservoir on Happy Valley Road while servicing the Blue Mountain Ski Resort and adjacent commercial and residential areas. The reservoir located on Happy Valley Road is approximately 2.5 km from the BPS and is at an elevation of 280.0 metres.

Second Nature Water Service

The property west of Blue Vista is known as the Second Nature subdivision and is currently being constructed by others. Second Nature has constructed a 300 mm diameter watermain from Grey Road 19 along Crosswinds Boulevard, which currently terminates at the north limit of the Windfall subdivision. Once Crosswinds Boulevard has been fully constructed, the 300 mm diameter watermain will be connected to the existing 300 mm watermain through Windfall, providing a looped water distribution.

In addition, Second Nature will construct a 200 mm diameter watermain from Crosswinds Boulevard, which will terminate at the east property boundary of Second Nature. A 200 mm diameter connection will be made between Blue Vista and Second Nature at Street A to supply water to the Blue Vista subdivision.

4.2 Proposed Blue Vista Infrastructure

Design Criteria

Water supply demands for the Blue Vista development have been calculated based on Ministry guidelines and the Town of The Blue Mountain design standards, as noted below:

Residential Population	2.3 persons per unit
Average daily demand per person	450 L/day

Maximum day factor	2.0
Peak hour factor	4.5
Minimum fire flow	66.67 L/s (4000 L/min)
Maximum watermain velocity	5.0 L/s

Allowable Pressure Ranges:	
Average and maximum day demand	350 kPa to 550 kPa (50 psi to 80 psi)
Minimum and peak hour demand	275 kPa to 700 kPa (40 psi to 100 psi)
Maximum day plus fire suppression	140 kPa to 700 kPa (20 psi to 100 psi)

Water Demands

While the development is currently proposing 133 residential units, water demands have been based on 180 units (considered the upper threshold).

Design Population	= Number of units x Persons per units
	= 180 units x 2.3 persons per unit
	= 413 persons
Average day demand (ADD)	= design population x Average daily demand per person
	= 413 persons x 450 L/day
	= 185,850 L/day
	= 186 m^3/day (2.16 L/s)
Maximum day demand (MDD)	= Average day demand (ADD) x Maximum day factor
	= 186 m^3/day x 2.0
	= 372 m^3/day (4.31 L/s)
Maximum day plus fire flow	= Maximum day demand (MDD) + Minimum fire flow
	= 4.31 L/s + 67.67 L/s
	= 71.98 L/s (for 2 hours)

Water Distribution System

A water distribution system layout has been prepared to demonstrate the feasibility of providing water service to the Blue Vista development based on the proposed number of units. The layout shown on Figure 4 includes a 200 mm diameter watermain on Street A with a connection to the Second Nature Development proposed 200 mm diameter watermain. The remaining residential streets throughout the Blue Vista development will consist of looped 200 mm diameter watermains.

Water Distribution Analysis

CCTA has developed a steady state WaterCAD computer model of the portion of the Town of The Blue Mountains water distribution system in the vicinity of Blue Vista. The model is based on plan and profile drawings of all existing and proposed watermains servicing the Windfall and Second Nature subdivisions, and on operating data provided by the Town of The Blue Mountains.

The model has been updated with the proposed Blue Vista watermains and demands, and subsequently used to analyse flows and pressures throughout the system under the following water servicing schemes (the WaterCAD model settings and detailed model results are included in Appendix B):

- average day demand
- maximum day demand;
- minimum hour demand;
- peak hour demand; and
- fire flow.

The model results predict the following:

- pressures within the Blue Vista water distribution system will range between 69 psi and 81 psi, which is well within the Town of The Blue Mountains design criteria.
- available flow under a fire scenario in Blue Vista will range between 83 L/s and 120 L/s while maintaining a minimum system pressure of 120 psi, which is above the minimum required 67 L/s; and
- a maximum watermain velocity of 2.24 m/s is predicted to occur in the 200 mm diameter watermain on Street A during a fire scenario.

4.3 Summary

The WaterCAD computer model results predict that the proposed 200 mm diameter watermains servicing Blue Vista will provide an adequate supply of water to meet all applicable design criteria.

5 Stormwater Management Plan

A *Preliminary Stormwater Management (SWM) Report* has been completed by C.C. Tatham & Associates Ltd. under separate cover to review the existing and proposed stormwater conditions for the proposed Blue Vista subdivision as well as the surrounding area. The SWM report should be read in conjunction with this report, the study findings and conclusions are summarized below.

Stormwater Management Plan

The proposed stormwater management plan maintains existing drainage conditions at the existing site outlets by restricting post development peak flow rates to pre-development levels. The stormwater management plan provides the required Level 1 "Enhanced" water quality control for the site effluent at all site outlets. Safe conveyance of the Regulatory storm event peak flows through the site to the downstream drainage system is provided and the drainage from all external lands is accommodated within the proposed drainage design.

The storm sewer servicing plan is illustrated in Figure 5.

Stormwater Management Facilities

The report concludes that one dry pond will be necessary to provide stormwater quantity control for outlet to the north (Outlet 1). The dry pond in combination with a proposed oil-grit separator unit and enhanced grass swales will provide Level 1 "Enhanced" protection and will discharge to the roadside ditch at the Osler Bluff Road.

There will also be one extended detention wet pond to provide both stormwater quantity and quality controls for outlet to the east (Outlet 2). The wet pond will provide the requisite Level 1 "Enhanced" protection and will discharge to the intermittent tributary watercourse to Silver Creek.

Natural Erosion Hazard Limit

A natural hazards analysis was conducted to establish the appropriate erosion hazard setback for development of the area adjacent to the open space block.

Siltation & Erosion Control

Construction and maintenance of siltation and erosion control facilities and adherence to strict housekeeping measures during site servicing and building construction will reduce the transportation of sediment from the site, improving stormwater quality and mitigating environmental impacts during construction.

6 Traffic Impact Study

A Traffic Impact Study has been prepared by C.C. Tatham & Associated Ltd. under separate cover to address the traffic and transportation issues related to the Blue Vista development from the perspectives of external and internal road systems. The traffic study should be read in conjunction with this report, the study findings and conclusions are summarized below.

Blue Vista Traffic Generation

Overall, the development is expected to generate 132 trips during the Friday PM peak hour and 124 trips during the Saturday peak hour. Given the ski activities during the winter in the area, winter Friday PM and Saturday peak hours have been used as the study periods.

Site Access

Blue Vista traffic will have direct access to Grey Road 21 (Osler Bluff Road) to the east and access to Crosswinds Boulevard to the west via connection of the internal road through the Second Nature development.

Future Traffic Projections

To address the potential impacts of the proposed site, peak hour operations were reviewed for the 2025 (build-out of Blue Vista), 2030 (5 years beyond build-out) and 2035 (10 years beyond build-out) horizons at the intersections of Grey Road 21 (Osler Bluff Road) with Grey Road 19, Monterra Road and the proposed site access. In addition to Blue Vista traffic, future traffic volumes considered overall growth in the area plus traffic associated with other area developments either under construction or in the planning stages, including:

- additional commercial and residential development at the Blue Mountain Village;
- Manorwood Blocks 152 and 153;
- Monterra Phase 2;
- Mountain House;
- Plateau East;
- Second Nature; and
- Windfall.

Planned Road Improvements

The following road system improvements have been previously identified and were considered in this review:

- provision of a roundabout at the intersection of Grey Road 19 and Grey Road 21 for the time period 2020-2021; and
- extension of Crosswinds Boulevard through Windfall to Second Nature, with a connection to Grey Road 19 opposite Jozo Weider Boulevard by 2020.

The above noted roundabout is expected to be the same size as that at Grey Road 19 / Grey Road 119 / Gord Canning Drive, thus providing consistency along the Grey Road 19 corridor.

Traffic Operations

In addressing the study area traffic operations, the intersections of Grey Road 19 (Osler Bluff Road) with Grey Road 21 and Monterra Road were analysed under existing conditions (2018) and for the 2025, 2030 and 2035 horizon periods. The results of the operational analyses indicate that the study area intersections will provide good overall operations through 2035 under both future background and future total conditions. The operations at the site access point on Grey Road 21 (Osler Bluff Road) was also reviewed and is expected to provide excellent conditions (LOS B or better) through 2035.

The capacity of the adjacent road network was reviewed under background conditions. With projected volumes expected to exceed the planning capacity on Grey Road 19, the long-term need for additional road capacity (i.e. additional lanes) was confirmed, while Grey Road 21 (Osler Bluff Road) is expected to operate well below capacity through the 2035 horizon. It is noted that additional lane capacity on Grey Road 19 through the study area was also identified in *The Town of The Blue Mountain Comprehensive Transportation Strategic Plan* and the *Blue Mountain Resort South Base & Orchard Expansion, Town of The Blue Mountains, Traffic Impact Study.*

Turn Lane Requirements

The intersection of Grey Road 21 (Osler Bluff Road) with the proposed site access point were reviewed with respect to the need to implement exclusive turn lanes to accommodate the projected traffic volumes. While a right turn lane is not warranted at the noted intersection, a northbound left turn lane on Grey Road 21 is warranted under 2030 total conditions. It is noted that the timing of such should be confirmed through ongoing monitoring, recognizing that the assessment considers fairly conservative background growth assumptions.

Sight Line Review

Sight lines were reviewed on Grey Road 21 (Osler Bluff Road) at the proposed Site Access. The available sight distances exceed the minimum stopping sight distance requirements for a design speed

of 70 km/h. As such, vehicles manoeuvring to/from the development can do so in a safe and efficient manner and no further improvements to address sight lines are required.

7 Utilities

Electrical Service

Hydro One was contacted to determine the availability of hydro services to the development area. Confirmation that the current system on the east side of Grey Road 21 (Osler Bluff Road) has capacity for the proposed units is still required.

Gas Service

Union Gas confirmed that there is a natural gas main in the area. Confirmation of the capacity in the current system to provide service to the proposed subdivision development is still required.

Telephone & Internet Service

Bell Canada has confirmed that there is servicing in this area and has confirmed their intention to service the development site.

Rogers Communications Inc. has confirmed their intention to provide telecommunication services to the proposed development.

8 Summary

Based on the preceding analysis, the development has adequate services available to support the draft plan of subdivision, including the potential increase in lot count from 133 units to 180 units. Specifically, the proposed servicing includes:

1. an internal sanitary sewer collection system to convey sewage to the existing trunk sewer on Grey Road 21 (Osler Bluff Road) and ultimately to the Craigleith Sewage Treatment Plant;

2. an internal water distribution system to supply the needs of the development without the need for external improvements;

3. an internal storm sewer collection system to convey surface water runoff to the proposed stormwater management facilities that will provide the requisite SWM quantity and quality controls for the development; and

4. electrical, telephone, cable and gas utilities.

Detailed design drawings will be completed for both internal services and the Grey Road 21 (Osler Bluff Road) access, for approval by the Town, County and relevant approval agencies as required in support of draft plan approval and registration of the associated Subdivision Agreement.

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Intern Engineer

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Reviewed by: Michael Cullip, B.Eng. & Mgmt., M.Eng., P.Eng.
Vice President Head Office Operations

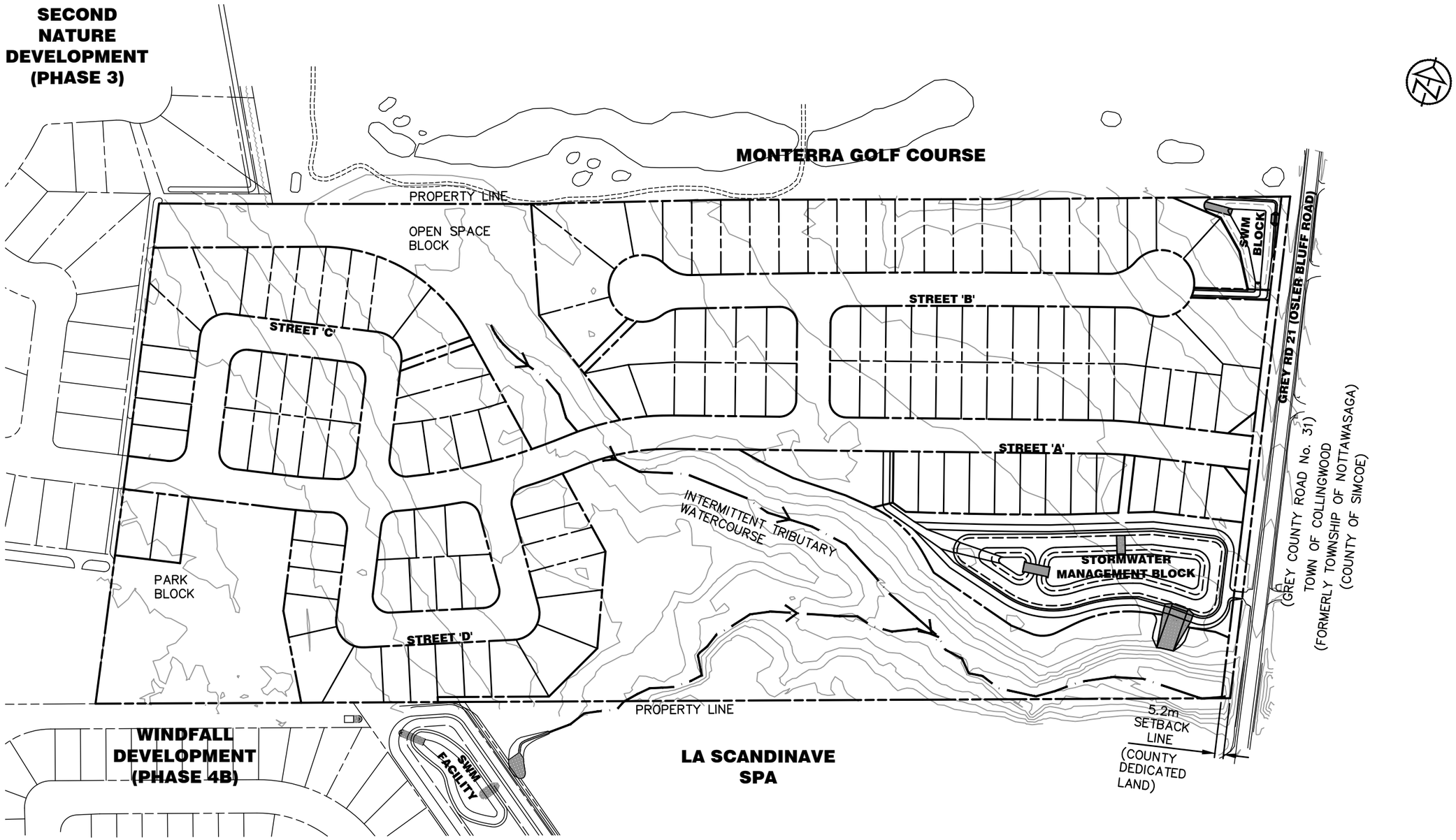
NO.	REVISIONS	DATE
1.	DRAFT PLAN APPROVAL	FEB/19

BLUE VISTA
TOWN OF THE BLUE MOUNTAINS

LOCATION PLAN

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

SCALE:	1 : 2,500		JOB NO. 117159
DESIGN:	JPA	CHECKED: RS	DWG. **FIG-1**
DRAWN:	RD	DATE: NOV/18	



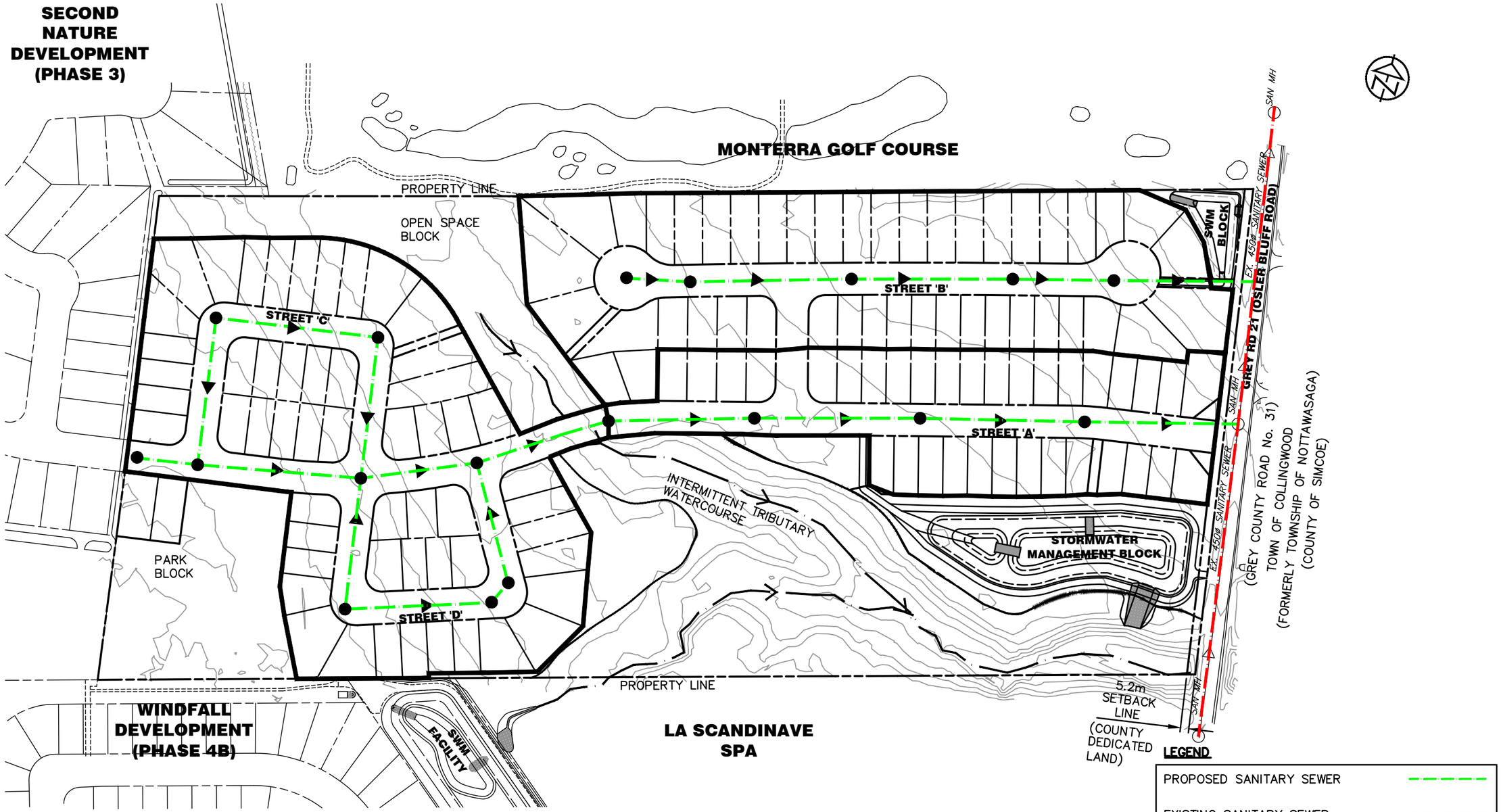
NO.	REVISIONS	DATE
1.	DRAFT PLAN APPROVAL	FEB/19

BLUE VISTA
TOWN OF THE BLUE MOUNTAINS

OVERALL PLAN

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

SCALE:	1 : 2,500			JOB NO. 117159
DESIGN:	JPA	CHECKED:	RS	DWG. **FIG-2**
DRAWN:	RD	DATE:	NOV/18	



NO.	REVISIONS	DATE
1.	DRAFT PLAN APPROVAL	FEB/19

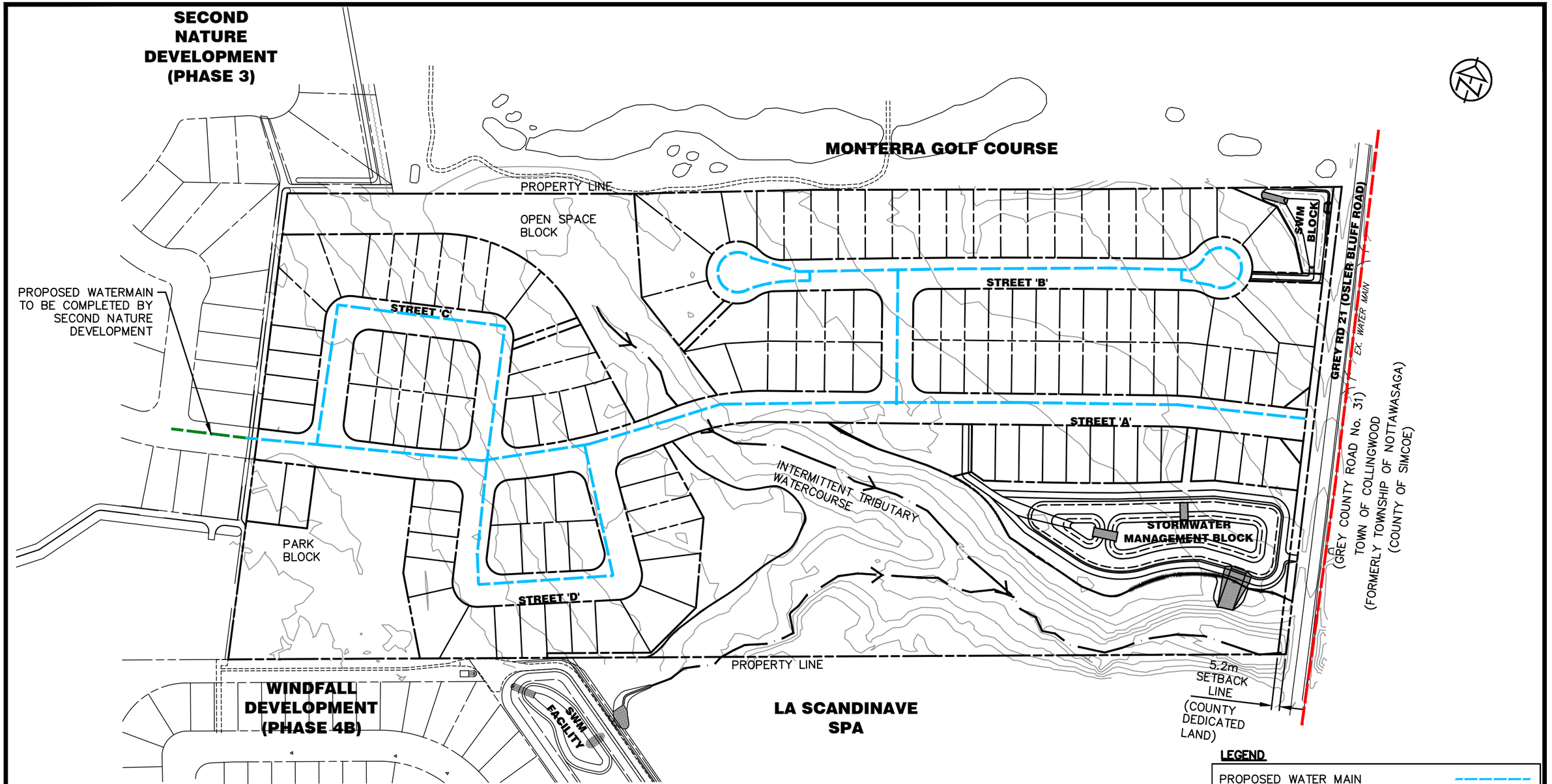
BLUE VISTA
TOWN OF THE BLUE MOUNTAINS

OVERALL SANITARY SERVICE PLAN

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

SCALE:	1 : 2,500	JOB NO.	117159
DESIGN:	JPA	CHECKED:	RS
DRAWN:	RD	DATE:	NOV/18

DWG. **FIG-3**



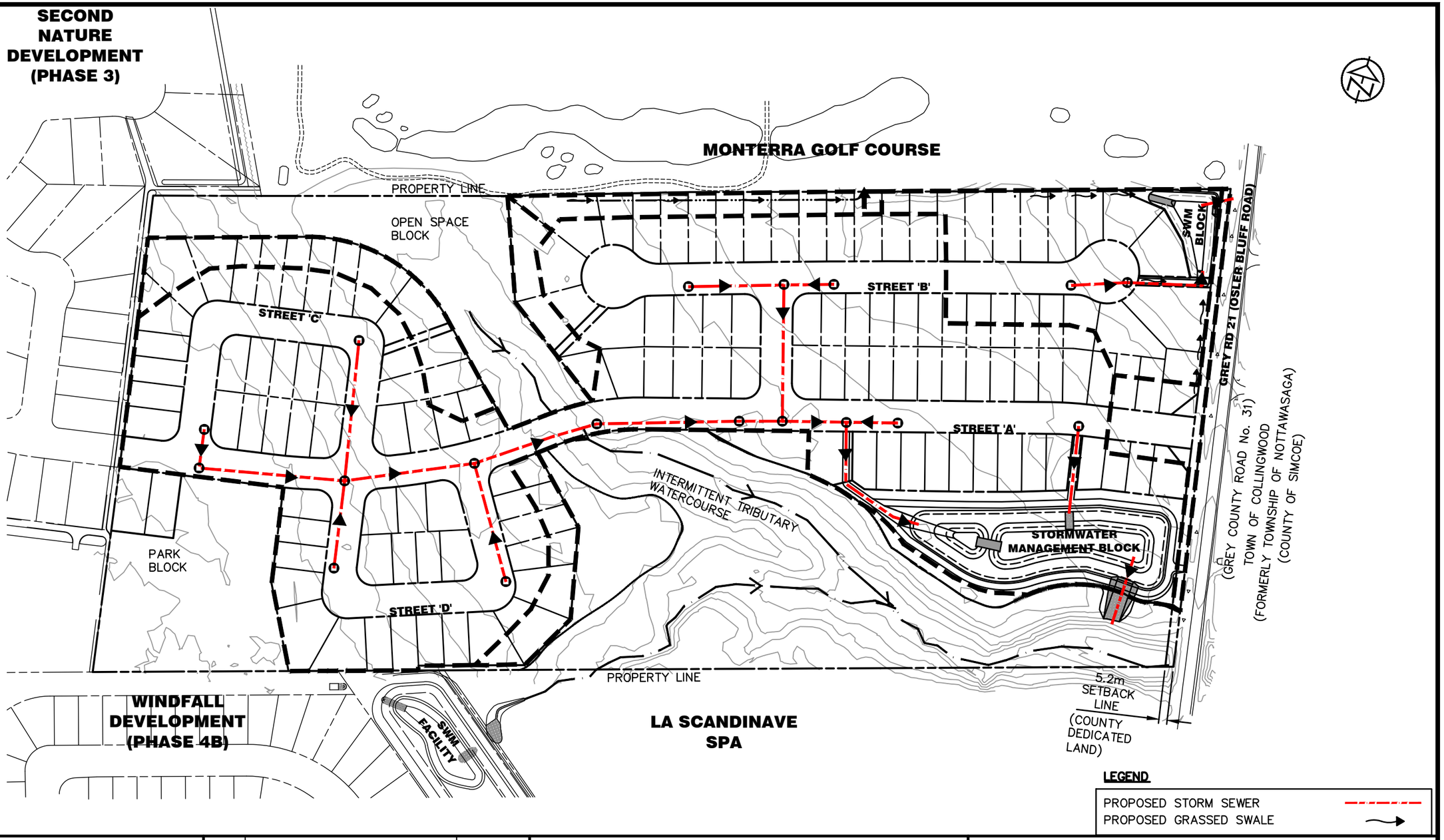
NO.	REVISIONS	DATE
1.	DRAFT PLAN APPROVAL	FEB/19

BLUE VISTA
TOWN OF THE BLUE MOUNTAINS

OVERALL WATER DISTRIBUTION PLAN

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

SCALE:	1 : 2,500		JOB NO. 117159
DESIGN:	JPA	CHECKED: RS	DWG. **FIG-4**
DRAWN:	RD	DATE: NOV/18	



NO.	REVISIONS	DATE
1.	DRAFT PLAN APPROVAL	FEB/19

BLUE VISTA
TOWN OF THE BLUE MOUNTAINS

OVERALL STORM SEWER PLAN

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

SCALE:	1 : 2,500		JOB NO. 117159
DESIGN:	JPA	CHECKED: RS	DWG. **FIG-5**
DRAWN:	RD	DATE: NOV/18	

APPENDIX A:
SANITARY SERVICING ATTACHMENTS

GREY COUNTY ROAD 21 - TRUNK SANITARY SEWER DESIGN SHEET

C.C. Tatham & Associates Ltd.
Consulting Engineers

Collingwood Bracebridge Orillia Barrie

FLOW CRITERIA (See Note 1)

Average Flow Rate:	1125	l/unit/d
Infiltration (Avg):	90	l/cap/d
Infiltration (Peak):	227	l/cap/d
Population:	2.5	cap/unit
Peaking Factor:	Harmon	

Project Name:	TRUNK SANITARY SEWER
Project Number:	August 31, 2206
Municipality:	Town of The Blue Mountains
Designed By:	JPA / PM
Date:	September 22, 2011
Checked By:	KRS
Date:	February 3, 2012
Revision Number:	1

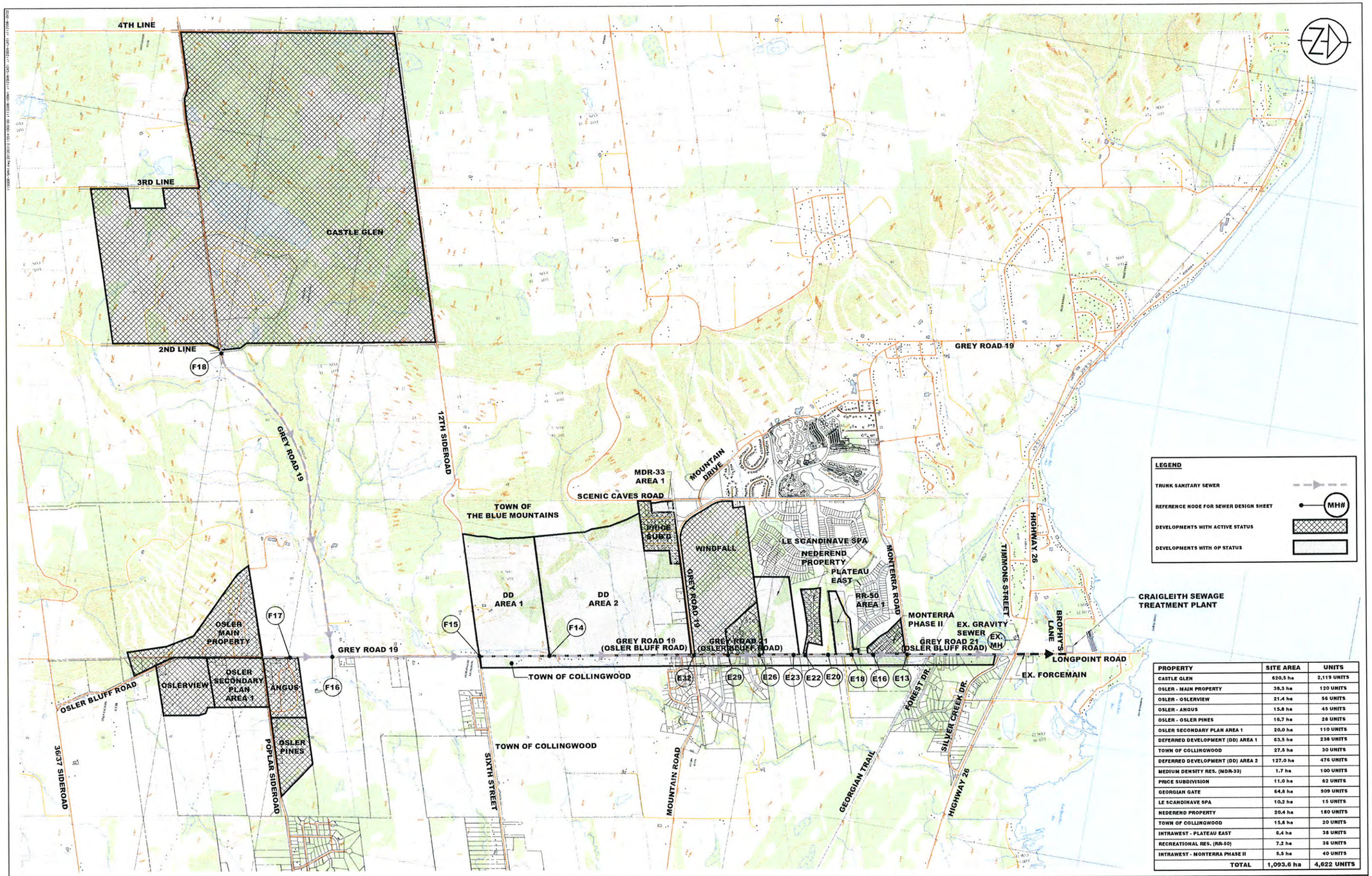
Approved:

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NUMBER OF LOTS/UNITS	ACCUMULATED NUMBER OF LOTS/UNITS	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR		AVERAGE FLOW			PEAK FLOW			PROPOSED SEWER					
										RESIDENTIAL	INFILTRATION	TOTAL	RESIDENTIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY	PEAK FLOW VELOCITY (ZERO INFILTRATION)
		MH No.	MH No.	units	units	cap.				l/s	l/s	l/s	l/s	l/s	l/s	m	mm	%	l/s	m/s	m/s
CASTLE GLEN			F18	2119	2119	5297.5	5297.5	3.22		27.59	5.52	33.11	88.89	13.92	102.81		375	0.50%	123.97	1.12	1.12
GREY ROAD 19		F18	F16	0	2119	0	5297.5	3.22		27.59	5.52	33.11	88.89	13.92	102.81	2970.0	375	4.30%	363.54	3.29	2.59
OSLER PROPERTIES			F17	359	359	897.5	897.5	3.83		4.67	0.93	5.61	17.90	2.36	20.26		200	0.50%	23.19	0.74	0.74
GREY ROAD 19		F17	F16	0	359	0	897.5	3.83		4.67	0.93	5.61	17.90	2.36	25.34	360.0	200	1.60%	41.48	1.32	1.21
GREY ROAD 19		F16	F15	0	2478	0	6195.0	3.16		32.27	6.45	38.72	101.88	16.28	123.24	1260.0	375	1.60%	221.76	2.01	1.87
DD1, TOC			F15	268	268	670.0	670.0	3.91		3.49	0.70	4.19	13.63	1.76	15.39		200	0.50%	23.19	0.74	0.74
GREY ROAD 19		F15	F14	0	2746	0	6865.0	3.11		35.76	7.15	42.91	111.37	18.04	129.41	610.0	375	0.75%	151.83	1.37	1.37
DD2			F14	476	476	1190.0	1190.0	3.75		6.20	1.24	7.44	23.24	3.13	26.37		250	0.50%	42.05	0.86	0.84
GREY ROAD 19		F14	E32	0	3222	0	8055.0	3.05		41.95	8.39	50.34	127.85	21.16	149.01	1240.0	375	0.75%	151.83	1.37	1.37
GREY ROAD 21		E32	E29	0	3222	0	8055.0	3.05		41.95	8.39	50.34	127.85	21.16	149.01	300.0	375	1.20%	192.05	1.74	1.74
MDR 33, PRICE, WINDFALL			E29	1071	1071	2677.5	2677.5				(See Note 2)	25.70		(See Note 2)	57.95		300	0.50%	68.37	0.97	0.00
GREY ROAD 21		E29	E28	0	4293	0	10732.5	2.92		55.90	11.18	92.78	163.45	28.20	249.60	94.2	450	0.80%	254.99	1.60	1.60
GREY ROAD 21		E28	E27	0	4293	0	10732.5	2.92		55.90	11.18	92.78	163.45	28.20	249.60	90.0	450	0.80%	254.99	1.60	1.60
GREY ROAD 21		E27	E26	0	4293	0	10732.5	2.92		55.90	11.18	92.78	163.45	28.20	249.60	85.0	450	1.10%	299.00	1.88	1.84
LE SCANDINAE SPA			E26	15	15	37.5	37.50				(See Note 3)	5.08		(See Note 3)	5.08	470.0	150	1.00%	15.23	0.86	0.00
GREY ROAD 21		E26	E25	0	4308	0	10770.0	2.92		56.09	11.22	98.09	163.94	28.30	255.27	95.0	450	0.90%	270.46	1.70	1.70
GREY ROAD 21		E25	E24	0	4308	0	10770.0	2.92		56.09	11.22	98.09	163.94	28.30	255.27	100.0	450	0.90%	270.46	1.70	1.70
GREY ROAD 21		E24	E23	0	4308	0	10770.0	2.92		56.09	11.22	98.09	163.94	28.30	255.27	100.0	450	2.50%	450.76	2.83	2.48
NEDERAN			E23	180	180	450.0	450.0	4.00		2.34	0.47	2.81	9.37	1.18	10.55		200	0.50%	23.19	0.74	0.66
GREY ROAD 21		E23	E22	0	4488	0	11220.0	2.90		58.44	11.69	100.91	169.75	29.48	262.26	95.0	450	2.40%	441.65	2.78	2.47
PLATEAU EAST			E22	38	38	95.0	95.0	4.25		0.49	0.10	0.59	2.10	0.25	2.35		200	0.50%	23.19	0.74	0.44
GREY ROAD 21		E22	E21	0	4526	0	11315.0	2.90		58.93	11.79	101.50	170.97	29.73	263.73	95.0	450	2.80%	477.04	3.00	2.61
GREY ROAD 21		E21	E20	0	4526	0	11315.0	2.90		58.93	11.79	101.50	170.97	29.73	263.73	100.0	450	4.20%	584.25	3.67	3.03
GREY ROAD 21 + TOC		E20	E19	20	4546	50.0	11365.0	2.90		59.19	11.84	101.81	171.62	29.86	264.51	100.0	450	3.20%	509.98	3.21	2.75
GREY ROAD 21		E19	E18	0	4546	0	11365.0	2.90		59.19	11.84	101.81	171.62	29.86	264.51	100.0	450	1.00%	285.09	1.79	1.79
RR50 (AREA 1)			E18	36	36	90.0	90.0	4.25		0.47	0.09	0.56	1.99	0.24	2.23		200	0.50%	23.19	0.74	0.44

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NUMBER OF LOTS/UNITS	ACCUMULATED NUMBER OF LOTS/UNITS	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR		AVERAGE FLOW			PEAK FLOW			PROPOSED SEWER					
										RESIDENTIAL	INFILTRATION	TOTAL	RESIDENTIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY	PEAK FLOW VELOCITY (ZERO INFILTRATION)
		MH No.	MH No.	units	units	cap.				l/s	l/s	l/s	l/s	l/s	l/s	m	mm	%	l/s	m/s	m/s
GREY ROAD 21		E18	E17	0	4582	0	11455.0	2.90		59.66	11.93	102.37	172.77	30.10	265.90	100.0	450	1.00%	285.09	1.79	1.79
GREY ROAD 21		E17	E16	0	4582	0	11455.0	2.90		59.66	11.93	102.37	172.77	30.10	265.90	85.2	450	1.00%	285.09	1.79	1.79
MONTERRA PHASE II			E13	40	40	100.0	100.0	4.24		0.52	0.10	0.53	2.21	0.26	2.47		200	0.50%	23.19	0.74	
GREY ROAD 21		E16	E15	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	99.8	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E15	E14	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	100.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E14	E13	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	92.3	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E13	E12	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	82.7	525	0.70%	359.79	1.66	1.57
GREY ROAD 21		E12	E11	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	80.0	525	0.70%	359.79	1.66	1.57
GREY ROAD 21		E11	E10	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	79.7	525	0.70%	359.79	1.66	1.57
GREY ROAD 21		E10	E9	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	80.3	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E9	E8	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	80.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E8	E7	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	100.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E7	E6	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	100.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E6	E5	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	100.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E5	E4	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	98.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E4	E3	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	97.5	525	0.40%	271.98	1.26	1.26
HIGHWAY 26		E3	E2	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	37.4	300	0.40%	61.15	0.87	0.87
HIGHWAY 26		E2	E1	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	42.7	300	0.40%	61.15	0.87	0.87
HIGHWAY 26		E1	EX SAN MH	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	72.4	300	0.22%	45.35	0.64	0.64

Notes:

1. Flow criteria based on the MOE Design Guidelines included in the Class EA for Craigleith Sewage Treatment Plant Expansion Environmental Study Report (Nov. 2009)
2. Flow calculated for MOR 33, Price and Windfall based on Windfall Master Servicing Sanitary Sewer Design Sheet and Town criterial for residential and extraneous flows.
3. Total peak flow generated by Le Scandinave Spa based on Part 7 of the Ontario Building Code. The calculated peak flow is used as an average flow to be conservative. See attached summary and design sheet for more information.



PROPERTY	SITE AREA	UNITS
CASTLE GLEN	620.5 ha	2,119 UNITS
OSLER - MAIN PROPERTY	38.3 ha	120 UNITS
OSLER - OSLERVIEW	21.4 ha	56 UNITS
OSLER - ANGUS	15.8 ha	45 UNITS
OSLER - OSLER PINES	16.7 ha	28 UNITS
OSLER SECONDARY PLAN AREA 1	20.0 ha	110 UNITS
DEFERRED DEVELOPMENT (DD) AREA 1	63.5 ha	238 UNITS
TOWN OF COLLINGWOOD	27.5 ha	30 UNITS
DEFERRED DEVELOPMENT (DD) AREA 2	127.0 ha	476 UNITS
MEDIUM DENSITY RES. (MDR-33)	1.7 ha	100 UNITS
PRICE SUBDIVISION	11.0 ha	62 UNITS
GEORGIAN GATE	64.8 ha	909 UNITS
LE SCANDINAVE SPA	10.2 ha	15 UNITS
NEDEREND PROPERTY	20.4 ha	180 UNITS
TOWN OF COLLINGWOOD	15.8 ha	20 UNITS
INTRAWEST - PLATEAU EAST	6.4 ha	38 UNITS
RECREATIONAL RES. (RR-50)	7.2 ha	36 UNITS
INTRAWEST - MONTERRA PHASE II	5.5 ha	40 UNITS
TOTAL	1,093.6 ha	4,622 UNITS

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL
1.	ISSUED FOR MOE ECA APPROVAL	MAR 12/12	KRS

APPROVED

LICENSED PROFESSIONAL ENGINEER K. R. SANSOM PROVINCE OF ONTARIO

GREY COUNTY ROAD 21 TRUNK SANITARY SEWER TOWN OF THE BLUE MOUNTAINS

SANITARY CONTRIBUTION AREA PLAN

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

SCALE: 1 : 15000		JOB NO.	112008-1
DESIGN: JPA/PM	CHECKED: KRS	DWG.	SAN-1
DRAWN: JPA	DATE: SEPT. 2011		

PRELIMINARY SANITARY SEWER DESIGN SHEET

Approved:

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

FLOW CRITERIA

Average Flow Rate:	450 l/cap/d
Infiltration Rate:	0.23 l/s/ha
Population:	2.3 cap/unit
Peaking Factor:	Harmon

Project Name:	BlueVista
Project Number:	October 7, 2220
Municipality:	Town of The Blue Mountains
Designed By:	ARO
Date:	Nov 30 2018
Checked By:	
Date:	
Revision Number:	

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR	AREA	ACCUMULATED AREA	AVERAGE FLOW			PEAK FLOW			PROPOSED SEWER					
									RESIDENTIAL	INFILTRATION	TOTAL	RESIDENTIAL	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	l/s	l/s	l/s	l/s	l/s	l/s	m	mm	%	l/s	m/s	m/s
STREET 'C', 'D' and 'A'	100	4	3	89.7	89.7	4.26	4.25	4.25	0.47	0.98	**1.44**	1.99	0.98	**2.97**	515	200	0.50%	**23.19**	0.74	0.44
STREET 'D'	101	3	2	27.6	117.3	4.22	1.21	5.46	0.61	1.26	**1.87**	2.58	1.26	**3.84**	150	200	0.50%	**23.19**	0.74	0.47
STREET 'A'	102	2	1	195.5	312.8	4.07	2.62	8.08	1.63	1.86	**3.49**	6.63	1.86	**8.49**	385	200	0.50%	**23.19**	0.74	0.61
STREET 'B'	103	5	6	101.2	503.7	3.97	4.54	16.87	2.62	3.88	**6.50**	10.42	3.88	**14.30**	385	200	0.50%	**23.19**	0.74	0.68

Notes:
1. Refer to Overall Sanitary Drainage Plan Figure FIG-3 prepared by C.C. Tatham and Associates for catchment areas.

C.C. Tatham & Associates Ltd.
Consulting Engineers

Collingwood Bracebridge Orillia Barrie

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Collingwood, Ontario L9Y 5A6
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Fax: (705) 444-2327
Email: info@cctatham.com
Web: www.cctatham.com

March 13, 2012

via e-mail & mail
CCTA File 112008

Reg Russwurm
Director of Engineering and Public Works
Town of The Blue Mountains
32 Mill Street
P.O. Box 310
Thornbury, ON N0H 2P0

Re: Grey County Road 21 Trunk Sanitary Sewer
Outlet Capacity

Dear Reg:

1.0 Introduction

Further to the Project Initiation Meeting on February 24, 2012, we have prepared the following technical summary in support of the Grey County Road 21 (GR 21) Trunk Sanitary Sewer project.

The primary purpose of this summary is to provide background for the areas included on the sanitary sewer design sheet and to assess the capacity of the downstream sanitary sewer along Highway 26 in order to determine the approximate number of additional units from the Windfall and surrounding properties that can be accommodated before the trunk sanitary sewer north of Highway 26 and the lift station at the sewage treatment plant are required.

We have also provided an overview to address the Town's comments with respect to the depth of the trunk sewer and the ability to extend the sewer to service the future developments south of the Mountain Road.

2.0 Unit Allocation

In order to estimate the sanitary sewage flows for the service areas contributing to the GR 21 trunk sewer, various municipal documents were reviewed. The following list summarizes the sources for the service areas shown on the overall Sanitary Contribution Area Plan (SAN-1):

Castle Glen: Development Plan and Combined EA Master Servicing Plan (June 2006)

Osler Lands: Combined EA Master Servicing Report

Deferred Development (1 & 2): Official Plan – DD designation – Assumed 75% of area would be developed (excluding EP & slope lands) at a rate of 5 units/ha.

Town of Collingwood: Town request to service only lands fronting on the Town line (GR's 19 & 21)

Medium Density adjacent to Price Subdivision: Official Plan

Price Subdivision: Actual lot count

Georgian Gate (Windfall): Initial Plan of Subdivision (Draft Plan and future medium density)

Le Scandinave Spa: Building Code

Nederend Property: Assumption similar to adjacent lands

Plateau East (Intrawest): Draft Plan

RR-50: Assumption based on comparison to Plateau East

Monterra Phase 2: Draft Plan

The total unit count of 4,622 shown on Drawing SAN-1 was used to develop the overall sanitary sewer design sheet for GC 21.

3.0 Temporary System Capacity

The "short term sewage servicing alternative – 4 'B'" as described in Section 8.2.2 of the Combined EA Master Plan for Craigleith, Castle Glen and Osler (June 2006), relies on the existing 300 mm diameter sanitary sewer between GR 21 and Timmins Road to provide the initial capacity until such time as the section of trunk sewer north of Highway 26 and the lift station at the plant are required.

We have reviewed the record drawings provided by the Town for the existing 300 mm diameter sanitary sewer between GR 21 and Timmins Road. The 300 mm dia. sewer east of Timmins Road between San MH 56 to San MH 66 has been installed at an average slope of 0.22% for the first 863 m. Although the drawings show some sewer sections at flatter slopes we believe it is reasonable to use the average slope in this section to calculate the available capacity. The sewer increases in slope east of San MH 66, to approximately 0.5%, to San MH 69 where the GR 21 sewer will connect. The capacity of a 300 mm diameter sewer at 0.22% is calculated to be 45.35 L/s for a pipe coefficient n=0.013. Although 0.013 is a generally accepted coefficient for sanitary sewers, the literature suggests that a coefficient of 0.011 to 0.009 is appropriate for PVC pipe. Applying these would produce a capacity for this pipe in the range of 54 L/s to 66 L/s.

There are currently approximately 38 parcels of land connected on the south side of Highway 26 and 7 on the north for a total of 45 parcels. Included in these 45 parcels is a motel converted to a condominium, plus 2 motels and two other commercial operations. Conservatively, we estimate a total of 75 equivalent units are currently or could be directly connected to the existing 300 mm diameter sanitary sewer between GR 21 and the Timmins Road sewer (750 dia. trunk).

3.1 Estimated Flow Per Unit

In order to estimate future overall sanitary sewage generation rates, MOE design guidelines as presented on page 12 of the Class Environmental Assessment for the Craigleith Sewage Treatment Plant Stage 3 Expansion (2009) were considered. The assessment uses an average flow rate of 1,125 L/unit/day (450 L/cap/day X 2.5 cap/unit) plus 225 L/unit/day for infiltration or a total of 1,350 L/unit/day. Considering the peak season average flows presented in Table 3 on page 7 of the assessment which shows the average daily flow of 890 L/unit/day, the above noted design criteria of 1,350 L/unit/day could be reduced by .34%.

In order to estimate the peak flow per unit we have considered the flows calculated using the Windfall Sanitary Sewer Design Sheets which was based on the Town of the Blue Mountains Engineering Standards. The Town standards apply an average flow rate of 1,035 L/unit/day (450 L/cap/day X 2.3 cap/unit) plus 0.23 L/s/ha for infiltration. The service area contributing to the 300 mm diameter sewer connecting Windfall to GR 21 at MH E29 includes a total of 1,071 equivalent units for a total population of 2,463 with a calculated peak flow of 57.95 L/s or 0.054 L/unit/s. A copy of the Windfall Sanitary Sewer Design Sheet is attached.

The overall trunk sewer design sheet uses similar per capita flows based on MOE design guidelines presented on page 12 of the Class Environmental Assessment for the Craigleith Sewage Treatment Plant Stage III Expansion (2009) (excluding the Windfall connection) of 1,125 L/unit/day (450 L/capita/day x 2.5 capita/unit) and peak infiltration of 227 L/capita/d. The resulting peak flow for 4,622 equivalent units was thus calculated to be 267.44 L/s or 0.058 L/unit/s. A copy of the GC 21 Trunk Sanitary Sewer Design Sheet is enclosed.

3.2 Available Capacity

By comparing the design flows to the historical flow data at the plant, it is reasonable to assume that the range of peak flows to use to establish the available capacity is in the range of 0.054 L/unit/s to 66% of design flow or 0.036 L/unit/s.

Assuming the overall capacity of the existing 300 mm dia. sewer on Highway 26 is 45.35 L/s, the capacity in terms of units would range from 840 to 1,260 units.

Considering the existing Highway 26 frontage already conveys sewage flows from approximately 75 equivalent units, the capacity in terms of units available for the GR 21 trunk sewer would be in the range of 765 to 1,185.

Assuming a growth rate of 60 units per year, the extension of the larger sewer will not be required for at least 12 years and likely over 20 years depending on the per capita flow being generated and the rate of development.

3.3 Monitoring

In light of all the variables involved in these calculations (occupancy rate, per capita flows, peaking factors, and sewer design coefficient) we recommend that a sewer flow monitoring program be established to check flows during the peak winter period starting in approximately 5 years and then repeating every 3 to 5 years depending on the results. By monitoring the actual flow to calculate the sewer capacity combined with knowing the actual number of connections, the Town can determine well in advance when the trunk sewer extension and lift station will be required.

4.0 Future Developments South of Windfall Development

In addition to the plan-profile drawings included with the submission, we have included drawing PP-10 which shows a future trunk sanitary sewer adjacent to the Windfall development from San MH E29 to San MH 32 at the intersection of GR 21 to GR 19 (Mountain Road). The future sanitary sewer at San MH E32 has the potential to be over 6 m in depth.

The road continues to rise to the south at an average grade of approximately 0.66% to the 6th Street intersection after which the grade increases. We also considered the need to cross under a significant culvert located approximately 1,200 m south of Mountain Road and determined that the proposed pipe and grade are appropriate. A more detailed assessment can be made at the time the sewer is extended, but at this time the design is considered conservative. We have included copies of the plan and profile sheets that were prepared in 1989 which have been marked up to demonstrate the grades shown on the sewer design sheet.

We trust you will find the above satisfactory. Should you require more detailed calculations please let us know.

Yours truly,

C.C. Tatham & Associates Ltd.

Original Signed by

Larry Hogarth, C.E.T.
Senior Municipal Technologist

Original Signed by

Kevin Sansom, B.A.Sc., P.Eng.
Project Manager

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GREY COUNTY ROAD 21 - TRUNK SANITARY SEWER DESIGN SHEET

C.C. Tatham & Associates Ltd.
Consulting Engineers

Collingwood Bracebridge Orillia Barrie

FLOW CRITERIA (See Note 1)

Average Flow Rate:	1125	l/unit/d
Infiltration (Avg):	90	l/cap/d
Infiltration (Peak):	227	l/cap/d
Population:	2.5	cap/unit
Peaking Factor:	Harmon	

Project Name:	TRUNK SANITARY SEWER
Project Number:	August 31, 2206
Municipality:	Town of The Blue Mountains
Designed By:	JPA / PM
Date:	September 22, 2011
Checked By:	KRS
Date:	February 3, 2012
Revision Number:	1

Approved:

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NUMBER OF LOTS/UNITS	ACCUMULATED NUMBER OF LOTS/UNITS	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR		AVERAGE FLOW			PEAK FLOW			PROPOSED SEWER					
										RESIDENTIAL	INFILTRATION	TOTAL	RESIDENTIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY	PEAK FLOW VELOCITY (ZERO INFILTRATION)
		MH No.	MH No.	units	units	cap.				l/s	l/s	l/s	l/s	l/s	l/s	m	mm	%	l/s	m/s	m/s
CASTLE GLEN			F18	2119	2119	5297.5	5297.5	3.22		27.59	5.52	33.11	88.89	13.92	102.81		375	0.50%	123.97	1.12	1.12
GREY ROAD 19		F18	F16	0	2119	0	5297.5	3.22		27.59	5.52	33.11	88.89	13.92	102.81	2970.0	375	4.30%	363.54	3.29	2.59
OSLER PROPERTIES			F17	359	359	897.5	897.5	3.83		4.67	0.93	5.61	17.90	2.36	20.26		200	0.50%	23.19	0.74	0.74
GREY ROAD 19		F17	F16	0	359	0	897.5	3.83		4.67	0.93	5.61	17.90	2.36	25.34	360.0	200	1.60%	41.48	1.32	1.21
GREY ROAD 19		F16	F15	0	2478	0	6195.0	3.16		32.27	6.45	38.72	101.88	15.28	123.24	1260.0	375	1.60%	221.76	2.01	1.87
DD1, TOC			F15	268	268	670.0	670.0	3.91		3.49	0.70	4.19	13.63	1.76	15.39		200	0.50%	23.19	0.74	0.74
GREY ROAD 19		F15	F14	0	2746	0	6865.0	3.11		35.76	7.15	42.91	111.37	18.04	129.41	610.0	375	0.75%	151.83	1.37	1.37
DD2			F14	476	476	1190.0	1190.0	3.75		6.20	1.24	7.44	23.24	3.13	26.37		250	0.50%	42.05	0.86	0.84
GREY ROAD 19		F14	E32	0	3222	0	8055.0	3.05		41.95	8.39	50.34	127.85	21.16	149.01	1240.0	375	0.75%	151.83	1.37	1.37
GREY ROAD 21		E32	E29	0	3222	0	8055.0	3.05		41.95	8.39	50.34	127.85	21.16	149.01	300.0	375	1.20%	192.05	1.74	1.74
MDR 33, PRICE, WINDFALL			E29	1071	1071	2677.5	2677.5				(See Note 2)	25.70		(See Note 2)	57.95		300	0.50%	68.37	0.97	0.00
GREY ROAD 21		E29	E28	0	4293	0	10732.5	2.92		55.90	11.18	92.78	163.45	28.20	249.60	94.2	450	0.80%	254.99	1.60	1.60
GREY ROAD 21		E28	E27	0	4293	0	10732.5	2.92		55.90	11.18	92.78	163.45	28.20	249.60	90.0	450	0.80%	254.99	1.60	1.60
GREY ROAD 21		E27	E26	0	4293	0	10732.5	2.92		55.90	11.18	92.78	163.45	28.20	249.60	85.0	450	1.10%	299.00	1.88	1.84
LE SCANDINAE SPA			E26	15	15	37.5	37.50				(See Note 3)	5.08		(See Note 3)	5.08	470.0	150	1.00%	15.23	0.86	0.00
GREY ROAD 21		E26	E25	0	4308	0	10770.0	2.92		56.09	11.22	98.09	163.94	28.30	255.27	95.0	450	0.90%	270.46	1.70	1.70
GREY ROAD 21		E25	E24	0	4308	0	10770.0	2.92		56.09	11.22	98.09	163.94	28.30	255.27	100.0	450	0.90%	270.46	1.70	1.70
GREY ROAD 21		E24	E23	0	4308	0	10770.0	2.92		56.09	11.22	98.09	163.94	28.30	255.27	100.0	450	2.50%	450.76	2.83	2.48
NEDERAN			E23	180	180	450.0	450.0	4.00		2.34	0.47	2.81	9.37	1.18	10.55		200	0.50%	23.19	0.74	0.66
GREY ROAD 21		E23	E22	0	4488	0	11220.0	2.90		58.44	11.69	100.91	169.75	29.48	262.26	95.0	450	2.40%	441.65	2.78	2.47
PLATEAU EAST			E22	38	38	95.0	95.0	4.25		0.49	0.10	0.59	2.10	0.25	2.35		200	0.50%	23.19	0.74	0.44
GREY ROAD 21		E22	E21	0	4526	0	11315.0	2.90		58.93	11.79	101.50	170.97	29.73	263.73	95.0	450	2.80%	477.04	3.00	2.61
GREY ROAD 21		E21	E20	0	4526	0	11315.0	2.90		58.93	11.79	101.50	170.97	29.73	263.73	100.0	450	4.20%	584.25	3.67	3.03
GREY ROAD 21 + TOC		E20	E19	20	4546	50.0	11365.0	2.90		59.19	11.84	101.81	171.62	29.86	264.51	100.0	450	3.20%	509.98	3.21	2.75
GREY ROAD 21		E19	E18	0	4546	0	11365.0	2.90		59.19	11.84	101.81	171.62	29.86	264.51	100.0	450	1.00%	285.09	1.79	1.79
RR50 (AREA 1)			E18	36	36	90.0	90.0	4.26		0.47	0.09	0.56	1.99	0.24	2.23		200	0.50%	23.19	0.74	0.44

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NUMBER OF LOTS/UNITS	ACCUMULATED NUMBER OF LOTS/UNITS	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR		AVERAGE FLOW			PEAK FLOW			PROPOSED SEWER					
										RESIDENTIAL	INFILTRATION	TOTAL	RESIDENTIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY	PEAK FLOW VELOCITY (ZERO INFILTRATION)
		MH No.	MH No.	units	units	cap.				l/s	l/s	l/s	l/s	l/s	l/s	m	mm	%	l/s	m/s	m/s
GREY ROAD 21		E18	E17	0	4582	0	11455.0	2.90		59.66	11.93	102.37	172.77	30.10	265.90	100.0	450	1.00%	285.09	1.79	1.79
GREY ROAD 21		E17	E16	0	4582	0	11455.0	2.90		59.66	11.93	102.37	172.77	30.10	265.90	85.2	450	1.00%	285.09	1.79	1.79
MONTERRA PHASE II			E13	40	40	100.0	100.0	4.24		0.52	0.10	0.53	2.21	0.26	2.47		200	0.50%	23.19	0.74	
GREY ROAD 21		E16	E15	0	4522	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	99.8	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E15	E14	0	4522	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	100.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E14	E13	0	4522	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	92.3	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E13	E12	0	4522	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	82.7	525	0.70%	359.79	1.66	1.57
GREY ROAD 21		E12	E11	0	4522	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	80.0	525	0.70%	359.79	1.66	1.57
GREY ROAD 21		E11	E10	0	4522	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	79.7	525	0.70%	359.79	1.66	1.57
GREY ROAD 21		E10	E9	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	80.3	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E9	E8	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	80.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E8	E7	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	100.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E7	E6	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	100.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E6	E5	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	100.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E5	E4	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	98.0	525	0.40%	271.98	1.26	1.26
GREY ROAD 21		E4	E3	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	97.5	525	0.40%	271.98	1.26	1.26
HIGHWAY 26		E3	E2	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	37.4	300	0.40%	61.15	0.87	0.87
HIGHWAY 26		E2	E1	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	42.7	300	0.40%	61.15	0.87	0.87
HIGHWAY 26		E1	EX SAN MH	0	4622	0	11555.0	2.89		60.18	12.04	103.00	174.05	30.36	267.44	72.4	300	0.22%	45.35	0.64	0.64

Notes:

1. Flow criteria based on the MOE Design Guidelines included in the Class EA for Craigleith Sewage Treatment Plant Expansion Environmental Study Report (Nov. 2009)
2. Flow calculated for MDR 33, Price and Windfall based on Windfall Master Servicing Sanitary Sewer Design Sheet and Town criterial for residential and extraneous flows.
3. Total peak flow generated by Le Scandinave Spa based on Part 7 of the Ontario Building Code. The calculated peak flow is used as an average flow to be conservative. See attached summary and design sheet for more information.

MASTER SERVICING - SANITARY SEWER DESIGN SHEET

Approved:

C.C. Tatham & Associates Ltd.
Consulting Engineers

Collingwood Bracebridge Orillia Barrie

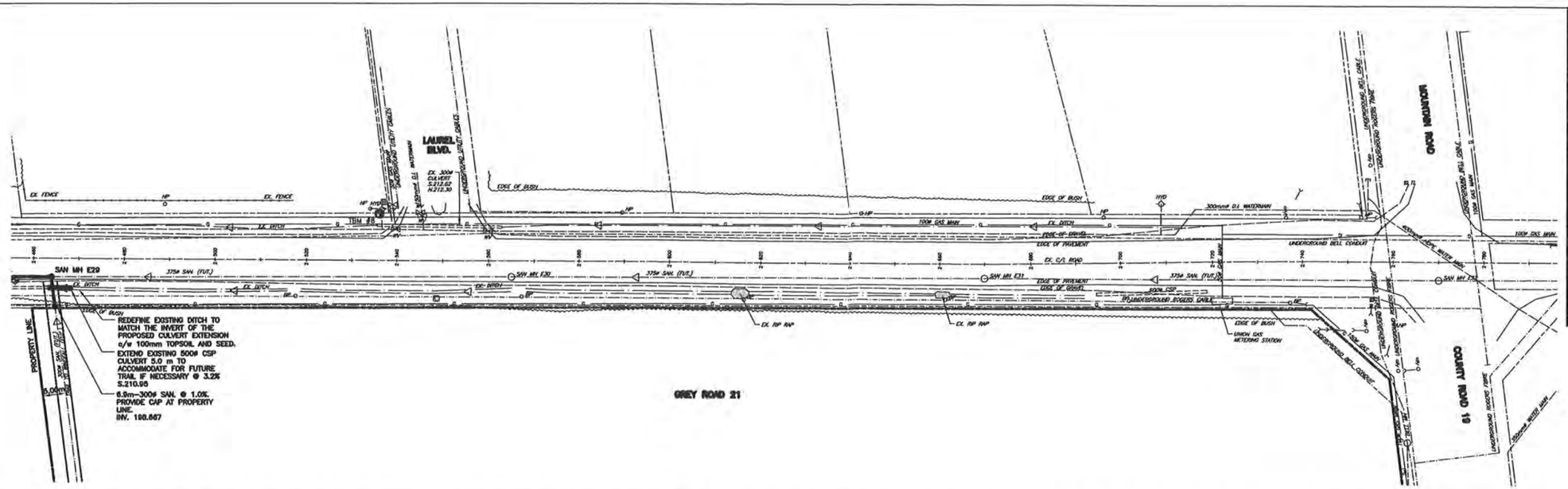
FLOW CRITERIA

Average Flow Rate:	450 l/cap/d
Infiltration Rate:	0.23 l/s/ha
Population:	2.3 cap/unit
Peaking Factor:	Harmon

Project Name:	Windfall - Master Servicing
Project Number:	111179-2
Municipality:	Town of The Blue Mountains
Designed By:	JPA
Date:	September 8, 2011
Checked By:	PM
Date:	January 6, 2012
Revision Number:	ORIGINAL

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR	AREA	ACCUMULATED AREA	AVERAGE FLOW			PEAK FLOW			PROPOSED SEWER					
									RESIDENTIAL	INFILTRATION	TOTAL	RESIDENTIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY	PEAK FLOW VELOCITY (2ERO INFILTRATION)
		MH No.	MH No.	cap.	cap.		ha	ha	l/s	l/s	l/s	l/s	l/s	l/s	m	mm	%	l/s	m/s	m/s
STREET 'D' and 'F'	100	SAN MH 508	SAN MH 408	232.3	232.3	4.12	6.22	6.22	1.21	1.43	**2.64**	4.99	1.43	**6.42**	478	200	1.40%	**38.80**	1.24	0.82
STREET 'D' and 'E'	101	SAN MH 415	SAN MH 408	296.7	296.7	4.08	6.16	6.16	1.55	1.42	**2.96**	6.31	1.42	**7.72**	484	200	1.10%	**34.40**	1.09	0.80
STREET 'G'	102	SAN MH 408	SAN MH 404	71.3	600.3	3.93	2.39	14.77	3.13	3.40	**6.52**	12.29	3.40	**15.69**	245	200	1.70%	**42.76**	1.36	1.12
STREET 'G'	103	SAN MH 404	SAN MH 112	80.5	680.8	3.90	1.72	16.49	3.55	3.79	**7.34**	13.83	3.79	**17.63**	229	200	0.50%	**23.19**	0.74	0.74
VARIOUS EX STREETS	104/105	SAN MH F13	SAN MH 206	363.4	363.4	4.04	13.36	13.36	1.89	3.07	**4.97**	7.65	3.07	**10.72**	638	200	0.70%	**27.44**	0.87	0.71
STREET 'C'	106	SAN MH 211	SAN MH 206	103.5	103.5	4.24	1.97	1.97	0.54	0.45	**0.99**	2.29	0.45	**2.74**	238	200	1.00%	**32.80**	1.04	0.58
STREET 'C'	107	SAN MH 206	SAN MH 122	117.3	584.2	3.94	2.48	17.81	3.04	4.10	**7.14**	11.98	4.10	**16.08**	299	200	1.00%	**32.80**	1.04	0.91
STREET 'C'	108	SAN MH 211	SAN MH 122	133.4	133.4	4.21	5.01	5.01	0.69	1.15	**1.85**	2.92	1.15	**4.08**	458	200	1.00%	**32.80**	1.04	0.62
STREET 'B'	109	SAN MH 122	SAN MH 120	6.9	724.5	3.89	0.46	23.28	3.77	5.35	**9.13**	14.66	5.35	**20.02**	141	200	2.60%	**52.88**	1.68	1.37
STREET 'B'	110	SAN MH 124	SAN MH 120	23.0	23.0	4.37	0.75	0.75	0.12	0.17	**0.29**	0.52	0.17	**0.70**	108	200	1.00%	**32.80**	1.04	0.39
STREET 'B'	111	SAN MH 120	SAN MH 118	18.4	765.9	3.87	0.60	24.63	3.99	5.66	**9.65**	15.44	5.66	**21.11**	72	200	2.00%	**46.38**	1.48	1.26
STREET 'B'	112	SAN MH 124	SAN MH 118	36.8	36.8	4.34	1.33	1.33	0.19	0.31	**0.50**	0.83	0.31	**1.14**	217	200	0.50%	**23.19**	0.74	0.35
Neighbourhood Park	113	SAN MH 118	SAN MH 115	0.0	802.7	3.86	0.13	26.09	4.18	6.00	**10.18**	16.14	6.00	**22.14**	141	200	0.50%	**23.19**	0.74	0.74
STREET 'I'	114	SAN MH 312	SAN MH 115	39.1	39.1	4.34	1.32	1.32	0.20	0.30	**0.51**	0.88	0.30	**1.19**	164	200	2.00%	**46.38**	1.48	0.58
		SAN MH 115	SAN MH 114	0.0	841.8	3.85	0.00	27.41	4.38	6.30	**10.69**	16.87	6.30	**23.17**	5	200	0.60%	**25.40**	0.81	0.81
STREET 'H'	115	SAN MH 308	SAN MH 114	119.6	119.6	4.22	2.57	2.57	0.62	0.59	**1.21**	2.63	0.59	**3.22**	305	200	1.70%	**42.76**	1.36	0.74
STREET 'I'	116	SAN MH 114	SAN MH 112	20.7	982.1	3.81	0.63	30.61	5.12	7.04	**12.16**	19.46	7.04	**26.50**	88	250	0.60%	**46.06**	0.94	0.86
STREET 'G'	117	SAN MH 112	SAN MH 109	2.3	1665.2	3.65	0.38	47.48	8.67	10.92	**19.59**	31.62	10.92	**42.54**	99	300	0.50%	**68.37**	0.97	0.90
STREET 'G'	118	SAN MH 607	SAN MH 109	108.1	108.1	4.23	3.28	3.28	0.56	0.75	**1.32**	2.38	0.75	**3.14**	379	200	0.70%	**27.44**	0.87	0.52
BLOCK S	119	SAN MH 109	SAN MH 102	0.0	1773.3	3.63	0.24	51.00	9.24	11.73	**20.97**	33.49	11.73	**45.22**	264	300	0.80%	**86.48**	1.22	1.09
6.0 m BLOCK (Sanitary Sewer)	120	SAN MH 102	SAN MH E29	690.0	2463.3	3.51	4.96	55.96	12.83	12.87	**25.70**	45.08	12.87	**57.95**	188	300	0.50%	**68.37**	0.97	0.97

Notes:
1. Refer to Master Servicing Sanitary Drainage Plan drawing SAN-1 prepared by C.C. Tatham and Associates for catchment areas.



KEY PLAN
NTS

CHAINAGE	2+460	2+480	2+500	2+520	2+540	2+560	2+580	2+600	2+620	2+640	2+660	2+680	2+700	2+720	2+740	2+760	2+780	2+797	CHAINAGE
EXISTING C/L ELEV	212.09	212.50	212.86	213.16	213.53	213.89	214.22	214.53	214.89	215.19	215.54	215.90	216.26	216.57	216.78	216.99	217.12	217.17	EXISTING C/L ELEV
PROPOSED C/L ELEV	212.09	212.50	212.86	213.16	213.53	213.89	214.22	214.53	214.89	215.19	215.54	215.90	216.26	216.57	216.78	216.99	217.12	217.17	PROPOSED C/L ELEV

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL
1.	ISSUED FOR MOE ECA APPROVAL	KRS	MAR 12/12

APPROVED

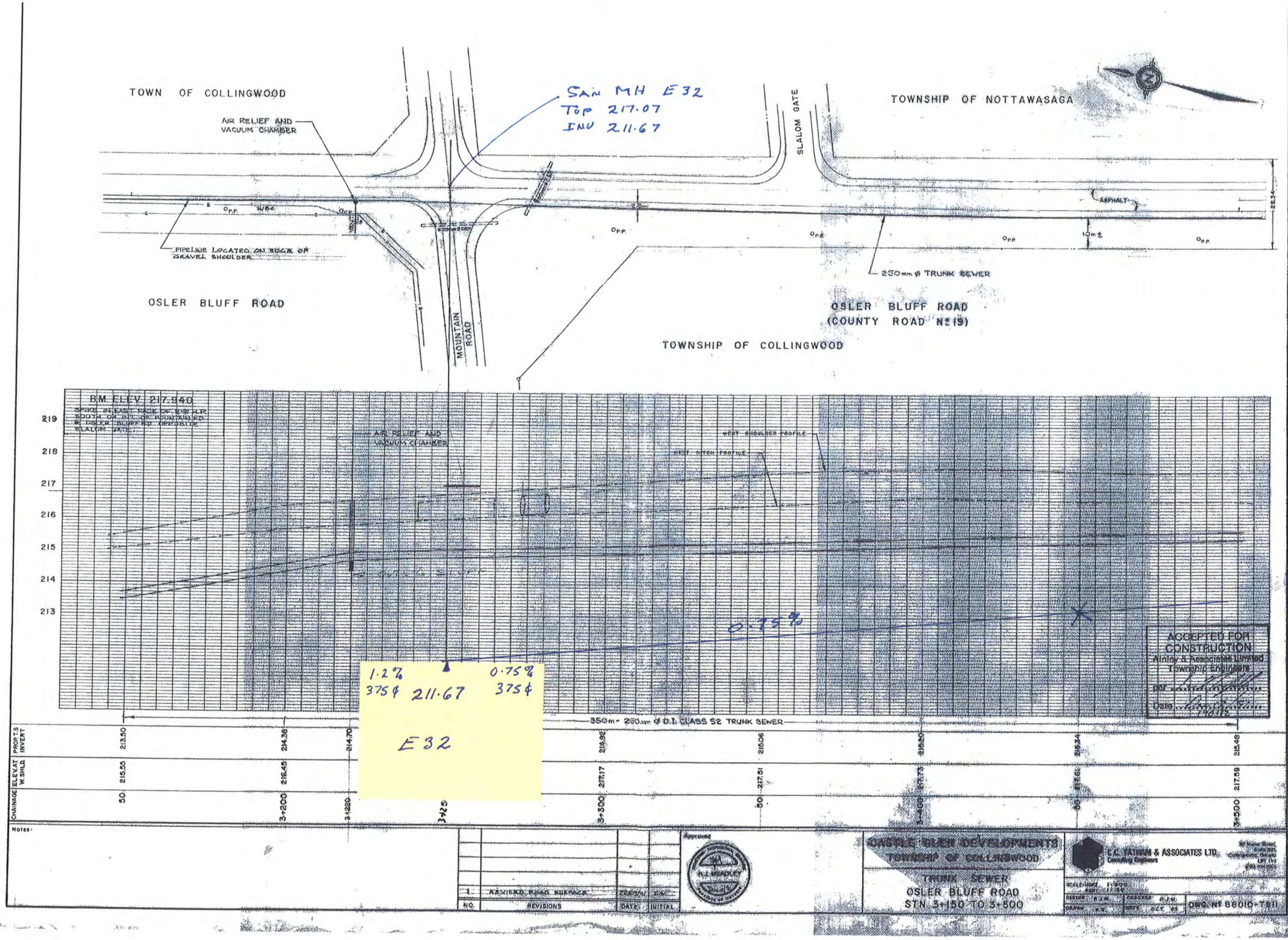
INFORMATION ONLY

GREY COUNTY ROAD 21
TRUNK SANITARY SEWER
TOWN OF THE BLUE MOUNTAINS

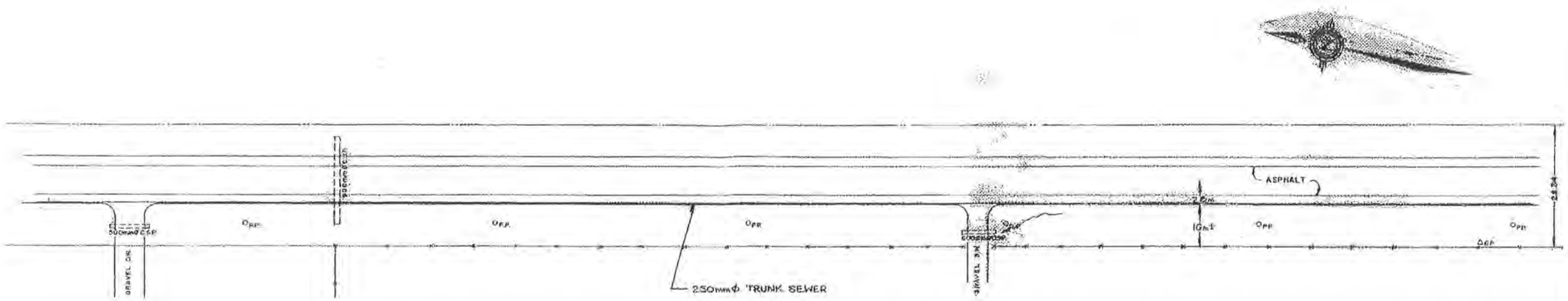
PLAN AND PROFILE
OSLER BLUFF ROAD
STA. 2+700 TO 2+800

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

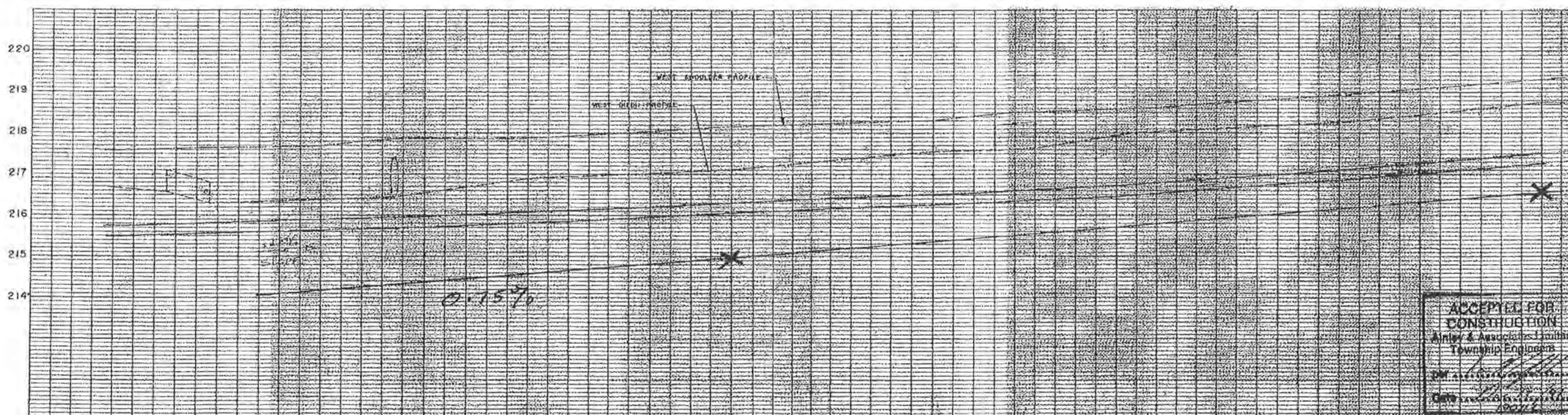
SCALE: 1 : 500 HORIZ., 1: 50 VERT.		JOB NO.	112006-1
DESIGN: PM	CHECKED: KRS	DWG.	PP-10
DRAWN: PM	DATE: FEB 2012		



TOWN OF COLLINGWOOD
San MH E32
Top 217.07
Inv 211.67
SLALOM GATE
TOWNSHIP OF NOTTAWASAGA
AIR RELIEF AND VACUUM CHAMBER
ASPHALT
PIPELINE LOCATED ON EDGE OF GRAVEL SHOULDER
250mm ø TRUNK SEWER
OSLER BLUFF ROAD
MOUNTAIN ROAD
OSLER BLUFF ROAD (COUNTY ROAD No 19)
TOWNSHIP OF COLLINGWOOD
B.M. ELEV. 217.940
AIR RELIEF AND VACUUM CHAMBER
WEST SHOULDER PROFILE
WEST DITCH PROFILE
0.75%
1.2%
375ø
211.67
0.75%
375ø
E32
ACCEPTED FOR CONSTRUCTION
Ainley & Associates Limited
Township Engineers
350m - 250mm ø D.I. CLASS 52 TRUNK SEWER
PROP'D INVERT
ELEVAT W. SHLD.
CHAINAGE
213.50
215.55
214.38
216.45
3+200
214.70
3+220
3425
214.92
217.17
3+300
215.06
217.51
215.20
217.73
3+400
215.34
217.61
215.48
217.59
3+500
Notes:
1 REVISED ROAD SURFACE
NO. REVISIONS DATE INITIAL
Approved
CASTLE GLEN DEVELOPMENTS
TOWNSHIP OF COLLINGWOOD
TRUNK SEWER
OSLER BLUFF ROAD
STN 3+150 TO 3+500
C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers
DWG. No 88010-TS11



OSLER BLUFF ROAD
(COUNTY ROAD No 19)



850m - 250mm φ D.T. CLASS 52 TRUNK SEWER

PROP. T.S. INVERT	215.48	215.62	215.80	216.05	216.25	216.47	216.66	217.24
ELEV. AT W. SHLD.	217.59	217.68	217.85	218.13	218.30	218.52	218.90	219.29
CHAINAGE	3+500	50	3+600	50	3+700	50	3+800	50

Notes:

NO.	REVISIONS	DATE	INITIAL

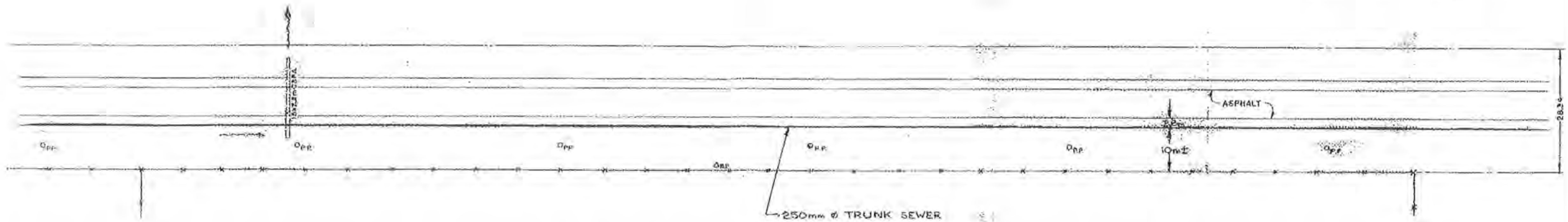
Approved

CASTLE GLEN DEVELOPMENTS
TOWNSHIP OF COLLINGWOOD

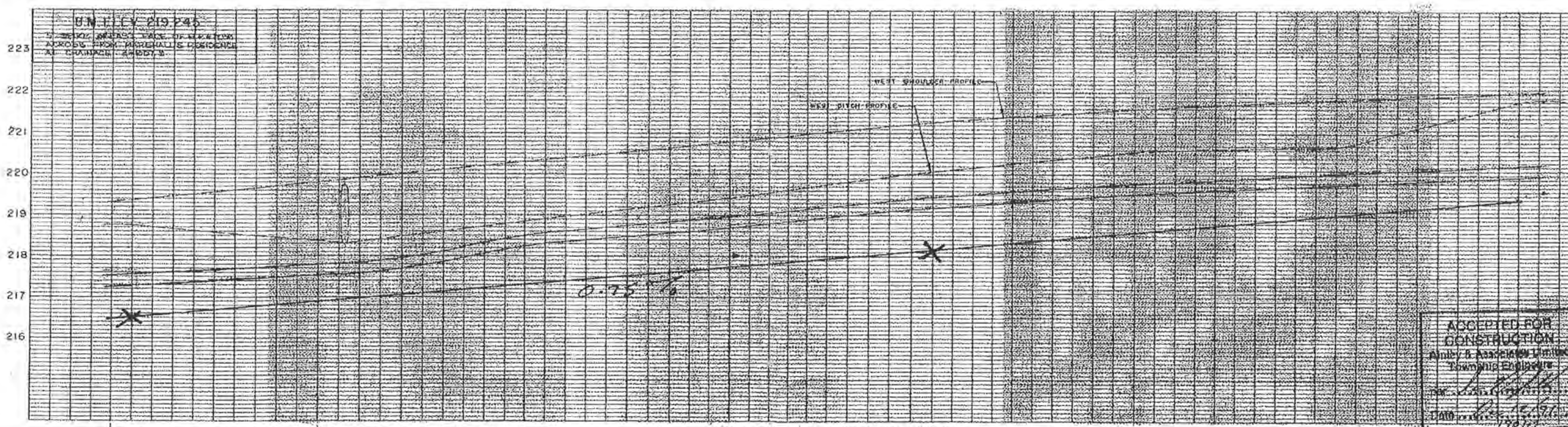
TRUNK SEWER
OSLER BLUFF ROAD
STN. 3+500 TO 3+850

C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers

DWG. No 88010-T.S.2



OSLER BLUFF ROAD
(COUNTY ROAD No. 19)



360m - 250mm ø D.I. CLASS 52 TRUNK SEWER

PROP'D S. INVERT	217.24	217.53	218.23	218.70	219.16	219.51	219.78	219.97
ELEVAT. W. SHLD.	219.29	219.82	220.28	220.76	221.21	221.76	221.63	222.02
CHAINAGE	50	3+900	50	4+000	50	4+100	50	4+200

NOTES

NO.	REVISIONS	DATE	INITIAL

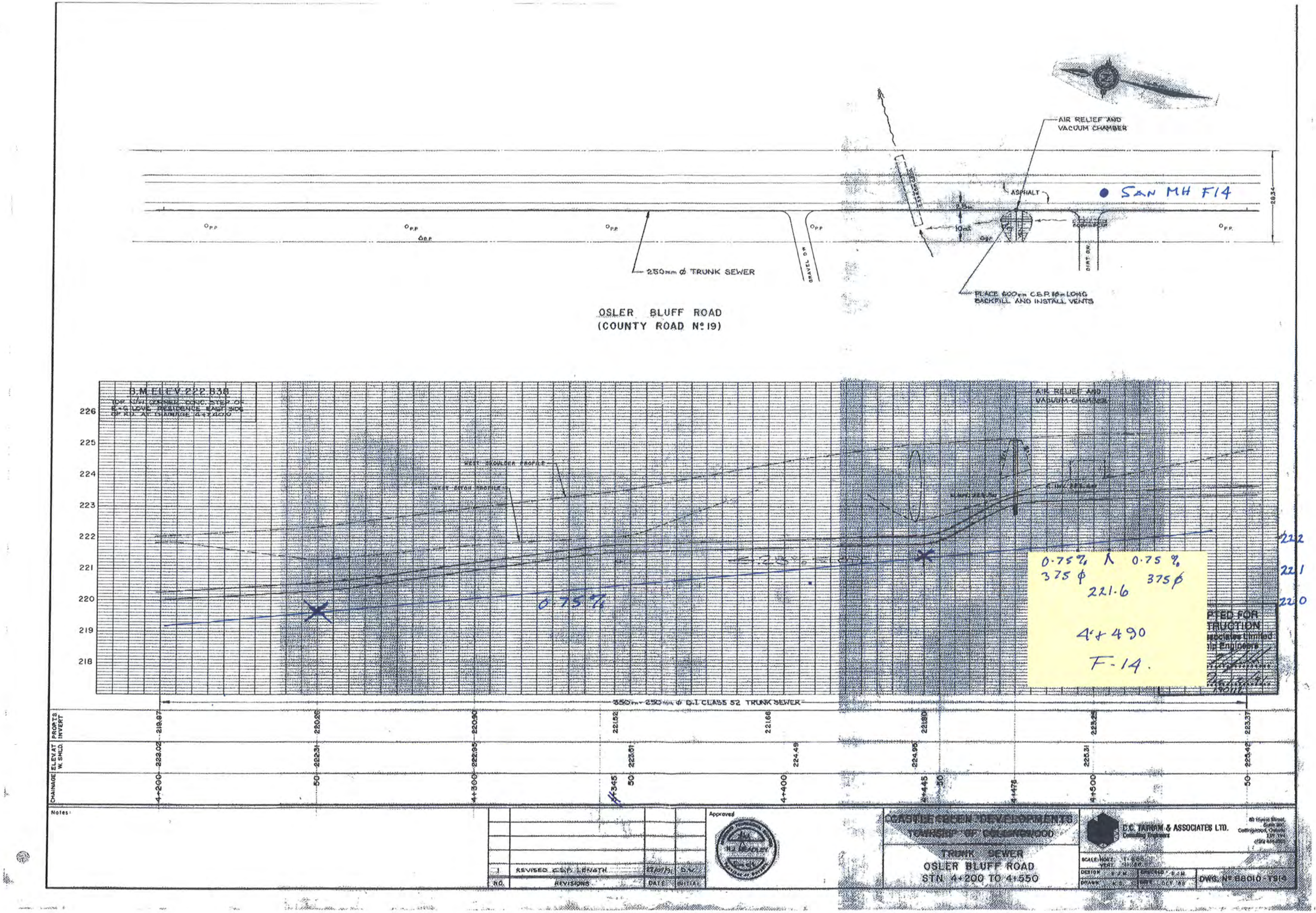
Approved
R.J. HEADLEY

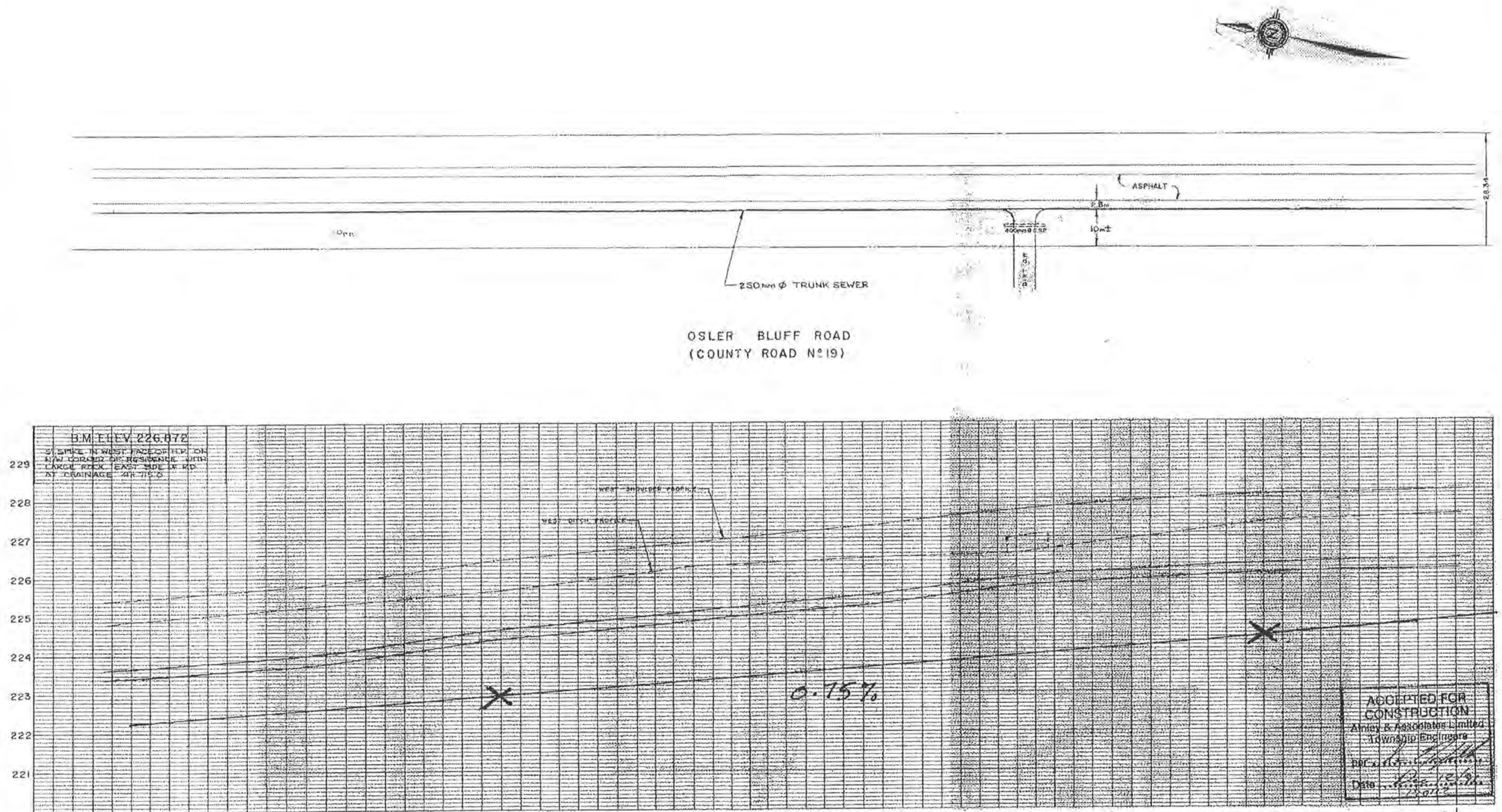
CARTHIG GLEN DEVELOPMENTS
TOWNSHIP OF COLLINGWOOD

TRUNK SEWER
OSLER BLUFF ROAD
STN. 3+850 TO 4+200

C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers
Collingwood, Ontario

DWG. No. 88010-T818


AIR RELIEF AND VACUUM CHAMBER
ASPHALT
● SAN MH F14
250mm ⌀ TRUNK SEWER
GRAVEL DW
DIRT DW
PLACE 600mm C.S.P. 10m LONG BACKFILL AND INSTALL VENTS
OSLER BLUFF ROAD
(COUNTY ROAD Nº 19)
B.M. ELEV. 222.838
WEST SHOULDER PROFILE
WEST DITCH PROFILE
0.75%
0.75% 0.75%
375 ⌀ 375 ⌀
221.6
4+490
F-14.
350m - 250mm ⌀ D.I. CLASS 52 TRUNK SEWER
PROP'D INVERT
ELEV. AT W. SHLD.
CHAINAGE
219.87
220.26
220.90
221.52
221.66
221.90
223.37
223.02
222.31
222.35
223.51
224.49
224.95
225.31
225.42
4+200
50
4+300
4+345
50
4+400
4+445
50
4+475
4+500
50
Notes:
1 REVISED C.S.P. LENGTH
NO. REVISIONS DATE INITIAL
Approved
TRUNK SEWER
OSLER BLUFF ROAD
STN 4+200 TO 4+550
C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers
SCALE: HORZ. 1:500
DESIGN
CHECKED
DRAWN K.S.
DATE OCT '88
DWG. Nº 88010-T914



350m - 250mm Ø D.I. CLASS 52 TRUNK SEWER

PROP'D INVERT	223.37	223.75	224.37	224.84	225.32		225.80	226.05	226.15
ELEV. AT W. SHLD.	225.42	225.76	226.42	226.89	227.37	227.74		228.10	228.20
CHAINAGE	50	4+600	50	4+700	50		4+800	50	4+900

Notes:

NO.	REVISIONS	DATE	INITIAL

Approved

R.J. MEADLEY

CASTLE GLEN DEVELOPMENTS
TOWNSHIP OF COLLINGWOOD

TRUNK SEWER
OSLER BLUFF ROAD
STN. 4+550 TO 4+900

C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers
60 Hume Street, Suite 300, Collingwood, Ontario L9Y 1V4 (705) 444-2565

SCALE: HORZ. 1:600 VERT. 1:60
DESIGN: E.J.M. CHECKED: R.J.M.
DRAWN: K.B. DATE: OCT. 89
DWG. Nº 88010-TS18

Notes:

NO.	REVISIONS	DATE	INITIAL

Approved

R.J. HEADLEY

CASTLE-GLEN-DEVELOPMENTS
TOWNSHIP OF COLLINGWOOD

TRUNK SEWER
OSLER BLUFF ROAD
STN. 4+950 TO 5+250

C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers
Collingwood, Ontario

SCALE-HORZ. 1:500
VERT. 1:50
DESIGN R.J.H.
CHECKED R.J.H.
DRAWN K.S.
DATE OCT '89
DWG. Nº 88010-TS18

APPENDIX B:
WATER SUPPLY AND DISTRIBUTION ATTATCHMENTS

WATERCAD MODEL DEMANDS - BUILD-OUT

Nederan Subdivision
Town of The Blue Mountains
File No. 117159

December 2, 2018

Design Criteria:

	Development & Design Criteria	
Proposed Residential Unit (ppu)	2.30	TOBM
Single Family Consumption Rate (L/p/day)	450	TOBM
Minimum Residential Fire Flow - Single family unit (L/s)	66.67	TOBM
Max Day Factor	2	TOBM
Peak Hour Factor	4.5	TOBM
Maximum Velocity (m/s)	5	TOBM
Total Number of Units	180	

Revisions Rev. No. Date By

								Peaking Factors					
								0.65		4.5		2	
Development	Description	WaterCAD Junction IDs	No. of SFU	Area (ha)	Existing or Future	ADD (m^3/d)	ADD (L/s)	MIN HR (m^3/d)	MIN HR (L/s)	PEAK (m^3/d)	PEAK (L/s)	MAX DAY (m^3/d)	MAX DAY (L/s)
Nederan Subdivision	SFU	J-80	23	-	Future	24	0.28	15	0.18	107	1.24	48	0.55
		J-81	23	-	Future	24	0.28	15	0.18	107	1.24	48	0.55
		J-82	23	-	Future	24	0.28	15	0.18	107	1.24	48	0.55
		J-105	23	-	Future	24	0.28	15	0.18	107	1.24	48	0.55
		J-104	22	-	Future	23	0.26	15	0.17	102	1.19	46	0.53
		J-106	22	-	Future	23	0.26	15	0.17	102	1.19	46	0.53
		J-107	22	-	Future	23	0.26	15	0.17	102	1.19	46	0.53
		J-78	22	-	Future	23	0.26	15	0.17	102	1.19	46	0.53
		Totals	180	0.00	Future	186	2.16	121	1.40	838	9.70	373	4.31

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

WATERCAD HYDRAULIC
MODELLING RESULTS

NEDERAN SUBDIVISION - DEVELOPENT BUILD OUT

Project:	Nederan Subdivision
Location:	Town of The Blue Mountains
File No.:	117159
Date:	December 3, 2018
Modeller:	HC
Checked by:	JRC
Revisions:	

Summary of the modelling settings:

Facility	Discharge Pressure (kPa) MDD	Water Level Elevation (m)		
		MinHD	MDD + Fire	PHD
		Initial	Initial	Initial
Collingwood Water Supply	-	218	218	218
Osler Bluff/ Grey Road 19 BPS	679	-	-	-
Happy Valley Reservoir	-	282	282	282

Summary of modelling results:

Minimum Hour Demand (MinHD)

Node ID	Elevation (m)	Demand (L/s)	HGL (m)	Pressure	
				kPa	psi
J-80	212.02	0.18	266	526	76
J-81	215.75	0.18	266	490	71
J-82	216.50	0.18	266	482	70
J-105	210.47	0.18	266	541	78
J-104	211.00	0.17	266	536	78
J-106	213.42	0.17	266	512	74
J-107	208.50	0.17	266	560	81
J-78	210.02	0.17	266	546	79
	Total MinHD	1.40	L/s		

Maximum Daily Demand (MDD)

Node ID	Elevation (m)	Demand (L/s)	HGL (m)	Pressure	
				kPa	psi
J-80	212.02	0.55	266	525	76
J-81	215.75	0.55	266	488	71
J-82	216.50	0.55	266	481	70
J-105	210.47	0.55	266	540	78
J-104	211.00	0.53	266	535	78
J-106	213.42	0.53	266	511	74
J-107	208.50	0.53	266	559	81
J-78	210.02	0.53	266	544	79
	Total MDD	4.32	L/s		

Peak Hour Demand (PHD)

Node ID	Elevation (m)	Demand (L/s)	HGL (m)	Pressure	
				kPa	psi
J-80	212.02	1.24	265	520	75
J-81	215.75	1.24	265	484	70
J-82	216.50	1.24	265	477	69
J-105	210.47	1.24	265	535	78
J-104	211.00	1.19	265	529	77
J-106	213.42	1.19	265	506	73
J-107	208.50	1.19	265	554	80
J-78	210.02	1.19	265	539	78
	Total PHD	9.72	L/s		

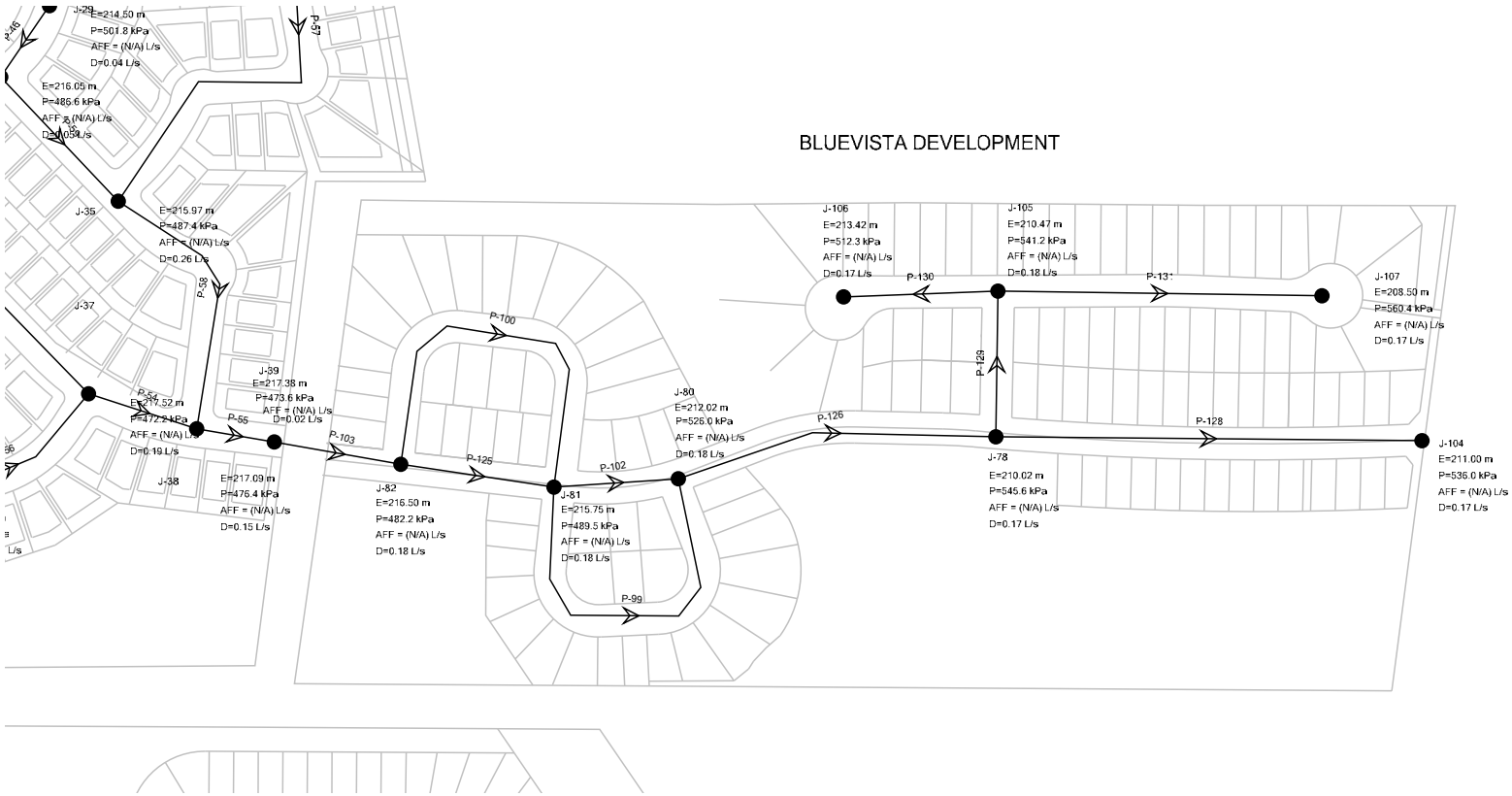
Available Fire Flow (AFF)

Node ID	Elevation (m)	AFF (L/s)	HGL (m)	Pressure	
				kPa	psi
J-80	212.02	120	233	205	30
J-81	215.75	120	239	232	34
J-82	216.50	120	242	248	36
J-105	210.47	96	225	140	20
J-104	211.00	87	236	242	35
J-106	213.42	89	236	217	31
J-107	208.50	83	231	223	32
J-78	210.02	103	224	140	20

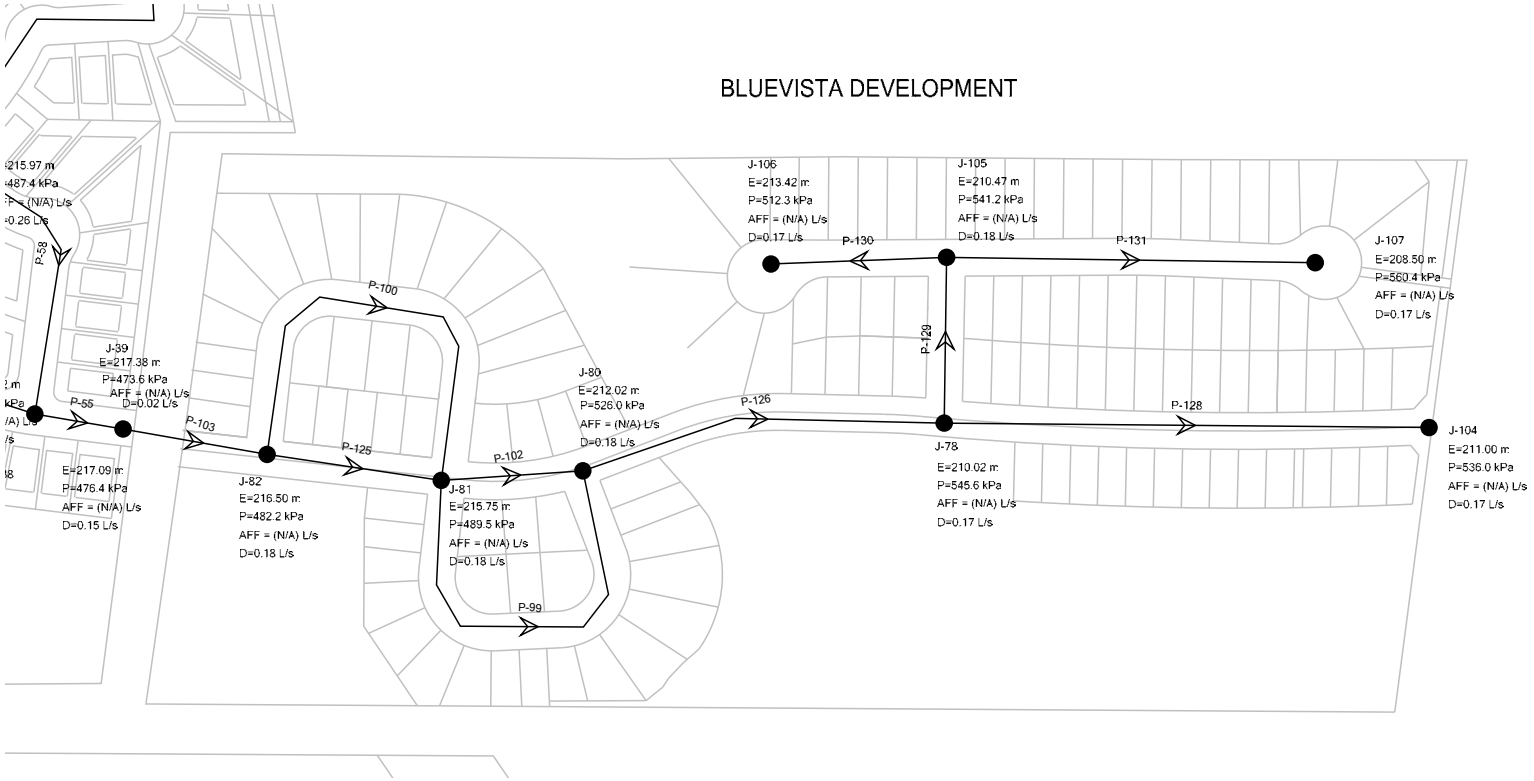
Pipe				MDD + Fire at J-82		PHD	
ID	Diam. (mm)	Length (m)	Roughness*	Velocity (m/s)	Friction Loss (mm/m)	Velocity (m/s)	Friction Loss (mm/m)
P-99	200	241	120	0.03	0.00	0.07	0.00
P-100	200	255	120	0.05	0.00	0.10	0.00
P-102	200	77	120	0.07	0.00	0.16	0.00
P-103	200	80	120	2.24	0.03	0.31	0.00
P-125	200	96	120	0.07	0.00	0.17	0.00
P-126	200	202	120	0.08	0.00	0.19	0.00
P-128	200	264	120	0.02	0.00	0.04	0.00
P-129	200	90	120	0.05	0.00	0.12	0.00
P-130	200	96	120	0.02	0.00	0.04	0.00
P-131	200	201	120	0.02	0.00	0.04	0.00

* Hazen-Williams "C"

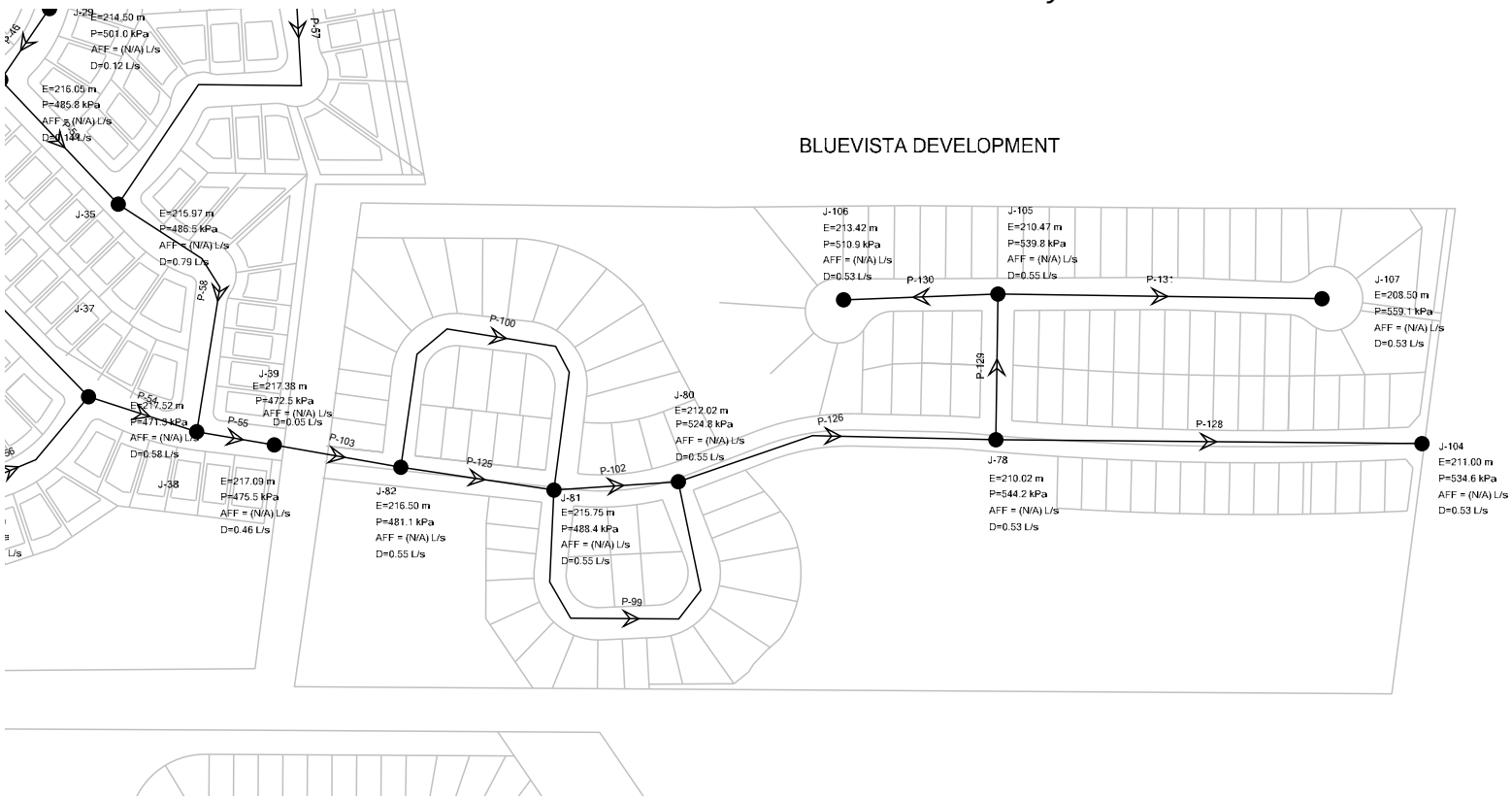
Scenario: Future MinHD



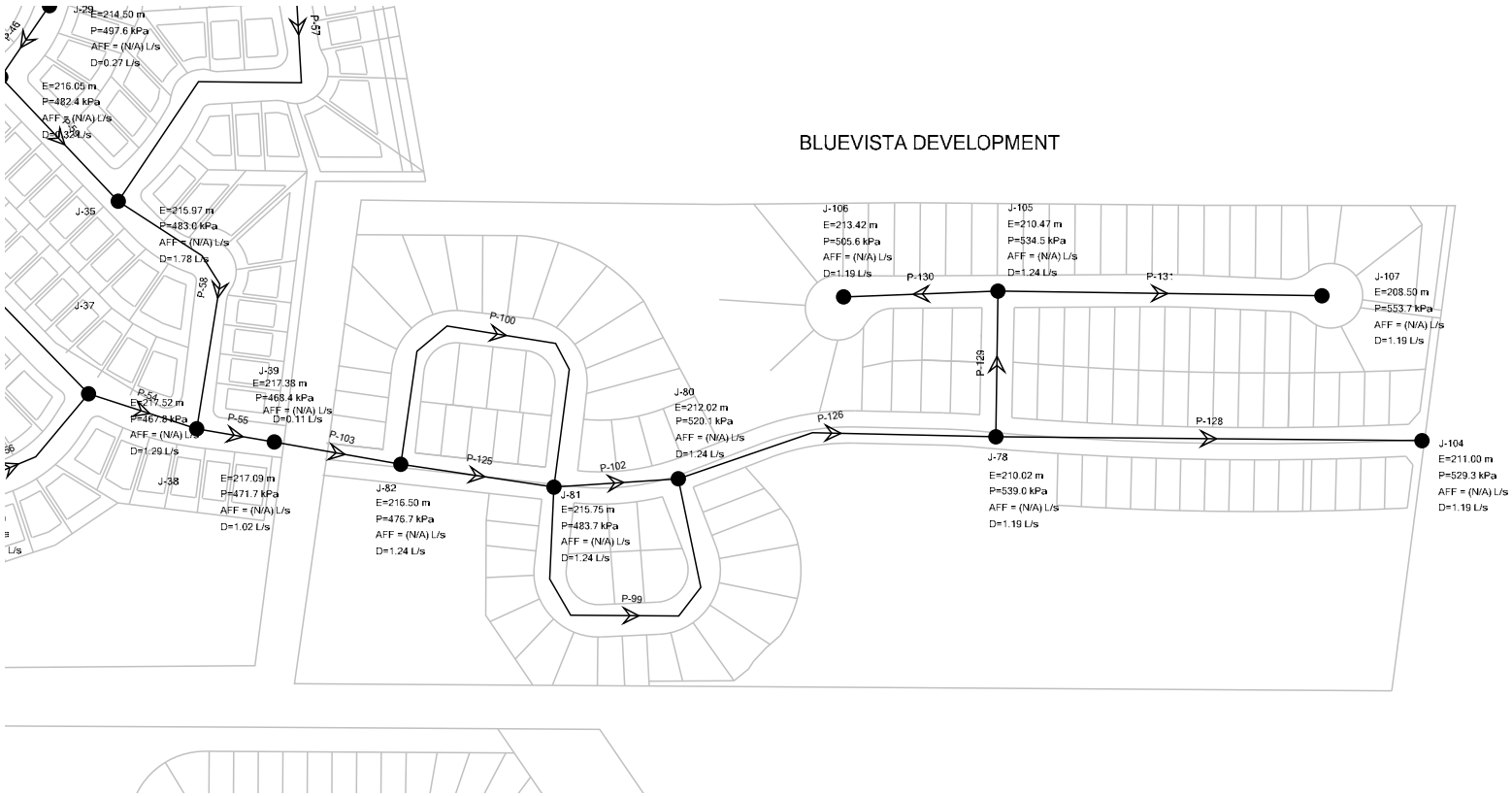
Scenario: Future ADF Base



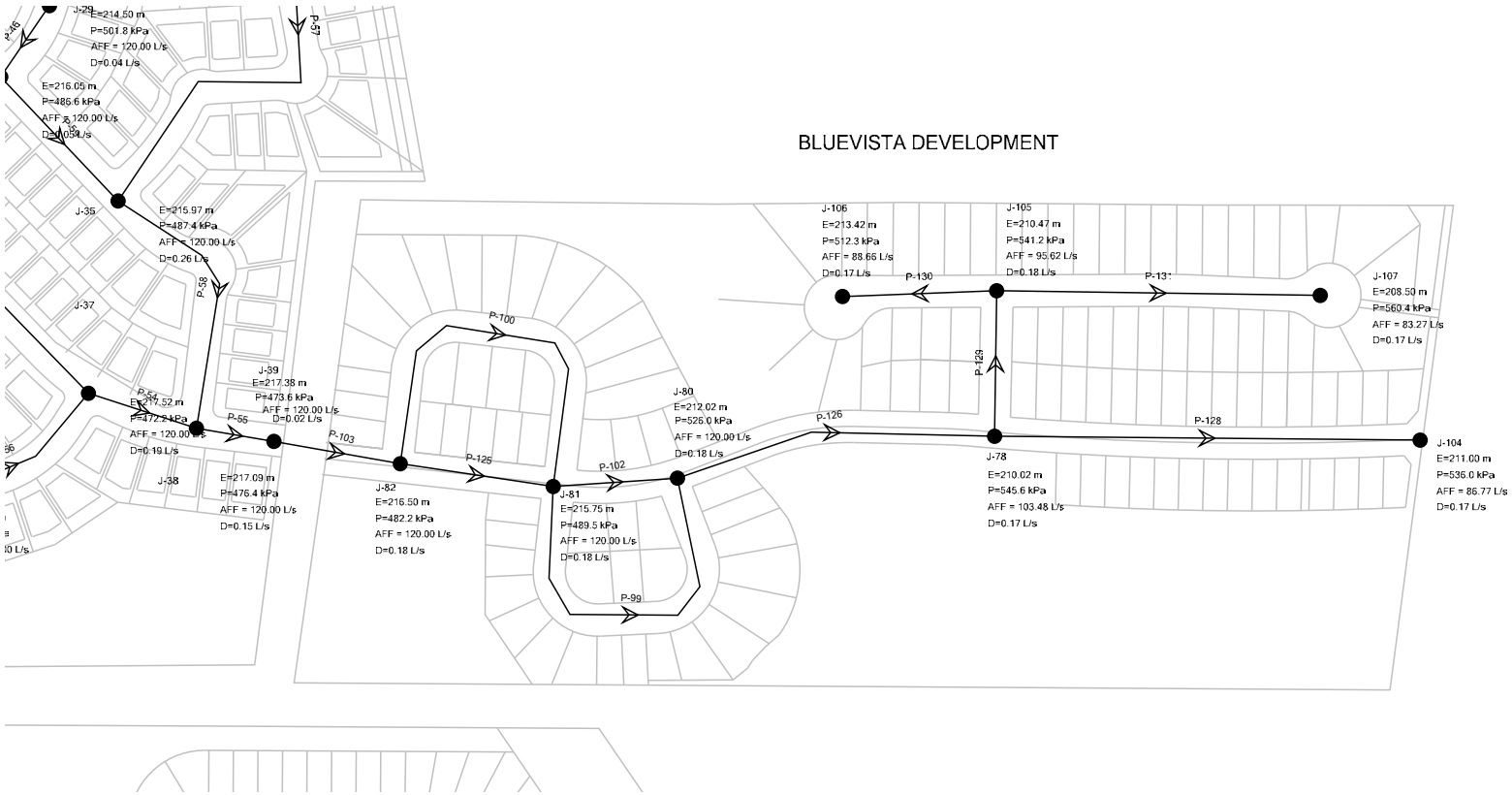
Scenario: Future Max Day



Scenario: Future Peak Flow



Scenario: Future MDD with AFF



Scenario: Future Max Day with Fire @ J-82