Corporation of the Town of Collingwood

Development Standards

June 2026

TABLE OF CONTENTS

1 General Requirements 1

1.1 Introduction 1

1.2 Definitions 2

1.3 Accessibility for Ontarians with Disabilities Act 3

1.4 Submissions to Government Agencies 5

1.5 Servicing Policy for Multi-Family and Residential/Industrial Condominium Developments 5

1.6 Pre-Servicing Policy 6

1.7 Site Alteration & Fill Management 7

1.8 Model Homes 8

1.9 Development Agreement Schedules 9

1.10 Securities and Security Reduction Requests 10

1.11 Administration Fees 12

2 Design Submissions 22

2.1 Introduction 22

2.2 First Submission 22

2.3 Second Submission 25

2.4 Interim Submissions 26

2.5 Final Submission 26

3 Drawings 29

3.1 General Drawings Requirements 29

3.2 General Servicing Plans 29

3.3 Composite Utility Plan 31
3.4 Storm Drainage Plans 32
3.5 Sanitary Drainage Plans 33
3.6 Grading Plans 33
3.7 Plan-Profile Drawings 35
3.8 Erosion and Sediment Control Plans 35
3.9 Landscape 35
3.10 Tree Protection 37
3.11 As-Built Drawings 38
4 Roads and Active Transportation 43
4.1 Classification, Road Allowance & Cross Section 43
4.2 Geometric Road Design 45
4.3 Road Pavement Design 46
4.4 Geometric Intersection Design 47
4.5 Driveways 50
4.6 Sidewalks, Trails, Service Walkways and Multi-Use Pathways 52
4.7 Concrete Curb & Gutter 55
4.8 Subdrain 55
4.9 Fencing 56
4.10 Boulevards 57
4.11 Community Mailboxes 57
4.12 Bus Shelters 58
4.13 Cul-de-Sacs 58

4.14 Street Elbows 58
4.15 Roadside Safety 59
4.16 Pavement Markings 59
4.17 Signage 60
4.18 Accessibility for Ontarians with Disabilities Act 62
5 Water Supply System 64
5.1 Watermain System 64
5.2 Maintenance 64
5.3 Design Criteria 65
5.4 Design Flow 65
5.5 Fire Flow 66
5.6 Selection of Watermain Sizes & Pressures 66
5.8 Depth of Watermains 67
5.9 Separation of Watermains & Sanitary Sewers 68
5.10 Location 68
5.11 Extra Mains & Extra Fittings 68
5.12 Pipe Classification & Embedment 68
5.13 Thrust Protection 69
5.14 Corrosion Resistance 69
5.15 Fire Hydrants 70
5.16 Valves 71
5.17 Service Connections 72
5.18 Fittings 72

5.19 Backflow Prevention 72
5.20 Testing & Acceptance 72
5.21 Temporary Connections During Construction 73
6 Sanitary Sewer System 76
6.1 Sewer System 76
6.2 Maintenance 76
6.3 Design Flows 76
6.4 Sanitary Sewer Requirements 77
6.5 Pipe Capacities 78
6.6 Flow Velocities 78
6.7 Pipe Grades 78
6.8 Depth of Sanitary Sewers 78
6.9 Location 78
6.10 Limits of Construction 79
6.11 Sewer Alignment 79
6.12 Pipe Specifications 79
6.13 Testing & Acceptance 80
6.14 Maintenance Holes 81
6.15 Sanitary Service Connections 83
6.16 Decommissioning of Sanitary Sewers 83
6.17 Forcemains and Pumping Stations 84
6.18 Modelling Requirements 87
7 Stormwater Drainage System 88

7.1 Stormwater Drainage System 88
7.2 Storm Sewer System 91
7.3 Trunk Sewer System 91
7.4 Pipe Capacities 92
7.5 Flow Velocities (Flowing full) 92
7.6 Minimum Size 92
7.7 Depth of Storm Sewers 92
7.8 Location 93
7.9 Radius Pipes 93
7.10 Limits of Construction 93
7.11 Sewer Alignment 93
7.12 Changes in Pipe Size 93
7.13 Standard Easement Requirements 93
7.14 Pipe Material Classification & Bedding 94
7.15 Testing & Acceptance 95
7.16 Maintenance Holes 95
7.17 Catch Basins 97
7.18 Roof Leaders 99
7.19 Foundation Drains 99
7.20 Storm Services 99
7.21 Culverts & Bridges 99
7.22 Open Channels 100
7.23 Overland Flow 101

8 Stormwater Management Design 103
8.1 Stormwater Management Report Requirements 103
8.2 Quantity Control 107
8.3 Quality Control 108
8.4 End-of-Pipe Controls – SWM Ponds and Wetlands 108
8.5 End-of-Pipe Controls – Treatment Units 111
8.6 Sediment and Erosion Control 111
9 Utilities and Lighting 114
9.1 Utilities 114
9.2 Lighting 115
10 Traffic Signals and Pedestrian Crossovers 126
10.1 Traffic Signal and PXO Design Submission Requirements 126
10.2 Traffic Signal and PXO Design Criteria 126
10.3 Traffic Signal and PXO Equipment General Specifications 127
10.4 Vehicle Detection 136
10.5 Standby Power for Traffic Signals 137
10.6 Approval, Construction and Energization 139
10.7 Configurations and Pole Offsets 140
10.8 Traffic Signals on Existing Hydro Poles 141
11 Geotechnical 143
11.1 Introduction 143
11.2 Site Investigation Requirements 143
11.3 Geotechnical Investigation Report 144

11.4 Material Testing 146
12 Grading 149
12.1 General 149
12.2 Lot Grading Criteria 149
12.3 Retaining Walls 151
12.4 Individual Lot Grading 153
12.5 Engineered Fill 159
13 Landscape 160
13.1 General 160
13.2 Maintenance 160
13.3 Warranty 160
13.4 Landscape 160
13.5 Acceptable Plant Species 163
13.6 Mixture and Proportion of Species 163
13.7 Plant Material Specifications 164
14 Tree Protection 166
14.1 General 166
14.2 Engineering Drawings 166
14.3 Scope of Inventory 167
14.4 Tree Condition 168
14.5 Minimum Tree Protection Zones 169
14.6 Tree Protection Fencing 170
14.7 Tree Removals 170

14.8 Mitigation Measures 170

14.9 Tree Protection Plans 170

Appendices

Appendix A: Request for Deviation Form
Appendix B: Standard Drawings
Appendix C GIS Data Submissions
Appendix D: Water Distribution Materials List
Appendix E: Acceptable Boulevard Tree Species List

1 General Requirements

1 General Requirements

1.1 Introduction

The Town of Collingwood Development Standards presented here are intended as engineering and infrastructure policy for land development to aid in the uniform design throughout the municipality.

This document manual provides best-practice sustainable standards to support the Town's strategic plan. It aligns with the current *Official Plan*, *Urban Design Manual*, *Infrastructure Master Plans* and all transportation studies and active transportation plans. It further develops the life cycle analysis and asset management principles as outlined in the Town's *Asset Management Plan*. These principles assist the Town to achieve the expected level of service and life cycle sustainability for all assets.

These standards are generally intended to guide the design of projects fronting on or including public roads. however, they do include some specific requirements for private roads/developments. Standards are to be read in conjunction with the *Ontario Provincial Standard Specifications* for municipal construction (OPSS.MUNI), the *Ontario Provincial Standard Drawings* (OPSD), the *Town of Collingwood Standard Drawings* and the *Town of Collingwood Standard Subdivision Agreement*. This manual and associated standard shall not relieve the Owner/Developer from the primary responsibility for the design to meet applicable federal, provincial, and municipal regulations.

It is the applicant's responsibility to obtain and check with the Town of Collingwood for new revisions of these standards. Copies are available from the Town of Collingwood or can be downloaded from the website at www.collingwood.ca.

The purpose of this section is to outline the minimum design requirements for the construction of infrastructure in the Town of Collingwood. These requirements are general in nature and do not relieve the Owner/Developer of the responsibility for submitting a completed product demonstrating competent engineering design in full compliance with all applicable legislation.

Should the Owner/Developer wish to deviate from the minimum Town standards, the Owner/Developer or their agent shall submit a formal request to the Town using the standard Request for Deviation form found in Appendix A. Innovative technologies that improve or maintain the quality of the design on a life cycle cost basis will be considered at the discretion of the Town and requests to use innovative technologies shall also use the Request for Deviation form. All requests

for deviation must be received prior to issuance of Accepted for Construction drawings.

1.2 Definitions

AWWA	American Water Works Association
Certification	Written confirmation from a professional Engineer that works constructed generally conform to the approved drawings (Accepted for Construction or Site Plan Approved), relevant engineering standards and best practices. Certifications shall be provided on company letterhead and shall be accompanied by an Engineer's seal. Applicable testing results may be requested to confirm works were constructed in accordance with approved drawings and applicable standards
CLI-ECA	Consolidated Linear Infrastructure Environmental Compliance Approval
Consultant	Professional Engineers licensed to practice in Ontario and shall be responsible for the preparation of drawings and specifications to the satisfaction of the Town's Engineering Department (the Consultant shall act on behalf of the Developer)
Contractor	The firm of Contractors, the company or individual acting as the Contractor and having entered into a contract with the Developer to install the infrastructure
CSA	Canadian Standards Association
Developer(s) or Owner(s)	The person(s) appearing on the development agreement with the Corporation of the Town of Collingwood
Development Agreement	Any agreement required in association with a development project which may include a site plan, subdivision, model home, pre-servicing, or other type of agreement required at the sole discretion of the Town, subject to legislative requirements or limitations.
DFO	Department of Fisheries and Oceans, Canada, or subsequent Federal Ministry with jurisdiction
EPCOR	Epcor Utilities Inc.
GSCA	Grey Sauble Conservation Authority
MECP	Ministry of the Environment, Culture and Parks, or subsequent Provincial Ministry with jurisdiction
MNRF	Ministry of Natural Resources and Forestry, or subsequent Provincial Ministry with jurisdiction

MTO	Ministry of Transportation, or subsequent Provincial Ministry with jurisdiction
NVCA	Nottawasaga Valley Conservation Authority
OHBDC	Ontario Highway Bridge Design Code
OPSD	Ontario Provincial Standard Drawings
OPSS	Ontario Provincial Standard Specification
O.Reg.	Ontario Regulation
TAC	Transportation Association of Canada Geometric Design Guide for Canadian Roads
Town	Town of Collingwood
Town Representative	Any person assigned to a project by the Town to carry out work on their behalf
UDM	Town of Collingwood Urban Design Manual
Watermain	A water distribution pipe that will be assumed by the Town
Water Service	A water pipe connected to a watermain providing water service to a property

1.3 Accessibility for Ontarians with Disabilities Act

All design elements within the development shall meet the most current O. Reg. in accordance with the *Accessibility of Ontarians with Disabilities Act 2005* (AODA).

1.3.1 Accessibility Compliance

Third Party Suppliers performing work for the Town of Collingwood must comply with the *Accessibility for Ontarians with Disabilities Act*, 2005 (AODA) and the *Integrated Accessibility Standards Regulation* (O. Reg. 191/11).

Pursuant to section 7 and section 80.49 of O. Reg. 191/11, *Integrated Accessibility Standards Regulation*, made under the AODA, contractors who provide goods, services or facilities on behalf of the Town shall ensure that all of their employees, agents, volunteers, or others for whom they are responsible, receive training on the requirements of the accessibility standards referred to O. Reg. 191/11 and on the *Human Rights Code* as it pertains to persons with disabilities.

The Town's *Multi-Year Accessibility Plan* shall also be followed as it relates to design elements, deliverables, communication and other items described herein.

1.3.2 Accessible Training Documentation

The Supplier shall submit to the Town, if requested, documentation describing its accessibility training policies, practices and procedures, and a summary of the contents of training, together with a record of the dates on which training is provided and the number of attendees.

1.3.3 Deliverables and/or Communication

The supplier shall ensure that any studies, reports and/or plans that result from this project must be created and provided to the Town in an accessible format. Documents created, adapted or otherwise presented on behalf of the Town or to Town employees will be made available in accessible formats as required in the AODA and O. Reg. 191/11, for the lifespan of the document.

Unless determined by the Town to not be practicable, the Owner/Developer shall ensure that any information, products, deliverables and/or communication (as defined in the Integrated Regulation) produced pursuant to the Contract shall be in conformity with *World Wide Web Consortium Web Content Accessibility Guidelines* (WCAG) 2.0 Level AA and shall be provided in accessible Word, Excel, PowerPoint, PDF, etc.

1.3.4 Built Environment

The Design of Public Spaces Standards under the Integrated Accessibility Standards Regulation must be included in the design and build process by contracted professionals when building or renovating, regardless of project size for all Town owned, operated or leased facilities.

1.3.5 Facilitators

Consultants who facilitate a public open house or otherwise seek/receive feedback of the Town shall ensure that all communication, equipment and materials take into account people's disabilities so that all in attendance may participate equally as outlined in the AODA legislation. This includes, but is not limited to:

1. Communicate in a format that allows an individual to receive/provide all information in an alternate format.

2. Holding events in venues that are physically accessible.

3. Communicate at all opportunities that documents are available in accessible formats and communication supports, provide contact information for these requests and be prepared to provide this accommodation.

4. Ensure that the event aligns with the Town's Accessibility Policies and Procedures.

1.4 Submissions to Government Agencies

The Consultant shall deal directly with the MECP, MNRF, NVCA or GSCA, DFO and any other government agencies for works that fall within their jurisdiction. It is the responsibility of the Consultant to ensure all correspondence, comments and approvals from other agencies or levels of government are provided to the Town.

1.5 Servicing Policy for Multi-Family and Residential/Industrial Condominium Developments

Engineering drawings shall be prepared to the satisfaction of the Town, and show location of all underground services, including sanitary, storm, watermains, hydro, telecommunications, gas, etc., together with the location of all roadways, sidewalks and boulevards. The drawings shall be certified and stamped by a registered Professional Engineer of the Province of Ontario.

Roadways shall not be considered to form any part of the required parking.

Designated fire access routes shall be provided throughout the development to the satisfaction of the Fire Department or Ontario Building Code, whichever one applies and in accordance with good engineering practise.

Multi-family developments shall be signed so as to easily identify the location of all blocks. Such signs shall be approved by the Planning and Building Department.

Proper waste collection areas must be provided throughout the development so that the waste hauler’s vehicles can enter the development and collect waste efficiently and safely. Such arrangements shall be in accordance with standards as set down by the Simcoe County.

A certified statement signed and stamped by a registered Professional Engineer of the Province of Ontario stating that all services have been designed and constructed in accordance with the Town Standards and Servicing Policy for Multi-family and Condominium Developments is required prior to registration of the development.

1.6 Pre-Servicing Policy

Subsequent to creation of separately conveyable parcels but before the execution of a development agreement, the Town may consider allowing the Owner/Developer to pre-service the subject lands at their own risk, provided all the following conditions have been met:

1. Engineering drawings have been accepted by the Town for the works under consideration.

2. Written approval of various agencies, e.g. MECP, NVCA or GSCA, MNRF, MTO, etc. where they relate to installation of services permitted by pre-servicing, including Environmental Compliance Approvals for the services being installed.

3. The applicable recommendations from any applicable report, study or other supporting documentation provided to the Town as part of the land use planning process (e.g. Environmental Site Assessment, Tree Inventory, Arborist Report, Archaeological Assessment, etc.), as agreed to by the Town, have been completed prior to site alteration.

4. Securities have been posted with the Town to secure the works subject to the pre-servicing agreement. Securities shall be calculated as per the *Fees and Service Charges By-law*. A 10% warranty holdback will be required on any works completed under pre-servicing.

5. The Town engineering fee and legal deposit has been paid to the Town as per the *Fees and Service Charges By-law.*

6. All required insurance certificates, as required by the Pre-servicing Agreement, have been provided to the Town.

7. All necessary planning approvals e.g. Official Plan and Zoning By-law Amendments, etc.) are obtained, as confirmed by the Town.

8. All other documents considered necessary to the works under the Pre-servicing Agreement including, 300 millimetre reserves, easements, etc., must be approved as to form and description.

9. The Owner/Developer has executed and entered into a Pre-servicing Agreement with the Town.

10. If the Town agrees to allow the Owner/Developer to proceed with pre-servicing, the following terms and conditions will apply:

    - Connections to existing municipal infrastructure will not be permitted until lots, units, or blocks are registered.

    - No permission will be given to construct external services prior to execution of the required development agreement, unless approved by the Town and a Letter of Credit has been deposited with the Town for the total cost of the external services, including full restoration.

    - Aboveground works will not be permitted to commence unless approved in writing by the Town.

    - Prior to site alteration, a Tree Cutting Application Form is to be completed, as per the *Tree Destruction By-law*. Fees and securities will be required as per the *Fees and Service Charges By-law.*

1.7 Site Alteration & Fill Management

The Town is in the process of developing a *Site Alteration By-law* that will regulate grading, drainage, and lot-level stormwater management. Upon its enactment by Council, all development shall comply with the *Site Alteration By-law* in addition to the requirements outlined in these Development Standards.

The removal or placement of fill within the Town of Collingwood is regulated by the *Site Alteration By-law*, as amended. Outside of having an executed development agreement, the placement or removal of fill within the Town of Collingwood is prohibited unless the appropriate Fill Permit has been obtained. A permit application can be found on the Town of Collingwood website at www.collingwood.ca.

Drawings required for permit application depend on the complexity of the project, but at a minimum shall include grading plans and erosion and sediment control plans. Reports required shall outline the quantity and quality of fill via a Fill Management Plan outlining the existing receiving site soil quality, the source site soil quality, trucking route, and entrance location. A “Qualified Person” determines if the fill is acceptable for the intended land use. If a Record of Site Condition (RSC) has been filed for the site, then the RSC dictates what fill is acceptable to the site.

Soil quality guidelines are outlined in the O. Reg. 406/19 (*On-Site and Excess Soil Management*), Ministry of the Environment, Conservation and Parks 2019, and *Rules for Soil Management and Excess Soil Quality Standards*, MECP 2019.

If the subject site is within a Conservation Authority regulated area, a permit is required from both the Town and Conservation Authority.

Securities are to be provided for all items identified on the erosion and sediment control plan and items related to the placement of fill such as sediment ponds, rock check dams, silt fence, mud mat, etc. Securities must also be provided to restore the site in the event fill operations unexpectedly ceases mid-way through. These amounts are typically the cost required to topsoil and seed all disturbed areas.

Fees for permits are as per the *Fees and Charges By-law* (amended yearly).

1.8 Model Homes

Subsequent to conditional land use planning approval and prior to execution of a development agreement, the Town may consider allowing the construction of model homes, which may or may not be used as a sales office, at the Owner/Developer's risk, when the following conditions have been met:

1. All necessary planning approvals (e.g. Official Plan and Zoning By-law Amendments, etc.) are obtained, as confirmed by the Town.

2. An agreement for the construction of model homes has been executed with the Town, which shall include:

    - Provision of a builder's road (road built to sufficient width and sufficient structure to support emergency vehicles).

    - Provision of fire protection.

    - Provision of services (sewer, water, hydro), if available. If not available, Fire Department and Town approval will be required.

3. The overall grading plan has been approved and there has been preliminary acceptance of the drainage system for the model home lots.

4. Securities, provided to the Town in as per the *Fees and Service Charges By-law* to ensure the obligations of the Owner/Developer are carried out as required by the terms of the agreement or provide for the demolition and removal of the structure(s) if the lots, units, or blocks as applicable do not proceed to registration within one year.

5. Confirmation the model homes shall not be occupied until after the registration of the lots, units and/or blocks and all requirements within the future development agreement are met.

6. Confirmation the issuance of building permits for model homes is entirely at the risk of the Owner/Developer and without liability or responsibility to the Town. The Owner/Developer shall indemnify the Town from all damages arising relating to the issuance of building permits for model homes.

7. Sales offices and model homes require adequate parking. If additional parking is provided on the lot while being used as a sales office or model home, this additional parking shall be removed prior to occupancy.

8. Confirmation the Owner/Developer agrees the use of model home lots shall be restricted to the following:

    - Parking
    - A sales office.
    - Model homes display.

9. The number of model homes does not exceed 10% of the total approved lots within the subdivision, but never greater than 15. If servicing has not been completed, the number of model homes shall not exceed 3.

1.9 Development Agreement Schedules

The following schedules will be generally required as part of any development agreement required by these standards and additional schedules may be further required, at the sole discretion of the Town:

Schedule A – Description of Lands affected by this Agreement

Schedule B – Development Plan (e.g. site plan, draft plan of subdivision, condominium description, etc.)

Schedule C – List of Engineering Drawings and Reports

Schedule D – Easements and Land Transfers

Schedule E – Estimated Costs of Public Works

Schedule F – Warning Clauses (if required)

Schedule G – Architectural Guidelines

Schedule H – No Occupancy Agreement

Schedule I – Form of Letter of Credit

1.10 Securities and Security Reduction Requests

Securities posted in as required by any development agreement shall be equal to 100% of all work to be constructed within or on municipal lands (e.g. rights-of-way, blocks, SWM facilities, open space, parkland, etc.), including work internal and external to the development. Lot grading securities in the amount specified in the *Fees and Service Charges By-law* will be held to ensure lot grading and drainage is constructed and maintained to the satisfaction of the Town of Collingwood. Lot grading securities will be released once the applicable Lot Grading Certifications are provided and accepted by the Town. Lot grading securities will only be released when there are 50 lots remaining to be certified.

Securities posted in support of infrastructure installed on private land and which will not be assumed by the municipality shall be equal to 100% of all external work, plus internal costs for the construction of the watermain distribution system, storm and sanitary collection systems, roads and parking lot/stalls (including granular base, curb and gutter, binder course asphalt and surface course asphalt), sidewalks and all landscape works, including topsoil and ground cover, erosion and sediment control.

Securities shall include a 5% allowance for contract administration and construction inspection and an additional 5% contingency allowance. An example of the security breakdown and calculations to be provided in support of a development agreement are provided below. Individual line items should be amended, as required, to reflect the proposed work. The Town may also require a more detailed breakdown of the work (such as a schedule of items and prices from a tender/contract) to verify the proposed securities are reasonable.

Reductions in securities will be considered in accordance with the following:

1. Confirmation the work completed, for which the security reduction request is being made, has been inspected by a qualified Consultant(s) and is in general conformance with the approved drawings and specifications.

2. A list of outstanding deficiencies, complete with a value to correct each deficiency.

3. A detailed breakdown including separate columns that show original value of work, % outstanding and value of outstanding work (as of date), generally in accordance with the format provided below.

4. All additional supporting documentation, as specified within the development agreement.

5. Requests to reduce securities will be considered at the following milestones:

    - Substantial (acceptance) underground work.

    - Substantial (acceptance) aboveground work.

    - Assumption.

6. Securities for stormwater management ponds shall not be released until the pond has been cleaned of sediment and certified by the Consultant prior to assumption. For phased developments, the Town will only assume the stormwater management pond as part of assumption for the final phase.

The Town may require a more detailed breakdown (such as from a recent Proper Invoice) to verify value of work completed to date.

In support of a security reduction request, the Owner/Developer (and/or their Consultant) shall coordinate an inspection with the applicable Town staff to review the work completed to date and confirm the value of outstanding work and/or known deficiencies, identified within the request is appropriate. If it is not feasible to inspect the work due to winter conditions, the applicable securities will be held until the Town is able to complete a proper inspection.

1.10.1 Landscape Securities

Prior to a field review by Town staff, the developer's landscape architect shall prepare and submit a Landscape Inspection Report confirming that landscape construction is substantially completed. It shall be provided a minimum of 2 weeks prior to Town review.

For boulevard trees, the report shall indicate in a table format.

- Municipal address.

- Tree location (front yard/side yard).

- Tree species/cultivar.

- Planting date.
- Condition/health and any deficiencies.

All municipal addresses shall be listed, including lots where no trees could be planted. Table shall identify conflict (e.g. conflict with water service and driveway offset).

- For sites, the report shall identify:
- Plan markup with any changes (including reason for change).
- Planting date (and date of replacement material).
- Known deficiencies.
- Incomplete works and anticipated schedule.

For the field review by Town staff:

- Staff reserve the right to stop or cancel review if works are found to be incomplete or inconsistent with the inspection report.
- Inspections for tree/vegetation health assessment must be completed no earlier than May 31st following leaf expansion and until September 15th of each calendar year. Reviews by staff must be completed no later than October 1st of any calendar year.
- Hardscape elements such as fencing, walkways, and associated features will not be reviewed during winter months when visibility is obscured by snow accumulation.
- Landscape Inspection Reports are only valid for the calendar year in which they are performed.

Within three (3) business days of the inspection, the Consultant shall provide to the Town's file manager a complete list of deficiencies identified.

1.11 Administration Fees

The Owner/Developer will be required to pay the Town a lump sum administration fee to cover their costs associated with engineering review and supervision. Fees are as per the *Fees and Service Charges By-law.*

Securities Example – Site Plan Agreements

Municipality:

Developer:

Development:

1. Security Requirements

	Description	Estimated Cost
A	Internal Works	
	Watermain	$_____
	Granular B	$_____
	Granular A	$_____
	Curb & Gutter	$_____
	Sidewalk	$_____
	Binder Course Asphalt	$_____
	Surface Course Asphalt	$_____
	Sediment & Erosion Control	$_____
	Subtotal Internal Works	$_____
B	External Works	
	Removals	$_____
	Siltation & Erosion Control	$_____
	Excavation & Grading	$_____
	Sanitary Sewer	$_____
	Storm Sewer	$_____
	Watermain	$_____
	Granular B	$_____
	Granular A	$_____
	Curb & Gutter	$_____
	Sidewalk	$_____
	Binder Course Asphalt	$_____
	Surface Course Asphalt	$_____
	Subtotal External Works	$_____
	Subtotal (A+B)	$_____
C	Landscape Works	
	Plantings/Trees	$_____

	Topsoil & Ground Cover	$_____
	Trails / Walkways	$_____
	Fencing	$_____
	Garbage Enclosures	$_____
	Bike Racks	$_____
	Benches	$_____
	Subtotal Landscape Works	$_____
	Subtotal (A + B + C)	$_____
D	Contract Administration & Construction Inspection (5%)	$_____
	Subtotal	$_____
E	Contingency Allowance (5%)	$_____
	Total Securities	$_____

2. Town of Collingwood Administration Fees

Town Administration Fee at 3% of the total securities ($4,080 min.)	$_____

Security Reduction Request Example – Site Plan Agreements

Municipality:

Developer:

Development:

	Description	Original Value of Work	% Outstanding	Value of Outstanding Work (As of Date)
A	Internal Works			
	Watermain	$_____	_____ %	$_____
	Granular B	$_____	_____ %	$_____
	Granular A	$_____	_____ %	$_____
	Curb & Gutter	$_____	_____ %	$_____
	Sidewalk	$_____	_____ %	$_____
	Binder Course Asphalt	$_____	_____ %	$_____
	Surface Course Asphalt	$_____	_____ %	$_____
	Subtotal Internal Works	$_____	_____ %	$_____
B	External Works			
	Removals	$_____	_____ %	$_____
	Siltation & Erosion Control	$_____	_____ %	$_____
	Excavation &	$_____	_____ %	$_____
	Sanitary Sewer	$_____	_____ %	$_____
	Storm Sewer	$_____	_____ %	$_____
	Watermain	$_____	_____ %	$_____
	Granular B	$_____	_____ %	$_____
	Granular A	$_____	_____ %	$_____
	Curb & Gutter	$_____	_____ %	$_____
	Sidewalk	$_____	_____ %	$_____
	Binder Course Asphalt	$_____	_____ %	$_____
	Surface Course	$_____	_____ %	$_____

	Subtotal External Works	$_____	_____ %	$_____
	Subtotal Internal Works + External	$_____		$_____
C	Landscape Works			
	Plantings/Trees	$_____	_____ %	$_____
	Topsoil & Ground	$_____	_____ %	$_____
	Trails / Walkways	$_____	_____ %	$_____
	Fencing	$_____	_____ %	$_____
	Garbage	$_____	_____ %	$_____
	Bike Racks	$_____	_____ %	$_____
	Benches	$_____	_____ %	$_____
	Subtotal Landscape Works	$_____		$_____
	Subtotal (A + B + C)	$_____		$_____
D	Contract Administration & Construction Inspection (5%)	$_____		$_____
	Subtotal	$_____		$_____
E	Contingency	$_____		$_____
	Original Security Amount	$_____		
F	10% of the Original Security			$_____
	Total Current Security Required (A+B+C+D+E+F)			$_____
	Security Currently Held			$_____

Total Security to be Released	$_____

Securities Example - Subdivision Agreement

Municipality:

Developer:

Development:

1. Security Requirements

	Description	Estimated Cost
A	Internal + External Works	
	Removals	$_____
	Siltation & Erosion Control	$_____
	Excavation & Grading	$_____
	Sanitary Sewer	$_____
	Storm Sewer	$_____
	Watermain	$_____
	Stormwater Management Facility	$_____
	Streetlight System	$_____
	Curb & Gutter	$_____
	Subdrains	$_____
	Sidewalk	$_____
	Road Base and Subbase	$_____
	Binder Course Asphalt	$_____
	Surface Course Asphalt	$_____
	Topsoil + Sod	$_____
	Landscaping and Trees	$_____
	Retaining Walls	$_____
	Fencing	$_____
	Signage + Barricades	$_____
	Subtotal Internal + External Works	$_____
B	Lot Grading	
	_____ lots at $3,000 per lot ($150,000 maximum)	$_____
	Subtotal Lot Grading	$_____
	Subtotal (A + B)	$_____
C	Contract Administration & Construction Inspection (5%)	$_____

	Subtotal	$_____
D	Contingency Allowance (5%)	$_____
	Total Securities	$_____

2. Town of Collingwood Administration Fees

Town Administration Fee at 5% of the total securities ($10,000 min.)	$_____

Security Reduction Request Example – Subdivision Agreements

Municipality:

Developer:

Development:

	Description	Original Value of Work	% Outstanding	Value of Outstanding Work (As of Date)
A	Internal + Removals	$_____	_____ %	$_____
	Siltation & Erosion Control	$_____	_____ %	$_____
	Excavation & Grading	$_____	_____ %	$_____
	Sanitary Sewer	$_____	_____ %	$_____
	Storm Sewer	$_____	_____ %	$_____
	Watermain	$_____	_____ %	$_____
	Stormwater	$_____	_____ %	$_____
	Streetlight	$_____	_____ %	$_____
	Curb & Gutter	$_____	_____ %	$_____
	Subdrains	$_____	_____ %	$_____
	Sidewalk	$_____	_____ %	$_____
	Road Base and Subbase	$_____	_____ %	$_____
	Binder Course Asphalt	$_____	_____ %	$_____
	Surface Course Asphalt	$_____	_____ %	$_____
	Topsoil + Sod	$_____	_____ %	$_____
	Landscaping and Trees	$_____	_____ %	$_____
	Retaining Walls	$_____	_____ %	$_____
	Fencing	$_____	_____ %	$_____
	Signage + Barricades	$_____	_____ %	$_____

	Subtotal Internal + External	$_____		$_____
B	Lot Grading			
	_____ lots at $3,000	$_____	_____ %	$_____
	Subtotal Lot Grading	$_____		$_____
	Subtotal (A + B)	$_____		$_____
C	Contract Administration & Construction	$_____		$_____
	Subtotal (A + B + C)	$_____		$_____
D	Contingency Allowance (5%)	$_____		$_____
	Original Security Amount	$_____		
E	10% of the Original Security Amount			$_____
	Total Security Required			$_____

2 Design Submissions

2 Design Submissions

2.1 Introduction

This section outlines the required submissions to be made to the Town in support of development after conditional land use planning approvals have been received and to inform any development agreement required. All submissions shall include digital documents, reports, engineering drawings, and correspondence in PDF format. Reports and engineering drawings shall be stamped by a Professional Engineer. All materials that are to be filed as part of an application are subject to the Freedom of Information Act and shall be provided in an accessible format.

Drawings shall be prepared in accordance with Town standards, complete with the submission number (First Submission, Second Submission, etc.) and the date of submission.

Subsequent submissions are not to be made until the Town's comments from previous submissions have been received and incorporated. Any incomplete submissions delivered to the Town will be returned immediately.

All design submissions shall be digital. The Town may request paper copies of the submission documents, which shall be provided at the Developer's cost.

2.2 First Submission

The following submissions shall be compiled and submitted to the Town simultaneously.

2.2.1 Engineering Submission

The submission shall include the following:

1. A cover letter from the Consultant, which includes the following:
    - Any required application form and fee.
    - Summary of the contents within the submission.
    - Summary of design elements that are not in accordance with Town Standards (if any), complete with justification for the deviation.

- Confirmation that designs completed by subconsultants (landscape, hydro, utilities, etc.) conform with the proposed grading and municipal services within the development.

2. A Letter of Retainer from the Consultant stating they have been engaged for the design and general construction inspection of all works, and coordination of all subconsultants.

3. Letters of Retainer from all subconsultants (Landscape Architect, Electrical Engineer, etc.) stating they have been engaged for the design and to complete general construction inspection of all their respective works.

4. Complete sets of the following drawings are required:

- Proposal Plan for Registration.
- Draft Plan of Subdivision (M-Plan) and Conditions.
- Cover sheet.
- General servicing plans.
- Sanitary catchment plans.
- Storm sewer catchment plans.
- Sedimentation and erosion control plans.
- Plan and profile drawings.
- Miscellaneous and special detail drawings.
- Overall grading plans.
- Detail drawings for outlets and watercourse improvements (if applicable).
- Landscape concept plan.

5. Storm Water Management Report.

6. Functional Servicing Report.

7. Sanitary sewer design calculations on standard design sheets.

8. Storm sewer design calculations on standard design sheets.

9. Geotechnical Report.
10. Registration of Subdivision Application Form.
11. Traffic Impact Study Report (if required).
12. Acoustical Report (if required).
13. Hydrogeological Report (if required).
14. Arborist Report and/or Tree Protection Plans (if required).
15. Any other reports related to the development.

2.2.2 Municipal Structures Submission

When a new structure is proposed, a specific submission related to the structure is required, which includes the following information.

1. General Arrangement drawing(s), prepared in general accordance with the MTO *Structural Manual*. It includes the roadway structure plan, profile, elevation and cross sections.
2. Design Report which includes, but is not limited to, the description of the works, how the detail was arrived at, different options and cost analysis/least expensive alternate.
3. Design Criteria Sheet which includes, but is not limited to, the type/class of roadway, volume of traffic, geometric information and cost estimate.
4. Geotechnical Report.
5. Hydrology / Hydraulic Report.
6. A letter from the Engineer responsible for the design which certifies that:
    - The bridge type, length and width are appropriate.
    - OHBDC requirements are met.
    - MTO standards have been followed.
    - The most economical life cycle cost solution has been selected for the site.

The structural design drawings and details included as part any development agreement shall be stamped and signed by the Engineer who designed the roadway structure and by the Professional Engineer who checked the structural design drawings.

2.3 Second Submission

The following submissions shall be compiled and submitted to the Town simultaneously:

1. A detailed chart or report with all the First Submission comments and how they have been addressed.

2. All other applicable approval agencies comments.

3. All revised drawings, including proposed M-Plans and R-Plans.

4. CLI-ECA and/or MECP application forms (sanitary sewer, storm sewer, SWM facility, drainage channels, etc.), signed by the Owner/Developer and the Consulting Engineer as applicable.

5. Draft development agreement pertaining to engineering submission, and all applicable cost estimates.

6. Composite Utility Plans.

7. Detailed landscape plans which shall include:

    - Streetscape and Buffer Planting Plans.

    - Detailed Park Development Plans.

    - Stormwater Management Facilities Planting Plan.

The Town will not sign the Environmental Compliance Approval (ECA) application until satisfied with the engineering design. It is the Consultant's responsibility to forward the complete CLI-ECA application to the Town, or the complete ECA application to the MECP as applicable. The Consultant shall review the requirements of the Town's CLI-ECA and confirm with the Town whether the development's ECA will be obtained through a CLI-ECA application to the Town or an ECA application to the MECP.

2.4 Interim Submissions

Only the material requiring revisions must be included in interim submissions.

2.5 Final Submission

The following plans and documents shall be compiled and submitted in their entirety by the Consultant in one complete package:

1. The draft registered or reference plans and all drawings listed in Schedule ‘C’ of the development agreement.

2. Clearance letters, including a summary of Draft Conditions and clearance documentation.

3. A digital copy of the complete set of engineering, tree protection and landscape drawings in a format approved by the Town.

4. Sanitary sewer design calculations on standard design sheets, sealed by the Consulting Engineer.

5. Storm sewer design calculations on standard design sheets, sealed by the Consulting Engineer.

6. All required approvals – i.e. MECP, NVCA, etc.

7. Submissions of Form 1 or Form 2, as applicable in support of the watermain improvements.

8. Detailed construction cost estimate of all proposed works.

9. The Owners/Developer’s insurance certificate as per the development agreement.

10. Written confirmation that agreements are in place with all applicable utility companies (Bell, Rogers, Enbridge, EPCOR) for the installation of these utilities within the Town road allowance, in accordance with Town Standards.

11. Confirmation that Canada Post has reviewed and approved the location of the proposed mailboxes.

12. A summary of lot area and frontage for each lot/block to be developed and confirmation they all meet the applicable By-laws prior to registration.

13. Fees and deposits:

- Engineering fees.
- Legal deposit.
- Securities.
- Parkland fees.

14. Other costs as per the development agreement 5 signed copies of the development agreement.

3 Drawings

3 Drawings

3.1 General Drawings Requirements

The following basic information shall apply in preparation of the drawings.

- All plans shall include a north arrow and key plan in the upper right-hand quadrant.
- Drawings shall be signed and sealed by the Professional responsible for the design.
- Drawings to be submitted using the Town's layering convention.
- All dimensions and elevations shall be in metric.
- Elevations are to be geodetic and related to the Geodetic Survey of Canada datum.
- All plans shall be prepared in a coordinate system whereby horizontal control is captured in NAD 83 (CSRS) datum, UTM 17N projection and a vertical datum by CGVD28.
- A local benchmark note shall appear in each drawing.
- Existing information shall be shown light or background line weight.
- Proposed information shall be shown bold or foreground line weight.
- In general east-west streets shall have zero chainage at their westerly limit and north-south streets shall have their zero chainage at their southerly limits.
- Chainage on a plan-profile shall increase from left to right.
- Sanitary and storm sewer structures (maintenance holes, catch basin maintenance holes, catch basins, headwalls, etc.) and watermain appurtenances (hydrants, valves, etc.) shall be numbered for reference purposes.

3.2 General Servicing Plans

General plans showing services and appurtenances are to be drawn to a scale of 1:1000 and shall indicate, but not be limited to, the following:

- Roadways and street names.
- All lot and blocks.
- Watermains, complete with pipe diameter.
- Watermain appurtenances, with numbers.
- Sanitary and storm sewers, complete with pipe diameters and direction of flow.
- Sanitary and storm sewer structures, with numbers.
- Lot numbers per registered plan with provision to add street addresses when available.
- School signs.
- Street signs.
- Barricades.
- Fencing existing and proposed.
- Retaining walls.
- Easements, including dimensions and descriptions.
- Driveway locations.
- Bus stop platforms.
- Community mail boxes.
- Existing trees within 12 metres of the proposed development property boundary and trees to be preserved.
- Existing structures adjacent to the proposed development limit.
- Hydro transformers.
- Streetlights.
- Sidewalks, walkways and trails.

3.3 Composite Utility Plan

The Composite Utility Plan(s) shall be prepared at a scale of 1:500 and show the proposed locations for all above and below ground utilities including gas, telephone, cable television, street lighting and hydro services. The drawings shall include:

- Roadways and street names.
- Walkways, easements, curbs and sidewalks.
- Watermains, valves, hydrants, water service boxes, blowoffs etc.
- Sewers, catch basins and maintenance holes.
- Lot numbers per registered plan with provision to add street addresses when available.
- If a subdivision encroaches on an existing floodplain, the approved fill and flood line restrictions must be shown, as specified by the appropriate Conservation Authority.
- Driveway locations.
- Hydro vaults.
- Streetlight poles and appurtenances.
- Telecommunication pedestals.
- Underground plant locations.
- Gas valves.
- All utility road crossings and extent of concrete encasement.
- Canada Post community mailboxes.
- Existing trees to be retained, tree protection fencing, and tree protection zones (as per the Tree Protection Plan).
- Street name and traffic control sign locations.
- Other features as may be directed.

The drawings shall include appropriate legends, offsets where required, etc. The Owner/Developer shall provide written confirmation from each utility shown that they are in agreement with the Composite Utility Plan.

All locations must be established and resolved by the Consultant in conjunction with the utility companies (Bell, Rogers, Enbridge Gas and EPCOR) and in accordance with the locations shown on the typical cross-section.

The hierarchy of municipal servicing and utilities shall generally apply when determining installation locations. These are, in descending order, municipal sewers and watermains including appurtenances, hydro, street trees, gas, telephone, cable, and other. The Town requires that the use of aboveground utility furniture be minimized in all new developments.

Composite utility plans shall be submitted with each engineering package following the first engineering submission.

3.4 Storm Drainage Plans

Storm drainage plans are to be drawn to a scale of 1:1000 (a scale not exceeding 1:5000 will be accepted for large external drainage areas) and are to indicate the total area to be drained by the proposed storm sewers. The storm drainage plan is to be compatible with the grading plan and available contour mapping.

The storm drainage plan shall indicate but not be limited to the following:

- Existing contours established from a topographic survey of pre-development conditions. Existing contours shall extend outside the subject lands far enough to determine the existing drainage pattern.
- Drainage patterns of adjacent lands.
- Runoff coefficients and areas (ha) of tributary areas outside the development and for each section of the storm sewers within the development. Catchments shall be labelled and numbered accordingly.
- Direction of runoff.
- Street names.
- Storm sewers, complete with pipe diameters and direction of flow.
- Storm sewer structures, with numbers.

- Rear lot catch basins or swales on lots or blocks, required to collect drainage.
- Temporary or permanent quantity and quality stormwater management facilities.
- Major and minor overland flow routes.
- Culverts and other drainage appurtenances

3.5 Sanitary Drainage Plans

Sanitary drainage plans are to be drawn to a minimum scale of 1:1000 (a scale not exceeding 1:5000 will be accepted for large external areas) and are to indicate the total area to be serviced by the proposed sanitary sewers, including future development areas. Drainage/sub-drainage area limits for which sewers are to be designed for are to contain and follow the lot/block lines to the proposed maintenance holes located on the right-of-way. The sanitary drainage plan shall indicate but not be limited to the following:

- Populations and areas (ha) of tributary area outside the development and for each section of the sanitary sewers within the development.
- Street names.
- Maintenance hole numbers.
- Sanitary pumping station and forcemain if required.
- Sewer sizes, slope and directions of flow.
- Location of temporary plug(s) utilized to isolate new system from existing sewers.

3.6 Grading Plans

Overall grading plans are to be drawn to a scale of 1:500. As a minimum, the following information shall be illustrated on overall lot grading plans:

- Existing contours established from a topographic survey of pre-development conditions (existing contours shall extend outside the subject lands far enough to determine the existing drainage pattern).
- Existing elevations at all property corners.

- Building envelopes based on the applicable zoning requirements of each individual lot and block.
- Proposed apron grade at the front and rear of the building envelope for each individual lot and block.
- Minimum underside of basement slab grade elevations of each individual lot and block.
- Seasonal high groundwater table elevation of each individual lot and block.
- Proposed elevations at the corners of each individual lot and block.
- Proposed elevations at the side yard highpoints if applicable.
- Driveways locations of each individual lot and block.
- Watermain valve box, individual curb stop valve box and watermain chamber locations, with numbers.
- Sanitary and storm sewer structure locations, with numbers.
- Centreline elevations of existing roads at 20 metre intervals.
- Centreline elevations of proposed roads at 20 metre intervals.
- Proposed elevations at existing trees, structures, watercourses, etc.
- Tree protection zones for all trees to be retained, including all trees located up to 6 metres outside the property boundary.
- Match grades at the edges of tree protection zones.
- Proposed 0.5 metre contours for grading within large blocks and parks.
- Proposed grades and location for major and minor overland flow routes, including cross sections, where applicable or deemed necessary, to demonstrate sufficient conveyance capacity and/or illustrate the impact to adjacent properties and/or buildings.
- Lot fabric of subject lands including lot, block and easement description.
- Physical structures such as fencing, retaining walls, etc.
- Proposed grades for storm system to intercept block and external drainage.

3.7 Plan-Profile Drawings

Plan-profile drawings are to be drawn to a horizontal scale of 1:500 and a vertical scale of 1:50 and are to conform to the following:

- Where multiple drawings are required for one street, match lines must be used and there shall be no overlap or duplication of information.
- Where intersecting streets or easements are shown on a plan-profile, only the diameter of the pipe and direction of flow of the intersecting sewers shall be shown.
- On profile portion of drawings, the type of sewer (storm or sanitary), diameter, length, grade and class of pipe shall be shown.
- On profile portion of the drawings, watermain diameter, length and class of pipe shall be shown.
- On the plan portion of the drawings, only the type and diameter of pipe shall be shown.
- Where possibility of conflict with other infrastructure exists, connections are to be plotted on the profile or a crossings chart included.
- The detail information from all borehole logs is to be plotted on the profile drawings and located on the plan.
- Additional curb and gutter drainage details for turning radii, cul-de-sacs and intersections.

3.8 Erosion and Sediment Control Plans

Erosion and sediment control plans are to be prepared in accordance with the Provincial, Town, and Conservation Authority Standards. These plans shall be in accordance with the latest *Erosion and Sediment Control Guide for Urban Construction* (by Sustainable Technologies Evaluation Program). Existing trees to be retained, tree protection fencing, and tree protection zones (as per the Tree Protection Plan) shall be shown.

3.9 Landscape

All landscape plans shall be drawn and stamped by a Full Member of the Ontario Association of Landscape Architects. All landscape plans shall be drawn at a minimum scale of 1:500.

The landscape documents may include the following drawings.

- Site plan.
- Grading.
- Existing natural features assessment.
- Streetscape and buffer planting plans and details.
- Detailed park development plans and details.
- Trails master plans and details.
- Landscape restoration plans and details.
- Stormwater management pond planting plan.

All streetscape plans shall be consistent with the Town's *Urban Design Manual* and will require Town approval before implementation of the plans.

As a minimum, the following shall be identified on landscape plans.

- All existing trees and natural features to remain.
- Existing and proposed ditches, swales, and watercourses.
- Street names, lot numbers, building envelopes, and easements.
- Walkway, trails, sidewalks, maintenance accesses, and driveways.
- All existing and required fencing.
- All proposed plantings.
- All entry features.
- Above and below-ground infrastructure (e.g. utilities, pedestals/vaults, service laterals, culverts, light standards, hydrants, water valves, curb stop valves, mailboxes, etc.) to ensure there is no conflict with tree locations.

Construction details will be required for all landscape elements to be implemented as part of the development.

Any required landscape restoration plans and stormwater management facility planting plans will require both the Town and the appropriate Conservation Authority's approval prior to implementation of the plans.

Owners/Developers are required to display approved landscape plans at the sales office for the homebuilder(s) in the new subdivision.

3.10 Tree Protection

All tree protection plans shall be prepared and stamped by a Full Member of the Ontario Association of Landscape Architects and shall be coordinated with the arborist inventory/assessment and the engineering drawings.

All tree protection plans shall be drawn at a minimum scale of 1:500 and shall identify the following:

- Existing site features.
- Main features of the proposed development (clearly differentiated from existing features by colour or other means), including grading limits.
- Edge of forest canopy.
- Location of individual trees, with symbol reflecting the canopy diameter.
- Tree number corresponding to the inventory table.
- Symbolic identification of trees to be retained and those to be removed.
- Area in square metres of existing tree canopy and anticipated remaining tree canopy after proposed removals.
- For trees to be retained: tree protection zones, tree protection fence type and locations (dimensioned for layout during construction), and any proposed mitigation measures to address encroachment in the minimum TPZ.
- Tree inventory table, amended to also include:
    - Tree number on plan (if different than tree tag number).
    - Whether the tree is to be retained and protected, retained and injured, or removed.
    - Reason for injury or removal.

- Construction mitigation measures.

- Temporary siltation control measures (proposed on the engineering drawings).

- Relevant Town of Collingwood Standard Details related to tree protection.

3.11 As-Built Drawings

3.11.1 General

Prior to final acceptance of the subdivision by the Town, the Owner/Developer's Consulting Engineer shall provide a set of as-built drawings for the development to the Town.

As-built drawings shall be provided to the Town in Shapefile, AutoCAD and PDF formats.

All drawings shall be revised to reflect the recorded conditions within the lands to be accepted by the Town. Lots and blocks are to be numbered according to the Registered Plan and a separate distinct number for the municipal street address will be provided by the Town. Specific requirements for storm sewers, sanitary sewers, watermains and roadways are noted in the following sections. An asset table for vertical works capital assets to be assumed by the Town will be provided to the Engineer and is the Engineer's responsibility to complete the table and submit to the Town. Asset valuation will be the responsibility of the Town.

The Town will perform a spot check of elevations and locations. If the Town finds major differences, the drawings will be returned to the Consultant for correction.

Drawings shall be supplied in digital format (PDF and AutoCAD). Digital drawings shall be supplied in a coordinate system whereby horizontal control is captured in NAD 83 (CSRS) datum, UTM 17N projection and the vertical datum by CGVD28.

3.11.2 Survey Control Monuments

Prior to the assumption of the subdivision, the Owner/Developer's Surveyor shall establish a network of second order horizontal control monuments, as set out in *Ontario Specifications for Horizontal Control Surveys (OS 79)*, as well as a network of vertical control benchmarks, as set out in *Ontario Specifications for Vertical Control Surveys (OS 79).*

The same monument may be used as both a horizontal and vertical control monument/benchmark. The horizontal control monuments, and the vertical control

benchmarks, shall be established at approved locations to the satisfaction of the Town, using the following criteria:

- 2 horizontal control monuments and 2 vertical control benchmarks for the first 10 hectares (10 ha) (or less) subdivided by the plan, and 1 additional horizontal control monument and vertical control benchmark for every additional 10 hectares (10 ha) (or less) subdivided by the plan.

- In addition, every existing horizontal control monument and vertical control benchmark destroyed during subdivision or site plan construction must be replaced.

- The new horizontal control monuments and vertical control benchmarks (including replacements) shall be installed by an Ontario Land Surveyor (OLS). A certificate by an Ontario Land Surveyor is to be provided.

- The OLS retained by the Owner/Developer is to contact Ministry of Natural Resources and Forestry staff prior to starting field work to obtain assigned benchmark identification numbers and confirm requirements to ensure acceptance of the work in the COSINE database.

- Monumentation to be constructed on publicly owned lands.

3.11.3 Storm Sewers

All storm sewer invert elevations at structures and along the mainline sewer at a maximum 30 metre interval shall be indicated on the as-built drawings. If difference is greater than 150 millimetres from the design vertical alignment, affected portions of the sewer shall be redrawn in profile. Swing ties shall be provided to all structures (to centre of frame and grate/cover) and any structure which differs from proposed horizontal location by more than 1.5 metres shall be redrawn in both plan and profile.

In addition, the following shall be indicated on the as-built drawings:

- Pipe/culvert size, grade, type, class/gauge, bedding.

- Chainage from the adjacent structure, along the main to all service tees.

- Swing tie dimensions from lot corners to service laterals, including the invert elevation of the service laterals at property line.

Geodetic coordinates shall be provided for all storm sewer structures and service lateral locations at property line in AutoCAD format.

If as-built grades of sewer differ by more than 10% of the design grade, the Consultant shall also submit hydraulic calculations. If required, hydraulic calculations shall include Q_{ACTUAL} and Q_{DESIGN} on as-built design sheets.

3.11.4 Stormwater Management Facilities

All sewer invert elevations at structures within the stormwater management facility shall be indicated on the as-built drawings. Grades pertinent to the design and functionality of the stormwater management facility (spillways, berms, bottom of bank, top of bank, side slopes, forebay, etc.) shall be confirmed and indicated on the as-built drawings.

3.11.5 Sanitary Sewers

All sanitary sewer invert elevations at structures and along the mainline sewer at a maximum 30 metre interval shall be indicated on the as-built drawings. If difference is greater than 150 mm from the design vertical alignment, affected portions of the sewer shall be redrawn in profile. Swing ties shall be provided to all structures (to centre of frame and grate/cover) and any structure which differs from proposed horizontal location by more than 1.5 metres shall be redrawn in both plan and profile.

In addition, the following shall be indicated on the as-built drawings:

- Pipe size, grade, type, class, bedding.
- Chainage from the adjacent structure, along the main to all service tees.
- Swing tie dimensions from lot corners to service laterals, including the invert elevation of the service laterals at property line.

Geodetic coordinates shall be provided for all sanitary sewer structures and service lateral locations at property line in AutoCAD format.

If as-built grades of sewer differ by more than 10% of the design grade, the Consultant shall also submit hydraulic calculations. If required, hydraulic calculations shall include Q_{ACTUAL} and Q_{DESIGN} on as-built design sheets.

3.11.6 Watermains

All watermain obvert elevations at all fittings, connections, chambers and main line pipe at a maximum 20 metre interval shall be indicated on the as-built drawings. If the difference is greater than 150 millimetres from design vertical alignment, affected portions of the watermain shall be redrawn in profile. If horizontal alignment changes exceed 1.5 metres the affected portions of the watermain shall be redrawn in plan.

In addition, the following shall be indicated on the as-built drawings:

- Pipe size, type, class, bedding.
- Swing-ties to all main appurtenances (valves, bends, tees, dead ends, reducers, etc.).
- Chainage from appurtenance along main-to-main stops.
- Swing tie dimensions from lot corners to service laterals, including the invert elevation of the curb stop valve at property line.

Geodetic coordinates shall be provided for all hydrants, water valves and curb stop valves in AutoCAD format.

3.11.7 Roadways

All roadway centre line elevations, at a maximum 20 metre interval, shall be indicated on the as-built drawings. Gutter elevations shall be indicated for cul-de-sacs and intersections to show drainage into the storm system. If horizontal road alignment changes more than 0.5 metres or vertical geometry changes greater than 150 mm the plan and/or profile shall be redrawn as appropriate.

In addition, the following shall be indicated on the as-built drawings:

- Driveways, lay-byes, curb depressions.
- Road signage.
- Pavement markings.
- Pavement structure including type and thickness of asphalt and granular materials.

4 Roads and Active Transportation

4 Roads and Active Transportation

All roads within the Town of Collingwood are to be designed as a Complete Street for all ages, abilities and modes of travel, where safe and comfortable access for pedestrians, cyclists, transit users and people with disabilities, is integrated into the design. The design approach equitably considers the needs of all road users and recognizes the importance of streets not only as conduits to move from one place to another, but also as public spaces and an integral component of the public realm.

The roads shall be designed and constructed in accordance with the latest version of the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads*, the corresponding MTO *Design Supplement for TAC Geometric Design Guide for Canadian Roads*, Town standards, OPSS.MUNI and OPSD.

These standards should be considered as minimum guidelines and provide the Town's design preferences under normal circumstances. The designer, however, should use the best judgment to find innovative solutions when abnormal design conditions are encountered. For pavement design, the methodology outlined is to be followed by designers, Owners/Developers, and Contractors. The Owner/Developer shall consider infrastructure asset management principles in any decision-making process.

The Town design standard have been developed in consideration of public safety, industry best practice, the Town's ability to operate and maintain infrastructure, lowest lifecycle costing, emergency access, accessibility, the Town's transportation studies, *Urban Design Manual*, and any other applicable master plans. Deviations from the requirements of this standard may be permitted when site constraints (e.g. natural heritage or other considerable challenges) prohibit the application of the prescribed requirements. No deviations to standards shall be permitted without the approval of the Town.

4.1 Classification, Road Allowance & Cross Section

4.1.1 Classification

All roads in new developments shall be classified in consideration of the Town's Official plan, land use planning process, Municipal Class Environmental Assessment process, transportation studies, traffic volumes expected (including truck traffic) the length of the road, the intended use of the road, and the environment (i.e. urban or rural).

The proposed classification of all roads in any development proposal shall be confirmed with the Town prior to the commencement of the design.

Criteria	Local	Minor Collector	Major Collector	Arterial
Source Provided	Land Access	Land Access	Land Access and Traffic	Traffic
Movement	Traffic	Transit Routes	Transit Routes	Transit Routes
Length of Trip	Short	Short and Medium	Medium	Long
Flow	Interrupted	Interrupted	Interrupted	Through
Interconnections	Local	Local, Collector	Local, Collector	Collector, Arterial
AADT	0 - 1000	1,000 – 6,000	6,000 to 8,000	Over 8,000

4.1.2 Private/Condominium Road

Internal private roadways shall be designed in accordance with the current Town design criteria for a private / condominium road (including subdrains and sidewalks where applicable) in accordance with the latest Ontario Provincial Standard Drawings and Specifications or Town Standards and Requirements as applicable, with the following modifications:

- Minimum width of roadway shall be 6.5 metres.
- Minimum centre line turning radius shall be 12 metres (fire truck) for any development which has no buildings over three stories.
- Lengths of driveways must be a minimum of 6 metres measured from the back of the sidewalk, where a sidewalk exists or 6 metres from the back of the curb, where no sidewalk exists.
- Minimum overhead clearance shall be 5.0 metres.
- The minimum pavement structure for the roads will be as follows but may vary depending upon site soil conditions. For site conditions or any specific uses which require extra strength pavement, the pavement structure shall be substantiated by a report from the Owner/Developer's geotechnical Consultant.

- 300 millimetres Granular B
- 150 millimetres Granular A
- 50 millimetres HL8
- 40 millimetres HL3

Parking lots shall be structurally designed to the equivalent of the internal road design standards.

4.2 Geometric Road Design

The geometric design of all roads shall follow the TAC *Geometric Design Guide for Canadian Roads.*

4.2.1 Posted and Design Speeds

The posted speed of a road shall be confirmed with the Town.

For local roads, the design speed can equal the posted speed. For collector and arterial roads, the design speed should be 10 kilometres per hour over the posted speed to ensure an appropriate factor of safety to the road design and road user. A design speed equal to the posted speed for a collector or arterial road may be accepted by the Town on a site-specific basis.

4.2.2 Road Grades

All grades shall be referenced to centreline of the road.

Cul-de-sac and expanded bulb corners shall be designed with the centreline profile increased to ensure that a minimum lip of gutter grade of 1% is maintained along the full length of the lip of gutter, to account for length increases due to curvature.

4.2.3 Vertical Curves

All points of grade change in excess of 1% shall be designed with vertical curves. The minimum ‘K’ values for crest and sag curves shall be as per the TAC *Geometric Design Guide for Canadian Roads*. The minimum tangent length of any road grade shall be 9 metres.

4.2.4 Horizontal Curves

The minimum horizontal curve centreline radii shall be as per the TAC *Geometric Design Guide for Canadian Roads.*

4.2.5 Stopping Sight Distance

The stopping sight distances noted in the TAC *Geometric Design Guide for Canadian Roads* based on typical automobile vehicles on a flat surface and should be adjusted to reflect uphill or downhill grades of 3% or more.

4.3 Road Pavement Design

4.3.1 Minimum Design

The minimum pavement design for all roads shall be as per the geotechnical recommendations or as per Town Standard Drawings, whichever is greater.

On roads with 4 or more lanes, the binder course asphalt shall be Heavy Duty Binder Course (HDBC), also known as HL-8HS.

All asphalt materials and work shall conform to OPSS.MUNI 1150, OPSS.MUNI 1151, and OPSS.MUNI 1101.

4.3.2 Geotechnical Requirements

The Town will require a geotechnical Engineer to confirm the applicability of the minimum standards or provide recommendations as to the depth of granular base and type and thickness of asphalt in consideration of the following:

- Physiographic setting and subgrade soil characteristics.
- Groundwater conditions.
- Projected traffic loading.

Tests of subgrade materials must be conducted by a recognized soils laboratory and be acceptable to the Town. Copies of tests, along with proposed road designs, shall be submitted to the Town.

4.3.3 Placement of Surface Course Asphalt

Approval to place surface course asphalt is required from the Town. The following must be completed:

- 85% of the buildings are constructed.
- All sidewalk, curb and boulevard work.
- Maintenance hole and catch basin frames and grates/covers raised to surface course asphalt grade.
- Flush, sweep and clean binder course asphalt surface and evenly apply tack coat on full width.
- Binder course asphalt padding and/or grinding, as required, in accordance with OPSS.MUNI 310.
- CCTV inspection of sanitary and storm sewer, including the correction of any deficiencies.

The following conditions must also be met:

- A minimum period of 1 year has expired from the completion date for the placement of the binder course asphalt.
- All undeveloped lots/blocks/units are rough graded in accordance with the approved grading plans.
- All service connections for multiple-residential, commercial, institutional or other blocks are installed.
- Certification from the Owner/Developer's Engineer that all works have been completed in accordance with the Accepted for Construction drawings.
- The approval of the Town is obtained in writing.

4.3.4 Temporary Asphalt

Where binder course asphalt and concrete curb and gutter have been installed and the placement of surface course asphalt will not occur prior to the onset of winter, temporary asphalt snow plow ramps shall be required at the Owner/Developer's cost. Ramping is to be removed by grinding to such depth as to accommodate the required thickness prior to the placement of surface course asphalt.

4.4 Geometric Intersection Design

Key intersection standards are detailed in the Intersection Design table.

Intersection Design

Intersection	Approach Angle	Minimum Curb Radius (metres)	Minimum Daylight (metres)
Local to Local	70 to 110°	5	3 x 3
Local to Collector	70 to 110°	7.5	5 x 5
Local to Arterial	70 to 110°	7.5	10 x 10
Collector to Collector	80 to 100°	12.5	10 x 10
Collector to Arterial	80 to 100°	12.5	10 x 10
Arterial to Arterial	80 to 100°	15.0	15 x 15
Industrial to Collector	80 to 100°	18.0	15 x 15
Industrial to Arterial	80 to 100°	18.0	15 x 15

4.4.1 Approach Angle

Roads should be designed to intersect at 90 degrees. However, this may be reduced to 70 degrees or increased to 110 degrees if necessary for intersections between local and/or collector roads. For intersections between collector and/or arterials, and those with industrial roads, the range will be 80 to 100 degrees.

Intersections on curves are not desirable. However, should no other alternative exist, calculations and/or drawings shall be submitted to the Town for review to adequately demonstrate that sufficient sight distances exist to satisfy all geometric requirements.

4.4.2 Curb Radii

The curb radii measured along the edge of pavement shall be in accordance with the Intersection Design table. Intersection curb radii may need to be increased on truck routes where higher volumes of large trucks (tractor semi-trailers) are expected.

4.4.3 Daylighting

A daylighting triangle is the area of a corner lot formed by measuring from the projected point of intersection between the two rights-of-way from a specific distance back along each right-of-way line. Daylighting triangles are required

where roads intersect to ensure adequate sight distances can be maintained between approaching drivers. Daylighting triangles for traffic signal or stop control intersections shall be in accordance with the Intersection Design table.

4.4.4 Backfall

At all intersections, the crossfall of the major street shall not be interrupted by the crown line of the minor street. A 1% to 2% backfall shall be provided on the minor street, which shall continue to the end of the curb return radii to facilitate proper drainage of the intersection. Overland flow routing of storm drainage through the intersection must be maintained.

4.4.5 Spacing

Intersection spacing shall be as per TAC *Geometric Design Guide for Canadian Roads.*

For arterial roads, the typical minimum intersection spacing is 200 metres, which allows for minimum lengths of back to back left turn lanes at adjacent intersections. This spacing is generally only applicable in areas of intense existing development or restrictive physical controls where feasible alternatives do not exist.

For collector roads, the typical minimum spacing is 60 metres.

For local roads, the typical minimum spacing is 60 metres. 40 metres is acceptable for adjacent 3-legged intersections.

The minimum intersection spacing between signalized intersections is a function of the average running speed and the signal cycle lengths. Reference is made to Table 9.4.1 in the TAC *Geometric Design Guide for Canadian Roads.*

4.4.6 Roundabouts

The implementation of a roundabout will be reviewed by the Town on a site-specific basis. The application of a traffic circle primarily as a traffic calming measure versus a roundabout for capacity purposes is to be confirmed by the Town during the land use planning process or the Transportation Master Planning process.

At locations where a roundabout is proposed, a traffic Consultant specializing in the design of roundabouts is to prepare a functional design and road allowance configuration. The drawings will illustrate the design, lighting, pedestrian facilities, active transportation elements and other details and shall be provided to the Town for review and approval. Roundabout design and guidance shall be per current

applicable geometric design standards and the latest edition of *National Cooperative Highway Research Program* (NCHRP) Report 672 Roundabouts: *An Informational Guide, Second Edition*, or the TAC *Roundabout Design Guide*. Design vehicles shall be confirmed with the Town. Buses and emergency vehicles shall be accommodated without use of the central island truck apron on collector and arterial road roundabouts.

Daylighting triangles shall be determined independently for roundabouts through the design process.

4.5 Driveways

4.5.1 Urban Driveways

Driveways shall be designed in accordance with STD No. 230 and the width and location of the depressions in the curb and gutter for single-family residential driveways, shall be 3.0 metres as detailed on OPSD 351.010 with particular attention being placed on the location of the garage and the direction of traffic flow. Driveway depressions are to be placed when concrete curb and gutter is initially poured. The maximum width for a single residential driveway shall be in accordance with OPSD 351.010, the maximum width for a double residential driveway shall be 6.5 metres, or 50% of the lot frontage (whichever is less).

The width and location of the driveway depressions for residential apartment, and non-residential driveways shall be as detailed on OPSD 350.010. These driveways shall be designed to accommodate the anticipated vehicular traffic without causing undue interference with the traffic flow on the street. The width of any driveway depression for residential apartment and non-residential driveways shall be between 7.5 and 15 metres. All apartment, commercial, institutional, and industrial driveways shall be provided with barrier curbs constructed to blend into the roadway curb and gutter.

4.5.2 Rural Driveways

Driveways shall be designed in accordance with STD No. 231, OPSD 301.010, OPSD 301.020 or OPSD 301.030. All driveway entrances and driveway culverts require a Road Occupancy Permit.

The minimum depth of cover for all culverts is 300 millimetres unless otherwise indicated by the Town.

4.5.3 Grades

Driveway grades shall be in accordance with OPSD 350.010 for non-residential and residential apartment entrances and OPSD 351.010 for other residential entrances. The maximum permissible design grade for any driveway shall be 6% while the minimum driveway grade shall be 2%.

Negative sloping driveways will only be considered in rural residential developments under special circumstances. Where negative sloping driveways are used, a positive slope of at least 2.5% must be maintained from the garage over a minimum distance of 10 metres.

4.5.4 Radius

For residential driveways, radii are not required to transition between the road and the driveway. For non-residential driveways, the minimum curb radius is 5.0 metres. Increased radii may be required to accommodate larger design vehicles and emergency services. The end of the radius should not extend beyond the property line.

4.5.5 Medians/Islands

The use of medians or islands at driveways for signalization, entrance/exit control or aesthetics will be considered by the Town on a case by case basis.

4.5.6 Pavement Design

All new driveways are to be constructed from the back of curb or edge of pavement to the property line, in consideration of the type and volume of traffic to be served and the minimum requirements of the Pavement Deign - Driveways table.

Pavement Design – Driveways

Design Element	Residential	Commercial, Light Industrial & Apartments	Heavy Industrial
Surface Asphalt	50 millimetres HL3	40 millimetres HL3	40 millimetres HL3
Binder Asphalt	-	50 millimetres HL8	2x50 millimetres HL8
Granular A	150 millimetres	150 millimetres	150 millimetres
Granular B	-	300 millimetres	300 millimetres

4.6 Sidewalks, Trails, Service Walkways and Multi-Use Pathways

4.6.1 Sidewalks

Sidewalks shall be installed in all developments in accordance with these Standards, including on private / condominium roads to facilitate safe pedestrian movement and encourage pedestrian traffic. Sidewalks shall meet the minimum requirements of the current O. Reg. for the *Accessibility for Ontarians with Disabilities Act*, *2005* and shall be constructed in a manner that provides maximum assistance to individuals with limited mobility and without creating hazards to individuals who are visually impaired. A maximum longitudinal sidewalk grade of 7% and a maximum crossfall of 4% will be permitted. However, the Consultant should strive to limit the longitudinal grade to no more than 5% and the crossfall to 2%, where possible.

4.6.1.1 Location

Sidewalks shall be constructed at locations as shown on the Town's standard road cross sections. In general, sidewalks are required on both sides of all Arterial and Collector Road and at least one side of all local and private/condominium roads. For local and private / condominium roads, the locations of schools, parks, churches, commercial establishments, along with number of units served, continuity, etc. will be used as criteria in determining which side of the street the sidewalk should be constructed. Where there are no other determining factors dictating location, sidewalks shall generally be placed on the south and east sides of the street. Streetlights shall be located on the same side as the sidewalk.

Where the development generates the need, in the opinion of the Town, sidewalks may be required on both sides of a local road or private/condominium road, on existing streets external to the subdivision or on streets where reverse frontage is proposed.

Sidewalks shall terminate at locations to ensure network connectivity and maintainability. Receiving sidewalks/ramps are required at all locations where pedestrians are directed to cross the roadway.

Roads abutting schools are to have sidewalks on both sides from the school property to a logical termination point to maintain network connectivity and maintainability (approximately 250 metres).

4.6.1.2 Construction

Sidewalks shall be 1.8 metres in width as per the Town's standard road cross sections. Under certain conditions and at the discretion of the Town, 1.5 metre wide sidewalks may be permitted. At the discretion of the Town, wider sidewalks may be requested to accommodate increased pedestrian volumes, mobility devices, Active Transportation routes as shown in endorsed master plans, etc. The Town does not approve of sidewalks constructed adjacent to the back of curb. If conditions require the installation of curb-faced sidewalk, the width shall be minimum 1.8 metres.

Concrete sidewalks shall have a minimum thickness of 125 millimetres except where adjacent to curb or through residential driveways in which they shall be a minimum thickness of 150 millimetres. Ramps shall have a minimum thickness of 200 millimetres with flared sides adjacent to ramps having a minimum thickness of 150 millimetres. Sidewalks through industrial or commercial driveways shall have a minimum thickness of 200 millimetres. Concrete sidewalks shall be constructed according to OPSD 310.010, 310.020, 310.030, 310.050, 350.010, 351.010 and OPSS.MUNI 351. Contraction and dummy joints in sidewalks shall be saw cut to one quarter of the depth of the concrete sidewalk and be located as shown on the applicable OPSD. Only expansion joints shall be trowelled.

Bedding under concrete sidewalks shall be 150 millimetre Granular A, compacted to 100% of the material's SPMDD.

All new sidewalk ramps at intersections shall include unpainted cast iron tactile warning surface indicators (TWSIs). Sidewalk ramps that are reconstructed for any reason should be retrofitted with cast iron TWSIs. TWSIs shall be in accordance with OPSD 310.039. Radius TWSI plates shall be used where applicable, and where possible curb radii shall be designed to accommodate standard TWSI radii.

4.6.2 Recreational Trails, Multi-Use Pathways, Service Walkways and Road Based Active Transportation Routes

The Owner/Developer shall design and construct a trail system, multi-use pathways and service walkways to existing trail and active transportation systems with a priority of safety and connectivity. The Town's *Official Plan Schedule 5*, *Master Mobility and Transportation Plan* and the *Active Transportation Plan* indicate locations of trail and active transportation corridors, including future locations and connections.

The Town's trail and active transportation network is generally comprised of:

- Multi-use pathways, minimum 3.0 metre width (hard surface, multiple users).
- Multi-use recreational trails, minimum 3.0 metre width (crusher fines, multiple users).
- Road-based active transportation routes.

4.6.2.1 Recreational Trails and Multi-Use Pathways

Trails and active transportation infrastructure will be constructed according to the most recent *Town of Collingwood Trail Construction Standards* (STD. No. 1120, 1121, 1122), as amended. The provision of new trails shall be consistent with and support the exiting Town-wide trails network as outlined in endorsed master plans. The trail system in Collingwood consists of a comprehensive trails network that includes the regional Georgian Trail, the Train Trail linking to the Simcoe County Trails Network and a series of multi-use community wide trails.

Proposed trails should link together local points of interest, all open space amenities, civic institutions, and connect to the regional trails network. To the extent possible the route should utilize public open spaces, unopened rights-of-way, blocks and easements separated from roadways. In the event trails are located along roadways additional right-of-way width may be required by the Town.

Trails connecting through urban areas located within the road right-of-way should be paved multi-use pathways.

Trails through sensitive natural features should be designed as soft surface paths and located to avoid fragile areas.

Entrance points to the trail system shall be marked with signage co-coordinated with the Town.

All trails shall be contained within land to be deeded to the Town.

4.6.2.2 Service Walkways within Developments

Service walkways are access points that are constructed between private properties, shall be constructed, as deemed necessary by the Town to ensure proper circulation of pedestrian traffic within the development and/or as connecting links to adjacent neighbourhoods, existing or proposed trail and active transportation systems.

Service walkways shall be designed in accordance with most current O. Reg. in accordance with the *Accessibility for Ontarians with Disabilities Act, 2005* and shall be between 2.75 metres to 4.0 metres in width to allow for snow storage. Concrete or asphalt walkways shall conform to the same minimum thickness, bedding and compressive strength requirements as the *Town Standards*.

All walkways shall be contained within blocks and the land deeded to the Town.

Walkways to be provided with a gate or removable bollard as per Town Drawings 508 and 515.

4.6.2.3 Road Based Active Transportation Routes

The implementation of active transportation facilities will require the approval of the Town. All active transportation facilities shall be implemented and designed in accordance with the TAC *Geometric Design Guide for Canadian Roads*, the corresponding MTO *Design Supplement for TAC Geometric Design Guide for Canadian Roads*, the MTO *Ontario Traffic Manual* (specifically Books 12A, 15 and 18) and the *Collingwood Active Transportation Framework.*

4.7 Concrete Curb & Gutter

New roads shall be constructed with curb and gutter as per OPSD 600.040 and OPSS.MUNI 353. Granular material installed as a base below the curb shall be compacted to 100% of the material's SPMDD.

The desired minimum grade on curb is 0.75% and the absolute minimum grade is 0.5%.

Driveway depressions shall be formed in the required locations and for each lot of record. Saw cutting of curb to create a depression will not be permitted. The capping of existing or improperly located depression will not be permitted.

Curb ramps shall be provided at all sidewalk intersections with curb line.

Prior to final acceptance all curb blemishes will be rectified by removing and replacing a minimum 1 metre long section of curb.

4.8 Subdrain

Road subdrains shall be constructed along both sides of all roads with curb and gutter. Subdrains shall conform to STD No. 210. Type A subdrain shall be used in most instances. Type B, with clear stone, shall be used for high groundwater environments.

Subdrains shall drain into catch basin locations where available or other stormwater outfalls such as roadside ditches or storm sewers.

4.9 Fencing

4.9.1 Chain Link Fence

Black vinyl chain link fence (in accordance with STD. No. 501) shall be installed along the boundary where municipally owned land (excluding rights-of-way) abuts private property. This generally includes public walkways/trails, park land, open spaces and stormwater management facilities (if applicable). It shall also be required adjacent steep slopes, where safety is a concern. Chain link fences shall be installed 150 millimetres from the common property line on the Town's side. The Town will assume ownership and maintenance of the fence.

4.9.2 Wood Privacy Fence

Wood privacy fence (in accordance with STD. No. 502) shall be installed along side yards and/or rear yards that back onto collector or arterial roadways, unless a noise attenuation barrier is required. Wood privacy fences shall be installed 150 millimetres from the common property line on the residential side. The private landowner will assume ownership and maintenance of the fence.

Wood privacy fence shall also be installed between residential and non-residential properties where they abut each other. Wood privacy fences shall be installed 150 millimetres from the common property line on the non-residential side. The non-residential landowner will assume ownership and maintenance of the fence.

4.9.3 Acoustic Fence

Acoustic fence (in accordance with STD. No. 505) shall be to a standard and installed in accordance with the recommendations of any applicable Acoustical Report. Noise attenuation fences shall be installed 150 millimetres from the common property line on the Owner/Developer's side. The private landowner will assume ownership and maintenance of the fence.

4.9.4 Gates

Gates will not be permitted within any fence, unless written approval is received from the Town.

4.10 Boulevards

Boulevards are defined as the area between the property line and the back of curb or edge of pavement. The balance of the boulevard not occupied by driveways or sidewalks shall be graded and finished as follows:

- A minimum of 300 millimetres screened topsoil and No. 1 Nursery sod (as classified by the Nursery Sod Growers Association of Ontario) for urban cross sections.
- A minimum of 300 millimetres screened topsoil and hydro-seed for rural cross sections.

In industrial areas and open space blocks, hydro-seeding of the boulevards on a minimum of 100 millimetres screened topsoil may be permitted at the discretion of the Town.

Tree planting in boulevards shall follow the specifications listed in the Landscape section of this Standard.

All work shall be completed in accordance with the applicable OPSS.MUNI and to the satisfaction of the Town.

Boulevards shall be constructed with positive drainage at the same slope as the driveway (minimum of 2% and a maximum of 6%).

Ditches shall be constructed in rural rights-of-way as indicated in the Town standard road cross section drawings.

4.11 Community Mailboxes

Provisions shall be included in the development design for community mailboxes. While the final locations are subject to approval by the Town and Canada Post, the Consultant must propose locations that are conducive to the pedestrian and vehicular movements anticipated in the area. As a result, placement on collector or arterial roads should be avoided.

Further, mailboxes are to be located a minimum of 30 metres from the edge of the road allowance at any intersection, preferably on a lot/block/unit line and considering other above ground features such as streetlights, fire hydrants, transformers, etc.

Community mailboxes must have direct sidewalk access and are to face the sidewalk. In rural areas, where sidewalk is not present, access is to be provided from the road.

All mailboxes must conform to Canada Post's standard drawings and specifications.

4.12 Bus Shelters

All bus shelters must conform to the Town's standard bus shelter manufactured by Daytech Limited.

4.13 Cul-de-Sacs

4.13.1 Permanent

The use of cul-de-sacs in the road design of new developments shall be avoided whenever possible. Cul-de-sacs will only be considered for low volume local or private/condominium roads provided the length of the road does not exceed 150 metres. Islands will not be permitted in the centre of cul-de-sacs.

Minimum grades of 1% shall be maintained along the flow line of all gutters around the cul-de-sac. The design road grade on the cul-de-sac shall be such that the drainage is directed away from the end of the cul-de-sac and towards the beginning of the bulb area where catch basins are to be located. Where this is not attainable, a double catch basin shall be installed at the low point and a suitable overland flow outlet shall be provided in an easement if necessary.

All cul-de-sacs shall be detailed at a scale larger than the road plan and shall show gutter, crown and other grades sufficient to determine that the road will properly drain.

Cul-de-sacs are to be designed in accordance with STD No. 220 or STD No. 221 as applicable.

4.13.2 Temporary

Temporary cul-de-sacs will be permitted at the discretion of the Town.

4.14 Street Elbows

Minimum gutter grades of 1% shall be maintained along the flow line of all gutters around the elbow. Street elbows are to be designed in accordance with Town standard drawings STD No. 224.

4.15 Roadside Safety

Roadside safety barriers are protective devices installed between motor vehicle traffic and a potential hazard off the road (e.g. cable guiderail and steel beam guiderail). Roadside protection shall be installed at all locations where warranted and if struck, where they will cause less damage as compared to the hazard.

All roadside protection elements shall be designed and installed per the TAC *Geometric Design Guide for Canadian Roads*, the corresponding MTO *Design Supplement for TAC Geometric Design Guide for Canadian Roads*, MTO *Roadside Safety Manual* and applicable OPSS.MUNI and OPSD.

4.16 Pavement Markings

The Owner/Developer will design pavement markings for all roads within the development, including pavement markings at all intersections, bike lanes and trails. Multi Use Path intersections, school crossings, and walkways to clearly indicate the proper traffic zones, lanes, stop lines and crosswalks. Pavement markings shall be designed in accordance with the MTO *Ontario Traffic Manual.*

The following standard will be applicable in school zones for crosswalks:

Crosswalk lines – 10 centimetres

Ladder bars – 0.6 centimetres

Stop bar with crosswalk – 30 centimetres

Stop bar without crosswalk – 60 centimetres

Longitudinal centre line – 10 centimetres wide yellow 12 metres long (all approaches)

Pavement markings will be installed on surface course asphalt and in some circumstances on binder course asphalt. All pavement marking removal required to prepare the area for final pavement marking shall be done by abrasion methods.

Lane markings are to be organic, solvent based, or water borne traffic paint complete with glass beads. All lane marking applications to new asphalt require 2 applications of paint. The second application shall not be applied until the first is tack free. Pavement markings are to conform to OPSS.MUNI 710 and OPSS.MUNI 1712.

All symbols, stop bars and crosswalks are to be durable pavement markings or field reacted polymeric pavement markings in accordance with OPSS.MUNI 710, OPSS.MUNI 1713 and OPSS.MUNI 1714.

Local roads do not require centreline pavement marking. Stop bars are required.

4.17 Signage

4.17.1 Traffic Signage Plan

A Traffic Signage Plan shall be prepared to show the proposed location of all signs to be installed in the development. The plan shall be prepared in accordance with the *Ontario Traffic Manual* and/or the *Highway Traffic Act Regulations for Ontario.* Double sided street name signs shall be supplied and installed by the Owner/Developer. Street name signs must be erected at the completion of the binder course asphalt road construction and prior to the issuance of Building Permits. Signs must be maintained by the Owner/Developer until assumption by the Town, unless signage is associated with a private/condominium road, in which case the Owner/Developer must determine a long-term maintenance plan through the development agreement.

Proposed street names to be approved by the Town in accordance with the *Municipal Naming Policy*.

4.17.1.1 Location

Street name signs are to be placed at every intersection in the locations shown on STD No. 401 and as noted on the Traffic Signage Plan.

4.17.1.2 Material

Street name signs are to be 160 millimetres high extruded aluminium blades, with green high-intensity background and 90 millimetre pre-cut, white high-intensity upper case block highway lettering, all vacuum applied. The suffix of each road name is to be abbreviated (e.g. AVE, BLVD, RD, ST, etc.).

4.17.1.3 Mounting

Street name signs are to be mounted on minimum 14 gauge 45 millimetres x 45 millimeters square punch out type or uniflange type galvanized steel post directly embedded into the ground, or with a breakaway base. They are not to be mounted on stop sign posts and must be mounted on their own post in a quadrant other

than the location of the stop sign. Street signs may be strapped to streetlight poles using aluminum brackets if the poles are properly positioned.

4.17.2 Traffic Control Signs

Traffic control signs are to be supplied and installed by the Owner/Developer and shall conform to the most recent versions of the *Ontario Traffic Manual* or the *Highway Traffic Act Regulations for Ontario*. Traffic control signs must be erected at the completion of the binder course asphalt road construction and prior to the issuance of Building Permits. Signs must be maintained by the Owner/Developer until assumption by the Town, unless control signs are associated with a private/condominium road, in which case the Owner/Developer must determine a long-term maintenance plan through the development agreement.

4.17.2.1 Location

Traffic control signs shall be located as shown on STD No. 401 and/or on the Traffic Signage Plan.

All signs, with exception of “Parking” signs, shall be mounted approximately at right angles to the direction of and facing the traffic that they are intended to serve. On curved alignments the angle of placement should be determined by the course of the approaching traffic rather than by the roadway edge at the point where the sign is located. Signs shall be individually erected on separate posts, unless otherwise indicated on the Traffic Control Plan. Signs for different purposes should not be placed closer together than 30 metres.

4.17.2.2 Material

All traffic control signs are to be made with high intensity type reflective sheeting in accordance with MTO, OTM, the *Highway Traffic Act Regulation for Ontario* and the Town, including colours. Temporary regulatory signs must also be reflective.

Signs are to be aluminum, anodized both sides, according to the following requirements:

Less than 600 millimetres in size - 1.6 millimetre utility series aluminium.

600 to 900 millimetres in size - 2.0 millimetre No. 655T6. and

Greater than 900 millimetres in size - 3.2 millimetre No. 655T6.

4.17.2.3 Mounting

As per STD No. 401, traffic control signs are to be mounted on 14 gauge 45 millimetres x 45 millimetres square punch out type or uniflange type galvanized steel post directly embedded into the ground, or with a breakaway base.

4.17.3 Roads Not Assumed Signs

Signs reading “Roads Not Assumed by Municipality – Use at Your Own Risk” shall be erected at each point of access/egress to the development where the project includes roads that are to be assumed by the municipality. Signs shall meet following requirements:

Minimum of 1.22 metres x 1.83 metres.

Maximum height of 2.15 metres above grade. and

Lettering 120 millimetres wide by 180 millimetres tall, black in colour on white reflective backing.

Signs shall be erected prior to the start of construction and shall be removed after municipal assumption.

4.18 Accessibility for Ontarians with Disabilities Act

All design elements within the development shall be in strict accordance with the *Accessibility of Ontarians with Disabilities Act.*

Where tactile walking surface indicators (TWSI) are required, they shall be unpainted cast iron, according to CSA B651-2012 and OPSD 310.039.

The truncated domes shall be of uniform size and shape. Units shall be uniform in texture, be free from pouring faults, sponginess, cracks, blowholes, and other defects, and have clean-cut and well-defined edges. All surfaces shall be bare, without any coating, and be uniform and free of flaking rust or mounts of rust or debris. Tactile walking surface indicators shall have ribs cast to the underside of the unit, have vent holes, and have a minimum plate thickness of 5 millimetres. Tactile walking surface indicators shall have radius bends to ensure a uniform curved alignment along corner radii.

Tactile walking surface indicators shall be set and pressed into wet concrete to final elevation according to manufacturer's recommendations. Remove any wet concrete that may spill onto tactile walking surface indicator surface.

Tactile walking surface indicators shall be placed at all intersections where the road interrupts the sidewalk. In private locations where the sidewalks run through the driveway, tactile plates are not required.

5 Water Supply System

5 Water Supply System

5.1 Watermain System

Watermains designed and constructed in accordance with the most recent requirements and specifications of the Town of Collingwood are required on every street within all proposed plans of subdivision, condominium or site plan. All watermain materials shall comply with all applicable current industry standards and specifications for quality management and quality control including: MECP's *Design Guidelines for Drinking Water Systems*, The Canadian Standards Association (CSA), American Water Works Association (AWWA), American Standard and Testing Materials (ASTM), Underwriters Laboratory (UL), and NSF International (NSF). Watermains shall be of adequate size to provide service for the development of adjacent lands designated by the Town.

This specification is applicable to installation of services and watermains up to and including 400 millimetres in diameter. Installations of watermains larger than 400 millimetres in diameter or for any special installation shall be reviewed on an individual basis by the Town.

5.2 Maintenance

The watermain system shall be maintained as required by regulation by the Town at the Owner/Developer's cost until assumption of all services in the subdivision. Once the watermain has been tested and approved, only the Town can operate the system.

The Town shall maintain ownership and maintenance responsibility of watermains installed in private developments. All deficiencies and repairs shall be completed by the Condominium Corporation/Site Owner's contractor and witnessed by the Town at the Condominium Corporation/Site Owner's expense. Blanket easements shall be provided in favour of the Town for maintenance access.

For Town watermains passing through private property, other than those in private developments with a blanket easement, the minimum width of easements for watermains shall be in accordance with the following table.

Minimum Width of Easements

Size of Pipe	Depth of Cover	Minimum Width of Easement
150 to 400 mm	1.8 m minimum	4.0 metres
450 mm and up	1.8 m minimum	4.5 metres

5.3 Design Criteria

The proposed development must be serviced from the existing municipal water distribution system. The Owner/Developer shall provide and construct at their own cost a watermain suitable for supplying the entire project and interconnected where possible, the connection from the nearest 150 millimetre diameter or larger watermain, including any necessary easements, to the satisfaction of the Town. Abutting private owners may connect to this connecting watermain without charge by the Owner/Developer.

To provide proper and reliable water distribution systems within the development, reasonable looping of these systems shall be provided to the satisfaction of the Town. Permanent dead ends, such as on cul-de-sacs, are to be avoided to the extent possible. Any permanent dead ends must be approved by the Town.

Should the Owner/Developer propose to phase the servicing of the development, the Town reserves the right to comment and/or alter the proposal, in order to service the development in a logical order.

5.4 Design Flow

Watermains shall be designed to carry maximum day demand plus fire flow, or peak hour flow whichever is greater.

The average daily demand is to be taken as 260 litres/capita/day.

The estimated populations and areas for the different neighbourhoods shall be in accordance with the *Master Servicing Plan.*

As a minimum, the estimated people per unit (ppu) values to be used in the design, shall be based on the following typical dwelling types (in terms of size, number of bedrooms, etc.).

Dwelling Density

Dwelling Type		People per Unit (ppu)
Single Detached	2 to 4 bedroom	2.9
Semi Detached	2 to 3 bedroom	2.7
Townhouse	2 to 3 bedroom	2.4
Apartment	1 to 2 bedroom	1.9

The maximum day and peak hour factors shall be determined using the *Master Servicing Plan* with consideration for the MECP *Design Guidelines*. The following are considered minimums:

- Maximum daily demand factor – 1.77 MDD/ADD
- Peak hourly demand factor – 1.3 PHD/MDD

Peak flows, other than domestic flows shall be determined on an individual basis.

5.5 Fire Flow

Fire flow calculations for watermains shall be based on the *Fire Underwriters Survey* (FUS).

Fire flow calculations for water services shall be based on the *Ontario Building Code*.

Available fire flow shall be determined using *National Fire Protection Association (NFPA) 291* for situations where a watermain or water service connects to an existing watermain.

Available fire flow shall be determined from the Town's water model for subdivisions.

5.6 Selection of Watermain Sizes & Pressures

The following are noted:

- The Hazen-Williams formula ($V = 0.85\ C\ R^{0.85}\ SH^{0.54}$) shall be used for computing friction losses and subsequently sizing the watermains.

- For new mains the values of the C coefficient shall be 120 for 150 millimetre diameter pipe and 110 for 200 millimetre diameter pipe regardless of pipe material.

- The minimum size of mains shall be 150 millimetre in diameter in residential subdivisions and 200 millimetre diameter industrial developments. The Town may require larger mains in certain locations for circulation or other reasons and this cost shall be borne by the Owner/Developer.

- The minimum pressure during the peak hourly demand shall be 275 kilopascals.

- The maximum pressure under static load or during the minimum hourly demand shall be 550 kilopascals. Where this threshold is exceeded, a pressure reducing valve shall be installed at the discretion of the Town and as confirmed by water modelling.

- The minimum fire flow in a residential area is to be 38 litres per second and the minimum fire flow in an industrial area is to be 75 litres per second. Watermains are to be sized accordingly.

- The minimum pressure when the system is tested for fire flow in conjunction with the design maximum daily demand shall be 140 kilopascals.

5.7 Modelling Requirements

The watermain design calculations shall be summarized in the Functional Servicing Report and provided to the Town with drawings in AutoCAD and PDF format showing the watermain layout and topographic information. The Town will coordinate modeling to verify the impact of the development's water demands on the existing Town water distribution system and any upgrades that are required. Modeling will be completed by the Town's modeling Consultant at the Owner/Developer's cost.

5.8 Depth of Watermains

The ground cover on watermains, service laterals and hydrant leads shall be 1.8 metres at all points unless otherwise approved by the Town.

5.9 Separation of Watermains & Sanitary Sewers

Minimum separation between watermains and sanitary sewers shall be provided in accordance with MECP *Procedure F-6-1*.

Water services shall be installed below the storm sewer and protected from freezing, unless proper justification is provided otherwise.

5.10 Location

The watermain shall be located as shown on the Town's Standard Road Cross Section Drawings.

5.11 Extra Mains & Extra Fittings

No roadway leading out of the subdivision shall be completed and accepted by the Town until connecting watermains are installed complete to the subdivision limits.

Extra fittings shall be installed on the watermains at the discretion of the Town to provide for future connections. Extra fittings are at the at the Owner/Developer's cost.

5.12 Pipe Classification & Embedment

Watermain pipe shall be as per the *Water Distribution Materials List*.

Tracer wire shall be 75°C 600V and in accordance with the *Water Distribution Materials List* or approved equivalent. A tracer wire shall be provided along the top of all watermains to permit field tracing of the watermain. The wire is to be secured to the top of the watermain at every fitting and valve and at intervals not to exceed 300 metres. Tracer wire shall be brought to the surface at hydrant valves and at water service boxes. For hydrant valves a loop of wire shall be installed along the outside of the valve box and fed through a 13 millimetre hole drilled 150 millimetres from finished grade. A 300 millimetre loop shall be left inside the top of the valve box. For water services a loop of wire shall be installed along the outside of the service box and wrapped round the top of the box at the surface. Joints in the tracer wire are discouraged. Where joints are necessary (such as the end of a roll) connections shall be made with approved watertight connectors.

A continuity test of the tracer wire installation is to be provided in writing by the Owner/Developer's Engineer as part of the commissioning of the watermain system and prior to Final Acceptance.

The class of pipe and the type of bedding shall be designed to suit loading and proposed construction conditions. Details are illustrated in the OPSD standard bedding, cover and backfill details. In general, Type B bedding (Granular A embedment) shall be used for watermains and services.

5.13 Thrust Protection

Mechanical joint restraints, as per the *Water Distribution Materials List*, are required at all changes in pipe direction, terminations and any location where thrust pressures may occur (tees, bends, caps, valves, hydrants etc.). Water valves shall be restrained on both sides to the same standard as a dead end. Mechanical joint restraint may also be required in special circumstances such as infill areas, deep installations, under culverts, trenchless installations etc. The length of watermain protected with mechanical joint restraint shall be calculated by the Engineer for the anticipated site conditions in accordance with the manufacturer's recommendations. The limits of watermain to be restrained shall be clearly shown and dimensioned on the construction drawings and updated on the as-built drawings.

Pipe deflection is to be avoided in favour of restrained fittings.

Where restraining glands cannot be used, thrust blocks may be approved for use by the Town. Thrust blocks shall be used in accordance with the applicable OPSD, supported by undisturbed soil, and/or as approved by the Geotechnical Consultant.

Restraining glands shall be as per the as per the *Water Distribution Materials List.*

5.14 Corrosion Resistance

All ferrous watermains, ferrous fittings, tracer wires and copper water service connections shall have corrosion protection provided by means of sacrificial anodes. The minimum corrosion protection requirements noted herein based on OPSS.MUNI 442 are to be confirmed by a Professional Engineer in the Geotechnical Report prepared for the proposed development based on site specific soils conditions. The minimum requirements are outlined in the table below.

Corrosion Protection Requirements

Element	Anode Size	Watermain Material
Ferrous Water Service	5.4 kilograms	Non-Ferrous

	14.6 kilograms	Ferrous
Valves and Fittings*	5.4 kilograms	Non-Ferrous
	5.4 kilograms	Ferrous
Hydrants	10.9 kilograms	Non-Ferrous
	10.9 kilograms	Ferrous
Watermain Pipe	N/A	Non-Ferrous
	Anodes at appropriate spacing	Ferrous
Ferrous to Non-Ferrous Pipe Connection	14.6 kilograms	All
Tracer Wire	5.4 kilograms per 1,000 metres	All

* Fittings shall include bends, tees, crosses, sleeves, reducers, plugs, caps, joint restrainers, couplings, service saddles, etc.

Anodes shall generally be magnesium. All valves and fittings are also to be protected with petrolatum and/or denso tape or wax tape systems. 175 gram zinc "Protecto Caps", or approved equal, shall also be included on all bolts.

All thermite weld connections shall be coated with Roybond 747 Primer and Royston "Handy Cap" or approved equal.

Bonding cables shall be provided on each side of the fitting to the existing watermain. Bonding cables shall be seven strand, coated copper wire, connected to the fittings and watermain by a thermite weld (Cad weld).

5.15 Fire Hydrants

Fire hydrants shall be as per the *Water Distribution Materials List.*

Hydrants are to be 1.85 metres long. Sections may be added if required to be installed below 1.85 metre section. Any added sections are to be added below grade at the 90° elbow.

Hydrants shall be spaced at a maximum distance of 90 metres in residential, commercial or industrial areas.

Hydrants shall be located 1.2 metres minimum clear distance from the edge of any driveway or house service connection. Other aboveground utilities such as light standards, transformers, street signs or boulevard trees shall be located no closer than 2.0 metres from a hydrant.

Hydrants shall be located on the projection of side lot lines. A hydrant shall be placed at the end of every cul-de-sac and dead-end street as well as at the high points in roads.

Hydrants shall be placed on the same side of the road as the watermain wherever possible.

Hydrants shall avoid conflict with planned street trees.

All hydrants shall have a Flexstake Hydrant Marker Model FHV804, 1.2 metres long, yellow in colour with a reflective hydrant graphic on both sides at the top of the marker. The required hydrant marker is positioned on the right port as viewed from the street. All hydrants shall have a fire hydrant anti tamper device for Century hydrants, colour coded blue.

5.16 Valves

Valves shall be as per the *Water Distribution Materials List.*

Generally, gate valves shall be located on the projection of side lot lines at or near intersections as required for spacing. 4 valves shall be placed at cross intersections and 3 valves at tee intersections, such that broken sections can be isolated without jeopardizing flow to other sections.

Where valves have more than 1.9 metres cover, valve stem extensions shall be installed.

Where watermains are terminated pending future extension, an auto flusher shall be installed that drains to the storm sewer. All auto flushers shall include a water meter in accordance with the *Water By-law*.

Valves shall have a maximum spacing of 150 metres for distribution watermains and 400 metres for trunk supply mains.

Valve chambers are required on trunk supply mains greater than 400 millimetres in diameter at the discretion of the Town.

Air release valves shall be considered at high points of all watermains where possible, installed together with valves in valve chambers.

Drains shall be considered at low points of all watermains and where possible, installed together with valves in valve chambers.

5.17 Service Connections

Service connections shall be 25 millimetre pipe unless a larger service is required by OBC, installed with a minimum cover of 1.8 metres, with a minimum 100 millimetres depth Granular A bedding and 300 millimetres depth Granular A cover Residential connections terminate at the property line at the centre of the lot and a 89 millimetre x 38 millimetre marker from the invert of the service to 600 millimetres above grade painted blue.

Curb stops are not to be located within driveways or hard surface locations. If the curb stop is required to be in a driveway or hard surface location, approval is required by the Town and will require an approved frost collar.

Service connections for industrial, commercial, institutional or multiple dwelling use will be considered on an individual basis. Fire connections may be required for industrial, commercial, institutional or multiple dwelling lots. Domestic and Fire services will separate at the property line with individual isolation valves.

A water service shall be provided for park blocks, if required by the Town. Water service diameter shall be confirmed by the Town.

Water services and fittings shall be as per the latest *Water Distribution Materials List.*

Water meters to be supplied by the Town through the Building Department.

5.18 Fittings

All fittings shall be as per the latest *Town Water Distribution Material List*. All mechanical joints shall use restraining glands, regardless of thrust pressures.

5.19 Backflow Prevention

Backflow preventers are to be installed, tested and removed as per the *Backflow Prevention By-law* and *CSA B-64*.

5.20 Testing & Acceptance

All water used for testing will be metered, recorded and charged to the Owner/Developer. If the Owner/Developer intends to phase the servicing this type of detail will need to be incorporated at each phase connection point. If an existing

watermain is not available to supply water for testing of the new watermain, the Owner/Developer shall supply water for testing using water trucks.

5.20.1 Watermains in Municipal Right-of-Way

The complete water system including service connections to the property line and hydrants shall be tested in accordance with OPSS.MUNI 441 prior to initial acceptance of the system. Watermains are not to be connected to existing watermains until bacteriological testing has been successfully completed. STD No. 611 shows a typical temporary connection detail for new watermains. Initial acceptance means when the watermain has been tested, commissioned and tied into the Town's water distribution system, but before assumption.

All watermain testing and commissioning will be conducted by the Owner/Developer in accordance with the Town's *Standard Operating Procedures,* MECP *Watermain Disinfection Procedure* and OPSS.MUNI 441, at the Owner/Developer's cost, to the satisfaction of the Town. The Town will collect the required microbiological water quality samples, at the Owner/Developer's cost, prior to placing the watermain into service.

5.20.2 Watermains on Private Sites

All watermain testing and commissioning will be conducted by the Owner/Developer in accordance with OBC requirements, at the Owner/Developer's cost, to the satisfaction of the Town. The Town will collect the required microbiological water quality samples, at the Owner/Developer's cost, prior to placing the watermain into service.

5.21 Temporary Connections During Construction

The new watermain shall be isolated from the existing water distribution system using a complete separation until satisfactory bacteriological testing has been completed and accepted by the Town. Water required to charge the new main shall be supplied through a temporary connection between the existing water system and the new main. The temporary connection shall incorporate a reduced pressure zone backflow prevention assembly as per the *Backflow Prevention By-law* and *CSA B-64*. The reduced pressure zone backflow prevention assembly shall be installed and tested by a Town approved Qualified Contractor at least 72 hours prior to use on Town watermains, with a document provided to the Town indicating a passing test as per the *Backflow Prevention By-law.* The backflow prevention device shall be disconnected (physically separated) from the new main during hydrostatic testing and reconnected afterwards. If reconnected, the

backflow prevention device shall be retested in the same manner as the original installation, with documentation provided to the Town. Refer to STD. No 611 for items to be included and additional details.

All temporary connection backflow prevention devices are required to be removed by a Town approved Qualified Contractor, documentation is required to be submitted to the Town as per the *Backflow Prevention By-law*.

6 Sanitary Sewer System

6 Sanitary Sewer System

6.1 Sewer System

Sanitary sewers designed and constructed in accordance with the most recent requirements and specifications of the Town are required to carry residential, and non-residential sewage, as defined in the *Sewer Use By-law* from each area of the development. Flow is to be by gravity and pumping will be considered only where other alternatives are not possible and only with the approval of the Town.

Connections to sewer systems from foundation drainage, weeping tile drainage, roof drainage, and any other connections prohibited by the *Sewer Use By-law* are not permitted.

When new sanitary systems are constructed to replace an existing sewer, all abandoned mains and maintenance holes must be removed in accordance with OPSS.MUNI 510.

If removal is not possible or practical, due to access or other conditions, the abandoned mains and maintenance holes must be filled with an approved material, and the maintenance hole cover removed and sealed off, all as per the requirements of OPSS.MUNI 510. The Town shall determine, in each case, if the existing infrastructure will be allowed to remain in place.

Sanitary sewers on private property are regulated by the *Ontario Building Code* and subject to building permit. Where there are no specific regulations in the *Ontario Building Code*, details from this Town Standard will apply.

6.2 Maintenance

The Owner/Developer shall maintain the complete sanitary sewer system including routine flushing for the duration of the maintenance period. The sanitary sewers or related infrastructure will not be released from the maintenance period until assumption of the works.

For private sites, the Owner/Developer shall maintain the complete sanitary sewer system including routine flushing in perpetuity.

6.3 Design Flows

The sewers are to be sized for maximum design flows plus an allowance for inflow and infiltration. A wet weather infiltration rate of 0.23 litres/hectare/second is to be

used. To satisfy self-cleaning requirements in sanitary sewers assume dry weather infiltration reduces to zero for several days during dry months.

The average daily residential flow is to be taken at 260 litres/capita/day.

As a minimum, the estimated people per unit (ppu) values to be used in the design, shall be based on the following typical dwelling types (in terms of size, number of bedrooms, etc.).

Dwelling Density

Dwelling Type		People per Unit (ppu)
Single Detached	2 to 4 bedroom	2.9
Semi Detached	2 to 3 bedroom	2.7
Townhouse	2 to 3 bedroom	2.4
Apartment	1 to 2 bedroom	1.9

Equivalent flows for areas intended for uses other than residential shall be calculated in accordance with MECP Standards and reviewed with the Town prior to design.

Maximum design flows are to be determined using average daily flows and peaking factors as identified in the MECP *Design Guidelines for Sewage Works*, using either the Harmon Formula or the Babbit Formula.

The minimum size for a sanitary sewer shall be 200 millimetres.

6.4 Sanitary Sewer Requirements

The system shall be designed to service all areas within the development to their maximum future development, in accordance with the Town's *Official Plan*. Allowance shall be made for inflows from the adjacent areas and shall meet with the approval of the Town. Discharges of the system are to be into appropriate sewers and are to be approved by the Town. The exact location for connecting to sewers in adjacent areas shall be as approved by the Town.

6.5 Pipe Capacities

Manning's formula shall be used in determining the capacity of all sanitary sewers. The capacity of the sewer shall be determined on the basis of the pipe flowing at 90% full. A roughness coefficient of n = 0.13 shall be used for all smooth wall types of pipe.

6.6 Flow Velocities

The minimum velocity for sewers when flowing full shall be 0.6 metres/second. In cases where the flow depth in the sewer, under peak flow, will not be 30% of the pipe diameter or greater, the actual flow velocity at peak flow should be calculated using a hydraulic elements chart and the slope increased to achieve adequate flushing velocities.

For circular pipes (flowing full) the maximum acceptable velocity is 3.0 metres/second.

6.7 Pipe Grades

The maximum and minimum grades for pipes shall be the grade necessary to meet the maximum and minimum velocity requirements, except that the required grade for the minimum velocity requirement shall not exceed 2% or the road grade where the road grade exceeds 2%. The minimum grade for the first upstream leg shall not be less than 1%.

6.8 Depth of Sanitary Sewers

Sanitary sewers shall be designed with sufficient depth to provide gravity service from the basement of each dwelling. The Engineer shall provide cross sections to illustrate the relationship based on the proposed building type. In areas of no sanitary services, the sewers shall have a minimum cover of 1.8 metres.

6.9 Location

The sanitary sewers shall be located as shown on the standard Town road cross section drawings.

Sanitary sewers on private property are regulated by the *Ontario Building Code* and subject to building permit. Where there are no specific regulations in the *Ontario Building Code*, details from this standard will apply.

Clearances at sewer and watermain crossings shall be in accordance with MECP *Procedure F-6-1*. Sanitary services shall be installed below the storm sewer, unless proper justification is provided otherwise.

6.10 Limits of Construction

Sewers shall be terminated with a maintenance hole at the development limits. The design of the maintenance hole at the development limits must allow for the future extension of the sewer.

6.11 Sewer Alignment

Sanitary sewers shall be laid in a straight line between maintenance holes unless radius pipe has been designed. Joint burial (common trenching) with storm sewers will be considered when supported by the recommendations of a Geotechnical Report.

The minimum width of easements for sanitary sewers shall be in accordance with the following table.

Minimum Width of Easements

Size of Pipe	Depth of Invert	Minimum Width of Easement
250 to 375 mm	3.0 m maximum	4.0 metres
450 to 675 mm	3.0 m maximum	4.5 metres
750 to 1500 mm	3.0 m maximum	6.0 metres
1650 mm and up	4.0 m maximum	4.0 metres + 3 x OD of pipe

For easements containing more than one pipe or underground service the minimum width will be based on the above chart for the maximum pipe size plus 3.0 metres.

6.12 Pipe Specifications

Sanitary sewer pipe shall be:

- PVC in accordance with OPSD 806.040, excluding the use of DR41 and CSA B182.2-06.

- Concrete pipe in accordance OPSD 807.030 or OPSD 807.040 and CSA A257.

- Polypropylene smooth wall ribbed pipe (dual wall) in accordance with CSA B182.13, OPSS.MUNI 1843 and OPSD 806.030, minimum pipe stiffness of 320 kilopascal.

- HDPE smooth wall ribbed pipe in accordance with CSA B182.6, minimum pipe stiffness of 320 kilopascal, may be considered in some applications.

Connections to catch basins and maintenance holes to be in accordance with OPSD 708.020.

All sanitary sewer pipes shall be CSA certified.

The Town will consider alternative pipe materials during the design stage only.

For sewer applications requiring pressure pipe, pipe design should reference MECP guidelines.

The class of pipe and the type of bedding shall be designed to suit loading and proposed construction conditions. Details are illustrated in the *OPSD Standard Bedding, Cover and Backfill Details*. In general, Type B bedding (Granular A embedment) shall be used for sanitary sewers.

The width of trench at the top of the pipe must be carefully controlled to ensure that the maximum trench width is not exceeded unless additional bedding or higher strength pipe is utilized.

6.13 Testing & Acceptance

The complete sanitary sewer system, including maintenance holes and service connections to the property line shall be successfully tested in accordance with OPSS.MUNI 410 in conjunction with the initial installation and acceptance by the Town, including deflection testing. Where Low Pressure Air Testing is proposed (and approved by the Town) in lieu of Testing with Water, leakage testing shall be performed on all maintenance holes.

A CCTV inspection of all sanitary sewer shall be performed in accordance with OPSS.MUNI 409 (including flushing and cleaning in accordance with OPSS.MUNI 411) in conjunction with the initial installation and acceptance by the Town. CCTV inspections of all sanitary sewer are also required prior to the placement of surface

course asphalt and prior to assumption. CCTV videos and reports shall be provided to the Town.

6.14 Maintenance Holes

6.14.1 Design Requirements

Maintenance holes may be either precast or poured in place concrete and shall be designed and constructed in accordance with the most recent OPSS.MUNI and OPSD. Where the standard drawings are not applicable, the maintenance holes shall be individually designed and detailed in consideration of the below.

Maintenance holes shall be designed as follows:

- The change in direction of flow in any maintenance hole shall not be more than 90 degrees.
- All maintenance holes shall be benched as per OPSD 701.021.
- Maintenance holes shall be located, wherever possible, a minimum of 1.5 metres away from the face of curb and/or any other service.
- All maintenance holes shall have frost straps as per OPSD 701.100.
- All maintenance hole joints between sections of precast concrete shall be waterproofed on the exterior of the structure prior to backfilling (i.e. Blueskin or approved equivalent).
- All connections to maintenance holes shall have rubber boot pipe connection.
- Safety platforms shall be provided as per OPSS.MUNI.
- Safety chains shall be provided on the downstream side of maintenance holes for sewers larger than 1.2 metres.

6.14.2 Location & Spacing

Maintenance holes shall be located at each change in alignment, grade or pipe material, at all pipe junctions, at the beginning or end of radius pipe sections and at intervals along the pipe to permit entry for maintenance to the sewer.

Maximum spacing of maintenance holes shall be 120 metres for sewers 600 millimetres or less in diameter and 150 metres for sewers 675 millimetres or greater in diameter.

Where there is not an existing maintenance hole for a connection to a new development, a maintenance hole shall be installed on the existing sewer.

For private sites, the Town may also require a maintenance hole to be installed 1 metre from the property line on the private side.

6.14.3 Head Losses & Drops

Suitable drops shall be provided across maintenance holes to compensate for the loss in energy due to the change in flow velocity and for the difference in the depth of flow in the sewers.

In order to reduce the amount of drop required, the designer shall, wherever possible, restrict the change in velocity between the inlet and outlet pipes to 0.6 metres/second.

The minimum drops across maintenance holes shall be as noted below.

Minimum Drop Across Maintenance Holes

Change of Direction	Minimum Drop
0^0	30 mm
1^0 to 45^0	50 mm
45^0 to 90^0	80 mm

Cast-in-place maintenance hole drop structures shall be specified in accordance with MECP guidelines, where the invert elevation of the inlet pipe is 610 millimetres or greater above the outlet invert elevation. Drop structures shall be in accordance with OPSD 1003.010 and OPSD 1003.020.

6.14.4 Frame & Cover

Where maintenance holes are located in areas to be flooded by the major design storm, maintenance hole covers shall be a sealed type and the maintenance hole is to be suitably vented.

All other maintenance hole covers shall be as per OPSD 401.010 with Type A closed cover.

Frames and covers shall be set to binder course asphalt grade in accordance with the details provided in OPSD 704.010, and shall be raised just prior to the placement of surface course asphalt using cast iron riser rings on the existing frame.

Self levelling frames and covers by Bibby-Ste-Croix or approved equivalent are also permitted.

6.15 Sanitary Service Connections

Sanitary connections are to be sized in accordance with the following sizes:

Single unit residential dwelling – 125 millimetre diameter (minimum) PVC SDR 28, green colour.

Multiple unit residential dwelling block or structure, and non-residential blocks or structures – designed in accordance with Section 4.3.3.2. minimum 200 millimetre diameter, PVC SDR 35, green colour.

No shared or wye type connections will be permitted.

Sanitary service connections shall be in accordance with OPSD 1006.010.

Residential connections shall terminate 2.5 metres right of water service (facing the lot/unit/block) with a gasketed cap, 125 millimetre x 100 millimetre reducer, plug suitably braced to withstand test pressures and 89 millimetre x 38 millimetre marker placed from the invert of the connection to 600 millimetres above grade, painted green.

A sanitary service shall be provided for park blocks, if required by the Town. Sanitary service diameter shall be confirmed by the Town.

6.16 Decommissioning of Sanitary Sewers

The following is required when decommissioning sanitary sewers:

1. Saw-cutting of existing pipe.

2. Removal and disposal off-site of existing pipes, fittings, thrust restraints and thrust blocks, as required.

3. Filling of abandoned sewer with grout.

4. Supply and placement of 15 MPa concrete plug in the ends of the existing sewers that are to be abandoned in place. Minimum length of the concrete plug shall be 300 millimetres.

5. Supply and placement of mechanical plug on existing sewer to remain in service, where required.

6.17 Forcemains and Pumping Stations

6.17.1 General

Sanitary sewer pumping stations and wastewater forcemains will only be allowed when the Town is satisfied that the conditions (such as topography) prevent the use of a gravity sewage system and that it is in the best interest of the Town to permit this type of system.

Sanitary sewer pumping stations shall be designed in accordance with the Town's *Sanitary Pumping Station Design Guidelines.* Sanitary sewer pumping stations shall be located such that the length of forcemain required is kept to a minimum.

6.17.2 Forcemain Design

Wastewater forcemain shall be generally designed in accordance with the following considerations:

1. Cleansing velocity of at least 0.60 metres/second shall be maintained.

2. Maximum velocity of 4.0 metres/second.

3. Minimum diameter shall not be less than100 millimetres.

4. Friction losses should be based on Hazen-Williams formula with a "C" factor of 100 or other acceptable methods using a generally equivalent friction factor.

5. An automatic air release valve shall be placed at high points in the forcemain to prevent air pockets.

6. The design of the profile and size of the force main shall minimize the excessive negative head to the system.

7. Configuration and head conditions should be evaluated as to the need for and placement of vacuum relief valves. Fittings and isolation valves shall be stainless steel.

8. Forcemains should enter the gravity sewer system at a point not more than 200 millimetres above the flow line of the receiving maintenance hole.

9. To be located in the boulevard opposite the watermain, subject to MECP clearance guidelines.

10. Minimum cover of 1.8 metres.

11. Cathodic protection of all metallic pipes, mechanical joints/fittings/restraints, etc. Sizing to be determined by a geotechnical Engineer subject to a minimum of 5.5 kilograms each.

12. Pipe materials may include:

- Polyvinyl chloride (PVC), DR 26 minimum, conforming to CSA B137.3 and ASTM D3139, green in colour. Alternatively, if the proposed size does not available on market, a tape marked “Sanitary” shall be used to wrap along the entire section of the sanitary sewer. Tracer wire with 8 gauge shall be installed.

- High density polyethylene (HDPE) conforming to CSA B137.0, B137.1, ASTM D3035, D3350 or CG 5 Spec 41-FP-25M. PE3408/3608. To be installed with 14 AWG tracer wire or, if in horizontal directional drilling (HDD) applications, 4 × 8 gauge tracer wire.

13. The forcemain, reaction blocking, and station piping shall be designed to withstand water hammer pressures and associated cyclic reversal of stresses that are expected with the cycling of wastewater lift stations. The need for surge protection chambers shall be evaluated. Forcemain pipe materials shall be approved by the Town. Pressure rating (class) to be as per design.

14. Hydraulic transient (i.e. surge) analysis required to confirm pressure rating of pipe surge protection devices, the provision of water hammer relief and identify potential vacuum and other conditions to be mitigated. Pump cycle times should be designed to minimize pump starts and stops to the extent practical.

15. The hydraulic grade lines for the range of potential pumping rates (i.e. minimum, average, maximum) shall be provided along the entire profile of the forcemain.

16. Detailed calculations for the system curve shall be provided.

17. Bedding material to be mortar sand conforming to OPSS. 1004 Granular D and placed in accordance with applicable OPS. Drawings.

18. Mechanical joint restraints are required at all changes in pipe direction, terminations and any location where thrust pressures may occur (tees, bends, caps, valves, etc.). Valves shall be restrained on both sides to the same standard as a dead end. Mechanical joint restraint may also be required in special circumstances such as infill areas, deep installations, under culverts, etc. The length of forcemain protected with mechanical joint restraint shall be calculated by the Engineer for the anticipated site conditions in accordance with the manufacturer's recommendations. The limits of forcemain to be restrained shall be clearly shown and dimensioned on the construction drawings and updated on the as-built drawings. Pipe deflection is to be avoided in favour of restrained fittings. Where restraining glands cannot be used, thrust blocks may be approved for use by the Town. Thrust blocks shall be used in accordance with the applicable OPSD, supported by undisturbed soil, and/or as approved by the Geotechnical Consultant.

19. The need for cleanouts on the force main shall be determined during plan review by the Town. As a general guideline, clean-outs will not be required on force mains under 600 metres in length.

20. Additional requirements may be identified at the time of detailed design based on site specific conditions, at the discretion of the Town.

6.17.3 Testing and Inspection of Forcemains

1. The contractor shall fill and pressure test the forcemain. The minimum required test pressure shall be the maximum forcemain operating pressure plus 50 psi.

2. Tracer wire inspections and conductivity tests shall be conducted prior to acceptance and assumption of forcemains. Inspections are to ensure that tracer wire is visible in maintenance holes, at pumping stations, etc. Conductivity tests are to ensure that the tracer wire is appropriately connected and continuous over its entire length.

3. A qualified representative of the Town is required to be present during any testing of services. Depending on pipe material and installation condition, the following OPSDs may apply: 802.010, 802.013, 802.014, 802.030, 802.031, 802.032, 802.033, 802.034, 802.050, 802.051, 802.052, 802.053 or 802.54.

6.17.4 Decommissioning of Forcemains

The following is required when decommissioning forcemains:

4. Saw-cutting of existing pipe.

5. Removal and disposal off-site of existing pipes, fittings, thrust restraints and thrust blocks, as required.

6. Filling of abandoned main with grout.

7. Supply and placement of 15 MPa concrete plug in the ends of the existing forcemains that are to be abandoned in place. Minimum length of the concrete plug shall be 300 millimetres.

8. Supply and placement of mechanical plug on existing forcemain to remain in service, where required.

6.17.5 Pumping Station Design

Sewage pumping station (SPS) design shall be in accordance with the Town's *SPS Design Guidelines.*

6.18 Modelling Requirements

The sanitary sewer design calculations shall be summarized in the Functional Servicing Report and provided to the Town with drawings in AutoCAD and PDF format showing the sanitary sewer layout and topographic information. The Town will coordinate modeling to verify the impact of the development's sanitary demands on the existing Town sanitary sewer system and any upgrades that are required. Modeling will be completed by the Town's modeling Consultant at the Owner/Developer's cost.

7 Stormwater Drainage System

7 Stormwater Drainage System

The purpose of this section is to outline the minimum design requirements for the construction of municipal services related to stormwater drainage systems in the Town of Collingwood. These requirements are general in nature and do not relieve the Owner/Developer of the responsibility for submitting a completed product demonstrating competent engineering design in full compliance with all applicable legislation.

7.1 Stormwater Drainage System

7.1.1 Minor Storm Conveyance System

Storm sewers designed and constructed in accordance with the most recent requirements and specifications of the Town of Collingwood are required on every street within all proposed plans of subdivision. Storm sewers shall be of adequate size and depth to provide service for the development of lands within the upstream watershed and/or for the drainage of any areas designated by the Town. Storm drainage shall be directed to an outlet considered adequate in the opinion of the Town and applicable agencies.

Storm sewers on private property are regulated by the *Ontario Building Code* and subject to building permit. Where there are no specific regulations in the *Ontario Building Code*, details from this Town Standard will apply.

Channel works, bridges, culverts and all other drainage structures or works shall be designed and constructed in accordance with the most recent drawings and specifications of all applicable agencies having jurisdiction. Also, they shall be approved by applicable agencies having jurisdiction including the Town, MECP, NVCA, MTO, MNRF, DFO, etc.

7.1.2 Maintenance

The Owner/Developer shall maintain the complete storm sewer system, including routine cleaning for the duration of the maintenance period. The storm sewers shall be maintained until assumption of all municipal services in the subdivision.

Channel works and stormwater management ponds (including headwall structures) shall be maintained until assumption of the subdivision, including the removal of sediment that may accumulate during the maintenance period.

For private sites, the Owner/Developer shall maintain the complete storm sewer system including routine flushing in perpetuity.

7.1.3 Rainfall Data

The intensity of rainfall is to be determined from the Intensity-Duration-Frequency (IDF) parameters summarized in the following table. The parameters have been developed accounting for predicted impacts of climate change.

IDF Curve Parameters

Design Storm	Parameter A	Parameter B	Parameter C
2-Yr	606.72	4.32	0.753
5-Yr	936.55	6.17	0.782
10-Yr	1191.05	7.41	0.797
25-Yr	1422.02	7.83	0.798
50-Yr	1684.81	8.59	0.810
100-Yr	1947.68	9.28	0.819

The equation used to determine rainfall intensity is:

$$i = \frac{A}{(t_c + B)^C}$$

i = rainfall intensity in millimeters per hour (mm/hr)

t_c = Time of concentration (minutes)

A, B, C = runoff parameter

7.1.4 Storm Sewer Design Calculations

Storm sewers shall be designed to drain all lands based on the Rational Method. The Rational Method calculations must be checked using a hydrologic model approved by the Town where the drainage area is greater than 5 hectares. The larger of the flows is to be used in the design of the sewer system unless approved otherwise.

$$Q = 0.0028\ C\ i\ A$$

Q = design flow in cubic metres per second (m^3/s)

A = drainage area in hectares (ha)

C = runoff coefficient

i = rainfall intensity in millimeters per hour (mm/hr)

7.1.5 Time of Concentration

The minimum initial time of concentration is to be 10 minutes.

7.1.6 External Upstream Time of Concentration

To calculate the initial time of concentration (Tc) for upstream, undeveloped lands, the following formulas may be used: Bransby Williams, SCS Upland Method, Airport Method, etc. The most appropriate method may be provided at the discretion of the Town.

To calculate the initial external time of concentration (Tc) for external lands that are scheduled for future development, the designer will use reasonable assumptions in accordance with the most recent MECP *Guidelines* and the MTO *Drainage Management Manual*. Future land use will be determined based on the Town's official plan. Appropriate oversizing of storm sewers internal to a development, based on any anticipated future upstream development, will be reviewed by the Town on a case by case basis.

7.1.7 Run-off Coefficient

Weighted runoff coefficients, based on the proposed lot coverage (house size, driveway, etc.) are to be calculated based on the most recent MECP *Guidelines* & the MTO *Drainage Management Manual* (MTO Design Chart 1.07). Diagrams, illustrating the lot layout, assumed values and calculations may be requested by the Town to justify the weighted runoff coefficients used in the design.

For preliminary design, the runoff coefficients summarized in the following table may be used.

Runoff Coefficients

Land Use	Runoff Coefficient
Pavement (asphalt, concrete, etc.)	0.90
Roofs	0.90
Residential	
Single detached & semi-detached	0.45
Detached with ADU on property	0.60

Townhouse	0.60
Apartment complex	0.75
Commercial, Industrial	0.80
Parks	0.25
Cleared open space	0.30
Lawns	
Sandy soil	0.20
Clayey soil	0.30

A minimum run-off coefficient of 0.80 is to be used for private gravel parking lots or laneways, where there is potential for the parking lot or laneway to be paved in the future.

A minimum run-off coefficient of 0.55 is to be used for undeveloped upstream area where future residential development is expected, and 0.80 where future industrial, high-density residential or commercial development is expected.

7.1.8 Drainage Area

Drainage systems must be designed to accommodate all upstream drainage areas considering interim and ultimate conditions.

7.2 Storm Sewer System

A storm sewer system shall be defined as the upper part of a drainage system draining areas less than 100 hectares of land. With indirect storm service connections in place in accordance with STD No. 625 the storm sewer shall be designed to a 5-year storm with a 0.1 litres per second allowance for additional flows.

7.3 Trunk Sewer System

A trunk sewer system shall be defined as part of a drainage system that drains an area of 100 hectares of land or greater. Trunk storm sewer systems shall be designed to accommodate a 25-year storm at a minimum and to a greater design storm if deemed necessary by the Town. Trunk storm sewers may be required at the Town's discretion including to service smaller drainage areas where the overland flow route is insufficient or not present.

7.4 Pipe Capacities

Manning's formula shall be used in determining the capacity of all storm sewers. The capacity of the sewer shall be determined on the basis of the pipe flowing full.

The value of the roughness coefficient 'n' used in the Manning's formula shall be as follows:

Roughness Coefficient

Type of Pipe	Roughness Coefficient A
Concrete pipe	0.013
Concrete box culverts	0.013
Corrugated Metal 68 x 13mm corrugations	0.024
Corrugated Metal 25% paved invert	0.021
PVC pipe	0.013
Polypropylene smooth wall ribbed pipe	0.013
HDPE smooth wall ribbed pipe	0.013
Open channel	As per MTO *Drainage Manual*

7.5 Flow Velocities (Flowing full)

For circular pipes the minimum acceptable velocity is 0.75 metres/second and the maximum acceptable velocity is 4.0 metres/second.

7.6 Minimum Size

The minimum size for a mainline storm sewer shall be 300 millimetres.

7.7 Depth of Storm Sewers

Storm sewers shall have a minimum cover of 1.5 metres to spring line. Where the minimum cover is not feasible, the Engineer shall provide a design solution with consideration for additional loading due to frost. Additionally, the Engineer shall provide a design solution with consideration for frost when in close proximity to watermains.

7.8 Location

The storm sewers shall be located as shown on the standard Town standard road cross section drawings.

Clearances at sewer and watermain crossings shall be in accordance with MECP guidelines. Sanitary and water services shall be installed below the storm sewer, unless proper justification is provided otherwise.

7.9 Radius Pipes

Radius pipe shall be allowed for storm sewers 975 millimetres in diameter and larger provided that a maintenance hole is located at the beginning or at the end of the radial section. The minimum centre line radius allowable shall be in accordance with the minimum radii table as provided by the manufacturers.

7.10 Limits of Construction

Sewers shall be terminated with a maintenance hole at the subdivision limits when external drainage areas are considered in the design. The design of the terminal maintenance holes must allow for the future extension of the sewer.

7.11 Sewer Alignment

Storm sewers shall be laid in a straight line between maintenance holes unless radius pipe has been designed. Joint burial (common trenching) with sanitary sewers will be considered when supported by the recommendations of a Geotechnical Report, prepared by a qualified Geotechnical Engineering Consultant.

7.12 Changes in Pipe Size

No decrease of pipe size from a larger upstream to a smaller size downstream will be allowed regardless of the increase in grade.

7.13 Standard Easement Requirements

The minimum width of easements for storm sewers shall be in accordance with the following guidelines.

Minimum Width of Easements

Size of Pipe	Depth of Invert A	Minimum Width of Easement
250 to 375 mm	3.0 m maximum	4.0 metres
450 to 675 mm	3.0 m maximum	4.5 metres
750 to 1500 mm	3.0 m maximum	6.0 metres
1650 mm and up	4.0 m maximum	4.0 meter + 3 x OD of pipe

Sewers shall be offset from the property line, and centred within the easement to help avoid conflict with future fence posts.

For easements containing more than one pipe or underground service the minimum width will be based on the above chart for the maximum pipe size plus 3.0 metres.

Regardless of the preceding, all situations will be reviewed and judged on individual cases at the discretion of the Town.

7.14 Pipe Material Classification & Bedding

Storm sewer pipe shall be:

- Concrete pipe in accordance with OPSD 807.030 or OPSD 807.050 and CSA A257 (525 mm and larger).
- PVC in accordance with OPSD 806.040, excluding the use of DR41 and CSA B182.2-06 (for 250 to 450 millimetres diameter only).
- Polypropylene smooth wall ribbed pipe (dual wall) in accordance with CSA B182.13, OPSS.MUNI 1843 and OPSD 806.030, minimum pipe stiffness of 320 kPa.
- HDPE smooth wall ribbed pipe in accordance with CSA B182.6, minimum pipe stiffness of 320 kPa.

Connections to catch basins and maintenance holes shall be in accordance with OPSD 708.020.

All storm sewer pipes shall be CSA certified.

The class of pipe and the type of bedding shall be designed to suit loading and proposed construction conditions. Details are illustrated in the OPSD standard bedding, cover and backfill details. In general, Type B bedding (Granular A embedment) shall be used for storm sewers.

In areas where it is difficult to control the infiltration of ground water into the sewer trenches bedding and embedment using clear stone wrapped in a suitable geotextile will be considered if supported by the Geotechnical Engineer.

The width of trench at the top of the pipe must be carefully controlled to ensure that the maximum trench width is not exceeded unless additional bedding or higher strength pipe is utilized.

7.15 Testing & Acceptance

A CCTV inspection of all storm sewer (including catch basin leads) shall be performed in accordance with OPSS.MUNI 409 (including flushing and cleaning in accordance with OPSS.MUNI 411) in conjunction with the initial installation and acceptance by the Town. CCTV inspections of all storm sewer are also required prior to the placement of surface course asphalt and prior to assumption.

Deflection testing in accordance with OPSS.MUNI 410 shall be completed on all flexible pipes.

The Town reserves the right to request additional testing (ie. leakage) if deemed necessary to ensure the proper installation of the sewer.

7.16 Maintenance Holes

7.16.1 Design Requirements

Maintenance holes may be either precast or poured in place concrete and shall be designed and constructed in accordance with the most recent OPSS.MUNI and OPSD. Where the standard drawings are not applicable, the maintenance holes shall be individually designed and detailed.

All maintenance holes shall have frost straps as per OPSD 701.100.

7.16.2 Location & Spacing

Maintenance holes shall be designed as follows:

- Located at each change in alignment, grade or pipe material, at all pipe junctions, at the beginning or end of radius pipe sections and at intervals along the pipe to permit entry for maintenance to the sewer.
- Maximum spacing of 120 metres for sewers 600 millimetres or less in diameter and 150 metres for sewers 675 millimetres or greater in diameter.
- The change in direction of flow in any maintenance hole shall not be more than 90 degrees.
- Maintenance holes shall be located, wherever possible, a minimum of 1.5 metres away from the face of curb and shall avoid or straddle the typical path of travel (wheel pattern).

7.16.3 Head Losses & Drops

Suitable drops shall be provided across maintenance holes to compensate for the loss in energy due to the change in flow velocity and for the difference in the depth of flow in the sewers.

To reduce the amount of drop required, the designer shall, wherever possible, restrict the change in velocity between the inlet and outlet pipes to 0.6 metres/second.

Hydraulic calculations shall be submitted for junction and transition maintenance holes on sewers where the outlet is 1050 millimetre diameter or greater to confirm the loss/required drop.

Regardless of the invert drop across a maintenance hole as required by calculations, the obvert of the outlet pipe shall not be higher than the obvert of the inlet pipe at any maintenance hole location.

The minimum drops across maintenance holes shall be as noted below.

Minimum Drop Across Maintenance Holes

Change of Direction	Minimum Drop
0^0	30 mm
1^0 to 45^0	50 mm
45^0 to 90^0	80 mm

Cast-in-place maintenance hole drop structures shall be specified in accordance with MECP guidelines, where the invert elevation of the inlet pipe is 610 millimetres or greater above the outlet invert elevation. Drop structures shall be in accordance with OPSD 1003.010 and OPSD 1003.020.

7.16.4 Frame & Cover

All maintenance hole covers shall be as per OPSD 401.010 with Type A closed cover.

In the interim, frames and covers shall be set to binder course asphalt grade in accordance with the details provided in OPSD 704.010. They shall be raised just prior to the placement of surface course asphalt using cast iron riser rings on the existing frame.

7.17 Catch Basins

7.17.1 Design Requirements

Catch basins may be either precast or poured in place and shall be designed and constructed in accordance with the most recent OPSD and OPSS.MUNI requirements.

Rear yard catch basins are to be sumpless.

7.17.2 Location & Spacing

Catch basins shall be selected, located and spaced in accordance with the conditions of design. The design of the catch basin location and type shall take into consideration the lot areas, the lot grades, pavement widths, road grades and intersection locations.

Maximum spacing for catch basins on standard 8.5 metre wide roads shall be as per the following table.

Maximum Catch Basin Spacing

Road Grade	Maximum Spacing
0.5% to 1.0%	75 metres
1.1% to 3.0%	110 metres
3.1% to 4.5%	90 metres

>4.6%	75 metres

Spacing on wider platforms shall be designed on a case-by-case basis.

Spacing shall be reduced along bends, bulbs and cul-de-sacs to ensure drainage is properly collected.

Catch basins shall be generally located upstream of pedestrian crossings. Catch basins shall not be located in curb depressions.

7.17.3 Types

Typical details for single, double and rear lot type catch basins are shown in the OPSD.

Any special catch basins and inlet structures must be fully designed and detailed by the Engineer for approval by the Town.

Double catch basins are to be installed at the low point or sag of any road.

7.17.4 Leads

For single catch basins the lead shall be a minimum diameter of 250 millimetres. For double catch basins and rear lot catch basins the lead shall be a minimum diameter of 300 millimetres. Slopes on all catch basin leads shall be designed to provide sufficient capacity and respect the velocity requirements noted in Section 7.5.

Long catch basin connections (in excess of 20 metres) shall be connected to a maintenance hole.

Rear yard catch basin leads shall be encased in concrete and connect to a catch basin or catch basin maintenance hole. These leads shall be offset from the property line, within the easement, to help avoid conflict with future fence posts.

7.17.5 Frame & Grate

The frame and cover for catch basins in roadway or walkway areas shall be as per OPSD 400.020. Prior to placement of surface course asphalt, catch basin frames and grates shall be set to binder course asphalt grade. They shall be raised just prior to the placement of surface course asphalt. The adjustment and setting of the frames and grates shall be completed in accordance with the details provided

in the OPSD 704.010. Catch basins located in rear yards shall have the “birdcage” frame and grate per OPSD 400.120.

7.18 Roof Leaders

Roof leaders shall discharge to splash pads in landscaped areas.

7.19 Foundation Drains

A sump pump system shall discharge to a residential storm sewer connection with an air gap as per STD. No. 625. Where storm sewer connections are not available, the sump pump system shall discharge to a splash pad in a landscaped area and with the water directed to side yard swales. The sump pump discharge is not to be directed to the road or sidewalk. The geotechnical report shall consider the ground water table elevation and recommend minimum basement elevations. Foundation drain discharge water that becomes a nuisance shall be corrected.

7.20 Storm Services

All proposed residential developments will be required to provide storm services to all residential dwellings.

Storm services shall be 150 millimetre diameter PVC SDR 28, colour white. Services shall have a minimum 1.2 metres cover and shall be installed with a minimum grade of 1%.

Storm services shall terminate at 1.0 metres to the right of the sanitary connection (when facing lot) with a gasketed cap/plug and an 89 millimetre x 38 millimetre marker painted white.

A storm service shall be provided for park blocks, if required by the Town. Storm service diameter shall be confirmed by the Town.

7.21 Culverts & Bridges

For culvert and bridge projects, the Owner/Developer is responsible for obtaining all necessary approvals from the governing agencies, such as the NVCA, MNRF, DFO and/or MECP and for applying design flood frequencies as per the following table.

Design Flood Frequency

Road Classifications	Design Flood Frequency
Arterial	1:100 Year
Collector	1:50 Year
Urban Local	1:25 Year
Rural Local	1:25 Year
Temporary Detour	1:10 Year
Driveway	1:5 Year

All driveway culverts must conform to STD. No. 406 and require a Road Occupancy Permit.

Bridges and other major drainage structures shall require special designs as determined by the Town. Hydraulic calculations will be required.

The frequency and magnitude of flooding or erosion shall not be increased on upstream or downstream properties.

7.22 Open Channels

The proposed criteria for an open channel design shall be submitted to the Town for approval prior to the actual design being undertaken. Open channels shall be defined as major system overland flow channels, minor system outfall channels or natural channels. Major system overland flow channel designs may be required to accommodate the Regional Storm or the 100-year storm for new development, whichever is greater.

Natural channel design criteria will be determined on a site by site basis. The allowable flow velocity guidelines as per the following table must be considered.

Natural Channel Flow Velocity Guideline

Open Channels	Minimum Velocity	Maximum Velocity
Grass Lined - Natural	0.7 m/s	1.5 m/s
Grass Lined - Maintained	0.7 m/s	1.5 m/s
Gabion Lined	0.7 m/s	2.5 m/s
Concrete Lined	0.7 m/s	4.0 m/s

The Owner/Developer is responsible for obtaining all necessary approvals from the governing agencies, such as the NVCA, MNRF, DFO and/or MECP.

7.23 Overland Flow

7.23.1 Overland Flow Routes

An overland flow route continuous to the nearest major channel must be established through all areas and shall be contained within either the road right-of-way or by easements.

The depths of flooding permitted on streets and at intersections during the greater of the Regional Storm or the 100-year storm are as follows:

No building shall be inundated at the ground line, unless the building has been flood-proofed.

For all classes of roads, the depth of water at the gutter shall not exceed 0.3 metres.

7.23.2 Inlet/Outlet Structures

Inlet and outlet structures shall be fully detailed on the engineering drawings. The details provided shall include the existing topography, proposed grading and the works necessary to protect against erosion.

Adequate means such as gabion baskets, rip-rap or concrete shall be provided at all inlets to protect against erosion and to channel the flow to the inlet structure and at all outlets to prevent erosion. The extent of the erosion protection shall be indicated on the engineering drawings and shall be dependent upon the velocity of the flow in the storm sewer outlet, the soil conditions, the flow in the existing watercourse and site conditions.

The inlets and outlets must be protected to prevent unauthorized access and debris accumulation.

Outfall structures to existing channels or watercourses shall be designed to minimize potential erosion or damage in the vicinity of the outfall from maximum design flows.

8 Stormwater Management Design

8 Stormwater Management Design

The purpose of this section is to outline the minimum design requirements for the construction of stormwater management facilities in the Town of Collingwood. These requirements are general in nature and do not relieve the Developer of the responsibility for submitting a completed product demonstrating competent engineering design in full compliance with all applicable legislation.

Any deviation from the minimum Town standards shall be specifically referred to by the Owner/Development and/or their agent with a copy of written approval of the Town attached.

Stormwater management requirements generally should reflect area wide solutions and can vary depending upon the watershed and the storm sewer shed that the site is located within. Site or area specific requirements can be obtained from the Town as part of the development pre-consultation process. In general, a stormwater management report will be required for all development applications. The stormwater management report shall consider all relevant environmental and flood protection guidelines including: water quantity control, erosion control, flood susceptibility, and water quality control requirements.

8.1 Stormwater Management Report Requirements

A complete submission package must be delivered to the Town for a detailed engineering review of the proposed Stormwater Management (SWM) Plan at both the conceptual/preliminary design and the detailed design stages. Depending on the design stage, the submission would consist of either a Preliminary SWM Report or a Final SWM Report reflecting final design. The suggested content of the reports is summarized below, however, it is recognized that as every development is different, some sections may not be applicable for certain sites. Exceptions to the report format can be made on a site by site basis through pre-consultation with the Town. As a minimum we suggest the following sections be included in the SWM reports.

- A presentation of background information including a description of the property location and existing information relevant to the design of the drainage system including topography, land cover, existing drainage systems and available outlets for storm drainage from the site. Relevant background reports such as background drainage plans and/or master drainage plans should also be referenced.

- Pre-development drainage conditions should be presented on a figure and described as storm drainage areas. This should include identification through catchment ID's and drainage patterns. Both internal and external drainage areas relevant to the site being analyzed should be included.

- The stormwater management targets and design criteria should be identified through pre-consultation with the Town and relevant approval agencies. These can be in keeping with recommendations from previously completed Master Drainage Plans or specific design criteria being applied in the reports.

- The proposed storm drainage and stormwater management system design should be presented to ensure an adequate description of minor and major drainage paths is identified. It should address how the drainage and SWM criteria identified for the site is being met. It should include the identification of a sufficient and suitable outlet for the drainage that will ensure no adverse impact to either upstream or downstream landowners will occur.

Characteristics of stormwater management system proposed should be identified. This would include any SWM facility design that is being proposed for water quality and quantity control purposes. Both pre and post development flows for the full range of storm events (2-year, 5-year, 10-year, 25-year, 50-year and 100-year design storms) for both the 4 hour Chicago and 24 hour SCS type II storm distributions should be summarized. The 25 millimetre – 4 hour Chicago storm, and the 12 hour Regional (Timmins) Storm event should also be considered in the function of the stormwater management system. Where applicable, design considerations such as thermal mitigation, water balance and erosion control should be presented in the design write-up of the stormwater management facility.

8.1.1 Meteorology & Design Storms

Rainfall intensities and design storms shall be generated from the Intensity-Duration-Frequency (IDF) parameters provided in Section 7.1.3.

In general, the 24 hour Type II SCS design storms should be used for determining the hydrographs for undeveloped watersheds and for checking detention storages required for quantity control. The 4-hour Chicago design storms should be used for determining hydrographs in urban areas and also for checking detention storage. In all cases, the Consultant will be required to run both sets of design storms to make sure that the more stringent is used for each individual element of the drainage system (pipe flow, street flow, channel flow, detention storage).

Based on these IDF curves for each storm event (2 year, 5 year, 10 year, 25 year, 50 year, 100 year), the Consultant is to develop the proper design storms for use in hydrologic studies. Additionally, the 25 millimetre – 4-hour Chicago event and the 12-hour Regional (Timmins) event shall also apply, modelled using average antecedent moisture conditions (AMC-II).

The time step for discretization of the design storm can vary according to the size of the sub-watershed but must not exceed the estimated time of concentration. The maximum rainfall intensity should be compatible with that of real storms on record.

8.1.2 Reporting, Figures & Drawings

This report shall include the required hydrologic information employing an appropriate modelling technique with defensible parameter values. The study shall describe the modelling parameters and the criteria for their selection as well as input and output data. The Consultant is to assume full responsibility for the proper application of the hydrologic models. The Town recommends that the Consultant follow the MTO Drainage Management Technical Guidelines or successor document. To facilitate municipal review, the following documentation must be submitted:

- Drawing/figure showing the pre- and post-development modelling sub catchments.
- Summary tables that provide the following data on each modelling sub catchment:
  - Total drainage area.
  - Pre- and post-development impervious area.
  - Pre- and post-development runoff coefficient to each ground cover element (rooftop, street, grass, etc.).
  - Total drainage area devoted to each hydrologic soil group.
  - Storage volumes associated with pre and post-development runoff control measures.
- Drawing/figure showing the drainage areas with modelling parameters, proposed facilities and pre and post-development flows at all crossings.

- Erosion and sediment control during construction should be described in the report and include such items as a schedule for implementation and maintenance requirements.
- Supporting calculations for the stormwater design components should be included in the appendices of the report and should include the following:
    - Stage-discharge-storage tables for any SWM facilities.
    - Runoff coefficients and parameters used in hydrologic modeling.
    - Tables comparing pre and post development flows.
    - A summary table summarizing the operational characteristics of SWM facilities.
    - Stormwater management design sheets.
    - Digital copies of the model schematics and hydrologic models.
    - Digital copies of the appropriate hydraulic models.

8.1.3 SWM Facility Operation & Maintenance Report

A stand-alone SWM facility operation and maintenance report shall be prepared for submission to the Town of Collingwood and the NVCA for review. The following items shall be discussed, where appropriate:

- A brief discussion of the SWM facility design elements and their function.
- A list of maintenance activities and estimated timing, including responsibility for maintenance.
- A checklist/log sheet of key items to be checked during regular inspections.
- A detailed description of the procedures to be undertaken during sediment removal.

8.1.4 Additional General Criteria

In addition to the above sections, the following is also noted:

- A control device (orifice) must have a diameter of no less than 75 millimetres in order to prevent clogging of the opening.

- Storm connections from the building roof and foundation drains in Industrial, Commercial and Institutional development must be made downstream of the maintenance hole and/or catch basin inlet controls.

- Ponding limits and available storage are to be depicted on the site servicing drawings, and the maximum ponding depth in parking areas is not to exceed 300 millimetres.

- An overland flow route shall be clearly marked on drawings. The grading of parking lots and landscaped areas must provide a safe path for the overland flow route to the surrounding municipal right of way (or other approved outlet) during storms exceeding the design storm event.

- Roof drains should be selected to give a minimum discharge of 0.042 $m^3/s/ha$ of roof area.

- An assessment is to be completed to assess whether the on-site storm water management system proposed requires an Environmental Compliance Approval (ECA) from the MECP. If an ECA is necessary two completed MECP Application forms are to be submitted to the Town signed by the Developer and Consultant.

- Where applicable, approval will be required from NVCA.

- A Professional Engineer must approve and stamp the on-site storm water management report and site servicing drawings.

8.2 Quantity Control

Stormwater management quantity control is required to control increases in storm runoff due to development. Post to pre quantity control shall be provided unless otherwise indicated by the Stormwater Management Master Plan Report and/or as directed by the Town. Typical methods of quantity control include the temporary storage of water on flat roof tops and parking lots and end-of-pipe stormwater management facilities. Low Impact Development techniques will be reviewed on a case-by-case basis as a best efforts basis for initial quantity reduction. Stormwater quantity controls are to be implemented in accordance with the applicable Stormwater Management Master Plan, sub-watershed plan or site specific stormwater management plan.

8.3 Quality Control

Water Quality controls are to be implemented on applications in accordance with the applicable master drainage or sub-watershed plan or site specific plan where they exist. In the absence of an established plan, the *MECP - Stormwater Management Practices, Planning and Design Manual* (MECP, 2003) or its successor document should be used. All watercourses within the Town of Collingwood are to be considered as requiring Enhanced (Level 1) water quality protection as per the above noted document.

8.4 End-of-Pipe Controls – SWM Ponds and Wetlands

When designing a stormwater management facility, consideration of the aesthetics of the design shall be paramount to incorporate the facility as an amenity to the surrounding neighbourhood and landscape with features such as enhanced trail systems, natural building materials and signage. The general guidelines for design shall follow the MECP *Stormwater Planning and Design Manual.*

8.4.1 General

- Permanent pool volume will be determined based on Table 3.2 of the MECP Stormwater Planning and Design Manual.
- Erosion control storage shall be sized to accommodate the total runoff volume from the development during a 4-hour – 25 millimetre Chicago storm event and released over a minimum of 24 hours. Notwithstanding this, a minimum of 40 m^3/ha of extended detention volume shall be provided per Section 3.3.2. of the MECP *Stormwater Planning and Design Manual*.
- Forebay shall be designed in accordance with the guidance in Section 4.6 of the MECP *Stormwater Planning and Design Manual.*
- Pond blocks should be sized in such a way to allow for naturalized shaping of the pond, avoiding square corners and straight lines and instead replicating the natural landforms in the area.
- Lookouts and seating areas may be required based on site specific conditions, at the discretion of the Town.
- Fencing of stormwater management facilities is not desired. However, fencing may be required if the Town considers it a safety issue, usually when side slopes exceed 5:1. Where stormwater management facilities to be owned by

the Town abut private property, chain-link fencing is required per STD. No. 501.

- Notwithstanding the noted slope and depth criteria below, in the case of headwall design, the depth of water related to adjoining side slopes may vary and fencing or pedestrian barricades is required for safety purposes.
- Areas subject to the collection of contaminants or spills shall be fitted with adequate oil/grit separators.
- A landscaping plan of the SWM pond shall be provided.
- Topsoil in SWM facilities shall be 300 mm depth.
- Prior to the Town accepting the storm water management pond as shown on the approved landscape plan, the Developer agrees to erect one or more information signs at Public Access Points, in accordance with STD. No. 531.
- Maintenance access requirements are to be determined on a site-by-site basis. however, the following general criteria are recommended:
    - A controlled maintenance access route shall be provided around the entire pond, including to both inlet and outlet structures, and forebays.
    - A minimum 3.0 metre wide surface to accommodate maintenance vehicles with a minimum 10 metre turning radius (inside radius) and a maintenance platform to the forebay is required.
    - Maintenance access routes shall not exceed a maximum running slope of 10% and a maximum cross sectional slope of 3.0%.
    - Removable bollards in accordance with Town Standard 515 shall be provided at the entry of the maintenance access route to deter local traffic from entering the pond block.
- A sediment drying area shall be provided adjacent to the maintenance access road and forebay and shall be appropriately sized for sediment drying. It shall have a maximum slope of 5%, draining back towards the forebay. No trees will be planted within the drying area.
- An emergency overflow spillway shall be provided and shall be designed to convey the uncontrolled peak flow from the greater of the 100-year or Regional design storm. The invert of the spillway shall be at or above the calculated

high water level of the facility, while maintaining 0.3 metres of freeboard above the calculated high water level.

8.4.2 Types of SWM Facilities

The type of facility selected will be in consultation with the Town and NVCA. Generally, dry ponds are not preferred as they do not meet Level 1 (enhanced) quality treatment criteria on their own, without implementing a 'treatment-train' approach. Wet Ponds typically refer to facilities with a permanent pool greater than 1.0 metres deep, which can minimize re-suspension of sediments, but may not support the growth of aquatic plant species. Wetlands typically refer to facilities with a shallower permanent pool (0.15 to 0.45 metres), and although support the growth of aquatic plant species, may require additional maintenance to remove the build-up of decomposing plants when necessary.

8.4.3 Side Slopes

The maximum SWM facility side slopes shall be as outlined in the MECP *Stormwater Management Planning and Design Manual*. Generally, these maximums shall be met in all instances. If the allowable side slopes are not met for any reason, the stormwater facility shall be fenced entirely.

The geotechnical investigation report should also provide recommendations on side slopes based on native soils, the need for any clay liners if required, and possible groundwater impacts on the pond and its structures. Berms constructed as part of stormwater facilities are not preferred.

The objective of the varying side slopes is to provide public use around the facility and aesthetic benefit. The permanent pool is to be curvilinear where possible and avoid straight lines.

8.4.4 Inlet/Outlet Structures & Sediment Forebay

The SWM Facility structures and sediment forebay shall be designed in accordance with the criteria outlined the MECP *Stormwater Management Planning and Design Manual*, and detailed calculations shall be included in the Stormwater Management Report. Specific design features shall include:

- The Engineer must demonstrate that the anticipated 10 year sediment accumulation will generate a sediment depth of one half the total depth of the sediment forebay.

- Headwall grates shall be specified for all inlet and outlet headwalls.

- Reverse-slope outlet pipes shall be used for wet pond facilities. A plunge pool shall be provided to ensure sufficient permanent pool and to mitigate thermal impacts.

- Outlet control structure calculations shall be provided in the Stormwater Management Report and must consider tailwater impacts from the receiving watercourse or storm sewer.

- Suitable fencing or pedestrian barricades shall be provided on top of headwalls.

8.5 End-of-Pipe Controls – Treatment Units

Where a stormwater management pond is not practical, consideration will be given to the use of oil/grit separators or stormwater quality treatment units. The units must be designed to provide 80% TSS removal for 90% of the annual runoff volume for the site using a fine particle size distribution. Where the above treatment efficiency can not be achieved by a single treatment unit, oil/grit separators and other stormwater quality treatment units should be used in conjunction with additional quality control measures to provide a treatment train approach.

Supporting calculations and anticipated maintenance requirements shall be provided to the Town along with certification of the design by a Professional Engineer.

Additional documentation may be required on a case-by-case basis.

8.6 Sediment and Erosion Control

Erosion control requirements for all sites shall be confirmed on a site specific basis and reviewed with the Town prior to submission. As a general rule for development sites that are more than 5 hectares in drainage area, erosion control measures should be implemented whereby the 25 millimetre – 4 hour Chicago storm shall be stored and released over a minimum 24 hour period, in accordance with MECP guidelines.

A sediment and erosion control plan shall be prepared for all sites and submitted for review to the Town and NVCA as applicable. The plan shall consider all phases of construction from topsoil stripping and earthworks to ultimate site stabilization. All erosion and sediment controls are considered temporary applications and are to be constructed prior to any disturbance of land, and shall be maintained until the site has been stabilized to a condition that is equal to, or better than, the existing.

The sediment and erosion control plan may include measures such as, but not limited to:

- Temporary sediment control ponds.
- Sediment control fences.
- Topsoil stockpile locations and footprint.
- Rock check dams.
- Vegetation buffer zones and tree preservation zones.
- Locations of all trees that are to be retained.
- Stone mud mats.
- Erosion control blankets. and
- Catch basin sediment traps.

All measures are to be designed in accordance with Town, MTO and NVCA standards. The document: *Erosion & Sediment Control Guidelines for Urban Construction* by Greater Golden Horseshoe Area Conservation Authorities, December 2006, should be consulted during preparation of the Sediment and Erosion Control Plans. During the period of de-stabilization, the measures shall be monitored, maintained and upgraded (if necessary) until site stabilization has occurred to the satisfaction of the Town and NVCA. The Consulting Engineer shall provide a written reports to the Town and NVCA every two weeks that outline the status of the erosion and sediment controls. These reports shall be prepared and submitted for the duration of the project until the disturbed areas have been stabilized to the satisfaction of the Town and NVCA, and the measures have been removed. Upon completion, Certification shall be provided from the design Engineer that the stormwater management facility has sufficient capacity and will operate in general accordance with the original design.

9 Utilities and Lighting

9 Utilities and Lighting

9.1 Utilities

All above ground utility infrastructure (i.e. poles, pedestals, transformers, boxes, etc.) shall be installed, wherever possible, at projections of lot property lines. A clustered location for utility pedestals and transformers is preferable.

9.1.1 Hydro

Hydro service shall be underground in locations as shown on the typical road cross-sections. The design and installation of the hydro distribution system shall be to the satisfaction of the Hydro Authority and subject to the approval of the layout by the Town.

A hydro service shall be provided for park blocks, if required by the Town.

Hydro service shall be installed by the Hydro Authority or an approved Contractor.

9.1.2 Telecommunications

Telephone, cable, and fibre optic services shall be underground in locations as shown on the typical road cross-sections and shall be installed by an approved utility Contractor. The Owner/Developer shall grant the service providers any necessary easements required for their services.

9.1.3 Gas

Gas service shall be underground in locations as shown on the typical road cross-sections and shall be installed by Enbridge Gas or an approved Contractor. The Owner/Developer shall grant the service providers any necessary easements required for their services.

9.1.4 Community Mailbox Requirements

In general, community mail centres and/or site individual super mailboxes shall be placed in locations approved by the Town. The design of the community mailbox must incorporate such criteria as pedestrian safety, traffic flow and aesthetics. The Town may require the Owner/Developer to furnish the following amenities within the community mail centre:

- Fencing.

- Landscaping.
- Pedestrian lighting.
- Concrete pad or interlocking stone finished surface.
- Adjacent car bays parallel to the travelled portion of the roadway.

Individual community mailboxes shall be located near the rear lot line of flankage lots on concrete pads whenever possible. Community mailboxes shall be located adjacent to sidewalks whenever possible. The location of community mailboxes shall in no way restrict site lines at intersecting roads. When establishing the spacing of street lighting within a residential subdivision, consideration must be given for the placement of a streetlight adjacent to the location of community mailboxes. Parallel car bays may also be located adjacent to community mailboxes to ensure a continuous traffic flow. The length of bays will be governed in general by the number of super mailboxes.

The approval of Canada Post with respect to location of community mail centres and/or site individual super mailboxes will be required prior to the approval of the engineering drawings by the Town.

9.2 Lighting

All municipal roads, intersections, cul-de-sacs, roundabouts, walkways, parking areas, condominium roads, commercial properties and any other location as deemed necessary by the Town for public safety shall be illuminated unless written approval is received from the Town stating otherwise. Streetlights shall be provided throughout all developments and may be required on roads bordering developments, if deemed necessary by the Town.

Streetlights shall be designed by an Electrical Engineering Consultant in accordance with the most recent requirements and specifications of the Town, the Hydro Authority and the Electrical Safety Authority (ESA). The installation of the streetlights will be subject to the same. Any attachments to hydro poles must have approval from the Hydro Authority and comply with O. Reg. 22/04 (or the latest revision thereof).

If the recommended illumination levels cannot be achieved, the Engineer must provide justification in writing and obtain approval from the Town.

9.2.1 Lighting Design Submission Requirements

Lighting design submissions shall include the following:

- Site plan layout showing above ground features, streetlight poles and a summary table of component.
- Complete wiring diagram.
- Diagram demonstrating adequate clearances to overhead cables.
- Installation details.
- Technical details.

Photometric designs shall be completed using AGi32 software. The AGi32 design file (.agi) shall be included in the design submission package.

Illumination values shall be shown in units of lux. The photometric calculation grid text must be legible. Summary tables shall include illumination values and uniformity. The submission drawing(s) shall state ANSI/IES target values and classifications for all calculation grids.

Photometric design drawings shall state the Light Loss Factor (LLF) used in the design calculations. LLF of 0.9 shall be used for all luminaires.

9.2.2 Lighting Design Criteria for Municipal Roads, Intersections, Midblock, Crosswalks, Roundabouts and Walkways

All designs shall comply with ANSI/IES RP-8 (latest edition) recommendations as relates to target values and calculation grid arrangements.

Street classifications, pedestrian activity level classifications and any other required parameters for design criteria selection shall be confirmed with the Town.

The following sections list the design criteria and results to be presented in lighting design submissions.

9.2.2.1 Lighting Design Criteria for Roads

Illuminance calculations only. Use luminance (cd/m^2) to illuminance (lux) equivalent conversion factors as per ANSI/IES RP-8 roadway lighting metrics.

Average illuminance calculations with applicable uniformities.

On-road bicycle facilities shall be included within the roadway calculation grid.

9.2.2.2 Pavement Illuminance Criteria for Full Intersection Lighting

Average illuminance calculations with applicable uniformities.

9.2.2.3 Pavement Illuminance for Partial (Isolated) Intersection Lighting

- Average illuminance calculations with applicable uniformities.

9.2.2.4 Lighting for Crosswalks

- Applicable to all pedestrian signals and pedestrian crossovers (PXO) – mid-block and intersection installations.
- Horizontal illuminance calculations of approach roads per Section 9.2.2.1 of this Standard, as required.
- Average vertical illuminance calculations, one for each approach direction.

9.2.2.5 Pavement Illuminance Criteria for Roundabouts, Based on Pedestrian Activity Classification

- Average illuminance calculations with applicable uniformities. and
- Average vertical illuminance calculations for crosswalks per Section 9.2.2.4 of this Standard.

9.2.2.6 Lighting for Walkways & Cycle Tracks (within the right-of-way but outside surround area)

- Applicable to off-road pedestrian and/or cycling facilities, within the right-of-way, but outside of the surround area.
- Average horizontal illuminance, minimum vertical illuminance and applicable uniformities.

9.2.2.7 Lighting for Walkways & Cycle Tracks (within the right-of-way and within the surround area)

- Applicable to off-road pedestrian and/or cycling facilities, within the right-of-way and within the surround area.
- Surround ratio as defined in RP-8.

- Average horizontal illuminance, minimum vertical illuminance and applicable uniformities.

9.2.2.8 Maintained Illuminance Values for Parking Lots

- Minimum horizontal illuminance and uniformity levels.
- Minimum vertical illuminance calculations.

9.2.2.9 Acceptable Levels of Spill Light

- Provide explanation of subject property lighting zone.
- Maximum initial vertical illuminance as per approved lighting zone.
- Illumination values of zero shall be provided along residential property lines.

9.2.2.10 Signage Illumination

Signage illumination is allowed in accordance with the following provisions:

- Signage installations shall be per relevant Town By-law.
- Lighting directed toward a sign shall be shielded so that it illuminates only the face of the sign and does not shine directly into a public right-of-way or residential premises.
- All external signage lighting must be directed downward. Upward illumination from the ground is not permitted.

9.2.2.11 Mailbox Illumination

- All mailbox locations shall have one streetlight that is adjacent to the mailbox location.
- For mailbox locations on the opposite side of the road than the light poles, the light pole should be directly across the road from the mailbox location.

9.2.3 Commercial and Private Residential Properties Site Lighting

- All other commercial and private residential property site lighting will be reviewed by the Town and must not exceed ANSI/IES recommendations as per the applications usage.

- For commercial applications, if overnight security lighting is required the outdoor lighting shall be reduced after normal hours of operation until dawn in accordance with IDA Dark Sky requirements.

9.2.4 Lighting Equipment General Specifications

Use of equipment other than those listed as “recommended” in this Standard is only acceptable with written approval from the Town. The Town may reject any alternative product at their sole discretion.

9.2.4.1 Luminaire General Specifications

- All materials used for streetlighting shall be CSA certified or equivalent Canadian approval.
- All luminaires shall have an “up light” rating compliant with International Dark Sky Authority (IDA) Dark Sky requirements. Any luminaire with a non-zero “up light” rating must be IDA certified.
- The Correlated Colour Temperature (CCT) of the LED lighting shall be 3000K for all local and collector roads, and 4000K for arterial roads.
- The Colour Rendering Index shall be 70+.

9.2.4.2 Decorative LED Luminaires & Poles

The following decorative luminaires and poles shall be used within the Town “Heritage District”, and any other area at the sole discretion of the Town. Unless otherwise directed by the Town, no alternative will be considered for decorative luminaires.

- Luminaries shall have zero-degree tilt.
- Luminaires shall be colour black.
- Recommended manufacturer and model number:
    - HCI # F316-L-LED-A378-1A-MOD-P474-85ATF-18.
    - The design Engineer shall specify required distribution type as a suffix to the above model number.

9.2.4.3 Cobrahead Style LED Luminaires

- Luminaries shall have zero-degree tilt.
- Luminaires shall be colour grey or silver. and
- Recommended manufacturers:
    - GE Evolve Series.
    - Cree XSP Series.
    - Phillips (Signify) Lumec Roadstar Series.

9.2.4.4 Standard Concrete Poles

Standard concrete poles shall be in accordance with the following:

- Direct buried only, installed as per OPSD standards.
- Round Class B medium duty pole, symetrically tapered shaft.
- 9.9 metre overall pole length (other lengths are only accetpable with Town approval).
- 8.2 metre pole height above grade.
- Standard mold finish and colour.
- Hand hole orientation as per OPSD 2220.01.
- Recommended manufacturers:
    - Stresscrete Group model E-325-BPR-G-MOO.
    - Utility Structures Inc. (USI) model HA-325-B-1-PG-10.

9.2.4.5 Photocells

The photoelectric control (photocell) shall be designed to automatically switch “ON” when the natural illumination decreases to 50 lux and to switch “OFF” when the natural illumination reaches more than 200 lux. Both operations shall be delayed 15 seconds.

Photocells shall meet the following minimum specifications:

- 10-year manufacturer's warranty.
- 20-year expected life.
- 40,000 A surge protection.
- Rated for LED.
- Ambient temperature range -40° C to +70° C.
- Tested to 15,000 operations.
- Recommended manufacturer:
    - Sunrise Technologies Inc. TRS Series Long Life LED Photocell.

9.2.4.6 Underground Ducts

Underground ducts shall be installed in accordance with the following:

- Ontario Electrical Safety Code (OESC) requirements.
- Hydro Authority standards for secondary power cables between a Hydro Authority point of common connection and the streetlighting power pedestal.
- Each streetlighting circuit shall be installed in a dedicated conduit.
- New road crossing ducts shall be concrete encased to OESC and Hydro Authority requirements.
- Directional drilling shall be used for road crossings under all existing roads unless otherwise approved by the Town.

9.2.4.7 Cables

- Streetlight cables shall be in accordance with the following:
- Ontario Electrical Safety Code (OESC) requirements.
- Continuous without splices.
- Installed after trenches are backfilled.
- Secondary power cables shall be installed per Hydro Authority standards.
- Minimum streetlighting cable size #6AWG copper, type RWU90.

- Design to confirm voltage drop calculations for all cable runs and increase from the minimum cable size to comply with the OESC. The calculation summary shall be provided to Town upon request.

9.2.4.8 Fuses

Fuses in pole handholes shall be in accordance with OPSD 2255.020 and OPSS.MUNI 617.

9.2.4.9 Power Service Pedestal

Streetlighting power service pedestals shall be in accordance with Hydro Authority requirements and the following specifications. The design Engineer shall confirm the acceptable power service pedestal manufacturer and model with the Hydro Authority during the design phase.

The power service pedestal shall be in accordance with the following:

- 120/240 V, 1-phase, 3-wire, 60 Hz.
- include a service entrance (as indicated) complete with a main breaker rated for 22 kAIC.
- Include main and feeder breakers series rated for 22 kAIC.
- Have a panelboard with bus and feeder breakers rated for 22,000 A (symmetrical) interrupting capacity.
- Include an outdoor, weatherproof, tamperproof, NEMA/EEMAC 3R enclosure, with electrostatic powder coated green paint finish (unless directed otherwise by the Town).
- Have stainless steel lockable fasteners and handles.

9.2.4.10 Grounding

Ground rods shall be installed at lighting power service pedestals (minimum 2 rods), at every fifth light pole (minimum 1 rod), and at the last light pole in each circuit (minimum 1 rod). Installation specifications shall be in accordance with OESC requirements.

Where subsurface conditions are not favourable for installation of ground rods (i.e. shallow bedrock), ground plates may be used in lieu of ground rods. Ground plates

shall be installed in the upright position and be sized to have the same grounding capacity as the rods specified above.

9.2.5 Approval, Construction and Energization

- Approval of the electrical engineering drawings for streetlighting must be obtained from the local Hydro Authority during the design process.
- The entire streetlight system shall be installed in full accordance with the ESA requirements. The design Engineer shall certify the streetlight system design is in accordance with O. Reg. 22/04.
- Prior to energization of the streetlight and electrical distribution system, the Owner/Developer shall schedule the inspection of the streetlight and electrical distribution system works by the ESA. The Owner/Developer shall also arrange for a copy of the ESA's *Connection Authorization* to be forwarded to the Town and arrange for the local Hydro Authority to provide the Town with 48 hours notification of the intent to energize the streetlight and electrical distribution system.
- The Owner/Developer is responsible for all costs associated with the energization of the streetlight system.
- For roads which are or will be assumed by the Town, the Town will pay the energy charges with respect to the streetlighting immediately upon energization. The streetlighting system shall be energized prior to the first occupancy.
- Where the Owner/Developer installs the streetlighting system, it must guarantee and maintain the lighting until assumption of the subdivision by the Town.

9.2.6 Lighting Configurations and Pole Offsets

Placement of streetlight locations shall be in accordance with the Town standard road cross sections.

Streetlight design drawings shall include a pole profile/clearance diagram to confirm suitable clearances from overhead cables per Hydro Authority and/or CSA standards.

All streetlights and lighting power pedestals shall be coordinated with all other above and underground utilities including, but not limited to, transformers,

communications, watermains, sewers, etc., and included on the composite utility plan.

9.2.7 Streetlighting on Existing Hydro Poles

The design Engineer shall confirm ownership of hydro poles and follow the applicable Hydro Authority's joint use procedures.

For poles owned by the Hydro Authority, attachment of streetlights to existing or proposed hydro poles shall conform to Hydro Authority standards, OESC, and O. Reg. 22/04.

Design submissions shall include pole profile drawings with as-built field measurements demonstrating suitable clearances to existing infrastructure.

The Town is not responsible for the approval to allow attachment of streetlights to existing hydro poles. This is the sole responsibility of the Hydro Authority.

10 Traffic Signals and Pedestrian Crossovers

10 Traffic Signals and Pedestrian Crossovers

A qualified Professional Engineer shall be responsible for the detailed traffic signal and pedestrian crossover (PXO) design and must ensure compliance with the *Town Development Standards.*

All traffic signals shall include pedestrian signals. Pedestrian signals shall comply with O. Reg. 191/11 *Integrated Accessibility Standards*. Where applicable, designs shall also include bicycle signals.

10.1 Traffic Signal and PXO Design Submission Requirements

Traffic signal and PXO design submissions shall include the following:

- Site plan layout showing the traffic controller, traffic poles, signal heads, pedestrian signal heads, accessible pedestrian signal (APS) push buttons, hand wells, power pedestal, pre-emption detectors, ground rods and plates, streetlighting, vehicle detection, pavement markings, signage and a summary table of components.
- Drawings shall show the point of demarcation with the location of the distribution panel/electrical disconnect.
- Complete wiring diagram.
- Lighting designs in accordance with the Town streetlighting standard.
- Diagram demonstrating adequate clearances to overhead cables.
- Installation details.
- Technical details.

10.2 Traffic Signal and PXO Design Criteria

All designs shall comply with the following:

- OPSS.MUNI and OPSD standards, unless otherwise noted by this standard.
- *Highway Traffic Act* (HTA), latest revision.
- O. Reg. 191/11 Integrated Accessibility Standards.
- MTO *Ontario Traffic Manual*, in particular Book 12, 12A, 15 and 18.

- Ontario Electrical Safety Code (OESC).
- Hydro Authority requirements.
- MTO Electrical Engineering Manual, Volume 1.

Pedestrian crossovers (PXO) shall:

- Have APS push buttons in accordance with Section 10.3.12 of this Standard.
- Include wireless communication between each side of the road.

Traffic signal installations shall:

- Include emergency vehicle pre-emption detection for all approaches.
- Have minimum two 100 millimetre diameter ducts at all road duct crossings as a minimum.
- Include at least one 675 millimetre diameter hand well per quadrant of an intersection.
- Have two 100 millimetre diameter ducts from the traffic controller cabinet to the first hand well as a minimum.
- Reduce “pole clutter” at intersections, combining poles where practical. Generally, eight poles will be required for a 4-way intersection.

10.3 Traffic Signal and PXO Equipment General Specifications

Use of equipment other than those listed as “recommended” in this standard is only acceptable with written approval from the Town. The Town may reject any alternative product at their sole discretion.

10.3.1 Traffic Controller & Cabinet Assembly

The traffic controller and cabinet assembly shall be in accordance with the following:

- NEMA TS2 Type 2, 8 phase assembly.
- 8 phase, solid state, with LCD display microprocessor-based traffic controller.
- Capable of providing vehicle extensions of actuated phases.

- Capable of holding up to 4 different timing plans.
- NEMA Plus solid state, 12 channel conflict monitor complete with LCD display and fault memory.
- Fully wired 12 position back panel and fully wired 8 position detector rack.
- 12 solid state load switches with power distribution contact (PDC) for vehicle and pedestrian indications only.
- Provisions for future dial-in communication access.
- 2 rack mounted pedestrian 2-channel isolator cards.
- 4 2-channel loop detector units.
- emergency pre-emption cards.
- Include a police panel complete with manual/auto switch, flash switch and signal on/off switch.
- 4 transfer relays.
- NEMA solid state, 15 A, 2-pole flasher.
- Include a radio interference filter.
- internal circuit breakers (one 40 A for traffic signal system, one 15 A for cabinet accessories).
- Include switches inside cabinet to simulate vehicle and pedestrian detector inputs.
- Include switches for stop timing and flash toggle.
- Include a surge protective device.
- Aluminium Type M-1 cabinet complete with neoprene gasket.
- Cabinet colour of ASA-70 grey using polyester powder coat (unless otherwise directed by Town).
- shelves including 1 with slide out tray.

- Vertical shelf support channels shall be provided. Keyhole slots are not required.
- Include a lockable main door with #2 door lock complete with 2 keys and police door lock complete with 1 long key.
- Include a disposable air filter complete with aluminium plate snow shield and an exhaust fan complete with guard.
- Include a 250 W panel heater complete with guard and adjustable thermostat controls.
- Include fault indication complete with switch.
- Include LED cabinet lighting.
- Include 1 duplex 15 A GFI receptacle.

The traffic controller cabinet shall be mounted on a concrete pad in a location which is not visually distracting to vehicular traffic. The cabinet shall be raised 450 millimetres above grade with a cabinet base extension.

Recommended traffic controller manufacturers:

- Econolite Cobalt.
- McCain ATC.
- Trafficware.

10.3.2 Concrete Pole Bases

Concrete pole bases shall:

- Be in accordance with OPSD 2200.04 for poles 3.7 metres and shorter.
- Be in accordance with OPSD 2200.01 for poles larger than 3.7 metres.
- Have an “X” marked atop the concrete to show the location of conduit entry.
- Include a 20 millimetre sleeve for the installation of ground wire.
- Have conduit sizes and routing to match OPSD, unless otherwise stated on the design drawings.

10.3.3 Steel Poles

Steel traffic poles shall be in accordance with the following:

- Octagonal shape and base mounted.
- Standard Duty (SD) and Heavy Duty (HD) classifcation.
- Hot dipped galvanized.
- Oriented such that hand holes point away from the road and the final mast arm position is perpendicular to the road.
- Unpainted, unless otherwise directed by the Town.
- Include hand hole covers and top cap.
- Lengths as indicated on the design drawings.

Recommended manufacturers:

- Valmont.
- Spina Steel Works.
- Polefab.

10.3.4 Hand Wells

Hand wells shall be in accordance with the following:

- Round, pre-cast concrete complete with cast iron frame and grate in accordance with the relevant OPSDs.
- Sizes determined by the design Engineer and indicated on the drawings.
- Separately grounded to a ground rod positioned 600 millimetres outside the structure by a #6AWG bare stranded copper ground wire.
- All ducts shall be installed through the side of the precast concrete hand well.

When loop detectors are used, a 300 millimetre hand well in accordance with OPSD 2112.01 shall be located level with the back of a presence loop (at the stop bar) or the front of an advanced loop (located some distance from the stop bar) for the splice point for the lead in wires.

Where subsurface conditions are not favourable for installation of ground rods (i.e. shallow bedrock), ground plates may be used in lieu of ground rods. Ground plates shall be installed in the upright position and be sized to have the same grounding capacity as the rods specified above.

10.3.5 Traffic Mast Arms

Traffic mast arms shall be in accordance with the following:

- Aluminum, complete with mounting hardware.
- Mounted such that the minimum clearance above the roadway is 5.2 metres.

10.3.6 Traffic Signal Heads

Traffic signal heads shall be in accordance with the following:

- Polycarbonate material with yellow door and housing, backboards, cowl visors and bird stops.
- Steel reinforcements between the red and amber sections.
- Include Fortran Snow Sentry units.
- LED traffic lenses at least 300 millimetres in diameter.
- Include 75 millimetre width reflectivity tape around the border of the backboards.

10.3.7 Traffic Signal Head Mounting Brackets

Traffic signal head mounting brackets shall be in accordance with the following:

- Utilize an adjustable mounting bracket system, except when mounted to a median pole. Plumbizers shall not be used except on primary traffic signal heads.
- When signal heads are mounted to median poles, a double arm bracket system shall be used.

Recommended manufacturers:

- Versa Bracket.
- Astro Bracket.

10.3.8 Pedestrian Signal Heads

Pedestrian signal heads shall be in accordance with the following:

- Single section polycarbonate with yellow door and housing, cowl visors and bird stops.
- LED lenses.
- Include a pedestrian countdown timer.
- Mounted with a minimum vertical clearance of 2.75 metres.

10.3.9 Pedestrian Signal Head Mounting Brackets

Traffic signal head mounting brackets shall be in accordance with the following:

- Utilize a double arm bracket system.

10.3.10 Bycycle Signal Heads

Bicycle signal heads shall be in accordance with the following:

- Polycarbonate with black door and housing, cowl visors and bird stops.
- Steel reinforcements between the red and amber sections.
- Include Fortran Snow Sentry units.
- LED traffic lenses at least 200 millimetres in diameter.
- Mounted with acceptable vertical clearance depending on whether the bicycle signal head is mounted above the road or in the boulevard area.

No backboard is required for bicycle signal heads.

10.3.11 Rapid Rectangular Flashing Beacons

Rapid rectangular flashing beacons (RRFBs) shall be in accordance with the following:

- Include 2 LED flashers per light bar and 1 tell tale LED. LED shall be minimum 3” x 7” for flashers and 1” x 2” for tell tale.

- Utilize amber LEDs with an automatic lighting control system to adjust the brightness of the LEDs based on solar conditions and remaining battery level.
- Rated usage of minimum 300 cycles per day, 25 seconds per activation.
- Minimum charged capacity of 25 days at rated usage for solar powered systems.

Recommended manufacturer:

- JSF Technologies.

10.3.12 APS Push Buttons

APS push buttons shall be in accordance with the following:

- O. Reg. 191/11 requirements.
- Yellow housing, with tactile arrow indicating crossing direction.
- Freeze-proof.
- Include all mounting hardware, including tamper proof screws. Anti-seize compound shall be applied to the face plate and mounting screws.
- Mounted at 1.1 metres above grade.
- Include Ra-12 signs above push button.

Additional push buttons shall be installed as required, such that push buttons are accessible from any off-road cycling facilities. These additional push buttons shall have the Ra-12 sign replaced with a bicycle version.

Recommended manufacturers:

- Polara.
- Campbell.
- Pelco.

Push buttons shall be configured as follows:

- Extended push application turned on.

- Audible “WALK” message only activated if push button is depressed for 3 seconds (Cuckoo for north/south, Canadian Melody for east west).
- Locate tone shall be activated.
- Ambient sensing system shall be activated for all emitted sounds.

10.3.13 Underground Ducts

Underground ducts shall be:

- Onstalled in accordance with OESC requirements for traffic signal cables. Duct quantities shall be as per the design drawings and OPSD requirements.
- Installed in accordance with Hydro Authority requirements for secondary power cables between a Hydro Authority point of common connection and the power pedestal.
- Buried with 1.2 metres cover for all new road crossing ducts to OESC requirements.
- Directionally drilled with 1.2 metres cover for road crossings under all existing road installations, unless otherwise approved by the Town.
- Installed with a 9 millimetre nylon fish rope in all spare ducts.

10.3.14 Cables

Cables shall be in accordance with the following:

- Secondary power cables shall be installed as per *Hydro Authority standards.*
- Cable installations shall generally conform to OPSD 2529.03 or OPSD 2529.07, whichever is most relevant.
- Traffic signal cables shall be manufacturered to *International Municipal Signal Association* (IMSA) standards.

Typical traffic signal cables are as follows:

- Vehicle signals – 12C #14AWG or 19C #14AWG.
- Pedestrian signals – 7C #14AWG.
- Push buttons – 4C #14AWG.

- Ground - #6AWG Cu RWU90 Green.
- Intersection Lighting – 2C #6AWG Cu RWU90.

The submitted design shall confirm voltage drop calculations for all cable runs and increase from the minimum cable size to comply with the OESC. The calculation summary shall be provided to the Town upon request.

10.3.15 Fuses

Fuses in pole hand holes shall be in accordance with OPSD 2255.020 and OPSS.MUNI 617.

10.3.16 Power Service Pedestal

Traffic signal and PXO installations shall have a separate power service pedestal in accordance with Hydro Authority requirements and the following specifications. The design Engineer shall confirm metering requirements and the acceptable power service pedestal manufacturer and model with the Hydro Authority during the design phase.

The power service pedestal shall be in accordance with the following:

- 120/240 V, 1-phase, 3-wire, 60 Hz.
- Include a service entrance (as indicated) complete with a main breaker rated for 22 kAIC.
- Include main and feeder breakers series rated for 22 kAIC.
- Have a panelboard with bus and feeder breakers rated for 22,000 A (symmetrical) interrupting capacity.
- Include an outdoor, weatherproof, tamperproof, NEMA/EEMAC 3R enclosure, with electrostatic powder coated green paint finish (unless directed otherwise by the Town).
- Have stainless steel lockable fasteners and handles.

10.3.17 Grounding

Ground rods shall be installed at power service pedestal (minimum 2 rods), at every hand well (minimum 1 rod), and at the traffic controller (minimum 2 rods). Installation shall be in accordance with OESC requirements.

10.4 Vehicle Detection

Intrusive and non-intrusive methods are acceptable means of vehicle detection. Details of each are provided in the following sections.

Intrusive Vehicle Detection

Intrusive detection systems shall utilize loop detectors.

Vechicle detection loops shall be installed in binder course ashpalt.

Loops shall be 10 metres x 1.8 metres.

Presence loops (located at the stop bar) shall be located to provide a minimum of 7 metres coverage behind the stop bar.

Advance loops (located away from the stop bar) shall be located 6.5 metres behind the stop bar or 1 metre from the presence loop detector if both are used.

If on-road bicycle facilities are provided, a quadrupole loop detector shall be installed with a suitable pavement marking indicating where a cyclist shall stop.

Loops shall be spliced to the “home run” cable inside a 300 millimetre diameter hand well, located per Section 10.3.4 of this Standard.

10.4.1 Non-Intrusive Vehicle Detection

- Non-Intrusive detection systems shall utilize radar technology.
- Vehicle detection zones shall be located to provide a minimum of 7 metre coverage behind the stop bar and 3 metres in front of the stop bar for presence detection.
- Vehicle detection zones for turning lanes shall be located 6.5 metres behind the stop bar (i.e. detecting the second vehicle in a queue) or 1 metre from the presence loop detector zone if both are used, for the purpose of advanced activation. Detection zones shall be minimum 10 metres long.
- If on-road bicycle facilities are provided, a detection zone shall be installed and provide a minimum of 10 metres coverage behind the stop bar and 3 metres in front of the stop bar.

Recommended manufacturers:

- Wavetronix.

- MS Sedeco.

10.5 Standby Power for Traffic Signals

Standby power for traffic signals may be required at critical intersections at the discretion of the Town. The requirements for standby power equipment are listed in the following sections.

10.5.1 Uninterruptable Power Supply Unit

The uninterruptable power supply (UPS) unit shall be in accordance with the following:

- True online design, with protection for power failure, brownouts, sags, surges, over voltage, transients, noise, frequency variations and harmonic distortion.
- UPS components to be mounted inside traffic controller cabinet where possible. If additional space is required, utilize a piggyback cabinet as specified below.
- Input power supply: 120V AC, single phase, 60 Hz, c/w cord and 5-20P plug.
- Output power supply: 120V AC, single phase, complete with six 5-20R receptacles.
- Battery back-up time: 60 minutes full load capability (minimum).
- Output voltage regulation: ±3% (maximum).
- Output frequency: 60 Hz, ±0.2% (maximum).
- Output Voltage THD: 5% (maximum) for resistive or non-linear loads.
- Ambient Operating Temperature: 0°C to 40°C.
- Batteries: sealed lead-acid, maintenance-free batteries, minimum 5-year service life, and a 4 hour recharging time to 90% capacity. Batteries mounted internally to UPS cabinet.
- Circuit protection: batteries, input line and output line protected by circuit breaker or fuse.
- Indication: LED indicating lights for Input Line On, Inverter On, alarm, bypass and battery indication.

- Controls: master on/off switch, audible alarm on/off switch, and bypass switch.
- Include a relay interface card to provide alarm indication of: Utility Failure, Low Battery, UPS Alarm/Ok, and On Bypass as a minimum. Each alarm to include a separate SPDT (Form ‘C’) isolated dry contact.
- Include battery heater mats.
- Include lightning arrestors.
- Mounting: provide all necessary support brackets and hardware.

Recommended manufacturers:

- Powerware (Eaton) 9PX Series.
- Liebert (Vertiv) GXT4 Series.
- Alpha FMX Series.

10.5.2 Uninterruptable Power Supply Bypass Switch

The uninterruptable power supply bypass switch shall be in accordance with the following:

- Continuous-duty, single-phase, maintenance bypass / power output distribution system, designed to operate as a maintenance bypass system in the following modes:
    - Normal: The UPS is continuously supplied available utility power by the POD. The UPS output power is returned to the POD and distributed to the critical AC load through the POD output receptacles.
    - Maintenance bypass: The bypass switch allows a transfer of the critical AC load from the UPS inverter to the utility source. to allow for service to or replacement of the UPS, without interrupting the load.
- Ambient operating temperature: + 32°F to + 104°F (0°C to +40°C).
- Relative humidity: 0 to 95% non-condensing.
- 2 status indicators for Utility and UPS indication.
- Spring-loaded rotary bypass switch that ensures a maximum transfer time of <6 ms.

- Utility and UPS line cords included, sized to suit.

Recommended manufacturers:

- Liebert MicroPod (hardwired).
- Alpha Nova Series.

“Piggyback” Cabinet (As Required)

The “piggyback” cabinet shall be in accordance with the following:

Outdoor rated Type 3R enclosure.

Aluminum construction.

Polyester powder coat to match traffic controller cabinet colour.

10.6 Approval, Construction and Energization

Approval, construction and energization of traffic signals and PXOs shall be in accordance with the following.

Approval of electrical engineering drawings and plans for traffic signals shall be obtained from the local Hydro Authority during the submission process.

The entire traffic signal system shall be installed in full accordance with ESA requirements. The design Engineer shall certify the traffic signal system design is in accordance with O. Reg. 22/04.

Prior to energization of the traffic signal/PXO and electrical distribution system, the Owner/Developer shall schedule the ESA for the inspection of the traffic signals and electrical distribution system works. In addition, the Owner/Developer shall arrange for a copy of the ESA’s “*Connection Authorization*” to be forwarded to the Town and arrange for the Hydro Authority to provide the Town with 48 hours notice of the intent to energize the traffic signal and electrical distribution system.

The Owner/Developer is responsible for all costs associated with the energization of the traffic signal.

Energy charges with respect to the traffic signals will be paid by the Town upon energization. The traffic signal system shall be energized prior to the first occupancy or as indicated by the traffic impact study (TIS).

10.6.1 Signal Timing

Traffic signal timing plans shall be prepared by a qualified Professional Engineer using the information provided by the TIS. Signal timing plans shall be submitted to the Town for approval at least two weeks prior to programming the traffic controller.

For intersections, pedestrian phases shall activate whenever the corresponding traffic phase is active, whether the push button has been pressed or not.

10.6.2 Testing and Commissioning

The Owner/Developer shall arrange with Town staff for final inspection of the traffic signals once they are fully constructed prior to energization. A minimum notice of 5 business days is required to arrange final inspection with the Town. Upon completion of the inspection, Town staff shall provide either acceptance of the final inspection or prepare an inspection report detailing the deficiencies that must be corrected prior to traffic signal energization. The Owner/Developer shall inform Town staff once deficiencies have been completed for arrangement of final inspection and energization.

The Owner/Developer is responsible to arrange and pay for costs to have a paid-duty police officer on-site during conflict monitor short-wire testing and traffic control signal energization.

During energization, the Owner/Developer must thoroughly test all vehicle detection, pre-emption detection and pedestrian push buttons.

10.7 Configurations and Pole Offsets

Configuration and pole offsets shall be:

- In accordance with OTM *Books 12, 12A, 15 and 18*, and O. Reg. 191/11.
- Coordinated with the Town.

All traffic signals and lighting power pedestals shall be coordinated with all other above and underground utilities including, but not limited to, transformers, communications, watermains, sewers, etc., and included on the composite utility plan.

10.8 Traffic Signals on Existing Hydro Poles

Unless site conditions do not allow any other installation option, and if such conditions exist it must be approved in writing by the Town, traffic signal equipment shall not be installed on hydro poles.

Under such circumstances where signals are proposed on hydro poles, the attachments to existing or proposed hydro poles shall conform to *Hydro Authority standards*, *OESC requirements* and O. Reg. 22/04.

The Engineer shall prepare the detailed traffic signal design and ensure it is in complete accordance with *Hydro Authority standards*. Design submissions shall include pole profile drawings with as-built field measurements demonstrating suitable clearances to existing infrastructure.

The Town is not responsible for the approval to allow attachment of traffic signals to existing hydro poles. This approval shall be obtained by the Owner/Developer from the Hydro Authority.

11 Geotechnical

11 Geotechnical

11.1 Introduction

This section has been prepared to provide Geotechnical Consulting Engineers with a checklist summarizing the geotechnical requirements for a typical development. This list shall provide many of the general requirements for geotechnical investigations and reporting. It is not necessarily exhaustive, and the Geotechnical Consulting Engineer shall be responsible to identify and report upon other issues that they consider relevant to the project.

11.2 Site Investigation Requirements

The following site investigations shall generally be the minimum standard requirements. Boreholes shall be placed along the proposed ROW and/or proposed location of underground structures. The spacing for boreholes shall be examined by the Geotechnical Consultant and the maximum allowable spacing shall be 150 metres. Boreholes shall be advanced to at least 1.0 metre below the proposed sewer or underground structure invert grades. Boreholes shall also be required in locations where other types of infrastructures (e.g. SWM pond, outlet structure, etc.) are proposed and where slope stability assessment is required.

The following tests and investigative works shall be conducted:

1. Standard penetration tests.
2. Shear tests.
3. Plasticity index.
4. Atterberg limits.
5. Resistivity tests.
6. Grain size analysis.
7. Moisture content.
8. Depth of water table at the time of drilling.
9. Well monitoring study, if applicable.
10. Fluctuations.

11. Groundwater monitoring, as required to establish the seasonal high groundwater table. As a minimum, groundwater monitoring shall be conducted throughout the spring season and during a second wet season (being either a second spring, or the fall).

12. California Bearing Ratio (CBR) tests for each representative soil type.

13. Depth of topsoil and the identification of any poor soil strata or areas of fill including additional boreholes or test pits.

14. Soil type(s) and depth(s) below topsoil.

15. Removal and management of excess soil in accordance with O. Reg. 406/19.

The obtained subsurface information from the investigation program shall be presented graphically in the form of borehole logs and the location of the investigation points shall be clearly shown on the plans.

11.3 Geotechnical Investigation Report

The Owner/Developer shall engage a Geotechnical Engineering Consultant to prepare a report on the existing soil conditions which as a minimum, shall generally include:

1. The identification, description and limits of the existing soil regimes, including the extent of topsoil and its suitability for reuse.

2. The suitability of native materials for trench backfill and general fill.

3. The conditions under which the native material may be used as trench backfill.

4. The procedures to be used for high moisture contents and water table levels which may affect the proposed servicing or structural works of the concerned area and surrounding lands.

5. The extent of native material which is unsuitable for trench backfill and the procedure for dealing with it such that it will not affect the structural stability of the proposed infrastructure or sub-surface structures.

6. Areas and procedures to be followed where blasting may be required with due consideration to surrounding structures and infrastructure.

7. The road material depths for pavement design shall meet or exceed minimum Town requirements.

8. Any special recommendation for embedment materials.

9. Potential corrosive or chemical problems that may affect infrastructure or structures (e.g. high sulphates) and the method of resolving such problems.

10. Recommendations in dealing with filling conditions within the road allowances, on building lands, in the construction of berms etc.

11. Identify problem areas and recommend mitigating procedures regarding the stability of existing slopes and the extent of unstable soils or conditions.

12. Results of the groundwater monitoring shall be used to include recommendations on the minimum basement floor elevations throughout the site, which shall be at least 0.5 metres above the seasonal high groundwater levels.

13. Recommendations on whether a Permit to Take Water will be required and/or whether a Hydrogeologic Study is necessary.

14. Dewatering requirements, including whether the project will need to be registered through the MECP.

15. Dewatering discharge to Town's sanitary sewers is not allowed. The report must address discharge to Town's storm sewers in accordance with the *Sewer Use By-law* and subject to quality acceptance by the relevant authorities having jurisdictions (Conservation Authority, MNR, MECP, etc.) and capacity confirmation to accommodate the proposed discharge. It must be demonstrated that the dewatering will not adversely affect adjacent structures or properties and preventative measures, where necessary, shall be provided.

16. Any special recommendations to be followed in the design and construction of building foundations including recommended foundation elevations in relation to the groundwater elevation.

17. The engineering properties of the native material including frost susceptibility, natural moisture content, compaction characteristics, relative density and structural integrity.

18. Recommendations in achieving proper compaction.

19. Recommendations in dealing with deep excavation of trenches.

20. Recommendations in dealing with septic or well systems that may be affected by the proposed building and servicing works.

The report is to confirm that sufficient boreholes have been taken to establish definite requirements and recommendations for the infrastructure and structural works. The report must identify minimum bearing capacity of the native soil (i.e. 75 kPa), preferably on a hole by hole basis. Boreholes located in the area of proposed underground infrastructure are to be taken to a depth of at least one (1) metre below the deepest trench.

Requirements and recommendations contained within this report along with borehole logs and grain size analysis of the native soils are to be documented.

During construction, the Owner/Developer is to retain a Geotechnical Consultant to supervise all earthwork and the installation of infrastructure (including embedment and backfilling of all trenches) within road allowances and easements. A trench backfill certification is required to indicate that sufficient tests have been carried out to obtain a representative report as to the compaction of the backfill and they find the backfill to be in compliance with Town Specifications, recommendations made within the Geotechnical Investigation Report.

A certification is required to confirm the final subgrade conditions are equal to or better than those anticipated in the preparation of the road subbase and asphalt design. If these conditions are less than what was anticipated, the Owner/Developer, Developer and the Town are to be advised immediately and a remedial plan of action and/or a new infrastructure or structural design shall be submitted to the Town for review and acceptance.

“This certification has been made to the best of the Geotechnical Consultant’s knowledge and information. This certification, however does not relieve the Contractor, the Owner/Developer, Developer or any other parties of their respective responsibilities pertaining to maintenance or otherwise.”

Where grading operations require the placement of “engineered fill” the Geotechnical Engineer must certify that the fill located at 1 metre below finished grade and deeper has been compacted to assure a minimum bearing capacity of 75 kilopascals and a 98% Standard Proctor Density.

11.4 Material Testing

A qualified testing and inspection Consultant shall be retained by the Owner/Developer to provide the following material testing and inspection services during construction for any applicable development project:

1. Soils, compaction and asphalt (for bedding, pipe cover, trench backfill, road subgrade, granular and asphalt road pavement materials).

2. Concrete (slump, air entrainment and compressive strength).

3. Reinforcing steel (material strength and placement).

4. Granular testing (gradation, proctor, etc.).

5. Proof-rolling and inspection of subgrade, subbase and base.

6. Asphalt laboratory tests (Full Marshall, asphalt content and gradation).

7. Concrete mix design and asphalt mix design review.

The material testing of any major structure, as determined by the Town, is to be carried out by an independent testing firm. Such testing is to be carried out in accordance with the latest revision of the OPSS.MUNI and CSA requirements. All test results are to be forwarded to the Owner/Developer, the Engineering Consultant, and the Town, with the appropriate comments and recommendations. Upon completion of the material testing, the testing firm is to certify to the Owner/Developer and the Town that the material requirements for the concerned structure have been achieved.

12 Grading

12 Grading

12.1 General

The grading and drainage design, regardless of the scale or type of development, shall generally be completed with the following objectives:

- Provide positive drainage and maximize the use of land while minimizing maintenance requirements.
- Work with the existing topography to the extent possible and be adequate to service the type of proposed development.
- Ensure the adjacent and downstream properties are not adversely affected and accommodate drainage from adjacent lands where applicable.
- Conform with the Arborist Report dealing with tree preservation and protection, where applicable.
- Conform to the Stormwater Management Report, where applicable.
- Minimize the use of rear lot catch basins and retaining walls.

Where development is phased or deferred within a particular area in a manner that would impact final grading, the Consultant will be required to develop an interim grading and drainage design for that area, to the satisfaction of the Town.

12.2 Lot Grading Criteria

As a minimum, lot grading shall generally be designed in accordance with the following criteria:

1. Rear to front lot grading is preferred and rear yard catch basins shall be eliminated wherever possible.
2. Where rear lot catch basins are used, the maximum area serviced by a rear lot catch basin shall be 2,500 square metres. Easements shall be provided for the catch basin and lead with width of the easement in accordance with Section 7.13. The catch basin and lead are to be entirely within one lot. All structures shall be protected from flooding if the inlet is blocked or surcharged by a major storm event.

3. Swales shall have a minimum depth of 150 millimetres and a maximum depth of 350 millimetres. The flows from the contributing areas should be calculated and the capacity of the swale confirmed to ensure adequate conveyance.

4. Minimum slope for swales shall be 2%. Where this cannot be achieved, a 150 millimetre diameter subdrain shall be provided under the swale, in a 300 millimetre x 300 millimetre clear stone trench and wrapped with filter fabric.

5. Maximum ponding depth for swales shall be 350 millimetres.

6. Maximum area serviced by a side yard swale is 500 square metres.

7. Maximum area serviced by a rear yard swale is 1,000 square metres and the maximum length is 60 metres.

8. Installation of structures, plantings, landscaping or other obstructions shall be prohibited in swales or on top of catch basins.

9. A minimum of 75% of the rear yard area shall be graded at 2 to 5% slope from the back of the building Beyond this area, the rear yard shall be graded with a maximum slope of 4:1 to a maximum vertical difference of 1 metre. Where the vertical difference exceeds 1 metre, a retaining wall shall be used.

10. Each lot shall have at least one side yard with a 1.0 metre wide platform, graded at 2 to 5% slope along the side of the building, continuous from the front of the building to the rear of the building.

11. All other areas shall have a maximum slope of 4:1.

12. Where crossfall on a lot exceeds 10%, a split-level dwelling may be required, and supplemental cross sections may be requested by the Town in support of the design.

13. Driveways shall have minimum 2% and maximum 6% slope. Reverse grade driveways are prohibited in new developments and will only be considered on a case-by-case basis in rural residential developments where it can be demonstrated the overland flow route within the Town right-of-way will not be compromised.

14. Where driveway edging is proposed, it must be flush with the driveway surface 0.45 metres from the Town right-of-way or in accordance with O. Reg. 239/02 *Minimum Maintenance Standards for Municipal Highways* (whichever distance is greater).

15. Drainage shall be directed away from all buildings and structures in accordance with the *Ontario Building Code*. Ponding of surface water adjacent to foundation walls is not permitted.

16. Grade around buildings shall be a minimum 150 millimetres below top of exterior foundation walls or as otherwise required by *Ontario Building Code.*

17. Minimum underside of basement slab elevations shall be at least 0.5 metres above the estimated seasonal high groundwater table.

18. No more than 5% of surface area within a lot/unit/block shall drain directly into the abutting road allowance.

19. Drainage ditches, swales and boulevards shall be completely topsoiled and sodded with a minimum depth of 300 millimetres of topsoil and number 1 grade turfgrass nursery sod. quality and source to comply with standards outlined in Canadian Nursery Landscape Association - *Canadian Standards for Nursery Stock*, as amended.

12.3 Retaining Walls

The lot grading design is to avoid the use of retaining walls. Specific permission from the Town will be required for any retaining walls being proposed. All reasonable alternatives must be investigated prior to the use of retaining walls. Where permitted, retaining walls shall generally be constructed according to the following:

1. Retaining walls greater than 1 m in height are prohibited and will be considered by the Town only when the overall grading design warrants such grading differentials. A building permit is required for all retaining walls meeting the following definition as amended: The *Ontario Building Code* describes a Designated Structure as a retaining wall exceeding 1 metre in exposed height adjacent to, public property or access to a building or private property to which the public is admitted.

2. If a retaining wall is permitted, a detailed drawing indicating the design, location, height, construction details, etc. shall be submitted for Town approval. Construction details of retaining walls, including footings, base, structural tiebacks, free draining backfill material, filter fabric and subdrain or alternative drainage location and outlet(s), must be noted on both overall grading drawings and individual lot grading plans. Subject to detailed design and review at the building permit stage retaining walls may be either removed or added to the individual lot grading plan.

3. Retaining walls shall be constructed on the higher lot/unit/block such that the wall and tie-back do not cross property lines.

4. Any swales shall be designed to direct drainage away from the top and base of retaining walls.

5. Retaining walls shall be constructed entirely on private property, not on property to be assumed by any public authority.

6. Retaining walls are to be constructed of stone and/or stackable connection blocks.

7. A minimum setback of 500 millimetres shall be maintained from any component retaining walls to the foundation of any structure. If the grading does not permit this setback, a Professional Engineer, licensed in the province of Ontario, shall provide a detailed design for Town consideration.

8. A minimum setback of 300 millimetres shall be maintained from the face of a retaining wall to any lot line. The retaining wall will be owned and maintained by the property owner.

9. All retaining walls with an exposed face height of 1 metre or greater shall be designed and certified by a Professional Engineer, licensed in the province of Ontario specializing in structural Engineering. The design must be accompanied by calculations clearly demonstrating it is structurally satisfactory for the particular location and soil type.

10. All retaining walls with an exposed face height of 0.9 metres or greater shall incorporate an appropriate railing. The railing required for the retaining walls shall be designed with a top and bottom rail and be structurally designed by a Professional Engineer licensed in Ontario for placement on top of the retaining wall as per the retaining wall manufacturer's specifications or approved industry standards. Material, post spacing, brace posts, and wire mesh shall be designed and approved by a structural Engineer to the satisfaction of the Town to meet industry standards for strength and safety requirements applicable to the location. The structural stability of the retaining wall in use must be able to withstand any extra forces exerted by the railing.

11. A Building Permit shall be obtained if deemed necessary by the Town and/or in accordance with the *Ontario Building Code.*

12. Retaining walls and railings shall have their construction certified by the Engineer prior to the release of securities and the commencement of the warranty period.

Shop drawings will be required for the retaining walls, railings and appurtenances prior to construction. The retaining wall manufacturer and designer shall provide structural approval by a Professional Engineer licensed in Ontario to the satisfaction of the Town.

The Town shall be notified 48 hours prior to the construction of all retaining walls in order to arrange for an inspection for walls not requiring a building permit. For walls requiring a building permit notification to be as per the permit.

12.4 Individual Lot Grading

12.4.1 General

When a new structure or building is constructed, the lot grading shall be designed and constructed in accordance with the *Ontario Building Code* and the grading criteria described above, to ensure surface drainage is directed away from the structure or building in a manner that does not adversely affect neighbouring properties.

12.4.2 Submission Procedure

Prior to acceptance of underground services, the Owner/Builder/Applicant shall submit the proposed individual lot grading plan to the Town for review and acceptance.

12.4.3 Plan Drawing Requirements

Individual lot grading plan shall bear the signature and seal of a Professional Engineer experienced in grading and drainage design. All drawings received shall be to scale, Metric 1:200 or 1:250 All elevations should be to Geodetic Datum where possible. If not possible then the point of reference (Temporary Benchmark), which is to be identified, shall be a fixed object in the immediate area.

As a minimum, individual lot grading plans shall generally include the following:

1. A north arrow.

2. Name of street, municipal address, lot/unit/block number and plan or concession number, in sufficient detail to describe the location of the subject property.

3. A key plan detailing the general location of the subject property.

4. Legal survey information around the perimeter of the property and easements (if applicable).

5. Location of the buildings or structures, existing and/or proposed, including those on abutting lands.

6. Estimated seasonal high groundwater table elevation, based on the Geotechnical Investigation.

7. Location of all downspouts, sump pump and other drainage discharge points.

8. Locations and size of all municipal or non-municipal infrastructure including watermains, storm and sanitary sewers, as well as utilities within the adjacent right-of-way.

9. Locations and size of all utility services to the subject property.

10. Existing elevations on the road, ditch, boulevards, curbs, as applicable in relation to the subject property and adjoining lands. Sufficient existing grades on abutting properties must be shown to indicate the drainage pattern.

11. Existing grade elevations at all lot/block/unit corners and significant changes, greater than 0.15 metres, in grades along property lines shall be clearly indicated.

12. Existing vegetation (trees), including size and type of trees are to be clearly indicated. All trees to be removed or retained shall be shown.

13. Provide a Building Elevation Table, which specifies the following proposed elevations:

    - Garage floor elevations (front and rear).
    - Finished first floor.
    - Top of foundation wall.
    - Underside of basement slab (minimum 500 millimetres above the estimated seasonal high groundwater table elevation).
    - Underside of footing.

Where multi-level footings and/or foundation walls are intended, all levels are to be shown.

In addition to the above elevations, based on the design elevations of the building/structure and within 0.15 metres of the “estimated seasonal high groundwater table elevation”, the Town may request the minimum elevation for the weeping tile invert be provided on the Building Elevation Table. When applicable, following installation, the weeping tile invert elevation shall be surveyed and confirmed in writing by the Contractor/Builder to the Town Building Inspector prior to the framing inspection. A note shall be added to the lot grading plan regarding this.

14. Proposed grade elevations at all corners of the building/structure, property lines and at each corner of the lot.

15. Proposed driveway or other access point grades and location.

16. When reasonably possible, the apron elevation of the proposed building/structure must be at least 300 millimetres higher than the edge of adjacent road or right-of-way.

17. Location, spot grades, high points, drainage direction and slope along swales.

18. Sufficient information to demonstrate drainage is clearly directed away from all buildings/structures.

19. Location of proposed subdrains (if any).

20. Sediment and erosion control measures.

21. Interim grading measures (if necessary) to ensure drainage does not adversely affect the neighboring or downstream properties during construction.

22. Low Impact Development (LID) features, if proposed.

23. Engineered fill elevations (if applicable).

24. Existing or proposed headwalls, fences, retaining walls, patios, decks, swimming pools, and/or any other above ground feature. Where retaining walls are proposed, the location and the construction details shall be included on the individual lot grading plan.

25. Proposed landscaping and/or landscape features that may impact proposed grading – complete with proposed grades as required.

12.4.4 Lot Grading Inspection and Certification

Upon completion of site grading and prior to landscaping (including fencing), lot grading shall be inspected by the Design Engineer, and a lot grading certification shall be submitted to the Town Building Department and the Development Engineering Department. The individual lot grading certification along with the record of the lot grading plan will confirm the grading and drainage works have been constructed in general conformance with the accepted design.

All grading design and construction shall comply with the *Site Alteration By-law*. The Town is in the process of developing a *Site Alteration By-law* that will regulate grading, drainage, and lot-level stormwater management. Upon its enactment by Council, all development shall comply with the *Site Alteration By-law* in addition to the requirements outlined in these Development Standards.

As a minimum, general conformance with the accepted design shall satisfy the following:

1. Drainage (including roof water leaders and downspouts) is directed away from all buildings and structures and there is no ponding water adjacent any foundations.

2. Swales and driveways/access ways are constructed in the locations shown on the individual lot grading plan and are constructed within an acceptable tolerance (respecting the minimum and maximum grades and depths allowed by the Town as outlined in these Standards).

3. Swales constructed within an acceptable tolerance as outlined in these Standards.

4. Grading will not adversely affect the adjacent properties.

5. Grading is consistent and well defined.

6. Sod has been placed with staggered joints, flush and rolled to help prevent settlement.

The following is a general summary of the accepted process to be followed in support of the individual lot grading certification. It is meant to establish a systematic approach system and to help alleviate grading issues to the extent

possible. Prior to the Town accepting a Lot Grading Certificate, the Consulting Engineer must advise the Town in writing that they have completed a pre-sod inspection(s) and collected as-built grading information to confirm the lot(s) has been inspected, all deficiencies have been corrected and the topsoil has been graded in general conformance with the individual lot grading plan. As a minimum, as-built information shall generally include the following as applicable on a site-specific basis:

1. Elevations adjacent to all building or structure corners.

2. Elevations at all lot/block/unit corners.

3. Swale elevations at all high points, adjacent to the front and rear of the buildings or structures (to confirm proper depth) and at any change in slope.

4. Swale grades.

5. Elevations at the top and bottom of retaining walls.

6. Location of subdrains.

7. Driveway/access way grades at the garage/building, property line and back of curb.

8. Grades at other pertinent features.

9. As-built grades shall be added to the approved individual lot grading plans and submitted to the Town for their records. It is strongly recommended that the Consultant Collects a photographic and/or video log of existing conditions during the inspection.

10. The consulting Engineer will then arrange a pre-sod inspection with the Town to review the lot/blocks/unit(s) prior to the placement of sod. It is strongly recommended that the Owner/Developer, Building and/or Landscape Contractor attend this inspection. The grading will be reviewed by all parties and deficiencies (if any) will be documented by the consulting Engineer (with a copy provided digitally to all parties). Depending on the severity of the deficiencies, the Town may request a subsequent pre-sod inspection be scheduled.

11. Once all deficiencies have been corrected and reviewed by the consulting Engineer, the sod can be placed. Once ground cover is established, the consulting Engineer will complete a final inspection and collect a final

photographic and/or video log of the final grading. Once the consulting Engineer is satisfied with the final grading, they will arrange for a final post-sod inspection with the Town and prepare and issue the Lot Grading Certificate, as-built drawing and the final photographic and/or video log to the Town.

As-built information and the photographic and/or video logs will be kept for as long as the development agreement remains registered on title and in the case of no development agreement, for 10 years. Photographic and/or video logs shall be provided by the Owner/Developer to the Town. These records will be available to resolve disputes that may arise (including situations where end user or Owner modify grades).

Lots/blocks/units which cannot be certified due to significant issues, irreversible conditions or design changes will be brought to the attention of the Town , in writing, by the consulting Engineer. If deemed necessary by the Town, a revised overall lot grading plan and/or individual lot grading plan(s) shall be submitted to the Town, to the builder, and to the Owner.

Prior to assumption, if the end user or Owner modified grades within their lot/block/unit, causing adverse effects contrary to these Standards, the Owner/Developer will be required to rectify the grading infraction to the satisfaction of the Town.

Prior to a building's superstructure proceeding, the Owner/Developer's Engineer or OLS must certify the final footing and foundation elevations conform to the individual lot grading plan.

12.4.5 Sodding & Ground Cover

The lot/block/unit shall be sodded according to the following:

1. All lots/blocks/units shall be sodded using 300 millimetres topsoil and No. 1 nursery sod.

2. All swales, drainage easements, slopes greater than 10% and septic tile beds shall be sodded using 300 millimetres topsoil and No. 1 nursery sod.

3. Where the combined side yard between buildings is less than 1.5 metres the surface treatment shall be 100 millimetres of clear stone over a vegetation suppressing geotextile to ensure positive drainage towards the intended outlet.

4. In the case of a multi-lot/unit/block development where construction is dormant for more than 1 year and/or to reduce dust, the Owner/Developer will be required to establish ground cover to the satisfaction of the Town.

12.5 Engineered Fill

Where engineered fill is required on a site, limestone products shall only be used beneath road platforms, defined as 1 metre beyond the asphalt surface. All other areas of a site shall use select subgrade material (SSM) or native material, as applicable. Frost tapers shall be included at the Geotechnical Engineer's recommendation where engineered fill materials change.

13 Landscape

13 Landscape

13.1 General

This Section to be read in conjunction with:

- Town of Collingwood *Zoning By-Law* and *Official Plan*.
- Town of Collingwood *Urban Design Manual*.
- Accessibility for Ontarians with Disabilities Act.
- OPSS.MUNI and OPSD.
- Other Sections of the Development Standards.

13.2 Maintenance

All plants and materials to be placed on municipal lands shall be completed in a manner that is deemed to be “low maintenance” and shall be maintained as required by the Town at the Developer’s cost until assumption. Maintenance shall ensure that all landscape elements remain in accordance with approved plans and includes but is not limited to monitoring programs, watering, mulching, pruning, replacements, and repairs as required.

13.3 Warranty

Landscape installations including planting shall be under warranty for 24 months, from the issuance of the Public Works Certificate or until such time as the subdivision is assumed, whichever is later. Should any plant material be installed for less than 24 months, the Town may, at its discretion, enter into a cash in lieu agreement with the developer to address the Town’s anticipated maintenance and replacement costs.

13.4 Landscape

13.4.1 Streetscapes

There shall be no entry features (including masonry columns) or planting beds within municipal road allowances and sight triangles. Additionally, neither shall be constructed by the developer on freehold lots.

Boulevard trees shall be planted as follows:

- One deciduous tree (minimum) in front of each lot.
- One deciduous tree (minimum) for every 12 metres of road frontage adjacent to side yards (corner lots), blocks, and parklands.

Where site constraints prevent the use of medium-to-large canopy trees (wider than 10 metres at maturity), smaller trees may be planted and the spacing shall be reduced to every 8 metres. Trees are to be planted so as not to interfere with other street functions, sight triangles, or services when the tree matures, as noted below.

Where there are more lots than trees proposed, coordination for additional planting within the subdivision or cash-in-lieu of boulevard trees may be required. Cash-in-lieu rate is provided in the *Fees and Service Charges By-law.*

Trees are to be located as indicated on the applicable road cross-section and in consideration of the minimum setback distances described in STD No.1105.

13.4.2 Buffers

Landscape plans must consider adjacent lands. Buffer requirements will be determined by the Town and may include any combination of the following: landscape strip width, plantings, fencing, and berming. In addition to the aesthetic qualities that soft landscaping presents, fencing and/or berming may be required to serve as a noise reduction and/or privacy enhancing element.

13.4.3 Parks

Parks shall be proposed on table lands where the overall grade of the property does not exceed 6%. Parks shall be graded, topsoiled and lawn seeded in accordance OPSS.MUNI and as follows:

- Grading shall ensure positive drainage (2% to 33%) and appropriate drainage swales and outlets shall be provided to the municipal sewer system or to an appropriate outlet.
- Due to high pH, limestone screenings shall not be used as fill.
- Surplus/unsuitable fill and excess topsoil shall not be stockpiled (temporarily) or placed in the park block (permanently).
- Topsoil depth is to be 300 millimetres.
- Lawn seeding shall be 100% lawn seed (no nurse/cover crop) applied at the manufacturer’s recommended rate.

Fencing requirements for parks shall be as per Section 4 of the Town of Collingwood Development Standards.

Servicing requirements for parks shall be confirmed on a case-by-case basis.

If amenable to both the Town and Owner/Developer, the Owner/Developer may front-end design and construction of park amenities (e.g., playground, shade structure, walkways, etc.) In these circumstances, a separate Park Development Agreement will be required, which will outline the Owner/Developer's responsibilities, including preparation of detailed Park Development Plans and cost estimates by the Landscape Architect Consultant.

13.4.4 Stormwater Management Facilities

Trees

- Provide a mix of deciduous and coniferous trees throughout the SWM facility block (approximately 1.5 trees/100 square metres of seeded area.)
- A tree buffer shall be provided where the SWM facility abuts residential properties, with some openings provided for views of the pond. Trees shall be at least 1.5 metres from the property boundary.
- Along the maintenance access, provide a horizontal clearance of 1.5 metres for deciduous trees and 3 metres for coniferous trees (measured from trunk to edge of maintenance access).
- Minimum setback distances described in STD No.1105 shall also be achieved.

Shrubs

- Provide a continuous band of shrubs (3 metres wide) around the water's edge (100% coverage), except where they conflict with engineering features or proposed trees.
- Provide groupings of shrubs in upland areas, to create variation in views, colour, and texture (approximately 30% coverage.)
- No shrubs shall be planted within 3 metres of residential properties.

Aquatics

- Provide a mix of deep-water, floating-leaved, and shallow-water aquatics. Total aquatic plant coverage should be 50% of the area represented

by a 3 metre band around the perimeter of the pond (except where it conflicts with engineering features), spaced 1 metre on-centre.

Urban treatment features such as lookouts, seating areas, buffers, and nodal planting may be required in addition based on site specific conditions and any applicable design guidelines at the discretion of the Town.

Bio-swales and Low Impact Development (LID) planting will be considered on a site-by-site basis.

13.5 Acceptable Plant Species

13.5.1 Boulevard Trees

Please refer to Appendix E for a list of acceptable boulevard tree species.

For all subdivision lots, 1 boulevard tree shall be provided per lot.

13.5.2 Stormwater Management Facility & Naturalization Planting

Proposed species are to be native to Ontario and appropriate for the location. Consideration may be given to additional species located just outside their native range (e.g. Carolinian) which are likely to tolerate the local climate (i.e. assisted migration.) Planting shall include deciduous and coniferous trees, shrubs, and aquatics (emergent, submergent, floating leaved.) SWM Facilities are to be seeded with native seed mixes.

13.5.3 Site Plan Planting

Species shall be selected by the landscape architect based on site conditions and individual design requirements, but they must be non-invasive.

Minimum setback distances for trees described in STD No.1105 shall also be achieved.

13.6 Mixture and Proportion of Species

To encourage biodiversity, planting schemes should incorporate the following:

- limit to 5 consecutive trees of any one species, including both sides of a road allowance.
- limit of 10% of any one tree species for stormwater facility blocks and boulevards (except along shorter roads, as appropriate).

- limit of 10% of any one tree species for site plans (excluding coniferous buffers).

13.7 Plant Material Specifications

All plant material shall meet the requirements of the *Canadian Landscape Standard* (latest edition), published by the Canadian Nursery Landscape Association and the Canadian Society of Landscape Architects, except where specified otherwise.

Trees may be rejected if they have codominant stems or girdling roots.

Minimum plant sizes* are as follows:

Plant Material	Minimum Size
Deciduous Trees	50mm caliper
Coniferous Tree	200cm tall
Deciduous Shrub	50cm tall, 3 gallon pot
Coniferous Shrub	50cm wide, 3 gallon pot
Perennial	1 gallon pot

* Whips and seedlings may be utilized for naturalization or restoration areas but not for stormwater management facilities.

14 Tree Protection

14 Tree Protection

14.1 General

Development applications shall include a Tree Inventory and Protection Plan and Arborist Report when trees exist in any of the following locations:

- On the development property.
- On the adjoining road allowance.
- On an adjacent property, located within 6.0m of the development property boundary.

14.2 Engineering Drawings

Engineering drawings shall be coordinated with the Tree Inventory and Protection Plan and shall identify:

- All trees to be retained.
- Their corresponding Tree Protection Zones.
- Tree protection fencing limits.
- Match grades at Tree Protection Zone boundaries (on grading plans).
- Reference to Town of Collingwood Standard Details associated with Tree Protection.

This information shall be provided on relevant engineering drawings, including but not limited to:

- Erosion and Sediment Control Plans.
- Existing Conditions and Removals Plans.
- Grading Plans.
- Composite Utility/Servicing Plans.

These drawings shall confirm that no grade changes or alterations of any kind are proposed within Tree Protection Zone.

14.3 Scope of Inventory

The tree inventory shall, at a minimum, identify the following:

- Endangered species.
- Distinctive trees (as defined by Town of Collingwood Bylaw 2012-084).
- Municipal trees.
- Boundary trees (as defined by the Ontario Forestry Act)*.
- Trees on adjacent lands within 6.0m of the property boundary.
- Vegetation types (as per Ontario's Ecological Land Classification) for forested areas.

* Boundary trees may be omitted from the inventory at the discretion of Town staff if the joint owners provide written consent to their removal and if the trees are not endangered, distinctive, or otherwise protected.

Non-forested areas of the property may require a complete inventory of individual trees (greater than 15 centimetres diameter-at-breast-height) which will be determined by the Town on a case-by-case basis.

If selective removal is anticipated within a grouping of trees to be retained, the Town may require a detailed inventory, at their discretion.

Trees are to be inventoried and assessed by a certified arborist, registered professional forester, or other qualified forestry consultant (as defined by the *Tree Destruction By-law*). The results of the inventory shall be presented in a table in the Arborist Report (with photos) and shall include:

- Date of inventory and name and qualifications of person that conducted the inventory.
- Tree tag number.
- Species (scientific and common names).
- Diameter-at-breast-height (measured 1.4 metres from grade).
- Canopy diameter.
- Tree ownership (and whether it may be a boundary tree).

- Limited visual assessment of condition (e.g., % deadwood, location of decay, pathogens, structural integrity, vigour, etc.) and a condition rating, as outlined below.
- Minimum tree protection zone, as outlined below.

14.4 Tree Condition

Trees shall be rated among six condition factors as follows:

Trunk Condition

- Sound and solid 5
- Sections of bark missing 3
- Extensive decay & hollow 1

Growth Rate (consider species)

- 15 cm twig elongation 3
- 5-15 cm trig elongation 2
- <5 cm twig elongation 1

Structure

- Sound 5
- 1 major or several minor limbs dead, broken, missing 3
- 2 or more major limbs broken, dead, missing 1

Insect & Disease

- No pests present 3
- 1 pest present 2
- Or more pests present 1

Crown Development

- Full & balanced 5

- Full but unbalanced 3
- Unbalanced & lacking a full crown 1

Life Expectancy

- >30 years 5
- 15-20 years 3
- <5 years 1

The ratings for each category are to be added together to determine the overall condition class:

- Rating of 23-26: Excellent (80-100%)
- Rating of 19-22: Good (60-80%)
- Rating of 14-18: Fair (40-60%)
- Rating of 10-13: Poor (10-13%)
- Rating of 9-6: Very Poor (0-20%)

14.5 Minimum Tree Protection Zones

Minimum Tree Protection Zones shall be based on trunk diameter-at-breast-height (measured 1.4 metres from grade) and canopy diameter as follows:

	Minimum Protection Distances Required	
Trunk Diameter (DBH)	**Town-owned & Private Trees**	**Conservation Authorities or Significant/Sensitive in Nature**
		Whichever of the two is greater:
<10 cm		The drip line or 1.2 m
10- 29 cm		The drip line or 3.6 m
30 – 40 cm		The drip line or 4.8 m
41 – 50 cm		The drip line or 6.0 m
51-60 cm		The drip line or 7.2 m
61-70 cm		The drip line or 8.4 m

71-80 cm	The drip line or 9.6 m
81-90 cm	The drip line or 10.8 m
91-100 cm	The drip line or 12.0 m
100 cm	12 cm protection/1 cm dbh or the drip line

14.6 Tree Protection Fencing

Tree protection fencing shall be consistent with the 'typical' fencing depicted in the Town Standard detail, except where 'boulevard' or 'hoarding' types are more appropriate. The type of fencing required will be assessed on a case-by-case basis.

14.7 Tree Removals

Tree removals shall be determined by the arborist or landscape architect, based on ownership, protection status, anticipated construction impacts, tree condition, and species (e.g., invasiveness). Should a tree be identified for removal, the reason for removal is to be provided.

14.8 Mitigation Measures

Where work is required within a minimum tree protection zone or under the tree canopy, but the intent is to retain the tree, mitigation measures are to be proposed. They may include mulch/horizontal hoarding, root or branch pruning, post-construction care (e.g., watering), etc. Recommendations should be provided in the arborist report and included on the Tree Protection Plans.

14.9 Tree Protection Plans

Tree Protection Plans shall be prepared by a Landscape Architect and coordinated with the arborist inventory/assessment and the engineering drawings. The drawing requirements are provided in Section 3 of these standards.

Appendix A: Request for Deviation Form

DEVELOPMENT SERVICES

2026 DEVIATION REQUEST FORM

Date:

Completed By: ☐ City ☐ Consultant ☐ Contractor

Town File No.:

Project Name: Project Phase:

Project Address

Consulting Firm: Phone:

Firm Address: Email:

□ Requesting a change of product or materials on any existing approved drawing

□ Requesting a change to an existing guideline or standard

□ Requesting consideration of deviating from a Town standard or policy

Attach to this form all related records, proposed design, specifications and data.

GENERAL INFORMATION:

What is the requested deviation?

1.
2.

What is the recommended alternative for consideration?

What is the rational or reasoning behind the requested deviation?

Are there disadvantages or financial implications with the requested deviation?

Town use only

Date: _____ **Name:** _____ **Signature:** _____

□ *Approved* ***Notes:***

□ *Rejected*

□ *More Information Required*

Appendix B:
Standard Drawings

A) ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH TOWN OF COLLINGWOOD STANDARDS, OPSD AND OPSS WHERE CONFLICT OCCURS, TOWN OF COLLINGWOOD STANDARDS TO GOVERN.

B) TRENCH BACKFILL (OPSD 802.XXX AS APPLICABLE) TO BE SELECT NATIVE MATERIAL OR IMPORTED SELECT SUBGRADE MATERIAL TO OPSS.MUNI 1010. BACKFILL TO BE PLACED IN MAXIMUM 200 mm THICK LIFTS AND COMPACTED TO 95% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD).

C) BEDDING AND COVER TO OPSD 802.010 (FLEXIBLE PIPE) GRANULAR A EMBEDMENT MATERIAL. BEDDING AND COVER TO OPSD 802.030, 802.031 AND 802.032 (RIGID PIPE), GRANULAR A BEDDING AND GRANULAR B (MAXIMUM AGGREGATE SIZE 25 mm) COVER FOR RIGID PIPE. ALL GRANULAR MATERIAL SHALL BE COMPACTED TO A MINIMUM 95% SPMDD.

D) CLEAR STONE WRAPPED IN FILTER FABRIC CAN BE SUBSTITUTED FOR BEDDING MATERIAL IF APPROVED BY THE ENGINEER.

E) ALL MAINTENANCE HOLES ARE 1200 mm DIAMETER UNLESS OTHERWISE SPECIFIED.

F) ALL TOPSOIL AND EARTH EXCAVATION TO BE STOCK PILED OR REMOVED TO AN APPROVED SITE AS DIRECTED BY ENGINEER.

G) THE OWNER'S ENGINEER SHALL PROVIDE BENCH MARK ELEVATIONS AND HORIZONTAL ALIGNMENT REFERENCE FOR THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DETAILED LAYOUT OF THE WORK.

H) ALL PROPERTY BARS TO BE PRESERVED AND REPLACED BY AN OLS AT CONTRACTOR'S EXPENSE IF REMOVED DURING CONSTRUCTION.

I) ALL MAINTENANCE HOLE AND CATCH BASIN FRAMES AND COVERS TO BE SET TO BINDER COURSE ASPHALT ELEVATION AND RAISED PRIOR TO PLACEMENT OF SURFACE COURSE ASPHALT TO THE SATISFACTION OF THE TOWN.

J) THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUPPLY OF TEMPORARY WATER AND POWER.

K) DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS.MUNI 517 AND 518 TO MAINTAIN ALL TRENCHES IN A DRY CONDITION. CONTRACTOR RESPONSIBLE FOR OBTAINING MECP PERMIT IF REQUIRED.

L) ALL ENGINE DRIVEN PUMPS AND GENERATORS TO BE ADEQUATELY SILENCED, SUITABLE FOR OPERATION IN A RESIDENTIAL DISTRICT.

M) DISTURBED AREAS TO BE REINSTATED TO PREVIOUS CONDITION OR BETTER.

N) THE CONTRACTOR IS RESPONSIBLE FOR PRESERVATION OF ALL EXISTING FACILITIES AND NOTIFYING ALL UTILITY COMPANIES PRIOR TO COMMENCING WORK AND COORDINATE CONSTRUCTION ACCORDINGLY.

DRAFT

				TOWN OF COLLINGWOOD	DATE: JAN/03
					APR'D: EDH
				GENERAL - CONSTRUCTION NOTES	DRAWN: TATHAM
1.	VARIOUS REVISIONS		MAR/26		SCALE: N/A
No.	REVISION	APR'D	DATE		STD. No. 122

A) MH, CBMH AND DICBMH TO OPSD 701.XXX (AS APPROPRIATE) C/W SUMP UNLESS NOTED OTHERWISE.

B) STEPS TO OPSD 405.010.

C) FROST STRAPS SHALL BE INSTALLED ON ALL MAINTENANCE HOLES IN ACCORDANCE WITH OPSD 701.100.

D) MH FRAMES AND GRATES TO OPSD 401.010 OPEN COVER.

E) CB TO OPSD 705.010, 705.020.

F) DICB TO OPSD 705.030, 705.040, 706.010, 706.020, 706.030, 706.040.

G) CB AND CBMH FRAME AND GRATES TO OPSD 400.020 AND REAR LOT 400.120.

H) PIPE SUPPORT AT MH, CB AND CBMH TO OPSD 708.020.

I) CB LEADS 250 mm DIA. SINGLE AND 300 mm DIA. DOUBLE TO OPSD 708.010, 708.030.

J) SERVICE CONNECTION TO TOWN STD. NO. 625 100 mm DIA. GRANULAR A EMBEDMENT, TERMINATE AT PROPERTY LINE 1.0 m RIGHT OF SANITARY SERVICE (FACING LOT) EXCEPT FOR TOWNHOME LOTS WHERE TOWN STD. NO. 620 SHALL BE USED. SERVICES SHALL BE C/W A CAP/PLUG AND A 38 mm X 89 mm MARKER STAKE PAINTED WHITE.

DRAFT

				TOWN OF COLLINGWOOD	DATE: JAN/03
					APR'D: EDH
2.	VARIOUS REVISIONS		MAR/26	NOTES - STORM SEWERS	DRAWN: TATHAM
1.	ADDED RES STORM CONNECTION	EDH	JUL/04		SCALE: N/A
No.	REVISION	APR'D	DATE		STD. No. 123

A) MAINTENANCE HOLES TO OPSD 701.XXX AS APPROPRIATE.

B) BENCHING TO OPSD 701.021.

C) STEPS TO OPSD 405.010.

D) FROST STRAPS SHALL BE INSTALLED ON ALL MAINTENANCE HOLES IN ACCORDANCE WITH OPSD 701.100.

E) FRAMES AND COVER TO OPSD 401.01 TYPE A (CLOSED COVER).

F) SERVICE CONNECTIONS TO OPSD 1006.020 (125 mm DIA.), USING TEE CONNECTIONS TO MAINS UNLESS SHOWN OTHERWISE. GRANULAR A EMBEDMENT, TERMINATE AT THE PROPERTY LINE 2.5 m RIGHT OF WATER SERVICE (FACING LOT) WITH A 125 X 100 REDUCER C/W PLUG AND 38 mm X 89 mm MARKER POST PAINTED GREEN. MINIMUM GRADE TO BE 2.0%.

G) RADIUS BENDS TO BE USED ON SANITARY SEWER CONNECTIONS WHERE THE ANGLE OF CONNECTION BETWEEN THE SERVICE AND SEWER EXCEEDS 90°.

H) MAINTENANCE HOLE FRAMES TO BE SET TO BINDER COURSE ASPHALT ELEVATION AND RAISED PRIOR TO PLACING SURFACE COURSE ASPHALT TO THE SATISFACTION OF THE TOWN.

I) PIPE SUPPORT AT MAINTENANCE HOLES AS PER OPSD 708.020.

J) GENERAL INSTALLATION AND TESTING OF SEWERS AND APPURTENANCES TO BE IN ACCORDANCE WITH OPSS.MUNI 407, 408, 409, 410, 421 AND ALL SPECIFICATIONS REFERENCED WITHIN THESE SECTIONS.

K) ALL PRECAST CONCRETE STRUCTURE JOINTS SHALL BE WATERPROOFED.

DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

NOTES - SANITARY SEWERS

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	N/A
STD. No.	124

A) MECHANICAL RESTRAINTS SHALL BE USED IN ACCORDANCE WITH TOWN STANDARDS. THRUST BLOCKS TO OPSD 1103.010 AND 1103.020 MAY BE USED AT THE TOWN'S DISCRETION.

B) SERVICE CONNECTIONS TO OPSD 1104.010, 100 mm GRANULAR A EMBEDMENT AND COVER OVER PIPE. TERMINATE AT PROPERTY LINE AT CENTRE OF LOT C/W CURB STOP AND BOX, TESTING TAIL TO SURFACE ATTACHED TO 38 mm x 89 mm MARKER POST PAINTED BLUE.

C) HYDRANTS TO OPSD 1105.010. DRAIN PLUGS SHALL BE INSTALLED WHERE HIGH WATER TABLE IS ENCOUNTERED.

D) MINIMUM COVER ON ALL WATERMAIN AND SERVICES TO BE 1.8 m.

E) GATE VALVES, BENDS AND HYDRANT LEADS AND FITTINGS TO BE CONNECTED WITH A ROMAX GRIP RING RESTRAINING CLAMP.

F) CLEARANCE BETWEEN WATERMAIN AND SEWERS TO BE A MINIMUM OF 0.5 m VERTICAL WHERE WATERMAIN IS BELOW SEWER OR 2.5 m MINIMUM HORIZONTAL SEPARATION. WHERE WATERMAIN IS ABOVE SEWER, THE MINIMUM SEPARATIONS SHOULD BE 150 mm (BEDDING MATERIAL).

G) SERVICE TO OPSD 1104.010 AND SHALL BE MADE WITH A SERVICE SADDLE.

H) FOLLOWING TESTING, CONTRACTOR SHALL OPERATE EACH WATER SERVICE TO VERIFY FULL FLOW AND PRESSURE AT THE CURB STOP TO THE SATISFACTION OF THE ENGINEER.

I) GENERAL INSTALLATION AND TESTING OF WATERMAIN AND APPURTENANCES TO BE IN ACCORDANCE WITH OPSS.MUNI 441 AND ALL SPECIFICATIONS REFERENCED WITHIN THESE SECTIONS.

J) ALL WATERMAIN TESTING SHALL BE COMPLETED BY THE DEVELOPER'S QUALIFIED THIRD PARTY CONTRACTOR IN ACCORDANCE WITH THE MECP WATERMAIN DISINFECTION PROCEDURE AT THE DEVELOPER'S COST TO THE SATISFACTION OF THE TOWN. THE TOWN WILL COLLECT THE REQUIRED MICROBIOLOGICAL WATER QUALITY SAMPLES, AT THE DEVELOPER'S COST, PRIOR TO PLACING THE WATERMAIN INTO SERVICE.

K) SENSUS IPERL 16X19 mm WATER METER C/W RADIO REGISTER TO BE INSTALLED AT PROPERTY LINE CURB STOP BOX. METER TO BE SUPPLIED AND INSTALLED BY THE CONTRACTOR AND VERIFIED BY THE ENGINEER PRIOR TO FINAL ACCEPTANCE.

DRAFT

No.	REVISION	APR'D	DATE
3.	VARIOUS REVISIONS		MAR/26
2.	REVISED WATERMAIN TESTING	EDH	APR/07
1.	REVISED SERVICE CONNECTION	EDH	JUL/04

TOWN OF COLLINGWOOD

NOTES - WATERMAINS

DATE: JAN/03
APR'D: EDH
DRAWN: TATHAM
SCALE: N/A
STD. No. 125

A) SANITARY SEWER - SDR 35 PVC (INCREASE SPECIFICATION WHERE INSTALLATION DICTATES).

B) SANITARY SERVICE - SDR 28 PVC COLOUR GREEN.

C) WATERMAIN AND APPURTENANCES SHALL BE IN ACCORDANCE WITH THE TOWN'S WATER DISTRIBUTION MATERIALS LIST.

D) FILTER FABRIC - TERRAFIX 270R OR EQUIVALENT.

E) PERFORATED SUBDRAINS - 100 mmØ BIG 'O' WITH GEOTEXTILE FILTER SOCK OR APPROVED EQUIVALENT.

F) STORM SEWER - PVC SDR35, CONCRETE CLASS III OR HDPE OPEN PROFILE BELL & SPIGOT (BOSS 2000 AND MIN. PIPE STIFFNESS = 320 Kpa OR EQUAL).

G) STORM SEWER CONNECTION PVC SDR28 - 100 mmØ COLOUR WHITE.

H) CULVERTS - SMOOTH WALL HDPE (MIN. PIPE STIFFNESS = 320 Kpa) OR CORRUGATED METAL PIPE (MIN. THICKNESS = 2.0 mm).

I) RIP-RAP TO OPSS.MUNI 1004.05.05.

J) ALL SPECIFIED AGGREGATES TO OPSS.MUNI 1010.

K) HYDRANTS ARE TO 1.85 m LONG. EXTENSIONS IF REQUIRED ARE TO BE INSTALLED BELOW THE 1.85 m SECTION.

L) KUPFERLE ECLIPSE #9800A AUTOMATIC FLUSHING DEVICE

DRAFT

No.	REVISION	APR'D	DATE
3.	VARIOUS REVISIONS		MAR/26
2.	ADDED HYDRANT LENGTH	EDH	APR/07
1.	ADDED STORM SEWER CONNECTION	EDH	JUL/04

TOWN OF COLLINGWOOD

NOTES - MATERIALS

DATE: JAN/03
APR'D: EDH
DRAWN: TATHAM
SCALE: N/A
STD. No. 127

A) SUBGRADE AND BOULEVARD MATERIAL TO BE COMPACTED TO A MINIMUM DRY DENSITY OF AT LEAST 95% SPMDD. SUBGRADE TO BE PROOF ROLLED AND CERTIFIED PRIOR TO PLACING GRANULAR B.

B) GRANULAR A AND B BASE TO BE COMPACTED TO 100% OF THE MATERIAL'S RESPECTIVE SPMDD.

C) ROADWAYS TO BE CONSTRUCTED WITH MIN. 300 mm GRANULAR B, 150 mm GRANULAR A, AND 50 mm HL8 BINDER 40 mm HL3 SURFACE COURSE ASPHALT. ALL SUBDRAINS TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS.MUNI 405.

D) SELECT SUBGRADE MATERIAL, OR IMPORTED GRANULAR MATERIAL APPROVED BY THE ENGINEER, COMPACTED TO 98% SPMDD TO BE USED AS FILL IN ALL AREAS WHERE PROPOSED PIPE INVERTS ARE HIGHER THAN EXISTING GRADE OR AS INSTRUCTED BY THE ENGINEER.

E) ALL GRANULAR AND ASPHALT MATERIALS AND PLACEMENT TO BE IN ACCORDANCE WITH OPSS.MUNI 314 AND OPSS.MUNI 310.

F) JOINTS WITH EXISTING ASPHALT TO BE SAW CUT STRAIGHT PRIOR TO PLACING NEW ASPHALT AND TACK COAT APPLIED TO EXISTING ASPHALT. WHERE EXISTING ASPHALT IS GREATER THAN 75 mm DEPTH, A 300 mm WIDE BY 40 mm DEEP LAP JOINT SHALL BE GROUND INTO THE EXISTING ASPHALT, OTHERWISE A BUTT JOINT SHALL BE USED.

G) STOP SIGNS AND STREET SIGNS TO TOWN STANDARDS.

H) REINSTATEMENT OF ALL DISTURBED BOULEVARDS TO INCLUDE REGRADING, 300 mm TOPSOIL AND SOD TO OPSS.MUNI 802 AND OPSS.MUNI 803.

I) CONCRETE CURB AND GUTTER TO OPSD 600.040, OPSD 600.070 OR TOWN STD. NO. 211 AND OPSS.MUNI 353.

J) CONCRETE SIDEWALK TO OPSD 310.010, 310.030 AND OPSS.MUNI 351. SUBBASE TO CONSIST OF MINIMUM 150 mm OF GRANULAR A.

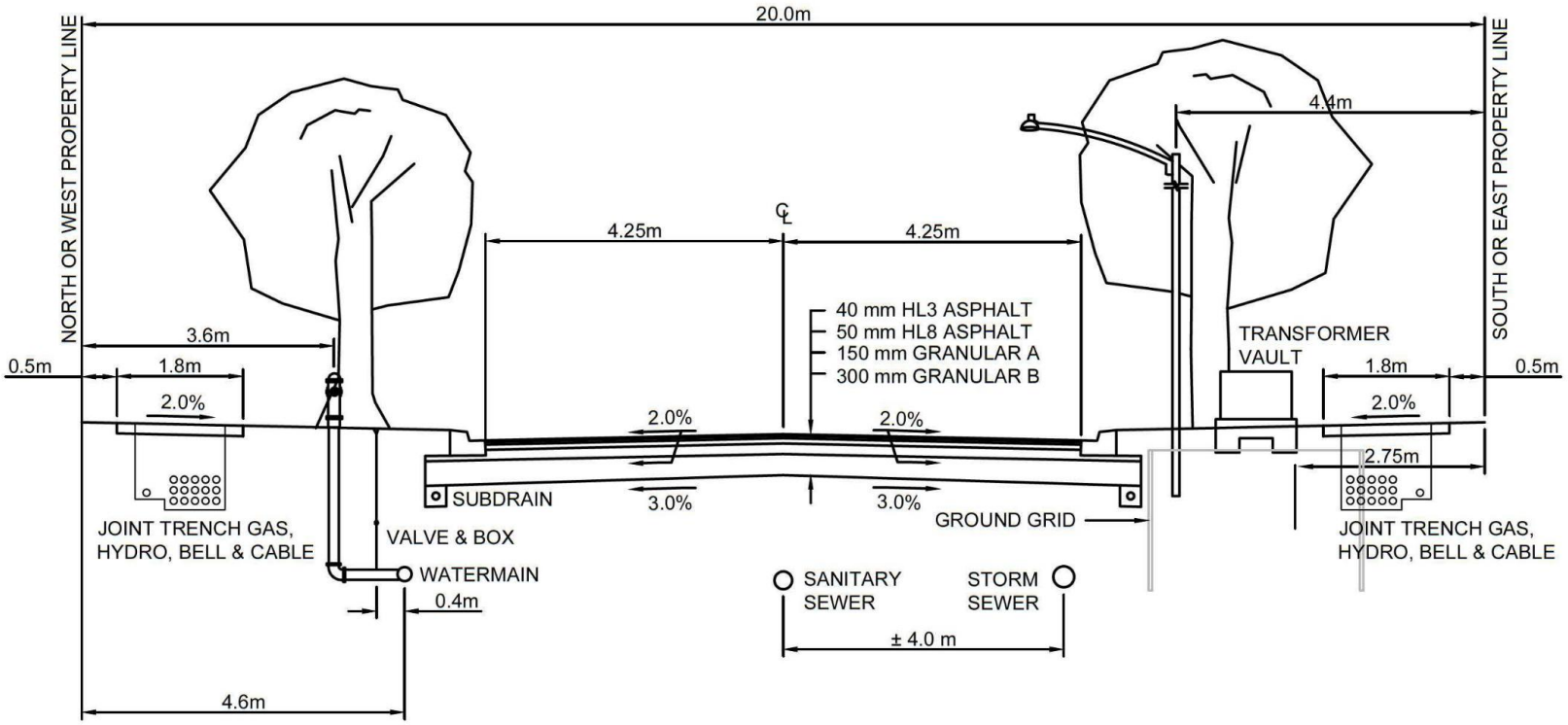
K) 100 mm DIAMETER PIPE SUBDRAINS SHALL BE PROVIDED AS PER STD. NO. 210 ON BOTH SIDES OF THE ROAD IN GRANULAR A TRENCH AND CONNECTED TO EACH CB OR CBMH.

L) SUBDRAINS TO BE PERFORATED OTHER THAN THE 2 m SECTION IMMEDIATELY UPSTREAM OF ALL STRUCTURES WHICH SHALL BE NON-PERFORATED.

DRAFT

COLLINGWOOD					**TOWN OF COLLINGWOOD**
	1.	VARIOUS REVISIONS		MAR/26	NOTES - ROADS
	No.	REVISION	APR'D	DATE	

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	N/A
STD. No.	126



NOTES

1. COVER ON STORM, SANITARY AND WATERMAIN AS PER DESIGN CRITERIA. JOINT UTILITY TRENCH SHALL HAVE A MINIMUM COVER OF 0.9 m.
2. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER TOWN DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
3. TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
4. ACTIVELY GROWING NURSERY SOD TO BE LAID ON 300 mm OF TOPSOIL PROPERLY GRADED AND ROLLED.
5. HYDRANTS AND WATERMAINS TO BE ON OPPOSITE SIDE OF ROAD FROM ELECTRICAL TRANSFORMER.
6. SUBDRAINS TO BE INSTALLED AS PER OPSD 216.021.
7. A CBMH STORM SEWER SYSTEM SHALL BE USED WHEREVER POSSIBLE TO LIMIT THE AMOUNT OF STRUCTURE LIDS IN THE WHEEL PATH OF VEHICLES.
8. ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWN WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
9. SIDEWALK SHOWN ON BOTH SIDES OF ROAD FOR SCHEMATIC PURPOSES ONLY. SIDEWALK TO BE ON ONE SIDE OF ROAD AS DISCUSSED WITH THE TOWN.
10. CONCRETE CURBS ARE PER OPSD 600.040, OPSD 600.070 OR TOWN STD. NO. 211.
11. CONCRETE SIDEWALKS ARE PER OPSD 310.010.
12. INSULATION SHALL BE PROVIDED WHERE WATERMAIN COVER IS LESS THAN 1.8 m.
13. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

DRAFT

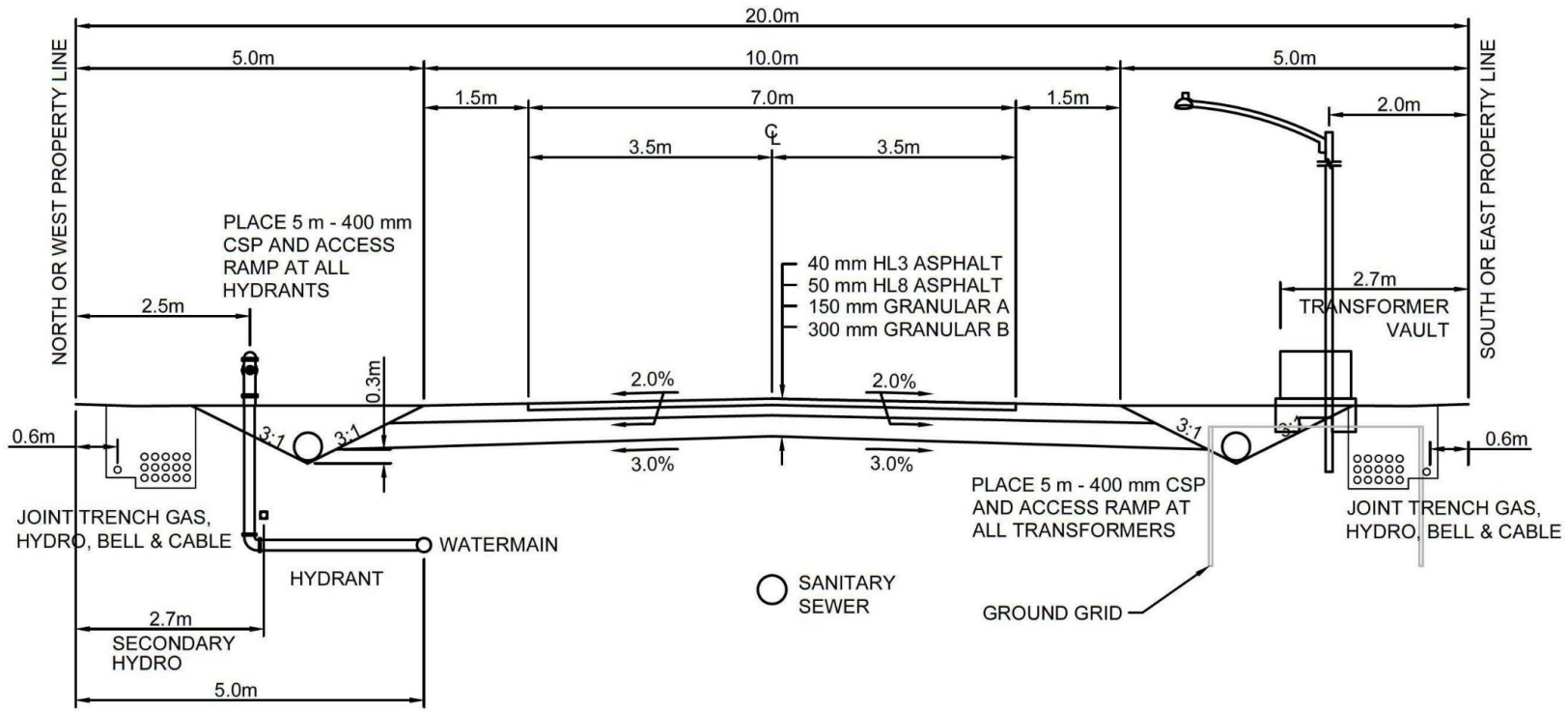
No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

URBAN - LOCAL RESIDENTIAL

20.0 m ROAD ALLOWANCE
8.5 m ASPHALT SURFACE

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 201	



NOTES

1. COVER ON STORM, SANITARY AND WATERMAIN AS PER DESIGN CRITERIA. JOINT UTILITY TRENCH SHALL HAVE A MINIMUM COVER OF 0.9 m.
2. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER TOWN DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
3. TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
4. ACTIVELY GROWING NURSERY SOD TO BE LAID ON 300 mm OF TOPSOIL PROPERLY GRADED AND ROLLED.
5. HYDRANTS AND WATERMAINS TO BE ON OPPOSITE SIDE OF ROAD FROM ELECTRICAL TRANSFORMER.
6. ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWN WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
7. INSULATION SHALL BE PROVIDED WHERE WATERMAIN COVER IS LESS THAN 1.8 m.
8. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

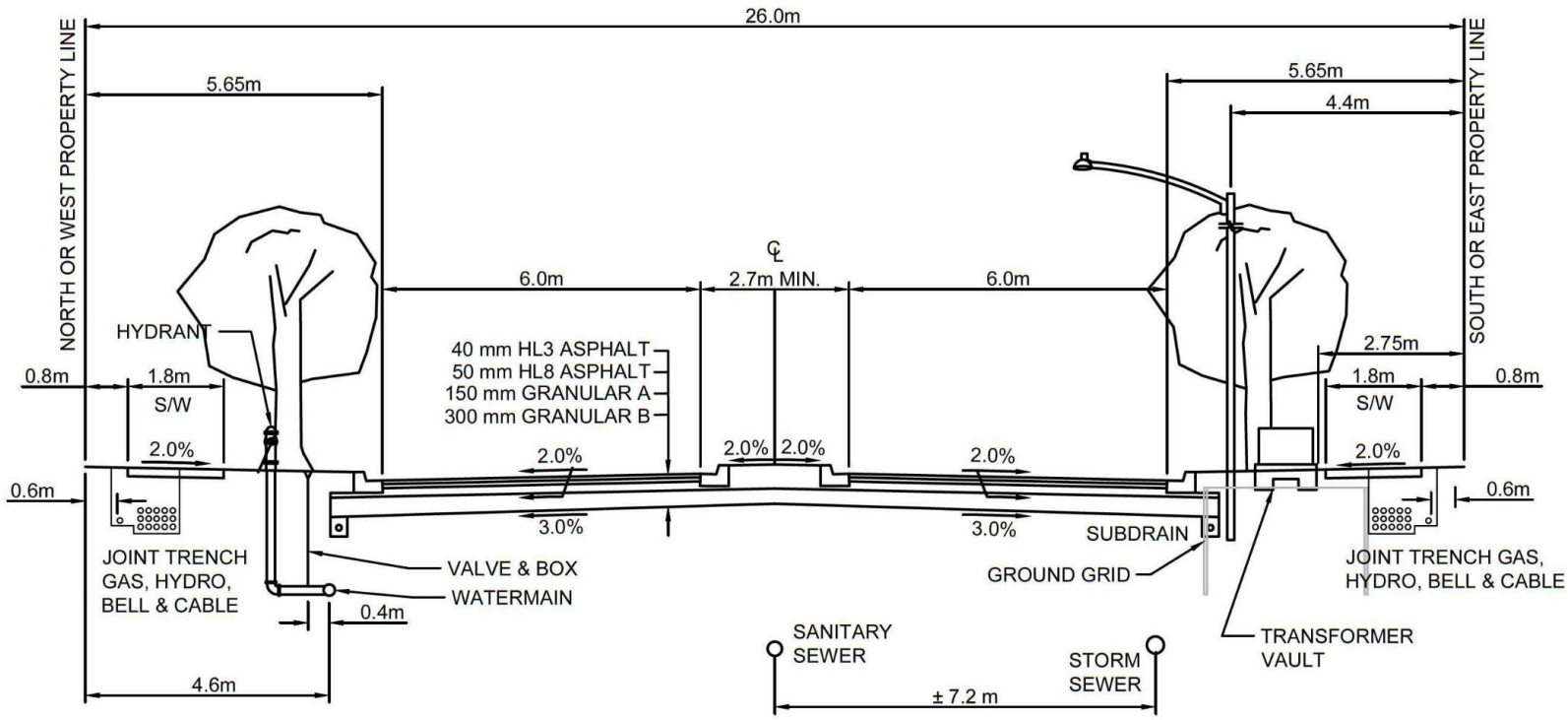
TOWN OF COLLINGWOOD

RURAL - LOCAL RESIDENTIAL

20.0 m ROAD ALLOWANCE

7.0 m ASPHALT SURFACE

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	202



NOTES

1. COVER ON STORM, SANITARY AND WATERMAIN AS PER DESIGN CRITERIA. JOINT UTILITY TRENCH SHALL HAVE A MINIMUM COVER OF 0.9 m.
2. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER TOWN DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
3. ISLANDS UTILIZE BARRIER CURBS AS PER OPSD 600.110 AND EDGE OF ROAD UTILIZE BARRIER CURBS AS PER OPSD 600.040.
4. TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
5. ACTIVELY GROWING NURSERY SOD TO BE LAID ON 300 mm OF TOPSOIL PROPERLY GRADED AND ROLLED.
6. HYDRANTS AND WATERMAINS TO BE ON OPPOSITE SIDE OF ROAD FROM ELECTRICAL TRANSFORMER.
7. SUBDRAINS TO BE INSTALLED AS PER OPSD 216.021.
8. A CBMH STORM SEWER SYSTEM SHALL BE USED WHEREVER POSSIBLE TO LIMIT THE AMOUNT OF STRUCTURE LIDS IN THE WHEEL PATH OF VEHICLES.
9. CONCRETE CURBS ARE PER OPSD 600.040.
10. CONCRETE SIDEWALKS ARE PER OPSD 310.010.
11. ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWN WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
12. NO ON-STREET PARKING SHALL BE PERMITTED WITH THIS CROSS SECTION.
13. INSULATION SHALL BE PROVIDED WHERE WATERMAIN COVER IS LESS THAN 1.8 m.
14. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
15. NO DRIVEWAY ACCESS WILL BE PERMITTED WHEN USING THIS STANDARD.

DRAFT

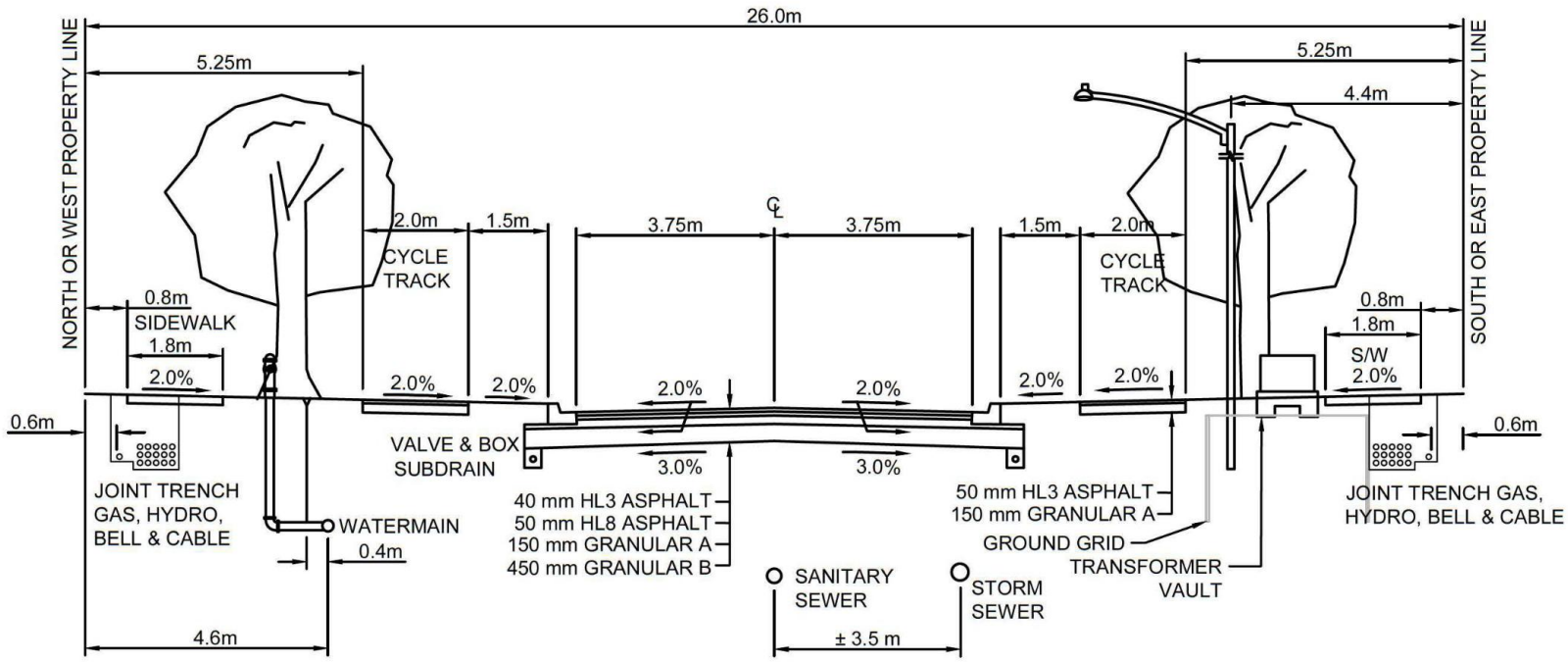
No.	REVISION	APR'D	DATE
2.	VARIOUS REVISIONS		MAR/26
1.	ASPHALT WIDTH	EDH	APR/07

TOWN OF COLLINGWOOD

URBAN - DIVIDED COLLECTOR ROAD

26.0 m ROAD ALLOWANCE
2 x 6.0 m ASPHALT SURFACE

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 203	



NOTES

1. COVER ON STORM, SANITARY AND WATERMAIN AS PER DESIGN CRITERIA. JOINT UTILITY TRENCH SHALL HAVE A MINIMUM COVER OF 0.9 m.
2. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER TOWN DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
3. TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
4. ACTIVELY GROWING NURSERY SOD TO BE LAID ON 300 mm OF TOPSOIL PROPERLY GRADED AND ROLLED.
5. HYDRANTS AND WATERMAINS TO BE ON OPPOSITE SIDE OF ROAD FROM ELECTRICAL TRANSFORMER.
6. SUBDRAINS TO BE INSTALLED AS PER OPSD 216.021.
7. A CBMH STORM SEWER SYSTEM SHALL BE USED WHEREVER POSSIBLE TO LIMIT THE AMOUNT OF STRUCTURE LIDS IN THE WHEEL PATH OF VEHICLES.
8. CONCRETE CURBS ARE PER OPSD 600.040, OPSD 600.070 OR TOWN STD. NO. 211.
9. CONCRETE SIDEWALKS ARE PER OPSD 310.010.
10. ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWN WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
11. NO ON-STREET PARKING SHALL BE PERMITTED WITH THIS CROSS SECTION.
12. INSULATION SHALL BE PROVIDED WHERE WATERMAIN COVER IS LESS THAN 1.8 m.
13. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

DRAFT

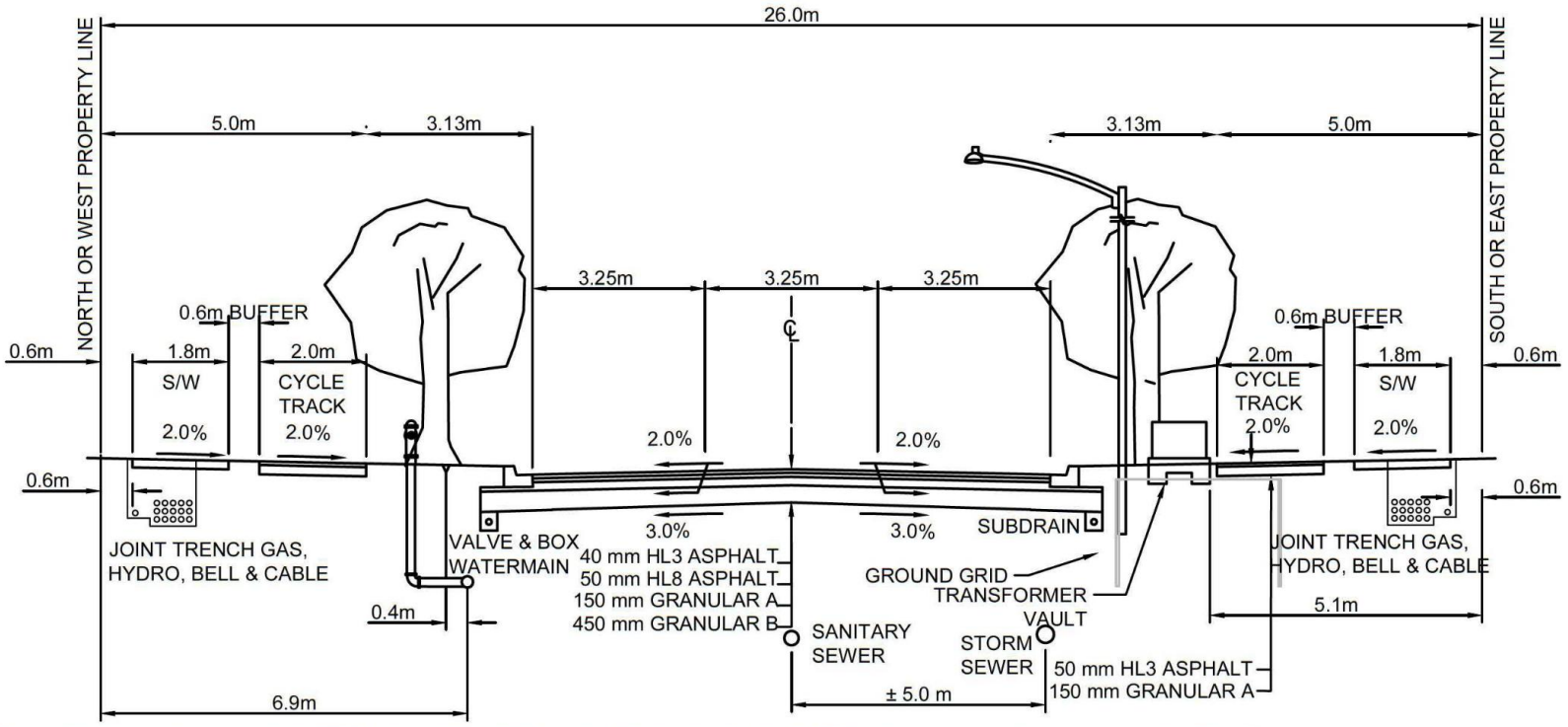
No.	REVISION	APR'D	DATE
2.	VARIOUS REVISIONS		MAR/26
1.	ASPHALT WIDTH	EDH	APR/07

TOWN OF COLLINGWOOD

URBAN - COLLECTOR

26.0 m ROAD ALLOWANCE
7.5 m ASPHALT SURFACE

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 204	



NOTES

1. COVER ON STORM, SANITARY AND WATERMAIN AS PER DESIGN CRITERIA. JOINT UTILITY TRENCH SHALL HAVE A MINIMUM COVER OF 0.9 m.
2. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER TOWN DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
3. TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
4. ACTIVELY GROWING NURSERY SOD TO BE LAID ON 300 mm OF TOPSOIL PROPERLY GRADED AND ROLLED.
5. HYDRANTS AND WATERMAINS TO BE ON OPPOSITE SIDE OF ROAD FROM ELECTRICAL TRANSFORMER.
6. SUBDRAINS TO BE INSTALLED AS PER OPSD 216.021.
7. A CBMH STORM SEWER SYSTEM SHALL BE USED WHEREVER POSSIBLE TO LIMIT THE AMOUNT OF STRUCTURE LIDS IN THE WHEEL PATH OF VEHICLES.
8. CONCRETE CURBS ARE PER OPSD 600.040, OPSD 600.070 OR TOWN STD. NO. 211.
9. CONCRETE SIDEWALKS ARE PER OPSD 310.010.
10. ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWN WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
11. NO ON-STREET PARKING SHALL BE PERMITTED WITH THIS CROSS SECTION.
12. INSULATION SHALL BE PROVIDED WHERE WATERMAIN COVER IS LESS THAN 1.8 m.
13. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

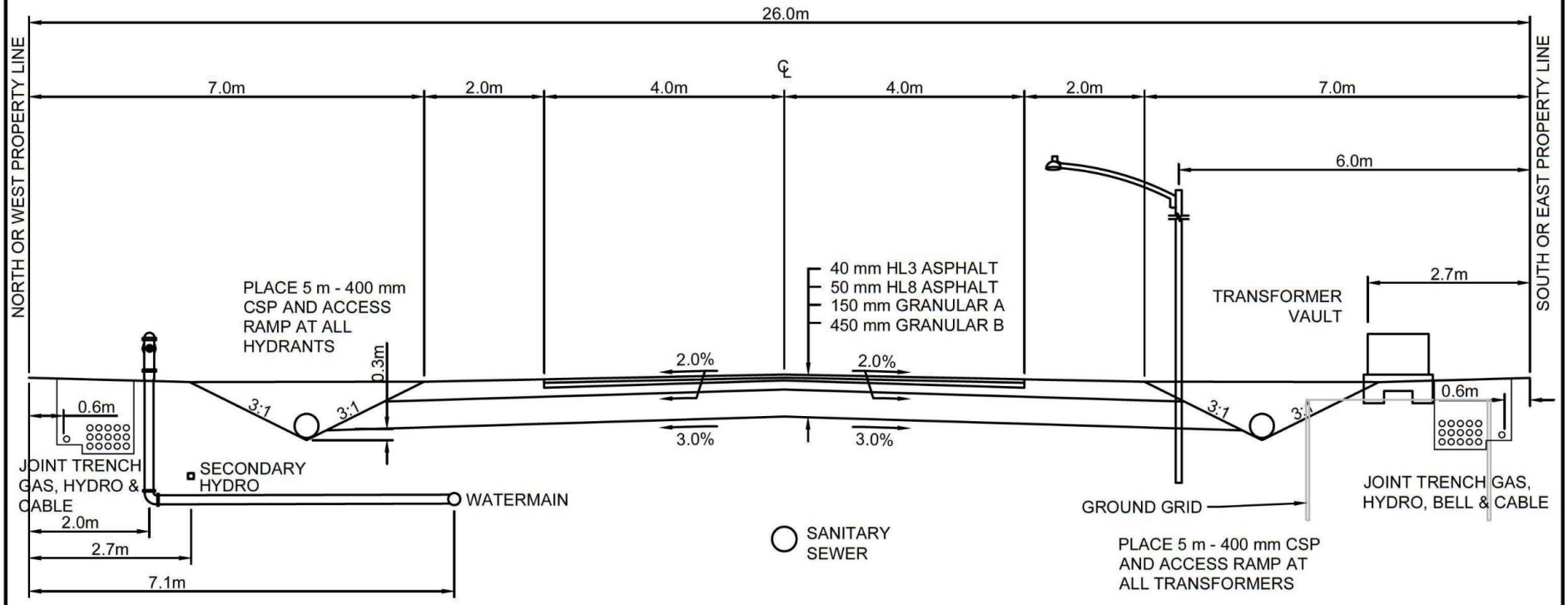
TOWN OF COLLINGWOOD

URBAN - COLLECTOR (CTL)

26.0 m ROAD ALLOWANCE

10.5 m ASPHALT SURFACE

DATE:	OCT/24
APR'D:	XXX
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 205	



NOTES

1. COVER ON STORM, SANITARY AND WATERMAIN AS PER DESIGN CRITERIA. JOINT UTILITY TRENCH SHALL HAVE A MINIMUM COVER OF 0.9 m.
2. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER TOWN DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
3. TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
4. ACTIVELY GROWING NURSERY SOD TO BE LAID ON 300 mm OF TOPSOIL PROPERLY GRADED AND ROLLED.
5. HYDRANTS AND WATERMAINS TO BE ON OPPOSITE SIDE OF ROAD FROM ELECTRICAL TRANSFORMER.
6. ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWN WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
7. INSULATION SHALL BE PROVIDED WHERE WATERMAIN COVER IS LESS THAN 1.8 m.
8. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

DRAFT

No.	REVISION	APR'D	DATE
3.	VARIOUS REVISIONS		MAR/26
2.	UTILITY POLE DISTANCE FROM ℄	EDH	JAN/07
1.	ASPHALT & GRANULAR THICKNESS	EDH	JUN/05

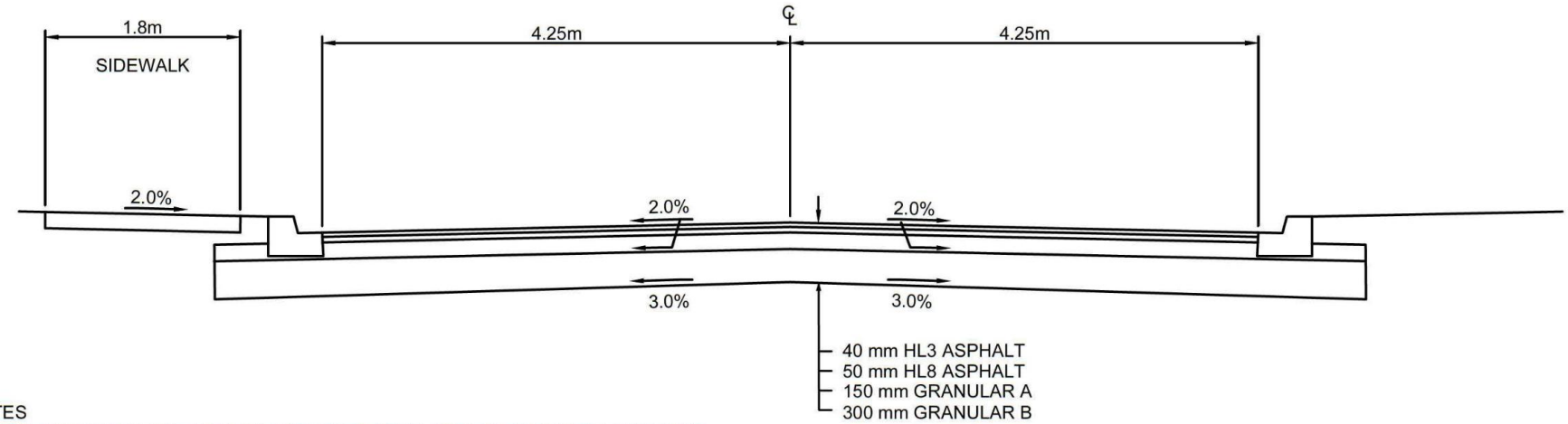
TOWN OF COLLINGWOOD

LOCAL INDUSTRIAL

26.0 m ROAD ALLOWANCE

8.0 m ASPHALT SURFACE

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	206



NOTES

1. THE SIDEWALK AND ASPHALT WIDTHS SHOWN ARE THE REQUIRED MINIMUMS.
2. BOULEVARD FEATURES HAVE BEEN INTENTIONALLY OMITTED.
3. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER TOWN DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION. ROAD SHALL BE DESIGNED TO SUPPORT THE EXPECTED LOADS IMPOSED BY FIREFIGHTING EQUIPMENT AND BE SURFACED WITH ASPHALT, CONCRETE OR OTHER MATERIAL DESIGNED TO PERMIT ACCESSIBILITY UNDER ALL CLIMATIC CONDITIONS.
4. CONCRETE SIDEWALKS AS PER OPSD 310.010.
5. CENTRELINE RADIUS SHALL NOT BE LESS THAN 12 m.
6. OVERHEAD CLEARANCE SHALL NOT BE LESS THAN 5 m.
7. ROAD GRADE SHALL NOT BE GREATER THAN 8% OVER A MINIMUM DISTANCE OF 15 m.
8. TURNAROUND FACILITIES SHALL BE PROVIDED FOR ANY DEAD END PORTION OF THE ROAD GREATER THAN 90 m LONG.
9. ROAD SHALL BE CONNECTED TO A PUBLIC THOROUGHFARE.
10. DIMENSIONS AND LAYOUT SHOWN FOR INFORMATIONAL PURPOSES ONLY. CURB TYPE AND DRAINAGE INFRASTRUCTURE WOULD BE IN ADDITION TO THE LAYOUT SHOWN. PRIVATE CONDOMINIUM DEVELOPMENTS ARE ENCOURAGED TO REVIEW ONTARIO BUILDING CODE AND AODA ACCESSIBILITY STANDARDS FOR FURTHER DETAILS.
11. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		JUN/26

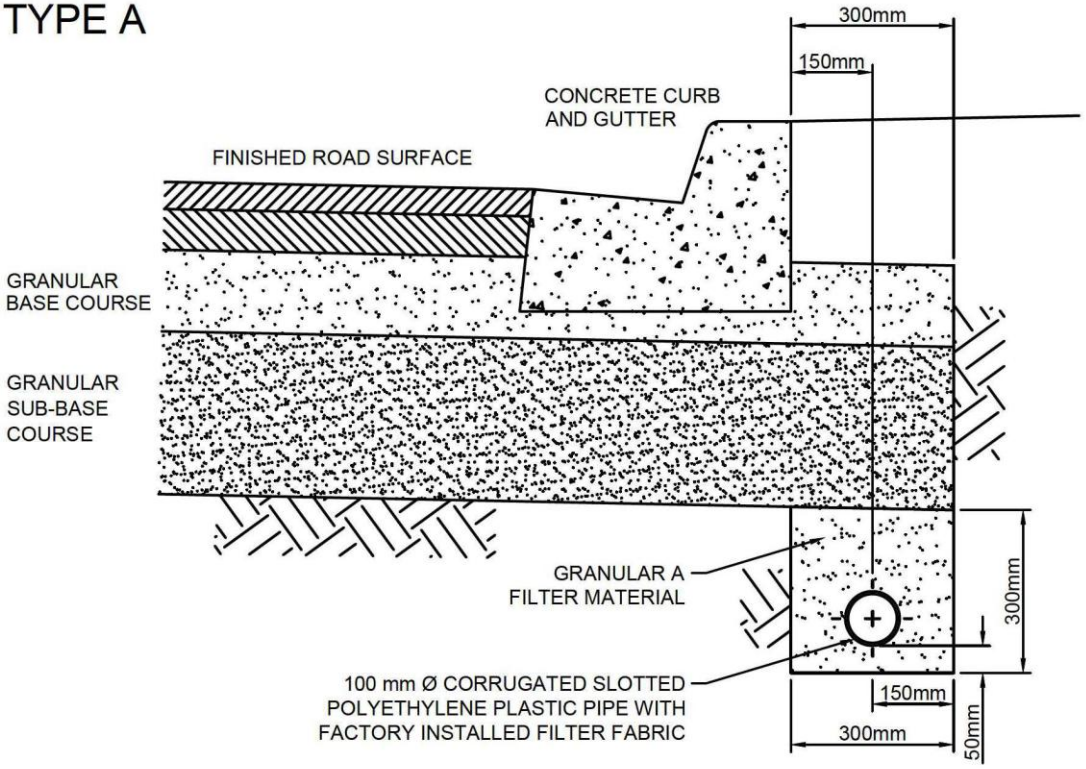
TOWN OF COLLINGWOOD

URBAN - CONDOMINIUM ROAD

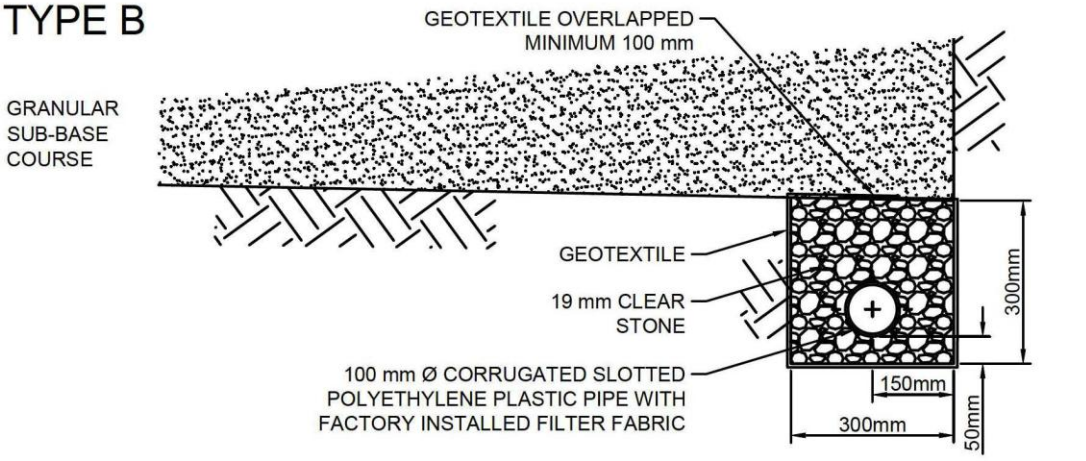
8.5 m ASPHALT SURFACE

DATE:	OCT/24
APR'D:	XXX
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	207

TYPE A



TYPE B



NOTES
1. ALL CONNECTIONS TO BE MADE ON THE UPSTREAM SIDE OF ALL CATCH BASINS MORTARED INSIDE AND OUTSIDE.
2. SUBDRAINS TO BE PLUGGED AT THE HIGH END WITH A MANUFACTURED PLUG.
3. TYPE B: THE SUBDRAIN TRENCH SHALL BE LINED WITH CLASS II, NON-WOVEN GEOTEXTILE WITH AN F.O.S. OF 75-150 um AND A MINIMUM THICKNESS OF 1 mm.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

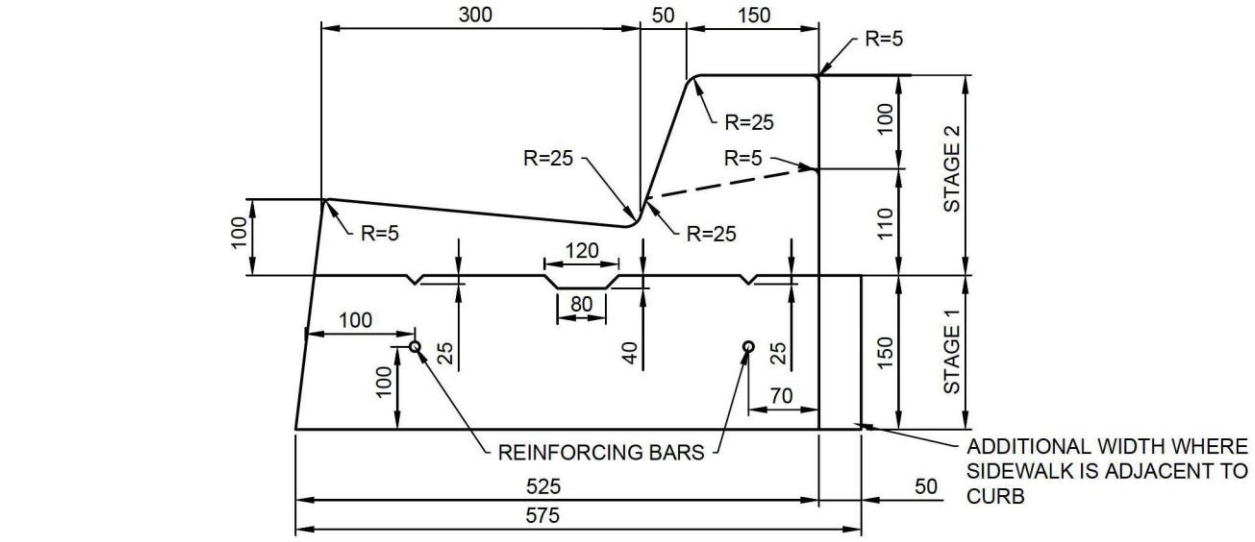
1.	VARIOUS REVISIONS		MAR/26
No.	REVISION	APR'D	DATE

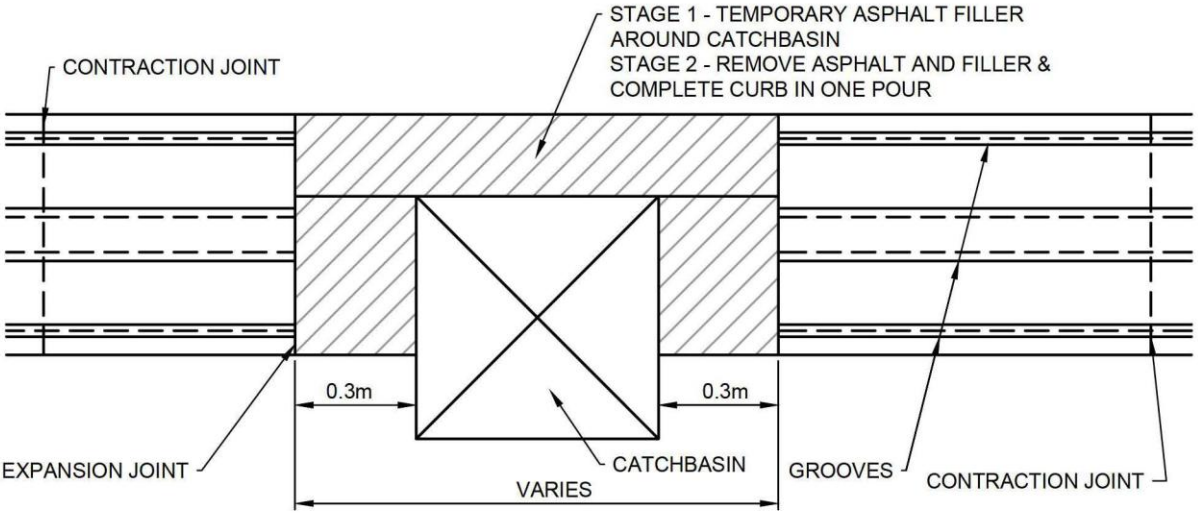
DRAFT

TOWN OF COLLINGWOOD

SUBDRAIN DETAIL

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 210	





NOTES

1. FIRST STAGE CURB TO BE A CONTINUOUS POUR. CONSTRUCTION JOINTS TO BE SAWCUT EVERY 3.0 m IN SECOND STAGE ONLY.
2. CURING:
   STAGE 1 - WATER AND BURLAP ONLY (CURING COMPOUND NOT PERMITTED)
   STAGE 2 - CURING COMPOUND
3. STAGE 1 TO BE THOROUGHLY CLEANED AND WET PRIOR TO STAGE 2 INSTALLATION.
4. GRATE TO BE SET TO THE ELEVATION OF STAGE 1, & READJUSTED FOR STAGE 2
5. ALL REINFORCING TO HAVE 50 mm COVER.
6. STAGE ONE CONCRETE TO BE 32 MPa COMPRESSIVE STRENGTH AT 28 DAYS WITH 7.0 ± 1.5 % AIR ENTRAINMENT, CEMENT RATIO SHALL BE 355 kg/m, STAGE TWO CURB AND GUTTER CONCRETE TO BE 32 MPa COMPRESSIVE STRENGTH AT 28 DAYS WITH 7.0 ± 1.5 % AIR ENTRAINMENT, CEMENT RATIO SHALL BE 325 kg/m.
7. REFER TO OPSS.MUNI 353.
8. REINFORCING BAR IN BASE IS 15M ON STRAIGHT AND 10M ON CURVES.
9. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.

No.	REVISION	APR'D	DATE

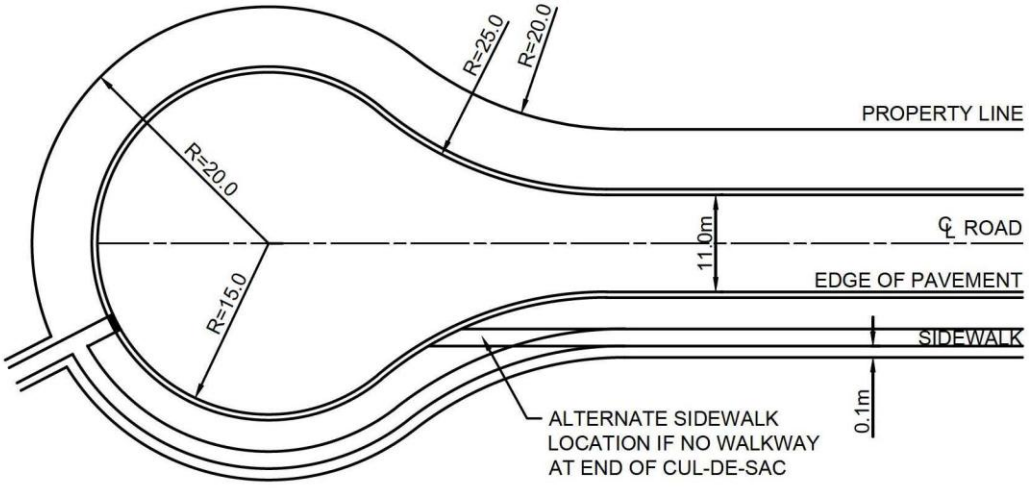
DRAFT

TOWN OF COLLINGWOOD

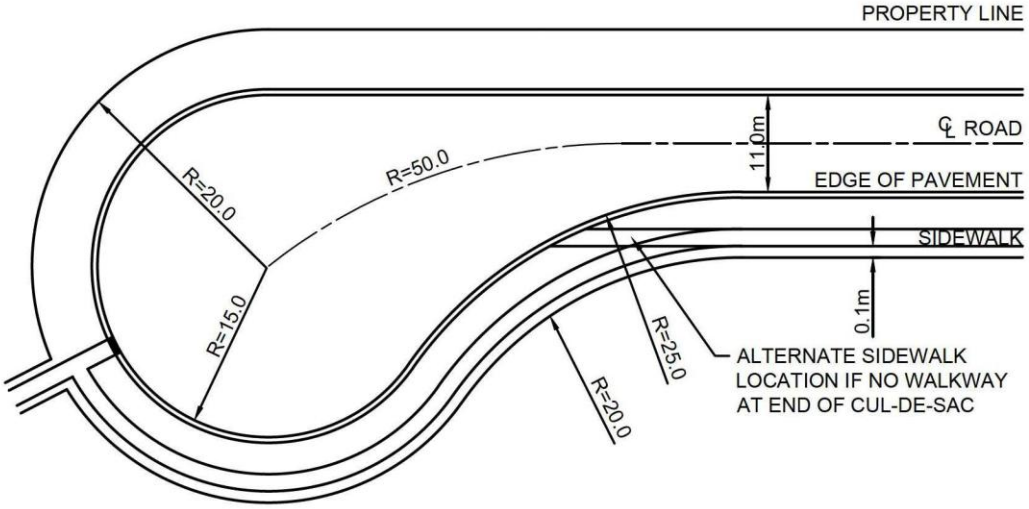
TWO-STAGE CURB AND GUTTER

DATE:	MAY/26
APR'D:	XXX
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 211	

TYPE A



TYPE B



NOTES
1. MINIMUM GUTTER GRADE 1%.
2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

2.	VARIOUS REVISIONS		MAR/26
1.	MINIMUM GUTTER GRADE		OCT/24
No.	REVISION	APR'D	DATE

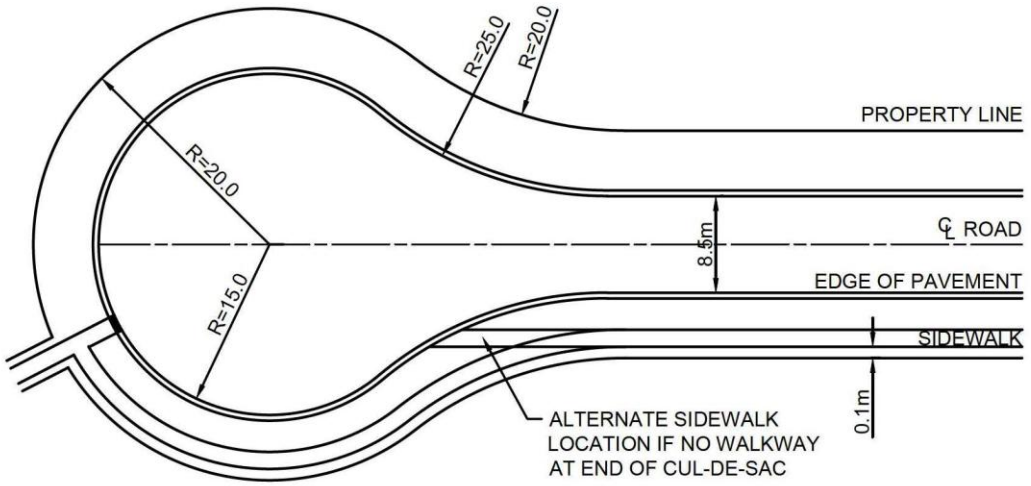
DRAFT

TOWN OF COLLINGWOOD

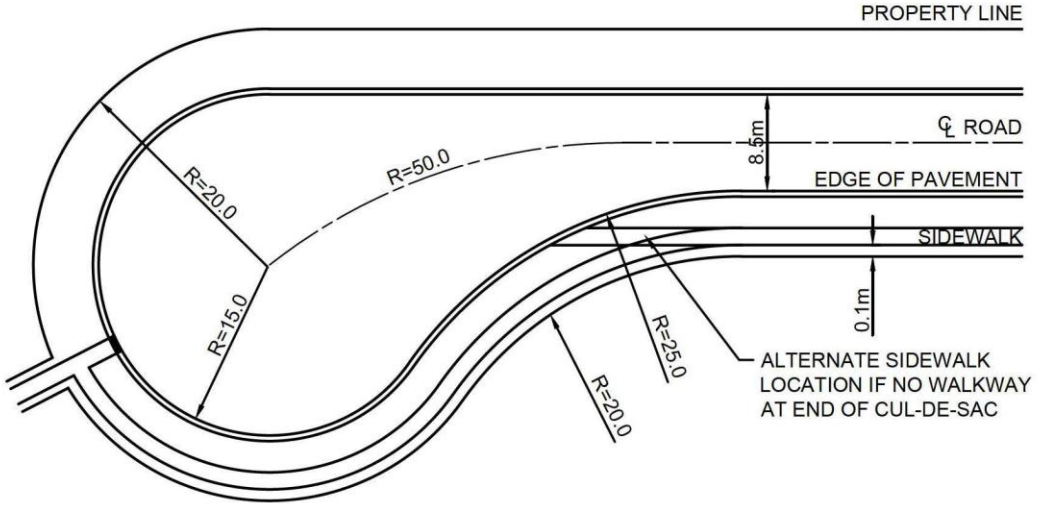
INDUSTRIAL CUL-DE-SAC

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 220	

TYPE A



TYPE B



NOTES
1. CURB ISLAND TO BE LANDSCAPED PER APPROVED PLAN.
2. MINIMUM GUTTER GRADE 1%.
3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

2.	VARIOUS REVISIONS		MAR/26
1.	MINIMUM GUTTER GRADE		OCT/24
No.	REVISION	APR'D	DATE

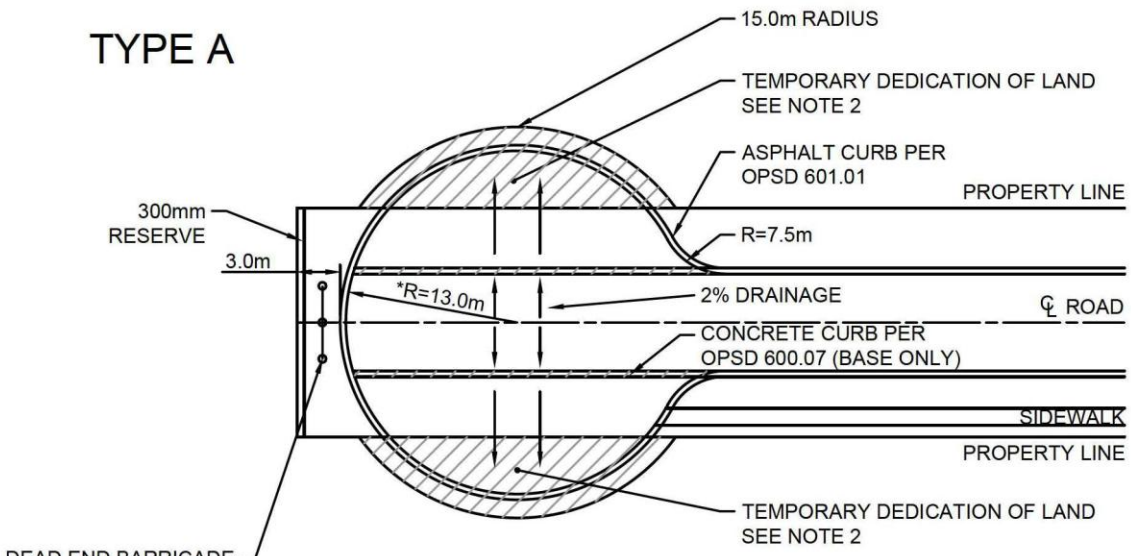
DRAFT

TOWN OF COLLINGWOOD

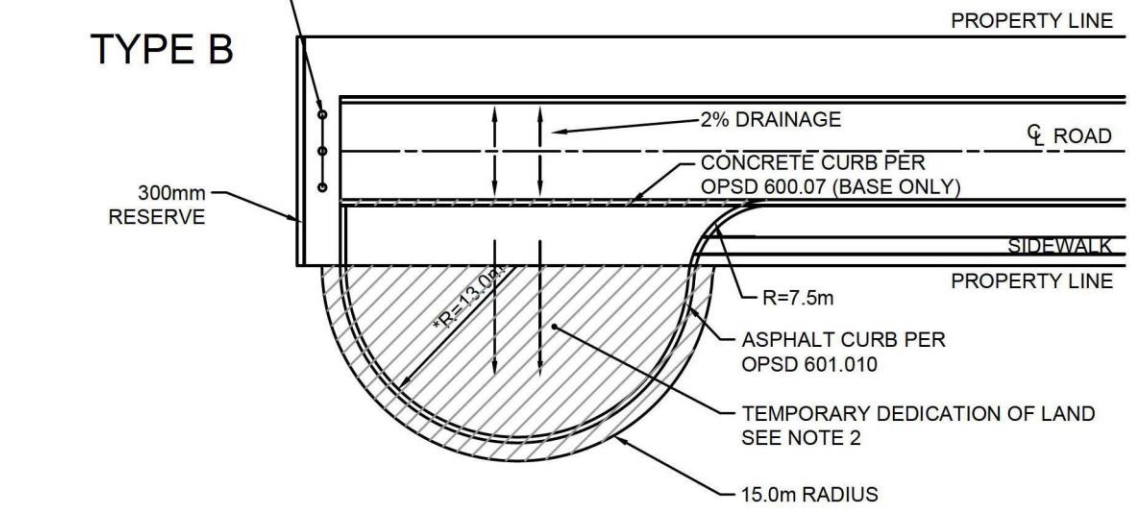
RESIDENTIAL CUL-DE-SAC

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 221	

TYPE A



TYPE B



NOTES
1. DEAD END BARRICADE PER OPSD 906.01 COMPLETE WITH ADDITIONAL 500mm X 500mm BLACK ON WHITE SIGN NOTING '- TEMPORARY ONLY - LOCATION OF FUTURE ROAD'.
2. TEMPORARY LAND DEDICATION VIA. BLOCK ON PLAN.
3. *IF SCHOOL BUS SERVICE IS REQUIRED THE MINIMUM RADIUS SHALL BE 14.5m.
4. MINIMUM GUTTER GRADE 1%.
5. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

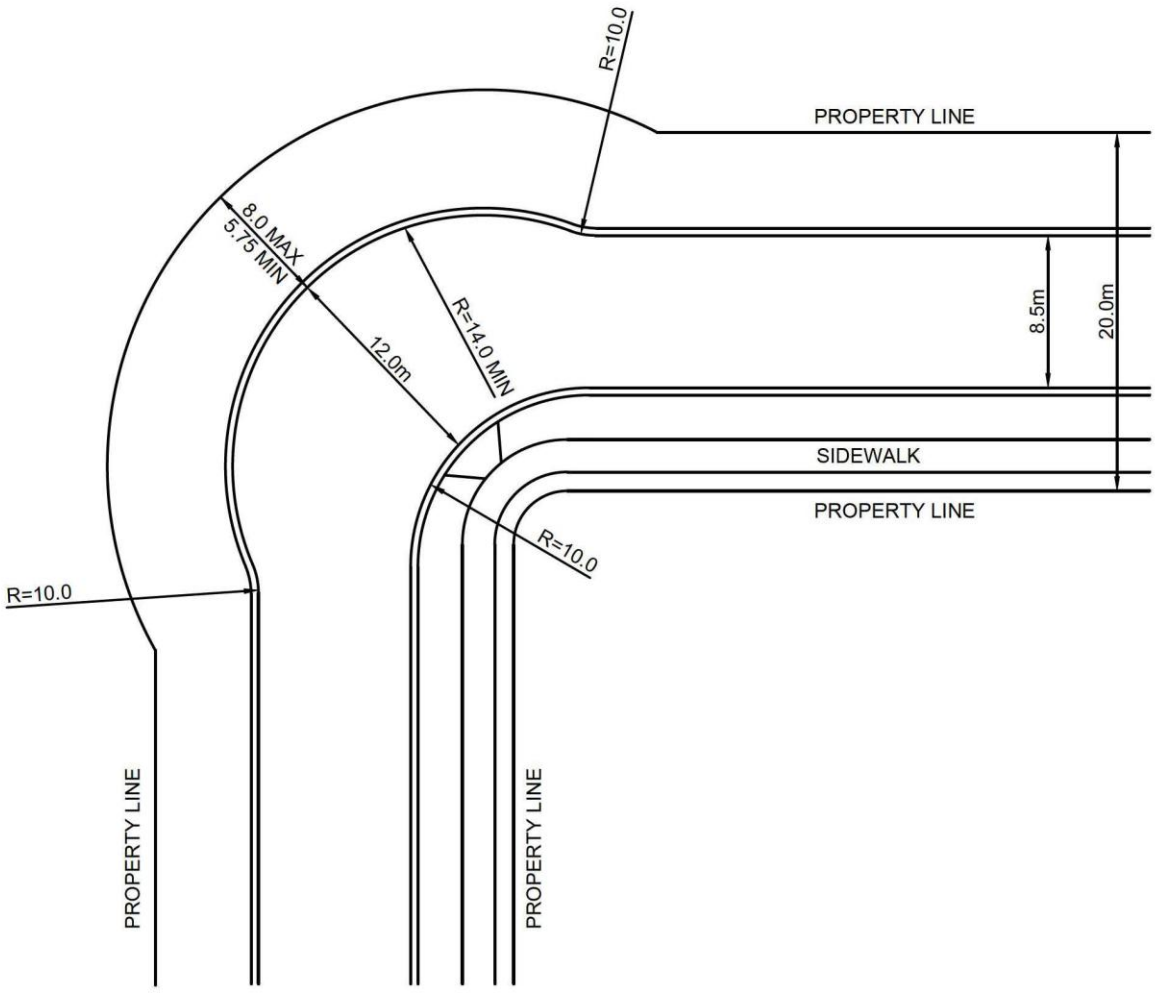
2.	VARIOUS REVISIONS		MAR/26
1.	MINIMUM GUTTER GRADE		OCT/24
No.	REVISION	APR'D	DATE

DRAFT

TOWN OF COLLINGWOOD

TEMPORARY CUL-DE-SAC

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 223	



NOTES
1. ADJACENT DRIVEWAYS SHALL NOT INTERSECT ALTHOUGH DOUBLE ENTRANCES MAY BE ALLOWED AT THE CURB.
2. IF SIDEWALK IS REQUIRED, IT IS TO FOLLOW THE PROPERTY LINE WITH 1.0 m OFFSET.
3. MINIMUM GUTTER GRADE 1%.
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

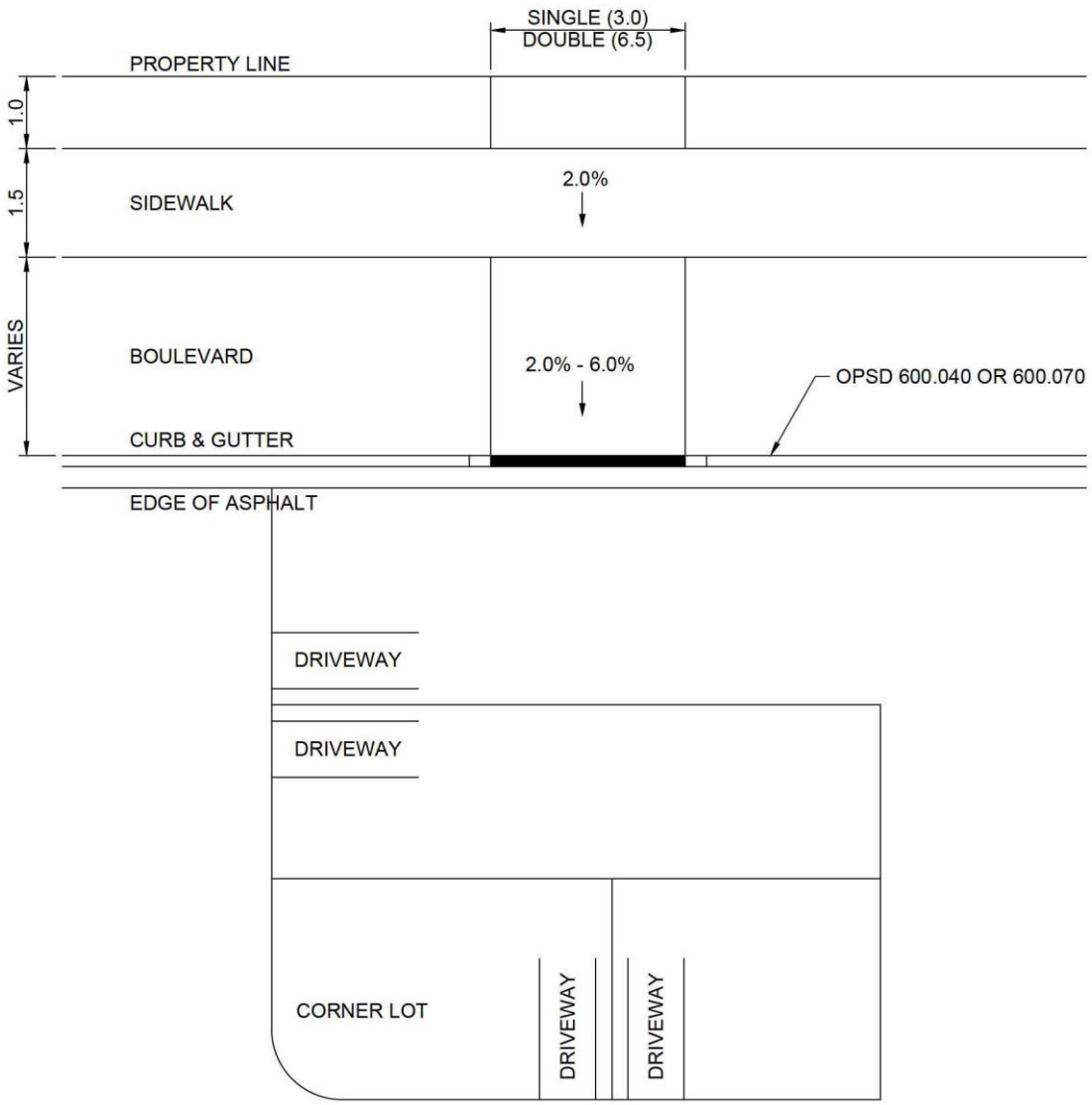
1.	VARIOUS REVISIONS		MAR/26
No.	REVISION	APR'D	DATE

DRAFT

TOWN OF COLLINGWOOD

ROAD ELBOW

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 224	



CORNER LOT LOCATIONS

NOTES
1. CROSSFALL OF SIDEWALK 2% UNLESS OTHERWISE APPROVED.
2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

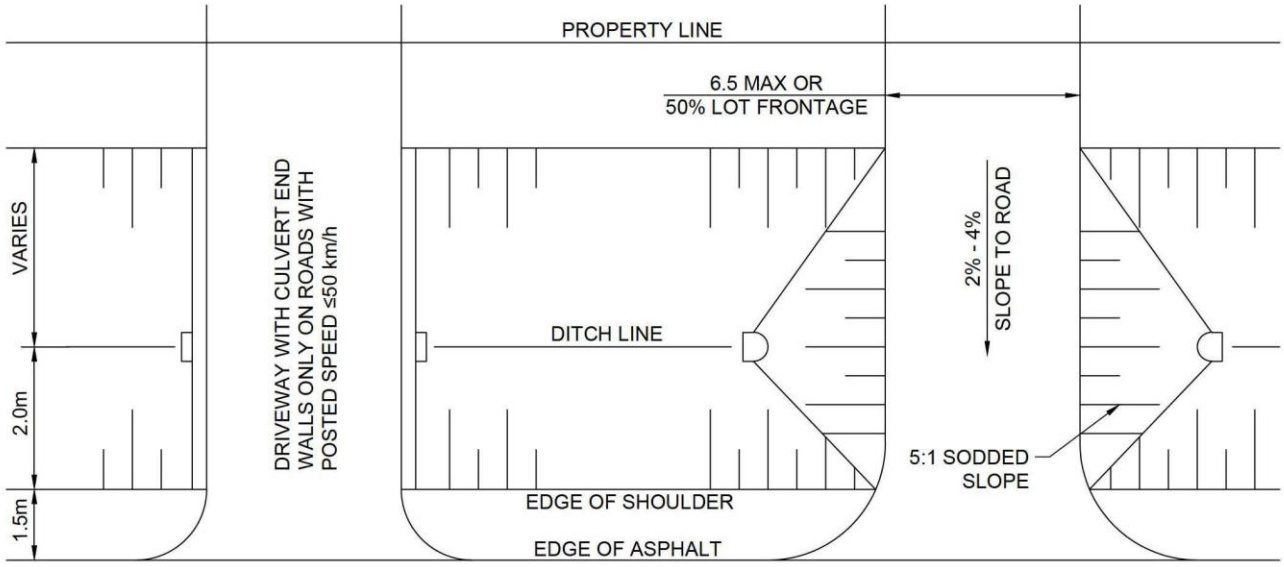
2.	VARIOUS REVISIONS		MAR/26
1.	DRIVEWAY WIDTH		DEC/24
No.	REVISION	APR'D	DATE

DRAFT

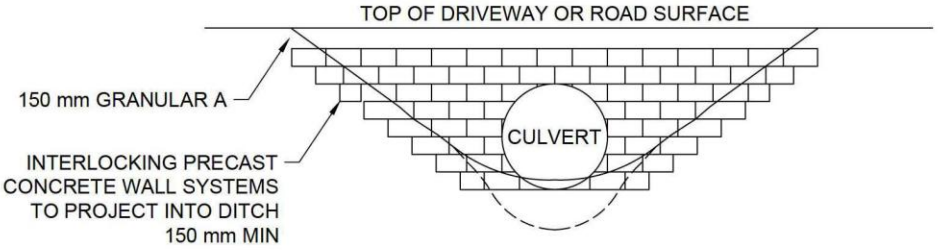
TOWN OF COLLINGWOOD

RESIDENTIAL DRIVEWAY
ENTRANCE DETAIL

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 230	



PLAN



ELEVATION

NOTES
1. DRIVEWAY CONSTRUCTED OF FROST TAPER PER OPSD 803.030 OR OPSD 803.031 AS APPLICABLE, GRANULAR A CULVERT EMBEDMENT.
2. DRIVEWAY SURFACE SHALL BE 50 mm HL3A OVER 150 mm GRANULAR A FROM STREET TO PROPERTY LINE.
3. CULVERT SHALL BE HDPE POLYPROPYLENE OR CSP 2.0 mm THICKNESS.
4. CULVERT END WALL SHALL NOT PROJECT ABOVE EDGE OF SHOULDER.
5. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

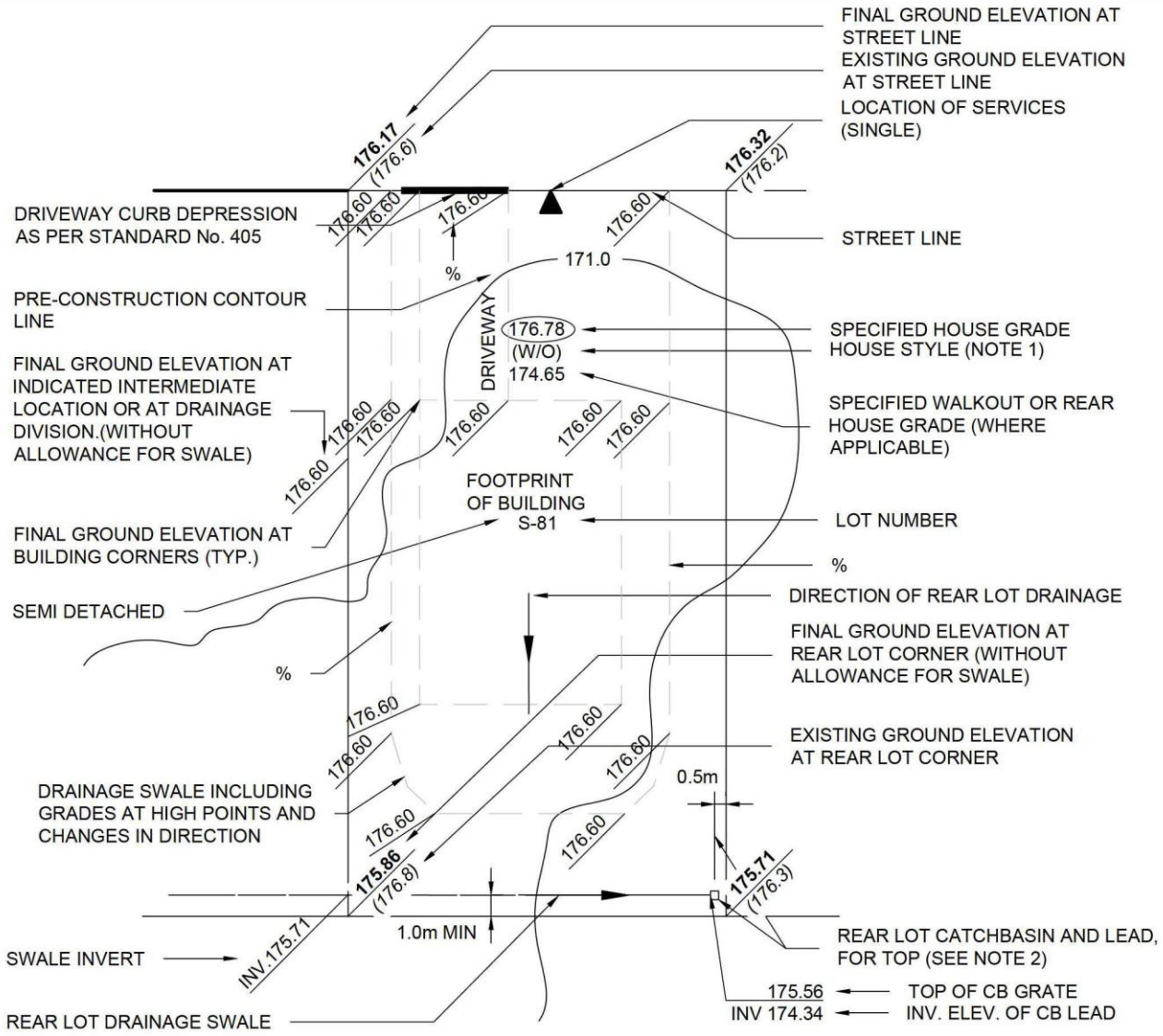
1.	VARIOUS REVISIONS		MAR/26
No.	REVISION	APR'D	DATE

DRAFT

TOWN OF COLLINGWOOD

RURAL DRIVEWAY ENTRANCE WITH CULVERT DETAIL

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 231	



NOTES

1. WHERE HOUSE STYLE IS RESTRICTED TO MEET THE LOT GRADING REQUIREMENTS, THE ACCEPTED HOUSE STYLES ARE TO BE INDICATED;
   W/O - REAR WALKOUT BASEMENT TYPE
   F/W FRONT WALKOUT BASEMENT TYPE
   BS - BACK SPLIT
   FS - FRONT SPLIT
   SS - SIDE SPLIT
2. FOR RESIDENTIAL LOTS USE BIRDCAGE GRATE PER OPSD 400.120.
3. THE HEALTH UNIT, CONSERVATION AUTHORITY AND/OR OTHER AGENCIES MAY HAVE ADDITIONAL REQUIREMENTS FOR THE GRADING PLAN SPECIFIC TO EACH SITE.
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

1.	VARIOUS REVISIONS		MAR/26
No.	REVISION	APR'D	DATE

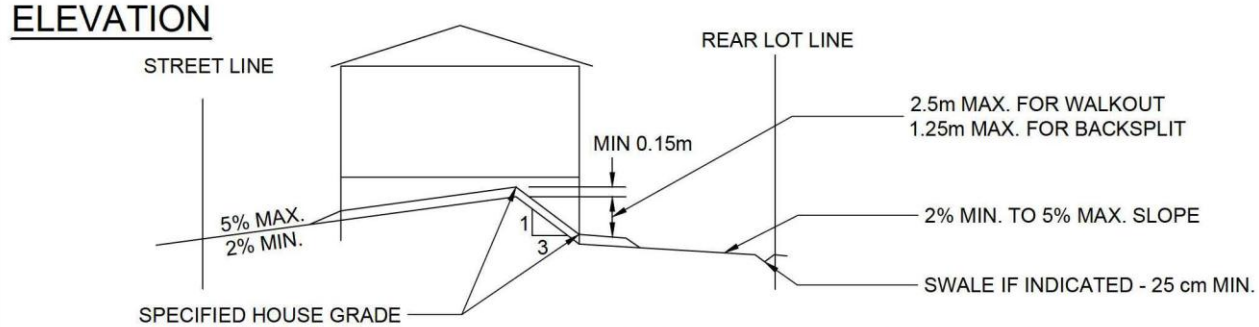
DRAFT

TOWN OF COLLINGWOOD

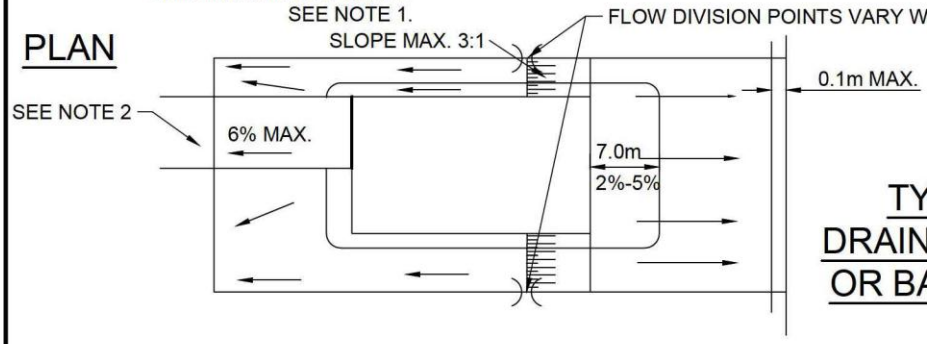
MINIMUM REQUIREMENTS FOR LOT GRADING PLANS

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 301	

ELEVATION



PLAN



TYPICAL SPLIT LOT DRAINAGE WALKOUT (WO) OR BACK SPLIT (BS) TYPE

NOTES
1. SPECIFIED HOUSE GRADE REFERS TO GROUND ELEVATION OPPOSITE FLOW DIVISION. POINTS MIN. 0.15 m FROM HIGHEST SPLIT POINT ELEVATION.
2. DRIVEWAY LOCATION CAN VARY WITH HOUSE TYPE AND ROAD GRADE.
3. SIDE SWALE TO BE LOCATED AT THE PROPERTY LINE.

1.	VARIOUS REVISIONS		MAR/26
No.	REVISION	APR'D	DATE

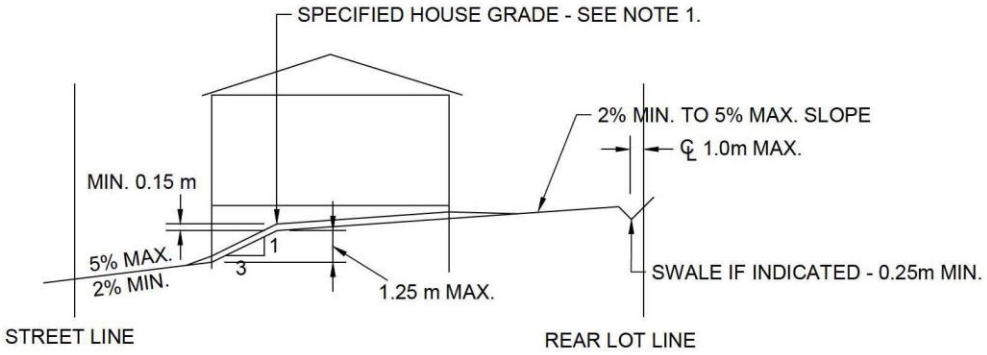
DRAFT

TOWN OF COLLINGWOOD

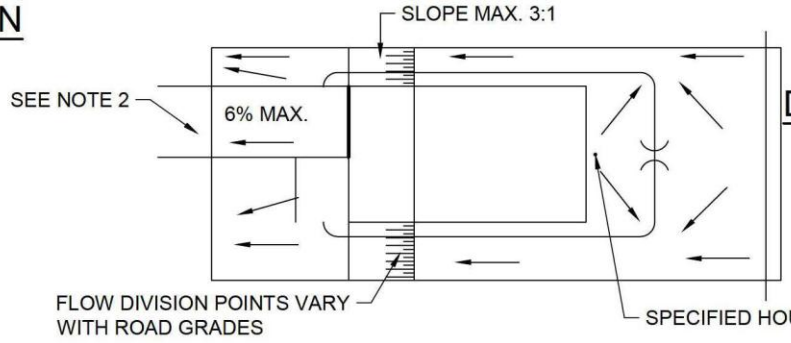
LOT DRAINAGE AND GRADING
WALKOUT AND BACK SPLIT LOTS

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	302

ELEVATION



PLAN



TYPICAL SPLIT LOT DRAINAGE FRONT SPLIT TYPE (FS)

NOTES
1. SPECIFIED HOUSE GRADE REFERS TO GROUND ELEVATION OPPOSITE FLOW DIVISION. POINTS MIN. 0.15 m FROM HIGHEST SPLIT POINT ELEVATION.
2. DRIVEWAY LOCATION CAN VARY WITH HOUSE TYPE AND ROAD GRADE.
3. SIDE SWALE TO BE LOCATED AT THE PROPERTY LINE.

	VARIOUS REVISIONS		MAR/26
No.	REVISION	APR'D	DATE

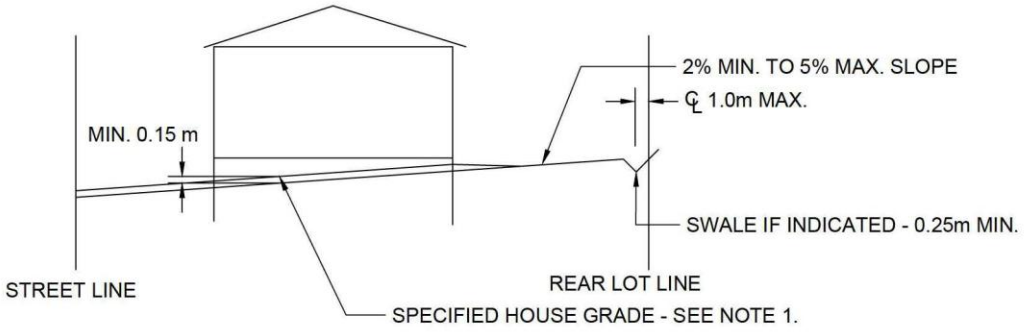
DRAFT

TOWN OF COLLINGWOOD

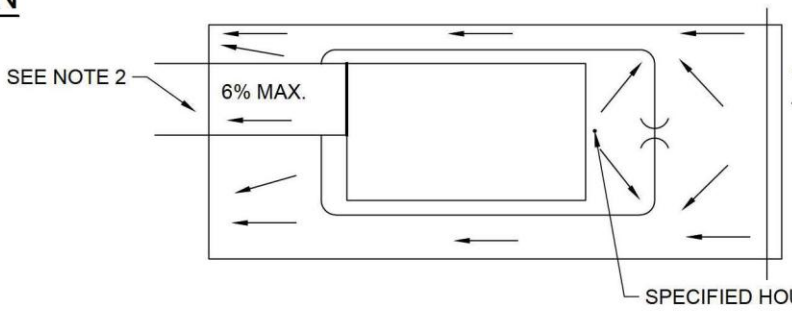
LOT DRAINAGE AND GRADING
FRONT SPLIT LOTS

DATE:	MAR/26
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 303	

ELEVATION



PLAN



TYPICAL LOT DRAINAGE REAR TO FRONT TYPE

NOTES
1. SPECIFIED HOUSE GRADE REFERS TO GROUND ELEVATION OPPOSITE FLOW DIVISION. POINTS MIN. 0.15 m FROM HIGHEST SPLIT POINT ELEVATION.
2. DRIVEWAY LOCATION CAN VARY WITH HOUSE TYPE AND ROAD GRADE.
3. SIDE SWALE TO BE LOCATED AT THE PROPERTY LINE.

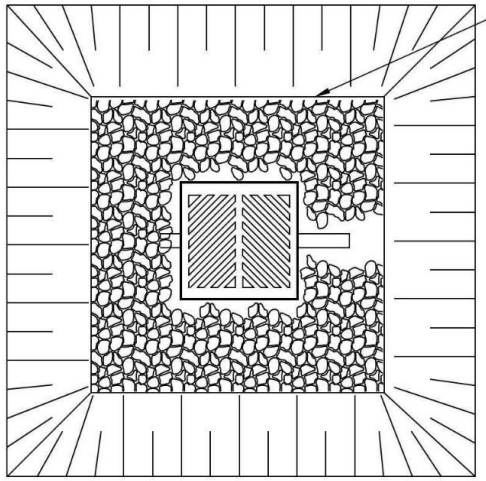
No.	REVISION	APR'D	DATE

DRAFT

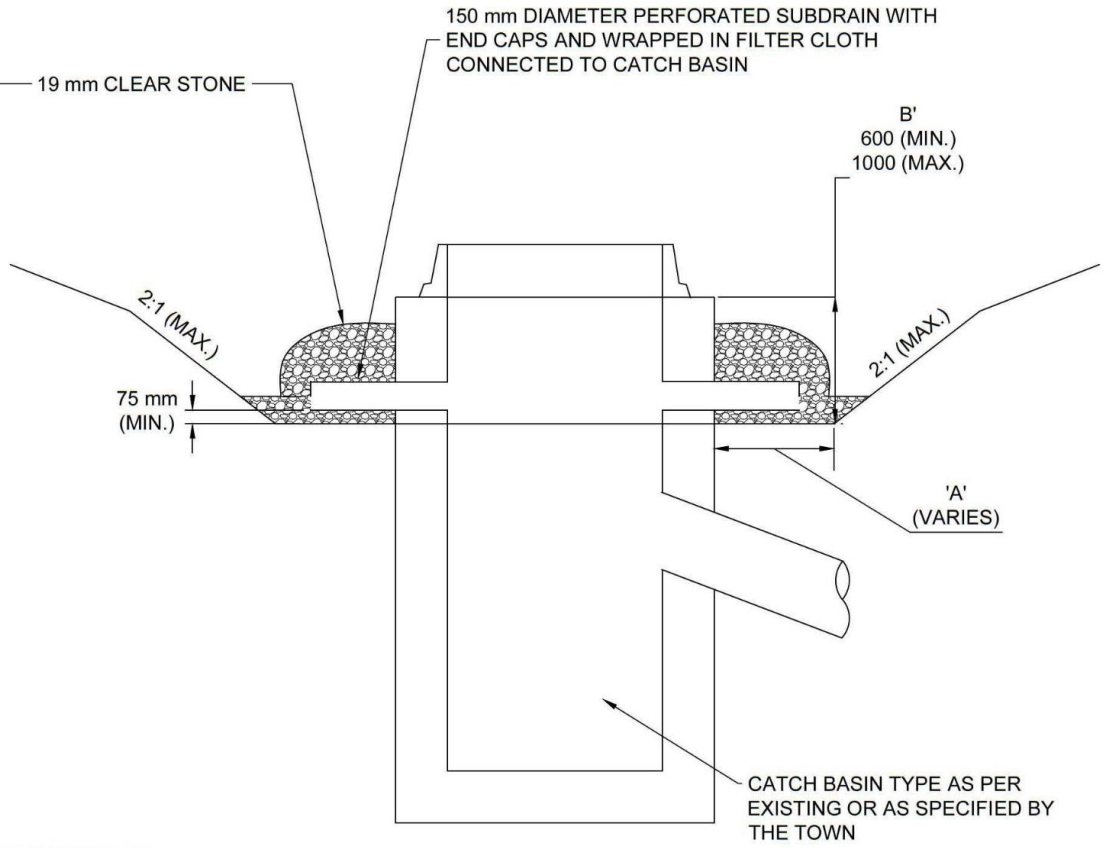
TOWN OF COLLINGWOOD

LOT DRAINAGE AND GRADING
REAR TO FRONT LOTS

DATE:	MAR/26
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	304



PLAN



SECTION A-A

NOTES

1. VOLUME OF SEDIMENT TRAP TO BE 125 m³ PER HECTARE OF DRAINAGE. DEPTH TO BE CALCULATED FROM TOP OF CATCH BASIN TO BOTTOM OF TRAP (DIMENSION 'B')
2. MINIMUM DEPTH FROM TOP OF CATCH BASIN TO BOTTOM OF TRAP SHALL BE 600 mm, MAXIMUM DEPTH SHALL BE 1000 mm.
3. SEDIMENT TRAP TO BE CLEANED AS DEEMED NECESSARY BUT AS A MINIMUM WHEN THE DEPTH FROM UNDERSIDE OF FRAME TO TOP OF SILT IS REDUCED TO 300 mm.
4. UPON REMOVAL OF TRAP, CATCH BASIN CONNECTION HOLES TO BE PARGED WITH CONCRETE.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

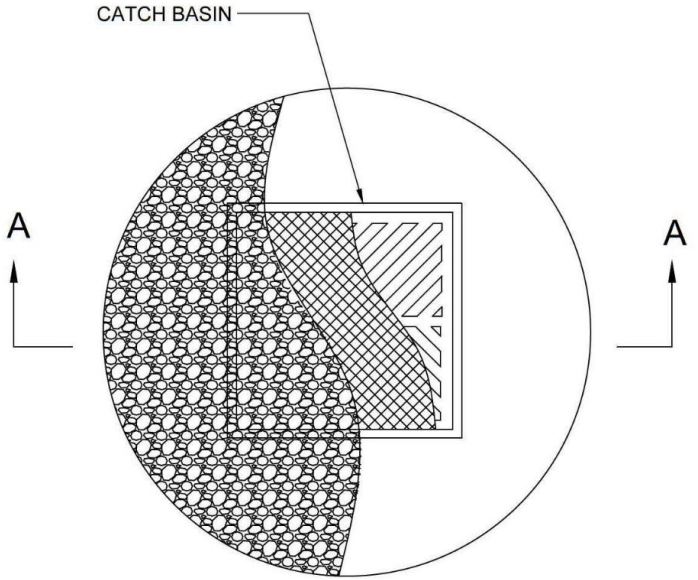
DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

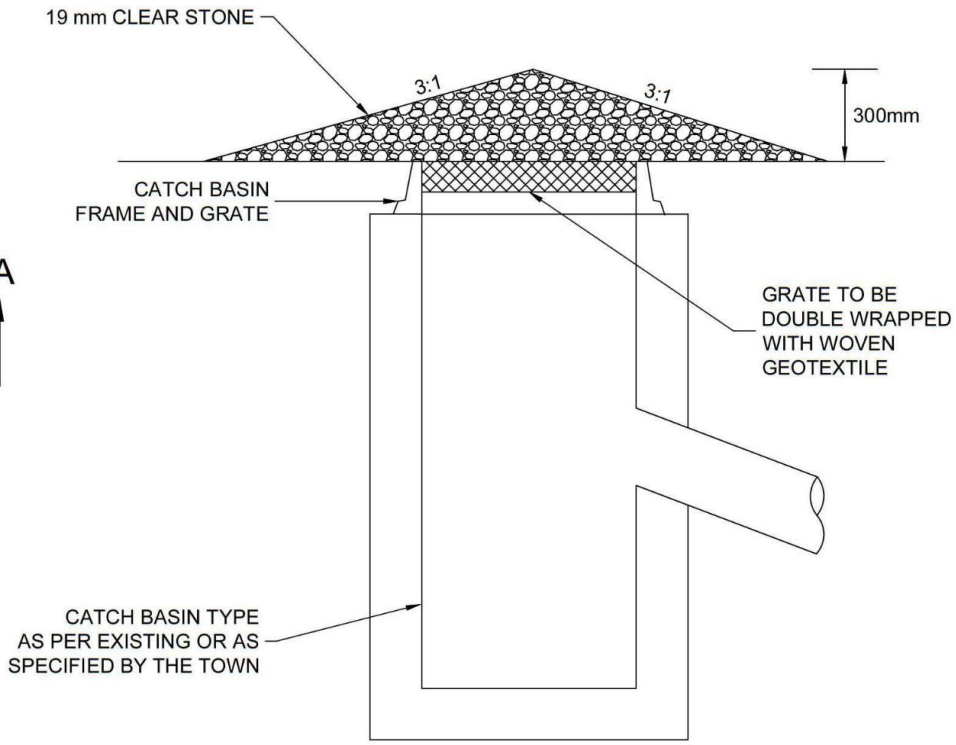
TOWN OF COLLINGWOOD

CATCH BASIN SEDIMENT TRAP

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 310	



PLAN



SECTION A-A

NOTES
1. CATCH BASIN LIFT HOLES TO BE PARGED WITH CONCRETE.
2. WOVEN GEOTEXTILE TO HAVE A MINIMUM EQUIVALENT OPENING SIZE OF 0.15 mm AND A MAXIMUM OPENING SIZE OF 0.25 mm.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

DRAFT

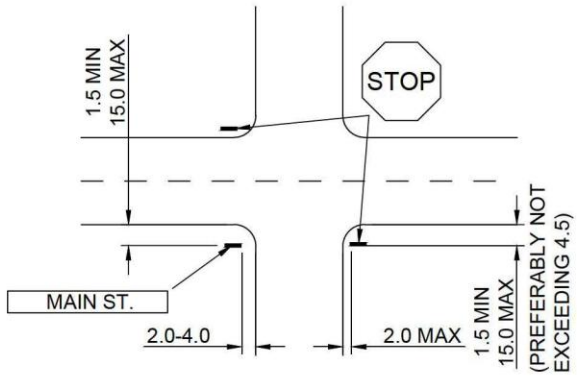
No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

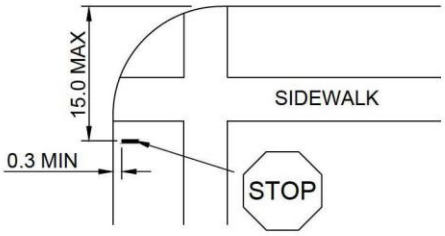
CATCH BASIN SEDIMENT BARRIER

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 311	

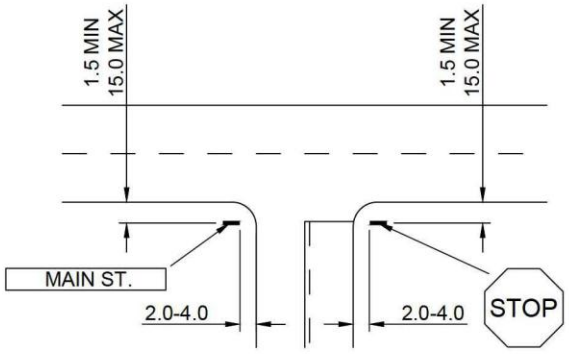
URBAN



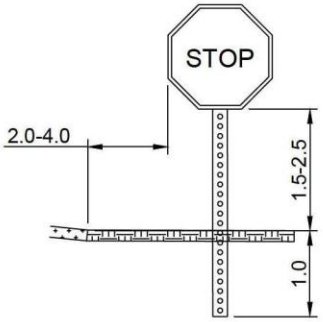
URBAN



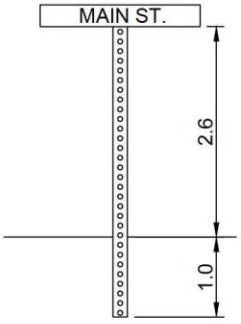
RURAL



STOP SIGN



STREET SIGN



NOTES

1. ALL REGULATORY SIGNS SHALL BE ON ALUMINUM BLANKS WITH HI-INTENSITY BACKGROUND AND LEGEND MEETING ASTM SPECIFICATION D4956-90 FOR TYPE III AND TYPE IV AND IN ACCORDANCE WITH CURRENT MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND HIGHWAY TRAFFIC ACT.
2. ALL SIGNS ARE TO BE MOUNTED ON 14 GAUGE 0.45 m x 0.45 m SQUARE PUNCH OUT TYPE OR UNIFLAGE TYPE GALVANIZED STEEL POST WITH DIRECT EMBEDDED OR BREAKAWAY BASE TYPE INSTALLATIONS.
3. STREET NAME SIGNS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS IN DEVELOPMENT STANDARDS DOCUMENT. STREET NAME SIGN NOT TO BE MOUNTED ON SAME POST AS STOP SIGN. STREET SIGN MUST BE MOUNTED ON IT'S OWN POST IN A QUADRANT OTHER THAN STOP SIGN.
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

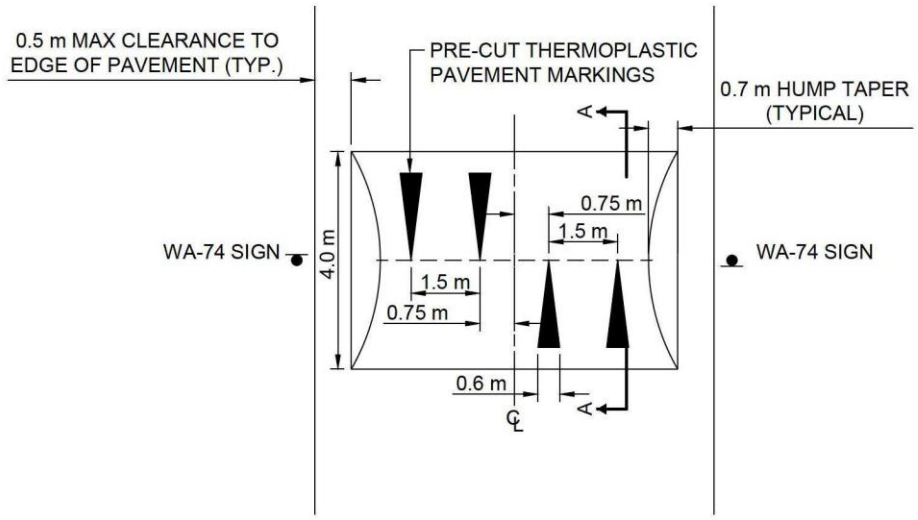
1.	MAX. URBAN EP OFFSET		MAR/26
No.	REVISION	APR'D	DATE

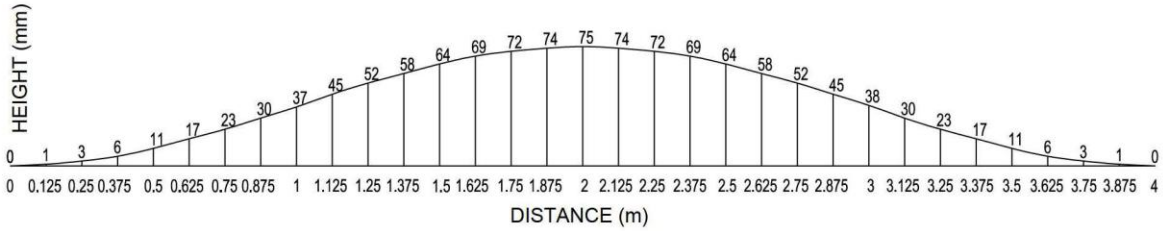
DRAFT

TOWN OF COLLINGWOOD

STANDARD STREET NAME AND REGULATORY SIGNS

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 401	





SECTION A - A
SINUSOIDAL SPEED HUMP

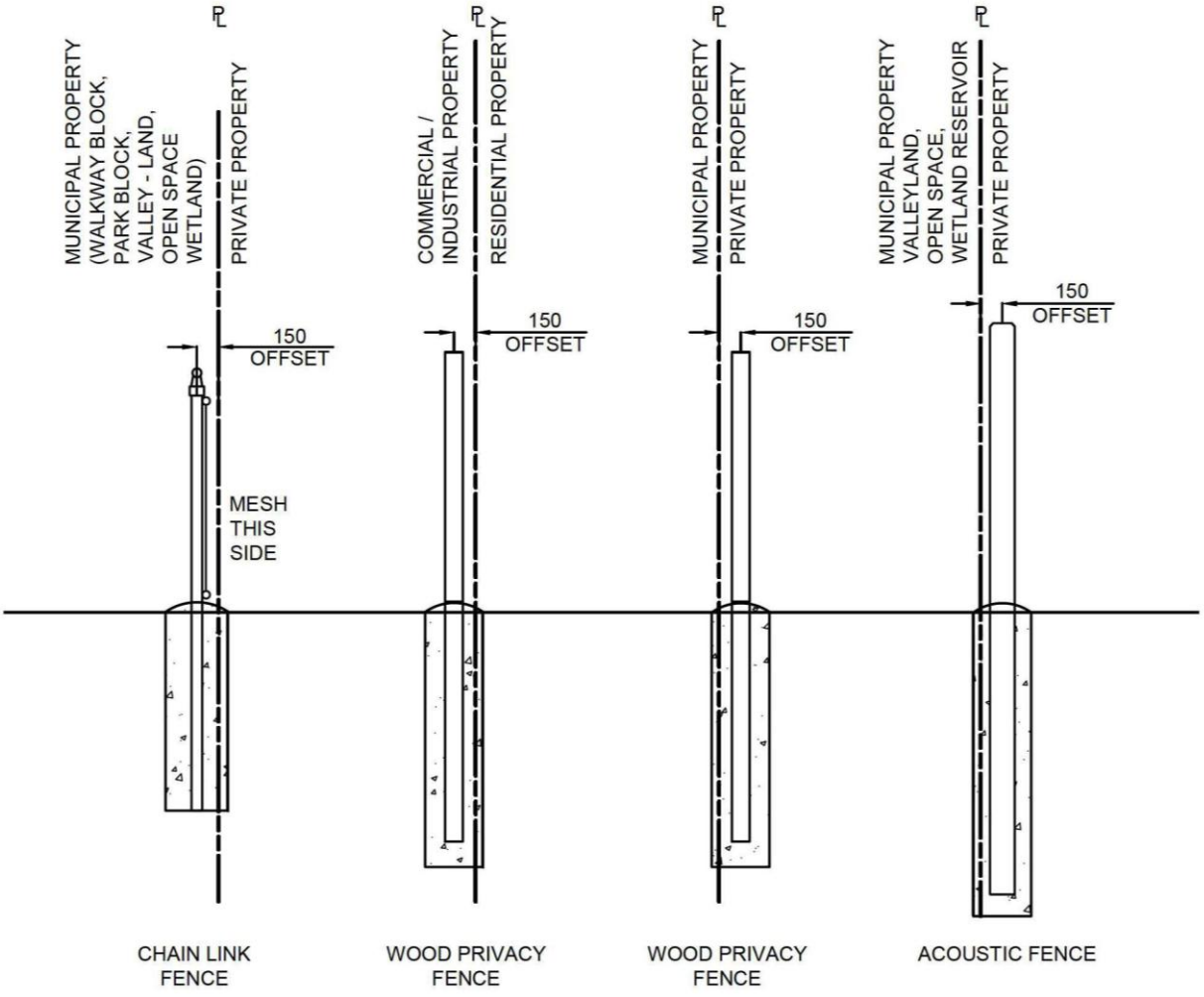
USED TO ACHIEVE A DESIRED SPEED OF 30 km/h

NOTES:
1. WHENEVER POSSIBLE SIGNS SHOULD BE PLACED BACK TO BACK ON NARROW TWO-WAY STREETS.
2. SPEED HUMPS SHOULD BE AT LEAST 15 m FROM AN UNCONTROLLED INTERSECTION AND AT LEAST 30-45 m FROM A CONTROLLED INTERSECTION.
3. NO MORE THAN FOUR ARROWS SHALL BE INSTALLED ON A TYPICAL TWO-WAY STREET UP TO 8.5 m WIDE. MAINTAIN CENTRELINE SPACING, AND EQUALIZE THE DISTANCE BETWEEN THE REMAINING ARROWS.
4. ALL PAVEMENT MARKINGS SHALL BE DURABLE TYPE.
5. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

No.	REVISION	APR'D	DATE

DRAFT

COLLINGWOOD	**TOWN OF COLLINGWOOD**	DATE: MAY/26
		APR'D: XXX
	SPEED CUSHIONS	DRAWN: TATHAM
		SCALE: NTS
		STD. No. 402



NOTE

1. FENCE LOCATION WILL BE EVALUATED BY THE TOWN ON A CASE-BY-CASE BASIS.

No.	REVISION	APR'D	DATE

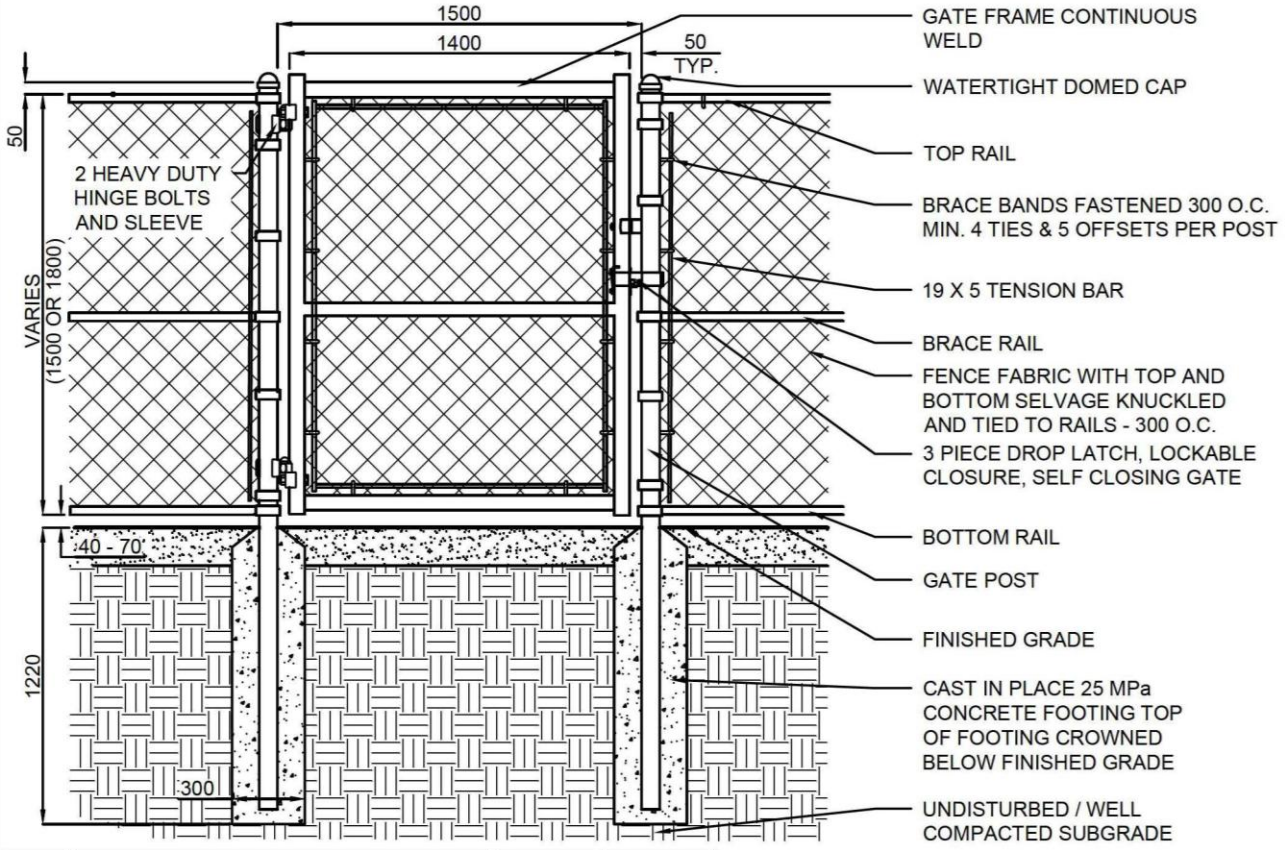
TOWN OF COLLINGWOOD

FENCE LOCATION

DATE:	MAR/26
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No.	500

NOTES

1. POSTS AND FRAME MEMBERS TO BE SCHEDULE 40 STEEL PIPE, WITH ALL OPEN ENDS CAPPED AND INSTALLED PLUMB. NO TUBING, CONDUIT, OR OPEN SEAM MATERIAL WILL BE PERMITTED.
2. ALL JOINTS TO BE CONTINUOUS WELD, GROUND SMOOTH.
3. ALL POSTS, FRAME MEMBERS, AND CAPS TO BE AS PER CAN/CGSB 138.2, GALVANIZED AND VINYL-COATED BLACK AS PER AS PER CAN/CGSB 138.1.
4. LINE POSTS TO BE 60.3 mm O.D. SPACED MAX. 3000 mm O.C.
5. END, CORNER, GATE AND STRAINING POSTS TO BE 89.9 mm O.D.
6. CORNER POSTS TO BE INSTALLED AT HORIZONTAL DEFLECTIONS OF 10 DEG. OR MORE.
7. STRAINING POSTS TO BE INSTALLED AT EQUAL INTERVALS NOT EXCEEDING 150m. STRAINING POSTS ARE ALSO REQUIRED WHEN CHANGES IN VERTICAL ALIGNMENT EXCEED 30 DEGREES.
8. TOP, BOTTOM, & BRACE RAILS AND GATE FRAME TO BE 42.9 mm O.D.
9. BRACE RAILS ARE REQUIRED AT ALL END & GATE POSTS AND ON BOTH SIDES OF CORNER & STRAINING POSTS.
10. FENCE FABRIC TO BE 9 GAUGE BLACK VINYL COATED GALVANIZED STEEL WIRE AS PER CAN/CGSB 138.1 WITH OPENINGS UNIFORMLY 38 OR 50 mm DEPENDING ON APPLICATION.
11. FASTENERS FOR MESH TO BE 3.76 mm DIA. ZINC OR ALUMINUM COATED STEEL CORE WIRE, WITH A BLACK VINYL COATING AS PER CAN/CGSB 138.1.
12. TENSION BARS, TENSION BANDS, BRACE BANDS, TOP RAIL SLEEVES, RAIL ENDS, AND WIRE TIES TO BE AS PER ASTM F 626 AND BLACK VINYL COATED.
13. CONCRETE SHALL BE AS PER OPSS 904. ALLOW CONCRETE TO CURE MINIMUM 5 DAYS BEFORE FENCE FABRIC INSTALLATION.

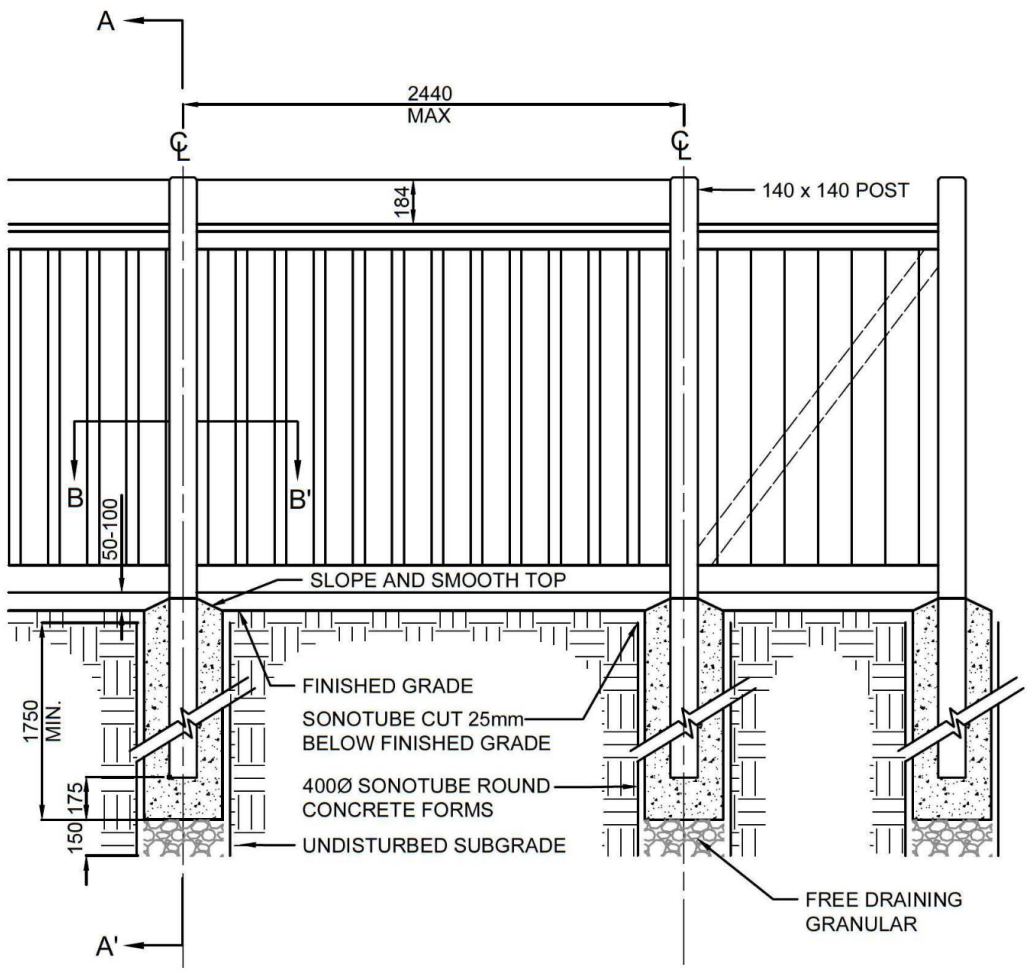


No.	REVISION	APR'D	DATE
3.	REVISED NOTES AND DIMENSIONS	AB	MAR/26
2.	REVISED MATERIALS AND SPACING		MAR/10
1.	REVISED FENCE HEIGHT	EDH	JUN/05

TOWN OF COLLINGWOOD

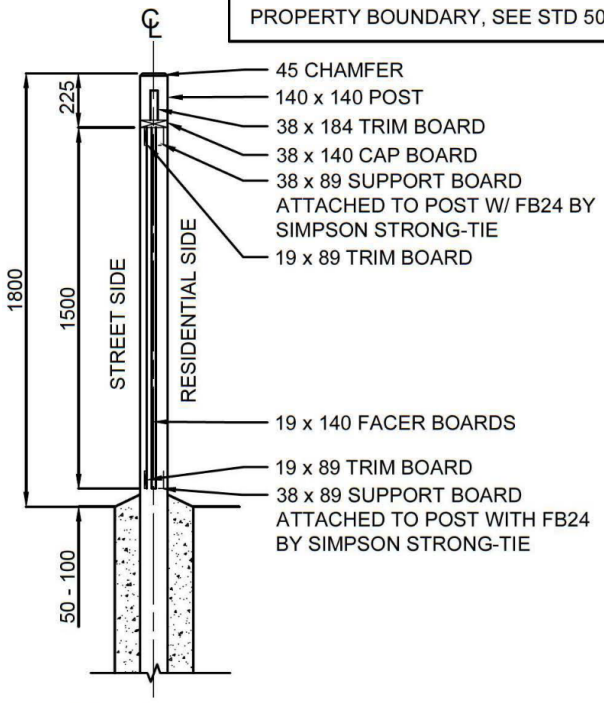
CHAIN LINK FENCE & PEDESTRIAN GATE

DATE:	JAN/03
APR'D:	EDH
DRAWN:	ETi
SCALE:	NTS
STD. No. 501	

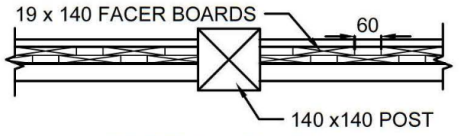


ELEVATION

NOTES
1. REFER TO WOOD FENCING NOTES - STD 506.
2. FOR FENCE LOCATION RELATIVE TO PROPERTY BOUNDARY, SEE STD 500.



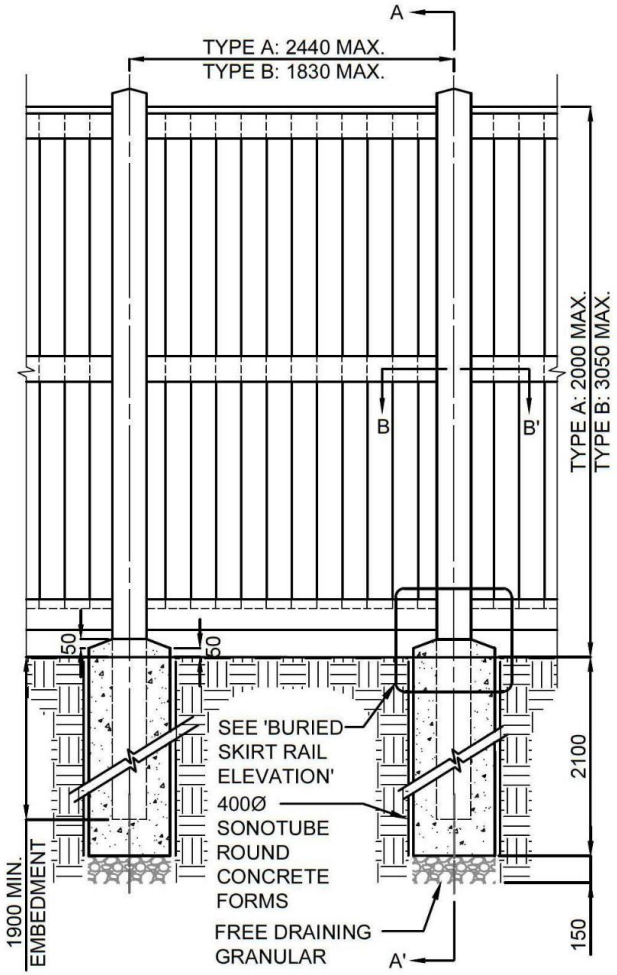
SECTION A - A'



SECTION B - B'

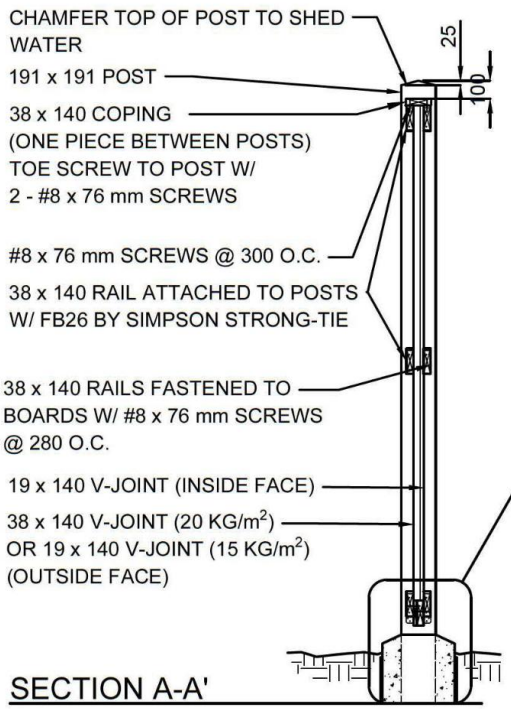
					TOWN OF COLLINGWOOD
1.	DIMENSIONS, NOTES, AND FOOTINGS	AB	MAR/26		WOOD PRIVACY FENCE WITH GATE
No.	REVISION	APR'D	DATE		

DATE:	JAN/03
APR'D:	EDH
DRAWN:	ETi
SCALE:	NTS
STD. No. 502	



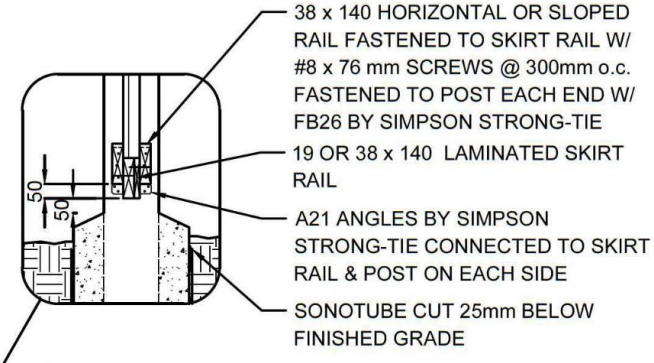
ELEVATION

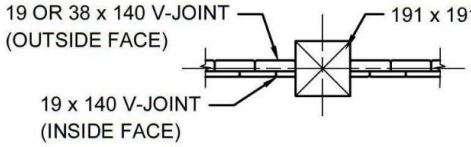
FOR ACOUSTIC DENSITIES OF: 20 KG/SQ.m^2 AND 15 KG/SQ.m^2
(REFER TO ACOUSTIC REPORT FOR REQUIREMENTS)



SECTION A-A'

NOTES
1. REFER TO WOOD FENCING NOTES - STD 506.
2. FOR FENCE LOCATION RELATIVE TO PROPERTY BOUNDARY, SEE STD 500.





SECTION B-B'

BURIED SKIRT RAIL ELEVATION

SECTION C-C'

No.	REVISION	APR'D	DATE
1.	REVISED DESIGN	AB	MAR/26

TOWN OF COLLINGWOOD

ACOUSTIC FENCE

DATE:	JAN/03
APR'D:	EDH
DRAWN:	ETi
SCALE:	NTS
STD. No.	505

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS (mm) EXCEPT AS NOTED.
2. ALL MATERIALS, COMPONENTS AND WORKMANSHIP SHALL CONFORM TO LOCAL BY-LAWS AND THE REQUIREMENTS SET OUT IN THE 2024 ONTARIO BUILDING CODE.
3. ALL CODES AND STANDARDS REFERENCED SHALL BE THE LATEST EDITION REFERENCED BY THE 2024 ONTARIO BUILDING CODE (DIV. B, 1.3.1.2).
4. DESIGN LOADS (COLLINGWOOD): WIND LOAD $q_{1/50}$ = 0.39 kPa
5. ALL PROPRIETARY PRODUCTS SPECIFIED ON THESE DRAWINGS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN SPECIFICATIONS.
6. STEP FENCE PANELS MAXIMUM OF 150mm AT POSTS AS REQUIRED TO MEET GRADE.

ACOUSTIC FENCING

1. FENCE HEIGHT SHALL BE AS SPECIFIED IN THE ACOUSTIC REPORT. SHOULD THE REQUIRED HEIGHT EXCEED THE MAXIMUM PERMITTED FENCE HEIGHT NOTED ON THE DETAIL, THE ACOUSTIC FENCE SHELL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER (P.ENG.).
2. WHERE NOTED "(19 OR 38)" ON THE SECTIONS, 19mm OUTSIDE FACE V-JOINT SHALL BE USED WHEN ACOUSTIC REQUIREMENTS ARE 15KG/m^2 AND 38mm OUTSIDE FACE V-JOINT SHALL BE USED WHEN ACOUSTIC REQUIREMENTS ARE 20KG/m^2

FOOTINGS

1. ALL FOUNDATION STRUCTURES TO BE FOUNDED ON DRY UNDISTURBED NATIVE SOIL HAVING A MINIMUM ALLOWABLE BEARING CAPACITY OF 75 KPA (SLS), AND 125 KPA (ULS).
2. CENTER FOOTINGS AND PIER UNDER CENTROID OF FENCE POSTS, UNLESS OTHERWISE NOTED.
3. KEEP EXCAVATION DRAINED AND FREE OF WATER AT ALL TIMES.
4. PROTECT FOOTINGS AND ADJACENT SOIL FROM FREEZING AND FROST ACTION AT ALL TIMES DURING CONSTRUCTION. DO NOT POUR CONCRETE AGAINST FROZEN EARTH.
5. CONCRETE SHALL BE READY MIX, CLASS N, MINIMUM 30 MPa AT 28 DAYS, IN ACCORDANCE WITH CAN/CSA A23.1.
6. CONCRETE ADDITIVES SHALL NOT BE ADDED TO CONCRETE MIX.
7. ALL EXPOSED CORNERS OF CONCRETE SURFACES TO HAVE 19mm x 19mm CHAMFER.

WOOD FRAMING

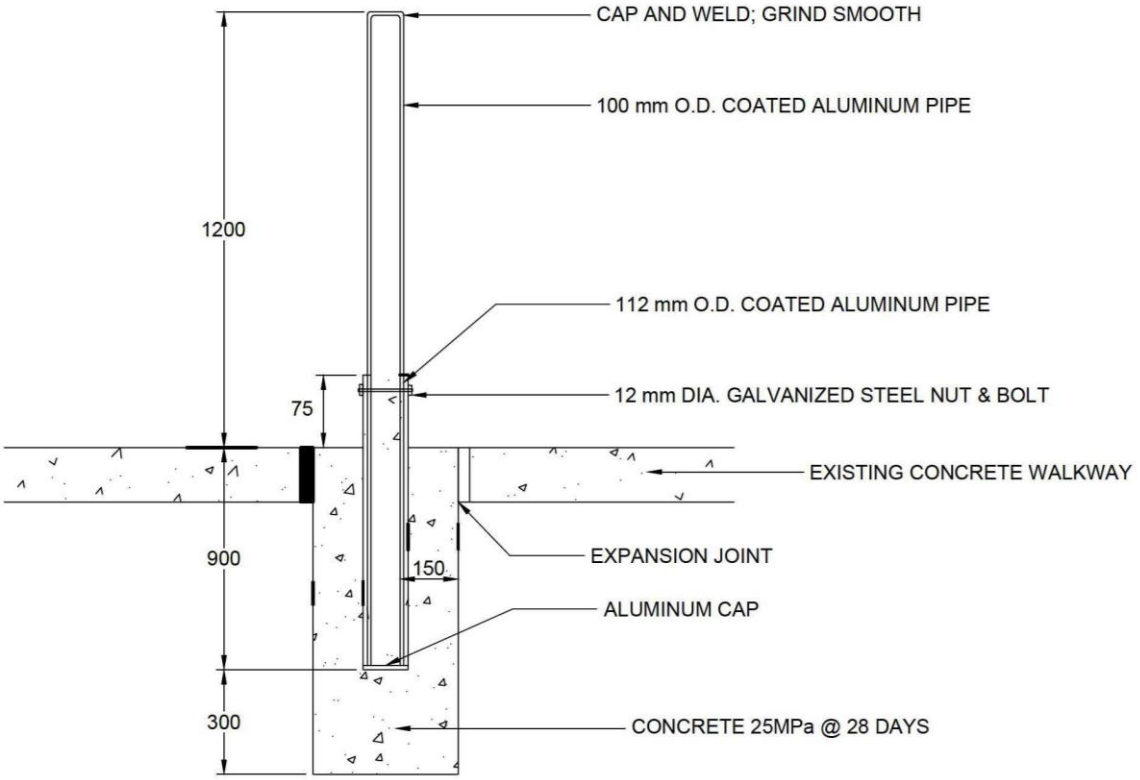
1. ALL WOOD AND ENGINEERED LUMBER COMPONENTS SHALL BE DESIGNED, FABRICATED, AND INSTALLED IN ACCORDANCE WITH CAN/CSA-086 AND THE ONTARIO BUILDING CODE OBC PART 9.
2. ROUGH CARPENTRY SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF OBC PART 9 UNLESS NOTED OTHERWISE.
3. ALL LUMBER SHALL BE NO. 1/2 GRADE SPF IN ACCORDANCE WITH CSA O86, UNLESS NOTED OTHERWISE.
4. KILN DRIED FENCING TO 15% MAXIMUM MOISTURE CONTENT.
5. ALL WOOD MEMBERS SHALL BE PRESSURE TREATED WITH MICROPRO SIENNA UNLESS NOTED OTHERWISE.
6. WHERE PRESSURE TREATED WOOD IS LESS THAN 150mm ABOVE GRADE OR EMBEDDED IN CONCRETE, GROUND PROTECTION TREATMENT IS REQUIRED AS PER OBC 9.3.2.9.
7. FASTENERS AND HARDWARE USED IN EXTERIOR APPLICATIONS SHALL BE HOT-DIPPED GALVANIZED.
8. ALL LUMBER FASTENING SHALL BE IN ACCORDANCE WITH OBC PART 9 OR MANUFACTURER'S SPECIFICATIONS, UNLESS NOTED OTHERWISE. ALL NAILS, SPIKES, AND STAPLES SHALL BE IN ACCORDANCE WITH OBC 2024, 9.23.3.
9. SPECIFIED CONNECTORS SHALL BE SIMPSON STRONG-TIE.
10. THE WORK SHALL BE LAID OUT TRUE TO LINE AND LEVEL, PLUMB & TRUE. STRUCTURAL SUPPORTS & MEMBERS SHALL BE ACCURATELY PLACED IN POSITION AND SECURELY BRACED TO REMAIN PLUMB AND TRUE UNTIL PERMANENTLY FIXED.
11. SELECT BOARDS FOR GOOD APPEARANCE. ALL MEMBERS SHALL BE FREE OF WANES AND BARK. ALL TORN GRAIN SHALL BE PLANED OR SANDED SMOOTH. MEMERS EXHIBITING MODERATE OR HEAVY KNOTS SHALL BE WELL-DISTRIBUTED THROUGHOUT THE FENCE FACE.
12. DO NOT CUT OR DRILL ANY OPENINGS IN STRUCTURAL MEMBERS UNLESS SPECIFICALLY NOTED ON THE STRUCTURAL DRAWINGS.

No.	REVISION	APR'D	DATE

TOWN OF COLLINGWOOD

WOOD FENCING NOTES

DATE:	MAR/26
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No.	506



NOTE
1. POST TO BE CENTERED IN MAJOR WALKWAYS.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

2.	VARIOUS REVISIONS		MAR/26
1.	112 mm PIPE HEIGHT		DEC/24
No.	REVISION	APR'D	DATE

DRAFT

COLLINGWOOD

TOWN OF COLLINGWOOD

REMOVABLE BOLLARD

DATE:	JUN/05
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 515	

NOTES

1. SIGN(S) MUST BE PLACED AT ALL POND ENTRANCES & OTHER LOCATIONS TO BE DETERMINED BY THE TOWN.
2. SIGN(S) TO BE MANUFACTURED USING REFLECTIVE FINISH (ENGINEER GRADE), WITH TOP AND BOTTOM MOUNT HOLES.
3. SIGN(S) TO BE MOUNTED TO 3.8m A 100x100mm PRESSURE TREATED WOODEN POST EMBEDDED MIN. 1.0m INTO THE GROUND
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.

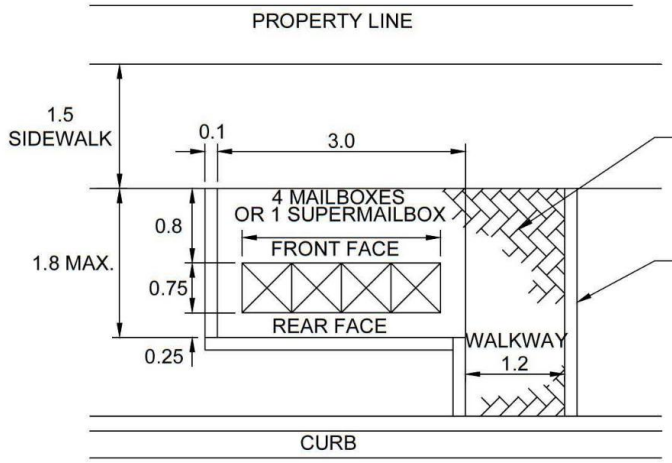
DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

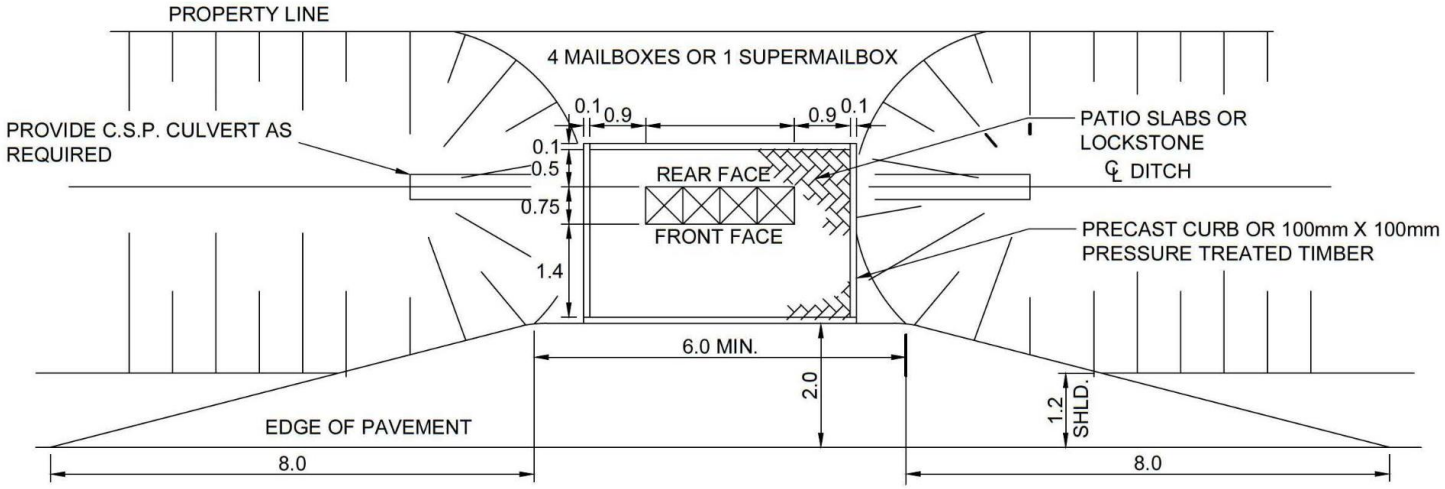
STORMWATER MANAGEMENT POND WARNING SIGN

DATE:	OCT/24
APR'D:	XXX
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 531	



NOTES
1. TYPICAL MAIL BOX LOCATIONS TO BE APPROVED BY TOWN FOR LOCATION CONSIDERATIONS.
2. MAXIMUM NUMBER OF GREEN MAILBOXES TO BE FOUR (4) OR ONE (1) SUPERMAILBOX.
3. PRECAST CURB OR 100mm X 100mm PRESSURE TREATED TIMBER TO BE INSTALLED AROUND LOCKSTONE OR PATIO SLAB FOUNDATION.
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

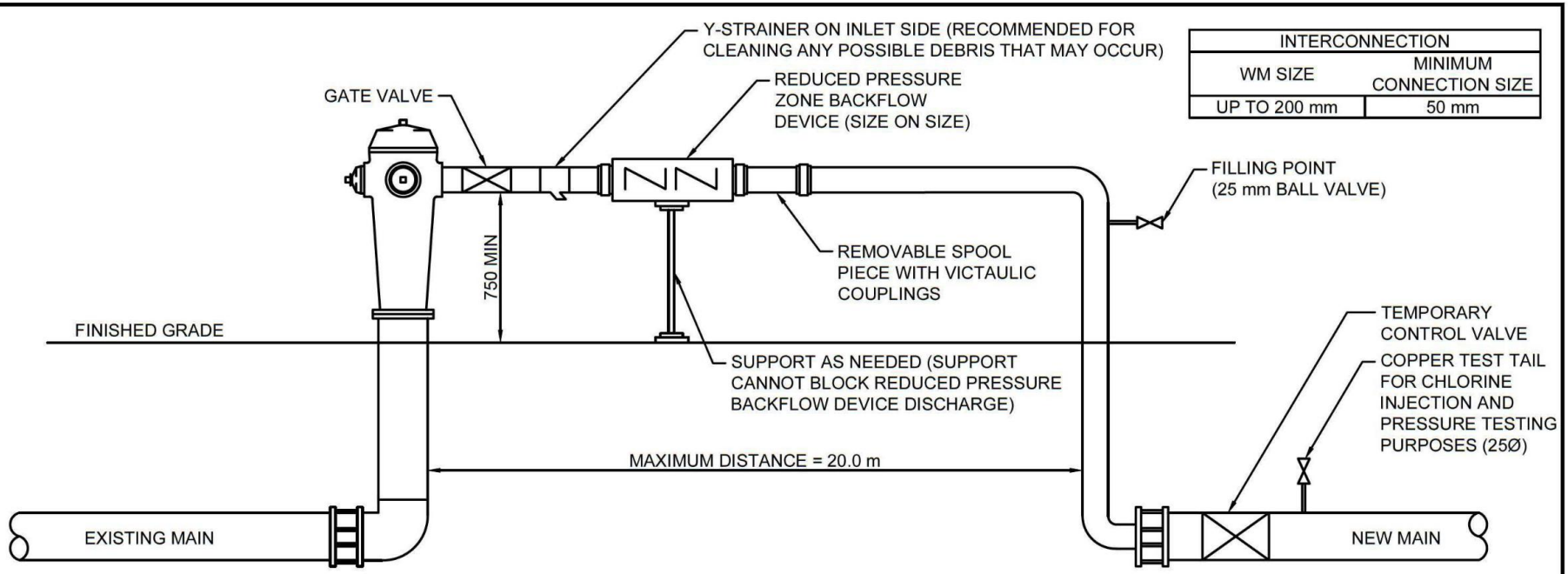
TYPICAL TEMPORARY URBAN MAIL BOX LOCATION



TYPICAL TEMPORARY RURAL MAIL BOX LOCATION

DRAFT

				TOWN OF COLLINGWOOD	DATE: JAN/03
					APR'D: EDH
				TEMPORARY MAILBOX LOCATION DETAIL	DRAWN: TATHAM
1.	VARIOUS REVISIONS		MAR/26		SCALE: NTS
No.	REVISION	APR'D	DATE		STD. No. 532



INTERCONNECTION	
WM SIZE	MINIMUM CONNECTION SIZE
UP TO 200 mm	50 mm

NOTES

1. TEMPORARY BACKFLOW BYPASS ASSEMBLY IS TO BE CONSRUCTED FROM COPPER OR BRASS IF BYPASS IS 50 mm OR BELOW AND DUCTILE IRON IF BYPASS IS 100 mm OR ABOVE. TEMPORARY BACKFLOW BYPASS CONSTRUCTED OF PVC OR PEX WILL NOT BE ACCEPTED.
2. THE REDUCED PRESSURE ZONE BACKFLOW PREVENTER (RPZ) MUST BE PROVIDED BY THE CONTRACTOR, IN GOOD WORKING ORDER, AND TESTED ANUALLY AS PER CSA B64-10 (AS AMENDED). THE ANNUAL TESTING LOGS MUST BE ON-SITE AND AVAILABLE FOR REVIEW BY THE TOWN OF COLLINGWOOD AT ANY TIME.
3. THE BACKFLOW PREVENTION ASSEMBLY AND THE BACKFLOW PREVENTION VALVE ASSEMBLY SHALL BE PHYSICALLY SEPARATED FROM THE NEW MAIN DURING WATERMAIN PRESSURE TESTS.
4. THE FINAL CONNECTION OF THE WATERMAIN SHALL BE COMPLETED ONLY AFTER AUTHORIZATION BY THE TOWN OF COLLINGWOOD.
5. THE WATERMAIN SHALL BE DRAINED BY CONTROLLED MEANS, DE-CHLORINATED AS REQUIRED AS PER AWWA, AND TEMPORARY CAPS OR PLUGS INSTALLED AS REQUIRED.
6. THE WATERMAIN SHALL BE CUT BACK TO REMOVE THE TAPPING POINTS OF THE TEMPORARY WATERMAIN BY-PASS ASSEMBLY. ENSURE COMPLETION PIECE IS LESS THAN 5.5 m AND DISINFECTED ACCORDING TO AWWA C651 (AS AMENDED).
7. ONLY THE TOWN OF COLLINGWOOD WATER OPERATIONS SHALL OPERATE VALVES AND/OR OTHER APPURTENANCES WITHIN THE NEW SYSTEM ONCE COMMISSIONING PROCEDURES ARE INITIATED.
8. ALL PIPING AND APPURTENANCES PLACED IN THE CONNECTION SHALL BE NEW MATERIAL THOROUGHLY DISINFECTED AS PER AWWA C651: DISINFECTING WATERMAIN (AS AMENDED).
9. A PHYSICAL SEPARATION MUST BE MAINTAINED AT ALL CONNECTION POINTS OF NEW WATERMAINS TO THE EXISTING SYSTEM UNTIL BACTERIOLOGICAL SAMPLES CONFIRM SATISFACTORY RESULTS. A SAMPLING TAP MUST BE PROVIDED AT THE END OF EACH BRANCH OR STUB.
10. THE ACTUAL CONFIGURATION USED MUST SATISFY THE INTENT OF THIS DRAWING AND AT THE DISCRETION OF THE TOWN REPRESENTATIVE (THE TOWN OF COLLINGWOOD WATER OPERATIONS BRANCH MUST BE CONSULTED PRIOR TO ANY CONNECTION TO THE EXISTING DRINKING WATER SYSTEM).
11. WINTER PROTECTION MUST BE PROVIDED WHEN APPLICABLE.
12. ALL TEMPORARY CAPS TO BE RESTRAINED. ALL RESTRAINED JOINTS AS PER PIPE MANUFACTURER'S SPECIFICATION.
13. TOWN OF COLLINGWOOD WATER OPERATIONS MAINTAINS THE RIGHT TO REQUEST ALTERNATIVE BY-PASS ASSEMBLY SIZING IN AREAS WHERE PRESSURE AND FLOW RATES MAY BE AN ISSUE.
14. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

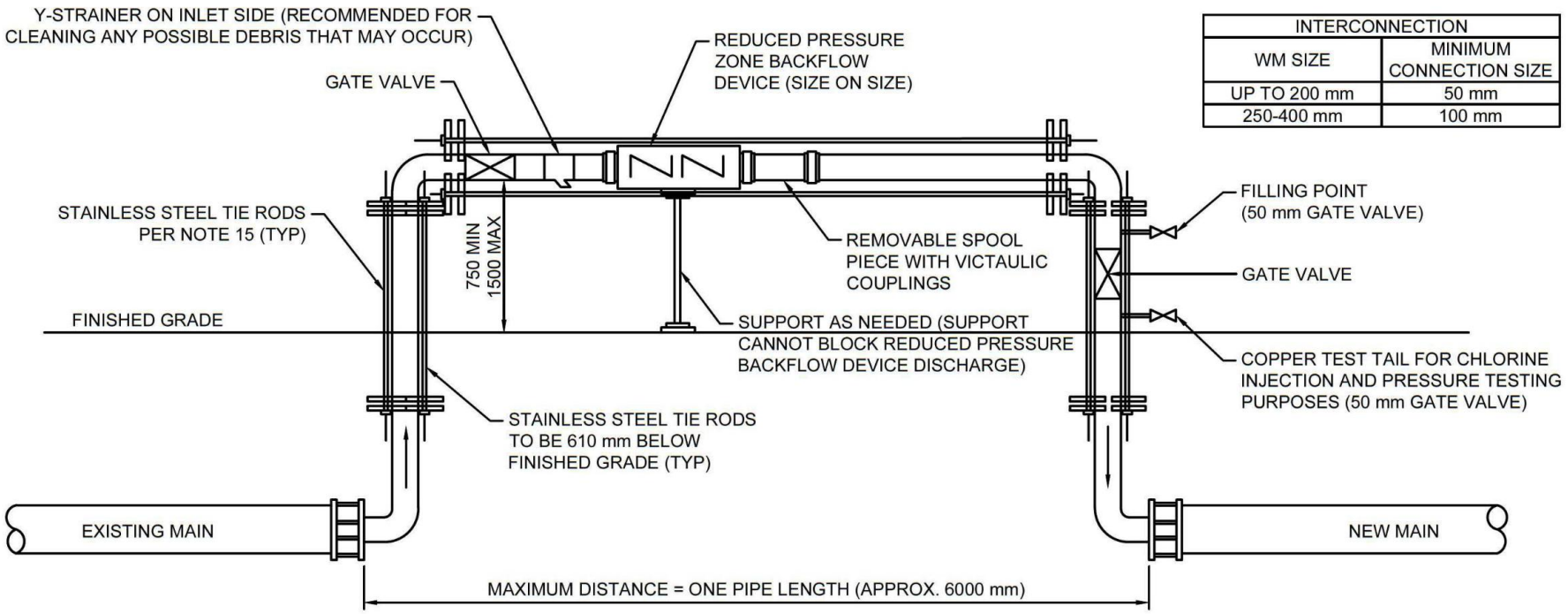
DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

WATERMAIN CONNECTION FROM HYDRANT (UP TO 200 mm)

DATE: OCT/24
APR'D:
DRAWN: TATHAM
SCALE: NTS
STD. No. 610



INTERCONNECTION	
WM SIZE	MINIMUM CONNECTION SIZE
UP TO 200 mm	50 mm
250-400 mm	100 mm

NOTES

1. TEMPORARY BACKFLOW BY-PASS ASSEMBLY IS TO BE CONSTRUCTED FROM THREADED COPPER OR BRASS IF BY-PASS IS 75 mm DIAMETER OR BELOW AND DUCTILE IRON OR PVC IF BY-PASS IS 100 mm DIAMETER OR ABOVE. IF PVC CONSTRUCTION IS USED, APPROPRIATE RESTRAINTS SHALL BE PROVIDED.
2. THE REDUCED PRESSURE ZONE BACKFLOW PREVENTER (RPZ) MUST BE PROVIDED BY THE CONTRACTOR, IN GOOD WORKING ORDER, AND TESTED ANUALLY AS PER CSA B64-10 (AS AMENDED). THE ANNUAL TESTING LOGS MUST BE ON-SITE AND AVAILABLE FOR REVIEW BY THE TOWN OF COLLINGWOOD AT ANY TIME.
3. THE BACKFLOW PREVENTION ASSEMBLY AND THE BACKFLOW PREVENTION VALVE ASSEMBLY SHALL BE PHYSICALLY SEPARATED FROM THE NEW MAIN DURING WATERMAIN PRESSURE TESTS.
4. THE FINAL CONNECTION OF THE WATERMAIN SHALL BE COMPLETED ONLY AFTER AUTHORIZATION BY THE TOWN OF COLLINGWOOD.
5. THE WATERMAIN SHALL BE DRAINED BY CONTROLLED MEANS, DE-CHLORINATED AS REQUIRED AS PER AWWA, AND TEMPORARY CAPS OR PLUGS INSTALLED AS REQUIRED. SUFFICIENT TRENCH DEWATERING CAPACITY SHALL BE USED WHEN THE EXISTING AND NEW WATERMAIN ARE DRAINED PRIOR TO THE FINAL CONNECTION TO ENSURE NO BACKFLOW OF TRENCH WATER INTO EITHER WATERMAIN.
6. THE WATERMAIN SHALL BE CUT BACK TO REMOVE THE TAPPING POINTS OF THE TEMPORARY WATERMAIN BY-PASS ASSEMBLY. ENSURE COMPLETION PIECE IS LESS THAN 5.5 m AND DISINFECTED ACCORDING TO AWWA C651 (AS AMENDED).
7. ONLY THE TOWN OF COLLINGWOOD WATER OPERATIONS SHALL OPERATE VALVES AND/OR OTHER APPURTENANCES WITHIN THE NEW SYSTEM ONCE COMMISSIONING PROCEDURES ARE INITIATED.
8. ALL NEW PIPING AND APPURTENANCES PLACED IN THE CONNECTION SHALL BE THOROUGHLY DISINFECTED AS PER AWWA C651: DISINFECTING WATERMAIN (AS AMENDED).
9. A PHYSICAL SEPARATION MUST BE MAINTAINED AT ALL CONNECTION POINTS OF NEW WATERMAINS TO THE EXISTING SYSTEM UNTIL BACTERIOLOGICAL SAMPLES CONFIRM SATISFACTORY RESULTS. A SAMPLING TAP MUST BE PROVIDED AT THE END OF EACH BRANCH OR STUB.
10. THE ACTUAL CONFIGURATION USED MUST SATISFY THE INTENT OF THIS DRAWING AND AT THE DISCRETION OF THE TOWN OF COLLINGWOOD (THE TOWN OF COLLINGWOOD MUST BE CONSULTED PRIOR TO ANY CONNECTION TO THE EXISTING DRINKING WATER SYSTEM).
11. WINTER PROTECTION MUST BE PROVIDED WHEN APPLICABLE.
12. ALL TEMPORARY CAPS TO BE RESTRAINED. ALL RESTRAINED JOINTS AS PER PIPE MANUFACTURER'S SPECIFICATION.
13. TOWN OF COLLINGWOOD WATER OPERATIONS MAINTAINS THE RIGHT TO REQUEST ALTERNATIVE BY-PASS ASSEMBLY SIZING IN AREAS WHERE PRESSURE AND FLOW RATES MAY BE AN ISSUE.
14. 100 mm DIAMETER AND ABOVE BY-PASS SHALL USE STAINLESS STEEL TIE RODS (LENGTHS AS REQUIRED), BOTH ENDS THREADED WITH APPROVED RESTRAINED CLAMP ASSEMBLY.
15. ALL 50 mm DIAMETER JOINTS TO USE A NON-LEAD COUPLING WITH INTEGRATED CLAMP SCREW.
16. ALL ITEMS IN CONTACT WITH DRINKING WATER SHALL MEET NSF 61 AND NSF 372.
17. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

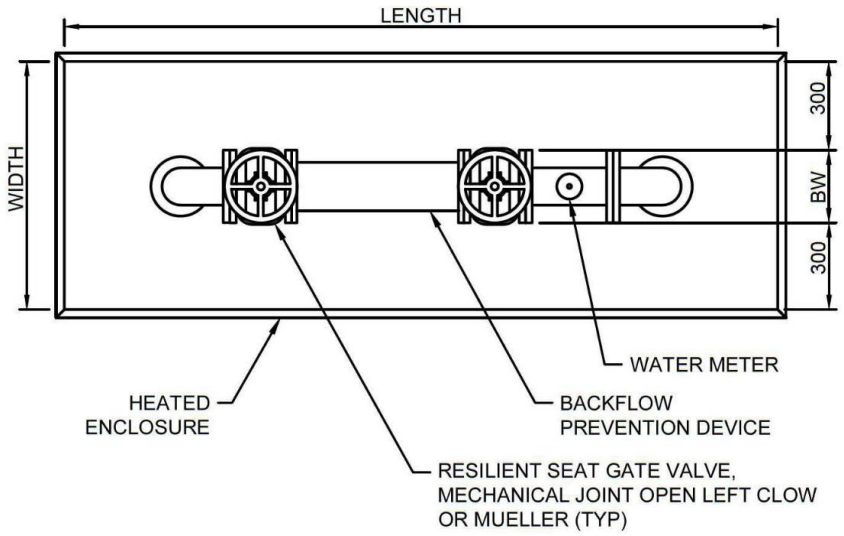
DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

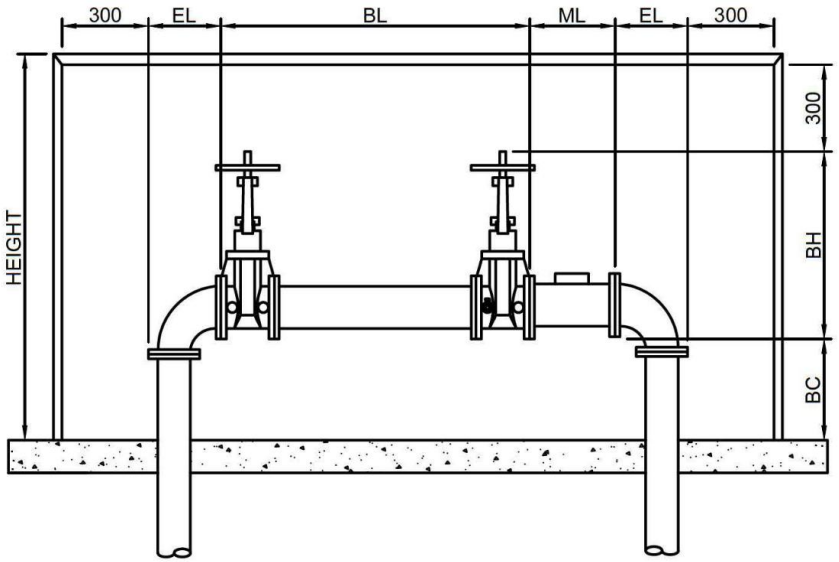
TOWN OF COLLINGWOOD

TEMPORARY BY-PASS CONNECTION FOR WATERMAINS (UP TO 400 mm)

DATE: OCT/24
APR'D:
DRAWN: TATHAM
SCALE: NTS
STD. No. 611



PLAN



ELEVATION

LENGTH = 300 + ELBOW LENGTH (EL) + BACKFLOW LENGTH (BL) + METER LENGTH (ML) + ELBOW LENGTH (EL) + 300
WIDTH = 300 + BACKFLOW WIDTH (BW) + 300
HEIGHT = BACKFLOW CLEARANCE (BC) + BACKFLOW HEIGHT (BH) + 300

NOTES
1. COMPONENTS TO BE SPECIFIED ON A PROJECT SPECIFIC BASIS AND REVIEWED BY THE TOWN OF COLLINGWOOD PRIOR TO CONSTRUCTION WITH DUE CONSIDERATION TO SURROUNDING WATER INFRASTRUCTURE.
2. BACKFLOW PREVENTION DEVICE CLASS SHALL BE DEPENDANT ON THE HAZARD CLASSIFICATION OF THE SITE.
3. SHOP DRAWINGS FROM BACKFLOW PREVENTION DEVICE MANUFACTURER TO BE USED FOR BACKFLOW PREVENTION DEVICE DIMENSIONS.
4. METER WIDTH WILL VARY BASED ON SERVICE SIZE.
5. HEATED ENCLOSURE SHALL MAINTAIN A MINIMUM INTERNAL TEMPERATURE OF 4°C AT ALL TIMES.
6. ACCESS DOOR TO HEATED ENCLOSURE SHALL BE LOCATED ON THE SAME SIDE AS THE WATER METER.
7. CONCRETE SLAB SPECIFICATIONS SHALL BE IN ACCORDANCE WITH HEATED ENCLOSURE MANUFACTURER'S RECOMMENDATIONS.
8. ONLY THE TOWN OF COLLINGWOOD WATER OPERATIONS SHALL OPERATE VALVES AND/OR OTHER APPURTENANCES WITHIN THE NEW SYSTEM ONCE COMMISSIONING PROCEDURES ARE INITIATED.
9. ALL ITEMS IN CONTACT WITH DRINKING WATER SHALL MEET NSF 61 AND NSF 372.
10. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

WATERMAIN DIAMETER	ELBOW LENGTH
19	95
25	103
38	130
51	146
76	235
100	279
150	343
200	400
250	483
300	546

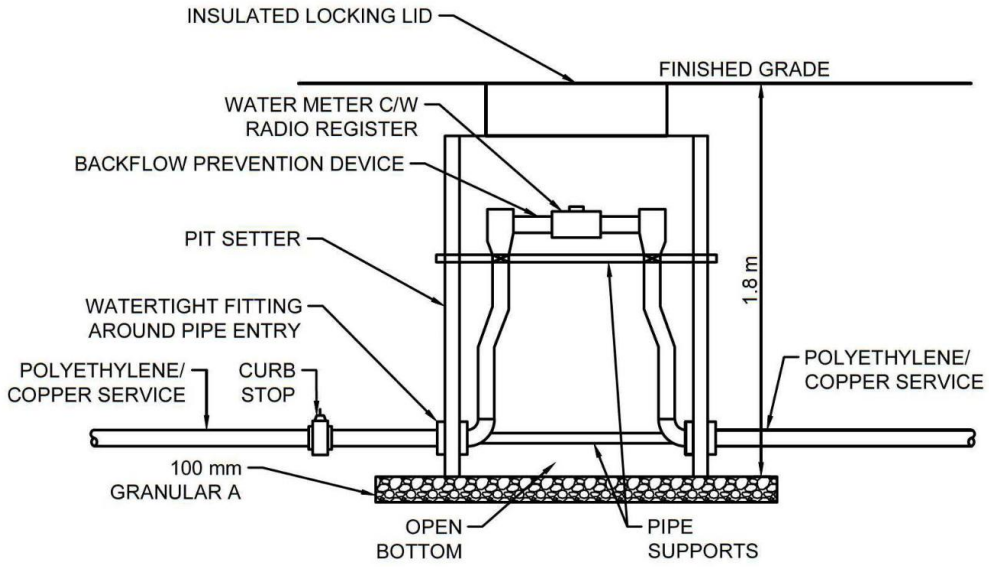
DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

BACKFLOW AND METER ASSEMBLY IN HEATED ENCLOSURE

DATE: OCT/24
APR'D:
DRAWN: TATHAM
SCALE: NTS
STD. No. 613



NOTES
1. INSTALLATION TO BE WITNESSED BY TOWN OF COLLINGWOOD OPERATIONS STAFF.
2. TOWN OF COLLINGWOOD RESERVES THE RIGHT TO SUBSTITUTE ALTERNATE WATERMAIN LAYOUT PER DETAIL FOR PERMANENT DEAD END INSTALLATION DURING THE DESIGN REVIEW PERIOD.
3. WATER METER CHAMBER TO BE LOCATED IN A LANDSCAPED AREA AND PROTECTED FROM LANDSCAPE AND SNOW REMOVAL EQUIPMENT C/W FLEXSTAKE HYDRANT MARKERS OR EQUIVALENT.
4. COPPER PIPING AND BRASS FITTINGS SHALL BE USED WITHIN THE WATER METER CHAMBER.
5. ALL ITEMS IN CONTACT WITH DRINKING WATER SHALL MEET NSF 61 AND NSF 372.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

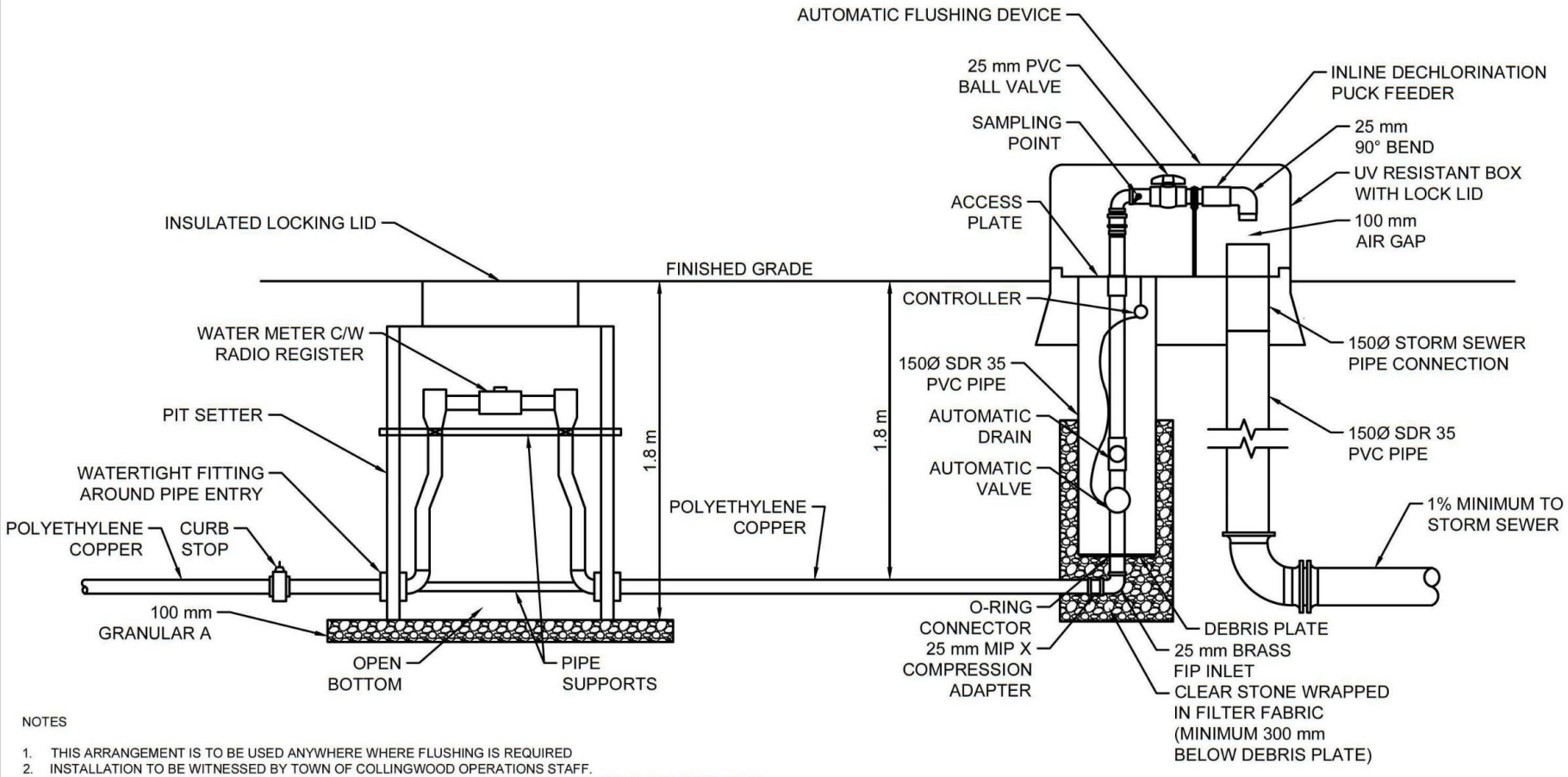
DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

WATER METER AND BACKFLOW DEVICE CHAMBER DETAIL

DATE:	OCT/24
APR'D:	
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	614



NOTES

1. THIS ARRANGEMENT IS TO BE USED ANYWHERE WHERE FLUSHING IS REQUIRED
2. INSTALLATION TO BE WITNESSED BY TOWN OF COLLINGWOOD OPERATIONS STAFF.
3. TOWN OF COLLINGWOOD RESERVES THE RIGHT TO SUBSTITUTE ALTERNATE WATERMAIN LAYOUT PER DETAIL FOR PERMANENT DEAD END INSTALLATION DURING THE DESIGN REVIEW PERIOD.
4. WATER METER CHAMBER TO BE LOCATED IN A LANDSCAPED AREA AND PROTECTED FROM LANDSCAPE AND SNOW REMOVAL EQUIPMENT C/W FLEXSTAKE HYDRANT MARKERS OR EQUIVALENT.
5. COPPER PIPING AND BRASS FITTINGS SHALL BE USED WITHIN THE WATER METER CHAMBER.
6. ALL ITEMS IN CONTACT WITH DRINKING WATER SHALL MEET NSF 61 AND NSF 372.
7. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

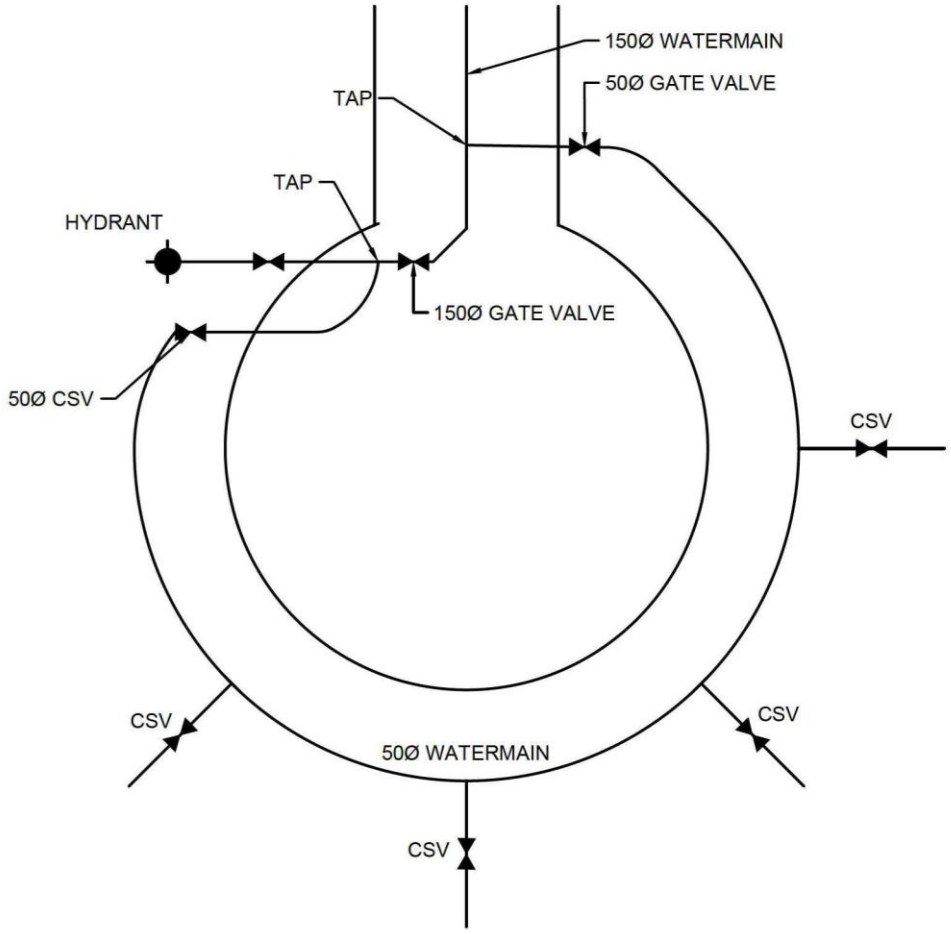
DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

AUTO FLUSH AND WATER METER CHAMBER DETAIL

DATE:	OCT/24
APR'D:	
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	615



NOTES
1. TOWN OF COLLINGWOOD TO REVIEW AND APPROVE LAYOUT ON A PROJECT SPECIFIC BASIS.
2. NUMBER OF SERVICES ON 50Ø LOOP SHALL BE CONFIRMED BY FLOW CALCULATIONS.
3. ALL ITEMS IN CONTACT WITH DRINKING WATER SHALL MEET NSF 61 AND NSF 372.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

1.	VARIOUS REVISIONS		MAR/26
No.	REVISION	APR'D	DATE

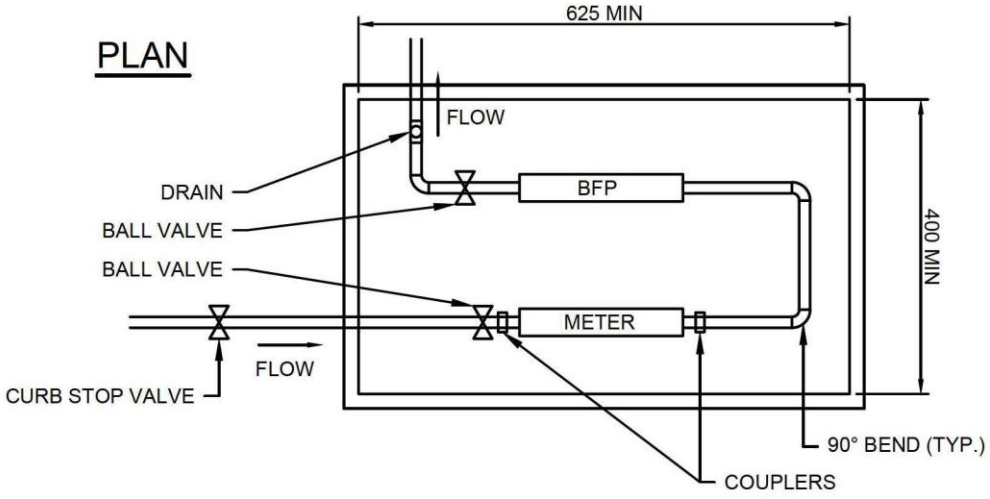
DRAFT

TOWN OF COLLINGWOOD

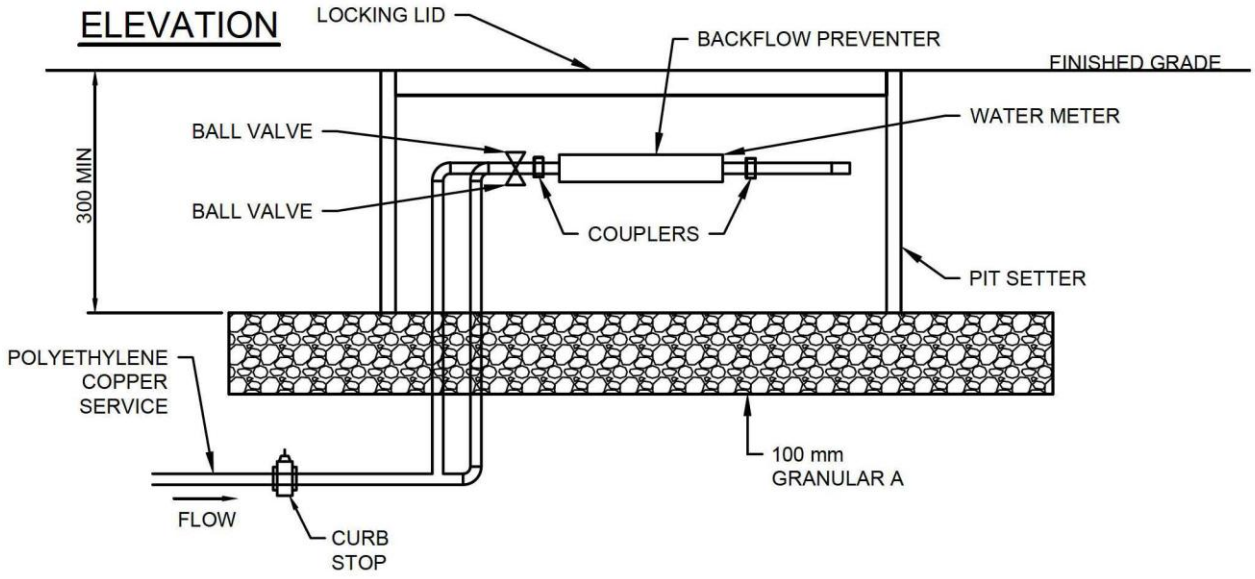
WATERMAIN LOOP FOR CUL-DE-SACS

DATE:	OCT/24
APR'D:	
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	616

PLAN



ELEVATION



NOTES

1. ALL INTERNAL AND EXTERNAL VALVES, FITTINGS, THROUGH WALL METAL PIPING AND MECHANICAL RESTRAINTS TO BE C/W DENSO PASTE, DENSO MASTIC AND DENSO TAPE OR APPROVED EQUAL, APPLIED TO MANUFACTURER'S RECOMMENDATIONS.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

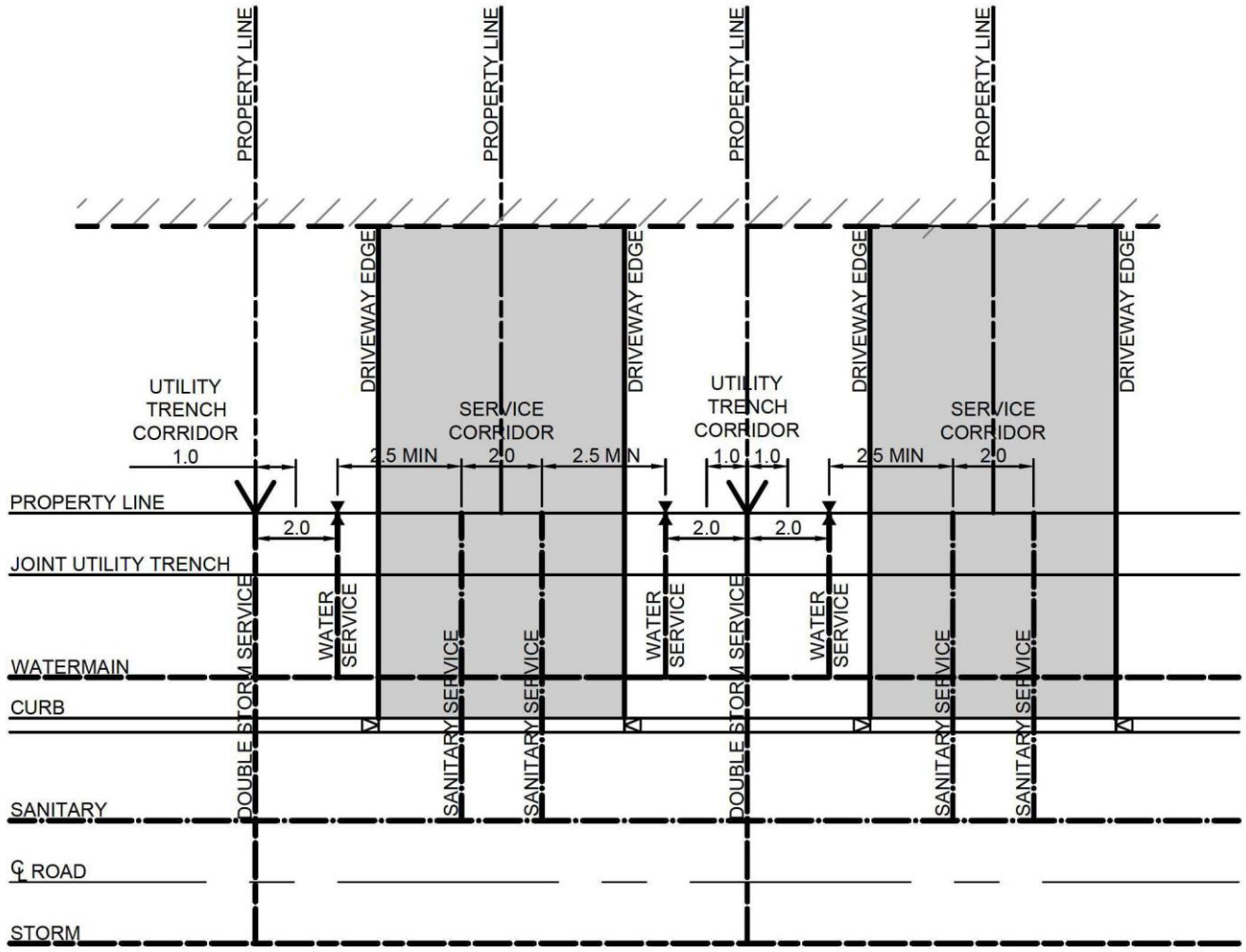
No.	REVISION	APR'D	DATE

DRAFT

TOWN OF COLLINGWOOD

METER CHAMBER FOR SEASONAL IRRIGATION SYSTEM

DATE:	OCT/24
APR'D:	
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	617



NOTES
1. CLEAN OUT REQUIRED IF SEWER CONNECTION LENGTH IS GREATER THAN 30.0 m.
2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

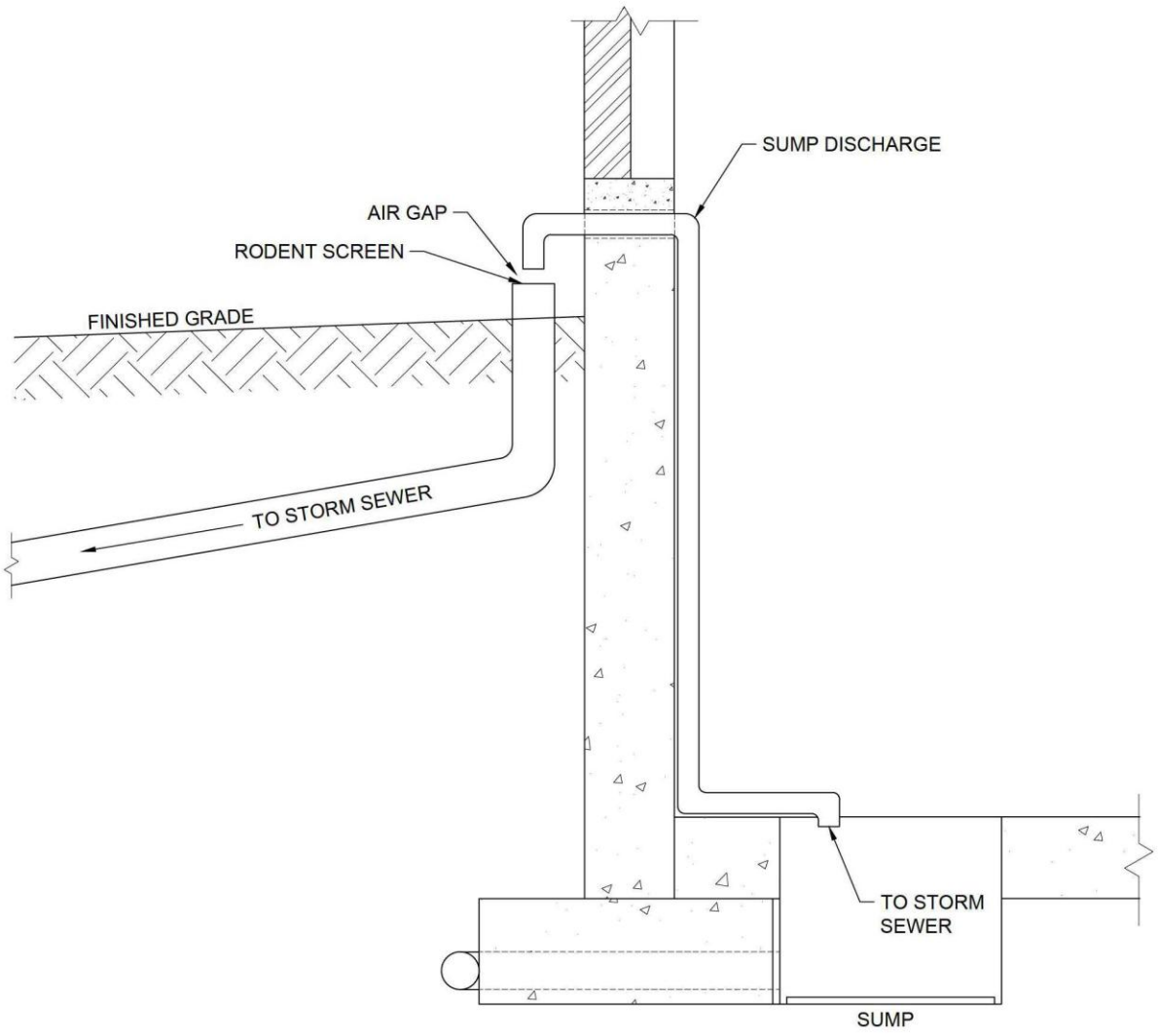
No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

DRAFT

TOWN OF COLLINGWOOD

TYPICAL TOWNHOUSE UNIT SERVICE ARRANGEMENT

DATE:	OCT/24
APR'D:	
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 620	



NOTES:
1. PIPE SHALL BE 150 mm DIAMETER PVC DR35 WHITE SEWER PIPE.
2. MINIMUM SLOPE OF PIPE TO BE 1%.
3. JUNCTION OF SUMP DISCHARGE AND STORM SERVICE MUST BE 100 mm ABOVE FINISHED GRADE AND IS NOT TO BE SEALED.
4. SUMP DISCHARGE PIPE TO BE CONNECTED TO THE SUMP PUMP AND FASTENED AS PER PART 7 OF THE ONTARIO BUILDING CODE.

No.	REVISION	APR'D	DATE
4.	VARIOUS REVISIONS		MAR/26
3.	ADDED AIR GAP		DEC/24
2.	DELETED OVERSIZING NOTE	EDH	APR/07
1.	PIPE (DR) CLASSIFICATION	EDH	APR/07

DRAFT

TOWN OF COLLINGWOOD

RESIDENTIAL STORM SEWER CONNECTION SERVICING

DATE:	JUL/04
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No. 625	

NAME OF DEVELOPMENT CORPORATION

NAME OF DEVELOPMENT PROJECT
TOWN OF COLLINGWOOD

LEGEND

INDEX

Dwg.No.	Description
	TITLE PAGE AND INDEX
XXXXXX-XX-XX	XXXXX XXXXX XXXXXXXXXXX XXXXXXXXXX XXXXXXXXXX

KEY PLAN

ACCEPTED FOR CONSTRUCTION
Town of Collingwood
per .....
Date: .....

CONSULTANT INFO

Contract No. XXXXXX

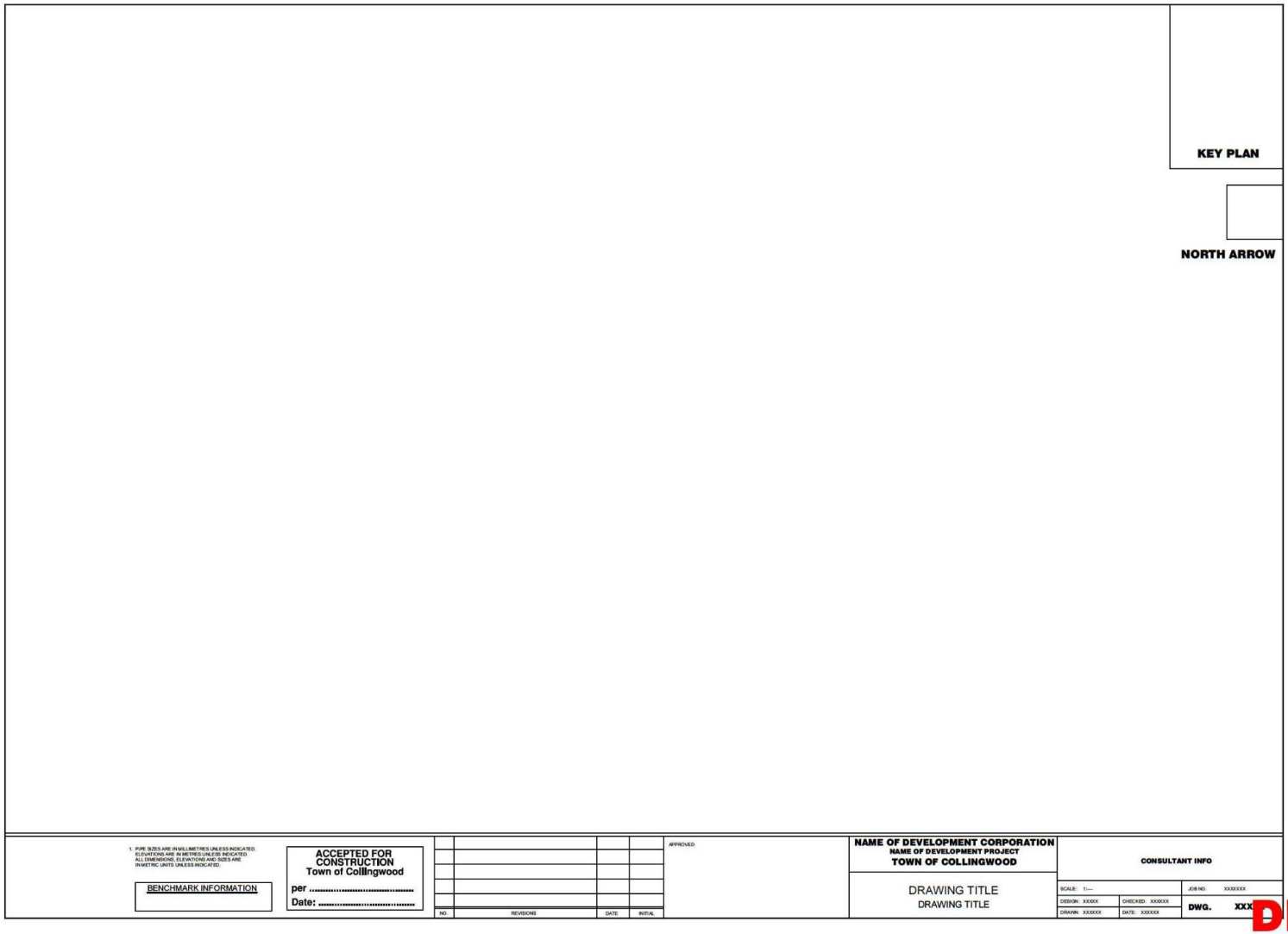
DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

STANDARD TITLE SHEET

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	700

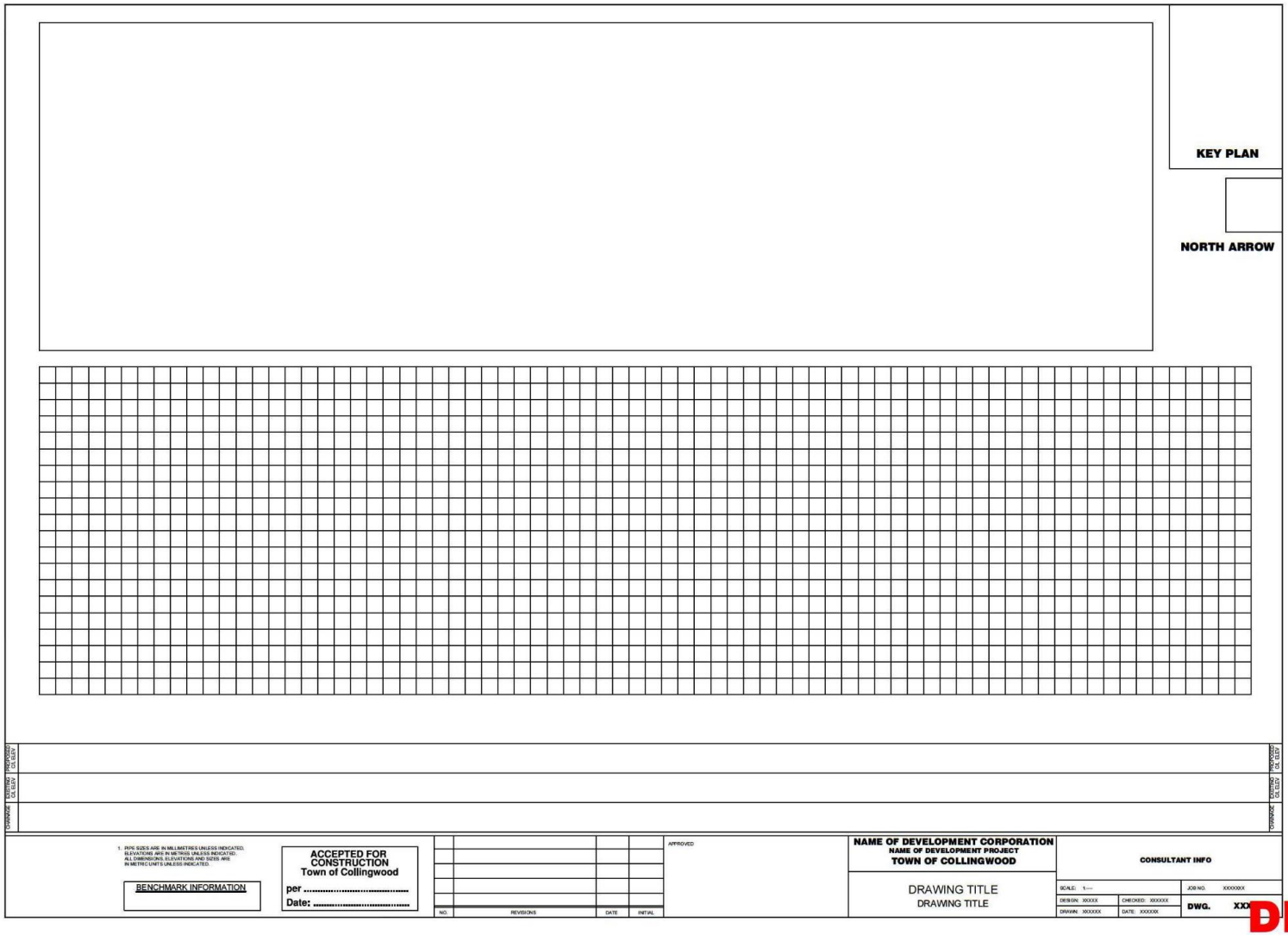


1.	VARIOUS REVISIONS		MAR/26
No.	REVISION	APR'D	DATE

TOWN OF COLLINGWOOD

STANDARD PLAN SHEET (HORIZONTAL TITLE BLOCK)

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	701



				TOWN OF COLLINGWOOD	DATE: JAN/03
					APR'D: EDH
					DRAWN: TATHAM
1.	VARIOUS REVISIONS		MAR/26	STANDARD PLAN & PROFILE SHEET	SCALE: NTS
No.	REVISION	APR'D	DATE		STD. No. 702

KEY PLAN

NORTH ARROW

1. PIPE SIZES ARE IN MILLIMETRES UNLESS INDICATED.
ELEVATIONS ARE IN METRES UNLESS INDICATED.
ALL DIMENSIONS, ELEVATIONS AND SIZES ARE IN METRIC UNITS UNLESS INDICATED.

BENCHM-RK INFORM-TION

ACCEPTED FOR CONSTRUCTION
Town of Collingwood
per .....
Date: .....

NO.	REVISIONS	DATE	INITIAL

APPROVED

NAME OF DEVELOPMENT CORPORATION
NAME OF DEVELOPMENT PROJECT
TOWN OF COLLINGWOOD

DRAWING TITLE
DRAWING TITLE

CONSULTANT INFO

SCALE: 1:---
JOB NO. XXXXXXX
DESIGN: XXXXX
CHECKED: XXXXXX
DRAWN: XXXXXX
DATE: XXXXXX
DWG. XXX

DRAFT

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

STANDARD PLAN SHEET (VERTICAL TITLE BLOCK)

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	703

LAYERING SCHEME

LAYER NAME	COLOR	LINETYPE	DESCRIPTION
1. EXISTING			
GENERAL:			
Bndry	4	bordex2	boundary line
Bordnock	7	cont.	title block
Bordsht	7	cont.	title block border
Bordtext	4	continuous	title block text
Bridges	2	continuous	bridges
Cline	10	center	centerline-end (or) baseline
Chinet	8	dashdot2	CNR railway
Comments	5	continuous	comments
Dim	3	continuous	dimension lines & text
Easmnt	1	dashed2	easement line
Gen1	7	continuous	notes
Gen2	4	continuous	notes
Grade	7	continuous	direction of grading
Grid	9	continuous	plan grid
Grid1	8	continuous	plan grid
Grid2	9	continuous	plan grid
Hydrant	180	continuous	hydrant symbol control
Logo	1	continuous	Town of Caledon logo
Lot	2	continuous	lot line
Match	7	continuous	matchline, limit of constr.
Misc	9	continuous	miscellaneous
No	4	continuous	north arrow
Numbers	9	continuous	municipal or lot numbers
Parking	9	dashed	parking
Pgrid	8	continuous	profile & X-section grid
Plan	7	cont.	plan view
Poles	2	continuous	poles
Pin	7	continuous	point number
Pinvis	7	continuous	point number (non-contourable)
PIB	7	continuous	text, leaders, dimension
PIB	7	continuous	text, leaders, dimension
PIS1	7	continuous	text, leaders, dimension
PIS2	7	continuous	text, leaders, dimension & vert. elev. on grid
PIS3	7	continuous	text
Remove	7	continuous	hatch pattern for objects to be removed
Removetpgrd	7	continuous	line painting removal
Rip-Rap	10	continuous	rip rap
Road	2	continuous	road
Road names	2	continuous	street names
Row	7	phantom2	right of way
Scratch	151	continuous	construction line
Shrub	100	continuous	top of bank
Slope	1	continuous	top or bottom slope, berm
Spotelev	1	continuous	spot elevation
Sta	51	continuous	road station & curve info.
Stnames	120	continuous	street names
Struct	7	continuous	building numbers
Streams	130	continuous	streams
Subshed	80	hidden	watershed sub-boundary
Swamps	40	continuous	swamp, area, marsh
Tcplpipe	41	continuous	Trans Canada Gas pipeline
Tick	7	continuous	tic marks
Towers	7	continuous	towers
Traffic	2	continuous	lane & pavement markings
Varicont	12	continuous	vertical control
Watershd	6	continuous	watershed area
SITE & ROAD:			
Bldgs	200	continuous	buildings
Dgnoclev	8	continuous	ex. ground elevation
Edge	8	continuous	ex. edge of trees
Edtxt	8	continuous	ex. text
Excl	8	center	ex. centerline and (or) baseline
Excurb	8	dashed2	ex. curb
Exditch	30	xditch	ex. ditch, swale
Exfence	8	xfence	ex. fence
Exgabion	23	continuous	ex. gabion baskets
Exguiral	50	continuous	ex. guiderail or post & wire
Exhipaint	53	continuous	ex. line painting
Exhipave	8	continuous	ex. edge of pavement
Expvmt	7	dashed2	ex. gravel
Exshldr	8	dashed2	ex. edge of shoulder
Exsw	8	dashed2	ex. sidewalk
Extrees	62	continuous	trees, vegetation
SEWER:			
Exculv	8	dashed2	ex. culvert
Exsanh	92	continuous	ex. sanitary, below info.
Exsanm	92	dashed2	ex. sanitary main
Exstmh	92	continuous	ex. sanitary manhole
Exsvce	92	xsans	ex. sanitary service
Exstm	8	continuous	ex. storm, below info.
Exstmh	8	center2	ex. storm main / subdrain
Exstmh	8	center2	ex. storm manhole
Exstmh	8	dashed2	ex. storm service
UTILITIES:			
Exbell	30	xbell	ex. bell
Excond	11	dashed	ex. conduit (traffic lights etc.)
Excty	96	xctv	ex. cable TV
Exhydr	151	xhydr	ex. hydrant
Exhydro	231	xhydro	ex. hydro
Exsprnk	132	dashed	ex. sprinkler system
Exwater	132	continuous	ex. notes, valve, ty.hydrant etc.
Exwaterm	132	xwaterm	ex. water main
Exwaters	132	xwaters	ex. water service
Exwv-hyd	132	continuous	ex. water valves & hydrants

LAYER NAME	COLOR	LINETYPE	DESCRIPTION
2. PROPOSED			
SITE & ROAD:			
Base	2	continuous	base plan
Curb	1	continuous	curb
Ditch	52	ditch	ditch line
Elev	2	continuous	ground elevation
Fence	2	dashed2	fence
Gabion	11	continuous	gabion baskets
Guiderail	6	fence2	guiderail or post & wire
Linepaint	7	continuous	line painting
Pavemnt	1	continuous	pavement edge
Prof	1	continuous	design profile
Shldr	20	hidden	shoulder edge
Sw	2	continuous	sidewalk
Text	7	continuous	text
Trees	3	continuous	trees, vegetation
SEWER:			
Culv	50	dashed	culverts
Gas	90	continuous	not incl. below info.
Sana	4	continuous	sanitary drainage area
Sanm	3	continuous	sanitary main
Sanmh	3	continuous	sanitary manhole
Sans	90	hidden	sanitary service
Stm	11	continuous	not incl. below info.
Stma	4	phantom2	storm drainage area
Stmh	5	dashed	storm main / subdrain
Stmm	5	continuous	storm manhole
Stms	5	dashed	storm service
UTILITIES:			
Bell	52	dashed2	bell
Cond	11	center2	conduit (traffic lights etc.)
Cty	2	dashed2	cable TV
Gas	2	center2	gas main
Hydro	6	dashed2	hydro
Sprnk	4	center2	sprinkler system
Water	4	continuous	notes, water valve, ty.hydrant etc.
Waterm	4	center2	water main
Waters	4	waters	water service
3. DRAINAGE PLANS			
SANITARY:			
Catchmnt	210	continuous	sanitary drainage divide
Subcatch	140	hidden	subcatchment boundary
Localmain	3	hidden2	local boundary
Zoning	7	continuous	zoning boundary
STORM:			
Exwat005	2	continuous	ex. watershed boundary - 5 year storm
Exwat100	11	continuous	ex. watershed boundary - 100 year storm
Fwat005	2	continuous	future watershed boundary - 5 yr storm
Fwat100	2	continuous	future watershed boundary - 100 yr storm
Exsub005	2	hidden	existing subcatchment - 5 year
Exsub100	133	hidden	existing subcatchment - 100 year
Fsub005	133	hidden	future subcatchment - 5 year
Fsub100	153	hidden	future subcatchment - 100 year
Localstm	11	hidden2	local boundary

LAYERING SCHEME FOR DWH-DTM (IF APPLICABLE)

TTM	8	continuous	triangulated terrain models (TTM)
DTMbrk	8	continuous	TTM breaklines
INDcont	2	continuous	index contours (5m)
INTERcnt	8	continuous	intermediate contours (1m)
AUXcont	1	continuous	auxiliary contours (0.5m)
Elev	2	continuous	point & breakline data, annotation text
Pgrid	8	continuous	profile and X-section grid
Poly	13	continuous	polygons
Exsec	2	continuous	ex. ground X-sections
Dsec	3	continuous	design X-sections
Exprof	8	dashed2	ex. ground profile
Prof	60	continuous	design profile

LAYERING SCHEME FOR AUWPROF (IF APPLICABLE)

Pdim	2	continuous	dimension lines
PIB	7	continuous	90 leroy text
P100	2	continuous	100 leroy text
P140	60	continuous	120 leroy text
Pgrid	8	continuous	profile grid
Prof	60	continuous	design profile
Psym	3	continuous	design profile
Submh	3	continuous	sanitary manhole
Stmh	5	phantom	storm main
Stmmh	5	phantom	storm manhole
Watermh	130	center2	water main

STANDARD DRAWING NAMES

TITLE - TITLE, KEY PLAN, LIST OF DRAWINGS SHEET
SITE1 - SITE PLAN OR LAYOUT PLAN (*)
SITE1 - SITE PLAN OR LAYOUT PLAN (*)
GEN1 - GENERAL SERVICE PLANS (*)
SAN1 - SANITARY DRAINAGE AREA (*)
STM1 - STORM DRAINAGE AREA (*)
G1 - GRADING PLANS (*)
PP1 - PLAN AND PROFILE DRAWING (*)
P1 - PLAN VIEW DRAWING (*)
DET1 - GENERAL NOTES & DETAIL SHEETS (*)
STR1 - STRUCTURAL DRAWING DETAIL (*)
SS1 - STREETSCAPING DRAWING (*)
ALT1 - ALTERNATIVE (*)
CON1 - CONCEPT DRAWING (*)
* - THE NUMBER INDICATES THE SHEET

FOR CONTRACT WHERE THERE ARE PART 'A' AND 'B' ADD'L TR DRAWING NAMES WITH 'A' OR 'B' AFTER THE DRAWING NUMBER, i.e. PP1A, PP1B. FOR DRAWINGS GENERAL TO BOTH PARTS, USE GEN1 AFTER THE DRAWING NAME, i.e. SANGEN1, DETGEN1

LINETYPE

	NAME
	BORDER
	BORDER2
	CENTER
	CENTER2
	DASHDOT
	DASHED
	DASHED2
	DIVIDE
	DIVIDER2
	DOT
	HIDDEN
	HIDDEN2
	PHANTOM
	PHANTOM2
	DITCH
	XDITCH
SAN	XSANS
WS	WATERS
W	XWATERS
	XWATERM
	XBELL
	XCTV
X	XFENCE
G	XGAS
U/H	XHYDRO
	FENCELINE1
	FENCELINE2
	ROW
	SANS

PLOTTER PEN ASSIGNMENTS

(PLOT BLACK)

PEN COLOR #	PEN #	PEN WIDTH (MM) CALCOMP
1	1	0.300
2	2	0.250
3	3	0.350
4	4	0.300
5	5	0.350
6	6	0.300
7	7	0.350
8	8	0.150
9	9	0.150
10	10	0.250
11	11	0.150
12	12	0.250
13	13	0.250
20	20	0.250
29	29	0.150
30	30	0.150
32	32	0.250
40	40	0.250
41	41	0.150
50	50	0.250
51	51	0.250
52	52	0.250
53	53	0.350
60	60	0.300
62	62	0.150
90	90	0.250
91	91	0.250
92	92	0.150
130	130	0.250
132	132	0.150
140	140	0.250
150	150	0.250
151	151	0.250
200	200	0.500
210	210	0.250
231	231	0.150

SYMBOLS

SYMBOL	LAYER	DESCRIPTION
C.M. , S.I.B. , S.S.I.B.	SURV	CONCRETE MONUMENT, STANDARD IRON BAR, SHORT STANDARD IRON BAR
I.B. , STK. , P.K.	SURV	IRON BAR, STAKE, NAIL
R.I.B. , I.P.	SURV	ROUND IRON BAR, IRON PIPE
C.C.	SURV	CUT CROSS
B.M. , G.B.M.	SURV	BENCH MARK, GEODETIC BENCH MARK
G.S.M.#	SURV	GEODETIC SURVEY MONUMENT (2nd Order)
P.I.	SURV	POINT OF INTERSECTION
B.H.#	SURV	BORE HOLE
R.C.S.	CNRAIL	RAILWAY CROSSING SIGN
S.B.	CNRAIL	SIGNAL BOX
	CNRAIL	RAILWAY TRACKS
R.W. / PROP. G.S. / PROP. R.W.	EXGDRAIL	GUIDE RAIL
	EXBASE	RETAINING WALL
	GUIDERAIL	PROPOSED GUIDE RAIL
	BASE	PROPOSED RETAINING WALL
x x x	EXFENCE	FENCE (INDICATE TYPE)
	EXDITCH	DITCH
x x x	FENCE	PROP. FENCE (INDICATE TYPE)
	DITCH	PROPOSED DITCH
H.P. , S.P.	BYLAYER	HYDRO POLE, BELL POLE
G.W.	BYLAYER	GUY WIRE
G.S. , S.S. , M.S.	BYLAYER	GAS SIGN, BELL SIGN, MONUMENT SIGN
B.B. , H.B. , CTV.B.	BYLAYER	BELL BOX, HYDRO BOX, CABLE TV BOX
POLE (DESCRIPTION)	MISC	MISC. POLE (ie. Clothline)
SIGN	MISC	SIGN POST (SPECIFY)
U.MH.	MISC	UTILITY MANHOLE (OTHER)
S.S. , T.S.	EXBASE	STOP SIGN, TRAFFIC SIGN
POST	EXBASE	POSTS
P.M.	PARKING	SINGLE PARKING METER
P.M.	PARKING	DOUBLE PARKING METER
L.P. , T.L.	EXHYDRO	LIGHT POLE, TRAFFIC LIGHT
H.MH.	EXHYDRO	HYDRO MANHOLE
E.MH.	EXHYDRO	ELECTRICAL MANHOLE (TRAFFIC LIGHTS)
B.MH.	EXBELL	BELL MANHOLE
	EXBELL	TELEPHONE BOOTH
HYD.	EXWATER , WATER	FIRE HYDRANT
V.#	EXWATER , WATER	WATER VALVE
	EXWATER , WATER	CURB STOP
	WATER	WATERMAIN CROSS, TEE
	WATER	WATERMAIN CAP, REDUCER
	WATER	FIRE HYDRANT (IN PROFILE)
G.V.	EXGAS	GAS VALVE
	EXGRNDELEV	EXISTING GROUND POINT
	BYLAYER	VAULT
	BYLAYER	GABION BASKET, STONE
	EXBASE	RIP RAP
	EXBASE	ROCK
WELL	EXBASE	WELL
EXSANMH , SANMH	EXSANMH , SANMH	SANITARY MANHOLE
STM.MH.	EXSTMMH , STMMH	STORM MANHOLE
C.B.MH.	EXSTMMH , STMMH	CATCH BASIN MANHOLE
C.B.	EXSTMMH , STMMH	SINGLE CATCH BASIN
D.C.B. , D.C.B.MH.	EXSTMMH , STMMH	DOUBLE CATCH BASIN, DOUBLE CATCH BASIN MANHOLE
D.I.C.B.	EXSTMMH , STMMH	DITCH INLET CATCH BASIN
	EXCULV	CULVERT
	EXWAMPS	SWAMP, MARSH
	EXTREES	TREE LINE, HEDGE
	EXTREES	DECIDUOUS, CONIFEROUS TREE , STUMP (TREE SIZES WILL BE IN 100mm INCREMENTS)
	EXTREES	DECIDUOUS AND CONIFEROUS SHRUBS
	REMOVE	HATCHING FOR OBJECTS TO BE REMOVED (SCALE OF HATCHING TO BE IN PROPORTION TO THE ITEM TO BE REMOVED)

BLOCK SYMBOLS

NOTE: THERE ARE 2 TYPES OF BLOCKS, FIRST WITH TEXT ONLY AND SECOND WITH AN ATTRIBUTE. ATTRIBUTED CAN BE ADJUSTED BY USING COMMAND: ATTEDIT
BLOCKS ARE DRAWN TO METRIC 1:1 SCALE AND ARE INCLUDED IN CITY OF BARRIE PROTOTYPE DRAWING BARRIETYPE.DWG
TREE SIZES (DIA.) WILL BE IN 100mm INCREMENTS.

BLOCK	BLOCK NAME
C.M. S.I.B. S.S.I.B. I.B. STK P.K. C.C. R.I.B. I.P. B.M. G.S.M. P.I.	CM SIB SSIB IB STK PK CC RIB IP BM GSM PI
R.C.S. S.B. S.S. T.S. P.M. P.M.	RCS SB SS TS SIGN POST PM1 PM2 EG
H.P. G.W. L.P. T.L. POLE B.P. B.B. G.S. M.S. M.S.	HP GW LP TL POLE BP BB GS MS N
C.S.M.H. D.T.M. M.H. D.C.M.H. C.B. D.C.B. D.I.C.B.	SANMH STMMH CBMH DCBMH CB DCB DICB CULV TREELINE HEDGE
B.M. B.B. H.B. C.T.V.B. U.MH. C.T.V.B.	BMH BB PHONE HMH EMH HB UMH CTVB DSHRUB CSHRUB
HYD. W.V. C.S. PHYD PWV PCS CAP CROSS TEE REDUCER PROP. FIRE HYDRANT HYD-PROP	HYD WV CS PHYD PWV PCS CAP CROSS TEE REDUCER
G.V. VAULT RIPRAP SWAMP ROCK WELL	GV VAULT RIPRAP SWAMP ROCK WELL

BLOCKS WITH ATTRIBUTES

BLOCK	BLOCK NAME
PROP.SANI. PROP.S.M.H. PROP.C.B. PROP.D.C.B. PROP.D.I.C.B. PROP.S.M.H.	PSTMMH PCBMH PDCBMH PCB PDCB PDICB
PROP.SANI. M1 1 2 3 4 5 6 7 8	
	PEANMH D1 D2 D3 D4 D5 D6 D7 D8
1.8 1.9 1.10 1.11 1.12 1.13 1.14 100	
	D9 D10 D11 D12 D13 D14 D15
C1 C2 C3 C4 C5 C6 C7 C8 C9	
	C10 C11 C12 C13 C14 C15
STUMP1 STUMP2 STUMP3 STUMP4 STUMP5 STUMP6 STUMP7 STUMP8 STUMP9	
	STUMP10 STUMP11 STUMP12 STUMP13 STUMP14 STUMP15 DBM BH

1. PIPE SIZES ARE IN MILLIMETRES UNLESS INDICATED. ELEVATIONS ARE IN METRES UNLESS INDICATED. ALL DIMENSIONS, ELEVATIONS AND SIZES ARE IN METRIC UNITS UNLESS INDICATED.

TBM INFORMATION

ACCEPTED FOR CONSTRUCTION
Town of Collingwood
per .....
Date: .....

NO.	REVISIONS	DATE	INITIAL

APPROVED

NAME OF DEVELOPMENT CORPORATION
NAME OF DEVELOPMENT PROJECT
TOWN OF COLLINGWOOD

DRAWING TITLE
DRAWING TITLE

CONSULTANT INFO

SCALE: 1:---
JOB NO. XXXXXXX
DESIGN: XXXXX CHECKED: XXXXXX
DRAWN: XXXXXX DATE: XXXXXX
DWG. XXXXX

DRAFT

SINCE 1858 A PLACE TO LIVE WORK & PLAY
COLLINGWOOD

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

TOWN OF COLLINGWOOD

STANDARD EXISTING SYMBOLS

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	704

200Ø SAN	PROPOSED SANITARY SEWER/ SIZE/ DIRECTION OF FLOW
450Ø STM	PROPOSED STORM SEWER/ SIZE/ DIRECTION OF FLOW
150Ø WATERMAIN	WATERMAIN/SIZE
	PROPOSED SANITARY SERVICE
	PROPOSED WATER SERVICE
	PROPOSED DITCH
	PROPERTY LINE
	LOT LINE
	PROPOSED CENTERLINE
	PROPOSED EDGE OF ASPHALT
	PROPOSED EDGE OF SHOULDER
SAN MH2	PROPOSED SANITARY MANHOLE/ NUMBER
C.O.	PROPOSED SANITARY CLEANOUT
DICB	PROPOSED DITCH INLET CATCHBASIN
STM MH2	PROPOSED STORM MANHOLE/ NUMBER
CB	PROPOSED CATCHBASIN
DCB	PROPOSED DOUBLE CATCHBASIN
	PROPOSED HEADWALL
	PROPOSED CULVERT
	PROPOSED RIPRAP
HYD & WV	PROPOSED HYDRANT & WATER VALVE
WV	PROPOSED WATER VALVE
CSV	PROPOSED WATER CURB STOP
VC	PROPOSED WATER VALVE CHAMBER
PRVC	PROPOSED PRESSURE REDUCING WATER VALVE CHAMBER
ARVC	PROPOSED AIR RELIEF VALVE CHAMBER
	PROPOSED BLOWOFF
	PROPOSED WATERMAIN TEE
	PROPOSED WATERMAIN ELBOW
	PROPOSED WATERMAIN PLUG AND THRUST BLOCK

No.	REVISION	APR'D	DATE
1.	VARIOUS REVISIONS		MAR/26

NOTE:
1. COMPLETE LEGEND IN DIGITAL FORMAT INCLUDING LAYERING, LINE TYPES, PEN WEIGHTS AND BLOCKS AVAILABLE UPON REQUEST FROM THE ENGINEERING DEPARTMENT.

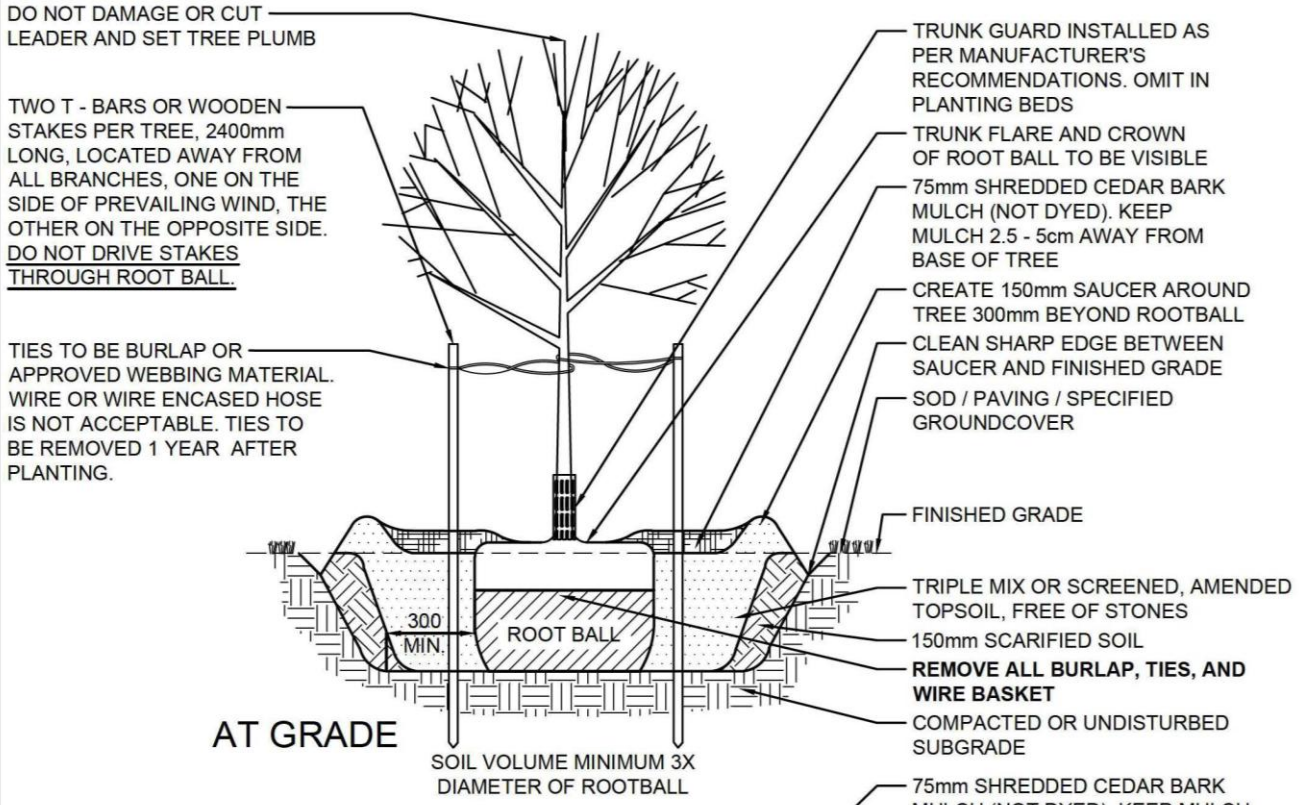
DRAFT

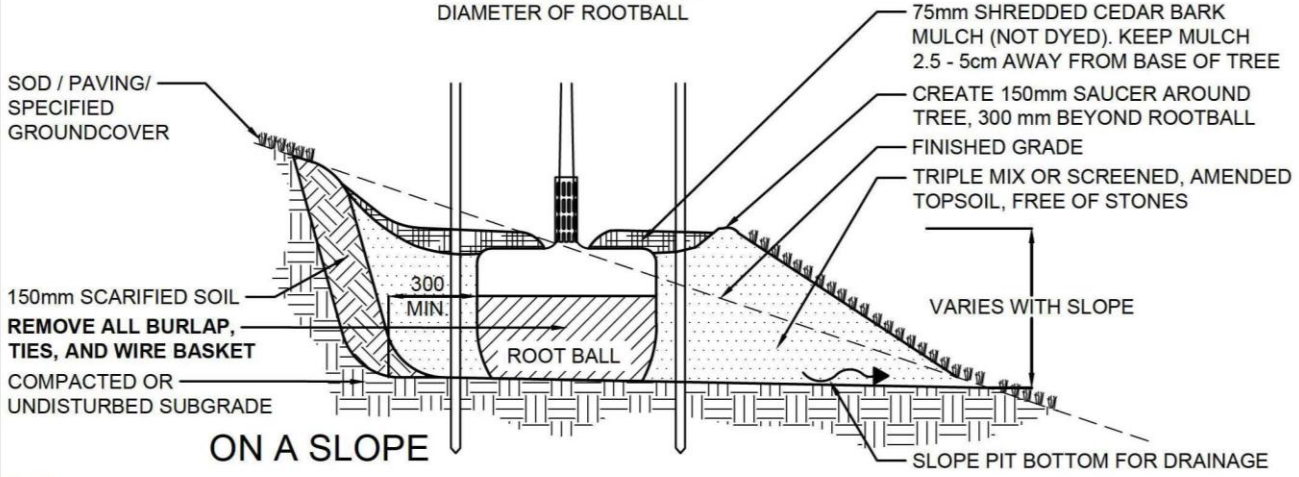
COLLINGWOOD — SINCE 1858 A PLACE TO LIVE WORK & PLAY

TOWN OF COLLINGWOOD

STANDARD SYMBOLS PROPOSED FEATURES

DATE:	JAN/03
APR'D:	EDH
DRAWN:	TATHAM
SCALE:	NTS
STD. No.	705





NOTES

1. DO NOT ALLOW AIR POCKETS WHEN BACKFILLING. ADD SOIL IN 4" LIFTS, TAMPING DOWN BETWEEN EACH LIFT.
2. POSITION CROWN OF ROOT BALL 50mm ABOVE FINISHED GRADE TO ALLOW FOR SETTLING.
3. ONLY REMOVE DEAD LIMBS AT TIME OF PLANTING.
4. FOR TREES PLANTED WITHIN PLANTING OR SHRUB BEDS, OMIT SAUCER AROUND BASE OF TREE.
5. NO TREE PITS SHALL BE LEFT OPEN OVERNIGHT.
6. TREES SHALL BE WATERED AT THE TIME OF PLANTING.
7. REMOVE ALL TAGS, TAPE, ROPE, AND OTHER EXCESS MATERIALS IMMEDIATELY AFTER PLANTING.
8. ALL DIMENSIONS ARE IN MILLIMETRES.

3.	PLANTING METHODOLOGY	AB	MAR/26
2.	PLANTING METHODOLOGY	DW	JUN/07
1.	PLANTING METHODOLOGY	EN	JUL/04
No.	REVISION	APR'D	DATE

TOWN OF COLLINGWOOD

DECIDUOUS TREE PLANTING

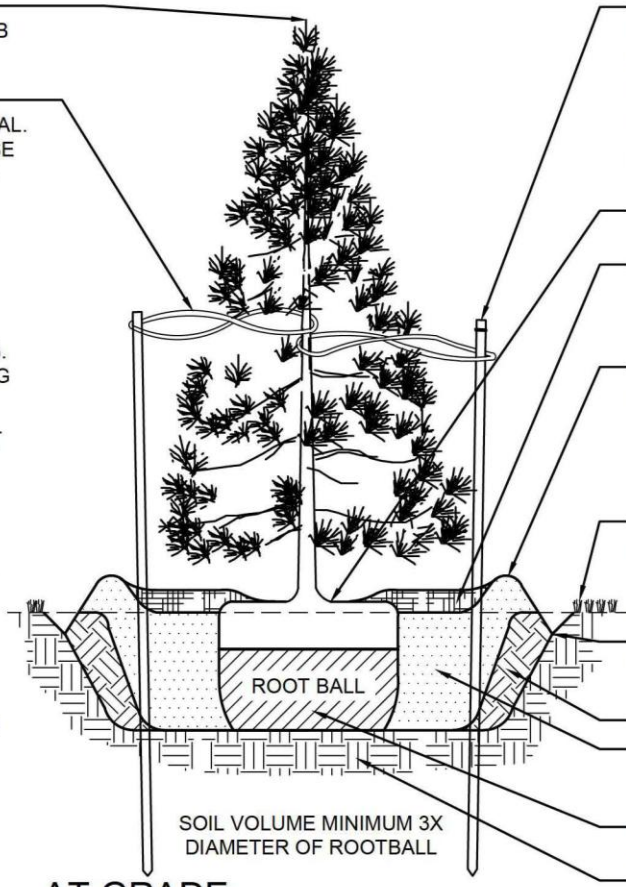
DATE:	JAN/03
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No.	1101

DO NOT DAMAGE OR CUT LEADER AND SET TREE PLUMB

TIES TO BE BURLAP OR APPROVED WEBBING MATERIAL. WIRE OR WIRE ENCASED HOSE IS NOT ACCEPTABLE. TIES TO BE REMOVED 1 YEAR AFTER PLANTING.

NOTES

1. DO NOT ALLOW AIR POCKETS WHEN BACKFILLING. ADD SOIL IN 4" LIFTS, TAMPING DOWN BETWEEN EACH LIFT.
2. POSITION CROWN OF ROOT BALL 50mm ABOVE FINISHED GRADE TO ALLOW FOR SETTLING.
3. FOR TREES PLANTED WITHIN PLANTING OR SHRUB BEDS, DELETE SAUCER AROUND BASE OF TREE.
4. NO TREE PITS SHALL BE LEFT OPEN OVERNIGHT.
5. TREES SHALL BE WATERED AT THE TIME OF PLANTING
6. ALL DIMENSIONS ARE IN MILLIMETRES.



TWO T - BARS OR WOODEN STAKES PER TREE, 2400mm LONG, LOCATED AWAY FROM ALL BRANCHES, ONE ON THE SIDE OF PREVAILING WIND, THE OTHER ON THE OPPOSITE SIDE. DO NOT DRIVE STAKES THROUGH ROOT BALL.

TRUNK FLARE AND CROWN OF ROOT BALL TO BE VISIBLE

75mm SHREDDED CEDAR BARK MULCH (NOT DYED). KEEP MULCH 2.5 - 5cm AWAY FROM BASE OF TREE

CREATE 150mm SAUCER AROUND TREE

SOD / PAVING/ SPECIFIED GROUNDCOVER

FINISHED GRADE

CLEAN SHARP EDGE BETWEEN EDGE OF SAUCER AND FINISHED GRADE

150mm SCARIFIED SOIL

TRIPLE MIX OR SCREENED, AMENDED TOPSOIL, FREE OF STONES

REMOVE ALL BURLAP, TIES, AND WIRE BASKET

COMPACTED OR UNDISTURBED SUBGRADE

AT GRADE

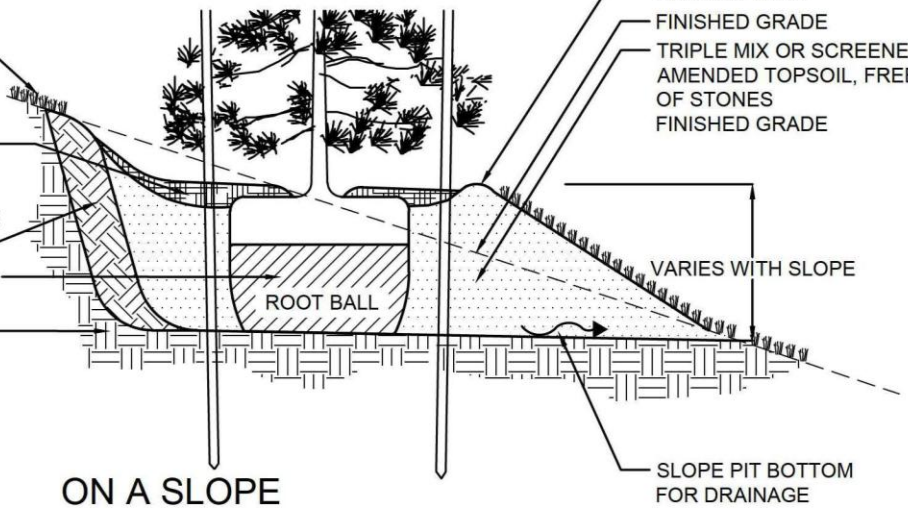
SOD / PAVING/ SPECIFIED GROUNDCOVER

75mm SHREDDED CEDAR BARK MULCH (NOT DYED). KEEP MULCH 2.5 - 5cm AWAY FROM BASE OF TREE

150mm SCARIFIED SOIL

REMOVE ALL BURLAP, TIES, AND WIRE BASKET

COMPACTED OR UNDISTURBED SUBGRADE



CREATE 150mm SAUCER AROUND TREE

FINISHED GRADE

TRIPLE MIX OR SCREENED, AMENDED TOPSOIL, FREE OF STONES FINISHED GRADE

SLOPE PIT BOTTOM FOR DRAINAGE

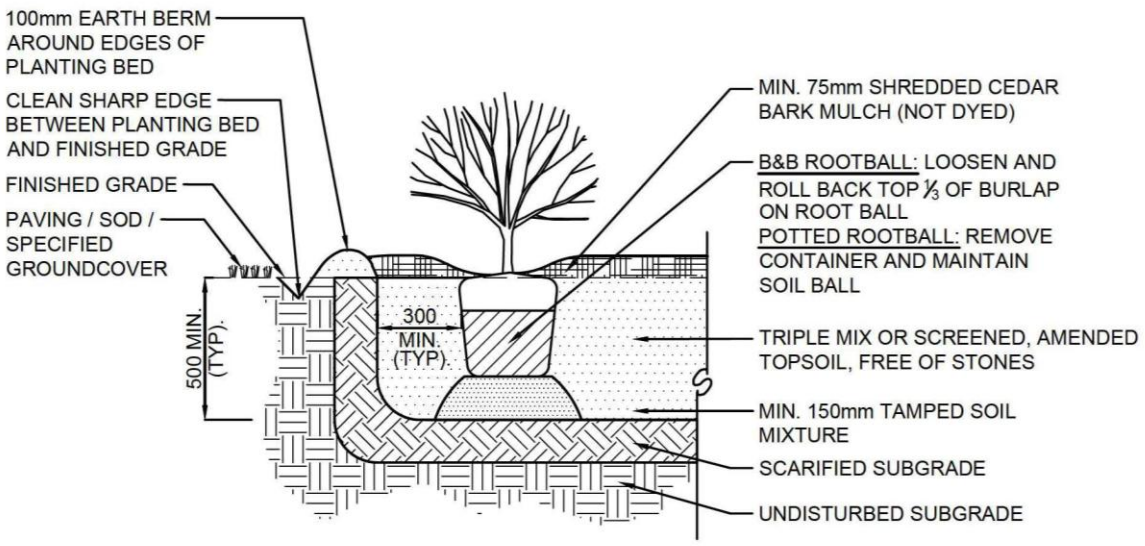
ON A SLOPE

No.	REVISION	APR'D	DATE
3.	PLANTING METHODOLOGY	AB	MAR/26
2.	PLANTING METHODOLOGY	DW	JUN/07
1.	PLANTING METHODOLOGY	EN	JUL/04

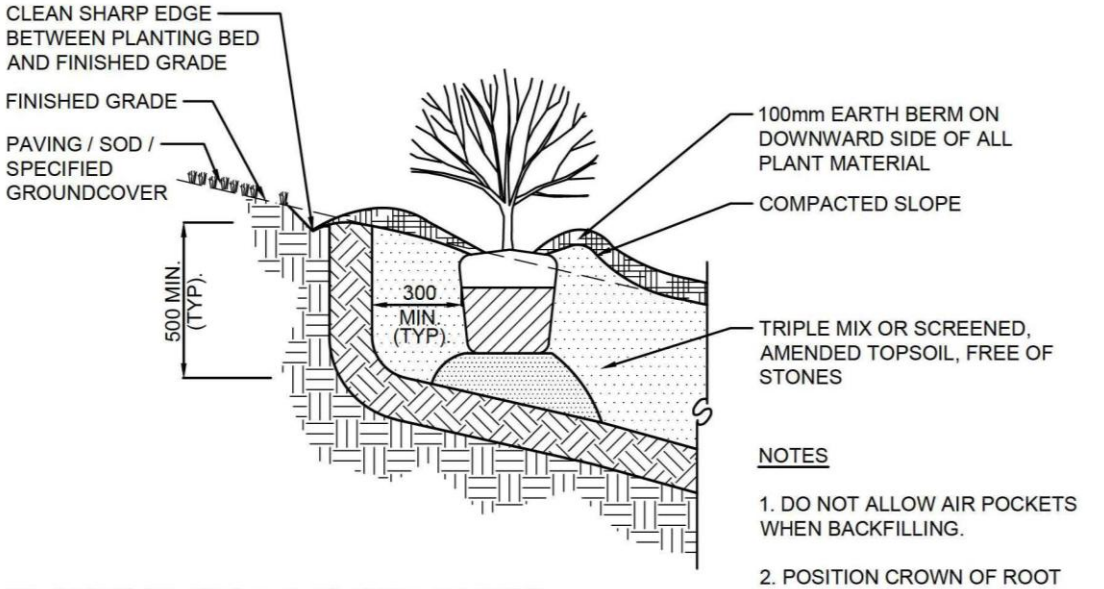
TOWN OF COLLINGWOOD

CONIFEROUS TREE PLANTING

DATE:	JAN/03
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No.	1102



TYPICAL SHRUB PLANTING



PLANTING ON 3:1 SLOPE DETAIL

NOTES

1. DO NOT ALLOW AIR POCKETS WHEN BACKFILLING.

2. POSITION CROWN OF ROOT BALL 25mm ABOVE FINISH GRADE TO ALLOW FOR SETTLING.

3. ALL DIMENSIONS IN MILLIMETRES.

No.	REVISION	APR'D	DATE
3.	PLANTING METHODOLOGY	AB	MAR/26
2.	PLANTING METHODOLOGY	DW	JUN/07
1.	PLANTING METHODOLOGY	EN	JUL/04

TOWN OF COLLINGWOOD

SHRUB PLANTING

DATE:	JAN/03
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No. 1103	

NOTES

1. CONTRACTOR SHALL REVIEW ALL INFORMATION IN THE DRAWINGS, DETAILS, AND SPECIFICATIONS FOR THIS PROJECT AND REPORT ANY DISCREPANCIES OR SUBSTITUTIONS TO THE CONTRACT ADMINISTRATOR IN WRITING PRIOR TO COMMENCEMENT OF WORK.
2. CONTRACTOR IS RESPONSIBLE FOR ALL SERVICE AND UTILITY LOCATES.
3. PLANT MATERIAL SHALL BE IN ACCORDANCE WITH THE CANADIAN LANDSCAPE STANDARD (LATEST EDITION), PUBLISHED BY THE CANADIAN NURSERY LANDSCAPE ASSOCIATION AND THE CANADIAN SOCIETY OF LANDSCAPE ARCHITECTS, EXCEPT WHERE SPECIFIED OTHERWISE.
4. ALL PLANTS SHALL BE SUPPLIED AS SPECIFIED IN THE PLANT LIST. SUBSTITUTIONS WILL NOT BE ACCEPTED UNLESS APPROVED IN WRITING BY THE LANDSCAPE ARCHITECT.
5. ALL MATERIALS TO BE APPROVED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
6. DEPICTED ON THIS PLAN ARE THE SPECIES AND THE APPROXIMATE LOCATION OF TREES. THE EXACT LOCATION OF THE TREES WILL BE STAKED ON SITE BY THE CONTRACTOR AND APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO PLANTING.
7. FURTHER TO THE ABOVE, TREES ARE TO BE LOCATED AS INDICATED ON THE APPLICABLE STANDARD ROAD CROSS-SECTION AND IN CONSIDERATION OF THESE MINIMUM SETBACK DISTANCES:

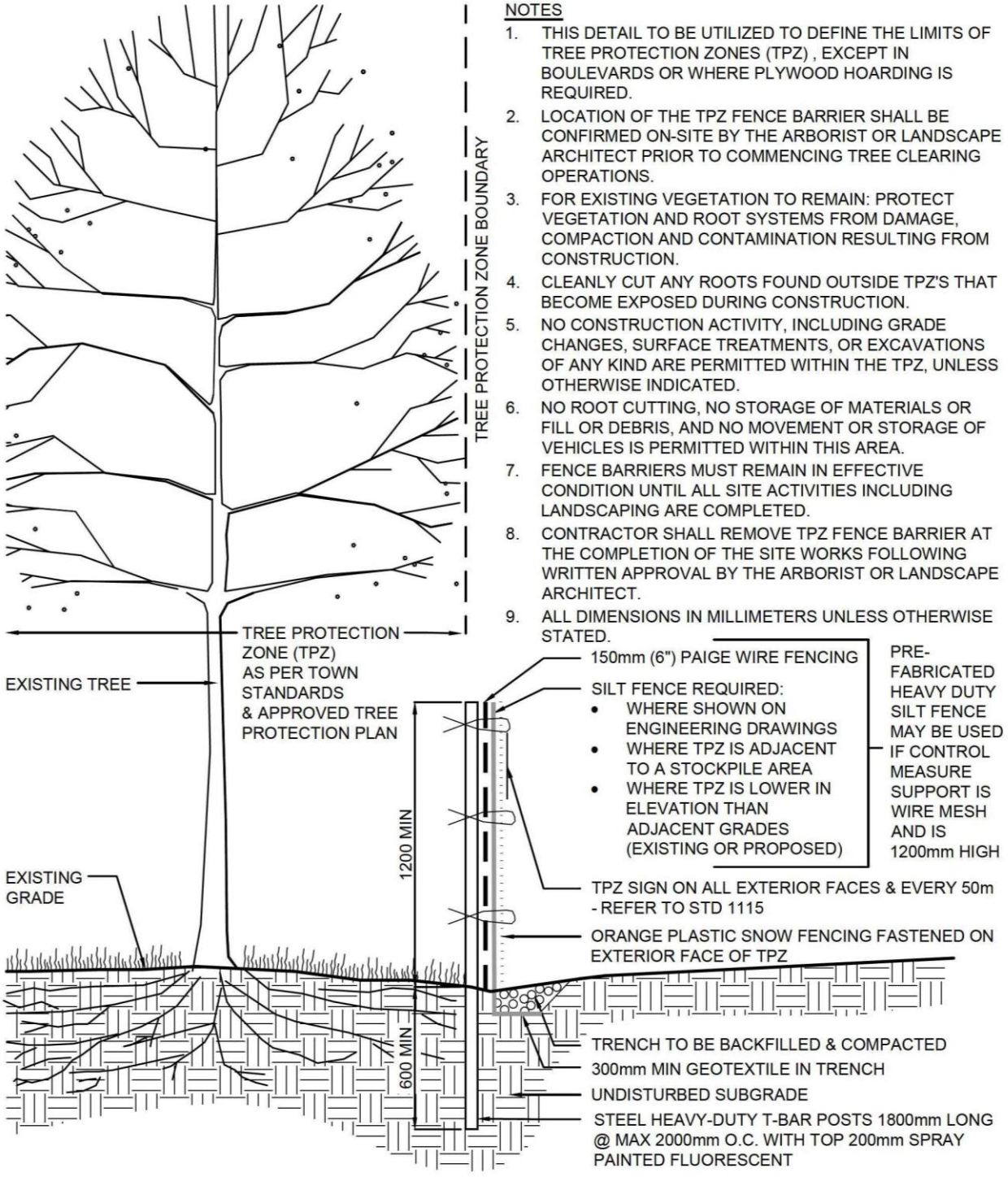
• RESIDENTIAL DRIVEWAY	1.5m
• COMMERCIAL/INDUSTRIAL DRIVEWAY	3.0m & OUTSIDE SIGHT TRIANGLE
• NEIGHBOURHOOD MAILBOX	2.0m
• WATER VALVE	1.0m
• FIRE HYDRANT	3.0m
• HYDRO VAULT/TRANSFORMER	1.2m (SIDES), 3.0m (FRONT)
• LIGHT STANDARD	5.0m (TREE CANOPY ≥ 8.0m AT MATURITY)
	3.0m (TREE CANOPY < 8.0m AT MATURITY)
• UTILITY PEDESTAL	1.0m
• STOP/CROSSWALK/WARNING SIGN	20.0m
• REGULATORY ROAD SIGN (NO PARKING)	3.0m

No.	REVISION	APR'D	DATE

TOWN OF COLLINGWOOD

NOTES
BOULEVARD TREE PLANTING

DATE:	MAR/26
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No. 1105	



NOTES

1. THIS DETAIL TO BE UTILIZED TO DEFINE THE LIMITS OF TREE PROTECTION ZONES (TPZ) , EXCEPT IN BOULEVARDS OR WHERE PLYWOOD HOARDING IS REQUIRED.
2. LOCATION OF THE TPZ FENCE BARRIER SHALL BE CONFIRMED ON-SITE BY THE ARBORIST OR LANDSCAPE ARCHITECT PRIOR TO COMMENCING TREE CLEARING OPERATIONS.
3. FOR EXISTING VEGETATION TO REMAIN: PROTECT VEGETATION AND ROOT SYSTEMS FROM DAMAGE, COMPACTION AND CONTAMINATION RESULTING FROM CONSTRUCTION.
4. CLEANLY CUT ANY ROOTS FOUND OUTSIDE TPZ'S THAT BECOME EXPOSED DURING CONSTRUCTION.
5. NO CONSTRUCTION ACTIVITY, INCLUDING GRADE CHANGES, SURFACE TREATMENTS, OR EXCAVATIONS OF ANY KIND ARE PERMITTED WITHIN THE TPZ, UNLESS OTHERWISE INDICATED.
6. NO ROOT CUTTING, NO STORAGE OF MATERIALS OR FILL OR DEBRIS, AND NO MOVEMENT OR STORAGE OF VEHICLES IS PERMITTED WITHIN THIS AREA.
7. FENCE BARRIERS MUST REMAIN IN EFFECTIVE CONDITION UNTIL ALL SITE ACTIVITIES INCLUDING LANDSCAPING ARE COMPLETED.
8. CONTRACTOR SHALL REMOVE TPZ FENCE BARRIER AT THE COMPLETION OF THE SITE WORKS FOLLOWING WRITTEN APPROVAL BY THE ARBORIST OR LANDSCAPE ARCHITECT.
9. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.

No.	REVISION	APR'D	DATE

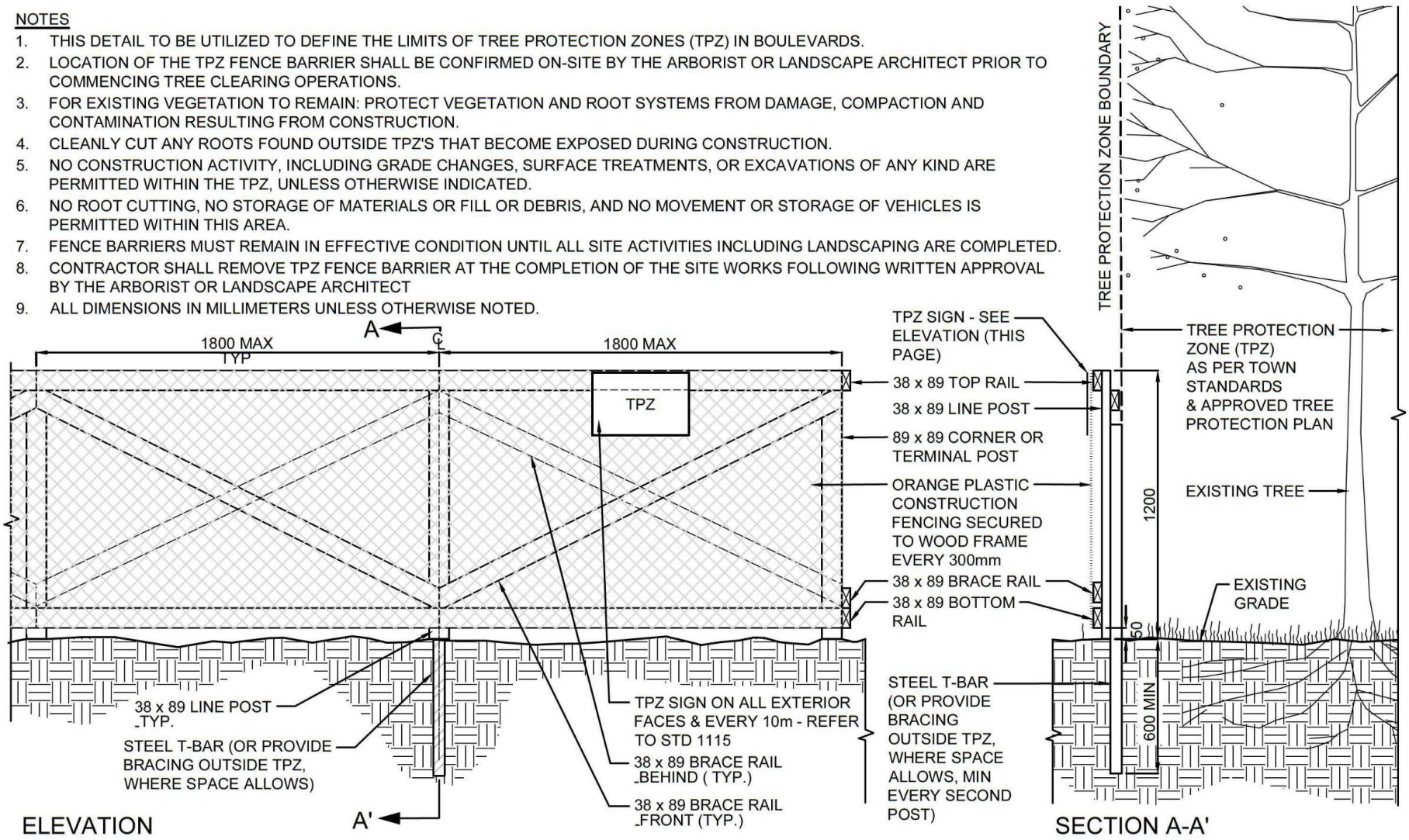
TOWN OF COLLINGWOOD

TREE PROTECTION
- TYPICAL

DATE:	MAR/26
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No. 1110	

NOTES

1. THIS DETAIL TO BE UTILIZED TO DEFINE THE LIMITS OF TREE PROTECTION ZONES (TPZ) IN BOULEVARDS.
2. LOCATION OF THE TPZ FENCE BARRIER SHALL BE CONFIRMED ON-SITE BY THE ARBORIST OR LANDSCAPE ARCHITECT PRIOR TO COMMENCING TREE CLEARING OPERATIONS.
3. FOR EXISTING VEGETATION TO REMAIN: PROTECT VEGETATION AND ROOT SYSTEMS FROM DAMAGE, COMPACTION AND CONTAMINATION RESULTING FROM CONSTRUCTION.
4. CLEANLY CUT ANY ROOTS FOUND OUTSIDE TPZ'S THAT BECOME EXPOSED DURING CONSTRUCTION.
5. NO CONSTRUCTION ACTIVITY, INCLUDING GRADE CHANGES, SURFACE TREATMENTS, OR EXCAVATIONS OF ANY KIND ARE PERMITTED WITHIN THE TPZ, UNLESS OTHERWISE INDICATED.
6. NO ROOT CUTTING, NO STORAGE OF MATERIALS OR FILL OR DEBRIS, AND NO MOVEMENT OR STORAGE OF VEHICLES IS PERMITTED WITHIN THIS AREA.
7. FENCE BARRIERS MUST REMAIN IN EFFECTIVE CONDITION UNTIL ALL SITE ACTIVITIES INCLUDING LANDSCAPING ARE COMPLETED.
8. CONTRACTOR SHALL REMOVE TPZ FENCE BARRIER AT THE COMPLETION OF THE SITE WORKS FOLLOWING WRITTEN APPROVAL BY THE ARBORIST OR LANDSCAPE ARCHITECT
9. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.

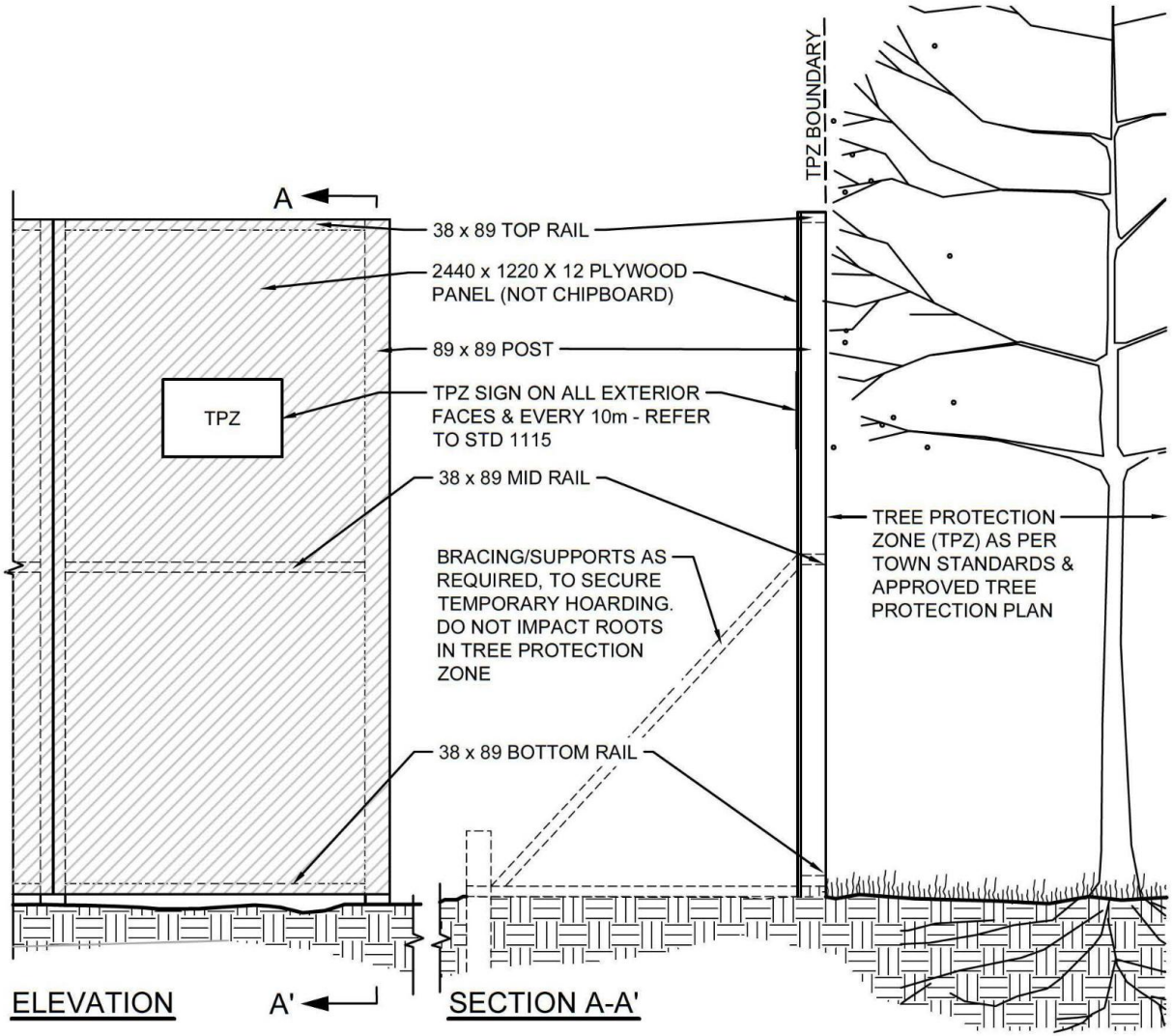


No.	REVISION	APR'D	DATE

TOWN OF COLLINGWOOD

TREE PROTECTION _BOULEVARD

DATE:	MAR/26
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No.	1111



NOTES

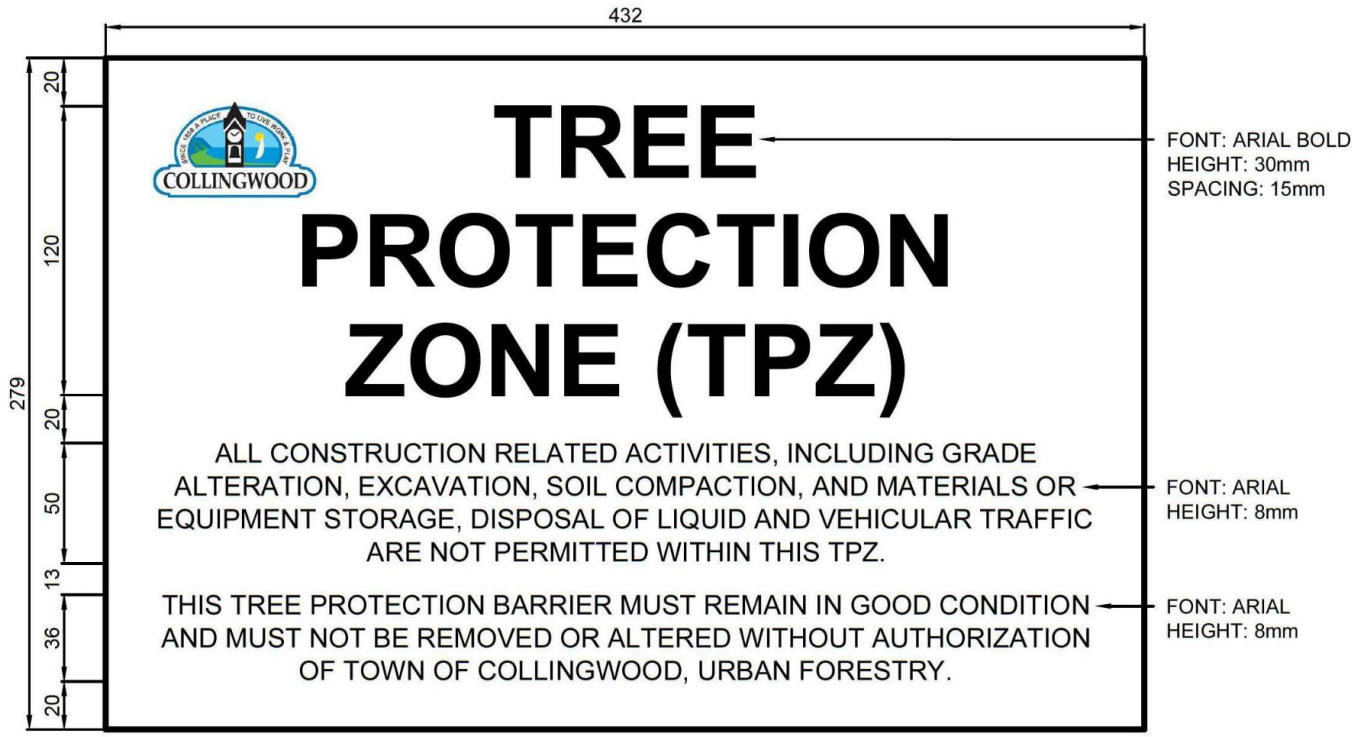
1. THIS DETAIL TO BE UTILIZED TO DEFINE THE LIMITS OF TREE PROTECTION ZONES (TPZ) IN CONSTRAINED LOCATIONS OR WHERE ADDITIONAL PROTECTION IS DEEMED APPROPRIATE BY THE TOWN.
2. LOCATION OF THE TPZ FENCE BARRIER SHALL BE CONFIRMED ON-SITE BY THE ARBORIST OR LANDSCAPE ARCHITECT PRIOR TO COMMENCING TREE CLEARING OPERATIONS.
3. FOR EXISTING VEGETATION TO REMAIN: PROTECT VEGETATION AND ROOT SYSTEMS FROM DAMAGE, COMPACTION AND CONTAMINATION RESULTING FROM CONSTRUCTION.
4. CLEANLY CUT ANY ROOTS FOUND OUTSIDE TPZ'S THAT BECOME EXPOSED DURING CONSTRUCTION.
5. NO CONSTRUCTION ACTIVITY, INCLUDING GRADE CHANGES, SURFACE TREATMENTS, OR EXCAVATIONS OF ANY KIND ARE PERMITTED WITHIN THE TPZ, UNLESS OTHERWISE INDICATED.
6. NO ROOT CUTTING, NO STORAGE OF MATERIALS OR FILL OR DEBRIS, AND NO MOVEMENT OR STORAGE OF VEHICLES IS PERMITTED WITHIN THIS AREA.
7. FENCE BARRIERS MUST REMAIN IN EFFECTIVE CONDITION UNTIL ALL SITE ACTIVITIES INCLUDING LANDSCAPING ARE COMPLETED.
8. CONTRACTOR SHALL REMOVE TPZ FENCE BARRIER AT THE COMPLETION OF THE SITE WORKS FOLLOWING WRITTEN APPROVAL BY THE ARBORIST OR LANDSCAPE ARCHITECT.
9. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.

No.	REVISION	APR'D	DATE

TOWN OF COLLINGWOOD

TREE PROTECTION _HOARDING

DATE:	MAR/26
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No.	1112



NOTES

1. SIGNS MUST BE FABRICATED FROM WEATHER RESISTANT MATERIAL.
2. SIGNS ARE TO BE SECURELY FASTENED AND PLACED AT 50 METER INTERVALS ALONG ALL TREE PROTECTION FENCING, UNLESS OTHERWISE NOTED.
3. SIGNS MUST REMAIN POSTED FOR THE DURATION OF THE PROJECT OR UNTIL APPROVAL TO REMOVE TREE PROTECTION FENCING IS PROVIDED BY THE TOWN.
4. ALL DIMENSION ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISION	APR'D	DATE

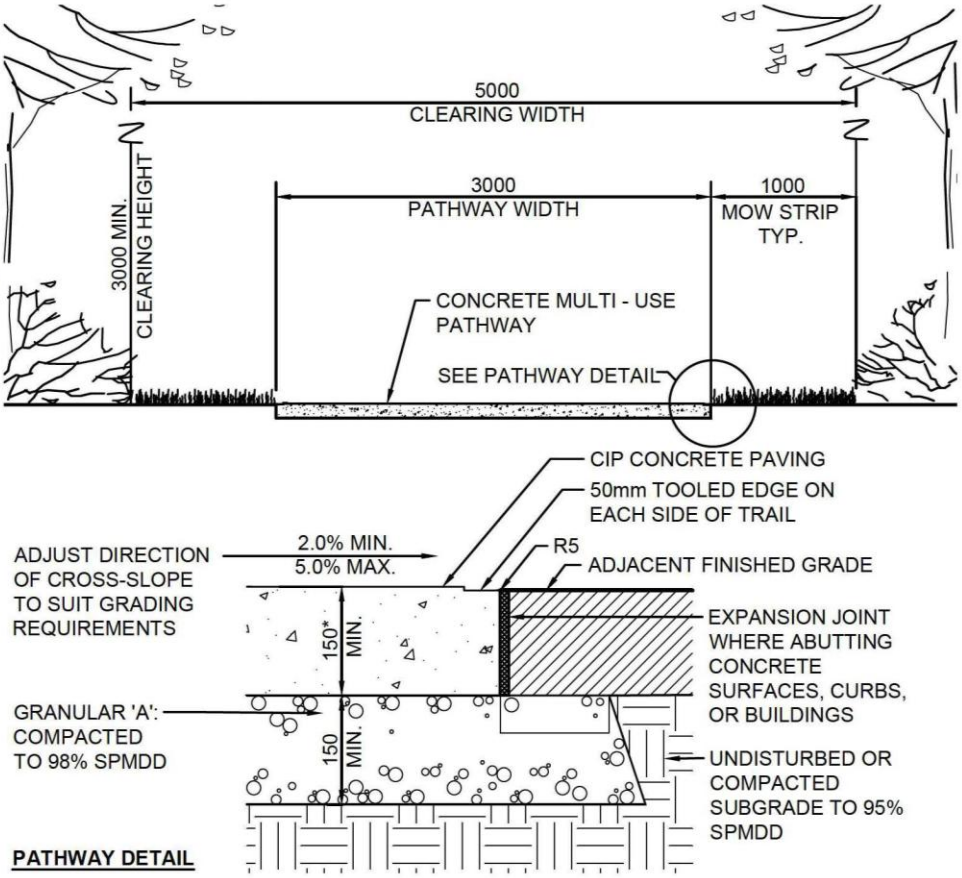
TOWN OF COLLINGWOOD

TREE PROTECTION ZONE SIGN

DATE:	MAR/26
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No.	1115

NOTES

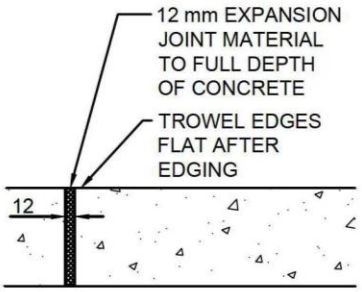
1. THE TRAIL CROSS-SECTION REPRESENTS TYPICAL LAYOUT REQUIREMENTS FOR A 3.0m MULTI-USE PATHWAY.
2. WHERE DEEMED NECESSARY BY THE TOWN, THE PATHWAY AND CLEARING WIDTHS MAY BE INCREASED OR DECREASED TO REFLECT SITE CONDITIONS, USER VOLUMES, AND/OR ANTICIPATED USER ACTIVITIES.
3. FOR ALL PATHWAY WIDTHS, THE MOW STRIP SHALL BE 1.0m ON EACH SIDE. THE TOWN MAY REQUIRE REDUCED MOW-STRIPS TO RESPOND TO SITE CONSTRAINTS OR TO PROTECT TREES.



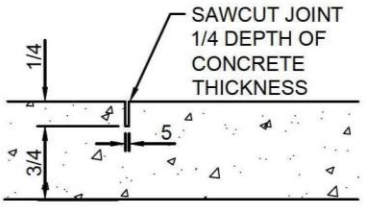
PATHWAY DETAIL

NOTES

1. EXCAVATE ALL TOPSOIL AND ORGANIC MATTER UNDER TRAIL BED.
2. STANDARD DETAIL REFLECTS IDEAL SUBGRADE CONDITIONS ON COMPACTED WELL DRAINED SOIL. ADDITIONAL GRANULAR MATERIAL MAY BE REQUIRED TO ADDRESS SITE-SPECIFIC CONDITIONS.
3. CONCRETE PAVING SHALL BE IN ACCORDANCE OPSS.MUNI 351.
4. GRANULAR BASE SHALL BE GRANULAR 'A' IN ACCORDANCE WITH OPSS.MUNI 314.
5. CONCRETE TO BE 32MPa COMPRESSIVE STRENGTH, C-2 EXPOSURE AT 28 DAYS WITH 5% TO 7% AIR ENTRAINMENT.
6. CONCRETE THICKNESS AT COMMERCIAL/INDUSTRIAL DRIVEWAYS TO BE 200mm.
7. FINISH: LIGHT BROOM FINISH, PERPENDICULAR TO GENERAL DIRECTION OF PEDESTRIAN TRAVEL.
8. PLACE CONTROL JOINTS AT 3.0m O/C AND EXPANSION JOINTS AT 6.0m O/C.
9. EXPANSION JOINTS: FULL DEPTH EXPANSION BOARD WITH JOINT EDGES TROWELED FLAT TO MATCH PANEL GRADE. RAISED TOOLED JOINT EDGES WILL NOT BE ACCEPTED.
10. CONTROL JOINTS: SAW CUT TO 1/4 DEPTH.
11. SLAB EDGES: OUTSIDE EDGES OF SLAB SHALL BE TOOLED WITH 50mm EDGER.
12. ROADWAY & DRIVEWAY CROSSINGS SHALL BE IN ACCORDANCE WITH PROVINCIAL AND MUNICIPAL CROSSING AND ACCESSIBILITY STANDARDS.



EXPANSION JOINT DETAIL



CONTROL JOINT DETAIL

No.	REVISION	APR'D	DATE
5.	UPDATED NOTES		JAN/26
4.	UPDATED JOINTS AND PATHWAY WIDTHS		JUNE/23
3.	UPDATED NOTES & DIMENSIONS		SEPT/12
2.	REVISE DETAIL NAME AND NUMBERING		APRIL/12

COLLINGWOOD

SINCE 1858 A PLACE TO LIVE WORK & PLAY

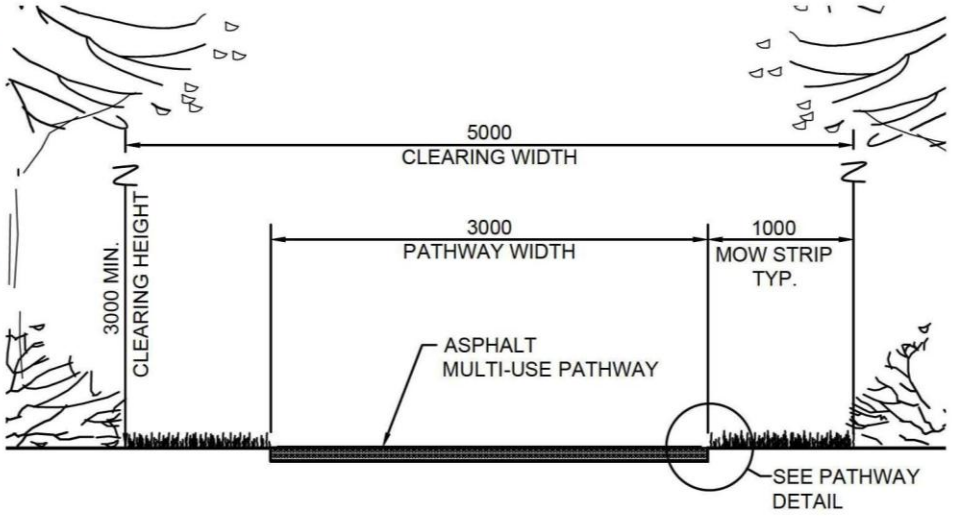
TOWN OF COLLINGWOOD

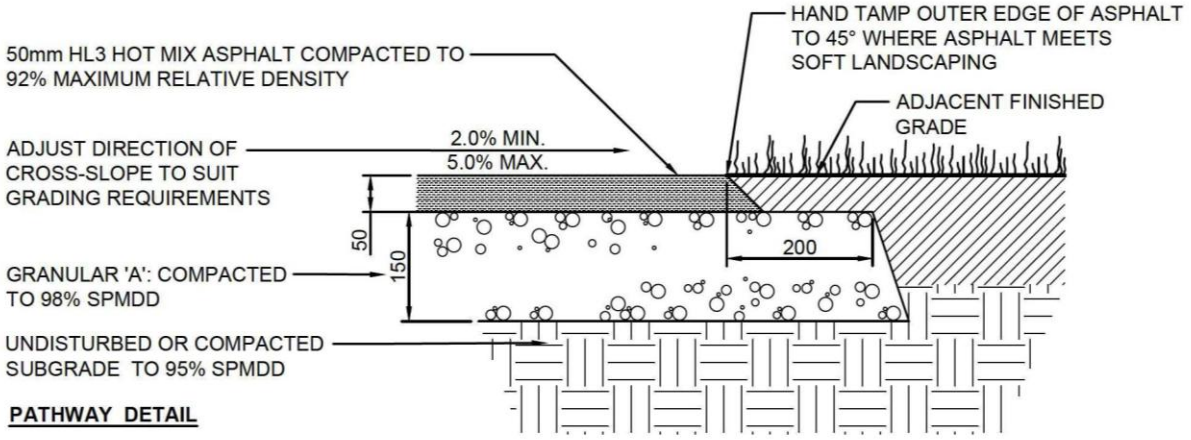
CONCRETE MULTI-USE PATHWAY

DATE:	JAN/03
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No.	1120

NOTES

1. THE TRAIL CROSS-SECTION REPRESENTS TYPICAL LAYOUT REQUIREMENTS FOR A 3.0m ASPHALT MULTI-USE PATHWAY.
2. WHERE DEEMED NECESSARY BY THE TOWN, THE PATHWAY AND CLEARING WIDTHS MAY BE INCREASED OR DECREASED TO REFLECT SITE CONDITIONS, USER VOLUMES, AND/OR ANTICIPATED USER ACTIVITIES.
3. FOR ALL PATHWAY WIDTHS, THE MOW STRIP SHALL BE 1.0m ON EACH SIDE. THE TOWN MAY REQUIRE REDUCED MOW-STRIPS TO RESPOND TO SITE CONSTRAINTS OR TO PROTECT TREES.





PATHWAY DETAIL

NOTES

1. EXCAVATE ALL TOPSOIL AND ORGANIC MATTER UNDER TRAIL BED.
2. STANDARD DETAIL REFLECTS IDEAL SUBGRADE CONDITIONS ON COMPACTED WELL DRAINED SOIL. ADDITIONAL GRANULAR MATERIAL MAY BE REQUIRED TO ADDRESS SITE SPECIFIC CONDITIONS.
3. HOT MIX ASPHALT FOR PATHWAYS SHALL BE IN ACCORDANCE WITH OPSS.MUNI 311.
4. GRANULAR BASE SHALL BE GRANULAR 'A' IN ACCORDANCE WITH OPSS.MUNI 314.
5. ROLL ASPHALT CONTINUOUSLY TO ACHIEVE NOT LESS THAN 92% MAXIMUM RELATIVE DENSITY.
6. DO NOT BACKFILL AGAINST ASPHALT FOR MIN. OF 48 HOURS.
7. ROADWAY & DRIVEWAY CROSSINGS SHALL BE IN ACCORDANCE WITH PROVINCIAL AND MUNICIPAL CROSSING AND ACCESSIBILITY STANDARDS.
8. DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.

No.	REVISION	APR'D	DATE
3.	UPDATED NOTES		JAN/26
2.	UPDATED NOTES		JUNE/23
1.	UPDATED NOTES & DIMENSIONS		SEPT/12

COLLINGWOOD

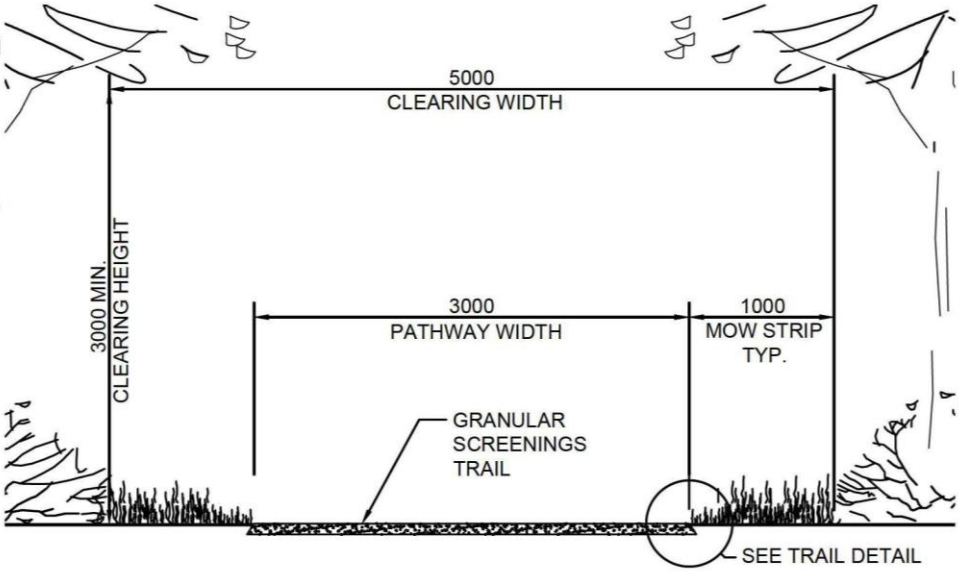
TOWN OF COLLINGWOOD

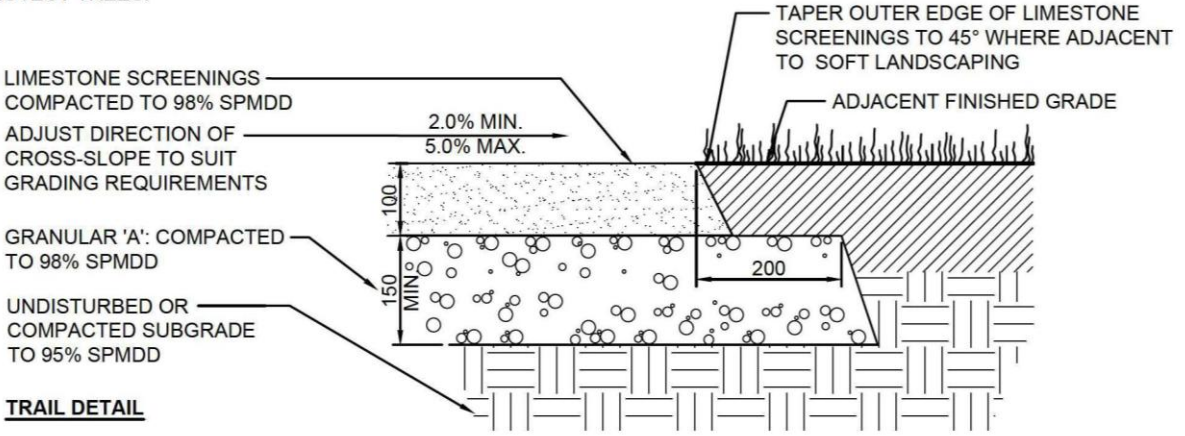
ASPHALT MULTI-USE PATHWAY

DATE:	APRIL/12
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No.	1121

NOTES

1. THE TRAIL CROSS-SECTION REPRESENTS TYPICAL LAYOUT REQUIREMENTS FOR A 3.0m GRANULAR SCREENINGS TRAIL.
2. WHERE DEEMED NECESSARY BY THE TOWN, THE TRAIL AND CLEARING WIDTHS MAY BE INCREASED OR DECREASED TO REFLECT SITE CONDITIONS, USER VOLUMES, AND/OR ANTICIPATED USER ACTIVITIES.
3. FOR ALL TRAIL WIDTHS, THE MOW STRIP SHALL BE 1.0m ON EACH SIDE. THE TOWN MAY REQUIRE REDUCED MOW-STRIPS TO RESPOND TO SITE CONSTRAINTS OR TO PROTECT TREES.





TRAIL DETAIL

NOTES

1. EXCAVATE ALL TOPSOIL AND ORGANIC MATTER UNDER TRAIL BED.
2. STANDARD DETAIL REFLECTS IDEAL SUBGRADE CONDITIONS ON COMPACTED WELL DRAINED SOIL. ADDITIONAL GRANULAR MATERIAL MAY BE REQUIRED TO SUIT CONDITIONS.
3. LIMESTONE SCREENINGS SHALL BE CLEAN, HARD, DURABLE, CRUSHED STONE PARTICLES, FREE FROM CLAY LUMPS, CEMENTATION, ORGANIC, FROZEN, AND/OR OTHER DELETERIOUS MATERIALS, IN ACCORDANCE WITH OPSS.MUNI.1001 AND MEETING THE FOLLOWING GRADATION (PERCENTAGE PASSING BY DRY WEIGHT): 9.5mm SIEVE AT 100%, 4.75mm SIEVE AT 70-90%, 2.00mm SIEVE AT 40-70%, 0.425mm SIEVE AT 10-30%, 0.075mm SIEVE AT LESS THAN 5%.
4. GRANULAR BASE SHALL BE GRANULAR 'A' IN ACCORDANCE WITH OPSS.MUNI 314.
5. IN AREAS WHERE FULL ORGANIC REMOVAL CANNOT BE ACHIEVED OR IN AREAS WHERE WETTER SOILS ARE PRESENT, TERRAFIX 2415 GEOTEXTILE (OR APPROVED EQUAL) MAY BE INSTALLED UNDER THE GRANULAR BASE. THE GEOTEXTILE SHALL EXTEND 200mm BEYOND THE BASE LAYER ON EACH SIDE OF THE TRAIL AND BE BURIED.
6. ROADWAY & DRIVEWAY CROSSINGS SHALL BE IN ACCORDANCE WITH PROVINCIAL AND MUNICIPAL CROSSING AND ACCESSIBILITY STANDARDS.
7. DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.

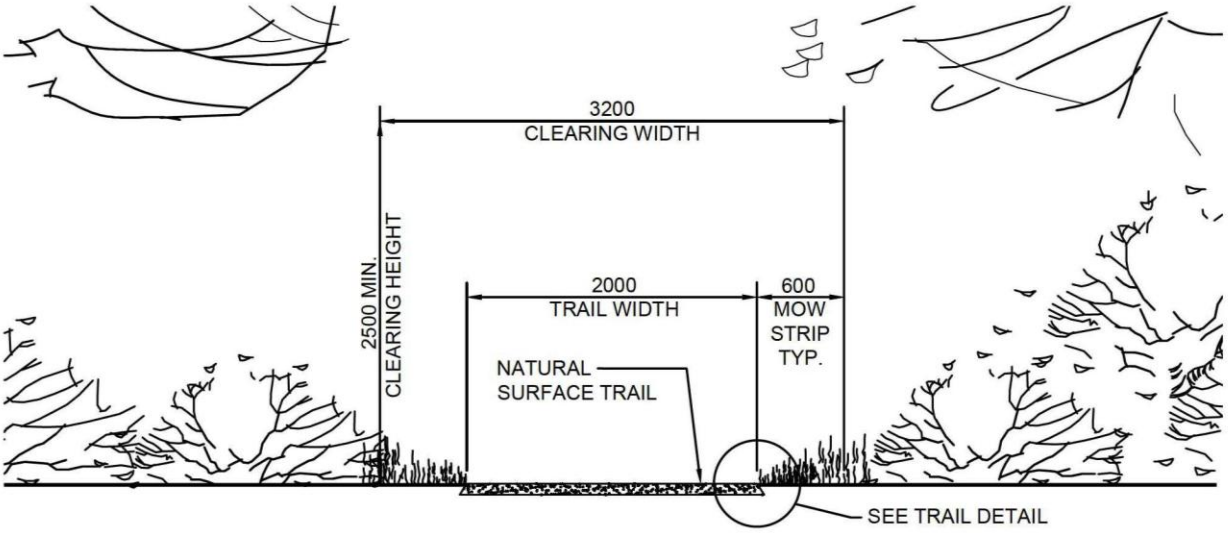
No.	REVISION	APR'D	DATE
5.	UPDATED NOTES		JAN/26
4.	UPDATED NOTES		JUNE/23
3.	UPDATED NOTES & DIMENSIONS		SEPT/12
2.	REVISED PROFILE, AND DETAIL NAME & NUMBERING		APRIL/12

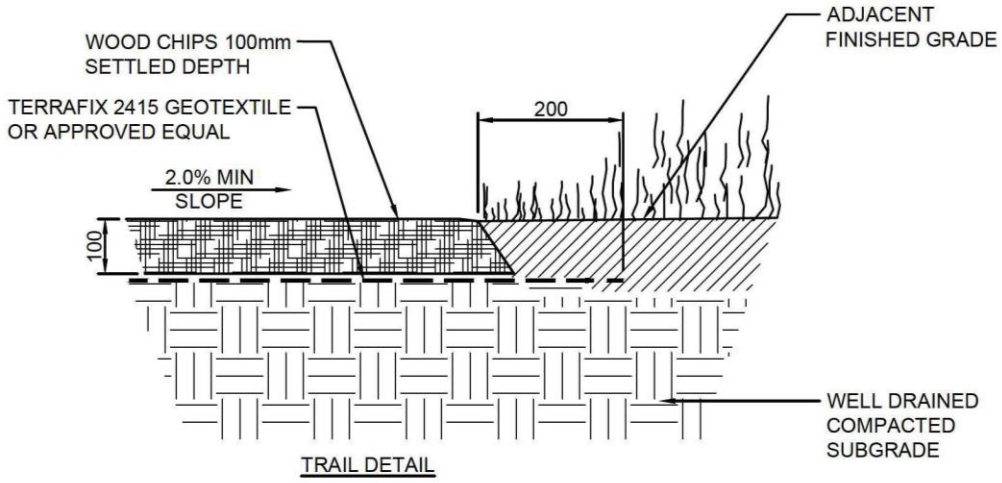
SINCE 1858 A PLACE TO LIVE WORK & PLAY
COLLINGWOOD

TOWN OF COLLINGWOOD

GRANULAR SCREENINGS TRAIL

DATE:	JAN/03
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No.	1122





TRAIL DETAIL

NOTES

1. STANDARD DETAIL REFLECTS IDEAL SUBGRADE CONDITIONS ON COMPACTED WELL DRAINED SOIL. ADDITIONAL MATERIAL MAY E REQUIRED TO SUIT CONDITIONS.
2. THE 2415 GEOTEXTILE IS TO BE USED UNDER IDEAL AND DRY SOIL CONDITIONS. GEOTEXTILE REQUIREMENTS MAY BE UPGRADED TO SUIT SOIL CONDITIONS AND MAY REQUIRE THE USE OF GEO-GRIDS OR WOVEN FABRICS.
3. DIRECTION OF CROSS SLOPE SHALL BE ADJUSTED TO SUIT GRADING REQUIREMENTS.
4. DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.

No.	REVISION	APR'D	DATE
4.	UPDATED NOTES		MAR/26
3.	UPDATED NOTES & DIMENSIONS		SEPT/12
2.	REVISED GEOTEXTILE AND DETAIL NAME & NUMBERING		APRIL/12
1.	ADDITION OF CONSTRUCTION DETAIL		DEC/07

COLLINGWOOD

TOWN OF COLLINGWOOD

NATURAL SURFACE TRAIL

DATE:	JAN/03
APR'D:	TOWN
DRAWN:	ETi
SCALE:	NTS
STD. No. 1123	

Appendix C:
GIS Data Submissions

In recent years the Town of Collingwood, has progressively changed how various asset data is utilized by departments in the organization, by embracing and implementing a Geographic Information System (GIS). To streamline and standardize the inputting of information, the Town is developing digital data submission requirements that are received from consultants, builders, and developers. Consistent file type submissions, formatting, and data attributes will assist with efficient data editing/updating, which will assist with ensuring the Town's GIS asset repository is timely and accurate.

Accepted for Construction and As-Built Drawing submissions that are sent to GIS should include the following data/documents. Documents submitted are to be in Shapefile, CAD, and PDF formats. File geodatabase containing feature classes are also acceptable.

The standard coordinate system for the Town is the Universal Transverse Mercator (UTM) Zone 17 North with the North American Datum 1983 "NAD83 (Original)". All CAD digital submissions must be geo-referenced.

Projected Coordinate System: UTM NAD 1983 Zone 17N (Original)

Projection: Transverse Mercator

Geographic Coordinate System: GCS North American 1983

Datum: North American 1983

Linear Unit: Metre

LAYER NAME	[FIELD NAME] and associated attributes
Storm Nodes	**[INSTALL YEAR]** ▪ Year of Installation ▪ **[T/G Z]** ▪ Top of grate elevation **[NODETYPE]** ▪ Inlet ▪ Maintenance hole ▪ Outlet **[NODESUBTYPE]** ▪ CB – catch basin ▪ CBMH – catch basin maintenance hole ▪ DCB – double catch basin ▪ DCBMH – double catch basin maintenance hole ▪ DDICB double ditch inlet catch basin ▪ DICBMH – ditch inlet catch basin maintenance hole ▪ MH – maintenance hole ▪ RLCB – rear lot catch basin ▪ RLDICB – rear lot ditch inlet catch basin ▪ TCB – triple catch basin
Storm Sewer	**[DIAMETER]** ▪ mm **[INSTALL YEAR]** ▪ Year of installation **[UPNODE_ID]** **[UPINVERT]** **[DOWNNODE_ID]** **[DOWNINVERT]** **[SLOPE]** **[MATERIAL]** ▪ Concrete ▪ Asbestos Cement ▪ HDPE ▪ Polypropylene ▪ PVC ▪ Other
Storm Culverts	**[INSTALL YEAR]** ▪ Year of installation **[DIAMETER]** ▪ mm **[CROSSSECTION SHAPE]** ▪ Circular ▪ Rectangle ▪ Oval ▪ Box

	▪ Arch **[MATERIAL]** **[SLOPE]** **[UPINVERT]** **[DOWNINVERT]**
Storm Pond	**[INSTALLYEAR]** ▪ Year of Installation **[STORAGEVOLUME]** **[DESCRIPTION]**
Storm Laterals	**[INSTALLYEAR]** ▪ Year of Installation

LAYER NAME	[FIELD NAME] and associated attributes
Sidewalk	**[WIDTH]** ▪ mm **[INSTALL YEAR]** ▪ Year of Installation **[MATERIAL]** ▪ Concrete ▪ Asphalt
Streetlights	**[INSTALL YEAR]** ▪ Year of installation **[LIGHTCOUNT]** **[FIXTUREHEIGHT]** **[ARMLENGTH]** **[WIRELOCATION]** ▪ Underground ▪ Overhead **[POLEOWNER]** ▪ Town ▪ Utility **[POLEMATERIAL]** ▪ Cast Aluminum ▪ Concrete ▪ Sectional Steel ▪ Wood **[LED]** ▪ Yes ▪ No **[WATTAGE]**

LAYER NAME	[FIELD NAME] and associated attributes
wHydrants	**[INSTALLYEAR]** **[HYDRANTTYPE]** ▪ Century 3 Port Draining ▪ Mueller ▪ Other – add comment **[ENDHYDRANT]** ▪ Yes ▪ No **[FLOWRATE]** ▪ AA Blue (<95.0 L/s [>1500GPM]) ▪ A Green (63.3-95.0 L/s [1000-1499 GPM]) ▪ B Orange (31.7-63.3 L/s [500-999 GPM]) ▪ C – Red (3.71 L/s [<500 GPM])
wMains	**[DIAMETER]** ▪ mm **[INSTALLYEAR]** **[MATERIAL]** ▪ PVC ▪ Asbestos Cement ▪ Cast Iron ▪ Cured in Place Pipe ▪ Ductile Iron ▪ HDPE ▪ Concrete
wLaterals	**[INSTALLYEAR]** **[DIAMETER]** ▪ mm **[MATERIAL]** ▪ PVC ▪ Copper **[LINETYPE]** ▪ Service ▪ Hydrant

wValves	**[DIAMETER]** ▪ mm **[INSTALLYEAR]** ▪ Year of Installation **[TYPE]** ▪ System ▪ Control ▪ Air Release Valve ▪ Blow off **[SUBTYPE]** ▪ Ball ▪ Butterfly ▪ Cone ▪ Gate ▪ Plug ▪ Backflow ▪ Live Tap
wCurbStop	**[DIAMETER]** ▪ mm **[INSTALLYEAR]** ▪ Year of Installation **[SUBTYPE]** ▪ Ball ▪ Butterfly ▪ Cone ▪ Gate ▪ Plug ▪ Backflow ▪ Live Tap

LAYER NAME	
Sanitary Sewer	**[DIAMETER]** ▪ mm **[INSTALLYEAR]** ▪ Year of Installation **[PIPETYPE]** ▪ Forcemain ▪ Gravity ▪ Overflow ▪ Siphon **[MATERIAL]** ▪ Concrete ▪ Asbestos Cement ▪ HDPE ▪ Polypropylene ▪ PVC ▪ Other **[UPNODE_ID]** **[UPINVERT]** **[DOWNNODE_ID]** **[SLOPE]**
Sanitary_Nodes	**[INSTALLYEAR]** ▪ Year of Installation **[RIM_Z]** ▪ Rim elevation
Sanitary_Service	**[DIAMETER]** ▪ mm **[INSTALLYEAR]** ▪ Year of Installation

Appendix D: Water Distribution Materials List

Materials Specifications

Water Distribution

March 2026

Product/Use	Type	Standards/Specifications	Approved Manufacturer	Description/Model	Requirements/Comments
Water Main	Polyvinyl Chloride (PVC) 100 mm to 300 mm	Minimum DR 18 (Class 235) AWWA C900 CSA B137.3 ASTM D3139 NSF/ANSI 61 Certification OPSS.MUNI.441	IPEX	Blue Brute®	Must be blue in colour Supplied with gaskets CIOD
			Westlake	CIOD PVC Pressure Pipe	
	Polyvinyl Chloride (PVC) 350 mm to 450 mm	Minimum DR 18 (Class 235) AWWA C900 CSA B137.3 ASTM D3139 NSF/ANSI 61 Certification OPSS.MUNI.441	IPEX	Centurion®	Must be blue in colour Supplied with gaskets CIOD *Materials for pipes over 450 mm must be selected in consultation with the Town
			Westlake	CIOD PVC Pressure Pipe	
	High Density Polyethylene (HDPE)	Minimum DR 11 CSA B137.1 AWWA C906 NSF/ANSI 61 Certification OPSS.MUNI.441	KWH Pipe Ltd		Thermal butt fusion joints *Only to be used in specialized installations with approval by Town
Fittings	Ductile Iron	AWWA C153/ANSI A21.53 AWWA C110/ANSI A21.10 AWWA C104/ANSI A21.4 Minimum Pressure Class 350 OPSS.MUNI.441 NSF/ANSI 61/372 Certification	Tyler Union/Bibby		Epoxy coated Cement lined Mechanical joint restrainer ends
			SIGMA Corporation		
			STAR® Pipe Products		

Product/Use	Type	Standards/Specifications	Approved Manufacturer	Description/Model	Requirements/Comments
Hydrants		AWWA C502 OPSS.MUNI.441 NSF/ANSI 61/372 Certification	Mueller Canada	Century	Hydrant painted chrome yellow 100mm ULC Stortz pumper connection (painted black) Two 63.5 mm side ports (CSA thread) 25 mm operating nut - open left Self-draining 1.8 m cover minimum Breakaway flange
Hydrant Leads		Minimum DR 18 (Class 235) AWWA C900-16 CSA B137.3 ASTM D3139 OPSS.MUNI.441 NSF/ANSI 61 Certification	IPEX	Blue Brute®	150 mm diameter lead Fully restrained No bends permitted
			Westlake	CIOD PVC Pressure Pipe	
Hydrant Flex Marker			Flexstake	C804	1.2 m yellow post with red hydrant graphic on white reflective background at top of post (both sides)
Hydrant Sign					Red hydrant graphic on white reflective background 250 mm x 350 mm Aluminum, engineer grade

Product/Use	Type	Standards/Specifications	Approved Manufacturer	Description/Model	Requirements/Comments
Valves	Resilient Wedge Gate Valves	AWWA C509 & C515 AWWA C550 ASTM A536 & A126 OPSS.MUNI.441 NSF/ANSI 61/372 Certification	Mueller Canada	A-2361 MJ by MJ	Open left (counterclockwise) Epoxy coated, Ductile Iron Mechanical joint ends Stainless steel hardware
			Clow Canada	A2639 or A2640	
Tapping Sleeve	Ductile Iron	ASTM D2000 & ASTM A3 AWWA C223 NSF/ANSI 61 & 372 Certification	Robar Industries Ltd	6906	Epoxy Coated Stainless steel hardware Mechanical joint outlet
			Smith-Blair	622	
			Mueller	H-304 MJ or flange outlet	
	Polyvinyl Chloride (PVC)	ASTM D2000 AWWA C223 & C213 & 207 NSF/ANSI 61 & 372 Certification	Robar Industries Ltd	6606BB	Stainless steel Stainless steel hardware Mechanical Joint Outlet
			Smith-Blair	663	
Tapping Valve	Resilient Wedge Gate Valves	AWWA C509 & C515 ASTM A536 NSF/ANSI 61 & 372 Certification	Mueller	H-687	Resilient seat tapping valve Open left (counterclockwise) Epoxy coated ductile iron Flange X mechanical joint end Stainless steel hardware
			Clow Canada	F-6114	
Air Release	Combination Air & Vacuum Release Valves	AWWA C512 ASTM A536 NSF/ANSI 61 & 372 Certification	Cla-Val	36 Series	Epoxy coated Single Body Housing Sized to manufacturer's specification
			Val-Matic	VM201C or VM202C	
Pressure Reducing	Pressure Reducing Valves	ASTM A536 NSF/ANSI 61 & 372 Certification	Mueller (Singer Valve)	Series 106/206 PR	Flanged ends To be installed in a chamber To be approved by Town
			Cla-Val	Model 90-01	

Product/Use	Type	Standards/Specifications	Approved Manufacturer	Description/Model	Requirements/Comments
Joint Restraints	For PVC pipe to Mechanical Joint Fitting 100 mm to 400 mm	ASTM F1674 AWWA C900 AWWA C111/A21.11 UNI-B-13-94	STAR® Pipe Products	PVC Stargrip Series 4000	
			Romac Industries Inc	Grip Ring (100 to 300mm only)	
	For Ductile Iron Pipe to Mechanical Joint Fitting 100 mm to 400 mm	ASTM F1674 AWWA C151/A21.51 AWWA C111/A21.11	Romac Industries Inc	Grip Ring (100 to 300mm only)	
			SIGMA Corporation	ONE-LOK Series SLDE for DI	
	For PVC Pipe Bell and Spiggot Joint	ASTM F1674 & A536 AWWA C900 UNI-B-13-94	SIGMA Corporation	PV-Lok for C900 PVC Pipe	
			STAR® Pipe Products	Pipe restrainers series 1100	
	For Ductile Iron Pipe Bell and Spigot Joint	AWWA C151/A21.51	STAR® Pipe Products	Pipe restrainers series 1100C	For connections and repairs
Couplings	For PVC, Ductile Iron, Cast Iron Pipe	ASTM A536 NSF/ANSI 61 & 372 Certification	Romac Industries Inc	Macro HP (Two Bolt) 4-12" ALPHA (TWO BOLT) 4-12"	Dresser Style Epoxy coated Stainless steel hardware
			Krausz	Hymax Grip Hymax	
	For HDPE Pipe	ASTM A536 NSF/ANSI 61 & 372 Certification	Krausz	Hymax	Dresser Style Epoxy coated Stainless steel hardware
			Romac Industries Inc	ALPHA	

Product/Use	Type	Standards/Specifications	Approved Manufacturer	Description/Model	Requirements/Comments
Warning Tape	For Non-Potable Water Main		Supplied by Seton Canada or approved equal		3.5 mm polyethylene underground warning tape 75mm wide, blue in colour with 50mm black lettering "CAUTION: BURRIED NON-POTABLE WATER LINE BELOW"
Valve Box	For watermain <400 mm	ASTM A48	Bibby-Ste-Croix	VB 2200 Slide Type 1.65 to 2.15	Cast Iron 130 mm diameter slide type (Cover 185 mm diameter) Valve box cover must be stamped "WATER"
			STAR® Pipe Products	Cat VB-0003 Item VB666A	
			SIGMA Corporation		
Water Service Connections	Crosslinked Polyethylene 25mm to 50mm	SDR 9 AWWA C904 ASTM F876, F877 & F2023 CSA B137.5 NSF/ANSI 14 and 61 Certification	REHAU	MUNICIPEX®	
			IPEX	Blue 904®	
	Copper 25mm to 50mm	ASTM B88 AWWA C800 NSF/ANSI 61 & 372 Certification	Great Lakes Copper Ltd	Seamless copper water tube type "K"	
Service Saddle	For services 25-50mm on PVC and Ductile Iron pipe	NSF/ANSI 61 & 372 Certification	Robar Industries Ltd	Series 2606 product #2626	Stainless Steel Double Bolt
			Cambridge Brass	403 Teck Saddle Series 8403	

Product/Use	Type	Standards/Specifications	Approved Manufacturer	Description/Model	Requirements/Comments
Corporation (Main) Stops	25mm to 50mm	AWWA C800 NSF/ANSI 61 & 372 Certification ASTM B62 & B584	Mueller	300 B-25008N	Ball valve AWWA CC Taper Thread Inlet x Compression outlet No Lead
			Cambridge Brass	301NL-A4H4 (25 mm) 301NL-A5H5 (31 mm) 301NL-A6H6 (38 mm) 301NL-A7H7 (50 mm)	
Curb Stops	25mm to 50mm	AWWA C800 NSF 61 & 372 Certification ASTM B62 & B584	Mueller Canada	300 B-25209N	Ball valve Compression joints Non draining No Lead
			Cambridge Brass	202NL-H4H4 (25 mm) 202NL-H5H5 (31 mm) 202NL-H6H6 (38 mm) 202NL-H7H7 (50 mm)	
Service Couplings	25mm to 50mm	AWWA C800 ASTM B62 & B584 NSF/ANSI 61 & 372 Certification	Mueller Canada	H-15403N	Compression joints Couplings not permitted in new construction between main stop and curb stop (property line) or services <20m in length
			Philmac	UTC -Universal Transition Coupling	
			Cambridge Brass	118NL-H4H4 (25 mm) 118NL-H5H5 (31 mm) 118NL-H6H6 (38 mm) 118NL-H7H7 (50 mm)	
Product/Use	**Type**	**Standards/Specifications**	**Approved Manufacturer**	**Description/Model**	**Requirements/Comments**

Service Boxes			Mueller Canada	8D1(25mm) 8D2 (31-50mm)	Epoxy coated cast iron Box top must be stamped "WATER" Standard pentagon screw type brass plug 13mm Type 304 stainless steel rod (36")with SS cotter pin Minimum depth of burry 1.7 m Adjustable
			Clow Canada	D1 (25mm) or D2 (31-50 mm)	
Anodes	All metallic pipe, fittings, and appurtenances	ASTM B-418 Type II or ASTM B-843 Type M1 OPSS.MUNI.442			Magnesium or Zinc
Sacrificial Nuts	On all bolts	ASTM B-418 Type II	Brentech		
			Duratron	DSN0750	
Insulation	For direct buried water pipes with <1.7m cover		Dow Chemical Co.	Styrofoam Highload 100	Extruded polystyrene Minimum 50mm thick
			Owens Corning	Formular NGX 400	
Tracer Wire	For all non-metallic water main, hydrant laterals and service pipe (direct buried)				#10 Gauge TWU single stranded copper White plastic coating Splices made with DryConn waterproof connectors For Horizontal Direction Drilling applications additional requirements apply including a minimum of 3 wires
Product/Use	**Type**	**Standards/Specifications**	**Approved Manufacturer**	**Description/Model**	**Requirements/Comments**

Automatic Flushing Station Meter Pit		NSF/ANSI 61 & 372 Certification AWWA C800 NSF/ANSI 61 & 372 Certification AWWA C800	Kupferle	Eclipse 9800A (25 mm)	203-CS-18-72-F-B-B-S nonfreezing
			Mueller Canada	THERMAL-COIL®	
Meter					Meter to be specified in consultation with the Town

IMPORTANT:

"All chemicals and materials used in the alteration or operation of the drinking water system that come into contact with water within the system shall meet all applicable standards set by both the American Water Works Association ("AWWA") and the American National Standards Institute ("ANSI") safety criteria standards NSF/60, NSF/61 and NSF/372."

Appendix E: Acceptable Boulevard Tree Species List

Acceptable Boulevard Tree Species List

Trees with large canopies at maturity are preferred. Smaller canopy trees are acceptable in locations where a larger tree cannot be planted.

The following species are intended for local residential roads. Higher concentrations of winter salt associated with arterial and collector roads may not be an appropriate environment for some species. The Town is also amenable to alternate species if they are appropriate for site conditions, are non-invasive, and have minimal fruit litter.

Scientific Name	**Common Name**	**Comments**
Medium to Large Canopy Trees		
Acer x freemanii	Freeman Maple	
Acer nigrum	Black Maple	
Acer rubrum	Red Maple	only if soil pH < 7.0
Acer saccharum cvs	Sugar Maple	urban tolerant cultivars
Celtis occidentalis	Hackberry	
Ginkgo biloba cvs	Ginkgo	non-fruiting cultivars
Gleditsia triacanthos var. *inermis*	Thornless Honeylocust	
Gymnocladus dioicus	Kentucky Coffee Tree	non-fruiting cultivars
Platanus x acerifolia	London Planetree	
Quercus macrocarpa	Bur Oak	not on residential frontage
Quercus palustris	Pin Oak	

Scientific Name	Common Name	Comments
Quercus rubra	Red Oak	
Tilia americana (urban tolerant cvs)	Basswood	
Tilia cordata	Littleleaf Linden	
Tilia flavescens 'Glenleven'	Glenleven Linden	
Ulmus americana cvs	White Elm	resistant to DED/Elm Yellows and with good structure
Ulmus davidiana var. *japonica* 'Morton'	Accolade Elm	
Small Canopy Trees		
Acer ginnala	Amur Maple	
Malus cvs	Crabapple	highly disease-resistant cultivars and non-fruiting/with small persistent fruit
Pyrus calleryana 'Chanticleer'	Chanticleer Ornamental Pear	
Syringa reticulata 'Ivory Silk'	Ivory Silk Lilac	