



City of Orillia

Engineering Design Criteria: General Guidance



City of Orillia
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Revision Record

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City of Orillia

Engineering Design Criteria: General Guidance

Table of Contents

1.0	INTRODUCTION.....	1
2.0	DEFINITIONS AND ABBREVIATIONS.....	1
3.0	REFERENCE DOCUMENTS	3
4.0	USE OF MANUAL	4
5.0	SUBMISSION TO GOVERNMENT AND OTHER AGENCIES	4
6.0	SUBDIVISION AGREEMENT	5
6.1	Requirements Prior to Commencement of Construction	5
6.2	Certificate of Substantial Completion and Final Acceptance	5
6.3	Pre-Servicing Policy for Subdivision Development	6
6.4	Site Alteration By-law	7
6.5	Security Reduction	7
6.6	Administration Fees, Securities, Area Rate Charges and Cash in Lieu Payments	7
7.0	SUBDIVISION REQUIREMENTS	7
7.1	General Requirements	7
7.1.1	Engineering Requirements for Draft Plan Approval	8
7.1.2	The Draft Plan	Error! Bookmark not defined.
7.1.3	General Plan of Services	Error! Bookmark not defined.
7.1.4	Storm Drainage Plan	Error! Bookmark not defined.
7.1.5	Geotechnical Report.....	Error! Bookmark not defined.
7.1.6	Hydrogeological Report.....	Error! Bookmark not defined.
7.1.7	Waste Management Plans	Error! Bookmark not defined.
7.1.8	Watermains and Sanitary Sewers	Error! Bookmark not defined.
7.1.9	Construction Management Plan	Error! Bookmark not defined.
7.2	First Engineering Submission	8
7.2.1	Engineering Submission.....	8
7.2.2	Municipal Structures Submission.....	9
7.2.3	Parks and Landscaping Submission.....	10
7.2.4	Subsequent Submission.....	Error! Bookmark not defined.
7.3	Second Engineering Submission.....	10
7.3.1	Engineering Submission.....	10
7.4	Final Engineering Submission	11
8.0	CONDITIONS OF CONSTRUCTION	11
8.1	Requirements for Pre-Construction Meeting	11
8.2	Commencement of Construction	12
8.3	Commencement Notice	12
8.4	Winterizing of Subdivisions.....	12
8.5	Hours of Work by Contractors	12
8.6	Directional / Informational Signage.....	13
8.7	Mud, Dust, Stockpile and Debris Control	13
8.8	Construction of Existing Roads.....	13
8.9	Construction Inspection and Reporting.....	14
8.9.1	Inspections	14

City of Orillia

Engineering Design Criteria: General Guidance

8.9.2	Inspection Reports	14
8.9.3	Geotechnical Reports	14
8.10	Subdivision/Project Closeout	14
8.11	Asset Information Collection	15
9.0	DRAWING REQUIREMENTS	15
9.1	Specifications for Engineering Drawings	15
9.2	General Drawing Requirements	15
9.3	Computer Aided Drawings (CAD)	16
9.4	General Servicing Plans	16
9.5	Storm Drainage Plans	18
9.5.1	Existing and Proposed Conditions Drainage Area Plans	18
9.5.2	External Areas	19
9.6	Sanitary Drainage Plans	19
9.7	Grading Plans	19
9.8	Plan-Profile Drawings	20
9.9	Utility Coordination Plan	22
9.10	Detail Drawings	22
9.11	Parkland Development Drawings	22
9.12	Trails and Walkways	23
9.13	Landscaping	23
9.13.1	General Requirements	23
9.13.2	Notes for Streetscape Submission Drawings	24
9.13.3	Notes for Naturalization Submission Drawings	25
9.14	As-Built and Record Drawings	25
9.14.1	General	25
9.14.2	"As-Built" Field Survey	25
9.14.3	Drawing Revisions	26
9.14.4	Tolerances	26
9.14.5	Submissions	26
9.14.6	Storm Sewers	27
9.14.7	Sanitary Sewers	27
9.14.8	Watermains	27
9.14.9	Roadways	28
10.0	SITE PLAN DEVELOPMENT	28
10.1	General Requirements	28
10.2	Security Reduction	28
10.3	Submission Requirements	29
10.4	Drawing and Design Requirements	30
10.4.1	General Requirements	30
10.4.2	Site Servicing Plan and Design	30
10.4.3	Site Grading Plan and Design	31
10.4.4	Roadway Design	32
10.4.5	Landscaping Requirements	32
10.4.6	Waste Collection Design Standards	Error! Bookmark not defined.
10.5	As-Built Drawings	32
10.6	Certification	33
10.7	Final Inspection	33

City of Orillia

Engineering Design Criteria: General Guidance

11.0	Parkland Development.....	36
11.1.1	Services	36
11.1.2	Grading	37
11.1.3	Timing of Construction	37
11.1.4	Maintenance.....	37
12.0	LANDSCAPE IMPLEMENTATION PROCEDURES	37
12.1	Streetscape Works	37
12.2	Naturalization Works	38
12.3	Maintenance Agreement for Naturalization Areas	Error! Bookmark not defined.
13.0	FENCING	38
14.0	LANDSCAPING	38
14.1	General Requirements	38
14.2	Sodding.....	39
14.3	Plantings	39
14.4	Retaining Wall	39
15.0	EASEMENT AND BLOCK REQUIREMENTS.....	39
15.1	General Requirements	39
15.2	Easement Width Requirements	40
15.2.1	Storm and Sanitary Sewers.....	40
15.2.2	Storm Connections for Rear Yard Catch Basins.....	40
15.2.3	Watermains	40
15.3	Block Width Requirements	41
15.4	Drainage Swales	41
16.0	SCADA STANDARDS	41
17.0	TOPOGRAPHICAL SURVEY	41
18.0	GEOTECHNICAL REQUIREMENTS	42
19.0	HYDROGEOLOGICAL REQUIREMENTS	44
20.0	EXCESS SOIL REQUIREMENTS.....	45
21.0	STANDARD DRAWING INDEX	45

List of Tables

Table 1: Typical Waste Collection Dimensions.....	35
Table 2: Minimum Sewer Easement Widths.....	40
Table 3: Minimum Watermain Easement Widths.....	41

City of Orillia

Engineering Design Criteria: General Guidance

List of Appendices

Appendix A	Notification to Commence Work
Appendix B	Request for Reduction in Site Servicing Financial Securities
Appendix C	Engineering Retainer Letter Template
Appendix D	Landscaping Retaining Letter Template
Appendix E	Subdivision Closeout
Appendix F	City Standard Drawings
Appendix G	Material Specifications – Water Main and Appurtenances
Appendix H	Material Specifications – Sewer Mains and Appurtenances for Storm and Sanitary

City of Orillia

Engineering Design Criteria: General Guidance

1.0 INTRODUCTION

The City of Orillia Engineering Design Criteria: General Guidance manual is intended to provide stakeholders, including City staff, engineering consultants, developers, contractors, and the public with common design reference standards to facilitate consistent application of engineering design practices within the City of Orillia (City).

The General Guidance manual outlines general City requirements pertaining to engineering submissions, site plan development, subsurface investigation and engineering, and landscape design procedures. The document is intended to assist in the planning and design activities of linear infrastructure within the City.

The proponent shall maintain all professional obligations in applying engineering principles and best design practices. The use of this manual does not supersede or replace governing legislation and/or regulatory requirements. Innovative technological changes that improve or maintain the quality of the design on a life cycle cost basis may be considered at the discretion of the City.

The criteria outlined in this manual is intended to be updated on a regular basis to remain consistent with other reference documents. It is the responsibility of the Developer or the Developer's Engineering Consultant to ensure the latest version of the City of Orillia Engineering Design Criteria documents are used at the time of engineering design. Comments or questions regarding the Engineering Design Criteria can be submitted to infrastructureplanning@orillia.ca.

2.0 DEFINITIONS AND ABBREVIATIONS

The following definitions and abbreviations for terms are used throughout the Engineering Design Criteria manuals.

Definitions

Arborist	The person(s) responsible for the care and maintenance of trees, qualified to provide arboriculture services and holding either an ISA Certified Arborist or Ontario Journeyman professional certification.
Certificate of Substantial Completion	The date when the services are complete and acceptable to the City subject to the maintenance requirements pursuant to the Subdivision Agreement.
City	City of Orillia.
City Representative / City Engineer	Any person, company, or organization, assigned to a project by the City to carry out work on their behalf. The name of

City of Orillia

Engineering Design Criteria: General Guidance

	the Representative shall be specified prior to the start of construction on any project.
Collection Services	Services provided by the City for removal of Waste from Serviced Units within the City.
Contractor	An independent company or individual acting as the Contractor and having entered into a legal contract to supply labour, material, equipment, management to construct, repair or install services..
Developer(s)/Owner(s)	The person(s) entering into the subdivision agreement / site plan agreement with the Corporation of the City of Orillia.
Engineering Consultant	A competent Professional Engineer or Geoscientist or firm of engineers or Geoscientists employed by the Developer or City which is registered with Professional Engineers Ontario and/or Professional Geoscientists Ontario, possessing a current Certificate of Authorization to practice professional engineering or geoscience.
Final Acceptance	The Developer's maintenance requirements have been fulfilled, and the Services are acceptable to the City.
General Manager of Environment and Infrastructure Services	Means the General Manager of Environment and Infrastructure Services for the City of Orillia, or his or her designate, authorized to act on his or her behalf.
Intersection	Means the area embraced within the prolongation or connection of the lateral curb lines or, if none, then of the lateral boundary lines of two or more highways which join one another at an angle, whether or not one crosses the other.
Landscape Architect	The person(s) responsible for the planning and design of outdoor spaces, qualified to provide consulting services and who is licensed to practice in the Province of Ontario.
Multi-Unit Residential Building	Building with six or more residential dwelling units; this definition is only applicable to the Solid Waste Management criteria within the City of Orillia Engineering Design Criteria documents.
Private Road	Includes any Roadway that is not assumed by the City or the Province of Ontario.
Professional Engineer	A person licensed by Professional Engineers Ontario (PEO) under the Professional Engineers Act and legally authorized to practice professional engineering, use the protected title

City of Orillia

Engineering Design Criteria: General Guidance

	"Professional Engineer" or the designation "P.Eng.", and take public responsibility for engineering works.
Serviced Unit	Includes any Residential Dwelling Unit and Multiple Residential Dwelling Unit within the City.
Standard Drawings	Formal technical documents that use universally accepted conventions to communicate the specifications of a design.
Turning Radius	Minimum radius required for a vehicle to turn around.
Waste	Garbage, brush, leaf and yard waste, green bin organics, and recycling box (including blue box)/cart materials, as amended from time to time.

Abbreviations

AWWA	American Water Works Association
CHBDC	Canadian Highway Bridge Design Code
DFO	Department of Fisheries and Oceans, Canada
LSRCA	Lake Simcoe Region Conservation Authority
MECP	Ontario Ministry of the Environment, Conservation and Parks
MNR	Ontario Ministry of Natural Resources
MTO	Ontario Ministry of Transportation
OBC	Ontario Building Code
OLS	Ontario Land Surveyor
OPSD	Ontario Provincial Standard Drawings
OPSS	Ontario Provincial Standard Specification
OTM	Ontario Traffic Manual

3.0 REFERENCE DOCUMENTS

The Proponent shall design and construct all components in conformance with the latest version of this manual, legislative requirements, industry standards and best practices. The criteria outlined in this manual is intended as a supplemental specification that overrides other

City of Orillia

Engineering Design Criteria: General Guidance

specifications. Where not overtly defined or overridden by the criteria outlined in this manual, design criteria to follow the latest versions of the following:

- Ontario Provincial Standard Specifications (OPSS) and Ontario Provincial Standard Drawings (OPSD)
- Applicable City of Orillia By-laws
- The City of Orillia Official Plan
- City of Orillia Consolidated Linear Infrastructure Environmental Compliance Approvals (CLI-ECA)
- Ontario Ministry of the Environment, Conservation and Parks (MECP) Design Guidelines
- Municipal Drinking Water Licenses (MDWL)
- Drinking Water Works Permit (DWWP)
- The City of Orillia Material Specifications and City of Orillia Standard Drawings
- Other reference documents as identified
- In accordance with manufacturer's specifications
- Other Applicable Acts and Legislations, such as but not limited to:
 - Municipal Act
 - Planning Act
 - Ontario Water Resources Act
 - Environmental Assessment Act
 - Environmental Protection Act
 - Accessibility for Ontarians with Disabilities Act (AODA)

4.0 USE OF MANUAL

The intent of the City's Engineering Design Criteria manual is to facilitate consistent engineering design and construction practices within the City. Moreover, the manual is intended to:

- Integrate industry standards and best practices;
- Prioritize the health and safety of the public; and
- Reduce impacts to the natural environment and protect resources.

Each section of the manual should be read in conjunction with the other sections.

- City of Orillia Engineering Design Criteria: General Guidance
- City of Orillia Engineering Design Criteria: Wastewater
- City of Orillia Engineering Design Criteria: Water Distribution
- City of Orillia Engineering Design Criteria: Stormwater
- City of Orillia Engineering Design Criteria: Transportation

5.0 SUBMISSION TO GOVERNMENT AND OTHER AGENCIES

The Consulting Engineer shall be required to make all submissions and representations necessary to obtain approval from all other applicable authorities (such as DFO, MNR, MECP, MTO, Canada Post Corporation, Transport Canada, etc.,) and any other agencies for works

City of Orillia

Engineering Design Criteria: General Guidance

which fall within their jurisdiction. It is the responsibility of the Engineering Consultant to ensure all correspondence, comments and approvals are provided to the City.

6.0 SUBDIVISION AGREEMENT

6.1 Requirements Prior to Commencement of Construction

Prior to commencement of construction, the Developer's Consulting Engineer shall submit the following information in digital format to the City for approval (allow at least two weeks for review).

- All construction specifications.
- Construction schedule
- The proposed Contractor and subcontractors.
- The Contractor's list of materials and suppliers.
- One copy of the signed contract documents complete with unit prices.
- All other information specified in the Subdivision Agreement as a requirement prior to commencement of construction or other information required by the City.
- MNR, LSRCA and/or DFO work permits for works within water bodies.
- Completed City of Orillia "Notice to Commence Work", included in Appendix 'A'.

6.2 Certificate of Substantial Completion and Final Acceptance

Final Acceptance of the subdivision shall be the date on which the City agrees all the conditions of the Subdivision Agreement have been fulfilled, and all maintenance requirements have been completed.

The Certificate of Substantial Completion and Final Acceptance must be requested in writing by the Developer. The dates for Certificate of Substantial Completion and Final Acceptance of the Services in the development shall be established by the City.

When the Services are complete to the satisfaction of the Consulting Engineer, they shall advise the City in writing that the work is completed and shall request an inspection by the City. The City shall carry out their inspections and shall advise the Consulting Engineer of any items of work requiring further rectifications. When all deficiencies have been corrected to the satisfaction of the City, a report shall be forwarded to the City with the request for the issuance of a "Certificate of Substantial Completion". The request shall include a recommended date for the commencement of the maintenance period which shall be reviewed and accepted or revised by the City accordingly

Near the end of the maintenance period the services shall be re-inspected by the Consulting Engineer and City and all deficiencies found shall be corrected. When the Consulting Engineer is satisfied the work is complete and acceptable, they shall advise the City and shall request a final inspection by the City. When all work is completed to the satisfaction of the City, a report shall be forwarded to the City recommending Final Acceptance of the works. Upon review and agreement, the City shall issue a "Certificate of Final Acceptance".

City of Orillia

Engineering Design Criteria: General Guidance

6.3 Pre-Servicing Policy for Subdivision Development

Subsequent to Draft Plan Approval and prior to execution of a Subdivision Agreement, the City may consider allowing pre-servicing of a subdivision at the Owner's risk. The Pre-Servicing Agreement application, submission materials and payment shall be made through the City of Orillia Planning Division. The Pre-Servicing Agreement will only be considered when the following conditions have been met and in accordance with City of Orillia By-Law Number 1989-38, as amended:

- Written acceptance from the City for specific works for which pre-servicing can proceed.
- Engineering drawings have been accepted for construction for the works under consideration.
- Acceptance of preliminary study works, including Hydrogeological Study, Geotechnical Studies, and Archaeological Studies (if required).
- Written approval of various agencies, e.g., MECP, including MECP Pre-Approval of Works (i.e., drinking water, sanitary sewer and stormwater), MNR, MTO, Ministry of Citizenship and Multiculture, where they relate to installation of services permitted by pre-servicing.
- Written confirmation from utility companies including, but not limited to, Hydro One, Bell Canada, Rogers Cable and Enbridge Gas, that satisfactory agreement has been reached for provision of respective services.
- Upon approval of the pre-servicing application, the Owner satisfies all conditions of City of Orillia By-Law Number 1989-38, as amended.
- No permission will be given to construct external services prior to full registration unless a Letter of Credit has been deposited with the City, for the total cost of the services and all restoration. Connections to existing services may not be permitted until the plan of subdivision is registered.
- All other documents considered necessary to the works under the Pre-Servicing By-Law including 0.3 m reserves, easements, etc., must be approved as to form and description.
- Cash deposits for engineering and legal fees for the City, in an amount determined by the City, must be paid to the City prior to the commencement of any works.
- The required Insurance Certificate is to be submitted as per the Pre-Servicing By-Law, with minimum coverage to be determined by the City.
- A cash or Letter of Credit deposit as security to facilitate Securities equalling 100% of the estimated cost of all siltation and erosion controls and potential emergency maintenance work by the City is to be submitted in an amount determined by the City.
- Any required zoning by-laws must be in effect.
- If the underground pre-servicing has been completed to the satisfaction of the City prior to the registration of the plan of subdivision, the City will not require the full value of the Letter of Credit provided an appropriate reduction request has been submitted and approved by the City.
- Construction Management Plan and onsite Storage of Materials Plan.
- The City reserves the right to require the Owner to enter into a formal Pre-Servicing Agreement based on the scope of development.
- For City waste collection services, access can be clearly provided with no obstructions from contractor vehicles or construction equipment.
- Dewatering works/plan.

City of Orillia

Engineering Design Criteria: General Guidance

6.4 Site Alteration By-law

The City's Site Alteration By-law will apply should any grading works, as defined by the by-law, for a subdivision be required prior to the execution of a subdivision agreement.

The Developer may make a request to grade the subdivision lands before registration of the plan of subdivision has occurred. If the Developer wishes to conduct pre-grading, they are required to follow the City's Site Alteration By-Law, the Tree Conservation By-Law, as well as fulfill any draft plan conditions that are required prior to grading work occurring. The Site Alteration By-Law is administered by the City's Development Coordinator. The Developer will be required to obtain a Site Alteration Permit and a Tree Removal Permit (if applicable) from the City prior to commencing any grading activities. These permits will inform the work, including environmental monitoring requirements or other requirements.

6.5 Security Reduction

Reductions in financial securities held by the City will be considered in accordance with the provisions of the Subdivision Agreement or Pre-Servicing Agreement. Request for reductions should be made in accordance with the sample letter included in Appendix 'B'. Each application for security reduction must include a cost-to-complete estimate certified by a Professional Engineer. Prior to the reduction of a security the Developer must submit the following with the request:

- Statutory Declaration re: Liens and Payments of Accounts
- Worker's compensation clearance

For additional information, refer to City of Orillia Policy 8.1.6.1 Site Plan Control and Development Agreement Security Percentages: City of Orillia, Financial, Chapter 454, User Fees – Environment and Infrastructure Service/Development Services and Engineering.

6.6 Administration Fees, Securities, Area Rate Charges and Cash in Lieu Payments

The administration fees, securities Area Rate Charges and Cash in Lieu payments applicable to subdivision development are stipulated in the subdivision agreement. Reductions in securities will be considered in accordance with the provisions of the subdivision agreement.

7.0 SUBDIVISION REQUIREMENTS

7.1 General Requirements

This section outlines the required submissions to be made to the City. All submissions are to be coordinated by the Consulting Engineer.

City of Orillia

Engineering Design Criteria: General Guidance

Subsequent submissions are not to be made until the City's comments regarding the previous submission have been received and incorporated.

All drawing submissions shall be in accordance with City standards and each drawing shall be stamped with the submission number (1, 2, or 3) and date of submission.

Engineering drawings shall be submitted to the City. The Consulting Engineer is advised to review the Ministry of Transportation design criteria for adjacent roads to determine the requirements for submission of engineering drawings to MTO, if applicable.

7.1.1 Engineering Requirements

The Preliminary Engineering documents must be presented in a readable, comprehensive and professional manner and shall be signed and sealed by a Professional Engineer.

The Preliminary Engineering documents are identified in the City's Official Plan. Available capacity in existing water treatment and sewage treatment plants must be taken into consideration. Analysis of downstream sanitary sewer capacity up to the nearest larger-diameter sewer is to be included

7.1.2 First Submission

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

7.1.3 Engineering Submission

- A Letter of Retainer from the Consulting Engineer stating they have been engaged for the design and general construction inspection of all works, and coordination of sub-consultants. A draft of the Retainer Letter is included in Appendix 'C'.
- The following drawings are required:
 - Approved Draft Plan
 - Proposed Plan for Registration (M Plan) showing all lot and block numbering and dimensioning
 - General servicing plan
 - Composite utility plan
 - Storm and sanitary drainage plans
 - Erosion and sediment control plan
 - Plan and profile drawings
 - Miscellaneous and special detail drawings
 - Grading plan
 - Landscape and streetscape plan
 - Grading plans for park blocks
 - Grading plan for school blocks
 - Detail drawings for outlets and watercourse improvements
 - Preliminary R Plan(s) showing proposed easements (if required)
 - Construction Management Plan
- Stormwater Management Report and storm sewer calculations on standard design sheets.

City of Orillia

Engineering Design Criteria: General Guidance

- Functional Servicing Report, including water supply and wastewater collection calculations to support the design of the distribution works including main sizes, fire flows and anticipated flows and pressures for domestic and other users, and sanitary design calculations on standard design sheets. Available capacity in existing water treatment and sewage treatment plants must be taken into consideration. Analysis of downstream sanitary sewer capacity up to the nearest larger-diameter sewer is to be included. Consideration must be given to the whole catchment area to ultimately be developed. The Functional Servicing Report must include discussion and flow calculations for any special amenities provided by the development (i.e., pools, banquet halls, etc.). Industrial/Commercial/Institutional calculations should be discussed, and usage patterns provided if available are to be provided.
- Traffic Report (if required).
- Acoustical Report/Noise Study (if required).
- Arborist Report, including Tree Removal Plan, Tree Preservation Plan, and Proposed Tree Planting Plan (if required).
- Geotechnical Report.
- Hydrogeological Report.
- Archaeological Assessment (if required).
- Illumination calculations or Photometrics Plan (if required).
- And any other identified specific Plan or Study from the City's Official Plan – Requirements for a Complete Application.
- A letter from the Consulting Engineer, summarizing the contents of the submission and certifying the design conforms to the City's Engineering Design Criteria.

7.1.4 Municipal Structures Submission

When a new roadway structure (i.e., roads, bridges, culverts, water crossings) is proposed, a specific submission related to the structure is required, which includes the following information.

- Roads shall be designed in accordance with Design Policies and Schedules of the City's most current Official Plan and the City's Transportation Master Plan.
- General Arrangement drawing(s), prepared in general accordance with the MTO Structural Manual which includes but not limited to the roadway structure plan, profile, elevation and cross sections.
- 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 alternative.
- Design Criteria Sheet which includes but is not limited to the type/class of roadway, volume of traffic, geometric information and cost estimate.
- Geotechnical Report.
- Hydrology and Hydraulics Report.
- A letter from the Professional Engineer responsible for the design which certifies:
 - The bridge type, length and width are appropriate.
 - CHBDC 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 of the Subdivision Agreement shall be stamped and signed by the Professional Engineer who designed the

City of Orillia

Engineering Design Criteria: General Guidance

roadway structure and by the Professional Engineer who checked the structural design drawings.

7.1.5 Parks and Landscaping Submission

- A Letter of Retainer from the Consulting Landscape Architect stating they have been engaged for the design and complete general construction inspection of all landscape works, plus an outline of the items contained within the submission. A draft of the Retainer Letter is included in Appendix 'D'.
- A covering letter from the Consulting Engineer and/or Landscape Architect stating the landscape work is in conformity with the proposed grading and municipal services for the development, plus an outline of the items contained within the submission.
- The following drawings (where applicable):
 - Existing Natural Features Assessment
 - Tree Survey/Vegetation Analysis and Tree Preservation Plan
 - Tree Canopy Plan and Survey
 - Streetscape and Buffer Planting Plans
 - Detailed Park Development Plans
 - Stormwater Management Pond Planting Plan
 - Landscape Plan
 - Lighting Plan and electrical services plan
 - (Should the park include services – washrooms, sports fields, that should be detailed as well with appropriate services plan allocations)

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

7.2 Second and Subsequent Engineering Submission

Subsequent submissions shall be made, as required, until the drawings and designs are acceptable to the City. The following submissions shall be compiled and submitted to the City simultaneously. All drawings are to have revisions identified through the use of revision clouds or deltas.

7.2.1 Engineering Submission

- First submission drawings “red lined” by the City from the First Submission review.
- Detailed chart or report with all the First Submission comments and how they have been addressed.
- All other applicable approval agencies comments.
- All revised drawings, proposed M- and R- Plans.
- Digital copies of CLI-ECA and MECP forms as applicable, signed by the Developer and the Consulting Engineer.
- Subdivision Agreement Schedules Pertaining to Engineering Submission and all applicable cost estimates.
- Composite Utility Plan.
- Streetlight design plans.

City of Orillia

Engineering Design Criteria: General Guidance

7.3 Final Engineering Submission

The following plans and documents shall be compiled and submitted in their entirety by the Engineering Consultant in one complete package. Any incomplete submissions, provided to the City, shall be returned immediately.

- Proposed M-Plan and R-Plan.
- All drawings listed in the Subdivision Agreement, with revisions identified with revision clouds or deltas.
- Drawing originals stamped and signed by the Consulting Engineer and/or Landscape Architect (where applicable).
- A digital copy of the complete set of engineering drawings in accordance with the City CAD requirements.
- Digital copies of the final storm drainage plan and the storm sewer design sheet labelled final design.
- Digital copies of all required approvals and forms – i.e., MECP, MTO, etc.
- Detailed cost estimate of all proposed works.
- The Developer shall submit evidence in writing that agreements are in place with utility providers, including electrical/energy providers, natural gas providers, and internet or telecommunication providers for the installation of these utilities in a common trench, where appropriate, in the prescribed locations on road allowances within the plan of subdivision or any other approved Contractor for the installation of street lighting.
- The Developer shall submit evidence in digital copies that satisfactory arrangements and approvals/clearances are in place with agencies or organizations, including but not limited school boards, and the Ministry of Transportation. The approved drawings will be signed and stamped “Reviewed” for construction and will be returned to the Engineering Consultant. Only drawings accepted for construction shall be utilized during construction of the works. Any changes to the approved drawings by the Consulting Engineer are subject to approval by the City.
- Upon completion of the construction of the services, the Engineering Consultant shall obtain the ‘as-built’ field information and revise the original drawings accordingly. The ‘as-built’ documentation must comply with established GIS standards.
- A summary of lot area and frontage for each Lot/Block to be developed to confirm By-law compliance prior to registration and Building Department Administration.

8.0 CONDITIONS OF CONSTRUCTION

8.1 Requirements for Pre-Construction Meeting

The Developer’s Consulting Engineer shall schedule a Pre-Construction Meeting to be held on / at the development site.

The Developer’s Consulting Engineer shall provide to the City via a digital format:

- WSIB Clearance Certificate
- Ministry of Labour Notice of Project
- Contractors Insurance Certificate

City of Orillia

Engineering Design Criteria: General Guidance

- Site Health and Safety Plan
- Identified and Approved Haul Routes to Site and Traffic Control Plan
- Materials Storage and Spill Response
- 24 Hr Emergency Contract Information
- Contact Information for all relevant parties: Owners, Consultants, Contractors,
- The proposed Contractor and Subcontractors
- The Contractor's list of suppliers
- Project Schedule of Servicing Works
- Issued for Construction Drawings

8.2 Commencement of Construction

Construction of services shall not commence until the Developer has entered into the necessary agreements with the City. The Developer shall also have obtained the required approvals from all external agencies or authorities that may be affected by the plan of subdivision.

8.3 Commencement Notice

The Developer shall provide written notice forty-eight hours prior to the commencement of construction. Should there be a cessation of construction of more than one week; the Developer shall again supply forty-eight hours notice prior to recommencing the work.

8.4 Winterizing of Subdivisions

In order to minimize repairs to new subdivision roads and snow plowing equipment, the City requires the following works to be carried out prior to November 15th of each year:

- Manhole tops, catch basin frames and valves on roads with base asphalt shall be set at the level of the base course asphalt.
- Settlements in roadways shall be repaired, particularly adjacent to manhole tops and catch basin frames.
- Sidewalk bays, which have settled and created a lip greater than 10mm shall be repaired.
- All asphalt roads, emergency accesses and loose surface roads identified by the Fire Department, Environment and Infrastructure and/or Development Services and Engineering representatives shall be cleared of mud and debris, have a minimum of one full lane open at all times and maintained in this manner throughout the maintenance period.
- Inlet manholes, catch basins, ditches or channel shall be cleared of debris to prevent blockages during winter and spring thaws.
- All fire hydrants shall be kept clear of snow, debris, soils, and a Hydrant Marker shall be affixed for location identification.

8.5 Hours of Work by Contractors

The hours of work shall adhere to the City of Orillia's Noise By-Law Chapter 938 - Noise.

City of Orillia

Engineering Design Criteria: General Guidance

These time restrictions are for all construction activities including (but not limited to) delivery of materials and equipment, starting, idling and warming of equipment, excavation, removal or moving of materials on site etc.

8.6 Development Informational Signage

The Developer is responsible to erect and maintain the development / informational signage prior to all works commencing and until Final Acceptance and Assumption.

An information sign shall be placed at every access point to the subdivision detailing: the developer, the general contractor, and the Developer's Consulting Engineer. Contact information for each shall be posted on the signage.

Refer to the City of Orillia Transportation Engineering Design Criteria for additional information about the signage for unassumed roads.

8.7 Mud, Dust, Stockpile and Debris Control

The City shall be satisfied that proper arrangements have been made to assure that all nuisance dust, mud and debris shall be properly cleaned on a regular basis.

The Developer is required to keep subdivision lands, internal roadways and adjacent roadways free from nuisance mud and dust at all times.

Roads are to be scraped daily or when mud accumulates, whichever is greater. The road is to be flushed and/or swept a minimum of once per week or more if required to assure dust and mud does not become a nuisance or unless otherwise directed by the City and all scattered debris is to be cleaned daily.

Roadways are not to be used for stockpiling materials once the road is open to the public use. If a road is to be blocked for more than two (2) minutes in duration with construction equipment, then an alternative signed detour route shall be established as per OTM Book 7 requirements.

8.8 Construction of Existing Roads

Whenever it is necessary to cut through an existing City Road, the contractor shall be responsible for proper compaction of the backfill material and replacing the original surface to an equal to or better condition.

Road Occupancy Permits shall be obtained prior to any work on an existing road allowance from the Environment and Infrastructure Department. It is the Developer's responsibility to provide the Development Services and Engineering Department a minimum of forty-eight (48) hours notice prior to commencing work so that Fire and Emergency Services and School Boards (as required) can be given advance notification. The road shall be maintained to a minimum of one lane for emergency access.

City of Orillia

Engineering Design Criteria: General Guidance

8.9 Construction Inspection and Reporting

8.9.1 Inspections

In addition to fulfilling an inspection role for construction, the Developer's Consulting Engineer shall serve as liaison between the Developer and the Contractor, as well as, between the Developer and the City. They are to ensure the approved design intent is implemented, to expedite design decisions on site, and to deal with homeowner's inquiries and concerns.

The Developer's Consulting Engineer shall have their own Site Inspector on site during all grading, construction and servicing works

8.9.2 Inspection Reports

Weekly inspection reports from the Developer's Consulting Engineer shall be submitted to the Development Services and Engineering Department at the end of each month for review.

The inspection reports shall at a minimum contain the following information:

- Weather Conditions
- General Progress of works; where the Contractor is working and what work is being done.
- Equipment being moved or arriving on the job site and its purpose
- Visits to the site by the City and all specific instructions they have been given
- Instructions given to the contractor
- Contractor's claims or complaints
- Compaction efforts for trench backfill, granular road bedding and asphalt
- Trench conditions
- All discussions or dealings with property owners
- Work performed on site involving the installation of utilities
- Hours worked
- Area of work
- Arrival and departure time of the Developer's Consulting Engineer or their inspector
- All pertinent information relating to the Quality Assurance of the works
- All erosion and sediment control devices shall be inspected once per week and after each rainfall of 10mm or greater

8.9.3 Geotechnical Reports

Geotechnical reports for all materials are to be provided to the City on a consistent basis, at least once per month.

8.10 Subdivision/Project Closeout

No roadway leading out of a subdivision shall be completed and accepted by the City until connecting water and wastewater mains are installed complete to the subdivision limits.

Refer to Appendix 'E' for Subdivision/Project Closeout checklist.

City of Orillia

Engineering Design Criteria: General Guidance

8.11 Asset Information Collection

The City will provide the most current templates ahead of the completion of all works. The Developer will be required to complete all templates and submit in that form, to the City, prior to any assets being brought into service. These templates may include, but are not limited to, asset unique number, description, manufacturer, model, serial number, length, material, dimensions, in-service date, replacement cost, useful life, GPS location, address, location, or other details. Some of the attribute information may be provided by the City, such as asset unique number and useful life.

Additional information such as maintenance schedules, consumable parts list, and operations manuals may be required.

All templates are to be completed in the format as required by the City.

9.0 DRAWING REQUIREMENTS

9.1 Specifications for Engineering Drawings

All drawings shall be submitted in a compatible PDF format and DWG format; all final submission drawings shall be identified as “As-Built” and stamped by a qualified engineer.

At final submission, GIS compatible drawing files shall be submitted to the City using UTM NAD 83 Zone 17N.

9.2 General Drawing Requirements

All engineering drawings shall be prepared in metric and in a neat and legible fashion. The design information presented on these drawings shall be completed in ink.

The standard City of Orillia title block as shown in the detail drawings shall be used on all engineering drawings. A title sheet is required for the engineering drawings.

All General Plans, Lot Grading Plans, Area Interim Grading Plans, Plan and Profile drawings and Detail Drawings shall be prepared for printing on standard 24” x 36” sheets. Storm and Sanitary Drainage Area Plans may be completed on larger sized drawings so the entire drainage system being designed may be presented on one sheet.

The lot numbering and block identification on all engineering drawings shall be the same as shown on the Registered Plan for the area.

All elevations shown on the engineering drawings are to reference Canadian Geodetic Vertical Datum 1928 and Transverse Mercator UTM NAD 83, Zone 17N). Aerial photo interpretation methods for securing existing contours and elevations will not be accepted by the City for base plan information on engineering drawings. A local benchmark stating the elevation and the appropriate datum must appear in each drawing.

City of Orillia

Engineering Design Criteria: General Guidance

All plan and profile drawings are to be prepared so each street can be filed separately. The street names shall be identified on the plan portion of the drawings.

When streets are of a length that requires more than one drawing, match lines are to be used with no overlapping of information.

The reference drawing numbers and centreline stations for all intersecting streets and match lines shall be shown on all plan and profile drawings.

A north arrow and key plan shall be included on the top right-hand side on all drawings.

A scale ratio and a bar scale shall be included in the title block.

All engineering drawings shall be stamped by a Professional Engineer. The Engineer's stamp must be signed and dated, and the drawings are to be signed by the City Engineer prior to the issuance of drawings for tendering.

All landscape drawings shall be stamped by a certified Landscape Architect.

Work on the drawings to be done neatly and legibly.

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.

All changes made between drawing submissions must be clearly shown and identified on subsequent drawing submissions.

9.3 Computer Aided Drawings (CAD)

Digital software compatible with AutoCAD .DWG file format Version 2020 or higher shall be used to prepare all drawings, in accordance with industry accepted standards and protocols.

9.4 General Servicing Plans

A General Servicing Plan showing aboveground services and appurtenances shall be prepared for all developments at a maximum scale of 1:1,000. This will be a plan based on the Draft Plan and must schematically show the proposed storm and sanitary sewer systems and watermains and their connection to existing systems. Direction of flow must be indicated on all sewers. Blocks and easements for storm and sanitary sewers, stormwater management facilities and watermain systems shall also be shown. This plan shall be reflective of the infrastructure discussed in the Functional Servicing Report.

When more than one General Servicing Plans is required for any development then the division of drawings shall reflect the limits of the Registered Plans.

City of Orillia

Engineering Design Criteria: General Guidance

Where more than one plan is prepared, a supplementary General Servicing Plan at a smaller scale shall be prepared to show the entire plan of subdivision on one drawing.

The reference Geodetic Benchmark and the Site Benchmarks to be used for construction shall be identified on the General Servicing Plan.

A Key Plan at a scale of 1:10,000 shall be shown on all General Servicing Plan drawings and the area covered by the drawing shall be clearly identified.

A scale ratio and a bar scale shall be included in the title block.

A drawing index shall be shown on all General Servicing Plans to identify the Plan and Profile Drawing number for each street or easement shown.

All road allowances, lots, blocks, easements and reserves are to be shown and are to be identified in the same manner as shown on the Registered Plan.

All existing services, utilities and abutting properties are to be shown in light or background weight lines.

All services to be constructed are to be shown on the General Servicing Plan in solid lines.

Dimensioning of utilities and roadways is not required on the General Servicing Plan.

All sites for trails, parks, schools, places of worship, commercial and industrial development must be shown.

General Plans shall indicate, but not be limited to the following:

- Roadways with curb lines and street names.
- Watermains and associated appurtenances, including invert elevations for all linear asset crossings, clearly shown on the plan with notes indicating sizes.
- Maintenance hole numbers.
- Sewers with notes showing sizes, and direction of flow.
- Signage:
 - School
 - Traffic control
 - Future land use
- Barricades.
- Fencing indicating height and type.
- Retaining walls.
- Catch basins.
- Community mailboxes with number of units serviced.
- Hydro vaults, streetlights, sidewalks.
- Boulevard trees.
- Transit routes have specific needs (layby lanes, transit signs, transit pads).
- Bike lanes.
- Hydrants.

City of Orillia

Engineering Design Criteria: General Guidance

- Transformers (public utilities).
- Trails and walkways

9.5 Storm Drainage Plans

9.5.1 Existing and Proposed Conditions Drainage Area Plans

Drainage area plans shall be prepared for the existing condition and proposed condition development scenarios; if deemed necessary by the City, an interim condition drainage area plan may be required. The pre- and post-development overland flow conditions should be derived from field reconnaissance, topographic survey data, aerial photography, and other supporting information; a consistent vertical datum shall be applied for all topographic data and all source data including vintage shall be provided. The drainage area plans shall include all internal and external areas that naturally drain into the system and any fringe areas not accommodated in adjacent storm drainage systems, as well as other areas which may become tributary through regrading.

The proposed storm drainage system shall be shown on the post-development plan with all maintenance holes numbered consecutively from the outlet. These maintenance holes shall be the tributary points in the design and the area contributing to each maintenance hole shall be clearly outlined on this plan. The area, in hectares, of each contributing area and the run-off parameter used shall be shown in a circle located within the contributing area. In cases where areas of different run-off parameters may be tributary to the same maintenance hole, the areas and the parameters shall be separately indicated on the plan.

In determining the tributary area to each maintenance hole, the proposed grading of the lots must be considered to maintain consistency in the design.

In the case of large areas under single ownership or blocks requiring future site plan agreements, an interim design shall be prepared on the basis of the whole area being contributory to one maintenance hole in the abutting storm sewer unless more than one private storm connection is necessary to serve the property, in which case the appropriate area tributary to each connection shall be clearly shown and taken into account in the storm sewer design.

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

- Existing contours depicted on the pre-development drainage area plan.
- Existing and proposed contours on the post development drainage area plan.
- 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.
- Direction of runoff.

City of Orillia

Engineering Design Criteria: General Guidance

- Street names, lots, blocks, and other lands within the development.
- Maintenance hole numbers.
- Sewer sizes, slope and directions of flow.
- Any catch basins or swales, on the lots or blocks, required to collect the runoff.
- Temporary or permanent quantity and quality storm water management facilities.
- Major and minor overland flow routes.
- Culverts and other drainage appurtenances.

9.5.2 External Areas

External tributary drainage areas to the drainage system for the development and areas which may become tributary due to regrading shall be included on the drainage plan. The external drainage areas shall be divided into smaller tributary areas and the area and the location to which the tributary area is considered to drain in the design shall be clearly shown. The plan shall clearly show all existing contours used to justify the limits of the external drainage areas.

9.6 Sanitary Drainage Plans

All tributary areas used for the determination of the design flows shall be shown on a plan at the scale of 1:1,000. The plan shall indicate the land use, area for residential areas, area for Institutional, Commercial, and Industrial (ICI) areas, and population density or number of units. Each sanitary drainage area on the plan shall show an identification number.

Standard sanitary sewer design sheets shall be used to compute the design flow for each leg of sewer. Analysis of downstream sanitary sewer capacity up to the nearest larger-diameter sewer is to be included.

9.7 Grading Plans

The specified lot grade shall be shown at a location 8 m from the street line. For “split” or “walkout” type drainage patterns, the specified rear of house grade shall be shown. The specified minimum basement floor elevation for each lot shall also be shown.

The grading plans shall indicate, but not be limited to the following:

- Elevations to be referenced to geodetic datum.
- All lots and blocks within the subdivision, numbered in accordance with the plan proposed for registration.
- Existing contours at maximum 0.5 m intervals within the subdivision and extended outside the subject lands far enough to determine the existing drainage pattern, and to extend to the limits of the drainage area to be served by proposed sanitary and storm sewer systems, including lands beyond the boundaries of the subdivision.
- For large external drainage areas, separate Grading Plans at a larger scale may be provided.
- Driveway, water service box locations and building envelopes.
- Elevations at existing trees, structures, watercourses, etc.
- Centreline elevations of proposed and existing roads at 20 m intervals.
- Proposed elevations at front and rear building envelope.

City of Orillia

Engineering Design Criteria: General Guidance

- Proposed elevations at the corners of each lot and block and intermediate point of grade change.
- Proposed elevations at side yard highpoints if applicable.
- Proposed 0.5 m contours for grading within large blocks and parks.
- Proposed grades for major and minor overland flow routes.
- Lot fabric of subject lands including lot, block and easement description.
- Physical structures such as fencing, retaining walls, etc.
- An arrow indicating the direction of the surface water run-off from all lots.
- All swales, other than the normal side yard swales, along with percent grade and the invert elevation of the swale at regular intervals.
- All swales to be topsoiled (minimum 100 mm) and sodded.
- All rear yard catch basins including the rim elevation of the catch basin and the invert elevation of the outlet pipe.
- All terracing required with the intermediate grades specified.
- All rear lot surfaces shall be constructed to a maximum lot grade of 12% for 6 m behind the house, remaining area to have slopes of 3:1 maximum.
- The lot grading plan shall make note of the City Standard Drawings applicable to the grading of the development. The City reserves the right to refuse any house type, which is incompatible with the lot grading design, specified for a lot.
- A 0.6 m strip shall be left undisturbed along the boundary of the subdivision next to adjacent properties unless grading is required to eliminate drainage problems on adjacent properties. Such grading must be stipulated on the approved Lot Grading Plan. Silt Control fencing shall be shown within the undisturbed strip along the boundary of the subdivision.
- Lot drainage is to be self-contained within the subdivision limits, where possible.
- Proposed locations for building envelopes and envelopes for private sewage disposal where required.
- All proposed easements for registration.
- Heights of proposed retaining walls, fences, etc.
- All retaining walls in excess of 1.2m to be engineered by a Professional Engineer.

9.8 Plan-Profile Drawings

Plan – profile drawings are required for all Municipal roadways, blocks and easements where services are proposed within the development, for all outfalls beyond the development to the permanent outlet, for all boundary roadways abutting the development and for other areas where utilities are being installed below grade. Plan – profile drawings are to be drawn to a maximum horizontal scale of 1:500 and a maximum vertical scale of 1:50 and are to include the following:

- Complete legend.
- All existing or proposed services, utilities and abutting properties are to be shown in light or background weight lines.
- All services to be constructed are to be shown in solid lines.
- The profile portion of the drawing shall be a vertical projection of the plan portion whenever possible.

City of Orillia

Engineering Design Criteria: General Guidance

- All road allowances, lots, blocks, easements and reserves are to be shown and are to be identified in the same manner as on the Registered Plan.
- All curb and gutter and sidewalks shall be shown and dimensioned on the plan portion of the drawing.
- Where multiple drawings are required for one street, match lines must be used with 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, diameter, length and grade shall be shown.
- On profile portion of drawings, the watermain diameter and length, shall be shown.
- Only the type, direction of flow and diameter of pipe shall be shown in the plan portion.
- All maintenance holes shall be shown on the plan and on the profile portions of the drawing and be identified by chainage and I.D. number and shall also be referred to the applicable Standard Drawing or to a special detail on the profile portion of the drawing. All invert elevations shall be shown on the profile with each having reference to the north arrow.
- All sewer maintenance holes which have safety platforms are to be noted.
- All drop connections are to be noted and referred to the Standard Drawing.
- All catch basins and catch basin connections shall be shown. Catch basins are to be numbered for easy reference. All rim and invert elevations for rear lot catch basins are to be shown.
- All watermains, hydrants, valves, bends and fittings, etc., shall be shown, described and dimensioned on the plan portion of the drawing. In addition, the watermain shall be plotted to true scale size on the profile portion of the drawing and shall be described.
- The location of all storms, water and sanitary service connections shall be shown on the plan portion of the drawing using different symbols for each service. These services need only be dimensioned when the location differs from the standard location as shown on the City Standard Drawings. The connections to all blocks in the development shall be fully described and dimensioned (size, length, grade, invert elevations, materials, class of pipe, bedding, etc.).
- The centreline of construction with the 20 m stations noted by a small cross shall be shown on the plan portion of the drawing.
- The original ground at centreline and the proposed centreline road profile shall be plotted on the profile. The proposed centreline road profile shall be fully described (length, grade, P.I. elevations, vertical curve data, high point chainages, low point chainages, etc.).
- Details of the gutter grades around all 90-degree crescents, intersections and cul-de-sacs shall be provided on the plan portion of the drawing as a separate detail at a scale of 1:100.
- Special notes necessary to detail construction procedures or requirements are to be shown.
- Chainage for the centreline of construction is to be shown on the profile portion of the drawing. The P.I., B.H.C., E.H.C., B.V.C. and E.V.V. chainages are to be noted.
- The basement elevation of all existing dwellings on streets where sewers are to be constructed shall be noted on the profile.

City of Orillia

Engineering Design Criteria: General Guidance

- All existing services, utilities and features are to be shown on the plan portion. Those services and utilities below grade critical to the new construction shall also be shown in the profile. Test holes may be required to determine actual elevation of these services and utilities.
- Profiles of roadways shall be produced sufficiently beyond the limits of the proposed roads, to confirm the feasibility of possible future extensions.
- The location of all luminaire poles shall be clearly shown on the plan portion.
- the proposed location and type of all street name and traffic control signs shall be shown on the plan portion.
- Proposed locations and types of all trees to be shown on the plan portion.
- Where possibility of conflict with other services exist, 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.

9.9 Composite Utility Plan

The Composite Utility Plan shall be prepared in the same format as General Servicing Plan” and show all the same aboveground information as well as the proposed location of driveways, telecommunications, Hydro, and Gas. All locations must be established and resolved by the Consulting Engineer in conjunction with the Utility companies and in accordance with the locations shown on the typical cross-section.

The design of the underground electrical distribution system shall be completed by an Electrical Engineer retained by the proponent, to the requirements of Hydro One. This design shall be submitted to the City and shall be approved prior to the final approval of the engineering drawings. The design of the telecommunication, fiberoptic system, and gas mains shall follow the same format as the Hydro One requirements, for a joint trench scenario.

All utility information is to be shown on a Composite Utility Plan, prepared by the Consulting Engineer.

9.10 Detail Drawings

The City of Orillia Standard Drawings shall be utilized whenever applicable. The use of the latest revision of the Ontario Provincial Standard Drawings may be utilized as specified in this document or when approved by the City. These drawings shall be reproduced as part of the engineering drawings for the development and must be referred to by number on the affected plan and profile drawings. The Consulting Engineer shall be responsible to check the suitability of the details provided on these standard drawings for the application proposed. Individual details shall be provided by the Consulting Engineer for all special features not covered by the City of Orillia Standard Drawings. These special details shall be drawn on standard sized sheets and shall be included as part of the engineering drawings. The minimum scale to be used for any special maintenance hole or sewer detail shall be 1:25.

9.11 Parkland Development Drawings

The Developer shall be responsible to prepare and implement a detailed Grading Master Plan for approval by the City, for all lands to be dedicated for park purposes. This plan shall show all

City of Orillia

Engineering Design Criteria: General Guidance

existing trees and features in conformity with the end use of the park and that are to remain. All other trees shall be removed by the Developer subject to City approval. Sod laid on 6" of topsoil and adequately watered until established will be required on all disturbed land.

9.12 Trails and Walkways

Drawing requirements for trails and walkways will be determined in conjunction with the City at the time the need is identified.

9.13 Landscaping

9.13.1 General Requirements

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 but not be limited to the following drawings:

- Existing Natural Features Assessment
- Tree Survey/Vegetation Analysis
- Tree Preservation Plan and Details
- 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 Facility Planting Plan
- Lighting Plans
- Planting Plans
- Landscape features, such as fencing, designed amenity areas, benches and seating, decorative retaining walls, patios, gazebos and shelters, permanent waste receptacles, decorative signage, etc.

Detailed Cost Estimates will be required for all approved landscape plans. This estimate will be used for security purposes. All streetscape plans shall be consistent with the City of Orillia Engineering Design Criteria and will require City approval before implementation of the plans.

The Streetscape Plan shall show the following:

- Existing trees and natural features to remain
- Building envelopes, driveways and sidewalks
- Walkways, trails and easements
- Required fencing including privacy, acoustic and chain link
- Proposed plantings
- Entry features
- Location of street lighting
- Location of public utility boxes and easements and hydrants
- Heights of existing and proposed retaining walls, fences etc.
- Transit routes

City of Orillia

Engineering Design Criteria: General Guidance

- Bike Lane routes
- Community mailboxes
- Signage (street signed, no parking, bus signage)
- On street parking allocations/restrictions

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 City approval prior to implementation of the plans.

Developers are required to display approved landscape plans at the sales pavilions for the homebuilders in any new subdivision.

9.13.2 Notes for Streetscape Submission Drawings

The following notes pertaining to layout requirements are to be included on all streetscape submission drawings:

- **NOTE 1**

“Depicted on this plan are the species and the approximate location of street trees. Once driveways, utilities and light standards have been installed, the exact location of street trees will be staked on site by the Landscape Architect and approved by the City prior to planting.”

- **NOTE 2**

“Minimum clearances for Street Trees (when trees are planted 2.1 m from the curb):

- 2.0 m from water hydrants.
- 2.0 m from driveways.
- 2.0 m from neighbourhood mailboxes.
- 3.0 m from hydro transformers.
- 5.0 m from streetlight poles.
- 15.0 m minimum from street line (street intersection as measured from back of curb) and behind the daylight triangle as per the Geometric Design Standards for Ontario Highways.
- 18.0 m from face of all warning signs.

When the minimum distances noted above are not achievable, street trees may be planted in an alternate location, 0.5 m from the property line (0.8 m behind the sidewalk) and adjacent to any fences. In cul-de-sac locations the street tree may be planted just inside the private property line. If a tree is planted in an alternate location, the distances marked with an asterisk must still be maintained.”

- **NOTE 3**

“The tree pits and planting beds for all trees and shrubs located within 1.0 m of underground utilities are to be hand dug.”

- **NOTE 4**

City of Orillia

Engineering Design Criteria: General Guidance

“Minimum clearance for fences from fire hydrants is 1.0 m.”

- **NOTE 5**

“All plant material must conform to the Canadian Standards for Nursery Stock and must be guaranteed for a minimum period of 24 months following acceptance of the work by the City.”

9.13.3 Notes for Naturalization Submission Drawings

The following layout note is to be included on the submission drawings for all areas to be naturalized:

- **NOTE 1**

“All plantings and hard landscape features are to be staked out on site and approved by the Landscape Architect and City prior to installation. Any deviations from the approved landscape plans require prior City approval.”

9.14 As-Built and Record Drawings

9.14.1 General

The “As-Built” drawings constitute the original engineering drawings amended to incorporate the construction changes and variances in order to provide accurate information on the works as installed in the development. “Record” drawings are those prepared by the reviewing engineer after verifying in detail the actual conditions of the completed project. Record drawings must be stamped by a Professional Engineer.

9.14.2 “As-Built” Field Survey

The “As-Built” revisions shall be provided in a GIS shapefile as per the City’s criteria based upon a final survey of all the subdivision services and the consulting Engineer’s construction records. The final survey of the subdivision services shall include a field check of the following items:

- Location, including GPS coordinates, invert and rim elevations of all sewer maintenance holes.
- Distances between all sewer maintenance holes.
- Location, including GPS coordinates, of all roadway catch basins.
- Location, including GPS coordinates, rim and invert elevations for all rear yard and lot catch basins.
- Location, including GPS coordinates, of all sidewalks and curbs.
- Location, including GPS coordinates, and ties to all valve boxes and valve chambers.
- Location, including GPS coordinates, of all hydrants.
- Location, including GPS coordinates, and ties to all watermain appurtenances in addition to obverts and rim elevations of valve chambers.
- Sewer and watermain characteristics (i.e., pipe material, diameter, length, etc.).
- Bus shelter pads and mailbox pads.
- Road centreline elevations.
- Site benchmarks.

City of Orillia

Engineering Design Criteria: General Guidance

- Location of all service connections to all lots and blocks and location of connection from nearest downstream maintenance hole (i.e., 0 + 023).
- Sewer pipe sizes.
- Location of all fencing constructed as part of the subdivision services.
- Streetscape landscaping/boulevard plantings.
- Driveway entrance locations.

9.14.3 Drawing Revisions

The original drawings shall be revised to incorporate all changes and variances found during the field survey and to provide the ties and additional information to readily locate all underground services.

All sewer and road grades are to be recalculated to two decimal places.

All Street line invert elevations of storm and sanitary house connections to each block shall be noted on the drawing.

All street names, lot numbering and block identification shall be checked against the Registered Plan and corrected if required.

The “As-Built” revision note shall be placed on all drawings in the revision block. The title sheet of the Engineering Drawings shall be clearly marked with “As-Built”.

The Contract Number, and/or City Job File Number, if applicable, shall be added to the drawings.

9.14.4 Tolerances

A maximum vertical plotting tolerance of 0.2 m on the 1:50 vertical profile portion of the drawings and a maximum horizontal plotting tolerance of 1 metre on the 1:500 scale drawing shall be considered acceptable without replotting.

All sewer lengths are to be shown to the nearest 0.5 m.

The Engineering Consultant shall be required to explain in writing any major difference between the design and the “As-Built” data and to provide verification that alteration does not adversely affect the design of the subdivision services.

9.14.5 Submissions

Upon completion of all construction work and the “As-Built” revisions, the original drawings shall be submitted to the City for their permanent records.

The submission of the “As-Built” PDF drawings to the City must be completed before “Final Acceptance” of the subdivision will be given.

City of Orillia

Engineering Design Criteria: General Guidance

The Consulting Engineer shall provide a written declaration to the City stating all subdivision works have been constructed in accordance with the terms of the Subdivision Agreement, approved Engineering Drawings and the City's Design Criteria, prior to "Final Acceptance".

Drawings supplied in a digital shall conform to the most recent requirements and AutoCAD or GIS standards of the City.

9.14.6 Storm Sewers

All actual storm system invert elevations shall be indicated on the "As-Built" drawings. If the difference is greater than 150 mm from the design vertical alignment, affected portions of the sewer or overland drainage route shall be redrawn in profile. Any maintenance hole which differs from the proposed horizontal location by more than 1.50 m shall be redrawn in both plan and profile.

In addition, the following shall be indicated on the "As-Built" drawings:

- Pipe/culvert dimensions, grade, type, class.
- Chainage from maintenance holes along main to service tees.
- The project maintenance hole designation and the appropriate City maintenance hole designation.

If as-built grade of sewer differs by more than 1% of the design grade, the Engineering Consultant shall submit revised hydraulic calculations.

9.14.7 Sanitary Sewers

All actual sanitary sewer invert elevations 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. Any maintenance hole which differs from proposed horizontal location by more than 1.50 m 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;
- Chainage from maintenance holes along main to service tees;
- Dimensions from lot corners and elevations for service laterals; and
- The project maintenance hole designation and the appropriate City maintenance hole designation.

If as-built grade of sewer differs by more than 1% of the design grade, the Engineering Consultant shall submit revised hydraulic calculations.

9.14.8 Watermains

All actual watermain obvert elevations at 50 m intervals shall be indicated on the "As-Built" drawings. If the difference is greater than 150 mm from design vertical alignment, affected portions of the watermain shall be redrawn in profile. If horizontal alignment changes exceed 1.0 m the affected portions of the watermain shall be redrawn in plan.

City of Orillia

Engineering Design Criteria: General Guidance

In addition, the following shall be indicated on the “As-Built” drawings:

- Pipe size, type, class.
- Swing-ties to all main appurtenances (valves, bends, tees, etc.).
- Chainage from appurtenance along main-to-main stops.
- Dimensions from lot corners and elevations for service laterals.

9.14.9 Roadways

All actual roadway centre line elevations, at a maximum 20 m interval, shall be indicated on the "As-Built" drawings. Gutter elevations shall be indicated for cul-de-sacs and intersections to show drainage into storm system. If horizontal road alignment changes more than 1.0 m 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-bys, curb depressions.
- Road signage.
- Lane marking and stop bar locations.

10.0 SITE PLAN DEVELOPMENT

10.1 General Requirements

The Developer of lands under Site Plan Control, as specified in the City’s Official Plan and by the City’s Site Plan Control By-law, and may require the entering into a “Site Plan Agreement” with the City prior to the commencement of construction of any building or service within the parcel of land. For all proposed site plan developments, the Developer shall secure site plan approval from the City.

Drawings showing grading and the location, size, grade, invert elevations, material and bedding requirements for all storm, sanitary and water main service connections shall be prepared and submitted to the City for approval. Engineering drawings shall also be prepared for all sanitary and storm sewers and water mains required to be constructed within road allowances or registered easements to service the subject property. These drawings are to be prepared to the City requirements.

The City is also responsible for the collection of revenue for water consumption and therefore the “metering” arrangement for the subject property shall be approved by the City.

10.2 Security Reduction

Reductions in financial securities held by the City will be considered in accordance with the provisions of the Site Plan Agreement or Undertaking Agreement. Requests for reductions should be made in accordance with the sample letter included in Appendix ‘B’. Each application for security reduction must include a cost-to-complete estimate certified by a Professional

City of Orillia

Engineering Design Criteria: General Guidance

Engineer. Prior to the reduction of a security the Developer must submit the following with the request:

Statutory Declaration re: Liens and Payments of Accounts
WSIB Clearance Certificate
Security Reduction Fee

For additional information, refer to:

- City of Orillia Policy 8.1.6.1 Site Plan Control & Development Agreement Meetings, Section 4 – Securities and Inspections;
- City of Orillia Municipal Code, Chapter 363 – Site Plan Control Area, Article 3 – Administration, Section 363.3.1 - Fees, Deposits, Securities, Reductions of Securities – requirements; and
- City of Orillia Municipal Code, Chapter 452 – User Fees - Environment and Infrastructure Services/Development Services and Engineering.

10.3 Submission Requirements

The Developer shall retain a qualified Professional Engineer to prepare all engineering drawings and to supervise the construction of all engineering services. The Consulting Engineer shall act as the Developer's representative in all matters pertaining to the design and construction of the services in the development. The requirement for a Professional Engineer to carry out design services for a site plan shall only be specific to those developments where water, sanitary and storm services, grading works, roadworks in public right-of-way and retaining walls are proposed. The Consulting Engineer shall be required to submit a Retainer Letter to the City in the format included in Appendix 'C' outlining their duties and responsibilities.

The City's Official Plan provides a comprehensive list of studies, plans and/or assessments that may be requested by the City in support of a Site Plan submission. As a general guide, Site Plan drawing sets and supporting calculations shall be submitted to the City, for approval, comprised of the following:

- Site Plan
- Site Grading Plan
- Site Servicing Plan
- Functional Servicing and Stormwater Management Report
- Drainage Areas Plan
- Elevation Plan
- Erosion and Sediment Control Plan
- Landscaping Plan
- Geotechnical Soils Study

Depending on the complexity of the proposed development, requirements of the above drawings may be combined, or waived, at the discretion of the City.

Additional Site Plan drawings shall be prepared when requested by the City. Prior to receiving a building permit, all plans must be approved by the City.

City of Orillia

Engineering Design Criteria: General Guidance

Supporting documents may be required including, but not limited to; Stormwater Management Report, Traffic Impact Assessment, Noise Report, Hydrogeological Report, Floodplain Study, Environmental Assessment Report and Archaeological Impact Study or other reports and studies as determined on an individual site plan basis. Further information is available within the City's Official Plan.

10.4 Drawing and Design Requirements

10.4.1 General Requirements

All Site Plan drawings shall be prepared from one base plan prepared at a minimum scale of 1:500 and which contains the following information:

- A key plan at a scale of 1:10,000 showing the site location.
- A north arrow.
- Site statistics.
- Street names, lot and Registered Plan numbers, and property dimensions.
- Road widenings.
- Easements.
- Vehicular loading and parking facilities.
- The outline of all buildings with the building numbers and unit numbers indicated and garage locations within the unit.
- Storage areas and enclosures for garbage and waste materials.
- Fire routes, truck delivery and other large vehicle drive paths.
- Walkways and ramps.
- Proposed roadways /driveways and all points of access.
- Adjacent lands.
- Existing land features (trees, watercourses, roads, services, etc.).
- The reference benchmark (geodetic) used to establish vertical control and the site benchmarks to be used for construction.
- Turning radii of any entrances, exits, and corners within the development.
- Lighting.
- Areas for Landscaping.
- Snow Storage.
- Private Utilities.
- Fencing and buffer requirements.

10.4.2 Site Servicing Plan and Design

The Site Servicing Plan shall show, at a minimum, the location, size and grade (as applicable) of the following services and information:

- All existing underground services on the streets and easements adjacent to the property.
- Storm and sanitary service connections to the property with grade and invert information.
- Watermain connections to the property.
- If existing servicing connections are to be abandoned and new connections installed, include locations and methodology to be used (e.g., live tap into existing main; abandon existing service at the main; etc.)

City of Orillia

Engineering Design Criteria: General Guidance

- The basement and finished floor elevations of all proposed buildings.
- Storm, sanitary and watermain services with length, grade, material and bedding requirements to be constructed within the development.
- Proposed sanitary and storm maintenance holes with invert and rim elevations.
- Hydrants, valves and appurtenances within the development.
- Sanitary, storm and water service connections to individual units, as applicable.
- Roof water leaders and method of discharge.
- All construction notes required to describe the construction detail or requirements.
- The locations of prime and reserve tile-bed areas, including mantles (where required).
- Proposed wells and septic beds to be decommissioned.
- Illumination standards.
- Proposed landscape features.

10.4.3 Stormwater Management

Stormwater management techniques shall be employed on all sites in accordance with requirements identified in the City of Orillia Engineering Design Criteria: Stormwater document.

10.4.4 Site Servicing Design

The rainwater leaders from all commercial, industrial, institutional and high-density residential buildings should be discharged onto grassed or garden areas. Alternatively, rainwater leaders may be directed to on-site detention facilities to achieve the necessary stormwater quantity control as calculated in the stormwater management report.

- Yard catch basins shall be provided where required for drainage of landscaped areas.
- Catch basin maintenance holes may be used for roadway drainage.
- All site servicing designs shall comply with the OBC, City Engineering Design Criteria, Site Plan Control By-Law, and all applicable Provincial and Municipal regulations.
- The watermain design shall be submitted to the City of Orillia Fire Department for approval of the watermain layout and the hydrant locations. The Ontario Safe Drinking Water Act applies to the watermain works within Municipal rights-of-way. Refer to City of Orillia Engineering Design Criteria: Water Distribution for design requirements.
- Where requested, easements for utilities shall be provided at no cost to the utility company.

10.4.5 Site Grading Plan and Design

The site grading plan shall show, as a minimum, the following information:

- The drainage of the site is to be self-contained.
- The grading of the site is to be compatible with the elevation of the surrounding lands.
- All grassed embankments shall have a maximum slope of 3:1.

City of Orillia

Engineering Design Criteria: General Guidance

- The grade of grassed or other landscaped areas shall have a maximum slope of 12% and a minimum slope of 1%.
- Swales on grassed areas shall have a minimum slope of 1.5% and a maximum slope so the velocity for the flow contained does not exceed 1.25 m/s.
- The maximum suggested length for any drainage swale is 75 m.
- The minimum depth for any drainage swale shall be 150 mm.
- The maximum depth for any drainage swale shall be 750 mm.
- The maximum side slope on any drainage swale shall be 3:1.
- All driveways shall have positive drainage from the street line to the roadway.
- Centreline grades at 15 m intervals along all existing streets bounding the property and existing grades.
- A legend indicating which are existing and proposed elevations.
- Contours at maximum 0.5 m intervals to indicate the existing elevations of the site. These contours are to extend to a minimum distance of 15 m beyond the property limits to indicate the grading and drainage patterns of the adjacent lands.
- Cross sections as required to clarify the proposed grading, particularly in relation to adjacent lands.
- Proposed elevations on paved areas, around proposed buildings, along swales, along roadways, parking areas, driveways, catch basin rim elevations, and any other elevations necessary to establish the grading and drainage patterns for the development. Arrows to be used to indicate direction of the surface drainage.
- A typical roadway cross section to indicate the pavement and granular base design.
- Roadway dimensions and curb radii.
- Concrete curbs.
- Embankments, retaining walls, stairs, play areas, swimming pools, etc.
- Curb depressions, with dimensions.
- Sidewalk.

10.4.6 Roadway Design

Roadway design shall be in accordance with requirements identified in the City of Orillia Engineering Design Criteria: Transportation Section and in the City's Official Plan..

10.4.7 Landscaping Requirements

A Landscaping Plan shall be prepared by a qualified Landscape Architect if required by the City. A schedule of plant species and sizes is to be identified on the landscaping plan.

All maintenance holes, catch basins, hydrants, valves, streetlights, fences, benches, pavilions, playground equipment, retaining walls, snow storage, and other servicing features that appear above grade shall also be shown on the landscaping plan.

10.5 As-Built Drawings

After all construction is complete, the design drawings shall be amended to incorporate the changes and alterations made during construction to ensure the drawings as amended

City of Orillia

Engineering Design Criteria: General Guidance

represent the services and conditions as constructed. One set of “As-Built” drawings must be submitted to the City within one year of final completion and prior to the final security reduction.

As-built drawings must include City designations for items such as maintenance holes, and not project designations (e.g., Manhole “A” is not acceptable).

10.6 Certification

Upon completion of construction the Consulting Engineer shall provide written certification to the City that all works have been constructed in accordance with the approved plans and specifications and in accordance with good engineering practices. The wording is to be followed by the Professional Engineers stamp and signature.

10.7 Final Inspection

Upon completion of all construction the Developer shall request the City to carry out a final inspection of the works. All deficiencies found during this final inspection shall be immediately corrected by the Developer. This final inspection is carried out for the benefit of the City and shall in no way relieve the Developer of his obligations under the Condominium Act and the Site Plan Agreement.

11.0 WASTE COLLECTION – DEVELOPMENT

11.1 General Information

This section is meant to provide information for developers about the City’s requirements for the provision of Waste Collection Services. These requirements must be met before the City will provide Waste Collection Services.

All requirements of Municipal Code Chapter 877 (Solid Waste Management) must be complied with for Waste Collection Services.

11.2 General Requirements

Outlined in the following section are the general requirements which must be adhered to for Waste Collection Services to be provided.

- The City will only provide Waste Collection Services if the requirements set out in this guideline manual to provide proper access for collection vehicles are adhered to.
- Private roads have the required widths, and road strength, turning radii, means of access, and means of egress required for the waste collection vehicles, appropriate overhead clearance, the road is clear of snow and ice, unobstructed access to the waste to be collected.
- The City reserves the right to revoke Collection Services to any Serviced Unit that does not adhere to the requirements as laid out in this document.
- For detailed information on Waste Collection Services and schedules, please refer to the City’s website at www.orillia.ca.

City of Orillia

Engineering Design Criteria: General Guidance

For new developments within the City including Subdivisions and Site Plans, a Waste Management Plan is to be provided that includes information on site access, vehicle movement entering, moving throughout and exiting the site, space allocated for and access to garbage, recycling and compostable organics collection, bin collection layout, and waste room configuration and design..

11.3 Waste Collection from Residential Developments with Serviced Units Fronting on a Public Road

For Serviced Units fronting on a public road, Waste Collection Services will be provided subject to the following requirements:

- The roadway is designed to accommodate collection vehicles. Road layouts are designed to permit continuous collection by the collection vehicle without reversing. Where the requirement for continuous collection cannot be met, a cul-de-sac or a “T”-turnaround may be permitted consistent with the Fire Access Route Design as per OBC 3.2.5.6.
- All roads are designed to have a minimum width of approximately 6 metres. The turning radius from the centre line must be a minimum of approximately 12 metres on all turns.
- New developments that include row townhouses or stacked townhouses are encouraged to allow for individual unit set out at the curb for garbage, recycling and green bin/yard waste. A centralized common collection point at such developments may not be eligible to receive City waste collection services and may be required to receive private collection.

The developer will be responsible for the collection and disposal of Waste until the City grants Collection Services.

11.4 Waste Collection from Multi-Unit Residences/Residential Dwelling Units

For residences fronting on a Private Road or driveway, Waste Collection Services will be provided, subject to the following requirements:

- The roadway is designed to accommodate collection vehicles. The internal road layout is designed to permit continuous collection without reversing. Where the requirement for continuous collection cannot be met, a cul-de-sac or a “T”-turnaround may be permitted consistent with the Fire Access Route Design as per Ontario Building Code (OBC).
- Private roads have the required widths (approximately 6 metres), and road strength, turning radii (approximately 12 metres), means of access, and means of egress required for the waste collection vehicles, appropriate overhead clearance as per the OBC, the road is clear of snow and ice, unobstructed access to the waste to be collected. Any variation from the requirements would have to be acceptable to the Service Provider and the General Manager of Environmental and Infrastructure Services.

For multi-unit residential buildings (apartments/condos) that have at least nine Serviced Units, the City provides centralized collection service of garbage bins, 360 litre recycling carts, and 46 litre bin carts for collecting organics (food scraps). In order for the complex to receive garbage collection service, recycling and green bin organics collection must be provided. The site design

City of Orillia

Engineering Design Criteria: General Guidance

should include enough space for each collection method. The recommended space to allocate is as follows:

- 4 m² per garbage bin.
- 1 m² per recycling cart (to determine the number of carts needed, divide the total number of residential units by 7 – so a 28-unit apartment would need to plan to have space for at least $28/7 =$ four recycling carts).
- 0.25 m² per green bin cart (a building should plan to have at least five or more green bin carts available for tenants).

Collection vehicles clearance access shall be in accordance with Table 1:

Table 1: Typical Waste Collection Dimensions

Typical Waste Collection Truck Dimensions	Approximate Truck Measurements
Length	10.7 meters (35 feet)
Width	2.7 meters (9 feet)
Height Clearance	6.3 meters - 7.3 meters (20-24 feet)
Width Clearance	4.0 meters (13 feet)
Length Clearance	15.2 meters (50 feet)

Multi-unit residential buildings should be designed with these clearances in mind.

The City does not provide waste collection services from underground waste collection systems that cannot be accessed utilizing conventional waste collection fleet equipment.

11.5 Waste Diversion Collection Services

To comply with the Government of Ontario's provincial legislation, Blue Box Regulation 391/21, that changes how blue box materials are managed and collected in Ontario, the City has transitioned to a new blue box collection system. Under the regulation, municipalities and First Nation communities in Ontario will move from the old system, which split costs between municipal taxpayers and Producers of blue box materials, to a new system which requires the Producers to pay for and operate the system and achieve performance targets. As of January 1, 2026, Producers will be responsible for collecting, processing and marketing blue box materials, reporting to the Resource Productivity and Recovery Authority, and meeting increasing targets for materials they collect and recycle.

Placing full financial, operational, and performance accountability for the blue box program on the Producers of blue box materials creates a direct incentive to reduce waste and improve recycling which decreases natural resource extraction and pollution, including greenhouse gases. The Producer entity that will be managing the Blue Box system in Ontario is Circular Materials (CM). As of January 1, 2026, they set out the collection guidelines for blue box materials collected from residential sources. Blue box recycling from Industrial, Commercial and Institutional (ICI) sources are serviced by the City unless otherwise noted.

Developers are encouraged to include sorting systems within multi-unit properties to meet precise sorting requirements and avoid potential issues like uncollected recycling.

City of Orillia

Engineering Design Criteria: General Guidance

New multi-residential properties are immediately eligible for free blue box collection service through the CM producer responsibility program. Please contact CM for more information. Property owners may apply to the City to service their garbage and organics streams.

11.6 Gates

New or existing developments that are to construct gates must meet any one of the following criteria in order to receive (or continue to receive) Waste Collection Services:

- The gates automatically open for larger vehicles including waste collection vehicles (e.g., entry/exit loop system, line of sight towers, etc.);
- The gates automatically open via two-way radio frequency through the collection driver keying in the radio transmitter on the collection truck (City's radio frequency is 169.96500 MHz); or
- The gates remain open on the scheduled collection day(s) for the development. Note that there could be more than one collection day for multi-unit residential developments. Please also note that collection is normally delayed by one day during weeks with statutory holidays.

The following gate activation methods are not acceptable:

- Using keys to manually unlock a gate.
- Manually entering a code in a keypad for the gate.
- Providing a remote opener chip for collection trucks.

All gates are to be designed to have a minimum width of approximately 6 metres. The turning radius from the centre line must be a minimum of approximately 12 metres on all turns.

11.7 Design Standards Waste Collection Services

The following clause is to be set out in subdivision agreements, condominium documents, and development agreements and included in all agreements of purchase and sale or lease if the developer wishes to receive Waste Collection Services from the City.

"The developer is required to comply with the City's Waste Collection Design Standards. Failure to comply could result in Waste Collection Services being withheld or suspended."

12.0 PARKLAND DEVELOPMENT

12.1 Services

The Developer shall provide to the satisfaction of the City, a water service connection and sanitary sewer and storm sewer lateral connections to the street line for the park, if required by the City. Metering requirements for water service connections shall be confirmed with the City.

Where required by the City, underground primary or secondary electrical cables shall be placed from the road allowance to designated locations within parkland.

City of Orillia

Engineering Design Criteria: General Guidance

12.2 Grading

Parkland shall be fine graded in accordance with the approved grading plan with particular care being taken to avoid damage to those trees or features to remain. All graded areas shall be covered with a minimum of 150 mm of approved topsoil and shall be seeded and fertilized in accordance with the specifications of the City Engineer. All topsoil stripped from parklands shall remain on-site and not removed or sold. The seed mixture proposed shall be approved by the City prior to placement. All park blocks less than 0.4 ha. in size shall be sodded on 150 mm. of topsoil. All stones and debris shall be removed and disposed of by the Developer prior to the seeding or sodding of any park.

The Developer shall provide chain link fencing along park boundaries or walkways as required by the City. Building materials or equipment cannot be stored on parkland and parkland shall not be used as a waste storage area. Stripped topsoil shall not be stockpiled on parkland or on any other City lands.

12.3 Timing of Construction

All park blocks must be graded and seeded or sodded within one year of the completion of the base course asphalt road construction in the area adjacent to the park. Seeding must be carried out during the desirable months for seeding of May, August or September. Boulevard grading and sodding on road allowances adjacent to parklands shall be completed at the same time as the park seeding.

12.4 Maintenance

The Developer shall be responsible for the maintenance, fertilizing and mowing of the parklands until "Final Acceptance".

13.0 LANDSCAPE IMPLEMENTATION PROCEDURES

Once the infrastructure of the subdivision is in place and housing is under construction, the developer must hire a landscape contractor to install the approved landscape components. The Landscape Architect shall inspect and certify the installation.

13.1 Streetscape Works

The developer is required to hire a contractor to install the landscape elements called for in the approved landscape plans. The Consulting Landscape Architect will inspect the work and then apply for a Request for Inspection and Security Reduction with the City's Planning Division. They will submit with the application a report on progress and provide the City with as-built drawings, if needed. An important part of the Landscape Architect's duties will be to maintain a summary chart documenting the history of each new tree planted in the parcel of land being developed. The City will conduct its own inspections following the submission of a Request for Inspection and Security Reduction form which can be obtained from the City's Planning Division. All streetscape works are to be guaranteed and maintained until assumption of services or 24 months whichever is longer.

City of Orillia

Engineering Design Criteria: General Guidance

13.2 Naturalization Works

As with streetscape works, the process begins with the developer hiring a contractor to install the landscape elements called for in the approved landscape plans. The developer's Landscape Architect will supervise the work and report on progress to the City. The City will conduct its own inspections following the submission of a Request for Inspection and Security Reduction form which can be obtained from City Planning Staff. All naturalization works are to be guaranteed and maintained until assumption of services or 24 months whichever is longer.

14.0 FENCING

Fencing shall be in accordance with the most recent requirements and specifications of the City as shown on the standard drawing, 72-STD-14.

Fencing is required:

- Alongside yard flankage and/or rear yards backing onto roadways unless noise attenuation barriers are required and referenced within the City's Zoning Bylaw 2014-44.
- Along public walkways, along any future land conveyances - i.e. stormwater management facilities, woodlots, trails, and parkland in accordance with City Standards, to delineate property boundaries and prevent future encroachments.
- As designated by City Engineering Staff.
- Acoustic fencing per approved report.
- Fencing is required on school blocks and details for that fencing is provided by the school boards.

15.0 LANDSCAPING

15.1 General Requirements

The Developer is responsible to plant trees along all road allowances in and abutting the development in accordance with the specifications established pursuant to the Subdivision Agreement. Tree locations on municipal roads must be confirmed with the City.

The developer is required to prepare a landscape design prepared by a qualified Landscape Architect to be approved by the City on a site-by-site basis. In general, at least one tree shall be planted in front of each single-family dwelling, semi-detached unit and townhouse block. A minimum of two trees shall be placed along the flankage side of each corner lot.

Trees should be placed so their mature form will not conflict with other essential services and functions.

All trees are to be placed during either the spring or fall dormant season in unfrozen soil.

All boulevard trees shall be #1 quality nursery grown stock, 2.25 m. to 4.0 m. in height with a minimum trunk diameter of 40 mm. measured at a minimum of 1.0 m. above ground level. All trees shall be free from physical damage, insects, pests and diseases and must have at least

City of Orillia

Engineering Design Criteria: General Guidance

three quarters of the root system intact. All trees must meet with the standards of the City of Orillia Designated Boulevard Tree Chart.

15.2 Sodding

The subdivision shall be sodded according to the following:

- All swales, ditches, drainage easements, and slopes 10% or greater shall be sodded using 150 mm topsoil and No. 1 nursery sod.
- All residential lots shall have a minimum of 150 mm topsoil and sod, rear and front.
- Where the combined side yard between buildings is less than 1.5 m the surface treatment shall be 75 mm of clear stone over a vegetation suppressing geotextile.

15.3 Plantings

All plantings within the municipal owned road allowance to adhere to the City of Orillia Tree Program and meet with the standards of the City of Orillia Designated Boulevard Tree Chart and Tree Planting Guidelines.

15.4 Retaining Wall

Retaining walls shall be constructed according to the following:

- Where retaining walls are required, they shall be constructed on the higher lot so the wall and tie-back do not cross property lines;
- Retaining wall shall be designed by an Engineer licensed in the Province of Ontario;
- Retaining wall construction shall be supervised and certified by an Engineer licensed in the Province of Ontario, in accordance with OBC requirements. A certificate of conformance to be provided to the City upon completion of the retaining wall;
- Retaining walls shall be constructed entirely on private property, not on property to be assumed by the City; and
- Pedestrian guard shall be provided if the retaining wall exceeds 1 m in height; and Retaining walls shall comply with the City's Zoning By-law 2014-44 requirements.

16.0 EASEMENT AND BLOCK REQUIREMENTS

16.1 General Requirements

The City shall require conveyance of easements or dedication of blocks, without consideration and free and clear of all liens and encumbrances, to the minimum width requirements, or greater as determined by the City Engineer, in the following circumstances:

- Easement Dedications
 - Rear and side yard swales designed to convey external or municipal drainage.
 - Rear and side yard piped storm drainage systems, including catch basins, French drains, maintenance holes and other appurtenances.
 - Storm sewers, watermains, and sanitary sewers (other than private connections).

City of Orillia

Engineering Design Criteria: General Guidance

- Where underground services are required beyond the limits of a subdivision or site plan.
 - Subject to City approval, private services or infrastructure located within municipal lands.
- Block Conveyances
 - All overland flow routes, open channels, and defined drainage systems accommodating a major storm.
 - Walkways and bicycle paths.
 - Valleys, streams, open channels, watercourses (whether flowing or intermittent), seepage areas, wetlands, natural bodies of water and floodplain lands identified by the City as being environmentally significant requiring protection or designated as hazard or open space lands.
 - Stormwater management facilities, including detention and retention ponds, water quality control facilities and infiltration facilities which are to be owned and operated by the City.

16.2 Easement Width Requirements

Easements must be located on one side of the common lot line between adjacent lots. Pipes shall be centred on the easement. The easements will not be permitted to straddle common lot lines. Buildings, including footings or building extensions, will not be permitted to encroach over the limits of the City's easements.

Where two pipes are to be located on one easement, the minimum width of easement shall be the width of easement required for the larger of the two pipes plus 1/2 the width of easement for the smaller pipe, rounded to the next 1.0m increment. Additional easement width may be required to ensure adequate separation between the two pipes and a minimum separation of 3.0 metres between the easement limit and the nearest pipe.

16.2.1 Storm and Sanitary Sewers

The minimum width of easements for storm and sanitary sewers shall be in accordance with Table 2.

Table 2: Minimum Sewer Easement Widths

Size of Pipe	Depth of Invert	Minimum Width of Easement
250 to 375 mm	3.0 m maximum	6.0 m
450 to 675 mm	3.0 m maximum	6.0 m
750 to 1500 mm	3.0 m maximum	6.0 m
1650 mm and greater	4.0 m maximum	4.0 m plus 3 times O.D. of pipe

16.2.2 Storm Connections for Rear Yard Catch Basins

The minimum width of permanent easements for leads to rear yard catch basins shall be 5.0 metres. The lead shall be centred on the easement.

16.2.3 Watermains

The minimum width of easements for watermains shall be in accordance with Table 3.

City of Orillia

Engineering Design Criteria: General Guidance

Table 3: Minimum Watermain Easement Widths

Size of Pipe	Depth of Invert	Minimum Width of Easement
Up to 600 mm	3.7 m	maximum 6.0 m
675 mm and greater	3.7 m	maximum 9.0 m

16.3 Block Width Requirements

Blocks of land shall be of sufficient dimension to accommodate the proposed facility, access from a public right-of-way and maintenance requirements.

The minimum width of blocks of land for open drainage channels shall be the width of top of open channel plus 7.5 metres along one side of the channel for maintenance requirements.

Valley lands (crest of slope to crest of slope) may be contained within blocks of land to be conveyed to the City, as a condition of development. Blocks of land in this case shall include 3.0 metre platform widths on both sides. Blocks of land will not be considered as part of parkland dedication requirements.

16.4 Drainage Swales

Easements are required for drainage swales which convey external or municipal storm water.

The minimum width of permanent easements for lot drainage swales shall be 4.0 meters. Additional easement widths may be required depending on the critical depth of swales proposed. Drainage swales to be centered over easements.

17.0 SCADA STANDARDS

Supervisory Control and Data Acquisition (SCADA) automation system is used to monitor and control processes at the Water Filtration Plant, West Orillia Well, Zone 3 Booster Station, Storage Reservoirs, Wastewater Treatment Centre, and Sewage Pumping stations. While most of the processes are run automatically by local Programmable Logic Controllers (PLC), the SCADA system continuously records operation, provides alarm notifications, and allows operators to remotely monitor and control the system process.

SCADA inquiries should be made to the Environment and Infrastructure Services Department for the latest standards. The current City of Orillia SCADA Standards that must be adhered to for any projects involving SCADA integration. Any project deviations from the SCADA standards must be documented and approved by the City, and any changes that need to be applied to the SCADA standards as the result of a project must be documented and provided to the City.

18.0 TOPOGRAPHICAL SURVEY

For new developments, the Owner shall engage an OLS to prepare a Plan of Survey, including a Topographical Survey, of the property depicting legal boundaries, building locations, physical features and other items of spatial importance.

City of Orillia

Engineering Design Criteria: General Guidance

A copy of the survey document at a typical metric scale (i.e., 1:100, 1:200, 1:250, etc.,) shall be submitted to the City in PDF format, stamped/sealed by the OLS.

Survey area to extend to 30 m outside of property boundary or as approved by the City. Identify easements, right of ways (R.O.W), encroachments on and immediately adjacent to the property.

A minimum of one benchmark shall be established for each site. 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 City. New horizontal control monuments and vertical control benchmarks (including replacements) shall be installed by an OLS. A certificate by an OLS shall be provided stating that the horizontal control monuments and vertical control benchmarks were installed as set out by the "Ontario Specifications for Horizontal Control Surveys (OS 79)" and the "Ontario Specifications for Vertical Control Surveys (OS 79)" respectively, and confirmation from the MNR that the horizontal control monuments and vertical control benchmarks have been accepted into their Cosine Database.

Horizontal control points are to be established NAD 83 UTM Zone 17, and vertical control system are to be geodetic using CGVD28.

19.0 GEOTECHNICAL REQUIREMENTS

The following geotechnical site investigations shall be the minimum standard requirements.

Boreholes shall be placed along the proposed ROW and/or within the proposed location of structure(s). The spacing for boreholes shall be determined by the Geotechnical Engineering Consultant with a maximum allowable spacing of 150 m for roadways. Boreholes shall be advanced to a minimum of 1.0 m below the proposed sewer invert or minimum of 3 m below underside of structures. Boreholes shall also be required in locations where other types of municipal infrastructures (e.g., SWM pond, outlet structure, Low Impact Development practices, etc.) are proposed, and where slope stability assessment is required.

The geotechnical investigation report shall include, as a minimum, the following:

- Borehole location plan including site limits and, if applicable, site concept plan.
- Identify each different soil unit and report respective index properties.
- Using a split spoon, obtain samples at a minimum of 0.75 m to a depth of 5 m and 1.5 m sampling intervals.
- In cohesion-less soil obtain Standard Penetration Test N-index values.
- In low strength cohesive soils obtain Standard Penetration Test N-index values and carry out in situ shear vane tests; obtain both the undisturbed and remolded shear strength values.
- Perform tests and measurements for soil index and structural properties in accordance with latest editions of applicable American Society for Testing and Materials (ASTM) standards and recognized good practice. Testing as a minimum shall include:
 - Atterberg limits and Plasticity Index;

City of Orillia

Engineering Design Criteria: General Guidance

- Grain size analysis;
 - Moisture content; and,
 - Resistivity tests.
- All surveyed topographic elevations referenced to a City benchmark.
- Depth and elevation of the observed groundwater at the time of drilling.
- Depth of topsoil and the identification of any poor soil strata or areas of fill including additional boreholes or test pits.
- Subsurface information from the investigation program shall be presented in the form of Borehole Logs and the borehole locations clearly shown on the site plans.

The geotechnical investigation report shall provide recommendations for following:

- Recommended requirements for the placement and compaction of engineered fill, including the suitability of on-site material.
- Recommendations with respect to poor sub-grade soil including sub-excavation and backfill compaction requirements.
- Recommendation to address identified frost susceptible native soils.
- Sub-excavation requirements including the use of filter fabrics and/or geogrid (with specifications).
- Recommended bearing capacity for design.
- Recommended foundation wall backfill and compaction requirements.
- Recommended pipe bedding material and trench backfill including compaction requirements.
- Include comments regarding deep excavations and shoring, if necessary.
- If necessary, temporary dewatering requirements during construction, trench stability and trenching requirements as required by the Occupational Health and Safety Act (OHSA).
- Including comments regarding the need for additional investigation, such as a Hydrogeological Investigation and reporting, to facilitate a Permit to Take Water (PTTW) or Environmental Activity and Sector Registry (EASR) application.
- Recommended minimum pavement structure(s). The pavement structure shall meet or exceed the minimum requirements specified in Section 10.3.4 Roadway Design.
- Stormwater Management (SWM) Ponds recommendations for side slope stability, temporary dewatering requirements/implications and pond bottom sub-grade strength. If applicable, determine the requirement of a clay liner for retention ponds including specification for alternative material (i.e., geosynthetic clay liner).
- Assessment of soil corrosion potential and rating (10-point system) in accordance with ANSI/AWWA C105/A21.5-99 to evaluate if additional cathodic protection measures are required on watermains.
- If necessary, recommendations for remedial measures for any off-site impacts on adjacent properties, woodlots, natural areas, etc.
- Recommendations for the supervision of bedding installation, backfilling, and compaction by a qualified geotechnical professional.
- Any additional recommendations that have not been addressed shall be identified in the Geotechnical Investigation reporting and how those recommendations shall be addressed.

20.0 HYDROGEOLOGICAL REQUIREMENTS

Hydrogeological studies for a proposed project must be conducted by a qualified Professional Engineer and/or Geoscientist licensed in Ontario to characterize the groundwater regime from a site-specific and regional perspective in order to address the criteria consistent with the Hydrogeological Assessment Submissions, Conservation Authority Guidelines for Development Submissions (June 2013), as updated. Reporting requirements for hydrogeological studies shall include but not limited to the following information:

- Documentation of groundwater levels including the seasonal high groundwater level;
- Confirmation of the site's location within a Significant Groundwater Recharge Area (SGRA), Ecologically Significant Groundwater Recharge Area (ESGRA), Wellhead Protection Area (WPA);
- Definition of the recharge/discharge conditions and the area of influence;
- Impacts to existing well water supplies within the project area based on the area of influence;
- Soil permeabilities and associated properties where the design of septic systems are concerned;
- Groundwater impact assessment to area aquifers from construction activities and/or discharge of waste or wastewater;
- Test wells and associated testing in accordance with Ministry of the Environment;
- Conservation and Parks (MECP) D-5-5 guidelines to address water taking impact sustainability;
- Impacts to nearby surface water bodies and identification of the groundwater/surface water interactions;
- Characterization of groundwater sensitivity to contamination;
- Specific technical review of well field or wellhead capture zones;
- If applicable, any impacts to adjacent structures or properties including preventative measures, if necessary, shall be provided;
- Pre-to post development water balance analysis based on an undeveloped site condition;
- In support of LID feasibility and construction, sufficient number of infiltration rate tests at the locations of the proposed LID practices; and,
- Permanent dewatering is not allowed for any project in the City unless appropriate mitigation measures are provided to the satisfaction of the City.

For general road and servicing construction, the report should consider the depth of services and identify any areas where temporary dewatering will be required, recommended dewatering methodology, the anticipated rate of dewatering, and any other requirements for dewatering including necessary permits. If temporary dewatering is necessary, the report should contain all required information to support a PTTW or ESAR application.

Where applicable, the report should also provide an assessment of the use of sump pumps for building design.

City of Orillia

Engineering Design Criteria: General Guidance

21.0 EXCESS SOIL REQUIREMENTS

The Project Leader shall employ or retain the services of a Qualified Person (QP) and shall have the qualifications as defined in O.Reg. 153/04, as amended.

Every effort should be made to beneficially reuse soil on-site as directed by the geotechnical engineer and Qualified Person.

If excess soil is required to be exported off-site, the Qualified Person shall ensure that excess soil is managed in accordance with the most current version of O.Reg. 153, O.Reg. 347, and O.Reg. 406 including the *Rules for Soil Management and Excess Soil Quality Standards*.

Soil stored on the project site should be indicated on the construction management plan.

22.0 STANDARD DRAWING INDEX

In general, OPSD's shall be used and referenced by the designer. The suitability of any particular OPSD shall be determined by the City.

The City Standard Drawings which form part of this document have been developed to reflect specific requirements of the City and shall take precedence over OPSD's. The following City Standard Drawings have been included in Appendix 'F'.

1. Typical Road Cross Sections

- Urban Road Cross Section
- Rural Road Cross Section

2. Lot Servicing Details

- Single
- Townhome
- Semi / Link

3. General Notes

4. Mud Mat Detail

5. Fenced Walkways

- Fencing Detail
- P-Gate Detail
- Removable Bollard Detail

6. Water Sampling Station