DEVELOPMENT STANDARDS,

Policies & Guidelines

Town of Caledon

Prepared by the Town of Caledon
Public Works & Engineering Department
Version 4 – January 2009

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Director of
Public Works & Engineering
TOWN OF CALEDON
DEVELOPMENT STANDARDS, POLICIES AND GUIDELINES

INTRODUCTION

The Town of Caledon Development Standards, Policies and Design Requirements presented here are intended as *GUIDELINES* for land development for new and Town projects to aid in the uniform design throughout the Municipality. The Director of Public Works & Engineering (hereon in referred to as the Director) must approve technological or economical changes that improve or maintain the quality of the overall design.

These standards are to be read in conjunction with Ontario Provincial Standard Drawings (O.P.S.D.). In the case of a discrepancy the Town Standards shall prevail.

It is the applicant’s responsibility to obtain and check with the Town of Caledon for new revisions. Copies are available from the Town of Caledon or can be downloaded from the web site at: [www.town.caledon.on.ca](http://www.town.caledon.on.ca)

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1.0 DESIGN SUBMISSION

1.1. Introduction

The following requirements cover submissions to be made to the Town of Caledon’s Public Works and Engineering Department. All submissions are to be co-ordinated by the Consulting Engineer.

Separate submissions are to be made to the Regional Municipality of Peel in accordance with their requirements. Second and Final submissions are not to be made until the Town’s and Region’s comments regarding the first and second submission, respectively, have been received and incorporated.

Prints of drawings for all subdivisions shall be in accordance with Town standards and each print shall be stamped with the submission number (1, 2, or 3) and date of submission.

This document covers the requirements of the Public Works & Engineering Department, however it should be noted that preparation of the Subdivision Agreement is through the Planning and Development Department. The applicant or their representative must deal directly with the Planning Department on this matter.

It is highly recommended that the Consulting Engineer arrange a pre-consultation meeting with the Public Works and Engineering Department prior to the first submission to understand the submission procedure, expectations of the Town and to receive copies of checklists, templates etc. If a Landscape Architect has been engaged it is recommended that he/she also attend the pre-consultation meeting.

It is the intent of the Public Works and Engineering Department to provide a response to a complete submission, within three weeks of said submission. This response time is subject to workload, vacation, and availability of in-house technical expertise.

1.2. Submissions to Conservation Authorities

Credit Valley Conservation Authority (C.V.C.A.) – Toronto and Region Conservation Authority (T.R.C.A.) – Nottawasaga Valley Conservation Authority (N.V.C.A.) – Lake Simcoe Regional Conservation Authority (L.S.R.C.A.) are the Conservation Authorities having interest within the boundaries of the Town of Caledon.

The Developer’s Engineering Consultant shall deal directly with the Conservation Authority for works that fall within their jurisdiction, until he/she has received his/her conditions of approval from the Town for a Draft Plan of Subdivision, Rezoning or Land Severance Application. The works that will be of interest to the local Conservation Authority will be noted in their requirements.

When the Conservation Authority has sent preliminary approval in writing, to the Town, the Developer shall submit subsequent, more detailed submissions directly to the Conservation Authority.
Authority. It is the Developer’s Engineering Consultant’s responsibility to ensure that all correspondence and comments are provided to the Town of Caledon at the appropriate submission time.

1.3. **Procedures for Applications Containing Municipal Structures**

When a new roadway structure (bridge, culvert, etc.) is required in a subdivision, the second engineering submission shall include two (2) copies of the following material for Ministry of Transportation review:

1. **General Arrangement drawing(s).** This drawing is to be prepared in accordance with the Ontario Ministry of Transportation (M.T.O.) Structural Manual. It includes the roadway structure plan, profile, elevation and cross sections.

2. **Design Report.** The design report includes but is not limited to the description of the works, how the detail was arrived, different options and cost analysis/least expensive alternate to construct and maintain.

3. **Design Criteria Sheet.** Generally type/class of roadway, volume of traffic, geometric information and cost estimate.

4. **Foundation Report.**

5. **Hydrology Report (when applicable).**

6. **Letter from the Engineer who certifies the design that Canadian Highway Bridge Design Code (C.H.B.D.C.) requirements are met.** M.T.O. approval will only be required for General Arrangement drawings. The General Arrangement drawing will be reviewed together with items 2 to 5 above to ensure that:

   - The bridge type, length and width are appropriate
   - C.H.B.D.C. requirements are met
   - Ministry 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 two professional engineers who designed the roadway structure and by the professional engineer who checked the structural design drawings.

Although the M.T.O. will not be approving the final designs, they will be monitoring, on a selected basis, some final designs and hence will require submission of one complete set of final plans.

The final engineering submission shall include the consultants’ covering letter to the M.T.O. confirming that the final drawings have been sent to the M.T.O.
1.4. **First Submission to Director**

Submissions to the Director shall include, as a minimum, all items listed under Engineering Submissions as well as Parks and Landscaping Submissions.

**Engineering Submission**

The following documents shall be submitted with the initial 3% processing fee that is to be in accordance with the Town’s fee By-Law. This processing fee is credited towards the total Engineering fee which is due at time of Registration of the Plan of Subdivision.

The Consulting Engineer and Landscape Architect are required to meet with the Public Works and Engineering Department’s review team to provide an overview of the development proposal and to show how they are in keeping with the Department’s Development Guidelines.

**Three complete rolled sets** of the following engineering drawings are required:

- Proposed Plan for Registration
- Cover Sheet/Legend Sheet
- General Above Ground Services Plan(s)
- General Below Ground Services Plan(s)
- Storm Drainage Plan(s)
- Erosion and Sediment Control Plan(s)
- Plan/Profile Drawings
- Miscellaneous Plans and Detail Drawings
- Grading Plan(s) (including lot grading, parks and school block)
- Topsoil Management Plan
- Detail Drawings for Outlets and Watercourse Improvements
- Street Light Plan(s) and Photometrics

**Two complete copies** of the following documents are required:

- Stormwater Management Report
- Storm Sewer Design Sheets
- Acoustic Report
- Arborist Report (if required)
- Soils Report
- Environmental Site Assessment
- Traffic Impact Study (if required)
- Topsoil Management Report
- Detailed Engineering and Landscaping Cost Estimates
- Schedules to be included in the Subdivision Agreement:
  - Legal description of the property
  - List of all drawings and reports
  - Summary of Cost Estimates
  - List of lands to be deeded or conveyed
The following letters are also to accompany the First Submission:

- Civil Engineer Letter of Retention, as per Section 5.16.1.
- Two copies of Ontario Land Surveyor (OLS) letter certifying no Changes to M-Plan since Zoning, as per Section 5.16.5.
- Electrical Engineer Letter of Retention, as per Section 5.16.1.
- Geotechnical Consultant Letter of Retention, as per Section 5.16.2.
- Letter regarding the Conditions of Draft Approval
- Landscape Architect Letter of Retention, as per Section 5.16.3.

**Parks and Landscaping Submission:**

Detailed Park Drawings and Park Construction Cost Estimates are required, as requested by the Town’s Landscape Architect.

Two complete folded sets of the following drawings are required (but not limited to):

- Streetscape/Buffer Planting
- Stormwater Management Pond Planting
- Vegetation Analysis and Tree Preservation Survey
- Park Concept and Facility Fit Plan
- Park Grading Plan

**1.5. Second Submission to Director**

As with the first submission, the second submission to the Director is to include the Engineering Submission as well the Parks and Landscaping Submission.

**Engineering Submission**

Marked-Up Drawings from Review of First Submission (Engineering and Landscape) - or copies of covering letters from the Director indicating requested changes due to non-conformance.

Two complete rolled sets of the following drawings are required:

- All Revised Drawings
- Proposed M- and R- Plan(s)
- Composite Utility Plan(s) (including Streetlighting Plan)
- Revised Topsoil Management Plan (indicating pre-development quantity of topsoil and depth of topsoil to be placed)
- Hydro One Servicing Plan(s)
- Topsoil Management Plan(s)

Two complete copies of the following documents are required:

- Acoustical Report (if required)
- Revised Stormwater Management Report
• Revised Storm Sewer Design Sheets
• Revised Soils Report (if required)
• Revised Topsoil Management Report
• Revised Traffic Impact Study
• Revised Schedules of Subdivision Agreement
• Revised detailed Engineering and Landscaping Cost Estimates

The following letters are also to accompany the Second Submission:

• Consulting Engineer’s Letter regarding addressed comments
• Two (original plus one) copies of Ministry of Environment (MOE) application forms (signed by Developer and Consulting Engineer)
• Two copies of all other Agency Comments (CVC, TRCA, Region, MOE, MTO etc)
• Consulting Engineer Letter regarding conformance

In addition to storm/sanitary sewers and watermains, MOE approval is required for proposed engineered channels, and stormwater detention facilities/stormwater management features.

Note:

The Town will not sign the MOE Application until they are satisfied with the engineering design. The Developer’s Consulting Engineer is responsible for forwarding the complete application to the MOE.

Parks and Landscaping Submission

All revised drawings.

Two complete folded sets of the following drawings are required (but not limited to):

• Revised Streetscape/Buffer Planting
• Stormwater Management Facility Planting
• Vegetation Analysis and Tree Preservation Survey
• Park Concept and Facility Fit Plan
• Park Grading Drawing

The following letter is also to accompany the Second Submission:

• Landscape Architect Letter regarding addressed comments

1.6. Final Submission to Director

The following plans and documents are required for the final submission to the director (This shall include both Engineering and Landscaping in one complete package):

• One copy of Proposed M-Plan(s) and R-Plan(s).
• Marked-Up Second Submission drawings (Engineering and Landscape) - or copies of covering letters from the Director indicating requested changes due to non-conformance.
• Consulting Engineer Letter regarding addressed comments.
• Landscape Architect Letter regarding addressed comments.
• Two (2) copies of all final reports.
• One (1) complete set of all Engineering drawing originals as listed in the appropriate Schedule of the Development Agreement (stamped and signed by the Consulting Engineer).
• One (1) complete set of all Landscape drawing originals as listed in the appropriate Schedule of the Development Agreement (stamped and signed by the Landscape Architect).
• One (1) complete copy of all drawings listed in Schedule ‘C’ of the Development Agreement.
• Two (2) sets of storm sewer design sheets labelled final design. These are to be included in a Detail Drawing with the Final Submission.
• One (1) copy of the consultants letter to the M.T.O. confirming that the final set of drawings for a roadway structure have been sent for M.T.O.’s files (if applicable).
• Copies of required approvals – i.e. MOE, C.V.C.A., etc.
• Detailed cost breakdown of all proposed works.
• Two (2) copies of the Insurance Certificate as per the Subdivision Agreement.
• The Developer must submit evidence in writing to the Director that they have made arrangements with the Bell Telephone Company, the Cable TV, and the Hydro One for the installation of their cables in a common trench in the prescribed locations on road allowances within the plan of subdivision.
• The Developer must submit evidence, in writing, to the Director that they have made satisfactory arrangements with Hydro One for the installation of hydro services.
• The Developer must submit evidence, in writing, to the Director that they have made satisfactory arrangements with Canada Post for the location of mailboxes.
• Consulting Engineer Letter regarding conformance.

Note 1:

Submissions are to include the items listed above and are to be submitted in their entirety by one (1) agent of the Developer in one (1) complete package. Any incomplete submissions, delivered to the Town, shall be returned immediately.

Note 2:

All final drawings shall contain the following text in the title block for signing by the Director Of Public Works & Engineering:
Town of Caledon
APPROVED
AS NOTED
This approval constitutes a general review and does not certify dimensional accuracy.

This approval is subject to further certification of the “as constructed” works by a registered Professional Engineer/Landscape Architect (as appropriate) of the Province of Ontario.

Date: ____________________
Approved By: ____________________
(print name of Director and certification)
Director of Public Works & Engineering

Note 3:

Once the drawings have been signed by the Director, the original signed drawings as well as, one (1) complete copy set of full sized drawings, two (2) complete sets of reduced drawings, and one (1) electronic copy of all drawings are to be submitted to the Town, in accordance with Town AutoCAD requirements. See section 2.1 Specifications for Engineering and Landscaping Drawings for specific details on drawing requirements.

1.7. Subdivision Pre-Servicing or Pre-Grading

Pre-Servicing and Pre-Grading is permitted, however no construction of any kind (including topsoil stripping, tree removal or any other works) shall commence until the Engineering Drawings have been approved, all necessary Permits (Region of Peel, MTO, or Conservation Authority) MOE Certificate of Approval have been received. In addition the appropriate agreement has been approved and executed. Each Agreement has an associated fee of $2,100 plus GST. This fee is subject to the Town’s fee By-law and may be revised on an annual basis.

1.8. Subdivision Agreement Schedules

The following is a brief outline of some of the Schedules that accompany the Subdivision Agreement. For full information regarding Schedules, the Legal Services Department should be contacted.

- A reduced copy of the Plan of Subdivision.
- A description of the lands in the Agreement, which are the lands for which application for approval of a Plan of Subdivision has been made.
- A list all drawings and reports that are applicable to the development.
• A list of all conveyances of land and easements as required by the Subdivision Agreement.
• All special conditions to be met by the Developer as required by the Subdivision Agreement.
• A summary spreadsheet of estimated costs for security purposes, cash contributions, and special notes as per the following example:
COST SCHEDULE

SUBDIVISION:     DEVELOPER:
CONSULTING ENGINEER:

A.  Town Works

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rough Grading Of Roads</td>
<td>$__________</td>
</tr>
<tr>
<td>Roads to Base Asphalt</td>
<td>$__________</td>
</tr>
<tr>
<td>Storm Drainage Works</td>
<td>$__________</td>
</tr>
<tr>
<td>Stormwater Management Facilities</td>
<td>$__________</td>
</tr>
<tr>
<td>Top Curb and Sidewalk</td>
<td>$__________</td>
</tr>
<tr>
<td>Top Asphalt</td>
<td>$__________</td>
</tr>
<tr>
<td>Street Lights</td>
<td>$__________</td>
</tr>
<tr>
<td>Streetscape, Landscaping and Boulevard Sodding</td>
<td>$__________</td>
</tr>
<tr>
<td>Fencing</td>
<td>$__________</td>
</tr>
<tr>
<td>Driveway Aprons</td>
<td>$__________</td>
</tr>
<tr>
<td>Other:</td>
<td>$__________</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td>$__________</td>
</tr>
<tr>
<td>Contingencies Allowance 5%</td>
<td>$__________</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td>$__________</td>
</tr>
<tr>
<td>Engineering 5%</td>
<td>$__________</td>
</tr>
<tr>
<td><strong>Total Town Works</strong></td>
<td>$__________</td>
</tr>
</tbody>
</table>

B.  Region Works

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitary Sewers</td>
<td>$__________</td>
</tr>
<tr>
<td>Watermain</td>
<td>$__________</td>
</tr>
<tr>
<td>Regional roads</td>
<td>$__________</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td>$__________</td>
</tr>
<tr>
<td>Contingencies and Engineering 10%</td>
<td>$__________</td>
</tr>
<tr>
<td><strong>Total Region Works</strong></td>
<td>$__________</td>
</tr>
</tbody>
</table>

Total Town and Region Works $__________

C.  Town of Caledon P.W. & E. Administration Fees

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Town Works at 6%</td>
<td>$__________</td>
</tr>
<tr>
<td>Town Drawing Mgt Fee at $515 per km of road</td>
<td>$__________</td>
</tr>
<tr>
<td>Town Benchmark Fee of $2,100</td>
<td>$__________</td>
</tr>
<tr>
<td>Less any Previous Payments</td>
<td>$__________</td>
</tr>
<tr>
<td><strong>Total Department Fee Owing</strong></td>
<td>$__________</td>
</tr>
</tbody>
</table>

D.  Town Planning & Development Administration Fee

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Town Works at 7.0% (or as approved by Planning Dept)</td>
<td>$__________</td>
</tr>
</tbody>
</table>
E. **Region Administration Fees**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Region Works at ______%</td>
<td>$______</td>
</tr>
<tr>
<td>Hydrant Inspection Fee</td>
<td>$______</td>
</tr>
<tr>
<td>Less any Previous Payments</td>
<td>$______</td>
</tr>
<tr>
<td>Record updating (484.46 per km of watermain)</td>
<td>$______</td>
</tr>
<tr>
<td><strong>Total Region of Peel Administration Fees</strong></td>
<td>$______</td>
</tr>
</tbody>
</table>

F. **Notes:**

1. Should the Town have to become involved in the clean-up of mud tracking, dust, and/or indiscriminate dumping relating to the development, the following rates are to apply:
   
   (a) Where the Town forces are used – cost times two.
   (b) Where the Town retains independent contractors – cost plus forty (40) percent.
   (c) Minimum charge is one-half day.

2. A lot grading security will be held back on the Letter of Credit after registration, in order to secure that adequate lot grading and drainage is maintained to the satisfaction of the Town of Caledon.

Detailed estimates of the servicing works are to be in an itemized format but will not form part of the Subdivision Agreement.
2.0 DESIGN

2.1. Specifications for Engineering and Landscaping Drawings

Size: Full sized drawings to be Arch D (610mm x 914mm) (24” x 36”). Reduced drawings are to be (279.4mm x 431.8mm) (11” x 17”).

Format: Same as Town of Caledon Public Works & Engineering Department standard sheets unless otherwise approved.

CAD Standards: Typical Plan Profile sheet complete with required Symbol and Layering is available in AutoCAD 2007 format.

Material for Preliminary And Second Submissions: Bond Black Ink (permanent)

Material for Final Submission: Bond Black Ink (permanent) Compact Disk

Materials for as-constructed drawings: Translucent Mylar (0.04mm matte) Compact Disc (AutoCAD 2007)

2.2. General Drawing Requirements

Work on the drawings to be done neatly and legibly.

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

- All plans shall include a north arrow in the upper right hand quadrant. All east-west streets shall generally be drawn with the north arrow pointing to the top, north-south streets with the north arrow generally pointing to the right, and all cul-de-sacs or other roads where this does not apply shall be drawn with the stations numbered from left to right.
- All drawings must have a Key Plan.
- Engineering drawings are to include the signature and seal of the Professional Engineer responsible for the design.
- Landscaping drawings are to include the signature and seal of the Professional Landscape Architect responsible for the design.
- Elevations are to be geodetic and related to the Town of Caledon datum. The description of the benchmarks used shall be annotated on the drawings.
- Rubber stamps shall not be used except for the Engineer’s and/or the Landscape Architect’s seal.
- Nothing shall be affixed to the drawing with tape or adhesive.
The drawings must contain a note indicating the submission phase to which they apply.

Permanent black ink is to be used.

Prior to assumption of the subdivision by the Town of Caledon, the Developer’s Engineer and Landscape Architect shall submit “As Constructed Drawings” in both hard copied and digital format to reflect the ‘as-constructed’ conditions of the development. For engineering, these drawings shall show the location both horizontally and vertically of everything that is on or under the lands that are to be accepted by the Town. This includes, but is not limited to, storm sewers, sanitary sewers, and watermains. These drawings shall be sealed and signed by a Professional Engineer, stamped ‘As-constructed’, and dated. For the Landscape Architect, these drawings shall show the location both horizontally and vertically of everything that is on or under the lands that are to be accepted by the Town. This includes, but is not limited to, plantings, service connections, entry features, fencing and trails. These drawings shall be sealed and signed by a Professional Landscape Architect, stamped ‘As-constructed’, and dated.

2.3. **Computer Assisted Drawings (CAD)**

All Drawings shall be prepared using the Town of Caledon Standard AutoCAD 2007 Format. Template Drawings for Plan-Profile and Plan-View are available in AutoCAD 2007 format and shall be used unless otherwise approved. The Town’s Typical Symbol, Line Type, Line Thickness and Layering Scheme shall be followed for all drawings. The line work shall be distinctive, easily readable and the lines’ thickness must accurately represent the width of the infrastructure that it represents (i.e. line thickness for sewers shall be drawn to represent the width of the Outside Diameter of the pipe). Electronic files shall be submitted for review and acceptance. The Final submission and As-Built submission shall also include an AutoCAD file that meets the Town’s format; if layering, line type & thickness or format is not adhered to the submission shall be deemed incomplete.

2.4. **General Plans**

2.4.1. **Aboveground Plans**

General plans showing aboveground services and appurtenances are to be drawn to a scale of 1 to 1,000 or larger and shall indicate but not be limited to the following:

- School signs
- Street signs
- Future land use signs
- Barricades
- Fencing (existing and proposed)
- Retaining walls
- Rear lot/block catchbasins
- Screen planting
- Existing trees within 10 metres and trees to be preserved
- Any required easements including dimensions and descriptions
- Driveway locations
• Building envelopes for detached dwellings less than 12 metres, semi-detached dwellings and townhouse dwellings
• A typical detail showing building envelopes, driveway location and widths
• Driveway curb cut and dimension for detached dwellings less than 12 metres, semi-detached dwellings and townhouse dwellings
• Bus stop platforms
• Community mailbox
• Hydro Vaults, street lights, street light pedestals, sidewalks
• Manholes (c/w numbers) and catchbasins

2.4.2. Below Ground Plans

General plans showing all below ground services and appurtenances are to be drawn to a scale of 1 to 1,000 or larger and are to include any required easements.

• Street names
• Watermain and appurtenances
• Manholes (c/w numbers)
• Sewer size and slope
• Directions of flow in the sewers
• Driveway locations
• All service connection locations to lots or blocks

2.4.3. Composite Utility Plan

The Composite Utility Plan shall include all the requirements of the Aboveground Plans as well as the proposed location of deep service locations to lots or blocks, Bell, Hydro, Gas, Cable TV, streetlights, manholes/catchbasins, Canada Post facilities and driveway locations. All locations must be established and resolved by the Developer’s Engineer in conjunction with the utility companies and following the locations shown on the typical cross-section.

2.5. Storm Drainage Plans

Storm drainage plans are to be drawn to a scale of 1 to 1,000 or larger (a scale not exceeding 1 to 5,000 will be accepted for large external drainage areas) and using available grading information are to show the total area to be drained by the proposed storm sewers. The storm drainage plan is to be compatible with the grading plan and the Town’s latest contour mapping. The storm drainage plan shall indicate but not be limited to the following:

• Existing contours
• 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
• Street names
• Manhole locations (c/w numbers)
• Catchbasin locations
• Sewer sizes and slope
• Directions of flow in the sewers
• Any catchbasins or swales, on the lots or blocks, required to pick-up the runoff
• Temporary or permanent quantity and quality stormwater management facilities
• Overland flow route
• Culverts and other drainage appurtenances

2.6. **Grading Plans**

Grading plans for lots and blocks are to be drawn to a scale of 1 to 500 or larger clearly showings existing contours with corresponding elevations established from field information.

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

- Existing contours (c/w elevations)
- Proposed elevations at the following locations:
  - Along the centre line of any existing or proposed roads (maximum 20m apart)
  - Centre line or break point of each lot
  - At the front and rear building line
  - At the corners of each lot and block
  - At frequent intervals along large block property lines
- Proposed elevation contours for grading within large blocks and parks
- Any other points necessary to give proper picture of the proposed drainage scheme including tops of catchbasins, bottoms of swales and top and bottom of retaining walls
- Existing contours and elevations within the plan and at least 30 metres externally. The external contours are to be extended far enough to determine the existing drainage pattern. In addition to the above, grading plans for parks are to indicate existing contours at 0.5m intervals along with all existing trees, structures, watercourses, etc.
- Percent street grades for all roads within the development and the distance of the particular grade shall also be included
- Overland flow routes
- Easements including dimensions and descriptions
- Retaining walls
- Drainage types in accordance with typical details
- Cut off swales and catchbasins to intercept interim block drainage and external drainage
- Areas of engineered fill
- Proposed driveway entrances, street light poles, hydro transformers, underground utility vaults, Cable TV and Bell pedestals
- Fencing both existing and proposed. A note is required on this drawing indicating that all proposed fencing is to be located on private property.
2.7. Plan – Profile Drawings

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

- Where two or more drawings are required for one street, match lines must be used and tied into the nearest full station and such station shall be indicated. Right-of-way, road and boulevard widths for all roads and partial legs must be indicated at the match line.
- Where intersecting streets are shown on a plan-profile, only the diameter of the pipe and direction of flow of the intersecting sewers are to be shown. This also applies to easements for which a separate plan-profile has been drawn.
- On plan-profile drawings the type of sewer (sanitary or storm), the diameter, length, grade and class of pipe are to be shown on the profile portion of the drawings only. Only the type and diameter are to be shown in the plan portion.
- Where possibility of conflict with other services exists, connections are to be plotted on the profile.
- Pavement/road base designs for the particular roadway are to be indicated on all plan-profile drawings.
- The detail information from all borehole logs is to be plotted on the profile drawings and located on the plan. If this interferes with some other detail such as a manhole, the exact location may be altered sufficiently for clarity. Borehole information should contain a borehole plot plus a brief description of soils and the water level. The borehole log must extend a minimum of (1) metre below the lowest manhole on the vicinity.
- Gutter drainage details for temporary turning radii and cul-de-sacs.
- Storm sewers shall be shown as solid lines on both the plan and profile view. Directional arrows must be used throughout the plan drawings to show the direction of flow.
- Sumps of sanitary manholes are to be hatched to distinguish them from storm manholes.
- Centreline curve data information must be shown on the plan view.
- The profile view must show the bottom of granular road base/sub grade elevation.
- All manhole invert elevations shall be indicated below the profile view in the appropriate blocked space provided.

2.8. Erosion and Sediment Control Plans

The erosion and sediment control plans are to be prepared in accordance with the Town of Caledon and the Conservation Authorities requirements. These plans shall be in accordance with the latest Erosion and Sediment Control Guidelines for Urban Construction and shall as a minimum show:

- Light duty and heavy duty silt fencing
- Mud mats
- Rock check dams
- Topsoil stockpiles with appropriate protection measures
- Temporary sediment control ponds or basins
- Swales
• Staked straw bales

2.9. Access/Haul Route Plan/Information Stage

A detailed map indicating the access/haul route to be used by the suppliers, contractors and other agents during construction is required to be submitted to the Town for approval. Location of informational/directional signage, route arrows and road patterns and all other pertinent information that will be needed to satisfy the Town that the access/haul routes are limited and maintained to cause the least amount of disturbance to the adjacent land owners. Information signs are required at every access point to the subdivision and shall conform to Town standards.

The Developer is responsible to maintain the directional/informational signage until assumption by the Public Works & Engineering Department or otherwise directed by the Town.

2.10. Park Development

Detailed Park Development Plans are to be submitted by the Developer’s Landscape Architect at the Developer’s cost. A complete set of detailed design plans and working drawings are required. Park plans are to be submitted at a scale of 1:500. A Landscape Cost Estimate for the park is required. The Developer’s responsibility for Park Development is complete upon the Town’s written acceptance of the park drawings, Landscape Cost Estimate, completion of rough grading, provision of required service connections and installation of perimeter parkland fencing according to Town’s standards.

2.11. Trail and Walkways

The Developer may be required to design and develop a trail system co-ordinating walkways and linkages to existing trail systems. Trail development will be implemented according to the Community Design Plan and the Town of Caledon Trails Master Plan. Walkways will be required adjacent to parkland. Walkways and walkway easements that are adjoining parallel roads or acting as service access shall be fenced, gated and planted according to Town of Caledon standards. All trail access points shall be gated according to Caledon trail standards. All trail and walkway developments shall be shown on the landscape plans.

2.12. Landscaping

All landscape plans shall be drawn and stamped by a Full Registered Member of the Ontario Association of Landscape Architects. All landscape plans shall be drawn at a scale of 1:500. Landscape Plans may include vegetative analysis plans, tree preservation plans, streetscape plan, stormwater management plans, trail master plans and reforestation plans. Landscape cost estimates will be required for all approved landscape plans. This estimate will be used for Letter of Credit purposes. All streetscape plans shall be done according to Town of Caledon Standards and will require Town of Caledon approval and may require Region of Peel approval before implementation of the plans. The streetscape plan shall show the following:

• All building envelopes and driveways
• All walkways, trails and easements
• All required fencing including privacy, acoustic and chain link
• All plantings to take place in the development
• All entry features
• Location of street lighting
• Location of public utility boxes and easement and hydrants

Construction details will be required for all landscaping taking place in the development. These details shall meet or exceed Town of Caledon standards.

Any required reforestation and stormwater management facility planting plans will require both the Town of Caledon’s and the appropriate Conservation Authority’s approval prior to implementation of the plans.

Developers are required to display approved plans and/or excerpts from the Development Standards and Design Requirements at the sales pavilions of the homebuilders in the new subdivision.

2.12.1. Topsoil Management Report

As part of the requirements of the engineering submissions the Engineer shall submit a Topsoil Management Report that will identify the available topsoil on the site, and the quantity proposed to be stripped and stockpiled. The proposed stockpile location shall be identified, the length of time the stockpile is anticipated to remain, the depths of topsoil proposed on the lots and boulevards, the depths of topsoil for the stormwater management facility (if applicable) and any other pertinent information or special requirements. The Topsoil Management Report shall address the minimum depth of requirements set out in section 3.12.1 and shall determine if there is excess or insufficient insitu topsoil. If excess topsoil is determined, a letter attached to the Report shall be addressed to the Director requesting permission to remove topsoil from the site and where the topsoil will be delivered. If it is determined there is insufficient insitu topsoil to meet the Town Standard depths then the report shall address this issue and shall indicate where the imported topsoil will come from. A Soils Report indicating the quality and chemical content of the topsoil will be required for imported topsoil. The topsoil, at a minimum must meet MOE guidelines for its intended use. Further soil qualities reports may be required if determined by Town staff. It should be noted on the appropriate drawing(s) and in the Topsoil Management Report that all slopes and the working face of any topsoil stockpile shall be at a minimum to the natural angle or repose and must meet the requirements of the Health and Safety Act. Protection of the topsoil stockpile shall be in accordance with Section 3.15.6 of these Guidelines.

Note:

Under no circumstances shall Town-owned lands (Parks or Open Spaces or any other lands) be used for stockpiling topsoil or any other materials, without the written permission of the Town.
2.13. **As Constructed Drawings**

2.13.1. General

Upon completion of the construction of the services, the Developer’s Consultants shall obtain the ‘As-Constructed’ field information and revise the original drawings accordingly. Any changes in drawing originals by the Consulting Engineer or Landscape Architect are subject to approval by the Director.

Prior to assumption of the subdivision by the Town, the Developer’s Engineer and Landscape Architect shall provide a complete set of revised drawings (engineering and landscaping) for the development to the Director for review. Upon acceptance, the Developer’s Engineer and Landscape Architect shall provide Mylar drawings and digital drawings in accordance with Section 2.1 of these Guidelines. In addition, a complete set of Mylar reproductions shall be prepared from the ‘As-Constructed’ originals and supplied to the Public Works Department of the Regional Municipality of Peel, in accordance with the Region’s requirements.

These drawings shall show the location both horizontally and vertically of everything, which is on, and under the lands to be accepted by the Town.

The Composite Utility Drawing is to show final location of all utilities, service connections, as well as driveway locations.

The engineering drawings shall be sealed and signed by a Registered Professional Engineer and stamped ‘As-Constructed’ and dated.

The Landscape drawings shall be sealed and signed by the Landscape Architect and stamped “As-Constructed” and dated.

The Town performs a spot check of elevations and locations. If the Town finds major differences, the ‘As-Constructed’ drawings will be returned to the consultant to be corrected.

Drawings supplied in a digital format in addition to the standard Mylars shall conform to the most recent requirements and AutoCAD 2007 standards of the Town.

2.13.2. Storm Sewers

All sewer invert elevations, if different than proposed, are to be indicated on the ‘As-Constructed” drawings. If the difference is greater than 50mm affected portions of sewer (in profile) will be required to be redrawn.

Hydraulic calculations are to be provided, reflecting these changes, for review and approval.

Any manhole or catchbasin locations, which differ by more than 1.50m from the proposed locations, are to be redrawn in both plan and profile.
The following shall be indicated on the ‘As-Constructed’ drawings, if different than proposed:

- Type of manhole
- Pipe size
- Grade of sewer
- Type of sewer material
- Class of pipe
- Type of bedding
- Proposed and “as constructed” information is to be provided for such information as length of pipes, slope, inverts etc.

Note 1:

If the ‘As-Constructed’ grade of sewers differs by more than 10% of the design grade, the Consultant will be required to submit the revised hydraulic calculations.

Note 2:

Q_{Actual} and Q_{Design} will also be required on ‘as-constructed’ sheets.

2.13.3. Sanitary Sewers

As constructed information is to be provided to the Region of Peel in accordance with their requirements and could include the following:

- All sewer invert elevations, if different than proposed. If the difference is greater than 50mm, affected portions of sewer (in profile) are to be redrawn.
- Any manhole location, which differs by more than 1.50m from, proposed to be redrawn both in plan and profile.
- The following shall be indicated on the ‘as-constructed’ drawings, if different than proposed:

- Type of manhole
- Pipe size
- Grade of sewer
- Service Tee chainage from downstream manhole
- Type of sewer material
- Class of pipe
- Type of bedding

2.13.4. Watermains

As constructed information is to be provided to the Region of Peel in accordance with their requirements and could include the following:
• All watermain elevations if different than proposed. If difference is greater than 100mm, affected portions of watermain (in profile) to be redrawn.
• All alignment changes greater than 100mm to have offsets revised in plan. If alignment changes exceed 1.5 metres, watermain to be redrawn in plan as well as indicating revised offsets.
• All main valves are to be tied to permanent features, such as building, manholes, catchbasins, etc.
• Ties and elevations to all stubs.
• The following shall be indicated on the ‘as-constructed’ drawings, if different than proposed:
  • Pipe size
  • Type and class of pipe
  • Type of bedding
  • All fitting changes (bends, reducers, blocking, etc.)
  • Type of valves and hydrants

2.13.5. Landscaping

All ‘As-Constructed’ drawings shall be submitted as Mylar drawings as well as in electronic version. In addition, a Tree Planting Summary Chart (per Standard No. 719) shall be submitted in Microsoft Excel format.

2.13.6. Stormwater Management Facilities

All sewer sizes, sewer inverts, control structure inverts, control structure sizes, access roads, road grades, contouring of the pond if different than proposed are to be indicated on the ‘As-Constructed’ drawings.

Hydraulic calculations and volume calculations of the pond are to be provided reflecting these changes for review and approval.

Any control structure locations which differ by more than 1.5 metres from the proposed location, are to be redrawn in both plan and profile.

An as built survey as well as a bathymetric survey are to be completed in order to ensure that the facility was built and maintained according to the Certificate of Approval, and that the full volume, per the original design requirement is available. This volume includes the permanent pool volume beneath the surface.

Digital pictures of all components plus digital information of the Stormwater Management Facility are to be submitted to the Town for inclusion in the Town’s electronic database.
3.0 DESIGN REQUIREMENTS

3.1. Introduction

The purpose of this section is to outline the general design requirements for the construction of Municipal Services in the Town of Caledon. These requirements, however, are only general and do not relieve the Developer of the responsibility for submitting a finished product of competent engineering design and construction.

For the approval of any deviation from minimum Town Standards and requirements, the applicant shall specifically refer to such deviation(s) and/or their agent with a copy of written approval to the Town attached.

3.2. Storm Drainage System

3.2.1. Sewer System

Storm sewers designed and constructed in accordance with the most recent requirements and specifications of the Town of Caledon are required on every street within all proposed plans of subdivision. Inverts of service connections at the property line shall be surcharge free and be above the 100 year hydraulic grade line of the municipal storm sewer system. Storm sewers shall be of adequate size and depth to provide service for the development of lands within the upstream watershed and/or for the drainage of any areas designated by the Director. Storm drainage shall be directed to an outlet considered adequate in the opinion of the Director and applicable agencies.

Channel works, bridges, culverts and all other drainage structures or works shall be designed and constructed in accordance with the most recent drawings and specifications. Approvals by the Director and all other applicable agencies such as the Ministry of the Environment (MOE), the Toronto Regional Conservation Authority (TRCA), Credit Valley Conservation (CVC), the Ministry of Natural Resources (MNR), and the Department of Fisheries and Oceans (DFO) etc. are required.

3.2.2. Maintenance

The Owner shall guarantee the storm sewers for a minimum period of two years after the Town has issued preliminary acceptance of base asphalt. Notwithstanding, the storm sewers will not be released from the maintenance period until top asphalt approval has been granted for the subdivision. All above-ground storm sewer appurtenances shall be maintained until assumption of the subdivision.

Channel works (including headwall structures) shall be maintained until assumption of the subdivision.
3.2.3. Storm Sewer Design

3.2.3.1. Run-off Calculations

Storm sewers shall be designed on Town Standard 105 Design Sheets. Storm sewers shall be designed to drain all lands based on the Rational Method. The Rational Method calculations must be checked using a model approved by the Director where the drainage area is greater than 10 hectares. The larger of the flows is to be used in the design of the sewer system.

\[
Q = 0.0028 \, CIA
\]

\( Q \) = Flow in cubic metres per second (m\(^3\)/s)

\( A \) = Area in hectares

\( C \) = Run-off coefficient

\( I \) = Intensity in mm/hr

**Intensity of Rainfall**

The intensity of rainfall is to be determined from the most recent Town of Caledon standard INTENSITY – DURATION – FREQUENCY RAINFALL CURVES in accordance with Town Standard Drawing No. 105. The equations for the I.D.F. curves are listed in Town Standard Drawing No. 105 and section 3.2.9 Meteorology.

**Time of Concentration**

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

**Pre-Development**

To calculate the initial time of concentration (\( t_c \)) for upstream, undeveloped lands, the following formulae may be used: Bransby Williams, H.Y.M.O./O.T.T.H.Y.M.O., S.C.S. Upland Method, etc. The most appropriate method will be determined at the discretion of the Director.

**Post-Development**

To calculate the initial external time of concentration (\( t_e \)) for external lands that are scheduled for future development, a straight line is to be drawn from the furthest point within the watershed to the proposed inlet. The top 50 meters shall have an initial \( t_c \) of 10 minutes and the remainder shall have a \( t_c \) as the velocity in the sewer is 2m/s. The summation of the two \( t_c \)'s will give the future external time of concentration. If the upstream area has adequate storm sewers, channels or culverts the velocity of the flow through the sewers, channels or culverts shall supersede the 2m/s calculation.
Run-off Coefficient

Run-off coefficients are to be determined from the Town of Caledon standard INTENSITY – DURATION – FREQUENCY RAINFALL CURVES (Town Standard Drawing No. 104).

A minimum run-off coefficient of 0.55 is to be used for undeveloped upstream area where future residential development is expected and 0.75, where future industrial, medium to high density residential or commercial development is expected, or as requested by the Town.

Drainage Area

Drainage systems must be designed to accommodate all upstream drainage areas for interim and ultimate conditions, as determined by contour mapping and drainage plans.

Note:

All drainage generated by the development shall be captured and treated within the limits of the development area.

3.2.3.2. Storm Sewer Requirements

Storm Sewer System

A storm sewer system shall be defined as the upper part of a drainage system draining areas less than 100 ha of land. Storm sewer systems shall be designed to accommodate a 10 year storm where foundation drains are to be connected. For systems that do not allow for foundation drains, a 5 year design will be allowed.

In Estate Residential designated subdivisions a 2 year design is allowed, overland flow routes will be utilised more frequently and flood proofing will have to be demonstrated if a 2 year design is proposed.

Trunk Sewer System

A trunk sewer system shall be defined as part of a drainage system that drains an area of 100 ha of land or greater. Trunk storm sewer systems shall be designed to accommodate a 25 year storm.

Pipe Capacities

Manning’s formula shall be used in determining the capacity of all storm sewers. The capacity of the sewer shall be determined on the basis of the pipe flowing full. The value of the roughness coefficient ‘n’ used in the Manning’s formula shall be as follows:
Concrete Pipe 0.013
Concrete Box Culvert 0.013
Corrugated Metal 68 x 13mm corrugations 0.024
Corrugated Metal 25% paved invert 0.021
PVC Pipe 0.013

Design flow calculations must be completed on Town of Caledon forms.

**Flow Velocities (Flowing Full)**

For circular pipes the:

- Minimum acceptable velocity is 0.75m/s and the
- Maximum acceptable velocity is 4.0m/s

**Note:**

**Under no circumstances shall the slope of the pipe be less than 0.40%.** If conditions require a slope of less than 0.4%, then self cleaning velocities must be maintained.

**Minimum Sizes**

The minimum size for an on street storm sewer shall be 300mm.

**Depth of Storm Sewers**

Storm sewers shall be located a minimum of one (1) metre below basement floor elevations to allow for the installation of foundation connections. In areas of no storm sewer connection the sewers shall have a minimum frost cover of 1.5m.

**Location**

The storm sewers shall be located as shown on the standard Town of Caledon road cross section drawings. This standard location is generally 1.5 metres south or west of the centre line of the right-of-way.

A minimum clearance of 500mm between the obvert of the sanitary sewer and the invert of the storm sewer must be provided. The sanitary sewer connections are required to go under the storm sewer.

**Radius Pipes**

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

Sewers shall be terminated with a manhole at the subdivision limits when external drainage areas are considered in the design. The design of the terminal manholes must allow for the future extension of the sewer. When external areas are not included in the sewer design, the sewer shall extend at least half way across the frontage and/or flankage of any lot or block in the subdivision.

Sewer Alignment

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

Changes in Pipe Sizes

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

Standard Easement Requirements

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

<table>
<thead>
<tr>
<th>Size of Pipe</th>
<th>Depth of Invert</th>
<th>Minimum Width of Easement</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 to 375mm</td>
<td>3.0m maximum</td>
<td>3.0m</td>
</tr>
<tr>
<td>450 to 675mm</td>
<td>3.0m maximum</td>
<td>3.0m</td>
</tr>
<tr>
<td>750 to 1500mm</td>
<td>3.0m maximum</td>
<td>5.0m</td>
</tr>
<tr>
<td>1650mm and up</td>
<td>4.0m maximum</td>
<td>4.0m plus 3 times OD of Pipe</td>
</tr>
</tbody>
</table>

For easements containing more than one pipe or underground service the minimum width will be based on the above chart for the maximum pipe size plus 4.0m. Regardless of the above, all situations will be reviewed and judged on individual cases at the discretion of the Director.

Pipe Classification and Bedding

The type and classification of storm sewer pipe and the sewer bedding type shall be clearly indicated on all profile drawings for each sewer length.

All storm sewer pipes shall conform to the requirements of the Canadian Standards Association (CSA).

The class of pipe and the type of bedding shall be selected to suit loading and proposed construction conditions. Details are illustrated in the OPSD Standard Bedding and Backfill Details. In general, the Type “B” bedding (Granular A bedding with granular over the sewer) shall be used for storm sewers in new developments, and the class of pipe will be selected to suit this bedding detail.
In areas where it is difficult to control the infiltration of water into sewer trenches a clear stone such as HL8 stone may be used. All clear stone must be completely wrapped in a suitable geotextile selected and installed in accordance with the manufacturer’s requirement.

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

**Testing and Acceptance**

Deformation gauge (Pig) test is required on all pipe works prior to maintenance and acceptance. All pipe works shall have a video taping complete as part of the preliminary and assumption inspections.

**3.2.3.3. Manhole Requirements**

Manholes may be either precast or poured in place and shall be designed and constructed in accordance with the most recent Ontario Provincial Standard Drawings and Specifications.

**Location and Spacing**

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

Maximum spacing of manholes shall be 120m for sewers 600mm or less in diameter and 150m for sewers 675mm or greater in diameter.

**Manhole Types**

Town of Caledon and OPSD Standard Manhole Details shall be used for manhole design. Although these standard drawings provide details for manholes up to certain maximum depths and sizes, the Consulting Engineer shall analyse, individually, each application of the standard related to soil conditions, loading and other pertinent factors to determine structural suitability. In all cases where the standard drawings are not applicable, the manholes shall be individually designed and detailed. A reference shall be made on all profile drawings to the type and size of storm manholes.

**Manhole Details**

- Manhole chamber openings shall be located on the side of the manhole parallel to the flow for straight run manholes, or on the upstream side of the manhole at all junctions.

- Change in direction of flow in any manholes shall not be greater than 90 degrees perpendicular to the flow.
• Safety gratings shall be provided in all manholes when the depth of the manhole exceeds 5m. The maximum spacing between safety gratings shall not exceed 4.5m.

• The obverts on the upstream side of manholes shall not be lower than the obvert of the outlet pipe.

• Where the difference in elevation between the obvert of the inlet and outlet pipes exceed 1.2m, a drop pipe as indicated on OPSD 1003.010 shall be placed on the inlet pipe.

• Storm sewer manholes shall be benched to the obvert of the outlet pipe on a vertical projection from the spring line of the sewer.

• Manholes shall be located, wherever possible, a minimum of 1.5m away from the face of curb and/or any other service.

Head Losses and Drops

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

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

Hydraulic calculations shall be submitted for junction and transition manholes on sewers where the outlet is 1050mm diameter or greater. In addition, hydraulic calculations may be required for manholes where the outlet pipe is less than 1050mm diameter if, in the opinion of the Director, there is insufficient invert drop provided across any manhole.

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

The minimum drops across manholes shall be as follows:

<table>
<thead>
<tr>
<th>Change of Direction</th>
<th>Minimum Drop (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>30</td>
</tr>
<tr>
<td>1° to 45°</td>
<td>50</td>
</tr>
<tr>
<td>45° to 90°</td>
<td>80</td>
</tr>
</tbody>
</table>

3.2.3.4. Catchbasin Requirements

Catchbasins may be either precast or poured in place and shall be designed and constructed in accordance with the most recent OPSD and OPSS requirements.
Location and Spacing

Catchbasins shall be selected, located and spaced in accordance with the conditions of design.

The design of the catchbasin location and type shall take into consideration the lot areas, the lot grades, pavement widths, road grades and intersection locations.

The maximum area to be served by any catchbasin shall be 2,000m\(^2\) of paved area or 4,000m\(^2\) of sodded area.

Maximum spacing for catchbasins shall be as follows:

- Road Grade @ 0.75% - 70m
- Road Grade @ 0.75% to 3% - 90m
- Road Grade Greater than 3% - 70m

Note:

For cul-de-sacs the distance is to be measured along the gutter. Catchbasins shall be generally located upstream of sidewalk crossings at intersections and upstream of all pedestrian crossings. Catchbasins shall not be located in driveway curb depressions.

For rural estate subdivisions, catchbasins may be spaced at greater intervals, however depth of flow shall not exceed gutter depth. In addition volume of flow shall not exceed capture capacity of catchbasin openings.

Catchbasin Types

Typical details for the single double and rear lot catchbasins are shown in the OPSD Standards.

Any special catchbasins and inlet structures proposed must be fully designed and detailed by the Consulting Engineer for approval by the Director. Double catchbasins are to be installed at the low point of any road.

Catchbasin Connection

For single catchbasins including rear lot catchbasins, the minimum size of connection shall be 250mm and the minimum grade shall be 2.0%.

For double catchbasins, the minimum size of connection shall be 300mm and the minimum grade shall be 2.0%.

In general, catchbasins located in close proximity to a downstream manhole shall have their leads connected to the storm sewer. Long catchbasin connections (in excess of 20m) shall be connected to a manhole.

Rear lot catchbasin leads shall be installed as follows:
• All pipes are to be concrete encased the entire line from sewer to the rear lot catchbasin.

Frame and Grate

The frame and cover for catchbasins shall be as detailed in the OPSD 400.100 (Perforated) Standards. In general, the “bicycle proof” catchbasin grate shall be required for catchbasins located in roadway and walkway areas.

Catchbasins located within the travelled portion of a roadway, shall have the frame elevation flush with the surface of the base course asphalt. The adjustment and setting of the frame and cover shall be completed in accordance with the details provided in the OPSD Standards. Catchbasins located within the rear lot shall have the Beehive Type Frame and Grate per Town of Caledon Standard No. 503

3.2.3.5. Roof Leaders, Foundation Drains and Storm Connections

Roof Leaders

Roof leaders must not be connected directly to the storm sewer system, and the following conditions must be complied with:

1. Roof leaders must discharge onto concrete splash pads which direct the water into side yard swales, these swales must discharge to the front of the lot, no roof leaders shall drain to the rear of the lot. Roof leaders are not permitted to discharge onto driveways or walkways. For walkouts, a note is to be added to the drawings that all roof drainage is to be directed to the front of the lot, unless otherwise approved by the Town.

2. Houses located on corner lots have roof leaders located at the corner(s) of the house, closest to the street lines.

3. Roof leader down spout locations are to be indicated on site grading plans.

“Add-on” roof conditions, such as extended kitchens or sunrooms, which are drained separately and do not receive drainage from the main roof, may discharge to the ground, with flows directed to the side yard swale.

Foundation Drains

It is the Town’s policy to permit the connection of foundation drains by gravity to the storm sewer system provided that the elevation of the basement floor is at least 1.0 metres above the elevation of the storm sewer obvert at that point.

Where the above provisions for gravity connection of foundation drains cannot be met, a sump pump system must be installed in the building and discharge to a location, which is satisfactory to the Director.
Storm Connections

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Minimum Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single family and semi-detached</td>
<td>single 125mm diameter</td>
</tr>
<tr>
<td>Residential areas</td>
<td>double 150mm diameter</td>
</tr>
<tr>
<td>Multiple family residential block</td>
<td>designed in accordance with Section 3.2.3.2</td>
</tr>
<tr>
<td>Commercial and Industrial areas</td>
<td>300mm diameter</td>
</tr>
</tbody>
</table>

Storm connections shall be designed in accordance with the following Town of Caledon Standards:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>Storm Sewer Service Connection for Flexible Pipe</td>
</tr>
<tr>
<td>501</td>
<td>Storm Sewer Service Connection for Rigid Pipe</td>
</tr>
<tr>
<td>502</td>
<td>Storm Sewer Service Connection for Services in Common Trench</td>
</tr>
</tbody>
</table>

Joints and Bedding

Joints and bedding for connections are to be equivalent to joints and bedding as specified for storm sewer pipes.

Connections of Services to Main Sewer

Double connections may be acceptable in residential areas where all other utilities can be accommodated and where the difference in the two connecting basement elevations does not exceed 600mm.

Manufacture of service tees at the main sewer shall be as follows:

- For storm main sewer pipe sizes 600mm or smaller, pre-fabricated tees from the plant shall be utilised.
- For storm main sewer pipe sizes 675mm to 900mm, tees shall be manufactured in the field on top of the trench with the proper saddles and shall be inspected by the Consulting Engineer prior to installation.
For storm main sewer pipe sizes 975mm and larger, tees shall be manufactured in the trench with proper saddles.

In the cases above, the storm sewer shall be drilled or scribed at the plant rather than breaking through the pipe wall on site.

50mm x 100 mm wooden markers placed from the invert of the service to 600mm above ground level shall be placed at the ends of each residential connection (at the street line).

The top 600mm of the markers are to be painted white.

### 3.2.3.6. Channel, Culvert and Overland Flow

For channel, culvert, bridge and/or erosion control projects, the Developer is responsible for retaining all necessary approvals from the governing agencies, such as the Toronto Region Conservation Authority (TRCA), Credit Valley Conservation (CVC), Ministry of Natural Resources (MNR), and/or Department of Fisheries and Oceans (DFO).

### 3.2.3.7. Culverts and Bridges

<table>
<thead>
<tr>
<th>Road Classification</th>
<th>Design Flood Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial</td>
<td>1:100 year to Regional</td>
</tr>
<tr>
<td>Collector</td>
<td>1:50 year</td>
</tr>
<tr>
<td>Urban Local</td>
<td>1:25 year</td>
</tr>
<tr>
<td>Rural Local</td>
<td>1:25 year</td>
</tr>
<tr>
<td>Temporary Detour</td>
<td>1:10 year</td>
</tr>
<tr>
<td>Driveway</td>
<td>1:5 year</td>
</tr>
</tbody>
</table>

Headwalls are not permitted on driveway culverts. All culverts must be of sufficient length to provide for a minimum 3:1 slope off the driving surface to the ditch invert. All driveway culverts require entrance approval.

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

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

### 3.2.3.8. Open Channels

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

“Natural” channel design criteria will be determined on a site by site basis. The following guidelines must be considered:

<table>
<thead>
<tr>
<th>Open Channels</th>
<th>Minimum Velocity</th>
<th>Maximum Velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass lined – Natural</td>
<td>0.7m/s</td>
<td>1.5m/s</td>
</tr>
<tr>
<td>Grass lined – Maintained</td>
<td>0.7m/s</td>
<td>1.5m/s</td>
</tr>
<tr>
<td>Gabion lined</td>
<td>0.7m/s</td>
<td>2.5m/s</td>
</tr>
<tr>
<td>Concrete lined</td>
<td>0.7m/s</td>
<td>4.0m/s</td>
</tr>
</tbody>
</table>

3.2.3.9. **Watercourse Erosion and Bank Stability**

Where erosion or bank instability is already evident in an area to be developed or redeveloped, the Town of Caledon requires that the situation be stabilized by appropriate remedial measures. Where development will cause significantly increased downstream erosion, the Town also requires the Developer to mitigate further damage by appropriate remedial measures.

Where designing remedial erosion or bank stabilisation works, preservation of the watercourse dynamics and natural valley aesthetics must be secondary only to achieving a sound technical solution. A normal bank flow channel has a capacity of about 1:2 year flood. Protection to this level will be adequate provided care is taken to prevent any damage by higher floods and provided that the channel bank is not coincident with a higher valley. In this latter case, it may be necessary to protect the bank to a level as high as the 1:100 year flood or even the flood resulting from the Regional Storm.

The proposed criteria for an erosion or bank stability design shall be submitted to the Director for approval prior to the actual design being undertaken.

3.2.3.10. **Overland Flow Routes**

An overland flow route which continues to the nearest major channel must be established through all areas and shall be contained within either the road right-of-way or by Town properties used for lineal passive parks/walkways.

The depths of flooding permitted on streets and at intersections during the 1:100 year storm are as follows:

- No building shall be inundated at the ground line, unless the building has been flood proofed.
- For all classes of roads, the depth of water at the gutter shall not exceed 0.3m or flood outside of the right-of-way, whichever governs.
Flow across road intersections shall not be permitted for minor storms (generally 1:10 year). To meet the criteria for major storm run-off, low points in roads must have adequate provision for the safe overland flow.

The depths of flooding permitted in lineal passive parks/walkways during the 1:100 year storm are as follows:

- No building shall be inundated at the ground line, unless the building has been flood proofed.
- The depth of water shall not exceed 0.6m and/or flood outside of the Towns property.

### 3.2.3.11. Inlet/Outlet Structures

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

Adequate structural means such as gabions, rip-rap or concrete shall be provided at all inlets to protect against erosion and to channel the flow to the inlet structure.

Gabion, rip-rap, concrete or other erosion protection shall be provided at all outlets to prevent erosion of the watercourse and to the area adjacent to the headwall. The extent of the erosion protection shall be indicated on the engineering drawings and shall be dependent upon the velocity of the flow in the storm sewer outlet, the soil conditions, the flow in the existing watercourse and site conditions.

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

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

The obvert of the outlet pipe is to be above the 25 year flood elevation of the receiving channel.

Barrier Hedge plantings must be used to deter persons from accessing or protect persons from accidentally falling onto thin ice or into turbulent waters within 10m of any inlet or outlet structures.

### 3.2.4. Stormwater Management

#### 3.2.4.1. Reporting and Legislative Framework

The policies and criteria documented herein are intended to guide the user as to:
Complementary Federal and Provincial policies and legislation,

Town of Caledon’s policy, criteria and role in implementation of the foregoing policies and legislation,

Application of stormwater management techniques or practices unique to the Town of Caledon.

Although stormwater management planning and design is influenced by the mandate of various Ministries and public agencies, the Town of Caledon plays a central role in integrating the objectives of each policy into new development and associated stormwater management works, as well as bearing ultimate responsibility for operation, ownership and maintenance of such works. Hence, the Town primary objectives must include ensuring the economic sustainability and functional effectiveness of stormwater management works within the Town.

3.2.4.2. Stormwater and Environmental Management Studies

3.2.4.2.1. General/Criteria

Any proposed changes in land use will affect the mechanics of storm runoff. Regardless of the status of land use planning, any proposed change in land use will need to be accompanied by a stormwater and environmental management studies.

Design

Typically, stormwater management planning and design occurs through a multi-phase process which is completed in concert with the land use planning process. The following preferred hierarchy of planning studies in the Town of Caledon has been identified:

- Watershed Plans
- Subwatershed Plans
- Subwatershed Impact Studies
- Stormwater Management Plans
  - Functional
  - Detailed Design

In some instances where there are limited numbers of landowners, and drainage areas are discrete, there may be an opportunity to combine the Subwatershed Impact Study with the Functional Stormwater Management Plan. Prior to initiating such a process, the proponent is required to review specifics with the Town and either the CVC or TRCA.
3.2.4.2.2. Specifications/Terms of Reference

Watershed and Subwatershed Plans

The Town of Caledon supports the implementation of Watershed and Subwatershed Planning Studies in concert with the land use planning process. Watershed and Subwatershed planning plays an important role in the development of Official Plan Land Use Designations and Secondary Planning.

The determination as to whether a Watershed or Subwatershed Planning Study is necessary for Official Plan Amendments, Secondary Plans or individual developments will be determined in consultation between the Town of Caledon, the development proponent(s), CVC and TRCA and other Ministries or public agencies having jurisdiction.

Rationale and justification to undertake Watershed or Subwatershed Planning Studies must include consideration of:

- Type and extent of proposed land use changes
- Area of land use change with respect to the total watershed/subwatershed area
- Physical sensitivity/significance of the receiving watercourse
- Existing downstream conditions and land use (i.e. flood and erosion hazards, water usage)
- Location and characteristics of the development area with respect to the potential to provide integrated servicing and stormwater management which would minimize long term maintenance and operation cost incurred to the Town

It is important to recognize that each Watershed or Subwatershed plan will have widely varying goals and objectives specific to the issues within each area. For these reasons, the study objectives, organization, and funding arrangements will necessarily differ for each study.

Subwatershed Impact Study

This intermediate level of study may be required in areas where multiple land ownership within the subwatershed occurs. This level of study would focus on integrating servicing and stormwater management of adjacent development to a greater level of detail than is normally achieved through the Subwatershed Plan. Typically this study would be required if the Subwatershed Plan has been completed prior to the development of preferred land use and lot plans. The objectives of this level of study will be to determine:

- Preferred servicing plan
- Road layout
- Integration of stormwater management facilities
- Opportunities to integrate recreation opportunities with stormwater management
- Phasing and cost sharing in areas of multiple ownership

The decision as to whether a Subwatershed Impact Study is warranted would be determined through consultation between the various development proponents, the Town of Caledon, CVC and TRCA, and would depend on:

- Level of planning information completed in the Secondary Plan process such as road layout, facility locations and multiple servicing concept
- Number of development proposals/proponents involved in the study area and opportunity to integrate facilities and phase developments

**Stormwater Management Plans**

Stormwater Management Plans are prepared in support of individual development applications. The plans complement the planning process associated with Draft Plans of Subdivision or individual Site Plans. Stormwater management reporting associated with this planning stage would be the “Functional Design” plan. Subsequently, in support of final subdivision design a “Detailed Design” plan is required.

**Functional Design**

This level of design typically involves demonstrating the feasibility of providing stormwater management for a particular development. In areas where no Subwatershed Plan has been completed, the Stormwater Management Plan will be required to address additional issues such as environmental baseline conditions and screening of various stormwater management strategies and techniques.

**Detailed Design**

The detailed design submission shall demonstrate how the required information, outlined in Functional Design report, has been integrated as well as addressing details related to minor system design details, landscaping, safety and maintenance aspects of facility design, and monitoring requirements.

**3.2.5. Stormwater Quantity, Quality and Erosion Control**

Stormwater management is required to control increases in storm runoff due to development. Typical methods of quantity control are temporary storage of water on flat roof tops and parking lots, discharging rainwater leaders onto grassed areas or infiltration galleries, and downstream stormwater retention or detention ponds.
Stormwater quantity controls are to be implemented on all applications in accordance with any applicable master drainage or subwatershed plan.

3.2.5.1. **Quantity Control**

A. **Flood Management**

Criteria

All newly developing or redeveloping areas must assess their potential impacts on local and regional flooding, and mitigate accordingly.

Design

In areas where no Watershed or Subwatershed Planning or Subwatershed Impact Study has been completed, it is the policy of the Town of Caledon to require that runoff peak flows are controlled to pre-development levels, unless the proponent can demonstrate through appropriate modelling and analysis that uncontrolled flow will not cause detrimental impacts on flood conditions on downstream properties and watercourse systems. Before the Town will accept any increase in runoff rates, it must also receive endorsement from the agencies having jurisdiction.

Where the Subwatershed Plans or Subwatershed Impact Studies have been completed, the development proponent will be required to comply with the recommendations of the specific plan. Any variations will need to be appropriately supported by detailed analysis and also be approved by any agencies having jurisdiction. Refer to Section 3.2.10 for analytical methodologies.

B. **Erosion Control**

Criteria

Depending on the downstream water level and the nature of the soil strata affected, streambanks can be subject to increased erosion potential. In these cases the proponent(s) will be required to provide appropriate protection in accordance with the Watershed or Subwatershed Plans or with the Subwatershed Impact Study, as well as policies of CVC and the TRCA.

In areas where no Subwatershed Plan exists, it shall be the responsibility of the development proponent to provide adequate erosion protection in accordance with Provincial Guidelines, unless it can be demonstrated through appropriate modeling and/or analysis that erosion processes will not be adversely affected by the proposed development.

Design

Erosion Control and management involves:
• Extended Detention storage for the 25 mm rainfall event as outlined in the Provincial Guidelines (ref. SWM Planning & Design Manual, MOE, 2003), in the absence of specific direction from a Subwatershed or Watershed Plan.

• Assessment of downstream erosion susceptibility and critical flow values in conjunction with event modelling.

• Assessment of downstream erosion critical velocity or shear forces in conjunction with continuous simulation techniques (duration analysis).

In areas where the downstream receiving watercourse is determined to be unstable, or where control/over control of flow rates is ineffective or not feasible, design of channel alterations may be considered, subject to design in accordance with natural channel design principles (refer to “Adaptive Management of Stream Corridors in Ontario”, Ministry of Natural Resources, 2001).

Storm sewer outfalls in natural channels should be provided with proper protection against erosion which includes appropriate bank scouring protection on either side of the outfall and creek. When storm sewer outfalls outlet to steep and/or deep valleys, drop structures should be designed in such a manner as to provide integral bank stability. Such local erosion protection measures should be designed so as not to interfere with the natural channel forming processes of the receiving watercourse system. Refer to Section 3.2.10 for analytical methodologies.

3.2.5.2. Quality Control

Criteria

Water quality treatment will be required for all new development within the Town of Caledon. Water quality treatment performance shall conform to Provincial requirements (refer to Stormwater Management Planning and Design Manual, MOE, 2003).

In areas of existing development where re-development is proposed, provisions for water quality measures will be evaluated on a site-specific basis, based on the feasibility of implementation. Where on-site measures are considered infeasible, the Town of Caledon may consider the potential for contributions to off-site improvements (i.e. cash-in-lieu), subject to agency concurrence.

In areas where a Subwatershed Plan has been prepared and approved, the guidelines and criteria cited within the plan shall be adopted by the Development Proponent.

Design

Specific guidelines for SWMP application have been developed by the Province based on the type of fisheries habitat downstream of the proposed development, as:
Three levels of protection are given, with the goal to maintain or enhance existing aquatic habitat, based on the suspended solids removal performance for the different end-of-pipe stormwater management facilities developed in the continuous simulation modelling. These levels of protection are based on a general relationship between the end-of-pipe stormwater management facilities long-term suspended solids removal and the lethal and chronic effects of suspended solids on aquatic life. The levels of protection correspond to the following long-term suspended solids removal:

**Enhanced** protection corresponds to the end-of-pipe storage volumes required for the long-term removal of 80% of suspended solids.

**Normal** protection corresponds to the end-of-pipe storage volumes required for the long-term removal of 70% of suspended solids.

**Basic** protection corresponds to the end-of-pipe storage volumes required for long-term removal of 60% of suspended solids.

As a general consideration, maintenance of the natural hydrologic cycle including infiltration is encouraged where soil conditions permit. Therefore the use of stormwater management practices which enhance or maintain infiltration should be considered for each development. Generally active infiltration measures will be applicable in permeable soils areas only and their use will require supporting soils documentation. Passive measures such as disconnection of roof leaders have been historically utilized in many areas and should be implemented as a matter of course in all areas unless specific constraints preclude theses measures.

In all cases the potential for groundwater contamination shall be considered, particularly where infiltration of road runoff is contemplated.

In areas where hydrogeologic concerns are identified and/or critical linkages to fisheries habitat are present, additional study and analysis may be required to determine the appropriate level of mitigation.

### 3.2.6. Stormwater Quantity, Quality Control Techniques

**3.2.6.1. General**

Current stormwater management practice advocates the consideration of SWMP’s on a hierarchical basis, whereby more pro-active techniques are considered first. The SWMP’s are grouped under the following headings in order of preferred application.

A. Lot Level Techniques and Source Controls and Alternative Development Standards

B. Transport or Conveyance Controls
C. End-of-Pipe Management Techniques

The philosophy behind this hierarchy is that stormwater management techniques are usually more effective when applied at the source. Table 3.1 constitutes a comprehensive list of currently available techniques associated with each of the foregoing categories. It is recognized that stormwater management remains an emerging science; hence this list will change over time. It will be the responsibility of the proponent to demonstrate that any technique, not currently approved by the Town, will address the intended function within expected maintenance and cost parameters, to the satisfaction of the Town of Caledon.

Stormwater management solutions should take into account multi-uses for the site. Integrated pathways, trails and passive recreational uses must be integrated in all designs. Stormwater management facilities shall be designed as an amenity and an asset and not as a rear yard, out of sight, piece of infrastructure. The use of Stormwater management facilities for passive recreational uses is not considered in lieu of parkland dedication, this is just considered good engineering principles.

During construction of the storm water management facility over excavation of the storm water management pond cells is not.
### TABLE 3.1
COMPREHENSIVE LIST OF AVAILABLE SWMP’S

<table>
<thead>
<tr>
<th>Stormwater Management Technique</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source Controls</strong></td>
<td></td>
</tr>
<tr>
<td>• reduced lot grades</td>
<td>Increases the inlet time for runoff.</td>
</tr>
<tr>
<td>• roof leader discharge to surface at front of dwelling</td>
<td>Increases the inlet time for runoff.</td>
</tr>
<tr>
<td>• roof leader and sump pumps discharge to soakaway pits</td>
<td>Discouraged in residential land use due to maintenance and impacts on use of rear yards. Alternative is in front yard.</td>
</tr>
<tr>
<td>• rear yard ponding</td>
<td>Creates short term ponding, less than 24 hours.</td>
</tr>
<tr>
<td>• rooftop storage</td>
<td>Applicable for peak flow control only in industrial/commercial applications.</td>
</tr>
<tr>
<td>• parking lot storage</td>
<td>Parking lot design grades creates ponding.</td>
</tr>
<tr>
<td>• porous pavement</td>
<td>New technology not fully developed for Canadian applications.</td>
</tr>
<tr>
<td><strong>Conveyance Controls</strong></td>
<td></td>
</tr>
<tr>
<td>• pervious pipe systems</td>
<td>Encourages the infiltration of water through storm system. Granular soils required for method to work.</td>
</tr>
<tr>
<td>• pervious catchbasins</td>
<td>Encourages the infiltration of water through catchbasin. Granular soils required for method to work.</td>
</tr>
<tr>
<td>• grassed swales (semi-urban road sections)</td>
<td>Encouraged where applicable (ref. Official Plan) ref. Hybrid Roadway Cross-section</td>
</tr>
<tr>
<td>• oversized pipes (Superpipes)</td>
<td>Appropriate in redevelopment of existing areas only.</td>
</tr>
<tr>
<td><strong>End-of-Pipe Facilities</strong></td>
<td></td>
</tr>
<tr>
<td>• wetlands</td>
<td>Applicable for water quality/quantity treatment</td>
</tr>
<tr>
<td>• wet ponds</td>
<td>Applicable for water quality/quantity treatment.</td>
</tr>
<tr>
<td>• dry ponds</td>
<td>Applicable for water quantity control only.</td>
</tr>
<tr>
<td>• infiltration basins</td>
<td>Encourages infiltration where soil type permits.</td>
</tr>
<tr>
<td>• infiltration trenches</td>
<td>Encourages infiltration where soil type permits.</td>
</tr>
<tr>
<td>• filter strips</td>
<td>Only considered appropriate for low density, small drainage areas</td>
</tr>
<tr>
<td>• buffer strips</td>
<td>Only considered appropriate for low density, small drainage areas</td>
</tr>
<tr>
<td>• sand filters</td>
<td>Filters have finite life cycle, need justification for use.</td>
</tr>
<tr>
<td>• oil/grit separators and equivalent systems</td>
<td>Applicable; most appropriate for Commercial/Industrial land use; require consideration of treatment train philosophy</td>
</tr>
</tbody>
</table>

1 The Town requires appropriate signage for all surface end-of-pipe techniques.
3.2.7. Sediment and Erosion Control during Construction

Criteria

New urban developments generally produce increased sediment loading to the surrounding streams particularly during construction. In order to avoid the inherent detrimental side effects from development (i.e. poor water quality and aesthetics, restricted channel conveyance etc.), it is recommended that sediment control measures be instituted. Some of these measures typically include, sediment traps (temporary or permanent), vegetation screens, catch basin filter bags and phased stripping of developable lands.

In all cases, it is recommended that sediment loading be controlled as per the guidelines “Erosion and Sediment Control Guidelines for Urban Construction” published by the Greater Golden Horseshoe Area Conservation Authorities (including the Credit Valley Conservation and Toronto Region Conservation Authority) in December 2006, and the “Ontario Guidelines on Erosion and Sediment Control for Urban Construction Sites” 1987. All Erosion and Sediment Control facilities shall be inspected and maintained until the site is stabilized to the satisfaction of the Town.

Design

As a minimum all Erosion and Sediment Control Plans should incorporate recommendations and protection measures pertaining to:

- Construction Scheduling/development phasing
- Minimizing soil exposure and re-establishment of vegetative cover
- Minimizing unnecessary clearing
- On-site sediment and erosion techniques
- Site Supervision
- Monitoring and Maintenance
- Submission of Inspection Reports
- Site Restoration
- Special Considerations (i.e. in-stream construction/crossings, fisheries timing constraints)

3.2.8. Storm Facility Maintenance

Storm facility designs shall consider future maintenance requirements and accesses shall have a minimum width of 5.0 metres designed to withstand the size and weight of heavy equipment. A Maintenance Report is required that meets the latest MOE guidelines and shall outline maintenance and monitoring requirements. The Maintenance Report shall determine which method of cleaning the facility of accumulated materials is economically feasible, either in the wet or in the dry.
Storm Facility Cleaning in the Dry

Storm facilities that are designed to be cleaned in the dry shall have a bypass storm sewer system and a diversion structure constructed that will divert a 2 year storm event around the facility to the outfall. Any storm intensity greater than the 2 year event shall be directed into the facility when the diversion is in operation.

The facility shall be designed to allow for gravity draining. There will be no pumping of facilities allowed for maintenance purposes. Accesses shall be designed to enable excavating equipment to reach all areas of the facility. If during cleaning of the facility in the dry requires equipment to enter the facility then the bottom of the facility shall be designed to withstand heavy equipment where it is necessary for this equipment to work.

Storm Facility Cleaning in the Wet

Storm facilities that are designed to be cleaned in the wet shall have access capable of withstanding the weight and size of the equipment and will enable equipment to reach all areas of the facility without having to enter the pond with the equipment. A drying area shall be incorporated in the design that will enable the excavated materials to be stockpiled on site until dried prior to being hauled off site. The drying area shall be designed that will allow the excavated materials to drain the absorbed water and retain the materials considering its liquid state. The drying area shall also have access that will withstand the weight and size of heavy equipment.

3.2.9. Meteorology

Town of Caledon intensity-duration frequency curves were originally derived from the rainfall data taken from the Guelph O.A.C. (Town Standard Drawing No. 105). The equations for these curves are as follows:

<table>
<thead>
<tr>
<th>Return Period (Yrs.)</th>
<th>a</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1070</td>
<td>0.8759</td>
<td>7.85</td>
</tr>
<tr>
<td>5</td>
<td>1593</td>
<td>0.8789</td>
<td>11</td>
</tr>
<tr>
<td>10</td>
<td>2221</td>
<td>0.9080</td>
<td>12</td>
</tr>
<tr>
<td>25</td>
<td>3158</td>
<td>0.9335</td>
<td>15</td>
</tr>
<tr>
<td>50</td>
<td>3886</td>
<td>0.9495</td>
<td>16</td>
</tr>
<tr>
<td>100</td>
<td>4688</td>
<td>0.9624</td>
<td>17</td>
</tr>
</tbody>
</table>

\[ I = \frac{a}{(t + c)^b} \]

Where:  a, b, c = above

I = intensity (mm/hr)

\( t \) = storm duration (min)
Based on these I.D.F. curves, the Consultant is to develop the proper design storms for use in hydrologic studies. In general, the S.C.S. design storms should be used for determining the hydrographs for undeveloped watersheds and for checking detention storage required for quantity control. The Chicago design storms should be used for determining hydrographs in urban areas and also for checking detention storage. In many cases, the consultant will be required to run both sets of design storms to make sure that the more stringent is used for each individual element of the drainage system (pipe flow, street flow, channel flow, detention storage).

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

In detailed design of storage structures, the operation must be checked for spring flood conditions due to combined snowmelt and rain. Wet ponds are to be checked for spring flood conditions due to combined snowmelt and rain. Wet ponds are to be checked for evaporative losses. Temperature data is to be submitted with these calculations. Operation of storage facilities must also be checked in order to verify that a sequence of storms is not more critical than a design storm.

3.2.10. Stormwater Management Analytical Methods

3.2.10.1. Rational Method

The Rational Method of determining design flows should only be used as an approximation of flows for relatively small drainage areas (i.e. less than 5 ha) due to the conservativeness of the approach. Flows determined using the Rational Method are typically higher than those resulting from complex hydrologic models.

The Rational Method can be used for storm sewer design regardless of the total contributing area, using the Town of Caledon storm sewer design sheet and IDF relationship.

3.2.10.2. Event Based Hydrologic Models

Both the Flood Plain Management in Ontario Technical Guidelines, Ontario Ministry of Natural Resources, 2001 and the Drainage Management Manual Parts 3 and 4, Ministry of Transportation, 1997 provide general guidelines on the selection of hydrologic models. The Ministry of Transportation document lists the characteristics of each model, from which the proponent can evaluate the appropriateness of certain event based hydrologic models.
Sound hydrologic modelling standards of practice should be followed in developing an event based hydrologic model. The following standards of practice are intended to guide general model preparation for most hydrologic programs and techniques, however, this list should not be considered exhaustive:

1. The modeller should provide the purpose for developing the hydrologic model, such as determining flow rates, runoff volumes, flow routing effects for proposed development, existing land use conditions etc.
2. The modeller should provide the study objectives and how they relate to the hydrologic modelling.
3. The modeller should provide the model selection criteria and how the model matches the criteria.
4. The modeller should provide the basis for the storm design information, outlining how the design storm has been selected.
5. The modeller should provide drainage area plans outlining both internal and external catchments, modeling schematics and tables providing drainage area parameters.
6. Background information on the selection of the drainage area parameters should be provided to assist the Town in understanding on the assumptions leading to the drainage area parameters.
7. Background data on overland and minor storm systems should be provided with plans clearly presenting and labelling both systems.
8. Data should be provided on routing through natural and manmade storage systems, with detailed plans and calculations outlining how the stage/discharge relationship has been developed.
9. Sensitivity analysis should be conducted on a minimum number of parameters which varies with model complexity.
10. Verification or validation of results should be provided through various methods such as calibration to recorded streamflow, unit flow rates and runoff volume comparisons using the techniques such as the MTO index method or equivalent. The application of the validation technique (number and type) will depend on the availability of data and the sensitivity of the analysis.
11. The modeller should provide all input and output details in a logical manner, with an explanation for potential errors.

3.2.10.3. Continuous Models

Continuous models differ from event based hydrologic models in that rather than using a synthetic design storm based on IDF data, a long term time series of historical meteorological data is used for the input driving function. In addition to historical rainfall data, continuous models typically require seasonal state variables. Continuous models are usually more complex than event based hydrologic models, as typically the models consider more processes including temperature, evapotranspiration, snow conditions and groundwater. Notwithstanding, the modeling standards of practice for event based hydrologic models also apply to continuous models. Continuous models are typically used but are not limited to higher level studies such as watershed and subwatershed studies. Continuous modeling may also be used for studies with a scope requiring historical data inclusion.
In addition to the standards of practice for event based hydrologic models, the proponent should demonstrate that the historical meteorological time series selected has been obtained from the nearest rainfall gauge to the proponent’s study area. This will often lead to a trade-off between duration of record and proximity. Typically, the minimum duration for meaningful continuous simulation is 20 to 25 years. Historical rainfall data is available from the Conservation Authorities and Environment Canada.

The proponent in selecting a continuous hydrologic model usually intends to develop frequency flows for the historical data period. The proponent should specify the assumptions and methodology for determining the frequency flows and typical year hydrographs. The proponent should provide validation of the selected probability distribution by using statistical tests.

The proponent should select the continuous model giving consideration to development and/or redevelopment characteristics to the satisfaction of the Town. In addition approval agencies (i.e. Conservation Authorities, MNR, MTO and others) other than the Town should be consulted to determine modelling requirements.

### 3.2.11. Hydraulic Capacity

Drainage systems can be subdivided into both closed and open systems. The hydraulic capacity of the receiving minor and major storm system is to be determined to verify that drainage can be safely conveyed as proposed. For each system various analytical techniques can be employed. Discussions with the Town and review agencies (Conservation Authorities, MNR, MTO and others) would be required to confirm the appropriateness of using selected hydraulic analytical techniques.

The hydraulic capacity of a storm system can be determined through hydraulic modeling and for certain applications through the use of standard ‘hand calculations’. As for hydraulic modeling, standards of practice relate to the use of various techniques. The following standards of practice are intended to provide direction:

1. The proponent should clearly identify the study objectives and how they relate to the hydraulic modeling.
2. The proponent should provide the purpose for the hydraulic modeling.
3. The modeller should provide the model selection criteria and how the model matches the criteria.
4. The proponent should provide plans clearly presenting the closed and/or open hydraulic system.
5. For plans describing open systems, the proponent should note cross-sections, study limits, land use, crossing details, spill areas, ineffective flow areas, and flooding limits and elevations for the appropriate design event(s).
6. For plans describing open systems, the proponent should note cross-sections, study limits, land use, crossing details, spill areas, ineffective flow areas, and flooding limits and elevations for the appropriate design event(s).
7. For combined hydrologic/hydraulic models such as SWMM, the proponent should provide plans that not only describe the closed system but also the contributing drainage areas and overland flow system.

8. For all hydraulic models, the proponent should provide the downstream and, if applicable, the upstream boundary conditions for each storm modeled and the assumptions used to define the boundary conditions.

9. For all hydraulic models, the proponent should document the parameters established for hydraulic losses such as Manning’s ‘n’, inlet and outlet losses and other appropriate losses.

10. The proponent should summarize the selection of procedures for determining the computed energy grade line and water surface elevations.

11. The proponent should document the hydraulic results in summary form for the relevant storm events.

12. The proponent should prepare the model of an open system such that it fully contains the modeled flows without exceeding the hydraulic cross-section. Should it not be possible to contain the flows within the defined geometry of the open storm system, the proponent should provide details on the spill characteristics. In the event of a spill, a rationale should be provided on whether or not to include a flow loss in the calculation.

13. The proponent should document potential impacts on existing infrastructure and possible mitigative measures.

14. Sensitivity analysis should be conducted on a limited number of parameters depending on the model type and complexity.

15. The proponent should, if possible, verify hydraulic results for an existing closed/open storm system by documenting historical flood elevations for specific storm events and comparing the hydraulic modeling results to the historical data; calibration of losses should be included, if sufficient data exists.

16. The proponent should provide the input and output data in a logical manner with an explanation of the potential error.

The hydraulic capacity of storm sewers is to be determined using the Town of Caledon Storm Sewer Design Sheet. The proponent is required to abide by the relevant hydraulic modeling codes of practice (i.e. specifically No.’s 1, 3, 6, 8 and 9). In addition the proponent should document, in both plans and text, the hydrology for the storm sewer design. The storm sewer design should be conducted using the Town’s 10 year IDF storm data of the Town’s approved storm event for the study area (regardless of the return period used previously to size downstream storm sewers).

3.2.12. Stormwater Management Facilities

3.2.12.1. General

New development shall be designed to mitigate impacts to the watercourse including erosion, flooding and water quality. Existing watercourses shall be left in their natural state as much as possible.

Stormwater quantity control is required to mitigate the detrimental impacts of flooding and erosion on the watercourse due to increased stormwater runoff from
new development. Stormwater quality controls are to be implemented based on all approved Subwatershed or Master Drainage Plans.

Source controls are encouraged where soil conditions allow infiltration. Owners are required to maintain and monitor the operation of quality ponds and shall ensure the facility meets current Ministry of the Environment criteria prior to the Town assuming control of the facility. The length of period required before the Town assumes responsibility of the facility depends upon the timeframe of housing completion. The minimum period of ownership responsibility shall be two (2) years beyond the completion of housing.

3.2.12.2. Maintenance Costs

The maintenance costs represent the costs to ensure the proper operation, longevity and aesthetic functioning of the stormwater control measures. The necessary tasks to achieve these objectives include sediment removal, trash removal, maintenance of the vegetation and inspections of the inlet and outlet. The Consulting Engineer shall provide a report to the Town detailing maintenance recommendations based on the approved stormwater management plan. The report shall include the following recommendations:

- Inspection of all structures and how frequently (minimum of once annually);
- Removal of all sediments and how frequently;
- Method of re-stabilizing of all disturbed areas;
- Sediments to be tested to determine method of disposal;
- Effluent sampling protocol.

The costs associated with stormwater facility maintenance will vary depending on the type and size of the facility and are subject to review and approval of the Town of Caledon. The cost identified shall be provided by the Owner(s) to the Town of Caledon to ensure sufficient funds are available for perpetual maintenance of the stormwater management pond. The payment of this fee will be required as part of the Subdivision Agreement approval process.

The required maintenance interval and unit price for each of the required maintenance activities are identified in Table 3.2.
### Table 3.2
COMPREHENSIVE LIST OF AVAILABLE SWMP'S

<table>
<thead>
<tr>
<th>Activity</th>
<th>Maintenance Interval (years)</th>
<th>Unit</th>
<th>Cost Per Unit</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Litter Removal</td>
<td>1/2</td>
<td>ha</td>
<td>$1,000</td>
<td></td>
</tr>
<tr>
<td>Weed Control</td>
<td>1</td>
<td>ha</td>
<td>$1,000</td>
<td></td>
</tr>
<tr>
<td>Landscape Restoration (Aquatic Vegetation)</td>
<td>10</td>
<td>ha</td>
<td>$1,500</td>
<td></td>
</tr>
<tr>
<td>Landscape Restoration (Terrestrial Vegetation)</td>
<td>10</td>
<td>ha</td>
<td>$1,000</td>
<td></td>
</tr>
<tr>
<td>Sediment Removal and Disposal</td>
<td>10</td>
<td>m³</td>
<td>$35</td>
<td></td>
</tr>
<tr>
<td>Pumping Storm Flows around Pond</td>
<td>10</td>
<td>L.S.</td>
<td>$1,500</td>
<td></td>
</tr>
<tr>
<td>Soil Sampling and Testing</td>
<td>10</td>
<td>L.S.</td>
<td>$1,000</td>
<td></td>
</tr>
<tr>
<td>Inspection of Inlet/Outlet</td>
<td>1</td>
<td>L.S.</td>
<td>$150</td>
<td></td>
</tr>
<tr>
<td>Pervious Pipe Cleanout</td>
<td>10</td>
<td>L.S.</td>
<td>$100</td>
<td></td>
</tr>
<tr>
<td>Operation of Infiltration Bypass</td>
<td>1</td>
<td>L.S.</td>
<td>$150</td>
<td></td>
</tr>
</tbody>
</table>

### 3.3. Roadways

#### 3.3.1. Road Works

Asphalt roadways complete with concrete curbs and gutters designed and constructed in accordance with the most recent requirements and specifications of the Town and the Ontario Provincial Standards are required on all road allowances within the plan of subdivision. The balance of the road allowance not occupied by the roadway, driveways, splash pad or sidewalks shall be graded, top soiled and sodded (estate subdivisions may be seeded where appropriate) to the satisfaction of the Town.

#### 3.3.2. Maintenance

All infrastructure shall be guaranteed and maintained to design specifications, Town Standards and manufacturer's specifications for a minimum period of one (1) year after the issuance of preliminary acceptance of the top course asphalt. The Developer must address and rectify all deficiencies during this period as required or directed by the Town.
3.3.3. Geometric Design

3.3.3.1. Roadways

Roadway geometric design will be in accordance with the Town of Caledon Geometric Design Standards and Road Sections as outlined in Town Standard Drawings.

A traffic distribution analysis is needed for all applications; this is in addition to a traffic impact study, if one is required. This analysis is to be completed by a qualified traffic engineer and the analysis must indicate the estimated two-way AADT for all road sections (road sections are segments of roadway between intersections) within the plan of subdivision. Several decisions are based on AADT and the Public Works & Engineering Department needs this information to properly process an application.

Road widths and Right-of-Ways are to be in accordance with the most recent Town of Caledon Standards:
<table>
<thead>
<tr>
<th>ADT</th>
<th>Posted Speed (km/h)</th>
<th>Hor. Curve Radi. (m)</th>
<th>Vert. Curve (Min. k)</th>
<th>Road Grade</th>
<th>Grade at Intersections</th>
<th>R.O.W Width (m)</th>
<th>Pav’t Width (m)</th>
<th>Intersection Angle</th>
<th>Cul-de-sac Radius Pav (m)</th>
<th>Max Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Residential</td>
<td>&lt;1000</td>
<td>50</td>
<td>90</td>
<td>12</td>
<td>8</td>
<td>6.0% 0.75% 2.0% 3.0%</td>
<td>18</td>
<td>7.9</td>
<td>85-&gt;95 15</td>
<td>3.0%</td>
</tr>
<tr>
<td>Local Industrial</td>
<td>&lt;1000</td>
<td>50</td>
<td>115</td>
<td>18</td>
<td>15</td>
<td>6.0% 0.75% 2.0% 3.0%</td>
<td>22.5</td>
<td>10.4</td>
<td>85-&gt;95  20</td>
<td>3.0%</td>
</tr>
<tr>
<td>Residential</td>
<td>1000 to 3000</td>
<td>60</td>
<td>130</td>
<td>18</td>
<td>15</td>
<td>6.0% 0.75% 2.0% 3.0%</td>
<td>20</td>
<td>8.9</td>
<td>85-&gt;95 N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Industrial Collector</td>
<td>1000 to 3000</td>
<td>70</td>
<td>190</td>
<td>25</td>
<td>25</td>
<td>6.0% 0.75% 2.0% 3.0%</td>
<td>26</td>
<td>13.9</td>
<td>85-&gt;95 N/A</td>
<td>N/A</td>
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<tr>
<td>Arterial</td>
<td>&gt;6000</td>
<td>80</td>
<td>250</td>
<td>30</td>
<td>35</td>
<td>6.0% 0.75% 2.0% 3.0%</td>
<td>30</td>
<td>7.0-15.0</td>
<td>85-&gt;95 N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1) Climb Lane - Add where grade is more than 4%
2) Widen R.O.W. - Through Intersection as Required
3) Hor. Curve Radii - Given at Centreline
4) Max. Cul-de-sac - 150m Without Emergency Access
5) Dual Carriageway - Where 2nd. Access Not Available
6) Min. Fire Route - 6.1m for One Way Traffic
7) Min. Fire Route - 9.0m for Two Way Traffic
8) Min. Lane Width - 3.8m for Through of Right Turn
9) Min. Lane Width - 3.25m for Left Turn
10) Min. Lane Width - 2.5m for Curb side Parking
11) Min. Sight Distance - 30.0m for industrial driveway setback
12) Corner Lot Rad. - 5.0m Min. Property Radius
13) Min. Cul de Sac
   Grade at Gutter 0.75%
14) Driveway Grade - 2.0% Min. 6% Max. 4% Preferred
15) Minimum Intersection Curve Radii (measured at Edge of Pavement)
   Arterial to Residential Collector 12.0 metres
   Arterial to Industrial Collector 15.0 metres
   Industrial Collector to Residential Collector 15.0 metres
   Industrial Collector to Local Industrial 15.0 metres
   Local Industrial to Local Industrial 15.0 metres
   Residential Collector to Local Residential 10.0 metres
   Local Residential to Local Residential 10.0 metres
   Residential Road to Laneway 10.0 metres
3.3.3.2. **Rear Lanes**

The function of rear lanes are to provide vehicular access to parking garages/areas located to the rear of a house/development that have frontages on another public street.

Rear lanes shall have 5.4m of paved surface and 1.0m setbacks to any structure, for an 8.0m ROW.

Storm sewers shall be required along the length of the rear lanes, but all other municipal infrastructure is prohibited along rear lanes. Catchbasins shall be spaced a maximum of 100m apart.

3.3.3.3. **Driveway Entrances**

Driveway entrances and drop curbs shall be in accordance with the Town of Caledon Standard Drawing 402 and the most recent standard drawings for this purpose.

Special designs are required for commercial, industrial and industrial commercial driveways, dependant on the expected use and anticipated loads.

All new residential driveways must be paved with two (2) lifts to a minimum 65mm HL3 from the curb to the property line on a base of a minimum of 150mm granular 'A' or 150mm of 19mm crusher run limestone. In Rural Estate subdivisions the driveway is to be paved a minimum of 1.0 metres behind the curb to provide support for the curb. In Estate Residential subdivisions, paving of driveway entrances may not be required for final assumption if the lot has not yet been developed.

Boulevard driveway slopes should be a maximum of 6% and a minimum of 2% wherever possible. Town policy will dictate the widths of curb depressions for driveways.

A minimum 0.6m separation at the curb shall be provided between driveways. Joint driveways are permitted in Semi-detached and Townhouse type developments. All driveway locations are to be indicated on the Aboveground General Plan and the Composite Utility Plan.

A minimum clear distance of 1.5m is required between the edge of the driveway and a utility structure or hydrant.

3.3.3.4. **Special Road Designs**

Special road designs not covered by the Town of Caledon Standards, shall conform with the most recent provisions of the geometric design standards manual.
and urban street geometrics, as adopted by the Transportation Association of Canada (TAC).

Special designs will be required in high density residential, commercial and industrial areas.

Pavement design shall be in accordance with the most recent Town of Caledon Standards and the Ontario Provincial Standards Drawings and Specifications.

Complete mechanical analyses of the proposed sub-grade are to be taken at a minimum of 150m intervals along proposed roads. On small sites a minimum of two mechanical analyses will be required.

3.3.3.5. Pavement Design (Roadways)

A soil analysis must be conducted by a recognised and licensed Geotechnical Engineering Firm that is acceptable to the Town of Caledon. The proposed road designs, along with copies of the soil analysis will be submitted to the Director of Public Works and Engineering.

The minimum thickness of asphalt and granular material shall be used as indicated on Town Standard Drawings.

In all cases:

- Base course of asphalt:
  - Local & Collector Roads - O.P.S.S. HL8
  - Arterial & Industrial Roads - O.P.S.S. HDBC

- Wearing course of asphalt:
  - Local & Collector Roads - O.P.S.S. HL3
  - Arterial & Industrial Roads - O.P.S.S. DFC

- Asphalt job mix designs, approved by the Owner's Geotechnical Engineering consultant, shall be submitted to the Town for review a minimum of 5 working days prior to the commencement of paving for review.
- O.P.S.S. Granular 'A' and Granular 'B' materials are to be used in roadway construction in the Town of Caledon.
- Crusher Run materials are an acceptable alternative to the approved O.P.S.S. Granular 'A' and Granular 'B' materials for the use in roadway construction.
- Roadways containing four or more paved lanes require an increase to the curb lane roadway pavement specification:
  - Binder course (base) asphalt under the bus route or curb lane must be increased by 50mm.
- Four lane roadways, bus routes and industrial roads require the base course asphalt to be Heavy Duty Binder Course (H.D.B.C.), O.P.S.S. 1149 and the wearing course shall be Dense Friction Course (D.F.C.).

| TABLE 3.4 |
| TOWN OF CALEDON ROADBASE STANDARDS |

<table>
<thead>
<tr>
<th>STAN</th>
<th>STD</th>
<th>Posted Speed (km/h)</th>
<th>HL 3 (mm)</th>
<th>HL 8 (mm)</th>
<th>Gran. A (mm)</th>
<th>Gran. B (mm)</th>
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<tbody>
<tr>
<td>LOCAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban/Rural</td>
<td>201</td>
<td>50</td>
<td>40</td>
<td>65</td>
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<td>Industrial</td>
<td>203</td>
<td>50</td>
<td>40</td>
<td>90</td>
<td>150</td>
<td>380</td>
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<tr>
<td>URBAN COLLECTOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1,000-12,000</td>
<td>203</td>
<td>60</td>
<td>40</td>
<td>90</td>
<td>150</td>
<td>380</td>
</tr>
<tr>
<td>1,000-12,000</td>
<td>204</td>
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<td>90</td>
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<td>380</td>
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<td>12,000-30,000</td>
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<td>200-5,000</td>
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<td>60-80</td>
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<td>300</td>
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<td>ARTERIAL</td>
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<td></td>
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<td>5,000-30,000</td>
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<tr>
<td>DRIVEWAYS</td>
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<tr>
<td>Asphalt</td>
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<td>65</td>
<td>N/A</td>
<td>150</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1. (Asphalt, Poured Concrete or Concrete Pavers) - Hard Surface as Approved by the Director of Public Works and Engineering.

NOTE: Asphalt thickness is the compacted thickness.

### 3.3.3.6. Placement of Top Course Asphalt within the Subdivisions

The following must be completed and approved by the Director of Public Works and Engineering before the placement of top course asphalt can commence:

- Complete all sidewalk works.
- Complete all curb works.
- Complete boulevard works.
- All manhole and catchbasin frames and grates must be raised and the rims painted with orange fluorescent paint to make them visible to drivers. Warning signs must be placed at all entrance points to the subdivision, indicating the raised manhole and catchbasin frame
covers ahead. Placement of the top course asphalt must be completed within two weeks of raising the frames and grates.

- Install any delineation required for raised manholes and catchbasins that are in excess of the 40mm top course asphalt lift. Delineation is required on any road with a posted speed limit of 60km/hr or greater.
- Flush and sweep surface and evenly apply tack coat.
- Base course asphalt pad as required in accordance with O.P.S.S.
- Place top course asphalt in accordance with O.P.S.S.
- Under no circumstances will topcourse paving between November 1st and May 1st be accepted no matter the weather conditions. Any paving done between these months must be removed and replaced at the owner’s expense.

3.3.4. Curbs and Gutters

All new town streets are to be constructed with a concrete barrier curb with a standard gutter in accordance with O.P.S.D. 600.040. Roads with an AADT less than 100 and a minimum lot frontage 30m and greater will be constructed with semi-mountable curbs with a standard gutter in accordance with O.P.S.D. 600.060.

A driveway entrance is required for each lot as detailed in within Town Standard No. 402.

Curb depressions are required at all pedestrian road crossings.

Curb and gutter is to be designed and constructed to the most recent Town Standards and Ontario Provincial Standards.

A minimum of 150mm of Granular ‘B’ material compacted to 95% Standard Proctor Density is required as a base for all curb installations.

Two-stage curb installation must be in accordance with O.P.S.D. 600.070.

Minimum curb grade is 0.75%, including cul-de-sacs and outside road elbows.

All curbs must be constructed with 2-15M reinforcing bars.

3.3.5. Concrete Specification

Concrete shall have a minimum compressive strength of 30 MPa at 28 days; air content of 7.0% ± 1.5%; a maximum slump of 60mm; and conform to O.P.S.S. 353.

3.3.6. Cul-de-Sacs

All local roads which permanently terminate at one end (dead end streets) shall be provided with a turning circle (cul-de-sac) of sufficient area to enable the turning of garbage trucks, snow removal equipment, school buses and other emergency vehicles. Residential
cul-de-sacs shall have a maximum allowance of 40 units or 150 m in length, unless there is emergency access.

3.3.6.1. Temporary Cul-de-Sacs and Allowances

Temporary cul-de-sacs shall be required for all temporary dead end streets, when incremental road construction and/or phasing is requested by the Owner for future extension. Should the Owner fail to extend the roadway the property within the temporary allowance shall then be permanently dedicated to the Town.

Extent of works to be determined on a site specific basis, and approved by the Director of Public Works and Engineering.

Temporary cul-de-sacs shall conform to all of the criteria of permanent cul-de-sacs. All temporary cul-de-sacs shall have a minimum radius of 15m.

All lots adjacent to a temporary cul-de-sac shall be frozen until the road is extended.

3.3.7. Traffic Calming

Proper disbursement of traffic should be inherently built into the road pattern of the development, having many alternative routes through a community is the best way to disburse traffic and reduce the impact on the surrounding land uses. Having long lineal tangent road lengths must be avoided to reduce the potential of aggressive driving behaviour. A Traffic Management Plan (TMP) is required for all subdivision development applications. If it is determined through the TMP that traffic calming measures will be required in specific locations then the principles contained in this section will be applied when selecting and implementing traffic calming measures. This will ensure that the measures are compatible with the community’s needs, and that any potential negative impacts are minimized. While each situation is unique, the principles of traffic calming are relevant to each situation. Application of these principles will maximize effectiveness of the traffic calming plans and help build community acceptance and support of the final traffic calming plans.

Prior to considering traffic calming, any potential negative impact on adjacent streets will be considered. Impacts may include traffic diverted to another street, or changes in turning movements with increase delays with other intersections. These effects will be considered in advance of approval, so traffic calming solutions do not create or exacerbate existing problems.

Since traffic calming measures should not be applied to all types of roadways, for a variety of operational and public safety reasons, traffic calming designs will be limited to installation on roadways that have been identified in the TMP as having potential cut through traffic, or in areas of school zones, parks or where vulnerable roadway users could be negatively impacted. Traffic calming designs that involve vertical alignment shifts will not be permitted on arterial roads and primary routes for emergency response agencies. Traffic calming designs should not be required on roads that carry local traffic
only with less then 500 ADT, such as, short cul-de-sacs and short crescents. Traffic calming will not be supported on roadways that do not have more than 200m of uncontrolled length, i.e. 200m between stop conditions or from a curve in a road greater than approximately 70 degrees.

The design of all traffic calming measures shall be subject to the guidelines of the Institute of Transportation Engineers (ITE), Canadian Guide to Neighbourhood Traffic Calming, TAC’s urban traffic calming guidelines as well as the Town of Caledon’s Urban Traffic Calming Manual. Designs will strive to improve the “quality of life” in the neighbourhood but must always be respectful of the safety of the motorists and have regard for operational matters.

Traffic calming usually involves the installation of or a combination of the following roadway design characteristics or features:

- Installation of special pavement markings and/or signage
- Installation of visual treatments that may include entrance or gateways features, roadside trees, and/or ground cover
- Changes to the roadways surface texture and/or colour
- Changes to the vertical and/or horizontal alignment of the roadway
- Changes to the travelled portion of the roadway through pavement and/or lane narrowing
- Restricting directional flows of traffic (one way streets)
- Traffic circles

Through well planned road patterning and proper disbursement of traffic the need for extreme traffic calming measures should not be necessary, however if proven through a TMP that traffic calming measures are required it should be noted that it has proven to be effective in the management of neighbourhood vehicular traffic. The behaviour of motorists can be safely altered through the successful design and installation of a well thought out plan that meets the needs of neighbourhood residents, roadway users and emergency response agencies.

3.3.8. Roundabouts

The Town of Caledon favours the use of roundabouts for intersection control. All intersections meeting warrants for signalization or all-way stop control MUST first be analysed for the intersection of a roundabout prior to proceeding with intersection control.

There are no warrants for when to construct roundabouts. In general terms, any intersection, urban or rural, that meets the criteria or a four-way stop condition or traffic signal, also qualifies for evaluation as a modern roundabout. Therefore, if an intersection warrants a signal or a four-way stop within the design life of the proposed project, then a roundabout alternative in the overall analysis will be included.

When completing a Traffic Impact Assessment for a proposed development, roundabouts will be evaluated and implemented based on the results of the assessment.
When compared to signalized intersections, studies show that roundabouts typically reduce overall delay and congestion, increase capacity and improve safety.

### 3.3.8.1 Roundabout Characteristics

Roundabouts must have the following major characteristics:

- **a. Traffic Control** – yield control is used on all entries. This circulatory roadway has no control;
- **b. Priority to Circulating Vehicles** – circulating vehicles have the right-of-way;
- **c. Pedestrian Access** – pedestrian access is allowed only across the legs of the roundabout, behind the yield line;
- **d. Parking** – no parking is allowed within the circulatory roadway or at entries;
- **e. Direction of Circulation** – all vehicles circulate counter-clockwise and pass to the right of the central island.

The following describes performance characteristics that need to be considered, either at policy level or at specific locations where a roundabout is one of the alternatives being considered.

1. **Safety**

Roundabouts may improve the safety of intersections by eliminating or altering conflict types, by reducing speed differentials at intersections and by forcing drivers to decrease speeds as they proceed into and through the intersection.

The reasons for the increased safety level at roundabouts are:

- Roundabouts have fewer conflict points. The potential for hazardous conflicts, such as right angle and left head turn head-on crashes is eliminated with roundabout use.
- Low absolute speeds associated with roundabouts allow drivers more time to react to potential conflicts, also helping to improve the safety performance of roundabouts.
- Since most roundabout users travel at similar speeds through roundabouts, i.e., have low relative speeds, crash severity can be reduced compared to some traditionally controlled intersections.
- Pedestrians need only cross one direction of traffic at a time at each approach as they traverse roundabouts.

Conflict points occur where one vehicle path crosses, merges or diverges with, or queues behind the path of another vehicle, pedestrian or bicycle.

Conflicts can arise from both legal and illegal manoeuvres; many of the most serious crashes are caused by failure to observe traffic control devices.

Conflicts can be divided into three basic categories:
• Queuing conflicts
• Merge and Diverge conflicts
• Crossing conflicts

Crossing conflicts are the most severe and carry the highest public cost, involving injuries or fatalities.

Incorrect lane use and incorrect turns are multi-lane roundabout conflicts that do not exist in single-lane roundabouts.

A pedestrian crossing at a typical signalized intersection faces four potential vehicular conflicts, each coming from a different direction:

- Crossing movements on red (typically high-speed, illegal).
- Right turns on green (legal)
- Left turns on green (legal for protected-permitted or permitted left turn phasing)
- Right turns on red (typically legal)

Pedestrians at roundabouts face two conflicting vehicular movements on each approach:

- Conflict with entering vehicles; and
- Conflict with exiting vehicles.

Bicycles can be provided with the option of traveling as either a vehicle or a pedestrian through a roundabout.

Bicycle-pedestrian conflicts can also occur in shared pathways adjacent to the roundabouts

2. Traffic Calming

Series of roundabouts can have secondary, traffic calming effects on streets by reducing vehicle speeds. Speed reduction at roundabouts is caused by geometry rather than by traffic control devices or traffic volume. Consequently, speed reduction can be realized at all times of day and on streets of any traffic volume. It is difficult to speed through an appropriately designed roundabout with raised channelization that forces vehicles to physically change direction. In this way, roundabouts can complement other traffic calming measures.

Roundabouts have also been used successfully at the interface between rural and urban areas where speed limits change. In these applications, the traffic calming effects of roundabouts force drivers to slow and reinforce the notion of a significant change in driving environment.
3. **Pedestrians**

Pedestrian crossings must be set back from the yield line by one (1) or more vehicle lengths.

Signalized intersections offer positive guidance to pedestrians by providing visual and occasionally audible pedestrian signal indications. In this respect, the decision process for pedestrians requires less judgment at signalized intersections than at roundabouts, particularly for visually impaired and elderly pedestrians. However, pedestrians are still vulnerable at signalized intersections to right-turn and left-turn movements unprotected by green arrow. In addition, high speed collisions are still possible if a vehicle runs through a red light. In this respect, the roundabout provides a speed constrained environment for through traffic. With crosswalks located back from the circulatory roadway, roundabouts place pedestrians in a more visible location.

4. **Bicycles**

Bicycles should be accommodated within roundabouts using the following principles:

- Avoid bike lanes on the outer edge of the circulatory roadway.
- Allow bicyclists to mix with vehicle traffic without any separate facility in the circulatory roadway when traffic volumes are low, on single lane roundabouts operating at lower speeds. movements on red (typically high-speed, illegal).
- Introduce separated bicycle facilities outside the circulatory roadway when vehicular and bicycle volumes are high. These separated bicycle facilities cross the exits and entries at least one car length from the edge of the circulatory roadway lane, adjacent to the pedestrian crossings.

5. **Large Vehicles**

Roundabouts should always be designed for the largest vehicle that can be reasonably anticipated (the "design vehicle"). For single-lane roundabouts, this may require the use of a mountable apron around the perimeter of the central island to provide additional width needed for tracking the trailer wheels.

In some cases, roundabouts have been designed with aprons or gated roadways through the central island to accommodate oversized trucks, emergency vehicles or trains.

3.3.8.2. **Geometric Design**

Roundabout design involves trade-offs among safety, operations and accommodating large vehicles.
Some roundabout features are uniform, while others vary depending on the location and size of the roundabout.

The most appropriate objective is achieving appropriate vehicular speeds through the roundabout.

Increasing vehicle path curvature decreases relative speeds between entering and circulating vehicles, but also increases side friction between adjacent traffic streams in multilane roundabouts.

Recommended maximum entry design speeds:

<table>
<thead>
<tr>
<th>Site Category</th>
<th>Maximum Entry Design Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini-Roundabout</td>
<td>25 km/h</td>
</tr>
<tr>
<td>Urban Compact</td>
<td>25 km/h</td>
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<tr>
<td>Urban Single Lane</td>
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<tr>
<td>Rural Single Lane</td>
<td>40 km/h</td>
</tr>
<tr>
<td>Rural Double Lane</td>
<td>50 km/h</td>
</tr>
</tbody>
</table>

1. **Number of Entry Lanes**

The volume-to-capacity ratio of any roundabout leg is recommended not to exceed 0.85.

**3.4. Pedestrian Ways**

**3.4.1. Sidewalks and Walkways**

Sidewalks are required in subdivisions in accordance with Town Standards and Guidelines and where specified by the Director of Public Works and Engineering.

Where the development generates the need, in the opinion of the Director of Public Works and Engineering, sidewalks may be required on existing streets external to the plan or streets where reverse frontage is proposed.

Walkways shall be constructed as required for adequate circulation of pedestrian traffic and shall be in accordance with the most recent requirements and specifications of the Town of Caledon and in accordance with the Community Design Plan and The Town of Caledon Trails Master Plan.

**3.4.1.1. Location**

Sidewalks shall be constructed on Town of Caledon streets as shown on the Town's Road Cross-section Standards.
Concrete sidewalks are required:

a. Along only one (1) side of local streets, with an AADT of approximately 100 or greater.

b. Along both sides of collector and arterial streets.

c. Along the inside of crescents or as determined by the Town.

d. On one (1) side of cul-de-sacs if:

   • cul-de-sac is longer than 100 m to the bulb;
   • cul-de-sac leads to a pedestrian node (i.e. a park, a school, a commercial area, an apartment building);
   • cul-de-sac is of such a design within the subdivision that through pedestrian travel is required;

e. On one side up to the built section of cul-de-sacs. The terminus of the sidewalk shall not conflict with driveways and services and the exact location shall be determined by the Town prior to construction.

Concrete sidewalks are not required in the "Bulb" section of cul-de-sacs or along the longer side of crescents, unless otherwise specified by Director of Public Works and Engineering.

Placement of the sidewalk shall generally be in the following priority:

- Same side as schools, parks and other areas that are pedestrian generators.
- North and east-side of road to take advantage of the sun.
- Minimum driveway crossings.
- Reduced road crossings.
- Inside side of Road Elbows.

3.4.1.2. Specification

Sidewalks shall be designed and built according to the most recent Town of Caledon Standards and Specifications.

- Sidewalk widths vary depending on the road designation (see standard drawings for widths).
- Concrete shall have a minimum compressive strength of 30 MPa at 28 days; air content of 7.0% ± 1.5% measured prior to placement.
- Concrete sidewalks shall normally be a minimum of 125mm thick, 150mm thick across residential driveways and 200mm thick across commercial or industrial driveways respectively.
- The sidewalk shall be constructed 25mm higher than the finished sod on the downstream side and flush to the finish sod on the upstream side.
- Sidewalks shall comply with OPSD 310.010 and 310.030 on a 150mm compacted Granular “A” base.
• Sidewalks shall not be constructed on organic soils.

3.4.2. Multi-Use Trails and Walkways

Sidewalks, bicycle lanes and multi-use trials shall be shown on the Traffic Control Plan(s) drawn to a scale of 1:1,000 or larger.

The Developer may be required to develop trail systems, co-ordinating walkways and linkages to existing trail systems. Trail development will be implemented according to the Town of Caledon Trails Master Plan, any relevant secondary plans, and/or Community Design Plans. All Trailway access points shall be gated according to Caledon Trailway Standards. All trail and walkway developments shall be shown on the landscape plans.

All walkways shall be a minimum of 3.0 m in width unless otherwise noted. They shall be excavated to a minimum depth of 350 mm. The excavation is to be backfilled with a minimum 200 mm compacted Granular "A" limestone plus 150 mm concrete. On either side of the walkway, the Developer shall construct a 1.5 m high chain link fence consisting of industrial type posts, No. 9 gauge wire. The said fencing shall have a 1-11/16” outside diameter (O.P.) top rail and single strand bottom tension wire 14 gauge fastened 450 mm on centre.

Bicycle lanes shall have the same structural standard as the road base with a 1.5 m lane in addition to the normal road cross-section designated by appropriate markings, as per the Traffic Control Plan. The final design, timing of bicycle circulation signage and markings will be determined by the Director of Public Works and Engineering.

The Developer is responsible for supplying and installing all traffic, pedestrian and bicycle control signs where required by the Town.

A Traffic Control Plan is to be prepared showing the location of all signs and markings to be installed in the subdivision.

All traffic and pedestrian control signs are to be made with High intensity type reflective sheeting approved by the Ministry of Transportation Ontario. All signs shall be mounted on galvanized steel “U” channel posts 3.6 m in length. Signs and markings shall be manufactured and installed in accordance with the current Ontario Traffic Manual and the Highway Traffic Act Regulation for Ontario.

All stop signs at Regional intersections and arterial roads are to be per O.T. Manual. Stop signs at ‘all way’ stop intersections are to be mounted with an ‘all way’ tab and a red and white horizontal hazard marker.

Parkland and park facilities will be designated to provide barrier free access to wheelchair users and others with mobility limitations. Each park will contain a pedestrian system of walkways, trails, bridges and ramps to provide continuous direct access from the access or entry point at the edge of the park or parking lot to the park facilities.
3.4.2.1. Walkway Lighting

a) Poles

The poles will be octagonal direct buried, pre-stressed “Midnight Lace” or equivalent coloured concrete with polished finish.

All poles will be specified with a cast metal tamper proof handhole cover and a ground wire cast into the concrete.

The wire within the pole will be RWU copper only.

Refer to Parks and Open Space Lighting – Type A or B (L-8 or L-9).

b) Fixtures

- The walkway fixture will be one piece cast metal construction with a hinged, gasketed, tempered glass lens.
- Polycarbonate vandal shields may be required for each luminaire, subject to the Town’s discretion.
- The fixture will have a 50 watt clear high pressure sodium lamp and ballast.
- Equivalent high efficiency LED (Light Emitting Diode) or CF (Compact Fluorescent) lighting may be offered as an alternative for consideration by the Town.
- The IES TYPE II or TYPE III full cut-off distribution pattern will be achieved with a one piece hydro formed reflector.
- The colour of the fixture will be co-ordinated with the pole.
- The minimum fixture mounting height is (4.58 m) 15 feet above finished grade.
- The pole spacing is not to exceed 30 metres on centres. Spacing will be reduced with the shape of the walkway and placement of the plant materials.
- The overall walkway will be designed to a .5 foot-candle maintained average.

c) Lighting Control

The first fixture in each walkway lighting circuit will be equipped with an integral button-type photo control to control the complete circuit.

Pre-Design

The Consultant will consult the Public Works and Engineering Department to determine the type of walkway lighting to be utilized on a given project.

Design

The Consultant is to complete the Walkway Lighting System Design in complete accordance with Section 3.11, 3.19.4.1 of this document, and Table 3.11.
Due to the variety of walkway arrangements, it is incumbent upon the Consultant to complete a photometric analysis to determine the spacing which meets Town requirements, and to include this information on the Detailed Design Drawings.

Where walkways intersect with the Municipal Right-of-Way, the Consultant must ensure that there is either a walkway light or a streetlight located within 2.0 m of the walkway entrance to ensure pedestrian safety.

Materials

All material pertaining to the Walkway Lighting System must be C.S.A. approved in accordance with the E.S.A. standards and specifications.

All material pertaining to the Walkway Lighting System must be in complete accordance with Section 3.4.2.1 of this manual.

<table>
<thead>
<tr>
<th>TABLE 3.6</th>
<th>FIXTURE ASSEMBLY “A”</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Manufacturer</td>
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<td>Ruud</td>
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<thead>
<tr>
<th>TABLE 3.7</th>
<th>FIXTURE ASSEMBLY “B”</th>
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</thead>
<tbody>
<tr>
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<td>70</td>
<td>King Luminaire</td>
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</tbody>
</table>

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<thead>
<tr>
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<th>POLE ASSEMBLY “A”</th>
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<tr>
<td>Overall Length</td>
<td>Class</td>
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<tr>
<td>6.1 m</td>
<td>A</td>
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</table>

*** Colour and finish to be confirmed by the Town Public Works and Engineering Department.

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<tr>
<th>TABLE 3.9</th>
<th>POLE ASSEMBLY “B”</th>
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</thead>
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<td>Class</td>
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<td>6.0</td>
<td>A</td>
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<tr>
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</tbody>
</table>
3.5 **Landscaping**

3.5.1. **General Streetscape Standards**

The standard details and specifications found in this section govern planting and fence construction along roads of all classifications. The species and sizes of plants to be installed may vary according to road classification. These are discussed in more detail under the sections dealing with plantings for Major Roads, Minor Roads and Internal Streets.

3.5.2. **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 determined on site by the Landscape Architect and approved by the Municipality prior to planting.

**NOTE 2**

Minimum clearance for street trees (when trees are planted 1.5m from the curb):

- 2m from water hydrants*
- 2m from driveways*
- 2m from neighbourhood mailboxes*
- 3m from hydro transformers
- 5m from streetlights
- 15m 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
- 18m from face of all warning and regulatory signs

When the minimum distances noted above are not achievable, trees may be planted in an alternate location, 0.5m from the property line (0.8m behind the sidewalk) and adjacent to any fences, or just inside the street line on private property, as might be the case in a cul-de-sac. 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 metre of underground utilities are to be hand dug.
mite clearance for fences:  
1m from fire hydrants

3.5.3. List of Details and Specifications

- Deciduous Tree Planting (Std. No. 700)
- Coniferous Tree Planting (Std. No. 701)
- Shrub Planting (Std. No. 702)
- Cedar Hedge Planting with Chain Link Fence (Std. No. 703)
- Chain Link Fence (Std. No. 600)
- Specifications for Streetscapes – Part 1 – (Std. No. 712) – General and Plant Material
- Specifications for Streetscapes – Part 2 – (Std. No. 713) – Bed Preparation, Preliminary Acceptance, Guarantee and Maintenance
- Specifications for Streetscapes – Part 3 – (Std. No. 714) – Assumption

3.5.4. Collector Road Street Trees

Collector Roads (primary and secondary) should be planted with high branching deciduous trees (80mm □aliper). It is recommended that four species of trees be repeated in groups of four, five, six, seven or eight trees. A design suggestion is to place Crimson King Maples in the boulevards where local roads intersect the Collector Roads. The dark red leaf colour of the Crimson King tends to “flag” intersections.

3.5.5. Corner Lot Treatments

All treatments erected on-site are the responsibility of the homeowner and must comply with the current Town of Caledon Fencing By-law No. 2005-36.

It is not permitted to construct a fence or other vertical obstructions with a height in excess of 1 metre in a corner yard, along the frontage or flankage, of a subdivision unless approved by the Town.

3.5.6. List of Design Guidelines for Planting along Collector Roads

- Typical Street Layout and Species for Collector Roads (Std. No. 708)
- Corner Lot Treatment for Collector Roads (Std. No. 710, 711)

3.5.7. General Planting Considerations for Local Roads

A typical streetscape layout will need to address many design issues. The following represents some of those issues that shall be addressed:
• Tree Spacing – The Town of Caledon standard is to have one street tree planted every ten (10) metres on centre on average.
• Lot Configuration – The planting design must address the many variations in lot configurations. The required spacing of trees and minimum setbacks means most lots will get one tree, some may get two and some may get none.
• Utilities – Because the presence of utilities, mail box clusters and the curb can interfere with the preferred placement of street trees, the street tree planting scheme must be flexible enough to accommodate on-site adjustments.
• Arboreal Accents – Smaller flowering trees planted at the end of a cul-de-sac or where there is a bend or eyebrow in the street are welcome design features.

3.5.8. List of Design Guidelines for Planting Internal Street Planting

Refer to Typical Street Tree Layout and Species for Local Roads (Std. No. 709)

3.5.9. Belowground Internal Street Tree Rooting Protection

Different situations often require different approaches. Root management requires a range of methods to allow the tree as much growing advantage as possible without affecting the surrounding infrastructure (pavements, underground services, walls and foundations).

Simply protecting paved surfaces from root heave does not require an unnecessarily restrictive vertical shear barrier on the tree. Town approved Greenleaf – Urban Tree and Landscape Products (or equivalent) offer products that will safely divert roots away from the surrounding infrastructure to a level where they can safely establish without surface damage.

Materials to be used as root control barriers should have the following qualities:

• Resistant to root penetration
• Resistant to puncturing
• Biologically inert
• Resistant to biodegradation

Deep Application Root Barrier

• High strength root barrier for deep applications
• Resistant to puncture or tearing
• Durable, resistant to biodegradation and photodegradation
• Effective control of invasive plants

Root Director

• Prevents root swirl and diverts root growth downward and outward, encouraging deep root growth
• Incorporates tree stability

Linear Pavement Protection

• This versatile and flexible system can be used to surround individual or groups of trees.
• Prevents root swirl and diverts lateral root growth downwards and outwards.

3.5.10. Standards and Guidelines for Naturalization Areas

Open-spaced blocks, areas in the rear of lots backing into conservation lands, as well as the land surrounding the stormwater management facility are to be naturalized. This entails planting native grasses, shrubs and trees so that there is a blending with existing natural areas. The majority of naturalization planting may be installed at a small size and, where applicable, as bare-root stock. It is expected that planting be dense to get good coverage per dollar invested and to allow for 10% of plant loss over the first three winters.

3.5.11. 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 laid out on site by the Consulting Landscape Architect to the satisfaction of the Town of Caledon prior to installation. Any deviations from the approved landscape plans require prior Town approval.

3.5.12. List of Details and Specifications for Naturalization Areas

• Deciduous Tree Planting (Std. No. 700)
• Coniferous Tree Planting (Std. No. 701)
• Shrub Planting (Std. No. 702)
• Cedar Hedge Planting with Chain Link Fence (Std. No. 703)
• Chain Link Fence (Std. No. 600)
• Tree Preservation (Std. No. 707)
• Deciduous Tree on Slope Planting (Std. No. 704)
• Coniferous Tree on Slope Planting (Std. No. 705)
• Shrub and Coniferous Seeding on Slope Planting (Std. No. 706)
• Specifications for Naturalization – Part 1 – (Std. No. 715)
• Specifications for Naturalization – Part 2 – (Std. No. 716)
• Specifications for Naturalization – Part 3 – (Std. No. 717)
3.6. **Regional Services**

3.6.1. **Sewer System**

Sanitary sewers designed and constructed in accordance with the most recent requirements and specifications of the Region of Peel are required in all residential subdivisions designated for sanitary servicing. Sanitary sewers shall be of adequate size and depth to service the adjacent external lands where so required by the Region of Peel Public Works Commissioner. A sewer connection from the sewer main to the edge of the road allowance shall be constructed for each lot or building block in the plan of subdivision.

3.6.2. **Water System**

Watermains and appurtenances shall be constructed on all streets within the plan of subdivision and shall be designed and constructed in accordance with the most recent requirements and specifications of the Region of Peel.

A separate water service connection shall be provided to the edge of the road allowance for each lot or building block within the plan of subdivision. Water services shall be constructed in accordance with the most recent requirements and specifications of the Region of Peel.

3.6.3. **Maintenance**

Regional requirements shall be guaranteed per the Regions requirements.

3.7. **Street Name and Traffic Signs**

3.7.1. **Plan**

The aboveground plan shall show the proposed location of signs to be installed in the subdivision. The plan shall be part of the engineering drawings, which must be approved by the Director of Public Works and Engineering. The signs must be clearly shown without cluttering other details.

3.7.2. **Street Name Signs**

Street name signs shall be placed at every intersection and shall be double sided. These signs shall be placed in the locations and shall be of the type shown on Town Standard Drawing No. 400.

Temporary street name signs, approved by the Director of Public Works and Engineering, must be erected at intersections upon completion of base asphalt on roadways. These signs must be maintained in legible condition until such time as the permanent street name signs are in place.
Street name and traffic signs shall be supplied and erected by the Developer. Temporary street name signs shall be supplied, erected and maintained by the Developer in order to facilitate deliveries during the construction period.

Temporary regulatory signs must be reflective. All permanent signs must be to Town Standard.

Once the proper traffic signs and street name signs have been installed, the Town will inspect the installations.

Traffic control signs shall be located as shown on Town Standard Drawing No. 400. Where the standard drawing does not cover the positioning, the location must conform to the most recent versions of the Ontario Traffic Manual (OTM) for Ontario or the Highway Traffic Act Regulations for Ontario.

Signs shall be located on the right-hand side of the roadway. Signs in any other position will be considered only as supplementary to the signs in the normal position.

Signs shall be mounted at right angles to the direction of and facing the traffic they are intended to serve.

Signs are to be aluminum, anodized on both sides, and comply with the following requirements:

<table>
<thead>
<tr>
<th>Sizes</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>600mm –</td>
<td>1.6mm utility series</td>
</tr>
<tr>
<td>600mm to 900mm –</td>
<td>2.0mm No. 655T6</td>
</tr>
<tr>
<td>Over 900mm –</td>
<td>3.2mm No. 655T6</td>
</tr>
</tbody>
</table>

All traffic control signs are to be made with high intensity type reflective sheeting approved by the Ministry of Transportation Ontario, the current standard of the OTM, the Highway Traffic Act Regulation for Ontario and the Director of Public Works and Engineering, including colours.

3.8. **Roadway Markings**

The Developer will design pavement markings for all roadways over two lanes in width or as required by the Director of Public Works and Engineering. The design shall be in accordance with the OTM and in accordance with the Town Standards or approved by the Director of Public Works and Engineering. These pavement markings will be installed on the top coat of asphalt, or at the discretion of the Director of Public Works and Engineering.

3.8.1. **Stop Bars**

The Developer shall be responsible for stop bars at all stop signs. All roadway markings shall be installed in accordance with OPSS 532 and are to have Glass Face, Stimsonite two way snowplowable, recyclable, reflective pavement marker LifeLite 101E, or equivalent, imbedded into the asphalt in accordance with the manufacturer’s specifications.
The markers are to be placed across the back of the stop bar at a spacing of 60cm (for 4.25m lane widths a minimum of 8 units will be required). LifeLite 101A’s are to be placed along centre line from the stop bar to 30m back, these markers are to be spaced @ 3m on centre.

3.8.2. Lane Delineation

The Developer shall be responsible for pavement lane delineation markings on Collector Roads, Arterial Roads, on roads with more than 2 lanes or as directed by the Director of Public Works and Engineering. The markings shall be installed in accordance with OPSS 532. In addition to the paint markings the Developer is also to install, @ 3m on centre, Glass Face, Stimsonite two way snow-plowable, recyclable, reflective pavement marker LifeLite 101B and LifeLite 101A, or equivalent, imbedded into the asphalt in accordance with the manufacturer’s specifications through all horizontal curves and 50m beyond in either direction of the tangent point or as required by the Director of Public Works and Engineering.

3.9. Decorative Asphalt

Projects that can be done are pathways for a park or civic space, a decorative plaza or a unique motif for a memorial or cultural landmark, high traffic areas like crosswalks, traffic circles, intersections and parking lots. All products must be durable and not affect the stability and strength of the asphalt.

Approval of plans for decorative asphalt must be obtained from the Director of Public Works and Engineering. The Developer must guarantee and maintain the integrity of the asphalt.

An approved decorative pavement supplier for the Town of Caledon is IPC – Integrated Paving Concepts (or equivalent).

3.10. Traffic Signals

Traffic Signals are to be designed on individual site-specific bases and must conform to Region of Peel Standards. The signals shall include Opticom Pre-emption Devices as per Region of Peel Standards

3.11. Street Lighting

Streetlights are to be designed by an Electrical Consultant and installed along all streets and most public walkways in accordance with the most recent lighting requirements and standards of the Town of Caledon. Electrical work is to be designed, certified, and constructed in accordance with the most recent requirements and specifications of the Town and Hydro One.

Approval by the Electrical Safety Authority (ESA) is required before any street lighting will be energized and assumed into the Town’s streetlight inventory. The Developer must guarantee and maintain the lighting until Assumption. Payment of energy charges for the street lighting system will be in accordance with the subdivision agreement.
The Engineer is to prepare all documentation for the Town to sign for energizing and is to submit the documentation to the ESA and shall manage the process on the Town’s behalf.

All street lighting poles shall have a one foot stripe located 1.5m above the ground identifying the wattage of the luminaire from the ground.

3.11.1. Lighting Levels and Uniformity Ratio

Street lighting shall be supplied and installed on all streets and pedestrian walkways in the subdivision as per Table 3.10.

Estate Residential development lighting shall be based on an average pole spacing of 100 metres and at key locations such as intersections, horizontal and vertical curves.

3.11.2. Light Source

The light source shall be High Pressure Sodium, or LED as determined by the Town. Minimum wattage of lights shall be 70 watts and all intersections must have a light located at the intersection with a minimum 6 lux higher than the main street wattage.

3.11.3. Light Fixtures

The light luminaries and pole shall be as approved by the Director of Public Works and Engineering.

Approved luminaries:

a. Dayform Century from Cooper Lighting
b. Georgian from Emergi-Lite/Powerlite
c. Tradition from McGraw Edison
d. K601 Series from King Luminaire
e. Overhead Cobra, with tapered elliptical arms
f. Or approved alternative

NOTE:

All lamps must be mogul base, type II distribution and 7.0m mounting height with CWI ballasts. All luminaries and brackets are to be finished in black.

Approved Suppliers of street light poles:

a. Stress Crete
b. Central Precast
c. Sky Cast
d. King Luminaire
e. or approved supplier
NOTE:

All poles are to be octagonal, spun concrete, polished Midnight Lace or equivalent finish and direct burial. If top luminaries are proposed then light duty poles may be used. If arm brackets are proposed then medium duty poles are required.

3.11.4. Approval and Construction

Approval of plans for street lighting must be obtained from the Director of Public Works and Engineering. The Developer must guarantee and maintain the lighting until assumption of the development. The Developer is required to provide an extra pole for every 50 required in a subdivision.
### TABLE 3.10 STREET LIGHTING GUIDE

<table>
<thead>
<tr>
<th>R.O.W. Width (m)</th>
<th>Pav’t Width (m)</th>
<th>S/L Pole Offset From P/L (m)</th>
<th>Offset From Edge of Pav’t (m)</th>
<th>Illumination Req’t</th>
<th>Luminaire Mounting Height (m)</th>
<th>Bracket Size (m)</th>
<th>Luminaire Wattage (HPS)</th>
<th>Distribution Type</th>
<th>Spacing (m)</th>
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<tr>
<td>Local Residential</td>
<td>18</td>
<td>7.9</td>
<td>3.4</td>
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<td>2 Lux @ 6:1</td>
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<td>Cut-off Optics</td>
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<tr>
<td>Local Industrial</td>
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<td>10.4</td>
<td>4.4</td>
<td>1.65</td>
<td>6 Lux @ 3:1</td>
<td>7.0</td>
<td>2.4</td>
<td>150</td>
<td>Cut-off Optics</td>
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<td>55 - 60</td>
</tr>
<tr>
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<td>4.15/3.65</td>
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<td>6 Lux @ 6:1</td>
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<td>2.4</td>
<td>100</td>
<td>Cut-off Optics</td>
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<td></td>
<td></td>
<td></td>
<td>55 - 60</td>
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<td>13.9</td>
<td>4.4</td>
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<td>Cut-off Optics</td>
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<td>55 - 60</td>
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<td>5.5</td>
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<td>5.5</td>
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<td>7.0</td>
<td>2.4</td>
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<td>5.0</td>
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<td>2.4</td>
<td>70</td>
<td>Cut-off Optics</td>
</tr>
</tbody>
</table>

* ROW - Right of Way  
Pav’t - Pavement  
S/L - Streetlight  
P/L - Property Line
3.12. **Fencing**

Fencing shall be in accordance with the most recent requirements and specifications of the Town of Caledon.

- Chain Link Fence (Std. No. 600)
- Trailway Entry Gate (Std. No. 602)
- Trailway Entry Gate Hinge Detail (Std. No. 603)
- Trailway Entry Gate Frame/Gate Section (Std. No. 604)
- P Offset Gates (Std. No. 605 and 606)
- Emergency Access and Walkway Gate (Std. No. 607)
- Removable Bollard (Std. No. 608)
- Noise Attenuation Barrier and Berm (Std. No. 609)
- Highway Fencing (O.P.S.D. 971.101)

Fencing is required:

- Where public property abuts private property
- Along public walkways (In accordance with Town Standard 600 and 607)
- Parks, SWM Facilities, Open Space Blocks and Reforestation Blocks
- As designated by the Town
- Acoustic fencing per approved acoustic report
- Fencing of property lines along non-developed bordering properties must be done with a minimum of Post and Wire Fence Highway Fence. To allow independent future upgrading of the fence, the wood posts must be placed at every rear lot corner to allow individuals to remove the Highway Fence and not disturb the neighbouring fence, “T” bars must be placed at a spacing in accordance between O.P.S.D. 971.101
- Fencing along property lines of active agricultural properties must be done with a minimum Town standard chain link fence

The minimum requirement for residential chain link fence is 1.5m high and screen fencing is 1.8m. Existing and proposed fencing is to be shown on the Above Ground Engineering Drawings.

**3.13. Residential Lot Drainage and Sodding**

**3.13.1. General**

- The Owner shall endeavour to retain all topsoil on site; the Topsoil Management Report shall address how much topsoil is located on the site and where the topsoil will be placed at what depths. Written permission from the Director of Public Works and Engineering is required to remove any topsoil from the site.
- Lots, including drainage ditches and swales, as well as road boulevards are to be completely topsoiled and sodded with 300mm of topsoil for lot or boulevard grading and 600mm of topsoil for stormwater management facilities (to a maximum depth of 1.0 metres) and No. 1 Nursery Sod. Rural Estate residential lots rear yards may be seeded on a site-specific basis (except
areas such as front yards/boulevards, septic systems, ditches, swales, slopes and tile beds which must be sodded).

- Grade areas to:
  - Provide proper surface drainage and maximum usable land area.
  - Preserve existing trees where possible.
  - Direct flows away from houses.

- Minimum yard slope shall be 2.0% for split lots and walkouts and 3.0% for back to front side swale drainage.

- Minimum driveway slope 2.0% and all driveways must slope away from the dwelling.
  - Maximum driveway slope – 6.0% (from standard sidewalk location).

- Maximum slope between houses in any direction:
  - 4 horizontal: 1 vertical for urban areas, use steps and/or retaining walls or low maintenance landscaping if this requirement cannot be met.

- Provide a 0.6m gently sloping area (at 2.0%) away from the house on at least one side of the building where side yard setback permits. (Usually the garage side or side door entrance.)

- Clear stone rather than topsoil and sod is required for combined side yards between two buildings which are 1.50m or less. If the combined side yard on the other side of the same building is 2.4m or more, then back-to-front drainage may be considered through that side.

### 3.13.2. Type of Drainage Pattern

- Back to front grading is preferred where feasible. Where this is not feasible the high point where the drainage is split from back to front should be located at the rear of the dwelling. If a lineal park/walkway is located at the rear of the dwellings then the drainage split is to be located at the front of the dwelling and all roof leaders are to be directed to the rear of the lot.

- Rear yards which drain through abutting lower back-to-front type lots are permitted where:
  - Sufficient fall is available between the adjacent streets to achieve desired grades for swales and yards.
  - Cut-off swales at the rear of the upper lots direct runoff into the lower lot side yard swales.
  - Downspouts on the upper lot do not direct flow to the lower lots.
  - Lower lot frontages are of sufficient width to provide side yard swales.
  - If roof water cannot be directed to the front, rear lot storm sewer system may be required.
3.13.3. Rear Yard

- A minimum of 7.5m of the rear lot area is to be sufficiently level (2% to 5% slope) to be usable.

- Rear yards in urban development areas must have a minimum of 75% of the yard area sufficiently level (2% to 5%) to be usable. This useable area shall be adjacent to the rear of the house.

- Retaining walls are not encouraged but may be employed where necessary to achieve the required useable rear yard areas.

3.13.4. Swales

- Longitudinal slope minimum 2.0% for split lots and walkouts and 3.0% for back to front side swale drainage
  - Side slopes – 4 horizontal to 1 vertical or less.

- Maximum length
  - On lots less than 12m in frontage – five lots
  - On lots 12m and greater in frontage – three lots

- Location of enterline, 1.0m maximum offset from the rear lot line

- Maximum swale depth
  - Preferred 250mm
  - Absolute 450mm
  - Minimum 150 mm

- Cut-off Swales minimum gradient of 2.0%

- Maximum upstream lot area added to drain to a side yard swale is 500m².

- Flows carried around houses are to be confined to defined swales located as far from the home as possible.

3.13.5. Rear Yard Catchbasins

- Rear yard catchbasins and outlet pipes shall be located entirely on one lot.
• The edge of a rear yard catchbasins shall be located 1.0 metre clear of property line.

• Rear yard catchbasins shall have a maximum drainage area of 500m$^2$.

• Leads shall be a minimum diameter of 250mm concrete pipe encased in concrete.

• Cross sections are required where pipes go between houses.

3.13.6. Retaining Walls

• Retaining walls are generally required where the difference in elevation between lots exceeds 0.60m.

• Construct retaining walls entirely on the upper lot so that tie-backs do not cross property boundaries.

• Certification by the Engineer stating that the retaining wall has been constructed to meet the approved design is required.

• For retaining walls greater than 0.9m in height, lightweight slab or stone component prefabricated walls are not permitted. For walls greater than 0.9m in height, heavy block or ready mix concrete are to be utilized. For walls under 0.9m in height: lightweight prefabricated concrete retaining wall products are to be utilised.

• Fencing or railing will be required where retaining wall height exceeds 0.6m. Structural stability of this wall must be such that it can withstand the force exerted on the fence as well as earth loads.

• Screen fencing will generally be placed on top of the retaining wall; however consideration should be given to the aesthetic impact of the combined wall/fence height.

• Design details of walls over 0.6m are to be submitted with grading plans and stamped by a Professional Engineer. It is preferable that the Engineer who stamped the plans certifies the wall construction.

• Building permits, in accordance with the Ontario Building Code may be required.

• The maximum allowable height for a retaining wall shall be 2.5m.

• Only Engineered Product (concrete, masonry, and armour stone) shall be permitted as retaining wall material.
3.13.7. Roof Leaders

- Roof drain connections to the storm service connection are prohibited. Roof leaders shall discharge on ground via splash pads and shall be directed away from the building foundation walls, without causing any erosion or inconvenience to adjacent property. Roof leaders may also be directed to infiltration trenches or rain collection facilities such as rain barrels or cisterns.

3.14. Block Grading

The grading and drainage of blocks in a subdivision must be in accordance with the most recent requirements and specifications of the Town of Caledon.

3.15. Erosion and Sediment Control

3.15.1. General

All Erosion and Sediment Control Facilities are to be inspected by the Consulting Engineer once a week and after each rainfall of 10 mm or greater or a significant snow melt. Daily inspections are required during extended rainfall or snow melt periods. These inspections are to ensure that the facilities are in proper working condition and all damaged ESC facilities are to be repaired and/or replaced within 48 hours of the inspection. A permanent record of these inspections must be forwarded to the Town's Public Works and Engineering Department within five (5) days of the inspection.

All erosion and sediment controls are temporary applications constructed prior to any land grading or disruption activities on the site. They are to be inspected and maintained by the Developer throughout the duration of the construction period, including building construction, until the site is stabilized.

All activities on the site shall be conducted in a logical sequence to minimize the area of bare soil exposed at any one time.

All disturbed ground left inactive shall be stabilized by seeding, sodding, mulching or covering, or other equivalent control measure. The period of time of inactivity shall not exceed 30 days, unless otherwise authorized by the Director of Public Works and Engineering.

3.15.2. Sediment Control Facilities/Basins

All Sediment Control Facilities/Basins are to be designed and constructed in accordance with Appendix “C” of the Erosion and Sediment Control Guidelines for Urban Construction published by the Greater Golden Horseshoe Conservation Authorities in December 2006. Construction safety fence shall be securely erected along the perimeter of any sediment pond/basin. A warning sign shall be attached to the security fencing stating that the area is off limits to the general public and advising that the pond/basin is used for sediment control purposes and that the enclosed area is subject to flash flooding.
3.15.3. Catchbasin Sediment Control

During construction, all catchbasins shall be provided with sediment control, in accordance with the following requirements.

Catchbasin Sediment Trap

Catchbasin sediment traps shall be provided for unpaved areas draining 2 hectares or greater and less than 4 hectares and shall be constructed in accordance with Town Standard Drawing No. 302.

Sediment removal is required when the depth from the underside of frame to top of the accumulated sediment is reduced to 300mm.

Catchbasin Sediment Barrier

All rear lot catchbasins or catchbasins within unpaved areas draining less than 2 hectares shall be provided with a sediment control barrier in accordance with Town Standard Drawing No. 303.

Roadside Catchbasin Sediment Protection

Under appropriate drainage circumstances, all non low point roadside catchbasins shall be provided with sediment protection by double wrapping the catchbasin grate with a woven geotextile. All low point catchbasins must utilize alternative sediment control measures so that the drainage outlet is not completely blocked. Regular weekly cleanings of the sump or the use of sediment bags shall be considered for these catchbasins. All sediment controls must be inspected and maintained on a regular basis.

3.15.4. Sediment Control Fence

Sediment control fences shall be placed along all down-slope sides of a site along the edges of a drainage channel passing through the site, and along the perimeter of all other areas sensitive to sediment accumulation. All heavy-duty sediment control fences shall be constructed in accordance with Town Standard No. 304, or approved equal.

3.15.5. Vegetative Buffer Strips

A minimum 3m wide vegetative buffer strip shall be provided along the limits of the development adjacent to existing road boulevards and existing residential properties. Where a sediment control fence is required, it shall be constructed in front of the buffer strip.
3.15.6. Topsoil Stockpile Protection

All topsoil stockpiles containing more than 100m$^3$ of material shall be located a minimum of 10m away from the roadway, drainage channel or an occupied residential lot. The maximum side-slopes for topsoil stockpiles shall be 1.5 horizontal to 1.0 vertical.

Location of Topsoil Stockpiles on lands to be dedicated to the public is prohibited. Topsoil Stockpiles should be located where possible on private lands between houses and on rear yards.

Runoff from all topsoil stockpiles shall be controlled by a sediment control fence or other approved devices.

3.15.7. Stone Pad Construction Entrance – Construction Access

In order to reduce the tracking of mud onto a paved street, a pad of crushed stone shall be constructed at the site entrance and exit leading onto any existing road. The stone pad shall be a minimum of 450mm thick, 30m long and 5m wide. The first 15m from the entrance/exit shall be constructed with 50mm clear stone. The remaining 15m shall be constructed with 150mm rip rap.

This stone pad must be maintained as required given the site conditions to ensure mud tracking is kept to a minimum.

3.15.8. Rock Check Dam

Rock check dams are to be installed in ditches and swales in accordance with OPSD 219.210 or 219.211.

3.15.9. Mud and Dust Control

The Town of Caledon requires all owners and builders in new subdivisions to take an active effort in controlling mud and dust deposited on neighbouring streets by vehicles exiting sites under development:

1. Once any house has been occupied the adjacent streets adversely affected by mud and dust build-up shall be cleaned at least twice a week. If cleaning is not completed to the satisfaction of the Town, the Town of Caledon has the rights to clean the neighbouring streets at the expense of the Owner.

2. Once homes have been occupied neighbouring streets shall be kept clear of building materials and dirt or mounds of soil.

3. Construction access routes shall be cleaned daily.
Owners and Builders are required to have all internal and external roads scraped, flushed and swept twice weekly. This work shall be completed every Tuesday and Friday of each week and continue until all lots are sodded.

The type of monitoring and the frequency of the monitoring required are described in more depth in Section 3.15 Erosion and Sediment Control.

### 3.16. Utilities

The appropriate utility company or their approved Contractor shall install the services for Telecommunications, Hydro, Gas and Cable TV. The Developer must bear the cost of any surcharges for underground installation made and must grant any necessary easements for their services.

Utility crossings for new roads shall be placed prior to placement of granular road base material. Utility crossings for existing roads shall have the asphalt surface saw cut and removed for a width of the trench plus a minimum of 0.5m out from each side of the trench walls.

Compaction of backfill for utility trenches shall be 95% Standard Proctor Density within boulevards and 100% for driveways and under travelled roads.

### 3.17. Canada Post

The number and locations of community mail boxes must be approved by Canada Post and the Town. Layout is to be done as per Canada Post standards for postal facilities. The permanent and temporary location shall be clearly shown on the approved engineering drawings. Warning clauses are required in the purchase and sale agreements for lots adjacent to Canada Post facilities.

Lay-by lanes will be required in rural and/or urban developments with central mailing facilities. Where postal facilities abut a municipal sidewalk, a 1.2 metre concrete sidewalk (OPSD 310.010) is required between the curb and municipal sidewalk immediately adjacent to the postal pad. A curb depression at the road is required.

Temporary facilities in a location approved by Canada Post and the Town are to be installed once occupancy has begun. The location(s) must be kept clear of all construction materials and positive drainage must be maintained.

The address and phone number of the Local Delivery Planning Office for the Town of Caledon is:

193 Church Street
Suite 200
Oakville, Ontario L6J 7S9
(905) 339-3401
3.17.1. Single Occupancy Mail Delivery System

Delivery service options for single family housing developments include:

- Community Mailboxes;
- Mini-Parks.

Mini-Parks are clustered community mailboxes with each cluster serving over 38 households. Where a Mini-Park is to be located on privately held land, the property owner must grant Canada Post a “License to Occupy” the land. This document is available from the Regional Delivery Planning Office.

The criteria for selecting the most appropriate option should include:

- Size of the development;
- Number of homes each centralized mail facility will serve; and
- Plans for the design and appearance of the subdivision.

The Town of Caledon promotes the use of community mailboxes and will work with Developers to site the facilities on a neighbourhood basis.

3.18. Noise Attenuation

A noise attenuation investigation shall be required to be carried out by a competent Consulting Engineer to assess noise attenuation with respect to the proposed infrastructures and building construction.

The Town of Caledon requires two (2) reports on noise attenuation. The first (preliminary) Acoustical Report shall be submitted with the draft plan and indicate whether or not noise attenuation is required. The second report shall be submitted with the Subdivision Design Plan and indicate the design details of the proposed noise attenuation.

3.18.1. General Philosophy of Noise Attenuation

The Town of Caledon Development Standards and Design Requirements with regard to Noise Attenuation are intended as Guidelines for land development and new and existing Town projects to aid in uniform design throughout the municipality. These guidelines are in conformity with and strengthen the existing guidelines as set down by the Ministry of the Environment.

The Environmental Protection Act empowers local municipalities to regulate or prohibit the emission of sounds or vibrations. Municipal By-laws can prescribe maximum permissible levels of sound or vibration and prescribe procedures for determining the levels of sounds or vibrations.

The MOE Guideline “Noise Assessment Criteria in Land Usage Planning” outlines the position of the MOE on noise criteria for planning of sensitive land uses. This guideline defines criteria for noise impact assessment of proposed residential or other noise sensitive land uses and specifies procedures for the establishment of sound levels on the site of
proposed noise sensitive land uses due to transportation sources as well as stationary sources.

Although noise control measures may be applied at various stages in the development of a community, the general procedure remains essentially the same. After establishing the locations of the noise sources and their sound characteristics, the sound levels at sensitive locations are determined either through measurements and/or through prediction techniques. The severity of noise impacts is determined by comparing the noise level to Ministry criteria. If impact is substantial, proper control measures are designed depending on cost, practicality and effectiveness.

The major control mechanisms available at various stages in the planning of a community include:

Official Plans: Spatial separation, policies aimed at protecting sensitive developments and policies aimed at controlling emissions.

Zoning By-laws: Noise control measures could deal with site-specific situations.

Plans of Subdivisions: Noise control measures may be applied through the conditions of approval.

Feasibility Noise Studies or Detailed Noise Studies will be needed to support the development proposal. The objective of the feasibility study is to estimate the feasibility of the proposal in the context of site design and the extent of control measures. The purpose of detailed study is to assess the impact of all noise sources affecting the subject lands and determine the appropriate layout, design and required control measures. The study report should include details of assessment methods, summarize the results and recommend the required outdoor as well as indoor control measures. All reports must follow the Noise Assessment Criteria in Land Use Planning Publication LU-131 put out by the Ministry of Environment. In addition the Ministry of Environment requires the use of the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) to assess the noise impact from existing roadways on planned residential land uses, to assess the noise impact of roadway projects, and to establish the ambient noise sources and for complaint investigation.

The noise impact of transportation sources is typically established through the use of prediction methods. In the case of road and rail sources the Ministry has established specific prediction methods ensure consistency in the noise impact assessments prepared for different land use developments.

Noise prediction methods are tools used to determine the noise levels based on traffic parameters. The prediction method provides an indication of the noise levels on a particular site and allows for an evaluation of the effects of operational changes in the transportation facilities. The effectiveness of some noise attenuation measures can also be evaluated as can the evaluation of noise levels when the noise source itself is in the planning stage.
3.18.2. Assessing Traffic Noise

The following information is obtained when assessing the road traffic noise impact on planned sensitive land uses.

- The Average Daily Traffic Volume (AADT) and when available the Summer Annual Daily Traffic Volume (SADT), the higher of the two is used.
- Composition of traffic in terms of the percentages of cars, medium trucks and heavy trucks.
- Traffic Speed, use 10 kph over the posted speed.

When assessing the noise impact, traffic volumes must be based in future traffic projections of at least 20 years after the completion of the planned project, or the ultimate capacity of the road as determined by the road authority.

3.18.3. Allowable Levels

The most common sound level descriptor used by the MOE is the energy equivalent continuous sound level (LEG) also known as equivalent sound level.

The Town of Caledon will NOT accept sound levels in excess of the following levels, unless design features exceed standard detail.

- For outdoor areas the equivalent sound level LEG from 7:00 am to 11:00 PM is 55 dB.
- For indoor areas such as living rooms during the day the LEG is 45 dB for roads and 40 dB for rail.
- For bedrooms at night the LEG is 40 dB for road and 35 dB for rail.

3.18.4. Control Measures

Noise control measures usually fall into the following categories:

**Barriers:** berms, walls, favourable topographical features and other intervening structures.

**Architectural Design:** room and corridor arrangement, blank walls, the placement of windows, balconies and courtyards, building height.

**Building Construction:** acoustical treatment of the dwellings walls and ceilings, selection of acoustical materials and other control devices, provision or installation of air conditioning.

**Mitigation at Source:** noise control applied directly to the noise source.

**Site Planning:** orientation of buildings and Outdoor Living Areas with respect to noise sources, spatial separation such as the insertion of noise insensitive land uses between source and receiver, appropriate setbacks, and the use of intervening service roads.
Windows/Doors: acoustically designed windows or doors that provide the required noise reduction, in order to allow for the windows and doors to remain closed, air conditioning units must be installed in the dwelling.

A qualified Professional Engineer must certify implementation of noise control measures with experience in environmental acoustics.

3.18.5. Noise Barriers

The need for noise attenuation is identified in the Acoustical Report prepared and submitted in support of the Draft Plan. The heights of walls will be minimized through the use of fence and berm combinations. All aspects of installation must conform to Town policy.

It is important that continuity of appearance be achieved within neighbourhoods. Noise barrier walls shall be constructed of concrete or vinyl panels.

NOTE:

The use of wood in noise control barriers and walls is prohibited.

The maximum barrier wall height shall be 2.4 m, although greater heights can be obtained using a combination of berm and wall.

Barrier walls shall be installed entirely on private property. No part of the berm will be allowed within the Right of Way.

Grading and berm construction associated with the barrier installation shall be completed to within 5 mm below the bottom of the barrier prior to constructing the barrier footings.

a. There shall be no visible gaps between any barrier panels or beneath the bottom panels after completion of the barrier.

b. Where footings are to be installed on or within 1.0 m from a downward slope of 3:1 or steeper, the embedment depth shall be increased a minimum of 0.5 m greater than the requirements of the Canadian Highway Bridge Design Code. The design of the depths may be altered based on the design by a Consulting Engineer.

3.19. Parks and Open Space

Parks and Open Space and their facilities are to be provided in accordance with Town of Caledon policies and the Recreation and Parks Master Plan.

Prior to the initiation of any design work, the Town requires pre-consultation with the Developer’s Consultant to address the design features for park and open space facilities.
3.19.1. Site Preparation

3.19.1.1. Site Examinations

a. General

Prior to commencement or work on site, verify existing sub-grade and site conditions including vegetation and report in writing immediately to the Landscape Architect, all discrepancies and conditions which are at variance with drawings and specifications.

Failure to do so will imply acceptance by the Developer's Contractor of surfaces and site conditions and no claim made thereafter for damages or extras resulting from such discrepancies will be accepted.

Verify on the site all underground services, such as water lines, sewers, electrical cables, telephone, gas and other utility lines and have such services located on the site by the appropriate authorities.

Be prepared to meet and blend smoothly with existing grades at the project boundaries where required.

Protect existing vegetation as directed on site by Landscape Architect prior to commencing any site works.

Protection should be in accordance with the Pre-Grading Agreement and/or Subdivision Agreement, if applicable.

b. Inspection

Upon completion of rough grading, adjustment and preparation of sub-grades, the work will be inspected by the Consulting Landscape Architect and the Town.

c. Compaction

Compact sub-grade under all areas to be paved, and where specified uniformly and adequately to ninety-eight percent (98%) minimum Standard Proctor Density.

Sub-grade under landscaped areas (planting and grass) shall meet eighty-five percent (85%) Standard Proctor Density.

d. Clearing

Clear site of all rubbish, rocks, boulders, tree stumps and other useless materials and debris, remove from site and dispose of unless instructed otherwise.

Cut all dead trees and remove stumps and roots to a minimum depth of 600mm below proposed finished grade.

e. Topsoil and Stripping
All areas designed for paving or the construction of structures shall be stripped of all topsoil and organic matter to its full depth taking care not to contaminate it with any sub-soil. All stripped topsoil shall be stockpiled in areas so designated by the Town.

Stockpile topsoil in loose layers, not exceeding 225 mm in depth, total height of stockpile not to exceed 4500 mm.

Topsoil will be re-used for landscape work, unless specified otherwise.

Commence topsoil stripping only after designated areas have been cleared of scrub, weeds, brush stumps, rocks and other deleterious materials. Such materials shall be removed from the site and disposed of.

f. Grading

After stripping of topsoil, do all necessary rough grading, excavating, and filling, where required, to establish the sub-grade under all areas as shown on drawings.

Level of sub-grade shall be to the depths specified, after compaction of sub-grade and of materials placed thereon.

Remove all soft and unstable areas in sub-grade to approved depth and backfill with clean, approved fill material.

Establish and maintain sub-grade parallel to finished grade and shape to allow adequate surface runoff and prevent ponding, scouring and erosion.

Provide for uniform slopes between points for which finished grades are shown on drawings. Meet and blend with existing grades in a smooth manner.

Establish smoothly rounded grades at top and toe of slopes and banks.

Do not grade when soil is wet or frozen.

Preparation of sub-grade:

Scarify sub-grade on which topsoil is to be placed, to the minimum depths specified. Scarify sub-grades under areas which are to be raised by placing fill to minimum depth of 75mm to provide a good bond and prevent slipping of fill.

g. Filling

Fill material shall be clean, free of topsoil and organic matter and debris, and shall be approved by the Consulting Landscape Architect and the Town before placing. On site excavated material may be used for filling when approved by the Town. Testing of proposed fill materials may be required.

Where required, supply and spread approved fill materials to raise existing grades to the specified sub-grade level, as shown on the drawings.
Place fill in loose layers, not exceeding 150 mm in depth and compact each layer to a minimum dry density of ninety-eight percent (98%) of the maximum Standard Proctor Density, before placing subsequent layers.

The surface shall be shaped at all times to ensure adequate surface runoff and prevent ponding and scouring.

### 3.19.1.2 Silt Protection

a. General

Ensure that all erosion and sedimentation resulting from the proposed works, dewatering operations, etc., is controlled and contained within the work site to the satisfaction of the Town and/or Conservation Authorities.

Any clean-up or damage costs resulting from the failure to control erosion or siltation shall be completely at the Developer’s expense.

At all times, the Developer shall prevent entry of sediment to watercourses. Controls shall include, but not be limited to, the following:

Runoff from construction materials and stockpiles shall be contained and discharged so as to prevent entry of sediment to watercourses.

Erosion and sedimentation control measures shall be placed in watercourses as directed by the Town and/or Conservation Authorities.

A dedicated stockpile area(s) shall be prepared prior to dredging. The stockpile area(s) shall be adequately sized to account for spreading of wet sediments and shall be determined in consultation with the Town.

Silt fences shall be installed along the perimeter of the stockpile site. Silt fences shall be installed across truck access routes to the stockpile at the end of the work day.

A 20m stand-by supply of prefabricated silt fence barrier, in addition to any other silt fence barrier, shall be maintained at the site prior to commencement of operations and throughout the duration of the site works.

All conventional and in-water sediment control fence shall be installed as per any drawings approved by the Town and Conservation Authorities. All sediment and erosion control measures shall remain in place until authorized for removal by the Town.

b. Silt Fence

Silt fence is to be accordance with Town Standards, lined with geotextile fabric and continuous row of straw bales to prevent any soil from eroding from re-graded or disturbed areas during construction.
Once the silt fence is to be installed, it must be inspected and approved by the Landscape Architect prior to the start of any construction. After approval, the silt fence is to be maintained intact until the grass cover is well established and approved by the Landscape Architect.

The Developer is responsible to remove silt fence and restore and re-seed disturbed areas as required upon assumption.

### 3.19.1.3. Tree and Shrub Protection

a. General

It is a requirement to protect the root systems and habitat of existing trees from damage due to excavation, compaction or contamination resulting from construction.

No construction shall occur within the drip line of a tree.

No trees shall be pruned without prior approval from the Town.

b. Scheduling of Site Work

It is the responsibility of the Developer to become directly acquainted with the site, to carefully examine the location of the proposed work, and to notify the Town of any discrepancies in the site conditions. No allowance will be made should there be failure to do so.

The Developer is responsible for damage caused to the surrounding facilities. Facilities damaged by the Developer’s Contractor shall be repaired to the approval of the Town, at the Developer’s expense.

Prior to commencing any excavation work, the Contractor shall establish as near as possible, the location and state of use of all utilities or services, and is responsible for damage or relocation incurred during the execution of the project.

The Contractor shall confine his operations to the Developer’s property as shown on drawings and as directed by the Developer.

The setting out of work shall rest solely with the Developer who will be responsible for the same. It is the Contractor’s responsibility to verify all grades, lines, levels, and dimensions as indicated on the drawings and report any errors or discrepancies to the Developer.

The Contractor shall have such staking approved by the Developer before the commencement of work.

c. Materials

Protective barrier to consist of rigid snow fencing complete with iron “T” bars placed at 2 metres O.C. (maximum spacing). Snow fencing is to be 1.2m high.
d. Installation

Prior to the start of any site work, the Contractor shall supply and install tree protection barriers around each tree and shrub grouping designated on the site plan to be protected, or as directed by the Consulting Landscape Architect and the Town. Protective barrier, as a minimum, is to be located at the outer limit of the drip line of the tree. The drip line is defined as the outside edge of the tree canopy.

Protective barriers for shrub massing are to be located 1m minimum from the outside edge of the plants.

No fill, machinery, chemicals, fuel or materials are to be placed within the protective barrier.

No re-grading, including filling or excavation, is to take place within the protected area.

All underbrush that is to be removed from within the protective barriers must be cleared by hand. The method of removal of brush from the protected area is to be approved by the Town.

All tree and shrub protection must be removed upon assumption.

e. Workmanship

All plant material damaged as a result of improper installation or maintenance of protective barriers must be replaced with material of equal value, at the cost of the Developer.

f. Guarantee

The protective barrier is to be installed prior to the start of construction and maintained intact until assumption of the project.

3.19.2. Site Grading

3.19.2.1. Topsoiling and Grading

a. Criteria

All areas designated for parkland are to have a minimum of 300mm of topsoil.

Any topsoil stripped from the area surrounding the park and stockpiled on the site is to be removed from the site prior to park development. Alternatively, all or part of the stockpiled topsoil may be incorporated into the overall site grading plan. Maximum slopes not exceeding 4:1. The Town requires topsoil testing to the Town’s satisfaction at the expense of the Developer.
Match with surrounding grades.

Spreading of topsoil, rough grading, fine grading and seed bed preparation (including removal of all stones and debris) are to be completed and inspected by the Town prior to seeding/sodding.

Topsoil shall be stabilized within the construction year’s growing season.

b. Testing

Test topsoil for N, P, K, Mg, soluble salt content, organic matter, pH Value, and agricultural herbicide residue.

Perform pH Test to determine required lime treatment to bring pH value of soil within 5.5 to 7.5 level. Test topsoil after it has been placed.

Submit two copies of soil analysis and recommendations for corrections to the Town.

Inspection and testing of topsoil will be carried out by a testing laboratory approved by the Town. Testing costs associated with conveyance of parkland are the Developer’s responsibility.

c. Materials

All topsoil to be obtained from stockpiles, or supplied by the Contractor, shall be a fertile, friable natural loam containing four percent (4%) minimum organic matter for clay loams and two percent (2%) minimum organic matter for sandy loams with acidity range of 5.5 pH to 7.5 pH and shall be capable of sustaining vigorous plant growth. It shall be free of any admixture of sub-soil, clay lumps, stones, and roots and other extraneous matter and shall be free of weeds and weed seeds.

d. Topsoil Spreading and Fine Grading

Obtain approval from the Town of prepared sub-grade prior to spreading topsoil.

Spread topsoil to the following depths:

- 150mm for all areas to be seeded and sodded.
- Depth indicated is compacted depth.

Spread topsoil on prepared sub-grade of the work site.

Fine grade topsoil to produce a smooth even surface free from debris, sod, stones and roots.

Compact (85% Standard Proctor Density)

Meet and match all existing turf areas, curbs, manholes and catchbasin frames in a smooth uniform line.
3.19.3. Site Servicing

3.19.3.1. Water

The Neighbourhood Park requires a minimum 50 mm service and each Community Park and District/Special Purpose Park requires a 150 mm service complete with backflow device, shut-off valve or curb stop, as per OPSD 1104.020, located at the property line. This will facilitate the future addition of an irrigation system, drinking fountain, water play feature, or service building. Each water service pipe diameter to be confirmed with Town staff prior to approval of servicing plans. Water meter chambers to be provided, in order to accommodate water service equipment – location of chamber to be confirmed by Town staff, based on approval of park concept plan and park facility layout.

Quick couplers are required to service specific areas; quantities and locations to be determined on a site-by-site basis. Booster pumps and/or oversized meter chambers may be required and will be assessed on a site-by-site basis.

3.19.3.2. Drainage

All drainage associated with park amenities and open space shall conform to Town of Caledon Lot Grading and Drainage Standards.

Parkland is to be conveyed in a condition where no surface water can be left standing and in accordance with a Park Grading Plan and stormwater review by the Town. The Developer will be responsible for all costs associated with installing a drainage system to meet Town approval.

The preliminary park drainage system required for conveyance is to be designed with the overall subdivision drainage taking advantage of nearby street sewers where possible.

Park and open space property is not to be used for draining private property.

The Developer is required to install a storm manhole within one metre (1m) of the Town property line.

All drainage is to be designed to encumber the site as little as possible recognizing that park amenities require excavation.

The entrances to the park or open space are to be clear of sewer appurtenances.
3.19.4. Electrical

3.19.4.1. Design

For all parks and open space, a minimum electrical service is required for walkway lighting and future connections within the park. Install a single phase service drop one metre inside the park property line.

Lighting priority is given to multi-use trails which are seen as a link between residential areas and schools or other pedestrian/cyclist destinations. Lighting of trails will only occur when trail is adequately populated by a continuum of users and can be sufficiently viewed from residential or public areas. For example, trails through woodlots or trails that lead to an unpopulated area will not be lit.

An independent Electrical Consultant with recent experience in municipal park and sports lighting design must be retained to prepare the electrical drawings and specifications.

The completed drawings and specifications will be submitted to the Town for their review.

3.19.4.2. Walkway Lighting

All lighting to be designed and installed to the satisfaction of the Director of Public Works & Engineering

a. Poles

The poles will be direct buried, pre-stressed coloured concrete with polished or etched finish.

All poles will be specified with a cast metal tamper proof handhole cover and a ground wire cast into the concrete.

The pole colour specified will co-ordinate with the luminaire specified.

The wire within the pole will be RWU copper only.

b. Fixtures

- The walkway fixture will be one piece cast metal construction with a hinged, gasketed, tempered glass lens.
- Polycarbonate vandal shields may be required for each luminaire, subject to the Town’s discretion.
- The fixture will have a 70 watt clear high pressure sodium lamp and ballast.
- Equivalent high efficiency LED (Light Emitting Diode) of CF (Compact Fluorescent) lighting may be offered as an alternative for consideration by the Town.
• The IES TYPE II of TYPE III full cut-off distribution pattern will be achieved with a one piece hydro formed reflector.
• The colour of the fixture will be co-ordinated with the pole.
• The minimum fixture mounting height is 15 feet (4.58m) above finished grade.
• The pole spacing is not to exceed 30 metres on centres. Spacing will be reduced with the shape of the walkway and placement of the plant materials.
• The overall walkway will be designed to a 0.5 foot-candle maintained average.

c. Lighting Control

The first fixture in each walkway lighting circuit will be equipped with an integral button-type photo control to control the complete circuit.
4.0 ADMINISTRATION FEES, SECURITIES AND DEVELOPMENT LEVIES

4.1. **Administration Fees**

4.1.1. **Calculation of Fees**

Fees for services provided by the Town’s Administration, Planning and Public Works and Engineering Department’s are to be determined as a percentage of the total estimated value of services to be assumed by the Town, including engineering and contingency fees. All fees shall be in accordance with the latest fee by-law.

4.1.2. **Payment Procedure**

- Included with the first engineering submission shall be the Engineering Processing Fee in the form of a cheque to the Town of Caledon in an amount equal to 3% of the total estimate of the Town Works.
- Prior to registration 100% of total Engineering fee (less processing fee made with first submission) is to be paid.
- Prior to registration or any work commencing on site the Planning and Development Department’s fee is to be paid in full.

4.1.3. **Cheques Submitted with the Various Submissions**

All cheques submitted with submissions of the subdivision process must be **CERTIFIED** and made out to the Town of Caledon or to The Regional Municipality of Peel, depending on the concerned item.

4.1.4. **Additional Fees for Non-compliance or Variances from the Subdivision Agreement, Plans or Standards**

- In the event that submissions of Engineering or Landscape drawings exceed the three allowable submissions a fee based on the following schedule shall be assessed. These fees shall accompany the drawing submission:
  - 0-20ha \( \text{per submission} \) $1,500.00
  - 20-40ha \( \text{per submission} \) $2,000.00
  - Over 40ha \( \text{per submission} \) $3,000.00
- If it decided by the applicant to phase the development after initial submissions of drawings have being reviewed, then fees based on the following schedule shall be assessed:
  - 0-20ha \( \text{per submission for each phase} \) $1,500.00
• 20-40ha $2,000.00 per submission for each phase
• Over 40ha $3,000.00 per submission for each phase

• Variances to block grading in industrial/commercial or multiple family areas after approval of development agreement.

• $500.00 per request

• Investigating complaints or inspections where work is found to be non-compliant with approved plans or specifications:

• Where the Town has requested to investigate a complaint or inspect works and the works are found to be not in compliance with the approved plans, standards or the subdivision agreement - $500.00 per occurrence

4.2. Securities Prior to Registration of the Subdivision Agreements

A cash deposit or a Letter of Credit as approved by the Town Treasurer in the amount of 100% of the estimated cost of the works to be installed, plus 10% of completed works installed, as listed in the Subdivision Agreement.

4.3. Development Charges

Development Charges shall be paid to the Town of Caledon, in accordance with the Town’s Development Charges By-law.

4.4. Reduction to Securities Post Registration

• Following registration and completion and acceptance of works the Consulting Engineer may request, in writing, a reduction to the letter of credit.
• The Consultant shall supply amended quantities as shown in the Schedules attached to the subdivision Agreement.
• The Town will reduce the Letter of Credit to the amount of the actual remaining work plus 10% of the work completed.
• The consultant shall include with his request a Declaration that stipulates that all liens and liabilities have been paid and that all outstanding accounts with the Town have been paid.
• A letter from the Region of Peel shall be received stipulating the amount of securities to be retained for Region Infrastructure.
• After all work has been completed, the Town shall hold back 10% of the actual contract costs, excluding storm sewer work, until an assumption by-law has been passed by Town Council.
• The Town will not release the securities for retaining walls and acoustical barriers until certification of walls and barriers have been received from the appropriate consultant and that the O.L.S. has confirmed wall or barriers location.
5.0 POLICIES AND PROCEDURES

5.1. Inspection-Consultants

In addition to fulfilling a supervisory role for construction, the Consulting Engineer (General Consultant) will serve as liaison between the Developer and the Contractor(s) and other consultants, as well as between the Developer and the Town. He is to ensure the approved design intent is implemented, to expedite design decisions on site, and to deal with Homeowner enquiry's and concerns.

The Consulting Engineer must have their own site representative on site full time, during any grading and/or construction works including house construction. If at any time, in the opinion of the Town, the site representative(s) is under qualified the Engineer shall replace the site representative(s) with someone to the satisfaction of the Director of Public Works and Engineering.

At the pre-construction meeting, the General and Geotechnical Consultant are required to provide the Town with a schedule of the works, together with the names & emergency phone numbers of all inspectors to be on site during the construction of the various phases of the works.

The Geotechnical Consultant must ensure that O.P.S.S. 514.07.08 regarding backfilling and compaction within road allowances and lots where fill exceeds 1.0m in thickness is strictly adhered to. The Geotechnical Consultant’s certification must make reference to this.

5.1.1. Approvals

The Engineer is required to give the Town 48 hrs notice to inspect the following stages of work prior to proceeding to the next stage:

Underground works – After installation of sewers the Engineer must arrange an inspection with the Town and the Region to witness a mandrel test to determine if there are any deflections or obstructions in the sewers. Prior to base asphalt and first stage curb being installed, video tapes of all sewers are to be delivered to the Town and the Region 10 working days prior to proceeding to the next stage. The Engineer is required to receive approvals of the sanitary and watermain from the Region in writing and copy the Town, prior to the Town giving approval to proceeding to the next stage work.

Base asphalt and first stage curb – Prior to second stage curb and top course pavement being installed the Engineer is required to arrange an inspection from the Town once the first stage curb and base asphalt is compliant.

Certificate of Assumption – The Engineer is required to arrange a final inspection of the infrastructure including video taping of the storm sewer system, once the works are all compliant and prior to the Town granting final approval of the works.
The Town’s representative does not inspect the work to determine what is non-compliant; the Town’s representative gives approvals for proceeding to the next stage of work once the Infrastructure is compliant. It is the Engineer that is responsible to determine what repair work is needed to meet compliance. If the Town is required to re-inspect a site for approval to proceed to the next stage of work, because the original inspection did not meet all compliance then a penalty of $500.00 may be assessed for each occurrence. Any works that proceed prior to approval from the Town to proceed to the next stage of work will not be accepted and may be required to be removed and replaced or additional warrantees may be added.

5.1.2. Preliminary Acceptance of Base Asphalt

The Town will grant Preliminary Acceptance of the base asphalt when all underground servicing, first stage curb, base asphalt, rough grading of the lots to 0.6m of final grades, (or as alternatively identified by the consultant and approved by the Town), and all other essential infrastructure that the Town deems necessary is constructed to Standards. The Owner will be required to maintain this infrastructure in good condition, to Town Standards, to Manufacturers Specifications and to safe conditions until such time the Town assumes the subdivision.

5.2. Geotechnical Engineering

In new developments, the Owner shall engage a Geotechnical Engineering Consultant who shall prepare a report that deals with the requirements for road and municipal services construction, to the satisfaction of the Director.

5.3. Lot Site Grading and Drainage Plans

5.3.1. Lot Grading and Sodding

It is the Developer’s responsibility to correct any drainage problems during the term of the Subdivision Agreement. The Developer is also responsible for certification of each lot’s grading and sodding as required by the Town of Caledon. The Developer is responsible to assure that all materials used (including materials used by the Builder) to alter the land or grading conforms to the Town Bylaw 96-3. No construction debris of any kind will be acceptable for fill material except as noted in Bylaw 96-3 for the purpose of the construction of a driveway.

The Director of Public Works and Engineering will not accept a Lot Grading Certificate from a Consulting Engineer without the following having taken place:

- The Consulting Engineer has advised the Public Works and Engineering Department, in writing, that he has visited the site. The Consulting Engineer is assured that the lots which he proposes to certify have been graded and sodded in accordance with the grading plan and the house has been built and
the ground elevation adjacent to the house are compatible with the lot grading which has been carried out.

- The Consulting Engineer will then arrange for themselves and/or their representative, the builder and/or his representative to visit the site and review each lot in the plan which is to be certified, and to agree on those lots which can be certified by a visual inspection. Further, this inspection is also to reveal those lots that require more surveying or work to determine how they can be certified. The Consulting Engineer will immediately certify all lots where the parties in the field have reached an agreement.

- The Consulting Engineer will re-survey those lots which cannot be certified by a visual inspection, or, if necessary, require the builder to do further work in order that such lots can be made certifiable. It should be noted that if the Builder will not correct the work as instructed by the Consulting Engineer, this responsibility will fall directly upon the Developer.

- Lots, which cannot be certified due to poor grading or due to changes in the type of house, which was built on the lot, will be brought to the attention of the Director of Public Works and Engineering, in writing, by the Consulting Engineer. The Consulting Engineer, on behalf of the Developer, will prepare a new grading plan(s) for the lots, which have not been built according to plan and will submit the revised plan to the Town, to the Builder, and to the Homeowner (if applicable).

- The foregoing is an attempt to establish a system which will likely cover 98% of the lot grading problems presently being experienced. However it is acknowledged that there are going to be problems that cannot be covered by this procedure. These problems will be dealt with between the Town, the Consulting Engineer, the Developer and the Builder, as they arise.

- Prior to assumption, if the residing Homeowner modifies grades within his own lot, causing adverse affects to neighbouring lands, the Developer will be required to rectify the grading infraction to the satisfaction of the Director of Public Works and Engineering.

It is recommended that the Developer’s Consultant and the Town file the actual grades being certified. This will allow a record to be kept for the duration of the Subdivision Agreement. This record will be available to resolve disputes involving changing or certified grades between certification and the Town’s assumption of the subdivision.

 Builders’ site grading plans are to show underside of footing elevations and top of foundation wall elevations. Where multi-level footings and/or foundation walls are intended, all levels are to be shown. Engineered fill level is to be shown where applicable.

 Downspout locations are to be indicated on Builder’s site plans.

### 5.3.2. Block Grading

The Developer is responsible for the correction of all drainage problems on the blocks during the term of the Subdivision Agreement and for sodding/seeding undeveloped blocks prior to assumption.
5.3.3. Submission Procedure

Two (2) certified copies of the proposed lot grading plan are to accompany all building permit applications.

The proposed and final grading certificates and drawings are to be certified by the Engineering Consultant responsible for the original design of the Subdivision.

The submission to the Building and Enforcement Department for preliminary lot grading certification will require the appropriate grading plan. The grading plan is to continue the following wording: “I hereby certify that the proposed grading, building type and appurtenant drainage and stormwater management works comply with sound engineering design and that the proposed grading is in conformity with those of the adjacent lands for drainage and relative elevations”.

The wording is to be followed by the Professional Engineers stamp and signature.

Drawings are to be 210mm by 297mm or folded to that size with title blocks visible.

5.3.4. Standard Grading Certification and Letters

This letter, found in Section 5.16.6, is to be sent to the Director of Public Works and Engineering. Under the Subdivision and Development Agreements of the Town of Caledon, the letter is required for the certification of building and lot grading. The date of the Director’s approval of the variance must be inserted in the space provided.

5.4. Landscaping Implementation Procedures

Once the infrastructure of the subdivision is in place and a number of houses have been completed, the Developer will need to hire both a Landscape Contractor to install the approved landscape components and a Landscape Architect to supervise the installation and perform some ancillary duties.

5.4.1. Streetscape Works

Flow Chart No. 1 Implementation of Streetscape Designs (See Section 5.4.5), summarizes the steps that need to be taken in completing streetscape work, while outlining the respective responsibilities of the parties involved.

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, handle homeowner notification and enquiry’s, report on progress to the Town and provide the Town with as-built drawings. An important part to 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 (See detail 719 – Tree Planting Summary Chart in the Design Drawings Index). At the appropriate times, the Town
will conduct its own inspections for the purposes of issuing a Certificate of Preliminary Acceptance, as well as issuing a Certificate of Assumption and reducing the Letter of Credit at the end of the guarantee period. All streetscape works are to be guaranteed for two (2) years.

5.4.2. The Landscape Architect and the Homeowner

In addition to fulfilling a supervisory role for construction, the Landscape Architect will serve as liaison between the Developer and the Contractor, as well as between the Developer and the Municipality. The Landscape Architect is to ensure the approved design intent is implemented, to expedite design decisions on site, and to deal with Homeowner enquiries and concerns.

The Landscape Architect will liaise with Homeowners when it is time to begin planting. This entails notifying Homeowners that work is about to commence, answering Homeowner’s enquiries and resolving Homeowner concerns. Modifications to the approved plans may be considered as long as they are acceptable to the Developer and the Town and provided they satisfy the intent of the Development Standards and Design Requirement.

An example of a Homeowner Notification Flyer is provided in the section on Standard Forms and Letters. The flyer informs Homeowners about the planting program. It also offers the name and telephone number of the Landscape Architect, who will be able to answer questions and co-ordinate planting activity.

5.4.3. Naturalization Works

Flow Chart No. 2 Implementation of Naturalization Designs (see Section 5.4.6), illustrates the process and describes the responsibilities entailed in completing the naturalization of open space blocks and the stormwater facility.

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 Town. At the appropriate times, the Town will conduct its own inspections for the purposes of issuing a Certificate of Preliminary Acceptance, as well as a Certificate of Assumption and reducing the Letter of Credit at the end of the guarantee period. All naturalization works are to be guaranteed for three (3) years. Wherever naturalization areas adjoin lands administered by a Conservation Authority, a representative of the Authority may periodically inspect the landscape works and make recommendations to the Landscape Architect and/or the Town.

5.4.4. Maintenance Agreement for Naturalization Areas

Carrying out a maintenance program for the first three (3) years after planting the naturalization areas will significantly reduce the mortality rate of the trees, shrubs, grasses, etc. and help to establish healthy vegetative cover.
At the time of planting, the planting details and specifications should be followed faithfully. This means, among other things, the proper transportation and handling of plant material, the use of fertile planting soil, the proper staking of trees and the proper installation of rodent protection.

Maintenance shall be governed by the three (3) year maintenance contract for Naturalization Areas the Developer has with the Contractor, requiring the Contractor to:

1. Apply appropriate fertilizer to promote growth
2. Prune dead or diseased tissue
3. Remove dead plant material
4. Replace dead coniferous naturalization species to maintain a minimum live-stocking standard of 90%
5. Replace dead deciduous and shrub naturalization species to maintain a minimum live-stocking standard of 90%, and
6. Suppress weed growth around new trees and shrubs by adding mulch and/or removing weeds by hand. Weeds shall not be cut down with a power trimmer.

An assessment of plant material is to be carried out annually by the Landscape Architect between mid-July and early September and reported to the Developer, the Contractor and the Town in the form of a Naturalization Assessment Report. Plant vigour can be determined by a visual inspection of the current year's foliage.

The initial inspection and assessment will be conducted in the summer following the planting. It will take account of the survival and condition of the plants. It will also include a summary of the maintenance operations performed. Finally, the assessment will propose any additional maintenance measures thought necessary, and recommend where, the following spring, plants need to be replaced or new plants added.

The second assessment will be conducted the following year, and will provide similar information to the first.

The third and final assessment will take place just prior to the expiration of the three (3) year Planting and Maintenance Agreement. The final report will provide a complete summary of the initial plantings, as well as a record of the replacements and maintenance services carried out during the guarantee period. The report will also make note of any additional work that should be performed prior to the Town conducting their own final inspection.
FLOW CHART NO. 1
IMPLEMENTATION OF STREETSCAPE DESIGNS

The Developer hires a Contractor to plant street trees and shrubs and to construct fencing under the direction of the Landscape Architect (L.A.)

At the time streetscape designs are approved, the final locations of driveways might not be known. Moreover, the expected locations of some streetlights and aboveground utility boxes could change during construction. Therefore, the number and species of trees might need to be adjusted accordingly, within the approved design intent.

The L.A. and a Town official will mark street tree locations with spray paint on curbs, making adjustments as required due to the as-built locations of driveways and utilities. No less than 2 weeks prior to planting, the L.A. will distribute flyers informing Homeowners about the planting.

See section 5.16.4 for example of a Homeowner Notification Flyer.

The Contractor plants the trees and installs fencing and other landscape works and maintains them for 2 years.

The L.A. will issue a Certificate of Completion once the Contractor’s work has been satisfactorily completed. The L.A. will also prepare a Summary Chart tracking the history of each tree until the Town issues a Certificate of Assumption.

See Standard No.719 for example of a summary chart.

A Town official will inspect the trees and fencing. Acceptance Certificate, providing the work is found to be satisfactorily complete.

The Town conducts preliminary and interim inspections between April 1 and November 30 (Weather permitting)

The L.A. will inspect the trees and shrubs after one year and again a few months before the guarantee expires. Inspection reports will inform the Contractor of any replacements necessary. (Replacements will be noted on the Summary Chart and must carry a guarantee of a further 2 years)

The L.A.’s final inspection report will remind the Contractor to (1) remove the stakes, wires and tree wrap. (2) prune trees, and (3) add mulch and fertiliser in order to obtain Certificate of Assumption by the Town.

Upon receipt of the L.A.’s Completion Certificate, the Town will issue a Certificate of Assumption and authorize reductions in the Letters of Credit once the 2-year guarantee period has expired and the trees and shrubs are certified by the Town to be healthy.

The Town conducts final inspections while the leaves are still on the trees, between May 15 and October 15 (weather permitting)

The L.A. will provide the Town with as-built drawings of the streetscape.
5.4.6. Implementation of Naturalization Designs Flow Chart No.2

FLOW CHART NO. 2
IMPLEMENTATION OF NATURALISATION DESIGNS

The Developer hires a Contractor to Plant naturalisation areas.

The Contractor plants trees and shrubs and seeds open spaces.

Planting is to be maintained by the Contractor for a minimum of 3 years, as per the maintenance agreement the Developer has with the Contractor.

The Developers Landscape Architect (L.A.) will inspect newly planted material. Once the work has been completed to the satisfaction of the L.A., the L.A. will send a Certificate of Completion to the Town, who will issue a Performance Acceptance Certificate (providing they agree with the L.A.) and the maintenance period will start.

For each of the next 2-years, the L.A. will conduct interim inspections between mid-July and early September and prepare reports indicating any remedial or replacement work to be carried out by the Contractor. A copy of these reports will be sent to the Town.

The L.A.’s final inspection report will remind the Contractor to (1) remove the stakes, wires and tree wrap, (2) prune trees, and (3) add mulch and fertiliser in order to obtain Certificate of Assumption by the Town.

The L.A. will conduct a final inspection near the end of the 3-year maintenance period and submit a final inspection report to the Town.

The Town conducts final inspections while the leaves are still on the trees, between May 15 and October 15 (weather permitting)

When the Contractor has rectified all deficiencies, the Town will conduct a final inspection. Once the 3-year guarantee period has expired and the new plantings are certified to be healthy and the Contractor has returned the required areas to a natural state, the Town will issue a Certificate of Assumption and release any outstanding money in the developer’s Letter of Credit covering the naturalisation portion of the work.

A copy of the maintenance agreement between the Developer and the Contractor is to be filed with the Town.

The Town conducts performance acceptance inspections between April 1 and November 30 (weather permitting)
5.4.7. Species List for Storm Water Management Pond Planting


5.5. Blasting or Tunneling

No blasting or tunneling will take place without written approval of the Director of Public Works and Engineering.

5.6. Construction on Existing Roads

Whenever it is necessary to cut through an existing Town or Regional road, the Contractor will be responsible for properly compacting the backfill material and replacing the original surface. Road Occupancy and Road Closure permits, and P.U.C.C. approval must be obtained prior to undertaking work on an existing road allowance. Notification to Fire and Emergency Services and School Boards is required 48 hours prior to commencing work. The road must be maintained to a minimum of one lane for emergency access as per the O.T.M. Guidelines. After roads within a plan of subdivision have been paved with top course asphalt, no cutting of the asphalt will be allowed to install services and the Contractor installing the service will require a Road Occupancy Permit from the Town, even though the roadway remains the Developer’s responsibility for maintenance.

Unshrinkable fill is to be utilized as the backfill material from top of cover material to the frost line in all trench installations within all Town road allowances to the bottom of the Granular ‘A’ (a minimum of 150mm of Granular ‘A’ is required) in accordance with existing road structure composition.

NOTE:

Subdrains must remain intact and at grade during these restorations.

Top asphalt cold joints must be sealed with either T-Bond Hot Mix asphalt joint Tape from McAsphalt or Denso Band by Denso. These sealants are to be installed in accordance with the manufacturer’s specifications.

Where overlaying or constructing new road works, a diagonal joint must be utilized across the travelled portion of the roadway.

Where proposed road granulars differ from existing road granulars, a frost taper must be utilized to minimize the effects of the different granular characteristics.
5.6.1. Standards and Maintenance

Work shall be to the satisfaction of the Director of Public Works and Engineering, or his representatives.

Work shall be designed and constructed in accordance with the most recent requirements, standards, specifications and by-laws of the Town of Caledon.

All Works constructed shall be guaranteed for such period of maintenance as required hereinafter.

5.6.2. Trench Backfilling on Roads

The use of excavated inorganic native subsoil is generally permissible for trench backfilling purposes by means of standard consolidation procedures subject to the following provisions:

- Backfilling operations are to be carried out in strict conformance with the requirements of O.P.S.S. 514.07.08 using earth compaction equipment of appropriate size and weight.
- The minimum compacted density within 1.0 metres of final sub-grade is increased to 98% Standard Proctor Density with moisture content with 2% of the optimum value.
- Soil moisture content high of optimum value is better suited for trench backfilling below the 1.0 metre sub-grade. The addition of water will be required particularly during dry summer conditions subject to the discretion of the Geotechnical Consultant.

The Geotechnical Consultant shall be present during any trench backfilling and consolidation operations ensuring that O.P.S.S. 514.07.08 regarding backfilling and compaction is strictly adhered to. The Geotechnical Consultant is to certify that he or his designate has witnessed all backfill and compaction operations including lot service and that all works were constructed in accordance with O.P.S.S. 514.07.08.

Adequate trench widths must be maintained to give compaction equipment being utilized adequate room to operate. Trenches must be at least the width of the compaction equipment plus 0.5m.

- Backfill with shale will be allowed provided a proper mix of shale and filler material, i.e. sand or clay is integrated onto the backfill material to eliminate voids. The Geotechnical Consultant must carefully monitor the backfilling operation to ensure this mix is maintained and that O.P.S.S. 514.07.08 is complied with. Maximum dimension of any shale backfill particle is 150mm.
- Granular backfill will be used around the perimeter of all manholes and catchbasins. Granular backfill is to extend 1.0m out from the outside edge of the manhole and is to be compacted using a vibratory means or approved alternatives. O.P.S.S. 514.07.08 and 516 must still apply.
Each service connection and trenches must be monitored and certified to ensure that O.P.S.S. 514.07.08 is complied with.

Narrow trenches for water service connections are prone to post construction settlement. The Contractor must defer backfilling of the upper 1.0 metre sub-grade zone until completion of all sewer and water service connections to promote uniformity of backfilling and compaction in the sub-grade zone.

The Geotechnical Consultant must maintain a plan and profile drawing indicating the location of each compaction test to ensure compliance with O.P.S.S. 514.07.08. Both failed and satisfactory results are to be indicated along with consolidation layer thickness. A compaction test list or legend may be required to keep the drawing legible. These drawings and other pertinent data must be kept on site within the Consultants trailer and available for Town reviews at all times.

If, in the opinion of the Town, excessive trench settlements have occurred at base or top asphalt levels, a road review will be required to determine the structural integrity of the road. The cost of this testing will be borne by the Developer. A review of the condition of the roads will determine whether the maintenance period of the road should be extended or if reconstruction is required.

Road construction will not be permitted until trenches have been backfilled and compacted in accordance with the most recent Town of Caledon requirements and specifications. Proof rolling at the sub-grade level must be completed and certified by the Geotechnical Consultant. Certificate must indicate structural integrity of the sub-grade and the adequacy of the structural road design. Sub-grade, granular and base course asphalt cross fall shall be 3%.

The following are actions required prior to the placement of granulars:

- A formal proof rolling test by means of a loaded tandem truck or equipment of equivalent wheel loading must be carried out for approval of the completed sub-grade and prior to placement of granular materials. The sub-grade must exhibit a firm and stable behaviour without rutting and/or flexing under wheel travel.
- Additional granular depth will be required to compensate for sub-grade which cannot pass the proof rolling and/or the removal and re-compaction of any “soft spots”.
- Placements of granulars prior to the Town issuing approvals may result in complete removal of all granulars and proof rolling undertaken in the presence of Town personnel and the Geotechnical Consultant.
- The following special conditions are subject to review on a case-by-case basis including consideration of non-standard consolidation procedures:

Winter construction operations for which full depth granular backfill may be required is subject to the discretion of the Town.

Additional Requirements of the Geotechnical Consultant

In addition to the parameters set out above, the following criteria are required.
1. Soil reports must state specifics of soils indigenous to the development and must emphasize requirements for trench backfilling and compaction and consolidation.

2. Only experienced Geotechnical Consultant personnel who have demonstrated their competence to the satisfaction of the Director of Public Works and Engineering are required to be on site. One Geotechnical Consultant personnel must be on site at all times with no more than two sewer or watermain or service crews under their direct supervision. Where there are more than two crews, additional Geotechnical Consultant personnel are required.

3. The Town requires a compaction test on every layer and every 50m² for mainline work and a compaction test per layer on lateral service trenches as minimum. Plot field density tests on plan and profile drawings.

4. The locations of the field density tests are also to be plotted on the plan and profile drawings. The plots should indicate the test number and the results.

5.7. Winterizing of Subdivision

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

- Manhole tops, catchbasin 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 catchbasin frames.
- Sidewalk bays which have settled and created a lip greater than 10mm shall be repaired.
- Asphalt roads shall be cleared of mud and debris and maintained in this manner throughout the maintenance period.
- Inlet manholes, catchbasins, ditches or channel shall be cleared of debris to prevent blockages during winter and spring thaws.

5.8. Policy for Holiday Work by Contractors

Shall be in accordance with the Town’s Noise Bylaw.

5.9. Access to Town Roads

Every individual property finds its legal access to public roads by means of sufficient frontage on an assumed public roadway, or by deeded access over property having frontage.

- An Improved property, fronting on an assumed Town Road, must have at least one entrance, approved prior to a building permit being issued.
- An encroachment permit onto a Town road must be secured by means of, a permit application, a site plan or by plans for a plan of subdivision.
- Vehicular entrance onto or egress from an assumed Town road is not permitted except at an approved entrance.
- Temporary access may be granted under permit application.
• Additional entrances may be granted under permit application.
• The Owner must maintain all entranceway improvements on Town property in a safe condition. The Town may, with appropriate notice, make improvements to, or remove, unsafe entrance features at the cost of the Owner.
• Where the Town makes improvements to road infrastructure, affected entrances will be restored to equal or better conditions. Non conforming entrances will not be restored.
• All entrances onto curbed streets must be of a hard surfaced nature at least to property line, be of a gradient not greater than 6% for the first 6m behind the curb, and have a curb cut of no less than 4m and not greater than 8m unless specifically approved otherwise. For Rural Estate Subdivisions a hard surfaced area of at least one metre in width is required behind curb at the driveway entrance to provide structural support to the curb.

5.10. Road Patterns

All new streets shall have regard for the following:

1. All new Town streets shall provide access, where possible, from two connecting directions to every private property, with qualified exception as shown in point 3 below. Connecting pedestrian ways may be required by secondary plan policy, despite exceptions for streets.

2. Existing non-conforming streets are permitted to continue as an exception
   a. Unless indicated otherwise by secondary planning process, or
   b. Where infrastructure has been configured for continuity, or
   c. The access is required to bring adjacent development into conformity.

3. An exception to 1 may be considered where:
   a. The second access is only available in future development – in which case such access should be planned for and pre-serviced with a temporary cul-de-sac, or
   b. Extenuating natural topographic features prevent the reasonable design of road and related services in connecting patterns, or
   c. Environmental Policy Areas or other environmentally regulated areas prevent second access, or
   d. The necessary lands cannot be acquired, or
   e. A one way street or link is accepted as a preferred traffic solution, or
   f. The Directors of Public Works and Engineering, Planning & Development and Fire & Emergency Services shall make the determination of whether an application is eligible for one of the exemptions. The proponent may be required to submit documentation to support an exemption.

4. Where a terminal road is permitted under 3 it must not exceed an average annual daily traffic (AADT) of 400 or a gradient of 4%.

5. Proposed patterns for lands around significant intersections should develop road patterns, which support reasonable alternate emergency routes around the intersection. Such intersections are identified to be intersections of streets of a collector/arterial nature.
a. Alternate routes can be laid over private lands by way of permanent easements for unobstructed vehicular access in favour of the Town. These easements must be maintained in good condition, and kept clear of obstruction, by the Owner.

6. Points of local commercial and/or institutional interest which front on arterial roads should have secondary access to/from the adjacent local and/or collector road pattern. Exemptions may be required or considered with regards to historical development patterns and land use compatibility.

5.11. Traffic Calming in Settlement Areas

At the discretion of the Director of Public Works and Engineering, traffic calming enhancements may be implemented in high pedestrian usage areas and the design shall be to the satisfaction of the Director.

5.12. On Street Parking in Settlement Areas

When requested by the Town, a street parking plan shall be prepared in accordance with the following:

- Where development density exceeds 12 residential units/100m of street, the Town requires detailed plans illustrating the capability of providing 3.5 regular parking spaces per residential unit; including garages, driveways, "on street" parking, parking strips, parking zones, and parking lots.
- Detailed plans must show curb drops for all driveway entrances. Changes to entrance locations shown on an approved plan require permit application.
- Required parking spaces should be located within 100m of the residential lot serviced.
- Parking spaces on public lands will not be designated to individual users.
- Parking spaces will not be required to meet handicapped requirements.
- Related infrastructure must be constructed according to acceptable geometric and design, standards and specifications.
- All parking spaces on or adjacent to Town streets will be surfaced with a permanent pavement on sub-grade comparable with the adjacent roadway.
- A parking space envelop shall be no less than 3m x 6m, rectangular, applying also to car ports and garage interiors. Fractions of spaces will not be recognised. Access is required to at least one side of each parking space from a travelled road, except in private driveways. Measurements may be made from face of barrier curb, centre line of a guttered curb, the edge of sidewalks, buildings and the edge of pavements.
- No parking space can overlap a municipal sidewalk, extend into the travelled street, or overlap a driveway entrance. Fire hydrant setbacks must be respected.
- No designated parking space can be along the curb on the sidewalk side unless the sidewalk has a clearance from the barrier curb face of at least 6m.
5.13. **Beginning of Construction**

Construction of services shall not commence until the Developer has entered into the necessary agreements with the Town of Caledon and the Region of Peel. The Developer must also have obtained any required approvals from the Ministry of Transportation Ontario, the Ministry of Environment, or any other organization that may be affected by the plan of subdivision.

5.13.1. **Commencement Notice**

The Public Works and Engineering Department of the Town of Caledon and the Public Works Department of the Region of Peel must be given forty-eight (48) hours written notice prior to the commencement of construction. Should there be a cessation of construction of more than a week, the Developer must again supply forty-eight (48) hours written notice before recommencing the work. The Developer shall include with his first Notification to Commence Work, the number of the respective Registered Plan or T number of subdivision and approval from the Director. A copy of the Notification to Commence Work shall be sent to the Town and Region of Peel. Failure to comply with any portion of the requirement will lead the Town to increase maintenance periods in addition to field investigation. Before the Town will accept the Commencement Notice, the Developer must submit a copy of the contract or indicate the equipment that the Contractor will be using for street sweeping and flushing. The Town must be satisfied that proper arrangements have been made to assure that all nuisance dust, mud and debris will be properly cleaned on a regular basis and in accordance with Section 5.13.4.

5.13.2. **Directional/Informational Signage**

The Developer is responsible to erect and maintain the directional/informational signage as per Section 2.9 prior to any works commencing and until assumption by the Public Works and Engineering Department or otherwise directed by the Town. An information sign shall be placed at every access point to the subdivision detailing who the Developer is, who the Builders are and who the Civil Consultant is. Phone numbers for each of these companies shall be posted on this sign. The sign shall meet the minimum requirements of Standard 401.

5.13.3. **Site Office**

The Developer is required to provide a site office trailer for the Engineer, his inspector and the Town’s Inspector’s use. Two weeks prior to the commencement of the contract work, the Contractor shall provide a temporary lock-up office complete with all fixtures for the sole use of the Engineer and the Town. The location of the building shall be as directed by the Engineer. The Contractor shall maintain the building with heat, light and telephone service and it shall be kept in a clean condition at all times. The Contractor shall provide for its removal upon completion of the Contract.

The office shall be at least two rooms 3.6 metres x 3.0 metres x 2.5 metres high each, fully weatherproofed, insulated, heated, air conditioned, ventilated, painted and lighted to the satisfaction of the Engineer. The floor shall be above ground level. The office shall be
provided at least two (2) opening windows of no less than 1.2 metres by 0.75 metres, complete with fly proofing.

Should construction on site not commence immediately, the Engineer may defer this requirement, but the office shall be erected and fully equipped before any materials are brought to the site or any construction work commences. Temporary sanitary facilities adjacent to office must be supplied and maintained for sole use of the Engineer’s and Town staff.

5.13.4. Mud, Dust, Stock Pile & Debris Control

The Developer is required to keep the roadways free from nuisance mud and dust at all times. The road is to be scraped at a minimum of twice (2) daily or when mud accumulates, whichever is greater. The road is to be flushed and swept a minimum of twice (2) per week or more if required to assure dust and mud does not become a nuisance or unless otherwise directed by the Town.

Roadways may not be used for stockpiling materials once the road is open to public use. If a road is to be blocked for more than 2 minutes in duration with construction equipment then an alternative signed detour route must be established and approved by the Town for the public. All signing and detours must conform to the latest version of the Ontario Traffic Manual.

The subdivision and adjacent roadways are to be kept free of debris, mud and nuisance dust at all times. Scattered debris is to be cleaned daily.


Prior to the assumption by the Town of the services constructed in a development, it is required that the Developer re-establish all Control Standard Iron Bars and a Registered Ontario Land Surveyor must make confirmation of re-establishing these iron bars in writing to the Director of Public Works and Engineering.

- Where registered lots of both the subject land and an existing registered plan are abutting and where these lots have been occupied and fenced, it shall not be a requirement to have these S.I.B.’s replaced.
- Where the boundaries of the plan involve either sewer or watermain easements, Town owned lands, Region owned lands, Public or Separate School Board lands, Hydro lands, etc., S.I.B.’s shall be required.
- If it is not possible along the road allowances within a development to place S.I.B.’s, because of above ground works, (i.e. paved driveways), it will be satisfactory to have the closest lot corner monumented with a S.I.B. When such a situation arises at the beginning or at the end of a curvilinear section, it is required that the closest lot corner on a straight street line portion be monumented.
The planting of Standard Iron Bars (S.I.B.’s) is to be done after the Preliminary Acceptance of Top Course Paving.

The Surveyor’s certificate required prior to assumption of the subdivision shall confirm that the Surveyor has either found in its original position or replaced each S.I.B. shown on the registered plan. The Certificate shall also confirm that the limits of all sewer and watermain easements have been barred, and that the tops of all S.I.B.’s are within 150mm of final grade. The Certification shall state the date of field verification.

5.14.2. Benchmarks

Prior to the assumption by the Town of the services constructed in a development, it is required that the Developer establishes permanent geodetic benchmark(s) and provides the information to the Town. A Registered Ontario Land Surveyor shall establish benchmarks such that the location is assessable, identifiable, permanent and free from vertical movement. The Town, prior to installation, shall approve the type and location of the benchmarks. The benchmarks are to be of the Second Order.

Number of Benchmarks Required:

- 1 to 250 lots - 1 benchmark
- 251 to 500 lots - 2 benchmarks
- 501 to 750 lots - 3 benchmarks
- 751 to 1000 lots - 4 benchmarks

5.15. Inspection Report

Daily inspection reports from the Consulting Engineer shall be submitted to the Public Works and Engineering Department prior to certification of works. The diary must at a minimum contain the following information:

- Weather Conditions.
- General Progress of work; where the Contractor is working and what he is doing.
- Equipment being moved or arriving on the job site and its purpose.
- Visits to the site by the Town or Regional Officials and any specific instructions they may have 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 the site involving the installation of public utilities.
- Stoppage of work by Contractor for whatever reasons with full description of why the work stopped.
- Extra works and miscellaneous happenings.
- Complete descriptions of how excavations were executed, type of equipment used and difficulties due to either improper equipment or nature of material.
- Indicate where all fill materials came from, such as the lot or station of the cut or name of the borrow site.
- Number of loads of material where possible without consulting with the Weighman or the Contractors records.
- All equipment that is on site must be recorded.
- The actual hours worked.
- The actual hours not worked.
- The actual area of work.
- Location and length of time of any stoppages.
- Particular attention must be taken with watering equipment and the number of loads of water applied per day must be recorded as well as the number of hours the equipment worked.
- The time of arrival and departure of the Consultant’s Inspector.
- All pertinent information relating to Quality Assurance of the works.

All erosion and sediment control devices are to be inspected by the Consulting Engineer once per week and after each rainfall of 10 mm or greater or significant snow melt to ensure that they are in proper working condition. Copies of the inspection report are to be received at the Public Works and Engineering Department within two (2) working days of the inspection.
5.16. **Standard Forms and Letters**

5.16.1. **Consultant’s Letter of Retention**

This letter is to be submitted to the Director of Public Works and Engineering as part of the First Engineering submission.

**COMPANY LETTER HEAD**

**DATE**

Public Works and Engineering Department  
6311 Old Church Road  
Caledon, Ontario  
L7C 1J6

Attention: Craig Campbell C.E.T.  
Director  
Re: **NAME OF SUBDIVISION**  
**21T NUMBER**

Dear Sir,

This is to state that our firm has been retained by (NAME OF DEVELOPER) for the purpose of carrying out those functions as outlined in the proposed Subdivision Agreement for 21T-NUMBER.

I also certify that I, (NAME OF PROFESSIONAL) of (NAME OF COMPANY) being a Professional Engineer in good standing in the Province of Ontario and licensed to perform consulting engineering services in the Province of Ontario, have received and reviewed The Development Standards, Policies & Guidelines, (as amended) prepared by the Town of Caledon Public Works and Engineering Department and agree to comply with said Guidelines. I also certify that the submission of drawings and reports have been prepared in accordance with these Guidelines. (If any of the Guidelines or standards have not been met, then list which ones with a brief summary of the issue(s) and the engineering principle that concluded the reason(s) for non compliance.)

It is also understood that a mandatory meeting is required with the Public Works and Engineering review team at the time of first submission to provide the review team with an overview of the submission.

It is also understood and agreed that during all phases of construction of said subdivision, our firm will provide full time supervision by qualified personnel of all servicing, grading and drainage works unless otherwise approved in writing by the Town.

It is also understood and agreed to that our firm will provide at a minimum weekly inspections of all erosion and sediment control facilities plus provide reports with recommended maintenance and repairs as per the Town requirements until such time that the subdivision has been assumed or as otherwise approved in writing by the Town.

Yours truly,

(LETTER TO BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER WITH SIGNING AUTHORITY FOR THE CONSULTING FIRM)
5.16.2. Geotechnical Engineer’s Letter of Retention

Instructions for Use

This letter is to be submitted to the Director of Public Works and Engineering as part of the First Engineering submission.

Sample Letter

Date:

Town of Caledon
6311 Old Church Rd.
Box 1000
Caledon East, ON
L0N 1E0

Attention: Director of Public Works and Engineering

Gentlemen:

Re: (Name of Subdivision)

This is to state that our firm has been retained by the Developer to supervise, in total, the installation of the bedding and backfilling of all trenches within the road allowances and easements within the above noted Subdivision.

We understand that we are to certify to the Owner and the Town that we have carried out sufficient testing to obtain a representative report as to the compaction of the backfill, and that we find the backfill to be in compliance with Town Specifications and requirements.

We shall also confirm that final sub-grade conditions are equal or better than those anticipated in the preparation of the pavement design.

Yours very truly,

(A Professional Engineer with signing authority for the Geotechnical Firm)
(Engineering’s Stamp)
5.16.3. Landscape Architect’s Letter of Retention

This letter is to be submitted to the Director of Public Works and Engineering as part of the First Landscape submission.

COMPANY LETTER HEAD

DATE

Public Works and Engineering Department
6311 Old Church Road
Caledon, Ontario
L7C 1J6

Attention: Craig Campbell C.E.T.
Director

Re: NAME OF SUBDIVISION 21T NUMBER

Dear Sir,

This is to state that our firm has been retained by (NAME OF DEVELOPER) for the purpose of carrying out those functions as outlined in the proposed Subdivision Agreement for 21T-NUMBER.

I also certify that I, (NAME OF PROFESSIONAL) of (NAME OF COMPANY) being a Professional Landscape Architect in good standing as a full member of the Ontario Association of Landscape Architects, have received and reviewed The Development Standards, Policies & Guidelines, (as amended) prepared by the Town of Caledon Public Works and Engineering Department and agree to comply with said Guidelines. I also certify that the submission of drawings and reports have been prepared in accordance with these Guidelines. (If any of the Guidelines or standards have not been met, then list which ones with a brief summary of the issue(s) and the design principle that concluded the reason(s) for non compliance.)

It is understood that a mandatory meeting is required with the Public Works and Engineering review team at the time of first submission to provide the review team with an overview of the submission. During all phases of construction of said subdivision, our firm will provide full time supervision by qualified personnel of all landscape works, unless otherwise approved in writing by the Town. Furthermore, our firm will provide preliminary and final inspection certification for all landscape works as well as provide as-built drawings and tree planting charts prior to assumption, unless otherwise approved in writing by the Town.

Yours truly,

(LETTER TO BE SIGNED AND STAMPED BY A PROFESSIONAL LANDSCAPE ARCHITECT WITH SIGNING AUTHORITY FOR THE CONSULTING FIRM)
5.16.4. Example Homeowner Notification Flyer

EXAMPLE OF A HOMEOWNER NOTIFICATION FLYER

Date

BOULEVARD PLANTING

Within the next few weeks, weather permitting, the Developer of your subdivision will be having street trees and shrubs planted. This is one of the obligations the Developer has to the Town under the subdivision agreement.

These trees and shrubs will be planted in accordance with a municipally approved street tree planting plan. This plan specifies the species and location of the trees. Streetlights, “sight triangles” at intersections, the proximity to stop signs, as well as setback requirements from utility boxes and driveways may require on-site adjustments for tree locations.

The Developer has hired a Contractor to plant trees. All street trees carry a two (2) year guarantee. If the tree dies or becomes sickly during the guarantee period, the Contractor will replace the tree. The Town will inspect all trees before the end of the guarantee period so that unhealthy trees can be identified and replaced prior to the Town granting assumption for the trees.

The following is a list of dos and don’ts to help us create a healthy urban forest.

<table>
<thead>
<tr>
<th>DO</th>
<th>DON’T</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Appreciate the trees.</td>
<td>• Mound soil around the base of the tree. Piling soil around the tree trunk may stunt its growth.</td>
</tr>
<tr>
<td>• Remove grass or weeds from the base of the tree.</td>
<td>• Over water or water when there has been plenty of rain.</td>
</tr>
<tr>
<td>• Water the tree thoroughly during summer dry spells.</td>
<td>• Prune, spray or fertilize the trees.</td>
</tr>
<tr>
<td>• Take care not to damage the bark of the tree when trimming around the tree. Cutting the bark can allow insects to adversely affect the trees health.</td>
<td>• Remove dead trees. This will void the guarantee.</td>
</tr>
<tr>
<td>• Call the contact person noted below if the tree is sickly or dead.</td>
<td>• Cut surface roots, dig or tie anything to the tree that can restrict its growth.</td>
</tr>
</tbody>
</table>

Thank you very much for your co-operation.

The red/orange mark(s) on the curb outside your home indicate(s) the approved location of the tree(s) in the boulevard.

If you have any questions, or wish to report a dead or dying tree, please call CONTACT NAME, TITLE, NAME OF LANDSCAPE ARCHITECTURE FIRM, who is co-ordinating the planting operations, PHONE NO. (After hours or on weekends, you may leave a message at this number.)
5.16.5. Ontario Land Surveyors Certification Re: Final M-Plan

This letter is to be submitted to the Director of Public Works and Engineering as part of the Final Engineering submission.

Sample Letter

Date:

Town of Caledon
6311 Old Church Rd.
Box 1000
Caledon East, ON
L0N 1E0

Attention: Director of Public Works and Engineering

Gentlemen:

Re: (Name of Subdivision)
21T-______________

I hereby certify that the final draft of the proposed M-Plan submitted as part of the Final Engineering Submission, has not been changed since the Zoning By-Law came into effect.

Yours very truly,

(The Ontario Land Surveyor who signs the Surveyors Certificate on the M-Plan)
(The O.L.S. Stamp)

NOTE:

If the certificate cannot be provided because of changes to Draft M-Plan, then three (3) Draft M-Plans and three (3) sets of lots schedules are to be included with final submission for approval by the Zoning Section of the Building Division of the Planning and Building Department. A letter is to be included from O.L.S. outlining where the changes on the M-Plan have occurred.
5.16.6. Standard Grading Certification Letter

Date:

Town of Caledon
Public Works and Engineering
6311 Old Church Road
Caledon, Ontario
L7C 1J6

Attention: Director of Public Works and Engineering

RE: CERTIFICATION OF FINAL LOT GRADING
 ..........SUBDIVISION – PHASE........
 PLAN NO: 43M - ...........LOT NUMBER.......... 

We have reviewed the final grading with respect to the above lot(s) and have viewed the finished building thereon and do hereby certify that the building constructed and the grading of the lots is in general conformity with the overall grading plan and the “Certification of the Proposed Building and Lot Grading” previously submitted. Also, we hereby certify:

1. Where manholes and catchbasins are present on property, all have been raised to the final grade, are uncovered and in a clean condition.
2. Roof leader downspout locations and outlets are in general conformance with the approved Grade Control Plan(s) for Registered Plan 43M-.....
3. Driveway aprons have been constructed to the latest Town Standard.
4. A minimum of 150mm of foundation wall is exposed above the finished grade.

Lot Grading Certification shall not relieve the Builder/Developer of his responsibility to correct any lot settlements or deficiencies that may occur, prior to assumption by the Town.

Yours truly,

Engineering Limited
(Place Engineer’s Stamp)

Project Manager

(This ORIGINAL certificate must be signed and be stamped by a Professional Engineer licensed to practice in the Province of Ontario. The certificate must clearly state the Planning File Number for the subdivision/ servicing agreement, 21T- (if applicable) and Registered/ Reference Plan Number(s), 43M-/ 43R- . )
5.16.7. Retaining Wall Sample Letter

Company’s Letterhead
(Engineering Firm)

Date:
File: (Registered Plan No.)

Town of Caledon
6311 Old Church Rd.
Box 1000
Caledon East, ON
L0N 1E0

Attention: Director of Public Works and Engineering

Gentlemen:

Subdivision __________________________ R.P. 43M - ____________
Lots ___________________________ R.P. 43M - ____________
Retaining Wall Constructed of __________________________
Maximum Height _________ m __________________________

This letter is to certify that the above-described retaining wall was adequately designed, and subsequently constructed, in accordance with the design to support the dead and live loads applied upon the structure.

This is also to certify that the above retaining wall has been designed and constructed in accordance with all the applicable standards and regulations.

Sincerely,

Company Name

Engineer’s Signature & Stamp

Developer
5.16.8. Sample Letter of Request for Reduction to Securities

This form shall be used in requesting reductions in Letters of Credit. Please note the last line of this letter and be advised that all requests for these reductions must be accompanied with the Developer’s Statutory Declaration with respect to outstanding accounts, liens and liabilities or the request will be directly returned.

Town of Caledon
Public Works and Engineering
6311 Old Church Road
Caledon, Ontario
L7C 1J6

Attention: ________________________________

Project Coordinator

RE: ENGINEER’S COMPLETION CERTIFICATE

...............SUBDIVISION – PHASE...............  
PLN 43M-.......... 

We have inspected the municipal services now constructed for this development including any additional work and hereby certify that the works described in the subdivision agreement and detailed on the attached Letter of Credit Reduction Summary have been completed in accordance with the Town of Caledon and Region of Peel Standards and Specifications and good engineering practices. Accordingly, we would appreciate your consideration and approval of a reduction to the Letter of Credit No. ........... from $.......... to the amount of $.........., a reduction of $.......... 

Should you have any questions with regards to the above and enclosed, please do not hesitate to contact this office.

Yours truly,

Engineering Limited

(Place Engineer’s Stamp)

______________________________

Project Manager

(This ORIGINAL certificate must be signed and be stamped by a Professional Engineer licenced to practice in the Province of Ontario. The certificate must clearly state the Planning File Number for the subdivision/ servicing agreement, 21T- (if applicable) and Registered/ Reference Plan Number(s), 43M- 43R- .)
5.16.9. Landscape Conformance

Date:

Town of Caledon
Public Works and Engineering
6311 Old Church Road
Caledon, Ontario
L7C 1J6

Attention: Director of Public Works and Engineering

RE: LANDSCAPE CONFORMANCE
SUBDIVISION – PHASE
PLAN NO: 43M - __________, LOT NUMBER __________

I have reviewed the landscape plans from the most recent Submission and hereby certify that there are no conflicts with street hardware, and that they are in conformity with the proposed grading and municipal services for this development.

Yours truly,

________________________
Engineering Limited
(Place Engineer’s Stamp)

________________________
Project Manager

(This ORIGINAL certificate must be signed and be stamped by a Professional Engineer licensed to practice in the Province of Ontario. The certificate must clearly state the Planning File Number for the subdivision/ servicing agreement, 21T- (if applicable) and Registered/ Reference Plan Number(s), 43M/- 43R- . )
6.0 INDUSTRIAL/COMMERCIAL/INSTITUTIONAL SITE PLAN DESIGN GUIDELINES

6.1. **Introduction**

The following section outlines site plan servicing and grading design criteria for the Infrastructure Department. The applicant must also refer to the Town of Caledon's current Site Plan Control Manual prepared by the Planning and Development Department for additional requirements.

The applicant may also need to make submission to: Conservation Authorities, Hydro One, CNR or CPR, pipeline companies, Ministry of Transportation, Region of Peel, Ministry of the Environment, Niagara Escarpment Commission etc. and should be familiar with each agency’s criteria.

6.2. **Submission Procedure**

The applicant shall refer to the Town of Caledon’s current Site Plan Control Manual prepared by the Planning and Development Department. The consultant shall prepare a Site Engineering Estimate (stamped and signed) for the purpose of obtaining securities. This estimate shall be forwarded to the Planning Department with the submission and will include, but not be limited to, the cost of storm sewers, catchbasins, manholes, bedding, subdrains, SWM and erosions controls, earthworks, granular road base, asphalt, sidewalk and curbs.

6.3. **Review by Subdivision Consultant**

Should the site be located in an unassumed subdivision then the Subdivision Engineer may be required to review and approve the Site Plan and Stormwater Management Report prior to submission to the Town. The Subdivision Engineer must certify that the site grading conforms to the approved Grade Control Plan, the overland flow route is maintained and that the allowable stormwater release rate is not exceeded.

6.4. **Site Plan Drawing Requirements**

1. The Site Servicing and Grading Plan shall be prepared in AutoCAD in a version compatible to the Towns version and at a metric scale of 1:250 to provide a clear and legible site plan.

2. A Key Plan showing the location of the property in relation to provincial, regional and municipal roads, complete with a north arrow and bar scale shall be included.

3. The project name, date, municipal address and legal description (i.e. lot and concession number and/or registered plan number with applicable lot/block number) shall be included.
4. A Geodetic Benchmark from which the topographic survey was derived shall be included.

5. A legend including, but not limited to: statistics, revision numbers and dates, symbols for existing/proposed grades, major system/overland flow routes, drainage direction, retaining walls, catchbasins and manholes, abbreviations etc. is to be included.

6. All Site Servicing and Grading Plans must bear the stamp and signature of a Professional Engineer. (In a plan of subdivision the grading plans may need to be certified by the original developer’s consulting Engineer prior to the submission of the site plan.)

7. A Stormwater Management Report (with a description of stormwater management techniques drainage, channels, flow patterns, easements, swales, ponding and storage area, % grades, ratio of slopes, etc.) must accompany the Site Servicing and Grading Plan and must bear the stamp and signature of a Professional Engineer.

8. An Engineering Cost Estimate, prepared by and bearing the stamp and signature of a Professional Engineer, is to be included. The items included in the estimate shall include, but not limited to: the cost of storm sewers, catchbasins, manholes, bedding, subdrains, SWM and erosion controls, earthworks, granular road base, asphalt, sidewalk and curbs.

9. Bearings and dimensions of the subject property, along with the dimensions of all buildings and structures including the height shall be delineated.

10. All site drainage and controls are to be self-contained within the lot unless otherwise approved by the Town.

11. Drainage from adjacent sites is to be considered and incorporated into the grading design. Grade differences at adjacent properties are to be matched or minimized. Existing elevations 20m beyond limits of site are required to determine the direction of existing drainage.

12. All grass swales are to be a minimum slope of 1.5%. Where a slope of 1.5% is impractical, the invert of the swale is to be of a hard surface such as concrete or asphalt. All swales or steep slopes are to be sodded. Maximum side slope allowable is 3:1.

13. Details of all stormwater management control features including roof top controls, on site storage, orifice plates, curb cuts, pond outlet controls are to be provided.

14. Indicate the elevation of SWM control along with a chart outlining the area in square metres of grass, paved and building.

15. Location of adjacent watercourses including top of bank and Regional floodline are to be delineated. (The layout of the site shall adhere to the appropriate setbacks dictated by the Planning Department and applicable Conservation Authority.)

16. All Silt and Sediment Controls are to be located within the drawing and shall reflect the latest Town of Caledon, Conservation Authority and MOE Standards.
17. All Private and Municipal easements and rights of way, sight triangles, 0.3m reserves, road widenings, land dedications and overland flow routes through the site shall be delineated along with Regional or Town Road widenings, if required, are to be identified and delineated.

18. The location of all on site existing and proposed utilities, as well as those on the entire width of the municipal right of way including, but not limited to: fire hydrants, streetlight or Bell telephone poles, transformer vaults, Bell Pedestals, guy wires, hydro, services, gas lines, existing trees, hydrants, valves, signs, sidewalks, all adjacent entrances on both sides of the road, curb depressions, ditches, culverts and cable shall be indicated.

19. All existing and proposed underground servicing information including, but not limited to: watermain, storm and sanitary sewers including size, inverts including connection invert at the mainline, slope and materials. Lines and connections to water, sanitary and storm sewers, all wells, septic tanks, lines and tile beds must be clearly indicated on the plan, as required. Setbacks and spot elevations surrounding and on top of the septic bed should be clearly dimensioned.

20. The location and dimensions of all pedestrian walkways shall be included.

21. The location and description of existing or proposed fencing and/or retaining walls shall be included. (Note: any retaining walls in excess of 1.2 metres (4 feet) must be accompanied by an Engineer’s stamp of approval.)

22. Driveway entrance locations shall indicate the location and type of curbing, entrance radius (to be 12.2 metres minimum, measured at the curb line) driveway width (minimum of 9.0 metres and a maximum of 12.5 metres in width). Should a culvert be required the culverts length, size and inverts are to be indicated. Driveways on adjacent properties should be delineated to ensure that the existing driveway is not to be disturbed as a result of the installation of services.

23. All factors affecting on-site traffic movement shall be clearly defined on the plan and include: proposed access points, fire routes and turning radii around buildings. As well as any items that may impact vehicle access onto the site (i.e. traffic signals, turning lanes, centre medians, sidewalks, etc.).

24. All parking areas shall be paved with asphalt or similar hard surface in accordance with the standards of the Town, unless otherwise prescribed by staff in writing. If allowed the Construction Notes should include the following (from the Town of Caledon Zoning Bylaw 3.4.4): The granular parking area shall be maintained with a stable surface which is treated so as to prevent the raising of dust or loose particles.

25. Existing and proposed spot elevations within the project site and on adjacent properties, in sufficient detail so that drainage patterns can be readily identified (including: % grades, slope ratios and directional arrows) are to be indicated.

26. Grade elevations for all berms, retaining walls and significant grade changes shall be provided. No earth slopes are to be greater than 3:1.

27. Top of foundation wall (T.F.W.) and finished floor elevation (F.F.E.) of the ground floor and entrance of all buildings are to be shown.
28. All existing manhole and catchbasin top elevations to be provided along with the existing centreline of road elevations.

29. Extent of any sidewalk removal and replacement at entrances is to be delineated. Complete details of replacement or new sidewalk are required including all relevant Town standard or OPSS drawing numbers.

30. Adequate snow storage areas are to be shown on the site plan and site lines shall be maintained especially at the site entrances.

6.5. General Notes

The following notes are to appear on the Site Plan:

1. Construction for this project to comply with the most current version of the Development Standards, Policies and Guidelines, prepared by the Town of Caledon Infrastructure Department and the Ontario Provincial Standards and Specifications.

2. All proposed construction shall be carried out in accordance with the requirements of the Occupational Health and Safety Act and Regulations for construction projects.

3. A minimum of forty-eight (48) hours prior to commencing construction within the municipal right of way the Contractor must contact the following:

   The Town of Caledon Public Works and Engineering Department
   905-584-2272

   The Region of Peel          Enbridge Consumers Gas
   Hydro One                   Bell Canada
   Rogers Cable                Fire and Emergency Services

4. All drainage to be self-contained and discharged to a location approved by the Public Works and Engineering Department and Conservation Authority prior to the issuance of a building permit.

5. Sediment control devices are to be installed prior to any construction on the site and shall be maintained throughout the construction period to the satisfaction of the Town and the applicable conservation authority.

6. A minimum of 1.2m clearance is to be provided from the limits of all sidewalks and driveways to existing utility structures within the municipal right of way. If this clearance is not maintained they shall be relocated at the applicant's expense.

7. Street curbs are to be continuous through the proposed entrance.

8. Municipal sidewalks shall be continuous through all entrances to the site and the curb shall be tapered back 600mm. Sidewalks shall be completely removed and replaced with a 180mm minimum concrete thickness, 30MPa and 5 to 7% air entrainment at all proposed industrial, commercial and institutional entrances.
9. Any changes to grades or servicing from the original approved site plan must be submitted by the Engineer to the Town for approval prior to construction.

10. Structural design of the fire route is required to support an 18 ton vehicle.

11. All boulevards to be restored with 150mm minimum of topsoil and sod to the satisfaction of the Town of Caledon Public Works and Engineering Department.

12. The minimum pavement design for the asphalt driveway apron within the municipal road allowance shall be as follows:

- 40mm HL3 Asphalt
- 50mm HL8 Asphalt
- 150mm Granular ‘A’
- 300mm Granular ‘B’

The consultant should review the above with respect to the expected usage.

13. Service Connection Backfill to be discussed with the Town.

6.6. **Grading Design**

The grading design for the site must adhere to the following criteria:

1. The consultant shall ensure that in the event of mechanical failure or during a major storm event that all structures are protected against flooding. A major system overland flow route shall be incorporated into the design to safely convey flows to an approved discharge location.

2. Site storm drainage to be self-contained and shall not adversely affect adjacent properties. Existing property line grades are to be matched. Grading shall not extend onto adjacent properties without prior written consent from the adjacent property owner.

3. Streetline grades are to be set to ultimate road elevations. Slopes within the municipal right of ways shall be as per Standard No.’s 201 to 220. Landscape berms shall not encroach onto the municipal right of way.

4. **Allowable Minimum/Maximum Grades**

- Landscaped Areas 2 to 6%
- Maximum Sideslope 3:1
- Asphalt Areas 0.5 to 6%

**NOTE:**

Maximum velocities should be checked and maintained below 1.5m/s to protect against erosion.
5. Proposed elevations are to be indicated for the finished floor elevation, top of foundation wall, at all changes in grade, at building corners, entrances to buildings, top and bottom of curbs, catchbasin and manhole tops.

6. Drainage shall not pass over retaining walls and a suitable outlet is to be provided for the subdrain. Proposed elevations are to be given at both the top and bottom of the retaining wall. Additional design criteria can be found in Section 3.12.5.

7. All curb heights are to be 150mm unless otherwise noted.

8. Roof leaders which discharge to grade shall not be directed on or near asphalt or pedestrian travelled areas but instead to large open grassed areas.

9. Catchbasins shall be located in the driving lane of the parking lot and outside of designated parking areas. The consultant shall ensure that the following ponding depths will not be exceeded in the event of mechanical failure:
   - Paved Area 0.3m
   - Landscaped Area 0.5m
   - Loading Area 1.0m

10. The applicant shall review any existing development agreements to determine their effects upon the subject site.

6.7. Servicing Design

The consultant shall design the site servicing in conformity with the following:

- All external drainage should be considered and accounted for in the storm drainage design.

- A storm sewer inspection manhole is to be located 0.3m inside the property line.

- All piping shall be clearly labelled with the pipe size, length, slope, flow direction, material and invert elevations.

- Connection type to the municipal sewer is required, i.e. tapping saddle per manufacturers specifications or as per OPSD 708.010 must be indicated on the site plan.

- In extreme situations where a minimum of 1.2m cover is not provided for, the pipe must be insulated and concrete encased from junction to junction, no spot encasing is permitted to avoid potential shearing of the pipe. The extent of this treatment must be delineated on the site plan and a detail provided.

- The sewer invert of a proposed connection must be equal to or higher than the obvert of the receiving municipal sewer at the connection to the municipal sewer. The connection type must be identified on the site plan.
• The diameter of the receiving sewer must be twice the size of the proposed connection or else a manhole must be installed or an existing one connected into. Benching details are to be provided.

• Valve boxes are to be located outside the driveway or sidewalks. Frost collars shall be provided on water boxes if driveway installation is unavoidable.

• All catchbasins within the site shall have 0.3m deep sumps.

• Storm sewers to be designed in accordance with Section 3.2.3 and the Ontario Building Code.

• The availability and adequacy of the existing water supply and sanitary sewer system shall be determined by contacting the Region of Peel.

6.8. Traffic Analysis

Consideration should be given to the impact the site plan has on existing traffic and the introduction of any new traffic from the site on the adjacent road system. The Public Works and Engineering Department, MTO or the Region of Peel may request that a traffic impact study or report be undertaken should it be deemed necessary.

6.9. Stormwater Management (SWM)

These guidelines are for site plan developments that are less than 5 hectares in size. Every applicant proposing development in the Town is responsible for the quantity and quality treatment of storm drainage runoff to mitigate the impacts of development. The consultant should be in consultation with the Public Works and Engineering Department and the local Conservation Authority to determine whether there is a Master Environmental Servicing Plan or Master Drainage Plan prepared for the region where the site is situated.

The proposed runoff calculations can follow the design criteria described in Section 3.2.3.1 for sewer design in residential areas. Since the site areas are less than 5 hectares the Rational Method can be used to determine runoff conditions. If there is a Drainage Plan with the runoff calculated by some other means it may be necessary to substantiate any deviation from the original plan by using the same model for comparison purposes. This will be established in consultation with Public Works and Engineering Department staff.

Rainfall Intensity

The intensity of rainfall is to be determined from the most recent Town of Caledon Standard Intensity – Duration – Frequency – Rainfall Curves in accordance with Town Standard Drawing No. 112.00. The equations for the I.D.F. curves are listed in Town Standard No. 115.00.

Time of Concentration

The minimum initial time of concentration is to be 5 minutes for local site plan sewer design.
6.10. **Site Grading**

Grading shall be designed such that if all mechanical systems fail then the major system/overland flow route will be capable of conveying the flows associated with the 100 year storm. The major system/overland flow route must be clearly indicated upon the plans and noted in the legend. Depths shall not exceed Town Standards noted elsewhere within this document or the maximum ponding depths permitted: 0.3m in drive aisles; 0.5m in landscaped areas; and 1.0m in below grade loading areas.

In situations where site servicing or grading constraints do not permit conveyance of the major overland flows directly to an existing R.O.W. or Town easement, the Consultant shall undertake the following options:

- Investigate an alternate path in which easements through adjacent properties would have to be obtained.
- Local site storage would be modified to use the local site sewer as the outlet control for the 100 year event taking into account all hydraulic calculations for potential submerged outlets. (Storage not to exceed previous depths.)

6.11. **SWM Quantity and Quality Controls**

The available techniques that can be considered on an individual site are found in the 2003 MOE SWM Planning and Design Manual. The Consultant can follow the design criteria in the MOE Manual or the more specific sizing measures provided in this section.

Specific measures that are more suited to ICI site plans are summarized as follows:

6.11.1. **SWM Quantity Controls**

Roof top storage, parking lot storage, landscaped area storage, on-line storage (oversized pipe or tank), extended detention facility (wet or dry).

6.11.2. **SWM Quality Controls**

Infiltration/recharge trench, grass swales w/ perforated pipe, grass swales w/ rock check dams, vegetated buffers, extended wet detention facilities, wetlands, oil/grit separators. (The use of roof top storage can reduce the storage requirements elsewhere on the site. The runoff from the roof can be separated from the remainder of the runoff when designing quality control measures to be implemented onsite.)

6.11.3. **Roof Top Controls**

Roof drain controls are to be indicated on the plan including: type of control, number of drains and weirs, location(s) of outlets, release rate per weir and total release rate, volume detained, drain down time (maximum 24 hours) and ponding depth (maximum 150mm). Drains are not to be located more than 15m from the edge of the roof and not more than
30m from the adjacent drains. There must be at least one (1) drain for each 900 square metres. At the discharge point for the roof drains, an orifice plate shall be installed such that the rate of discharge is equal to that of the roof drain design.

6.11.4. Infiltration

The use of infiltration trenches can be considered on sites where soil conditions are appropriate. These measures can be used to augment water quality measures in areas with sandy soils. Sandy soils typically range in coefficient of permeability from 1-10cm/sec (coarse sand) to 5-10cm/sec (silty sand). An oil/grit separator should be used to capture flows from pre-treatment prior to entering the infiltration trench.

6.11.5. Grass Swales

The use of grassed swales to provide water quality treatment has limited use but can be used in conjunction with other methods. Runoff passing through the soil/air interface in the grass can provide water quality treatment. For small flows and low velocities, swales can provide some treatment. The use of perforated pipe with a shallow sand filter will also increase quality treatment. Small dams will also help reduce velocities and promote longer contact time with vegetation. Swale should convey flows with velocity less than 0.5m/sec during a 25mm storm event. Swale length >30m.

6.11.6. Ponds

Ponds and wetlands are suitable for drainage areas greater than 5 hectares. They have been included in this section since there are possibilities of use in areas where sites larger than 5 hectares are being phased in smaller blocks. These features are to be sized using the criteria outlined in the 2003 MOE manual (Table 3.2).

6.11.7. Vegetated Buffers

The use of a vegetated buffer can be considered for small drainage areas (<0.3ha) and for flows that are not concentrated. The buffer should have a level of flow spreader that distributes the flow over an area (10m to 20m wide) that ensures a flow depth between 50 and 100mm during a 10mm 4 hour Chicago storm. For flat slopes the length of the buffer is 10 to 15m. For slopes greater than 5% the length of the buffer is 15 to 20m.

6.11.8. Oil/Grit Separators

Oil/grit chambers are to be used to augment other measures to be used for water quality treatment and are mandatory on sites where there will be storage of fuels or chemicals.
6.11.9. Outlet Controls

The control used predominantly on site plans is the orifice. The minimum size orifice to be used is a 75mm diameter opening. The minimum contributing impervious area to the storage location serviced by an orifice is 0.375ha. The orifice size, control chamber and location must be clearly detailed upon the plans.

6.11.10. Quantity Storage Requirements

Areas where stormwater management volumes are shown as ponded, the surfaces are to be paved and not left as gravel surfaces, which can be easily modified. The required storage is dependent upon the required controlled release rate and the percentage imperviousness of the site.

6.11.11. Quality Storage Requirements

The quality control requirement of extended detention is sized using $40m^3/ha$. The individual measures being implemented may achieve the required treatment without adhering to this sizing criterion.

6.11.12. Miscellaneous

Back-flow preventers will not be permitted.

6.12. Erosion and Sediment Control

All erosion and sediment must be minimized and controlled in accordance with the latest requirements of the CVC, TRCA and the Town of Caledon (Refer to “Erosion and Sediment Control Guideline for Urban Construction”, The Greater Golden Horseshoe Area Conservation Authorities, December 2006). No silt shall be permitted to leave the site or into or onto any waterways, wetlands or environmentally significant lands that crosses or is adjacent to the site. Silt Fence shall be erected, at a minimum, unless otherwise noted or directed, along the property limits. Mud pads will be required at construction access points to limit the amount of silt and dirt onto the roadway.

6.13. Utility Co-ordination

The Applicant is required to fill out a “New Utility Proposal” application, which is available through the Town of Caledon Public Works and Engineering Department. This form requests the utility companies to do a general review of the site plan. It shall be the responsibility of the Applicant to follow up with the utility to ensure there is sufficient infrastructure in place to service the site. The Applicant shall also be responsible to undertake utility locates prior to construction.
6.14. **Road Occupancy Permit**

A Permit for Installation/Relocation of Public Utilities must be obtained and the Town of Caledon Public Works and Engineering Department, Region of Peel or Ministry of Transportation. The Public Works and Engineering Department is to be notified 48 hours in advance of the commencement of any construction within the Towns municipal right of way. These works include but are not limited to curb cuts, culvert installation, service connection and utility installation.

All works are to be done at the Owner’s expense.

Town forces shall install entrance culverts, unless otherwise directed by the Town. The Applicant shall apply for an entrance culvert permit at which time the Town will determine if the Applicant’s Contractor is competent to install the culvert to Town Standards or better. If it is determined the Applicant may install the culvert with his Contractor then a road occupancy permit is required by the Contractor or his representative. The Owner/Applicant shall restore all disturbed areas within the municipal right of way to original or better conditions in accordance with the Road Occupancy Permit or otherwise approved on the Site Plan and to the satisfaction of the Town of Caledon. It shall be the responsibility of the Owner/Applicant to ensure that all street furniture is not buried during construction and that they are adjusted to the proposed grade.

No planting, berming or landscaping will be permitted within the Town right of way unless otherwise approved.

It shall be the Owners/Contractors responsibility to ensure that any mud or material, which is tracked onto the road, is removed immediately. Should the roads not be kept free and clear of mud and debris it shall be cleaned, without notice by Town forces at the Owner’s expense.

6.15. **Final Lot Grading Inspection**

A qualified engineering firm shall monitor construction of the site grading and servicing. Once construction is complete a certificate stamped and signed by a Professional Engineer stating that the “As Constructed” work complies with the approved Site Plan, Stormwater Management Report and the Site Plan Agreement. The certificate shall follow the format found in Section 5. All sod, landscaping and asphalt works, and rooftop and flow control devices must be installed and inspected by the Engineer for the certificate to be valid. The engineer must confirm that the stormwater storage volumes are available and that the major system will function without flooding adjacent structures.

6.16. **Lighting**

All site plans shall have consideration for the effect on night sky and regard for residential areas. No light for the site shall cast onto adjoining properties unless otherwise approved.

All on-site exterior lighting is to be directed downward and internal to the site and shall in no way infringe on adjacent properties.
The maximum height of all lighting fixtures is 9.0m with Type II fixtures and a note shall appear on the drawings to this affect.
### 6.17. Site Plan Checklist

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
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<tr>
<td><strong>Site Plan</strong></td>
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<td>Site Services and Grading Plan stamped by a P. Eng?</td>
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<td>Site to be reviewed by Subdivision Engineer? Or Assumed?</td>
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<td>Site Engineering Cost Estimate Provided/Stamped?</td>
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<td>Gen. info., legend, north arrow, metric, scale, notes, key plan etc.?</td>
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<td>Geodetic Benchmark Information provided?</td>
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<td>Road Widening Provided?</td>
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<td>Traffic issues including driveway locations identified?</td>
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<td>Curb cut length, driveway width and curb radii indicated?</td>
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<td>Adequate setbacks to utilities?</td>
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<td>Stamped retaining wall detail with handrail?</td>
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<td>Match Existing Grades at Property Line?</td>
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<td>Minimum/Maximum slope adhered?</td>
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<td>FFE and TFW elevations (TFW 0.15m above grade) indicated?</td>
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<td>Elevations and % grades indicated on drawing?</td>
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<td><strong>Servicing</strong></td>
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<td>Pipe size, length, slope, flow direction, material and invert elevations?</td>
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<td>Road restoration notes included?</td>
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<td>Storm drainage self-contained?</td>
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<td>Allowance for external drainage?</td>
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<td>Silt and Sediment control measures implemented?</td>
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7.0 DESIGN DRAWINGS AND STANDARD DRAWINGS

- Town of Caledon Design Drawing Index
- Town of Caledon Design Drawings