

# 10.0 ENGINEERING GUIDELINES

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## CHAPTER 10



## 10.1 Parking And Access Management Guidelines

### 10.1.1. Parking

- SG1. The maximum number of parking spaces permitted shall be in accordance to the Development By-Law provision and shall be limited according to their lot sizes.
- SG2. Parking area shall be calculated as part of the landscape open space if it contains sustainable paving materials and detailing.
- SG3. Parking location shall be integrated into the design of buildings and prevented from

dominating the streetscape or becoming a buffer between pedestrians and the street front.

- SG4. Parking shall not be used as a buffer between the pedestrian realm and the development and shall only be located at the rear of the property.
- SG5. Access to parking areas shall be well defined.
- SG6. Each parking space shall be designed to allow a vehicle to move in and out easily.
- SG7. Parking onto a major on-site driveway shall be discouraged.

### Secondary Plan (SPA2) Policy 5.6.2.6 d)

#### Parking and Access

i) The consolidation of driveway accesses to rear parking areas along Main Street North shall be strongly encouraged. In this regard, an Access Management Plan may be prepared by the City to guide decision-making as development and redevelopment is proposed.

ii) While it is expected that on-site parking will be provided for uses, it is the intent of the City to provide opportunities for public parking for non-residential uses within the Main Street North right-of-way, along side streets and in municipal parking lots in the area and to minimize the need for on-site parking.

iii) Outside of Special Policy 2A and 2B areas, the City may only require on-site parking spaces for residential uses, restaurants, medical clinics and any accommodation facility where overnight stays are proposed.

iv) Use of shared parking facilities and interconnected rear parking areas is encouraged.

v) Provision of parking between the building and the street for lots fronting onto Main Street North, shall be avoided wherever possible. Views of parking areas from the public realm shall be screened through the use of landscaping and decorative fencing.

vi) To ensure compatibility of parking in rear yards with adjacent uses, appropriate screen fencing and landscaping shall be provided along the property line adjacent to the parking area.



Figure 10.1 Driveway Location





- SG8.** Location of parking areas shall be in accordance with OP policies, BPS By-Law and applicable Guidelines in Chapter 5.
- SG9.** The design of parking areas shall promote safe traffic flow.
- SG10.** Unless specified in the by-law, each parking space shall have a minimum width of 2.7 metres with 5.4 metres length and 6.6 metres aisle width for double row of 90 degree parking.
- SG11.** Site accesses shall be located in such a manner as to reduce traffic conflict or confusion; i.e. It should have sufficient distance from the intersection of roads, be in alignment with other accesses and be confined to right-in and right-out if necessary.
- SG12.** Street accesses and major internal aisles shall have a minimum width of 6.6 metres for two-way traffic in CMU2 zone. Where the traffic volume is high or the movement of a delivery truck is anticipated, the driveway width may be increased. In CMU3 zone access width shall be minimum driveway width.
- SG13.** Access radius should be 6 metres for passenger cars and 7.5 Metres for truck.
- SG14.** Access roads for fire fighting vehicles shall be provided in accordance with Ontario Building Code.
- SG15.** Traffic circulation on the site shall be provided with a simple and functioning pattern. Dead end driveways shall be avoided for commercial developments.
- SG16.** Internal one-way driveways shall be clearly indicated and signage for such clearly provided.
- SG17.** Delivery and servicing traffic should be separated as much as possible from passenger cars.
- SG18.** Delivery facilities shall be located away from a visually prominent area.
- SG19.** Delivery area shall have sufficient clearance for truck manoeuvre ability without difficulty.
- SG20.** The site layout shall provide on-site snow storage areas.
- SG21.** Access curbs should have a minimum of 1.2 metres clear setback from hydrants or utility poles.
- SG22.** All cars and trucks shall move in and out from the site in a forward motion and no backward manoeuvring shall be allowed on city streets.
- SG23.** In CMU3 zone, curb radius shall be appropriate for the volume of traffic based on the capacity and its impacts on streetscape and pedestrian realm. Reduction of curb radius may be considered.

### 10.1.2. Access Management Requirements

- SG24. Each lot shall be only be permitted to have one access point.
- SG25. Access for corner lot properties shall only be permitted from the side street.
- SG26. Property owners are encouraged to consider shared access driveways on one side of their property.
- SG27. Alternatively, driveways to property can be on the same side of the property but shall be restricted to a maximum of 6.0 m at the common access point from the public road.
- SG28. The preferred access location for each lot is as indicated in figure 10.2.



Figure 10.1 Preferred Driveway Location



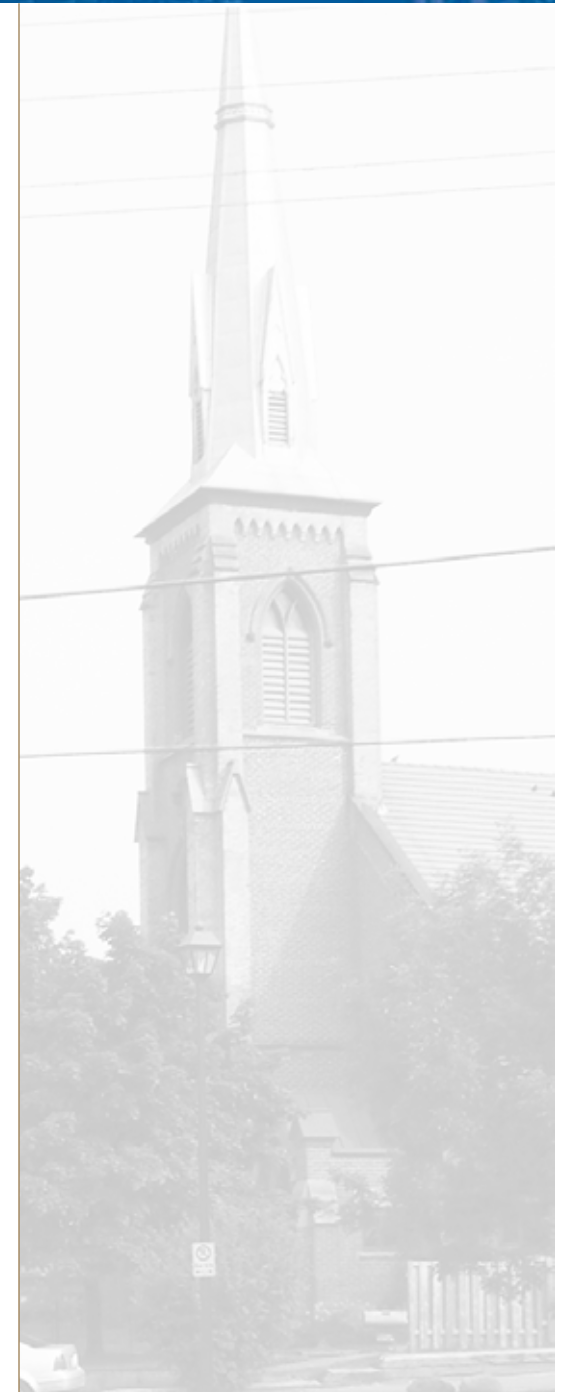


**10.1.3. On Street Parking**

- SG1. The City shall permit paid on street parking along Main Street North and the side streets as needed.
- SG2. Reduction of parking requirements shall be considered in accordance with the provision in the Development Permit By-law.



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**Secondary Plan (SPA2) Policy****5.6.2.6 g) i)**

*All lighting shall be internally oriented so as not to cause glare on adjacent properties or public roads. Outdoor lighting fixtures that reduce energy consumption and direct light away from the night sky shall be encouraged.*

**Official Plan Policy 4.4.3.8**

*Within the Central Area, parking requirements for certain uses may be eliminated or reduced within the implementing Zoning By-law to both encourage appropriate development and recognize the pedestrian oriented nature of the area."*

**10.1.4. Parking Lighting Guidelines****1. Goal**

The goal of this lighting guideline is to enhance the attractiveness and livability of the Main Street North neighbourhood during the night without compromising the safety, security and well-being of persons engaged in outdoor nighttime activities and impacts on adjacent residential areas.

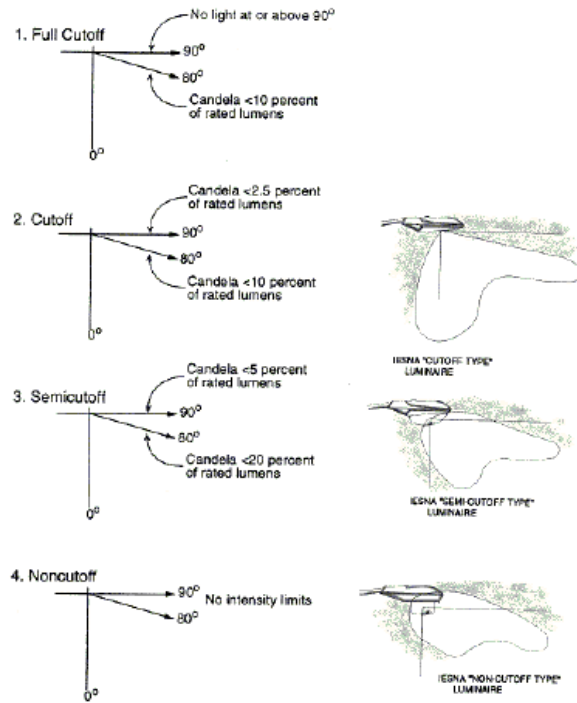
**Objectives**

- To control the obtrusive aspects of excessive and careless outdoor lighting usage while preserving, protecting and enhancing the lawful night use and enjoyment of the property and the surrounding areas.
- Encourage energy conservation through the use of efficient lighting technologies.
- Provide minimum and maximum light levels and establish standards of lighting uniformity to enhance night vision and security.

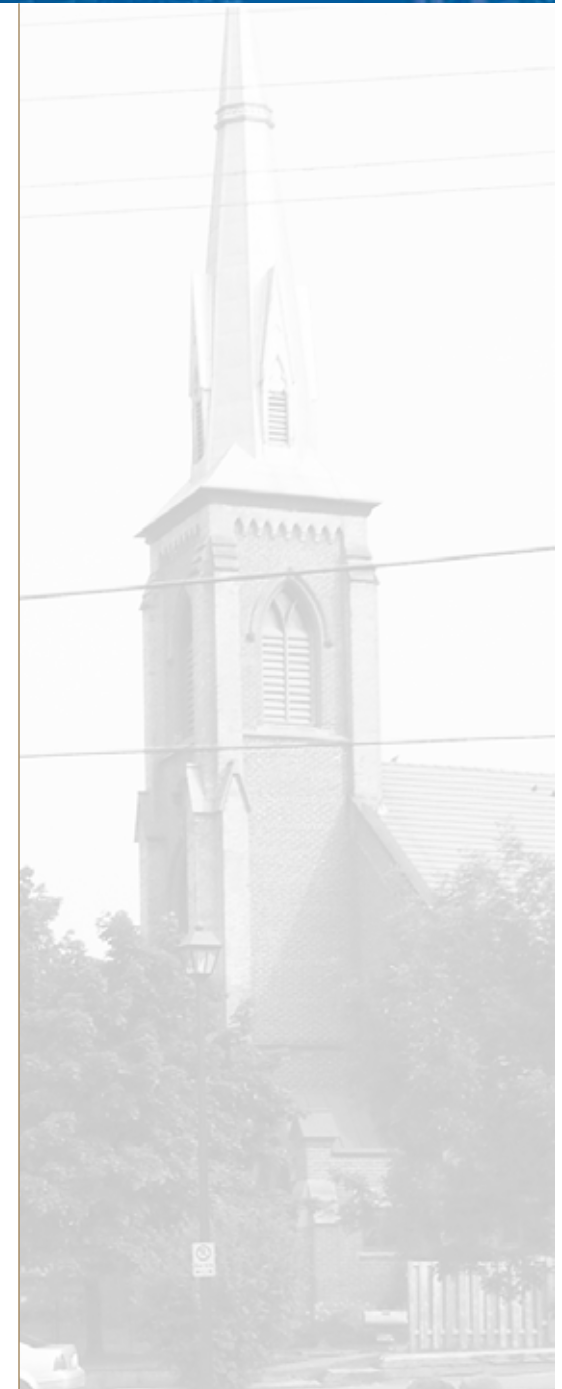
**2. Guidelines**

- SG1. Appropriate lighting arrangements shall be provided for parking areas and pedestrian walkways.
- SG2. Ensure that parking areas, public gathering places, approaches to buildings and other areas active at night have adequate outdoor illumination.

- SG3. Minimize the adverse impacts on public safety and comfort due to excessive glare. Lights shall be unobtrusive and designed to avoid glare into neighbouring properties, public space and night sky.
- SG4. Minimize spillage of light on adjacent or nearby property. Lights should be directed downward and not to the sky.
- SG5. Minimize the effects of sky glow. Avoid flood lighting the entire yard, parking area or patio.
- SG6. Select light fixtures that are architecturally compatible with the theme and height of the building.
- SG7. Security lighting should be hooded, recessed and directed to the intended area to avoid unnecessary glare.



The standards in this section are based on the standards in the IESNA Lighting Handbook, 9th Edition and "Lighting for Exterior Environments: An IESNA Recommended Practice," RP-33-99; both published by the Illuminating Engineering Society of North America. These publications shall be used in interpreting undefined terms and unclear provisions of this section.



## Secondary Plan (SPA2) Policy

### 5.6.2.6 e)

#### Site Servicing Policies

##### g) Site Servicing Principles

i) All lighting shall be internally oriented so as not to cause glare on adjacent properties or public roads. Outdoor lighting fixtures that reduce energy consumption and direct light away from the night sky shall be encouraged.

ii) Site and building services, utilities and mechanical equipment, shall be located and/or screened from public streets and adjacent residential areas or other sensitive land uses, in order to mitigate their visual and operational impacts.

iii) Waste storage areas should be integrated into the main building on the lot. Waste storage areas external to the main building shall be enclosed and shall not face a public street.

iv) Service and loading areas shall be located away from streets so as to minimize disruption or conflicts with adjacent land uses and sidewalks and allow for the appropriate screening of such areas. Loading and service areas should be buffered for noise impacts, particularly when located in the vicinity of sensitive land uses.

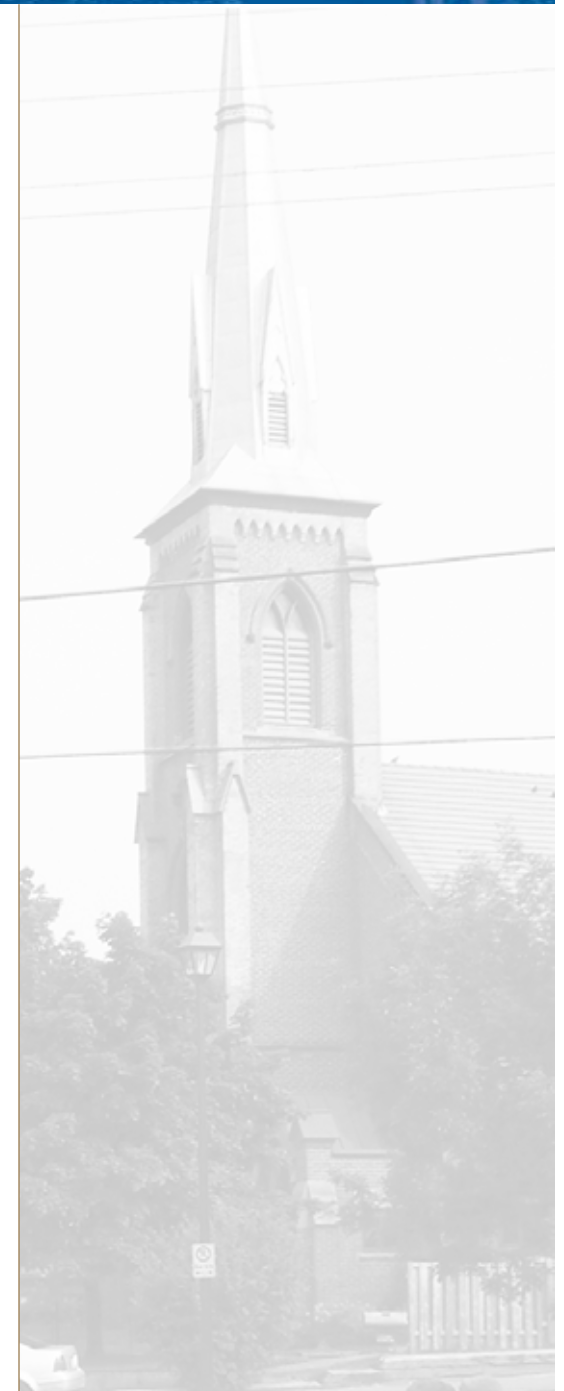
## 10.1 Engineering Grading And Servicing Guidelines

### 10.1.1. Drawing Requirements

- Site servicing and grading plans submitted to the Engineering and Development Services Division for approval must comply with City Standard #422 and the following items must appear on all plans. (Note: All plans are to be folded rather than rolled).
- Stamped approval is required by the subdivision Consulting Engineer if the site is located within an unassumed plan of subdivision. The subdivision Consulting Engineer must certify that the property line grading and stormwater management design conforms to the approved subdivision engineering plans and drainage design. All drawings and the stormwater management report must include the following:
  - “The proposed lot grading and drainage is approved as being in conformity with the overall approved grading plans for the subdivision.”
  - Development Permit Application number (DP \_\_\_\_ - \_\_\_\_), Project Name, Scale, Geodetic Benchmark, Municipal Address, Lot # and date of plan.
  - Site plan must be in metric scale.
  - Include a key plan, including the nearest major intersection, north arrow and legend.
  - Indicate any existing above ground utilities and trees within and around the site.
  - Indicate any existing 0.3 metre reserves across the frontage of the site (or flankage) and all road widening required by the City, Region or M.T.O.
- Existing and proposed entrance width and curve radii to be dimensioned.
- Location of all existing and proposed curb cuts and sidewalks must be identified. Existing curb cuts that are no longer required must be reinstated to O.P.S.D. or City standards, as required.
- All existing driveway locations adjacent to the site or across the road must be shown.
- Watercourse, swale, culvert, retaining wall, embankment, catch basin and other man-made or natural features on or adjacent to the site.
- Any easements or right-of-ways are to be shown on plan and identified as to the purpose and to whom the easement is in favour of.
- Finished floor elevations of buildings on adjacent properties must be indicated on the grading plans.
- Existing road centre line and top of curb elevations of frontage street must be shown at 20 metre intervals.
- Indicate grades with arrows and percent slope on laneways, parking/landscape surfaces and drainage swales.
- A stamp from a Civil Engineer licensed to practice in the Province of Ontario.

### 10.1.2. General Notes

- The following notes shall be included on all Grading and Servicing plans:
  - All the construction work for this project shall comply with the Standard Drawings and Specifications of the City of Brampton and the Ontario Provincial Standards and Specifications.
  - All surface drainage shall be collected and discharged at a location to be approved, prior to the issuance of a building permit. Drainage of abutting properties shall not be adversely affected.
  - Proposed elevations along site property lines must match existing elevations.
  - A silt fence as per City Standard #406 must be placed around the perimeter of the site.
  - At all entrances to the site, the road curb and sidewalk will be continuous through the driveway. The driveway grade will be compatible with the existing sidewalk and a curb depression will be provided at each entrance. Access construction as per City of Brampton Standard #237.
  - Sidewalk to be removed and replaced as per O.P.S.D. 310.010.
  - The portion of the driveway within the municipal boulevard must be paved with 40mm HL3 and 50mm HL8. Sub Base to be 150mm Granular "A" (or 130mm of 20mm crusher run limestone) and 300mm Granular "B" (or 225mm of 50mm crusher run limestone) compacted to 100% standard proctor density.
  - A utility clearance radius of 1.2 metres between the proposed driveway entrance curb return and all above ground utilities must be maintained.
- Road occupancy/access permit must be obtained 48 hours prior to commencing any works within the municipal road allowance.
- The service connection trench within the traveled portion of the road allowance shall be backfilled in accordance with the requirements of the road occupancy/access permit application.
- Within the City's right-of-way, storm sewers and storm sewer connections must be concrete or approved equal with type "B" bedding throughout. The strength of the concrete pipe must be as per City Standard #341 and as follows; minimum 65-D for reinforced pipe and minimum ES for non reinforced pipe.
- The minimum catch basin lead diameter allowed is 200mm.
- Storm sewer pipes connecting to the City's storm sewer shall not be smaller than 200mm.
- All catch basin manholes and manholes with inlet control devices must have a minimum 0.3 metre sump and top, as per municipal standards.
- Foundation drains shall not be connected to the storm sewer on sites with stormwater management control.
- It is the responsibility of the design engineering consulting firm to ensure that an elevation detail of existing aerial plant is submitted when overhead cabling is present. Cables shall not be less than 4.7 metres from the highest point of the finished pavement to the lowest point of the aerial cable directly above the pavement area to ensure clearances are met.





- Provide this note if applicable – “The building sited on this plan has been designed utilizing controlled flow roof drains in accordance with local municipal standards.”
- Provide this note if applicable – “The owner’s attention is drawn to the fact that the storm sewer being proposed underneath the building is not a recommended practice of the City of Brampton – Planning, Design and Development Department. It is the sole responsibility of the owner in the event of any damages to the storm sewer or settlement of the building foundation.”

### 10.1.3. Lot Grading Criteria

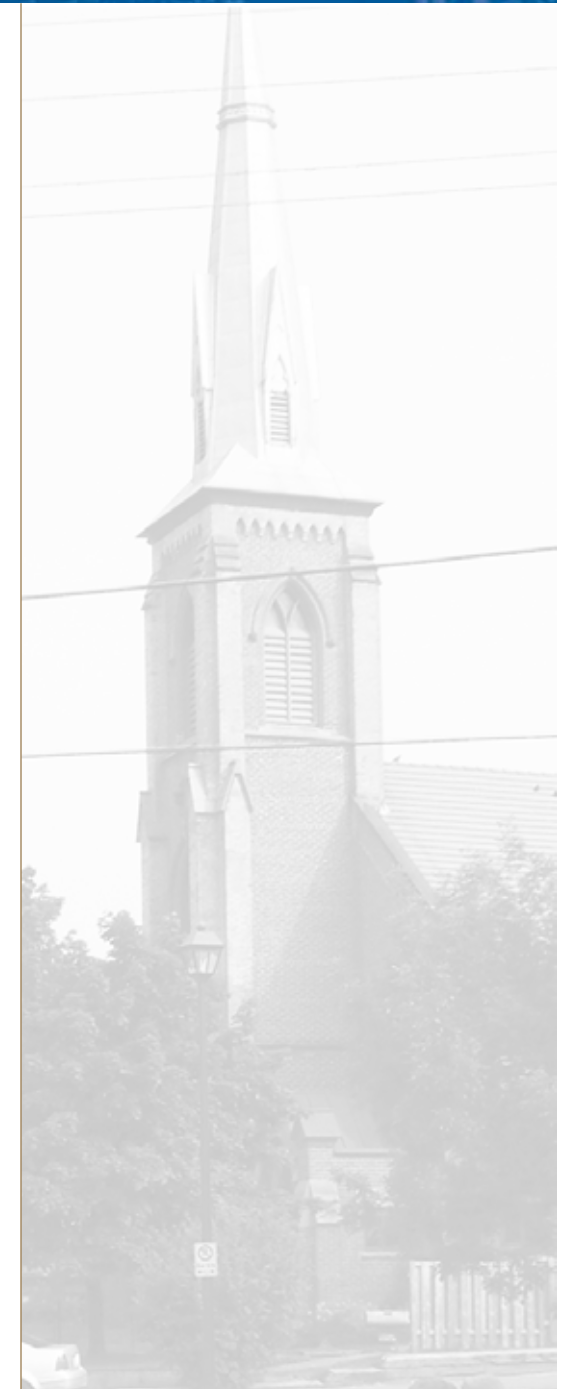
- SG1.** Ensure that all drawings are consistently detailed between the servicing plan and the grading plan.
- SG2.** The maximum ponding depth permitted is 0.3 metres in parking areas, 1 metre in below grade loading docks and 0.5 metre in approved landscaped areas. Institutional sites shall not have ponding greater than 0.3 metres under system failure.
- SG3.** Municipal boulevards must be graded between 2% and 6% maximum.
- SG4.** Within the site, the following grading criteria is to be used:
- a) Driveway grades 2% to 8%;
  - b) Other asphalt grades 0.5% to 8%;
  - c) Sodded areas 2% to 6%;
  - d) Landscaped berms to be a maximum 3 horizontal: 1 vertical grade (3:1);
- SG5.** Proposed elevations along all property lines must be compatible with the existing or proposed elevations of adjacent sites. Grading shall not extend onto adjacent properties unless written approval is obtained from the landowner previous to grading approval.
- SG6.** Existing ground elevations for 5 and 10 metres outside of property line, at 20 metre intervals, must be provided and the direction of drainage on the adjacent lands must be shown to the satisfaction of the Director of Engineering and Development Services.
- SG7.** If retaining walls are required the following criteria is to be followed:
- a) All retaining walls are to be concrete or heavy block concrete products; the use of timber will not be accepted. The backfill is to be compacted free draining granular material.
  - b) All retaining walls are to be designed, approved and stamped by a Consulting Engineer specializing in structural engineering. The design must be accompanied by calculations clearly demonstrating that it is structurally satisfactory for the particular location and soil type.
  - c) The detailed drawing shall include the following notes:
    1. The subject walls have been designed in accordance with accepted engineering principles
    2. The wall is suitable for the geotechnical condition of the site and
  - e) Swales: min. 2% for institutional sites, min. 1% for commercial and industrial sites

for the type of loading.

- d) The detail drawing shall show a weeping tile and incorporate a filter cloth envelope.
- e) The installations are to be inspected during construction and certified in writing by the Consulting Engineer as to conformity to design and suitability for the site conditions.
- f) For retaining walls 0.6 metres in height or less, approved lightweight slabs using tiebacks will be permitted. A geogrid fabric or equivalent must be utilized as the tie back medium.
- g) For retaining walls greater than 0.6 metres, the following systems may be utilized:
  1. A concrete tie-back system,
  2. A heavy block system,
- h) Protective fencing is required where the exposed retaining wall face height exceeds 0.6 metres. The structural stability of this wall must be able to withstand the extra force exerted by the fence as well as the earth loads.
- i) Retaining walls shall not be located less than 1 metre from noise wall footings, except where absolutely necessary, at the discretion of the City and as designed and certified by a structural engineer for both walls.

#### 10.1.4. Storm Drainage

- SG8. The internal storm sewer system shall be designed for the 2-year post development storm event.
- SG9. The elevations along the property line should be carefully examined with respect to external drainage. The impact of external drainage must be addressed and provided for as required.
- SG10. Site drainage shall be self-contained with only the municipal portion draining onto public roads.
- SG11. Grading must be completed such that an overland flow route is maintained assuming all mechanical systems fail. This route must be clearly identified on the drawings including the ultimate outlet of the overland flow route (i.e. watercourse or roadway). The maximum ponding depths as outlined in section 4.2.2 must not be exceeded.
- SG12. For storm sewers, the length, slope, size of pipe, pipe material, class of pipe and inverts at all connections must be shown.
- SG13. Frost protection is required where cover is less than 1.2 metres from the pipe obvert to grade. Delineate extent of insulation on plan and provide a dimensioned detail.
- SG14. Where utilities cross, a minimum clearance of 150mm must be provided between the top elevation of the lower pipe and the bottom elevation of the upper pipe.
- SG15. As a general guide, one catch basin is required per 1,000 square metres of parking lot area depending upon the layout of the site.





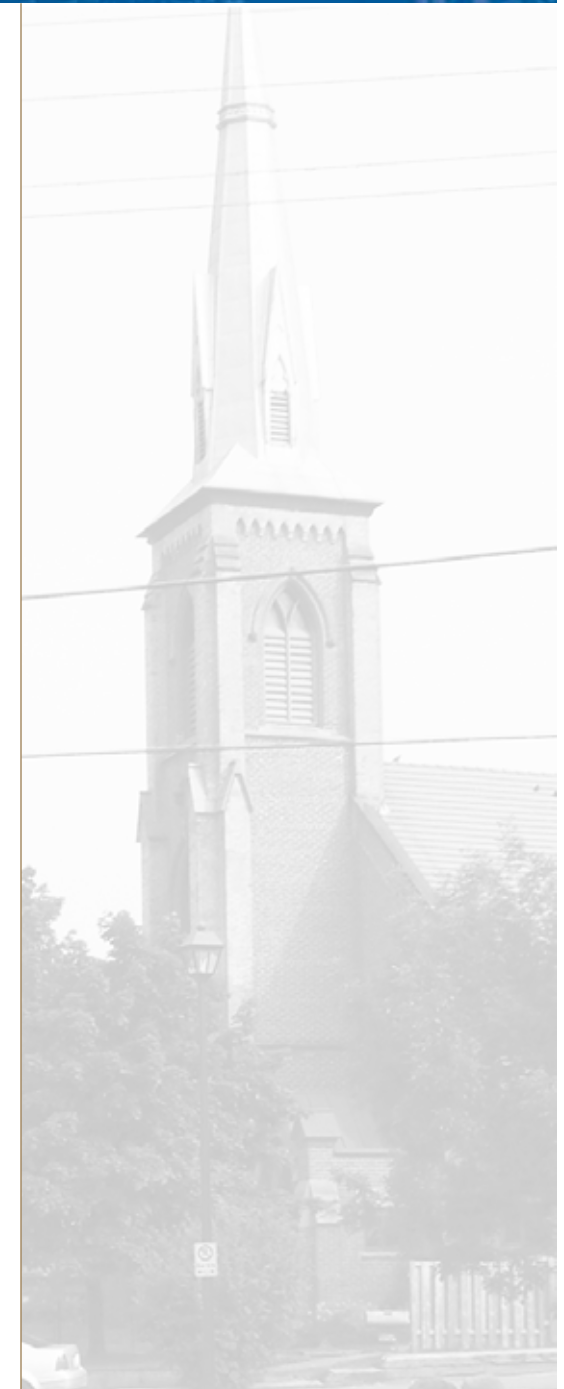
- SG16. The storm connection to the sewer in the street must have an invert above the spring line of the main sewer. A manhole is required if the storm connection lead is greater than one half the diameter of the street storm sewer.
- SG17. Drop pipes must be provided where difference in obverts between incoming and outgoing pipes exceed 500mm as per City Standard #314.
- SG18. The length of the sewer between the building and the first manhole to which the building sewer connects shall not exceed 30 metres.
- SG19. The storm sewer spacing between manholes shall be 90 metres.
- SG20. The minimum flow angle allowed is 90 degrees.
- SG21. Storm sewers proposed underneath buildings is not recommended. If proposed, a clause will be included in the site plan agreement in which the owner accepts sole responsibility in the event of any damages to the storm sewer or settlement of the building foundation.

- SG22. Each property must have a separate connection to the municipal storm system as per the Ontario Building Code.
- SG23. The control manhole or oil and grit separator should be located a minimum of 1.0 metre into the property.
- SG24. Fee-in-lieu for quality control is available at the City's discretion.
- SG25. The following runoff co-efficients shall be used:

Land Use	Co-efficient
Parks	0.25
Single and Semi-Detached	0.50
Multiple, Institutional	0.75
Commercial, Industrial, Road Right Of Way	0.90
Driveways / Parking lots (asphalt and gravel)	0.90

## 10.1 Storm Water Management

- SG26.** Stormwater Management (SWM) Reports must be submitted with the grading and servicing plans if required. The design criteria will be determined by the Engineering and Development Services Division and varies depending on the geographic location of the site within the City. The design criteria must be clearly stated in the report.
- SG27.** Stormwater management design must incorporate the City of Brampton IDF curves Std. #343.
- SG28.** Sites will use an inlet time of 10 minutes. Rural sites may have higher inlet times, which must be demonstrated with appropriate calculations.
- SG29.** SWM reports utilizing computer modeling must be done with an accepted model by the City of Brampton with a 2 to 4 hour duration storm and a maximum 10-minute time step.
- SG30.** The SWM Report must clearly state which method is being used to determine peak flow and storage required (i.e. rational method, OTTHYMO, etc.). Provide calculations indicating what the allowable discharge from the site is, what volume of storage is required and what volume of storage is provided.
- SG31.** The SWM report must define an orifice size. This orifice design must be correctly identified and detailed on the drawings. An orifice tube will also be required. The following criteria shall be used for the design of the restrictor pipe downstream of the orifice plate as a permanent stormwater quantity control for on-site storage to satisfy the Conservation Authority.
- SG32.** For sites with Oil/Grit Separator:
- An orifice plate, sized in accordance with the recommendation of the SWM report, shall be installed in the Control Manhole upstream of the Oil/Grit Separator.
  - A restrictor pipe, with manufacturer's standard pipe size equal to or one size larger than the orifice plate design, shall be installed between the Control Manhole and the Oil/Grit Separator located 1.0 metre from the Street line within the property.
  - The maximum length of the restrictor pipe shall be 5.0 metres. A manhole shall be installed at any change in pipe size within the site.
  - Downstream of the Oil/Grit Separator, continue with the required design storm sewer sizing or a minimum 200mm diameter storm sewer, whichever is greater.
- SG33.** For sites without Oil/Grit Separator:
- An orifice plate, sized in accordance with the recommendation of the SWM report, shall be installed in the Control Manhole.
  - A restrictor pipe, maximum 5.0 metres in length with manufacturer's standard pipe size equal to or one size larger than the orifice plate design, shall be installed downstream of the Control Manhole. If the restrictor pipe is less than 200mm in diameter, the restrictor pipe shall extend 1.0 metre into the City right-of-way and increase to a minimum 200mm diameter pipe size with an eccentric increaser.



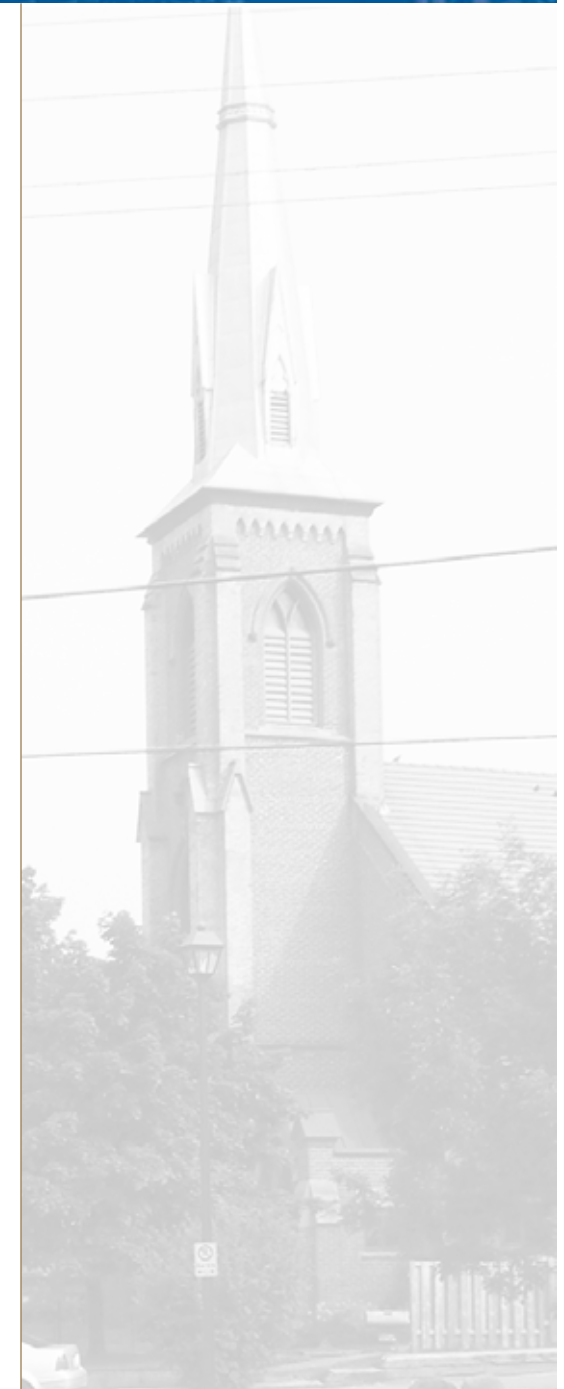


- Note: If the design of the orifice plate diameter is the same size of a manufacture standard pipe, an orifice plate will not be required upstream of the restrictor pipe.
- The orifice control device must be installed on the outlet pipe from the control manhole and conform to City of Brampton Standards. The control manhole must have a minimum 0.3m sump.
- If permitted, roof top storage details including control device type/ model (vandal proof), maximum depth, maximum flow, volume and number of notches per drain must be included in the SWM Report and shown on the Servicing Plan.
- Ensure that the required ponding areas are shown on the plan, and indicate ponding volume and elevation.
- Ponding (if permitted) is allowed in the following areas:
  - a) Rooftops (150mm max.)
  - b) Paved areas and parking lots (300mm max.)
  - c) Landscaped Industrial areas (500mm max.)(Only if the Parks Planning Division has approved the location. It is the Applicant's responsibility to obtain this approval in writing.)
  - d) Below grade loading dock (1000mm max.)
- The ponding depths on the site must be reviewed under the following two conditions:
  - a) A properly functioning stormwater management system.
  - b) A failed stormwater management system, where the system has become surcharged or blocked.
- The resultant site ponding shall not exceed City of Brampton's specifications (as outlined in section 4.2.2.).
- Quality control for all site plans shall be designed to the M.O.E.'s enhanced level of protection (Level 1).
- Ensure Oil/Grit Separator is shown and properly detailed on the downstream side of control MHs (where required). Specify the name of manufacturer and model number. Fee-in-lieu for quality control is available at the City's discretion.
- The finished first floor elevation at each building must be compatible to the road and the adjacent buildings. (I.e. the F.F.E. should be a minimum 0.15 metres higher than the maximum ponding depth). One hundred-year basement protection must be achieved.
- No foundation drains are to be connected to the storm sewer on sites with stormwater management control.

## 10.1 Condominium Townhouses

- SG34. Condominium townhouse projects must be designed and built to the City of Brampton's Subdivision Design Standards and Specifications.
- SG35. If the site is a plan of condominium or co-operative housing project, the owner will have the option of posting the full security value for the project or may post the securities as follows:
- Prior to execution of the site plan agreement, the developer, in addition to the normal security for work on public lands and landscaping and fencing, would post an initial engineering security of \$10,000 and sign a pre-servicing agreement.
  - The developer could then proceed to construct the common element works in accordance with approved engineering plans without posting additional security up to the time the road is constructed to base course asphalt.
  - Once the road has been constructed to base course asphalt, before any building permits are issued, the developer's Consulting Engineer shall certify to the City that the completed works have been constructed in accordance with approved engineering plans.
  - The developer would then be required to post full engineering securities for the value of the remaining common element works to be completed plus 10% maintenance for works completed. This could take the form of applying existing engineering securities that might otherwise be available for reduction to the remaining common element works.

- SG36. The developer's consulting engineer shall be required to provide certification that the top of foundation wall has been constructed as per the approved site plan. This certification shall include the as constructed elevation of the foundation wall and shall be sent to the City of Brampton immediately after construction of the foundation wall.





## 10.1 Engineering and Development Approval Process

- If submissions are deemed incomplete in terms of the applicant's failure to provide all the necessary documents, then the department will return the submission.
- If the site is within an unassumed subdivision, the Engineering and Development Services Division will not review the grading plans unless the submission and report have been certified by the developer's consulting engineers (see section 4.1.1.).
- Two copies of the drawings and reports shall be submitted with the initial submission for review.
- The drawings will be returned with redline comments, if required, to the applicant who submits the plans to the Engineering and Development Services Division.
- No redlined revisions will be accepted. All drawings shall be fully completed by the applicant and all notes and approvals shall be included on the drawings prior to the approval by the Engineering and Development Services Division.
- At the time of approval, the Engineering and Development Services Division requires seven copies of all site servicing and grading plans and two copies of the SWM report and related calculations.
- All plans, reports, and calculations shall be stamped, signed and dated by a Civil Engineer licensed to practice in Ontario prior to Engineering and Development Services Division approval.
- The following security amounts are being used by the Engineering and Development Services Division:
  - \$25 per linear metre of site frontage
  - \$15,000 lot grading deposit for sites less than or equal to two (2) hectares in size.
  - \$20,000 lot grading deposit for sites greater than two (2) hectares in size.
  - \$300 per square metre of retaining wall or toe wall face.