Community Planning
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GRADING AND DRAINAGE CHECKLIST AND FAQ FOR LOW-DENSITY RESIDENTIAL PROPERTIES

GRADING AND DRAINAGE CHECKLIST AND FAQ

When is Grading and Drainage review required?

A Grading and Drainage review is required for all applications that require a Building Permit as part of the Pre-Building Approval Application Process. Any exterior construction which involves new structures (large or small), additions, new hard surfaces (asphalt, concrete, granular, interlock, and/or patio stones), or changes to the approved drainage pattern requires a Grading and Drainage review.

Do I need a Grading and Drainage Plan?

The following scopes may be EXEMPT from grading and drainage review:	**✓ if applicable**
Uncovered decks with no grading alterations	
Pergolas or accessory structures with an **open / slatted roof**	
Front yard porch additions and/or covering an existing **front yard** porch only	
Second story addition only (no at grade work)	
Basement walkout and/or walk-ups only	
Damage repairs (including fire) with a like-for-like replacement only	
If your development scope is NOT exempt, refer to page 2.	

The following scopes are <u>subject to review</u> and require a Grading and Drainage Plan prepared by an Ontario Land Surveyor or Professional Engineer	**✓ if applicable**
New dwellings, including reconstruction on an existing foundation	
Additions to dwellings **at grade**, including additions on helical piers	
Roofed-over decks and patios within a **side or rear yard**	
Accessory buildings and structures larger than 15 m^2 (e.g., sheds, cabanas, detached garages, etc.)	
Work including the creation of additional hard surface area or any changes to the grade within a **side or rear yard**	
Work including new catchbasins, area drains, and/or low impact development measures (e.g., drywell, infiltration gallery, soakaway pit) • Grading and Drainage plan must be stamped by a Civil Engineer • A catchbasin, area drain, and/or low impact development requires a **Stormwater Management Brief** • A low impact development requires a **Geotechnical Investigation** Refer to the Additional Grading and Drainage Requirements section below for specific plan and report details	

GENERAL – FREQUENTLY ASKED QUESTIONS

What if I am proposing a new structure or addition built on piers?

Additions and structures built on piers require a Grading and Drainage Plan. For any new addition or structure, the surrounding site must be graded to ensure positive drainage is sloped away from the structure; topsoil must be removed from the site of the new structure; new downspouts may be required; and the property's storm water runoff will be affected.

What if I am proposing a new structure or addition built on a slab-on-grade?

Additions and structures built on a slab-on-grade require a Grading and Drainage Plan. For any new addition or structure, the surrounding site must be graded to ensure positive drainage is sloped away from the structure; topsoil must be removed from the site of the new structure; new downspouts may be required; and the property's storm water runoff will be affected.

Who can prepare a Grading and Drainage Plan?

A grading and drainage plan may be prepared by an Ontario Land Surveyor or Civil Engineer.

GRADING AND DRAINAGE PLAN REQUIREMENTS

What information should be shown on a Grading and Drainage Plan?

The following requirements are as per the Grading By-Law 52-2018, as amended:

1. The Grading and Drainage Plan (the "Plan") shall be stamped and certified by an Ontario Land Surveyor or a Professional Engineer, pursuant to Section 5.03 of By-law 52-2018.
2. Submit three (3) copies of a Grading and Drainage Plan, for approval, pursuant to Section 6 of By-law 52-2018 and in accordance with the following requirements:
   A. Only a Plan drawn to a metric scale of 1:100, 1:200, 1:250 or 1:300 will be accepted.
   B. All property lines shall be shown on the Plan.
   C. If the City's right-of-way is not at its deemed width, an Ontario Land Surveyor will need to determine the required right-of-way widening (measured from the original centreline of the City's right-of-way and to 3 decimal places) and the deemed right-of-way shall be shown on the Plan.
   D. All site engineering, as defined in Section 1 of By-law 52-2018, shall be shown on the Plan and shall not encroach onto the City's deemed right-of-way or adjacent lands.

E. All site engineering shall be in accordance with City of Burlington Lot Grading Standard Drawings S-118 and S-119.

F. All restoration of the City's right-of-way shall be shown on the Plan and shall be in accordance with City of Burlington Reinstatement Standard Drawings S-114, S114-A and S-114-B, as required.

G. All existing and proposed elevations shall be derived from a City of Burlington control monument and reference to the monument shall be provided on the Plan. For a complete list of control monuments, visit the City's Open Data webpage.

H. The location, dimensions and elevations of the existing grade, including swales, ditches and any drainage system appurtenances, on the site and 5 metres beyond the property line for the adjacent lands and the location, dimensions, elevations and grade of any proposed site engineering, including swales, ditches and any drainage system appurtenances, to address site runoff shall be shown on the Plan. The proposed site engineering shall be in accordance with the following:

   i) Drainage system appurtenances shall be designed to accommodate the stormwater runoff of a 5-year storm event and the design shall be certified by a Professional Engineer;
   ii) Minimum slope for side and rear yard swales shall be 2% or shall require subdrain;
   iii) Minimum slope for finished ground (except impervious surfaces) shall be 1%;
   iv) Maximum slope for finished ground (except impervious surfaces) shall be:
      - ❑ 2:1 for slopes less than 0.6 metres in height;
      - ❑ 3:1 for slopes from 0.6 metres to 1.25 metres in height;
      - ❑ 4:1 for slopes greater than 1.25 metres in height; and
   v) Minimum slope for impervious surfaces (except driveways) shall be 0.5%.

I. The location, dimensions, elevations and use of any buildings and other structures, including fencing, to be protected or demolished or proposed to be erected on the site and adjacent lands shall be shown on the Plan. The provided elevations of any buildings and other structures on the site shall include and be in accordance with the following (where applicable):

   i) Top of Foundation Wall (TFW) – shall be a minimum of 0.15 metres above surrounding finished ground elevations;
   ii) Finished Floor Elevation (FFE) – shall be a minimum of 0.30 metres above TFW;
   iii) Basement Slab Elevation (BSE);
   iv) Underside of Footing Elevation (USF); and
   v) Garage Floor Elevation (GFE).

J. The location, dimensions and elevations of any retaining walls to be protected or demolished or proposed to be erected on the site shall be shown on the Plan. Any proposed retaining walls shall be located a minimum of 0.3 metres from the property line. Any proposed retaining walls greater than 1 metre in height shall be designed by a Professional Engineer. Any proposed retaining walls greater than 0.6 metres in height may require a barrier.

K. The location, dimensions, elevations and grade of existing or proposed driveways, including the locations of existing and proposed driveway curb cuts shall be shown on the Plan. Proposed driveways shall be in accordance with the following:
    i) Normal Driveway – shall be between 2% (minimum) and 8% (maximum); and
    ii) Reverse Driveway – shall be between 2% (minimum) and 5% (maximum) and shall only be permitted when it is proven by a Professional Engineer that the driveway will not flood during a 100-year storm event.

L. The location and discharge direction of all existing and proposed sump pumps and downspouts shall be shown on the Plan. Sump pumps shall not discharge to a side yard and both sump pumps and downspouts shall discharge to a permeable surface via concrete splash pads or outlet extensions.

M. The location of any existing and proposed underground services (water, sanitary, storm, gas and hydro) and appurtenances and any aboveground utilities (overhead lines, poles, boxes, etc.) and any connections to services or utilities on the City's right-of-way shall be shown on the Plan.

N. The location, dimensions and instrument number of any existing or proposed easements shall be shown on the Plan.

O. The location and details of all site control measures shall be shown on the Plan.

P. The location of Environmentally Sensitive Areas, as identified in the Halton Region Environmentally Sensitive Areas Consolidation Report dated April 2005, as amended, lakes, streams, channels, ditches, swales, water courses and other bodies of water on the site and 15 m beyond the property lines for sites less than 0.2 ha, and 30 m beyond the property lines for site greater than 0.2 ha shall be shown on the Plan.

Q. The location and dimensions of Conservation Halton's regulated area shall be shown on the Plan (where applicable).

R. The location and diameter at breast height (DBH) for any City owned trees shall be shown on the Plan. All City owned trees require tree protection, in accordance with City of Burlington Tree Protection and Preservation Specification SS12A, the location and details of which shall be shown on the Plan. Please Note: The proposed removal of any City owned trees may require Council approval.

S. The location and diameter at breast height (DBH) for any privately-owned trees on the site and within 3 metres of the property line on adjacent lands and with a DBH of 0.1 metres or shall be shown on the Plan. All other vegetation shall be shown as massed outlines.

ADDITIONAL GRADING AND DRAINAGE REQUIREMENTS

Do I need a Drainage System Appurtenance Agreement?

A drainage system appurtenance includes any additions to the normal operation of surface related grading that is necessary for the effective operation of the drainage system. These items may include catchbasins, area drains, maintenance holes, retaining walls, as well as low impact development related matters.

If your Grading and Drainage Plan requires any drainage system appurtenances, then a Drainage System Appurtenance Agreement will be required. Generally, the purpose of the agreement is to ensure the appurtenances are maintained and functioning and to identify the existence of appurtenances and maintenance responsibilities for future property owners. If in the future the approved appurtenances were not maintained or were removed without City approval, then damage to the subject property and/or neighbouring properties may occur for which the subject property owner would be solely liable.

Please be advised that all fees for preparation, registration and disbursement for this agreement shall be paid by the property owner, in accordance with Grading and Drainage Clearance Certificate By-law No. 52-2018, as amended. The fees will be collected by the Legal Department. **Please be advised that the agreement will not hold up the issuance of approvals but will be required prior to security release.**

What supporting documentation is required for a catchbasin and/or area drain?

If a catchbasin and/or area drain is proposed, then a Stormwater Management Brief which is stamped and certified by a Civil Engineer will be required. Post construction, a Civil Engineer will be required to provide as-built certification for the catchbasin and/or area drain in the form of a letter, as-built Grading and Drainage Plan, and CCTV inspection.
The CCTV inspection to be conducted in accordance with OPSS.MUNI 409. It will include a minimum of 2 videos for one municipal storm sewer connection and applicable report. Provide

one video of the private connection to the municipal storm sewer and the second video to begin from the nearest municipal storm sewer maintenance hole and to be advanced a minimum 10 m past the private connection.

The **Stormwater Management Briefs** shall confirm the following:

A. All documents to be prepared in accordance with the Council approved Stormwater Management Design Guidelines (SWM), as amended:
    - Use the City's Intensity Duration Frequency Curves as per SWM Appendix B
    - Runoff coefficients as per SWM 4.2.3 Table 4.1
    - Existing drainage patterns to be maintained to the extent possible as per SWM 3.3 and 3.4
    - Storm sewer maximum design capacity 85.0% as per SWM 5.2.1
    - Storm sewer minimum velocity 0.75 m/s and/or maximum velocity 4.5 m/s as per SWM 5.2.1
    - Storm sewer minimum slope 2.0% or best efforts to achieve full flush
    - Storm sewer minimum frost protection 1.2 m above the obvert as per SWM 5.2.3
    - Storm sewer minimum horizontal and vertical separation 0.5 m as per SWM 5.2.3
    - Storm sewer minimum horizontal watermain separation 2.5 m as per SWM 5.2.3
    - Emergency major overland flow maximum depth 300 mm as per SWM 5.3.2
B. Catchbasin and/or area drain has been designed to accommodate runoff from the post-development 5-year without any surface ponding;
C. Major overland flow route has been provided to accommodate runoff from storms exceeding the post-development 5-year storm event and that major overland flow routes will not adversely impact proposed and/or existing structures;
D. Identify all external flows and safely accommodate them under the developed conditions to avoid upstream flooding or ponding. The external flows do not have to be controlled; and
E. If a major overland flow route is not feasible, the limits and depths of any surface ponding from the post-development 100-year or Regional storm event, whichever is greater.

Please be advised that if a catchbasin and/or area drain is proposed, then a **Grading and Drainage Plan** shall be required to confirm the following:

A. Catchbasin and/or area drain connection details:
    - Rim elevations
    - Invert elevations

- Pipe locations (minimum 1.0 m from property line)
- Pipe size (minimum 250 mm)
- Pipe materials
- Pipe slope (minimum 2.0%)
- Concrete encasement if lead is located on private property
- Frost protection if a minimum 1.2 m ground cover is not maintained from obvert
- Applicable OPSD and City standards (Bee-hive lid, sumpless catch basin)
- Any previously approved and existing drainage infrastructure;

B. Reference to the Stormwater Management brief
C. Any modifications to the existing drainage infrastructure and/or new drainage infrastructure;
D. Major overland flow route;
E. If a major overland flow route is not feasible, the limits and depths of any surface ponding from the post-development 100-year or Regional storm event, whichever is greater; and
F. Other information as required in the Grading and Drainage Plan Requirements of the FAQ.

What supporting documentation is required for a low impact development?

If a low impact development (LID) is proposed, then a Geotechnical Investigation and a Stormwater Management Brief, both of which are stamped and certified by a Professional Engineer, will be required. Post construction, a Professional Engineer will be required to provide as-built certification for the low impact development in the form of a letter and as-built Grading and Drainage Plan.

The **Geotechnical Investigation** shall confirm the following:

A. Elevation of seasonally high groundwater table;
B. Elevation of bedrock; and
C. That surrounding soil has an infiltration rate no less than 15 mm/hr.

The **Stormwater Management Brief** shall confirm the following:

A. All documents to be prepared in accordance with the Council approved Stormwater Management Design Guidelines (SWM), as amended:
    a. Use the City's Intensity Duration Frequency Curves as per SWM Appendix B
    b. Runoff coefficients as per SWM 4.2.3 Table 4.1
    c. Existing drainage patterns to be maintained to the extent possible as per SWM 3.3 and 3.4

B. LID is suitable for the existing soil conditions;
C. LID has been designed to accommodate runoff from the post-development 5-year storm event without any surface ponding;
D. Bottom of the LID is a minimum 1 m above the seasonally high groundwater table elevation;
E. Bottom of the LID is a minimum 1 m above bedrock elevation;
F. The LID is no closer than 4 m to any below grade structure;
G. The LID is no closer than 3 m to any property lines;
H. Major overland flow route has been provided to accommodate runoff from storms exceeding the post-development 5-year storm event and that major overland flow routes will not adversely impact proposed and/or existing structures; and
I. If a major overland flow route is not feasible, the limits and depths of any surface ponding from the post-development 100-year or Regional storm event, whichever is greater.

Please be advised that the permeability of the native soil will dictate the maximum allowable underground storage depth, as indicated by Section 4.5.6 (Equation 4.2) of the Ministry of Environment, Conservation and Park's (MECP) Stormwater Management Planning and Design Manual. Typically, storage depths greater than 1.5 m are not recommended for infiltration systems from both a cost and compaction perspective. Additionally, the weight of the water in a deep infiltration system can compact the surrounding native soil and decrease the infiltration capacity.

Please be advised, the City references the following documents for low impact development design and best management practices:

- City of Burlington standard drawings: S-IDF, S-2D, and S-3D;
- MECP's Stormwater Management Planning and Design Manual (Section 4.5.8); and
- Credit Valley Conservation Authority's Low Impact Development Stormwater Management Planning and Design Guide (Section 4.4 and Appendix C).

Please be advised that if a low impact development is proposed, then a **Grading and Drainage Plan** shall be required to confirm the following:

A. LID design details;
B. Reference to the Geotechnical Investigation and Stormwater Management brief
C. Any previously approved and existing drainage infrastructure;

D. Any modifications to the existing drainage infrastructure and/or new drainage infrastructure;
E. Major overland flow route;
F. If a major overland flow route is not feasible, the limits and depths of any surface ponding from the post-development 100-year or Regional storm event, whichever is greater; and
G. Other information as required in the Grading and Drainage Plan Requirements of the FAQ.

Will any site inspections be required?

Yes. Site inspections are often necessary prior to construction, during construction and following the completion of construction.

Inspection of Erosion and Siltation Control Measures:

Prior to the issuance of approvals, a site's erosion and siltation control measures shall be installed and inspected. Typical erosion and siltation control measures include light-duty silt fence barrier, catchbasin siltation sacks and vehicular mud mats. The erosion and siltation control measures shall be installed in accordance with the approved Grading and Drainage Plan. In the absence of an approved plan:

- Light-duty silt fence barrier shall be installed around the limits of construction and site disturbance;
- Catchbasin siltation sacks shall be installed at any catchbasins on-site and/or any nearby catchbasins on the road allowance; and
- A mud mat shall be installed where an existing impervious driveway does not exist and/or where an existing driveway will be removed.

To request an erosion and siltation control measures inspection, please email the Site Engineering staff person that is reviewing the application. To this email, please attach site photos of the siltation control measures to confirm the required measures have been installed, including the burial of low-duty silt fence barrier. Failure to include site photos of the required measures may result in delays if installations have not been completed correctly.

Inspection Prior to Sod Installation:

Once the grading has been completed and prior to the installation of sod, the Site Engineering staff person that reviewed the application should be contacted to complete an

inspection. A grading inspection prior to the installation of sod reduces the likelihood that costs will be incurred for work associated with grading deficiencies and reinstalling sod.

Inspection for Final Approval and Security Release:

Once the sod has been installed and all other work has been completed, the Site Engineering staff person that reviewed the application should be contacted to complete an inspection. A final inspection prior to security release is necessary to ensure the grading was maintained during sod installation and to ensure that all other work, including restoration of the road allowance, has been completed.

Please be advised that final approval and security release inspections will not be completed during the winter months due to snow cover and frozen ground conditions. In the spring, the Site Engineering staff person that reviewed the application should be contacted to complete an inspection.

Why are erosion and siltation control measures required?

Erosion and siltation control measures are intended to protect the environment from the exposed earth through various capture methods that mitigate the transfer of fine sediments offsite. They are required to be installed prior to the commencement of construction and maintained through all phases of construction until all surfaces have been fully restored and stabilized. Failure to comply with the erosion and siltation control measures requirement may result in the use of the securities to correct any deficiencies.

Light-Duty Silt Fence Barrier

The City of Burlington refers to the Ministry of Transportation's standard drawing for light-duty silt fence barrier (OPSD 219.110). Light-duty silt fence barrier is a black geotextile fabric, approximately 60 cm in height, that is designed to mitigate the transfer of fine sediments while allowing water to pass through. Two common installation mistakes are to neglect burying the bottom of the silt fence barrier and to install the silt fence barrier backwards, with the geotextile fabric on the downstream side of the stake.

If tree roots interfere with the proper installation of the light-duty silt fence barrier, it may be agreed upon by the City Arborist and Site Engineering staff person to allow for the installation of the silt fence barrier on the ground surface with clear stone backfill covering the bottom.

Catchbasin Siltation Sacks

A catchbasin siltation sack is intended to be installed inside of a catchbasin. A typical installation requires that a catchbasin lid be lifted to allow for the siltation sack to be inserted and secured to the four corners of the catchbasin. Catchbasin siltation sacks have the potential to become quite heavy if they are not maintained. As such, catchbasin siltation sacks should be routinely emptied to ensure proper functionality of the catchbasin.

Vehicular Mud Mat

There are several construction methods for mud mats that all employ the same basic principles. They are intended to scrape fine sediments from the tires of vehicles exiting a site and reduce vehicle ruts which contribute to mud tracking from a site. A mud mat shall be installed where an existing impervious driveway does not exist and/or where an existing driveway will be removed. For construction methods that employ granular it is important to keep the municipal right-of-way clear of soil and/or debris for pedestrian safety. Therefore, while a mud mat may be required it shall not extend beyond the front property line and onto the road

Is an "As-Built" Grading and Drainage Plan required?

YES – An "As-Built" Grading and Drainage Plan will be required, for approval, prior to Site Engineering staff completing final approval and security release inspections, unless otherwise indicated in writing by Site Engineering staff.

Please be advised that all "As-Built" Grading and Drainage Plans shall be certified by an Ontario Land Surveyor or a Professional Engineer.

SITE SECURITIES

Will a site security deposit be required?

Site engineering securities (minimum $5,500) are required for all applications as part of the grading and drainage review, save and except uncovered decks with no grading alterations and tree impacts. Securities are not required at the time of application submission. The security requirement is determined during review of the application and is to be deposited prior to the issuance of the Consolidated Pre-Building Permit approvals. Securities in an amount greater than $5,500 may be required for applications proposing work that includes drainage system appurtenances (see below), retaining walls, is near sensitive municipal infrastructure or may impact a tree.

Site engineering securities are necessary to ensure the proper installation and management of erosion and siltation control measures, to ensure the timely removal of any soil/debris from the public road allowance and neighbouring private property, to ensure work has been completed in accordance with the approvals, to ensure repair of any damage to municipal property and to ensure the replacement of an impact tree, if necessary.

What are the accepted methods of payment for securities?

Applicants will be provided with payment options once the securities have been calculated. Preferred payment methods are E-transfer or EFT/Wire Payments.

What is the process for release of securities?

1. Complete all work in accordance with the issued approvals, including any restoration and/or stabilization work.
2. Execute and register the Drainage System Appurtenance Agreement, if required.
3. Complete and submit an "as-built" Grading and Drainage Plan for approval if required.
4. Contact Site Engineering staff to carry out a final inspection and to obtain final approval for the completed groundwork.

Please refer to **Is an "As-Built" Grading and Drainage Plan required?** for more information about "as-built" plan requirements.

Please refer to **Will any site inspections be required?** for more information about inspections.