Residential Property Lot Grading Guidelines

Development Services Division 638 Princess Ave Brandon MB, R7A 0P3



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Introduction

These guidelines are intended to educate and provide general direction to developers, landscapers and property owners in order to achieve and maintain proper lot grading. Lot grading refers to the finished surface of a lot which will direct water to a designed drainage system and away from buildings. These guidelines are intended to be for informational purposes only. The content of these guidelines is general in nature, does not constitute professional advice, and should not be relied on as a substitute for professional advice. The City of Brandon (City) disclaims any liability in connection with the use of the information in these guidelines. All persons utilizing this document are encouraged to seek the assistance of a professional as required.

These guidelines primarily speak to achieving proper runoff from a site to the City collection system. It should also be noted that low impact development measures, such as rain gardens and rainwater harvesting, are strongly encouraged. Best practice guidelines have been provided for rain gardens and small scale rainwater harvesting near the end of this document.

Background

Growth within the City of Brandon results in new neighbourhoods being developed in addition to re-development and densification within existing neighbourhoods. New developments are constructed based on design drawings prepared by engineers and accepted by the City of Brandon (City). At the time of development and servicing, detailed grading is provided for streets while general grading is provided for each lot. Once the servicing, streets and rough grading of the lots is complete, individual lots are sold for new home construction at which time a more detailed grading plan will be submitted for each specific lot. Every owner of a residential property is responsible for ensuring that their lots are graded and maintained in accordance with design drawings accepted by the City.



This figure illustrates drainage being directed away from all structures and towards property lines, eventually being directed to the public drainage system by way of swales combined with general lot grading.

Lot Grading Plans

Lot grading is completed in accordance with lot grading plans accepted by the City, which include at minimum design elevations at the front and rear property corners and any break points within the lot depending on lot drainage style. It is essential to grade the lot in accordance with the City accepted design elevations and maintain the design elevations after construction. If the lot is not graded in accordance with the accepted lot grading plans, or the design elevations are not maintained, the chances of ponding and/or flooding are greatly increased. Existing lots within older neighbourhoods may not have accepted lot grading plans. Under these circumstances, lots in these areas should be sloped to drain to the street and/or back lane.



Lot Drainage Styles

Three common lot drainage styles are outlined on pages 6 through 9. All the drainage styles require water to be directed away from all buildings.

1. Back to Front Drainage (Type A)

The highest elevations for the lot are located on the rear property line. Surface drainage is directed to side property lines creating swales, which are sloped to drain to the front street.



This figure illustrates drainage being directed away from all structures ultimately draining to the front of the lot. There are swales in the back yard which direct drainage to an often shared side yard swale. The side yard swales direct all drainage towards the curb at the front of the lot.

2. Front to Back Drainage (Type B)

The highest elevations for the lot are located on the front property line. Surface drainage is directed to side property lines creating swales, which are sloped to drain to the rear property line and will typically drain to a back lane or drainage corridor.



This figure illustrates drainage being directed away from all structures ultimately draining to the rear of the lot. There are swales close to the front face of the building which direct drainage from the front yard to swales on side property lines. The side yard swales direct all drainage towards a swale located adjacent to the rear property line.

3. Split Drainage (Type C1)

The highest elevations for the lot are located at an intermediate point between the front and rear property line. Surface drainage is directed to side property lines creating swales, which are sloped either to the street or to the rear property line from the high point of the lot.



This figure illustrates drainage being directed away from all structures and being split with a portion draining to the front of the lot and the remainder draining to the rear of the lot. There is a high point in the lot along the side property lines at the approximate mid-point of the building. From the high point drainage is either directed towards the curb to the front of the lot, or towards a swale located adjacent to the rear property line.

4. Walkout Basement (Type C2)

An alternative form of split drainage. Typically the front of the building is the highest elevation on the lot. Surface drainage is directed to side property lines creating swales which are sloped either to the street or to the rear property line from the high point of the lot.



This figure illustrates drainage being directed away from all structures and being split with a portion draining to the front of the lot and the remainder draining to the rear of the lot. There is a high point in the lot along the side property lines at the approximate mid-point of the building. From the high point drainage is either directed towards the curb to the front of the lot, or towards a swale located parallel and adjacent to the rear property line. This is a modified split drainage lot drainage style, where the break towards the rear of the lot is quite steep from the mid-point of the structure to the rear of the structure allow for the rear of the lot to drain away from the basement as opposed to the main floor.

Development Grading

Lot grading is typically completed in three stages: area and rough grading, lot grading and landscaping.



1A. Area Grading

Area grading applies to new neighbourhoods and is the responsibility of the land developer. This is completed in accordance with the accepted engineered drawings which include lot, street and drainage infrastructure. Area grading includes stripping of topsoil and shaping and sloping the sub-soil to prepare for rough grading.



This picture shows an example of a larger area consisting of multiple lots in which area grading would apply.

1B. Rough Grading

Rough grading is typically the responsibility of the land developer, however with infill lots this may be the individual lot developer or property owner. This is completed in accordance with the accepted engineered drawings. Rough grading includes further sloping the sub-soil to prepare for individual lot sales. In accordance with the Lot Grading, Drainage and Elevations By-law it is anticipated that through rough grading the land developer will bring the site grade to within 15cm (six inches) below final grades. It is the responsibility of the individual lot developer or property owner to ensure that the lot is at an acceptable rough grade elevation prior to land transfer.



This pictures shows the sub-soils within an individual lot which have been shaped to a consistent grade below the finished grass surface to achieve rough grading.



This picture shows the stage of lot grading where the topsoil has been placed and spread over a single lot

2. Lot Grading

Lot grading is the responsibility of the individual lot developer or property owner. This is completed in accordance with the accepted detailed lot grading drawings and includes backfilling the basement excavation while ensuring positive slope away from all structures, shaping and sloping any fill and/or topsoil in preparation for landscaping.

3. Landscaping

Landscaping is the responsibility of the individual lot developer or property owner and it includes sodding or seeding and constructing any landscaping features such as planting beds, areas surfaced with crushed rock or other porous decorative material as accepted on the site drawings through the permit process.

Swale locations, and private and/or public drainage easements should be taken into consideration when locating sheds and raised landscaping features such as garden areas, flower or shrub beds, and patios. Locating these features immediately adjacent to rear and side property lines is not recommended. It is recommended that all sheds and landscaping features are a minimum of 0.6 metres (two feet) away from any property line where a swale is designed and/ or present. If an easement exists nothing may be placed within the footprint of the easement without consent from the easement owner.



This picture shows finished lanscaping on an individual lot.

Lot Grading Requirements

Minimum Slope from Foundation Walls

A sloped surface is required to effectively drain water away from the foundation walls, including areas under steps and decks.

See below and page 14 for the minimum grade recommendations adjacent to a foundation.

Soft Surface (including pervious gravel, clay, topsoil, sod, or crushed rock)

• Area within three metres (10 feet) of the foundation – recommended five percent (1 in 20) or 15 cm (six inch) drop slope. Minimum two percent (1 in 50) drop slope.

• For side yard less than three metres (10 feet) wide – recommended 15 cm (six inch) drop slope. Minimum two percent (1 in 50) drop slope.

The intention of the recommended grading noted above is to accommodate future settlement adjacent to the building foundation while maintaining an ability to achieve positive drainage away from all structures.



This figure illustrates the side slope of a yard with topsoil and sod directing stormwater towards a shared property line swale with a minimum 15 cm (six inch) drop slope.

Hard Surface (including concrete, asphalt or brick pavers)

• Area three metres (10 feet) or greater around foundation - minimum two percent or six centimetres (2 1/2 inch) drop slope

• For side yard less than three metres (10 feet) wide – minimum two percent (1 in 50) drop slope



This figure illustrates storm water being directed towards a shared property line concrete swale with a two percent drop slope.

Drainage Swales

Drainage swales are small ditches which convey surface water runoff towards a city street, lane or stormwater drainage network, and are typically constructed along rear and side property lines.

- Side property line swales should have a minimum two percent slope for grass, clay or decorative rock surface, or 0.5 percent for a hard surface such as concrete, asphalt or pavers.
- Within new neighbourhoods, drainage swales are typically located along shared property lines.
- Drainage swales should be a minimum of 60 cm (24 inches) in width with a minimum of 30 cm (12 inches) on each side of the shared property line.
- Where a swale cannot be located on a shared property line due to elevation differences between the two properties, an internal side yard swale is to be constructed with a minimum depth of 100 mm (four inches). This may require construction of either a retaining wall or earthern berm to facilitate the swale.

Surfacing Limitations

- There are limitations to the placement of porous materials within the public boulevard. Porous materials may be acceptable abutting a public sidewalk however the porous landscaped area is to be slightly recessed, a minimum of 2.5cm (one inch) from the top of porous material to the top of sidewalk, porous material may only be placed on the short side yard between driveways. If a side yard exceeds 1.5m (five feet) in width, porous material will not be acceptable in the public boulevard. Porous materials will not be allowed adjacent to a sidewalk in which the City clears snow. Where there is no sidewalk present, there is to be a minimum 4.2m (13 feet nine inches) wide sod buffer between porous materials and the back of curb or edge of roadway.
- Wood chips are not permitted in the public boulevard and should be carefully considered when placing on private property. During heavy rain events, wood chips are susceptible to washing away and clogging the public stormwater system.



Drainage swales

This picture shows a grass drainage swale located on property line between two houses to direct drainage out towards the street.



Porous material for landscaping

This figure illustrates permitted placement locations of porous material adjacent to and/or within the boulevard.

Earthen Berms

Primarily when re-developing within existing neighbourhoods where existing grades do not comply with current by-laws, the use of an earthen berm may be required to meet lot grades as required under the Lot Grading, Drainage and Elevations By-law. Earthen berms should:

- Be 150 mm (six inches) higher than the adjacent grade
- Have drainage swales to prevent drainage onto adjacent properties



This figure illustrates an earthen berm near property line with a drainage swale offset from property line to capture surface runoff and direct the drainage towards the street.

Window Wells

Lot grading design is to take window well placement into consideration. Window well construction is to be in accordance with the Manitoba Building Code.

Retaining Walls

All measures should be taken to avoid the use of a retaining wall. If it is not possible to meet design grades by way of landscaping or an earthen berm, then a retaining wall will be accepted. Retaining walls are to be constructed in accordance with Regulation 002 – Retaining Walls under the authority of the Building By-law and should:

- · Be constructed of wood, concrete, or an approved alternative
- Be 100 mm (four inches) higher than the adjacent grade
- Be designed by a professional engineer if taller than 1.0 metres (three feet)

• Have drainage swales to prevent drainage onto adjacent properties

• Be designed to not allow water to permeate through the retaining wall to the adjacent property

Fences are not retaining walls and should not be used to retain a higher grade. The unknown burial depth of an existing fence, in addition to potentially unsuitable materials, may lead a fence to fail if re-purposed as a retaining wall. A retaining wall may act as the base of a fence.



This figure illustrates a precast concrete block retaining wall used to transition between lots that have substantial grade differences. A drainage swale is offset from the wall and property line to capture surface runoff and direct the stormwater runoff towards the street.



This figure illustrates a downspout extending two metres (six feet) from the building with drainage directed towards the front property line.

Downspouts

Roof drainage is integral to the lot grading design. Through the eavestroughs and downspouts, rainwater and snowmelt is directed from the roof to the ground. It is the individual lot developer or property owner's responsibility to ensure proper eavestrough and downspouts design such that roof drainage does not adversely impact their property or any neighbouring property. The downspout locations and the direction of discharge should take lot drainage styles and neighbouring lot grading into consideration. It is recommended that downspouts are directed to discharge in a consistent direction with site lot grading. Discharge should not be directed towards neighboring properties unless a pre-determined shared drainage swale has been implemented to keep downspout discharge within 15cm (six inches) of the shared property line. Downspout placement shall not result in roof or surface drainage being discharged onto stairs or neighbouring properties.

Downspouts should:

- Be no higher than 0.6 metres (two feet) from the ground
- Extended at least two metres (six feet) from any foundation
- Extended no closer than three metres (10 feet) to any property line
- Where practicable be discharged into drainage swales
- Be discharged onto a permeable surface such as a lawn or raingarden

Foundation Drainage Sump Discharge

Where present, weeping tile is to discharge into a sump pit located in the building basement. Sump pit and associated discharge is to be constructed as per Regulation 009 – Sump Pit and Pump Installation under the authority of the Building By-law.

Garage Grading Recommendations

The top elevation of a detached garage slab adjacent to a back lane must be a minimum 150 mm (six inches), recommended 250mm (10 inches), above back lane grades to ensure positive drainage away from the building and allow for future back lane maintenance. Where the garage fronts onto a sidewalk and/or street, it is recommended that a minimum driveway grade of two percent is maintained. Positive grade away from the garage is required in all directions and should be consistent with accepted lot grading. Roof and downspout drainage from the garage shall not be discharged on stairs or neighbouring property.



This picture shows a detached garage adjacent to a back lane. The garage slab is greater than 150mm (six inches) higher than the adjacent lane to achieve positive drainage away from the garage.

Infill Development

Infill development refers to the process of developing vacant, under-used or existing sites within established or mature neighbourhoods. It is recommended that infill developers and/or property owner consult with all potentially impacted neighbours prior to any lot grading, drainage, or elevation changes within an infill development lot. This consultation could be used to provide direction for the lot grading design. It is desirable that proposed infill grading matches the established grades along shared property lines however it is understood that to ensure proper surface drainage within an infill lot and come into compliance with the Lot Grading, Drainage and Elevations By-law this may not be achievable. Where it is not possible to match the existing grades, as they are non-compliant with the Lot Grading By-law, retaining walls, or where feasible earthen berms, with internal swales are recommended along property lines. If the grading of a neighbouring lot is not sloped properly to provide positive drainage away from their foundation, it should be identified at the time of lot grading permit application. Regrading the neighbouring side yard should be considered at the same time as the infill development.

Regrading in Mature Neighbourhoods

Considering and consulting with adjacent neighbours is a very important step which should be taken when contemplating any adjustments to lot grading or downspout/ sump pump discharge. The changes may seem minor; however, they can greatly impact neighbouring lots and surface drainage patterns. The City encourages neighbours to work together to resolve drainage problems. The lot grading practices outlined in this document when partnered with thoughtful consideration of adjacent property and good communication serve as great tools regardless of the project scope. If there is insufficient slope away from a neighbour's foundation it may be difficult to achieve positive drainage away from their foundation after adjacent sites have been developed, it should be recommended that the neighbour consider regrading their side yard at the same time as the primary development. If a shared drainage swale along the property line is not possible or if a neighbour is uncooperative, then a swale within the lot being altered is recommended to establish proper drainage.

Low Impact Development (LID)



This picture shows a downspout extension directing rainwater into a completed rain garden consisting of a rocky bed with plants in the early stages growth

Rain Gardens

A rain garden is a landscape feature designed to collect stormwater runoff and melted snow which runs off impervious surfaces such as rooftops and driveways in addition to grassed areas during storm events and spring runoff. Rain gardens typically consist of a shallow depression landscape to encourage natural filtration of stormwater. In addition to filtering rainwater, rain gardens reduce the volume of stormwater that enter the storm sewer and ditch network and assist with recharging groundwater. Although water is collected in rain gardens, due to the short period of time that they hold water before drying out they are not a breeding habitat for mosquitoes. Depending on plant species included in the rain garden design they can attract birds, butterflies, pollinators and other beneficial insects.

Additional information related to rain gardens and design considerations can be found on the City of Brandon website at https://www.brandon.ca/allabout-water/rain-garden

Rainwater Harvesting

The simplest form of rainwater harvesting is through the installation and use of rain barrels at the outlet of building downspouts. During the summer rainwater can be captured within rain barrels and used for watering gardens and landscaping. In addition to providing a means to lower your water bill by reducing potable water consumption, rain barrels provide relief to the City's storm sewer and ditch network by offsetting peak runoff times or re-directing runoff from impermeable roof surfaces.

Lot Grading Best Practice Summary

Preliminary assessment and design: Obtain a lot grading sheet and/or development grading plan to verify the design lot drainage style and any predetermined lot grades. This can be obtained by contacting the developer which the lot was purchased from or Development Services. Older lots, primarily located in mature neighbourhoods, may have minimal pre-determined design grades. Where applicable, typically in mature neighbourhoods, topographic survey may be required.

Consult with neighbours: Discuss the lot grading concept including, drainage style, drainage swales, berms or retaining walls, roof drainage downspout and sump discharge locations, driveways and/or parking placement and fencing. Additionally, neighbours may have historical drainage information which can be helpful during preliminary assessment and design.

Design lot grading: Prepare a lot grading plan taking into consideration the information gathered during preliminary assessment and consultation with neighbours. The lot grading plan should include, at minimum, the items noted on the Lot Grading & Drainage Plan check list on the City of Brandon website for either a Development Permit (City of Brandon - Development Applications & Forms) or if a Development Permit is not required, a Building Permit (City of Brandon - Building & Plumbing). The City would also encourage your lot grading design to take low impact development design elements, such as rain garden design and placement, into consideration during the design stage. Obtaining the assistance of a professional is strongly encouraged for the preparation of a lot grading plan. The scope and scale of a project may require that the lot grading plan is prepared by a professional.

Obtain a lot grading permit

Layout rough grading: Design lot grades should be surveyed and marked out on site. Rough grading should be between 100 mm (four inches) and 150 mm (six inches) below the final lot grading design elevations, this is to allow for topsoil and sod or seed placement. Design grades should be marked on stakes clearly indicating if the marking is for rough grade or finished grade. These stakes should be at a frequency which allows for the lot to be graded consistently in accordance with the accepted lot grading plans. The benchmark noted on the lot grading sheet and/or lot grading plans or, if lot grading sheets are not yet available the development grading plans, should be used when laying out grading stakes. Surveying may require the assistance of a professional.

Rough grade lot: Ensure the basement excavation is properly backfilled to provide a positive slope away from the foundation and grade the remainder of the lot in accordance with the survey stakes to be between 100 mm (four inches) and 150 mm (six inches) below the final design grade.

Construct hardscaping features: Driveways and sidewalks should be constructed as per the accepted lot grading plans.

Survey finished grade: Design lot grades should be surveyed and marked out on site using the benchmark noted on the lot grading sheet and/or lot grading plans, this benchmark should also be used for setting the building foundation. Finished grade should be marked on stakes at a frequency that allows for the lot to be consistently graded as per the accepted lot grading plans. Surveying for finished grades also provides a check to verify that the lot has been sufficiently rough graded. Surveying may require the assistance of a professional.

Final grade lot: Spread topsoil over the lot to allow for sodding or seeding. Verify that all finished grades are in accordance with the accepted lot grading plans including positive slope away from any building foundation. A perched area of 1m at sides and 2m at front and back with a 15cm (six inches) slope should be achieved sloping away from any structure.

Landscape: Sod or seed lawn, plant trees or shrubs, create gardens and place crushed rock or other porous decorative material. The lot slope grade and elevations must be maintained during landscaping to ensure proper drainage. The grade must be sloped to final grade before placing the porous decorative material, as surface water can flow through these materials.



Development Services Division

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