Permit Applications and Stormwater Management

Quick SWM Tool User Guide

Introduction

The implementation of on-site stormwater management (SWM) measures can reduce the increased risk of flooding on existing properties and public road allowances from new developments. As housing density increases, imperviousness also increases, which in turn increases stormwater runoff. If stormwater management measures are not implemented as part of new developments with more hard surfaces, the increase of uncontrolled runoff can lead to flooding due to the limited capacities in existing stormwater systems (minor and major).

On-site storage and stormwater management measures are stormwater management practices that capture and temporarily store stormwater during rain events prior to slowly releasing it to the City's storm sewer system or to a surface outlet along the Municipal Road Allowance if a sewer system is not available.

As a stormwater management measure, runoff from rooftops can be captured and temporarily stored either on rooftops or underground in storage pipes, or through other measures, depending on the property layout and building design.

The Quick SWM Tool provides an easy-to-use means of calculating the on-site SWM requirements for new developments based on the lot size and proposed impervious surface coverage. The tool does not consider or account for surface runoff and/or storage within soft landscaped areas to meet the on-site SWM requirements.

Glossary

Term	Definition
Runoff	Runoff generated from rainfall or snowmelt from either hard surfaces or in excess of the infiltration capability of the soils that flow overland, such as streets, roofs, and lawns, as it travels into storm drains or natural waterways.
Impervious Surface	An impervious surface is any proposed uses, structures, hard landscape, and driveway area that offers little infiltration, such as roads, roofs, parking lots, interlock stones, pavers, asphalt and concrete pathways.
On-Site Stormwater Management	The practice of capturing stormwater runoff on-site, and gradually releasing it to minimize the risk of downstream flooding.

Overall Site Release Rate	Maximum allowable rate at which stormwater can be discharged from the site to the receiving stormwater system, typically controlled by an orifice restrictor.
Swale	A shallow, often vegetated channel designed to collect and/or convey runoff.
C Factor (Runoff Coefficient)	The fraction of rainfall that becomes runoff. If the site's C Factor exceeds 0.45, stormwater management measures are required.
Threshold/Target	The value (e.g., C > 0.45) above which on-site SWM is mandated.
Eavestrough	A gutter system that collects roof runoff and conveys it to storage or discharge points.
Minor System	The minor system is designed to capture and convey frequent runoff events, and is typically composed of lot grades, ditches, backyard swales, roof leaders, foundation drains, gutters, catchbasins, and storm sewers.
Major System	The major system conveys runoff from infrequent events that exceed the minor system capacity. It typically consists of natural streams, valleys, swales, artificial channels, roadways, stream road crossings and ponds.

Using the Quick SWM Tool

The following section outlines the step-by-step instructions for using the Quick SWM Tool to input site parameters and confirm on-site stormwater management requirements.

The PDF tool should be completed with compatible major PDF viewers such as Adobe Acrobat, or built-in browser PDF readers such as Google Chrome and Microsoft Edge. Please note that the tool will not function in basic previewer applications such as within Microsoft Outlook or OneDrive.

1. Measure Site Details

Lot Area (m^2): The lot area is calculated by measuring the extent of land on which the site development is to be located, based on property boundaries shown on GeoOttawa or a Legal Plan. The lot area shall be calculated for a single property.

Driveway/Parking Area and Walkway Area (m^2): The Driveway/Parking and Walkway areas are calculated by measuring the plan view area of all hard landscaping, defined as non-vegetative surfaces such as brick, pavers, rock, stone, concrete, tile, and wood.

Roof Area (m^2): The roof area is calculated by measuring the plan view area of all roofs on the property and is equivalent to the building footprint.

2. **Input Area**

   Enter the measured area into the 'Site Details' section of the Quick SWM Tool to determine if the site is subject to on-site stormwater management requirements.

3. **Assess On-Site Stormwater Management Requirements**

   If the tool indicates the site's hard landscaping and driveway area threshold (C Factor >0.45) is exceeded, on-site stormwater management measures must be implemented.

   The tool identifies the requirements for on-site stormwater storage volume (in L) and the overall site release rate (in L/s).

   The required stormwater storage and discharge methods must be clearly identified on the submitted Site Grading and Servicing Plan and match the requirements of the tool and demonstrate how the storage and site release rate requirements are being achieved.

4. **Select Storage and Discharge Solution**

   Choose between rooftop or underground storage based on site layout and roof type. Ensure all roof leaders/eavestroughs convey flows to the selected storage solution. If at grade storage and/or infiltration measures are desired, a stormwater management brief will be required.

Example Scenarios

The illustrations on the following pages highlight different example sites accompanied by step-by-step instructions on how to use the Quick SWM Tool, determine key site parameters, and implement storage and outlet configurations for each site.

Example 1: On-Site Stormwater Management Not Required – 100 Any Street

The example site does not require on-site stormwater management. Based on the proposed site details, the limit of proposed uses, structures, hard landscape, and driveway area has not been exceeded, and thus the site will not be subject to on-site stormwater management.

Refer to Figures 8 to 9 in Appendix A for graphics of the proposed site and measurements of site details.

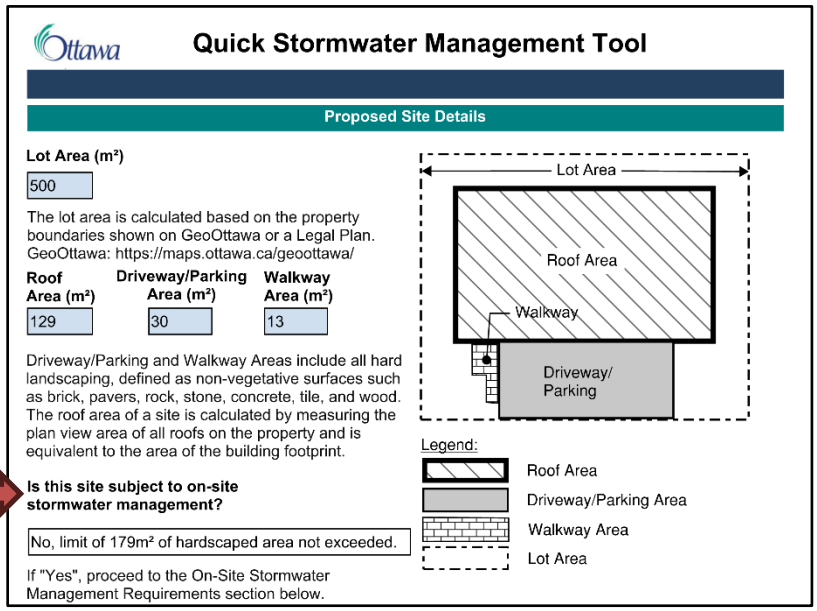

Figure 1: Proposed Site Details at 100 Any Street

Step 1. Measure Site Details

Step 2. Input Area into Quick SWM Tool

Step 3. Assess On-Site Stormwater Management Requirements

Based on the site details input above (step 2), the site is not subject to on-site stormwater management.

Example 2: Underground Storage – 200 Any Street

The example site consists of a pitched roof, and thus it is not suitable for rooftop storage. An underground storage solution can be implemented for this site to meet its SWM requirements.

Refer to Figures 10 - 12 in Appendix B for graphics of the proposed site, measurements of site details, and a schematic underground storage solution.

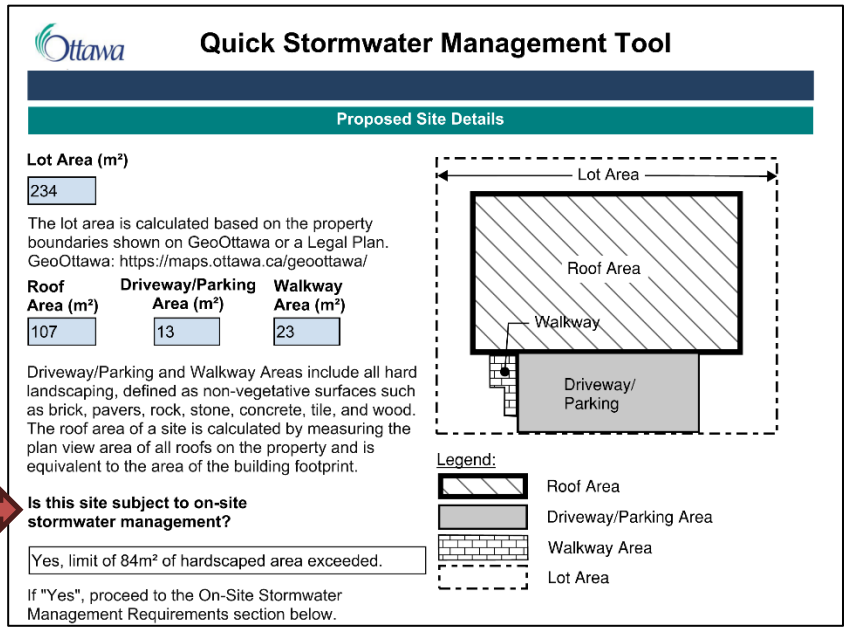

Figure 2: Proposed Site Details at 200 Any Street

Step 1. Measure Site Details

Step 2. Input Area into Quick SWM Tool

Step 3. Assess On-Site Stormwater Management Requirements

Based on the site details input above (step 2), the required on-site stormwater storage (L) and overall site release rate requirements are identified. Note that 1000 L is equivalent to 1.0 m^3.

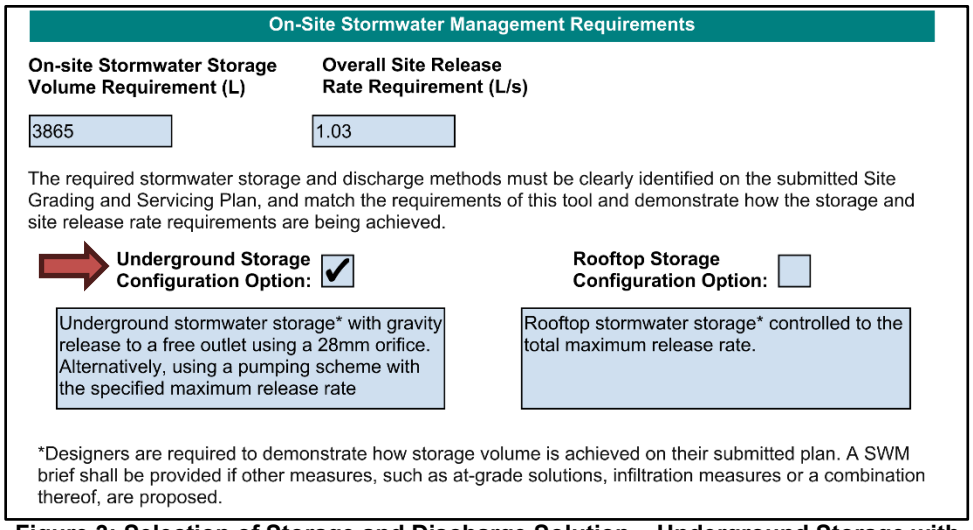

Figure 3: Selection of Storage and Discharge Solution – Underground Storage with gravity release

Step 4. Select Storage and Discharge Solution

The existing stormwater outlet for the site is towards an existing storm sewer on 200 Any Street. The proposed underground storage reservoir will discharge by gravity through a 28 mm orifice into an existing storm sewer. Runoff captured on the roof will be conveyed to the underground storage system via eavestroughs.

Example 3: Rooftop Storage – 300 Any Street

The example site consists of a flat building roof, which makes it a suitable option for rooftop storage.

Refer to Figures 13 - 15 in Appendix C for graphics of the proposed site, measurements of site details, and a schematic underground storage solution.

Step 1. Measure Site Details

Step 2. Input Area into Quick SWM Tool

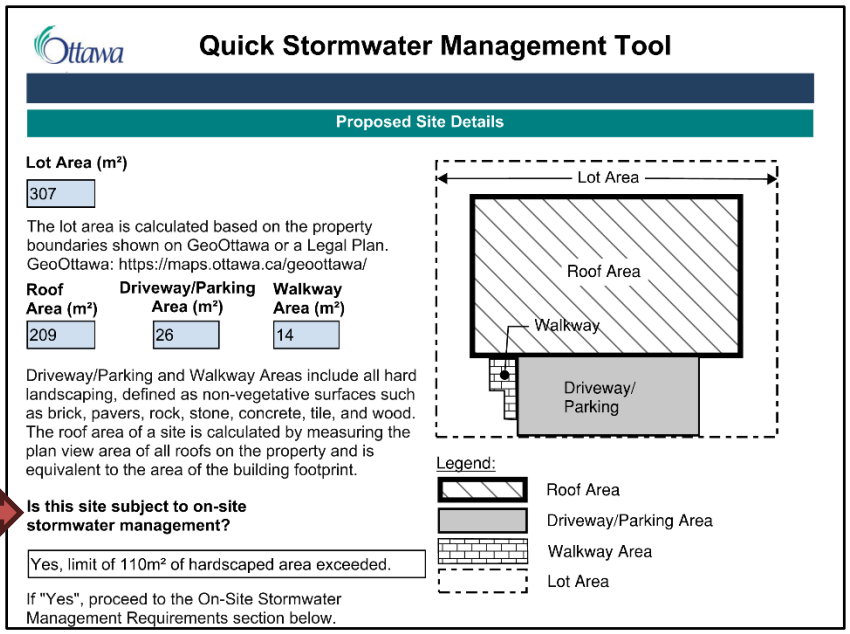

Figure 4: Proposed Site Details at 300 Any Street

Step 3. Assess On-Site Stormwater Management Requirements

Based on the site details input above (step 2), the required on-site stormwater storage (L) and overall site release rate requirements are identified. Note that 1000 L is equivalent to 1.0 m^3.

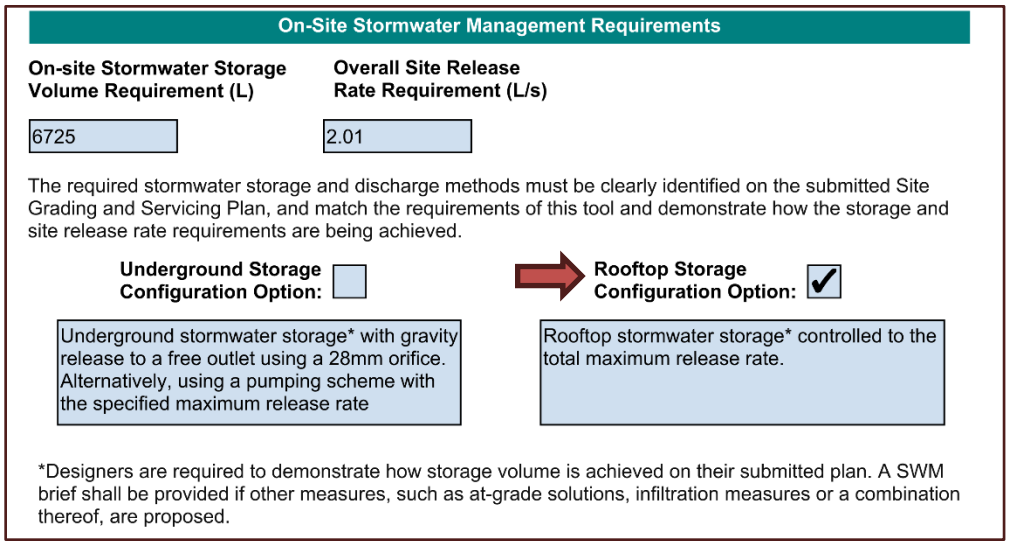

Figure 5: Selection of Storage and Discharge Solution - Rooftop Storage

Step 4. Select Storage and Discharge Solution

The existing stormwater outlet for the site is towards an existing storm sewer on 300 Any Street. The proposed rooftop storage system will be configured to meet the required controlled release rate of 2.01 L/s, and ultimately outlet to the existing storm sewer in the right of way.

Example 4: Front to back drainage – 400 Any Street

This example site features a property that slopes from the front yard towards the back, creating typical front to back drainage pattern. In such cases, surface drainage is generally directed to side property line swales which are sloped to drain to the rear property line.

Refer to Figures 16 - 18 in Appendix D for graphics of the proposed site, measurements of site details, and a schematic underground storage solution.

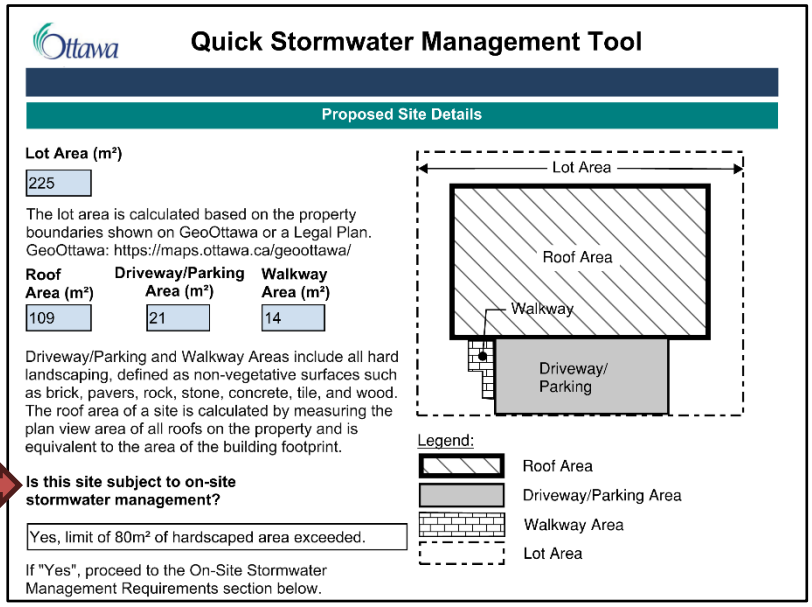

Figure 6: Proposed Site Details at 400 Any Street

Step 1. Measure Site Details

Step 2. Input Area into Quick SWM Tool

Step 3. Assess On-Site Stormwater Management Requirements

Based on the site details input above (step 2), the required on-site stormwater storage (L) and overall site release rate requirements are identified. Note that 1000 L is equivalent to 1.0 m^3.

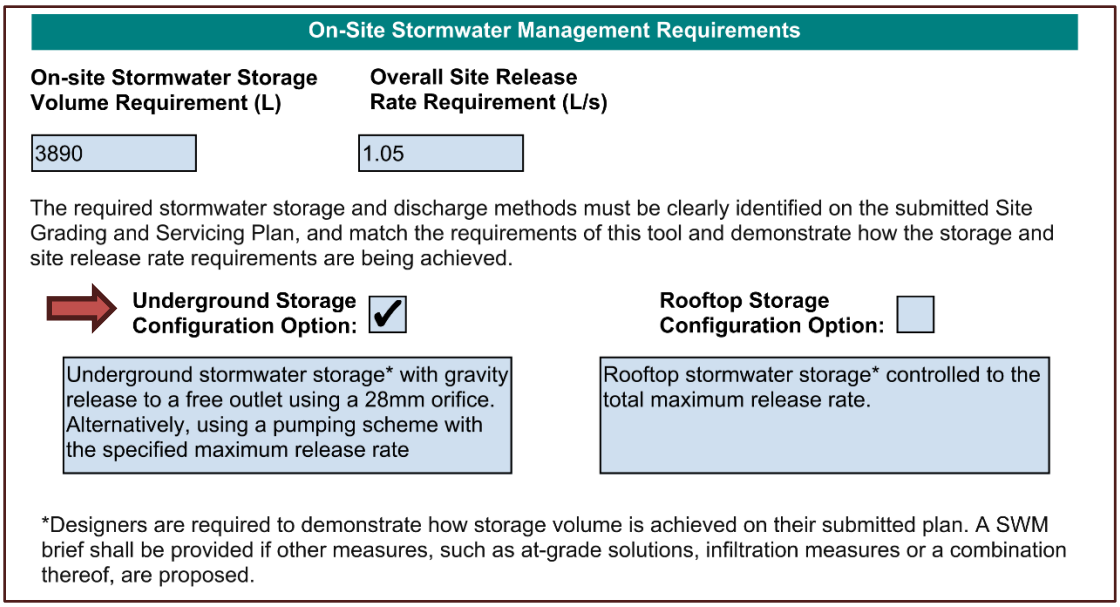

Figure 7: Selection of Storage and Discharge Solution – Underground Storage with pumping scheme

Step 4. Select Storage and Discharge Solution

Rooftop storage is not a viable option for this site given that the proposed roof is pitched.

The existing stormwater outlet for the site is towards an existing ditch along the right of way. The proposed underground storage reservoir will be configured with a pump that meets the required controlled release rate of 1.05 L/s, an ultimately outlets to the existing ditch. Runoff captured on the roof will be conveyed to the underground storage system via eavestroughs.

APPENDIX A – ON-SITE SWM NOT REQUIRED – 100 Any Street

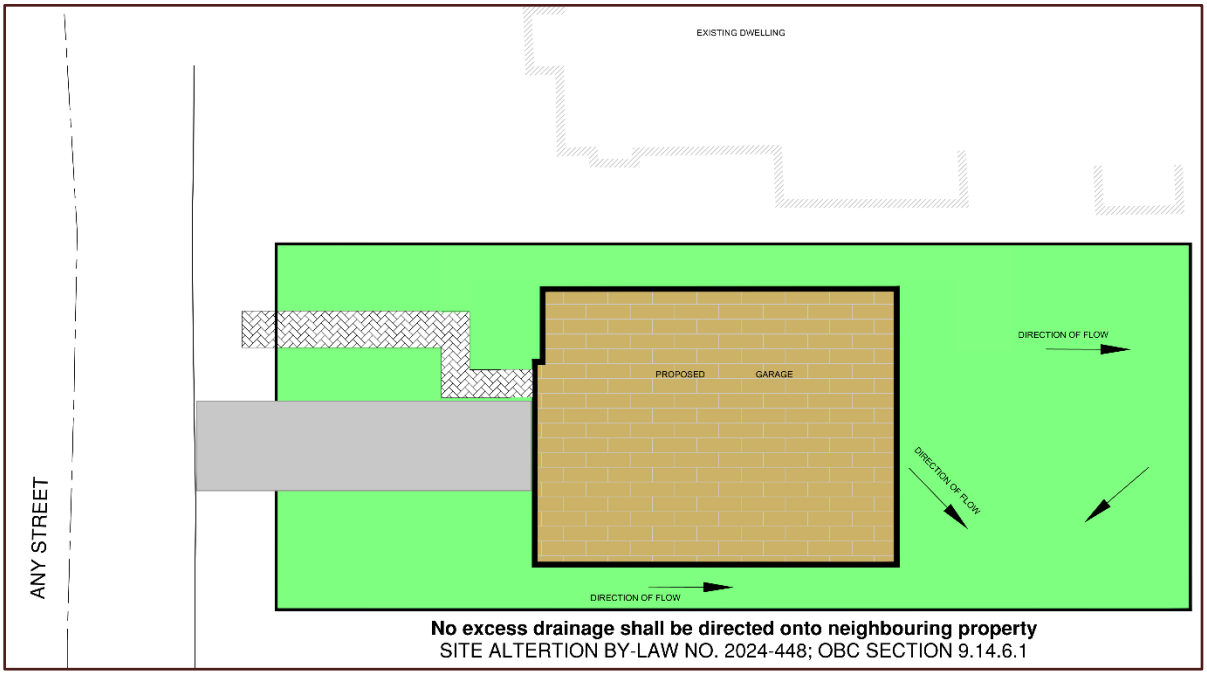

Figure 8: Proposed Development at 100 Any Street

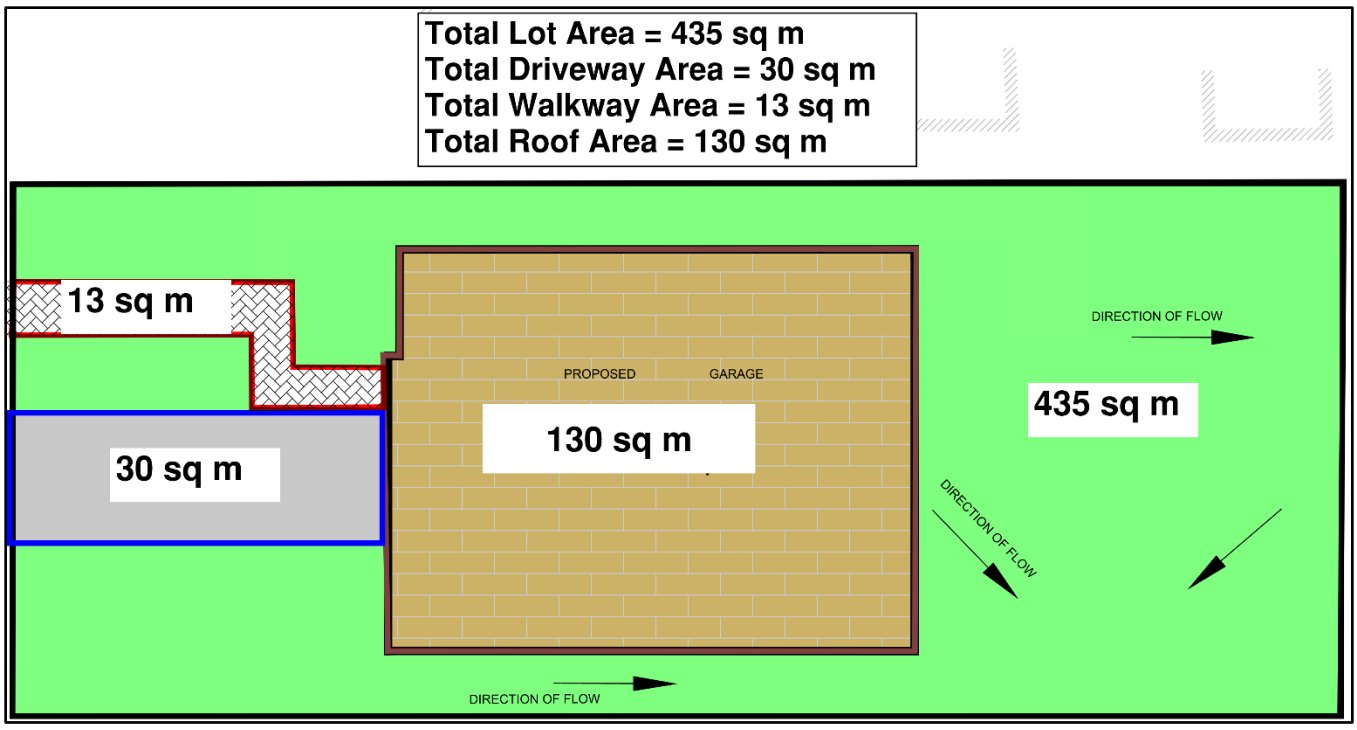

Figure 9: Lot Area, Driveway Area, Walkway Area, and Roof Area Calculation

APPENDIX B – UNDERGROUND STORAGE – 200 Any Street

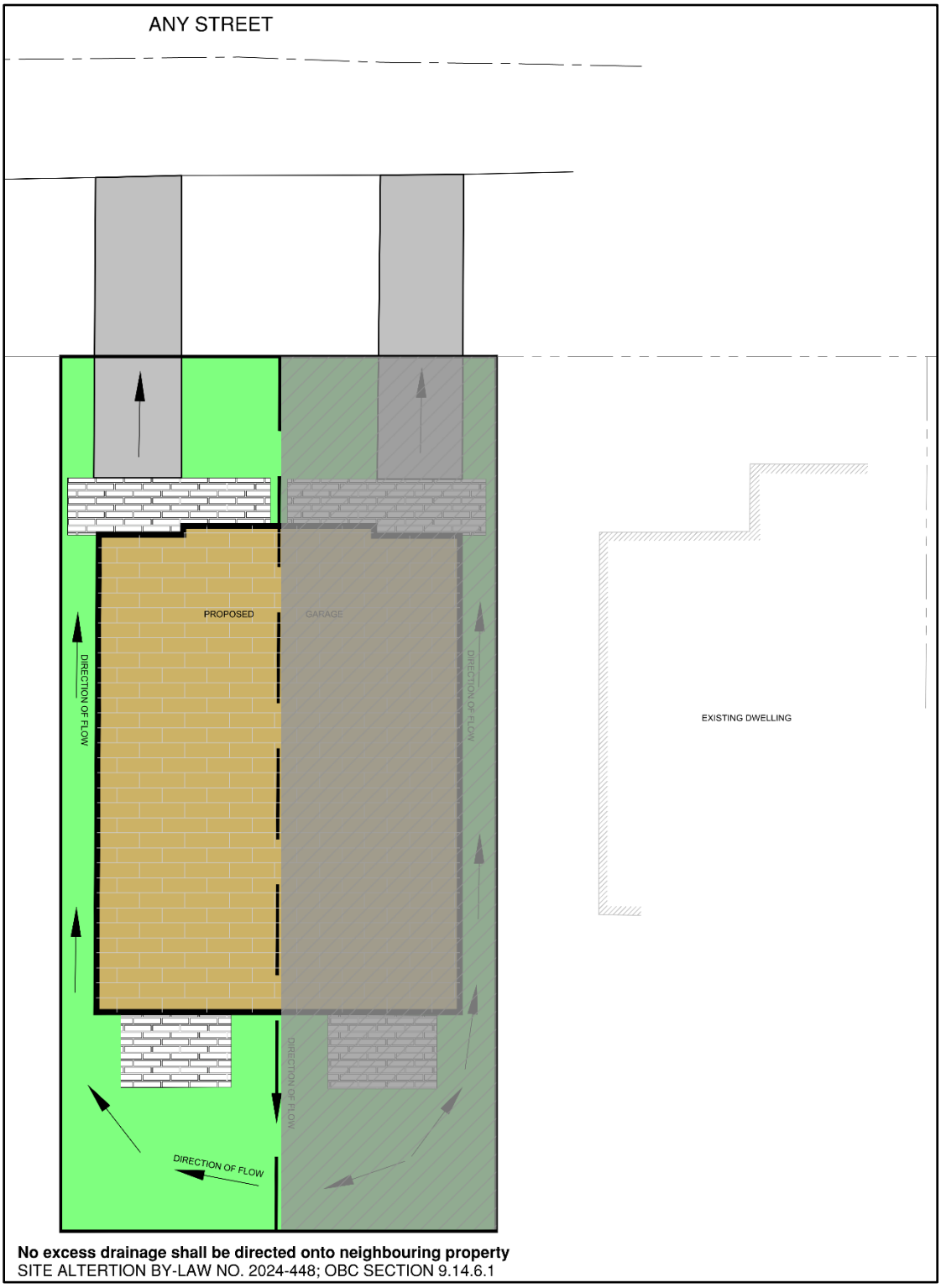

Figure 10: Proposed Development at 200 Any Street

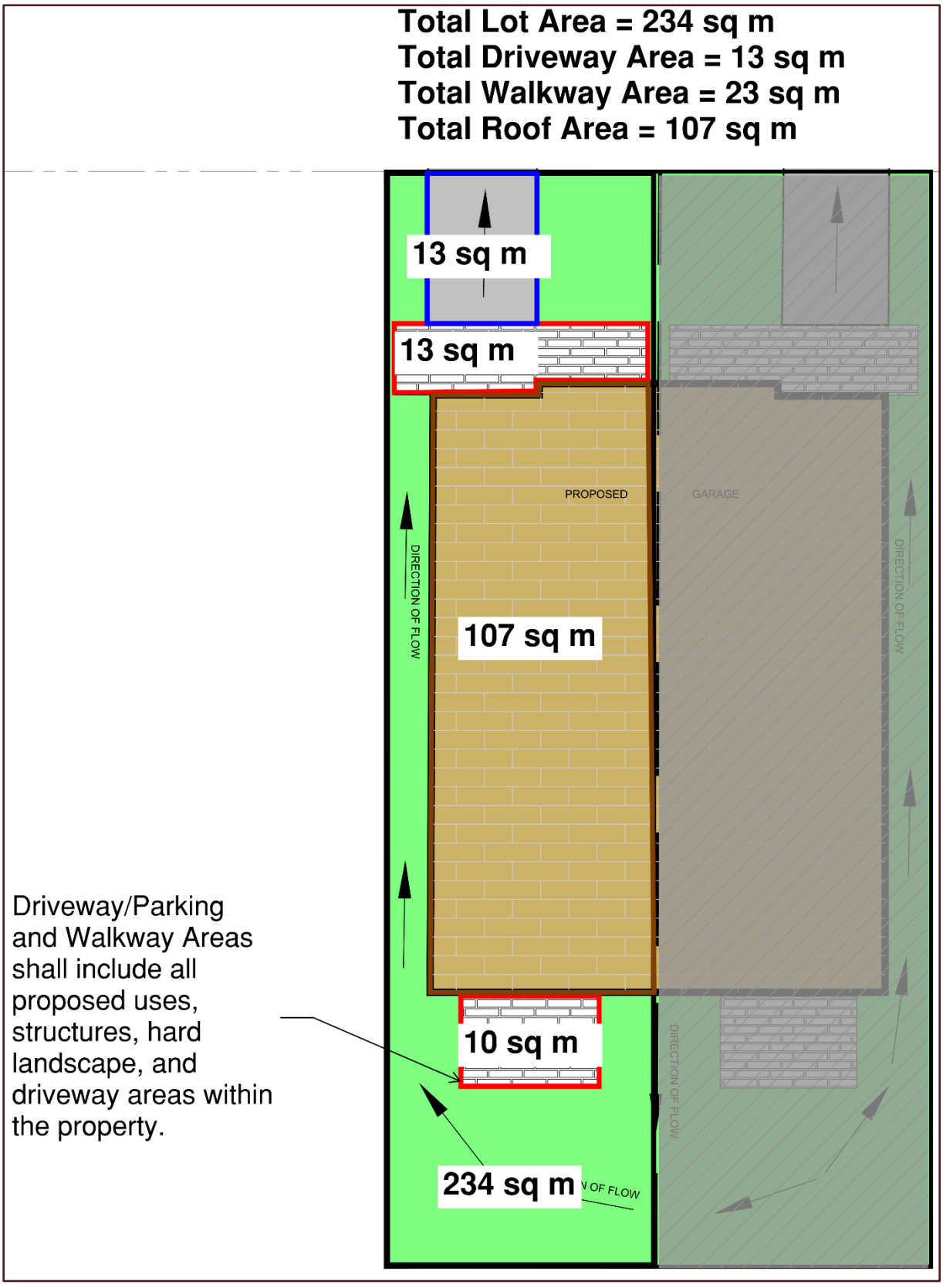

Figure 11: Lot Area, Driveway Area, Walkway Area, and Roof Area Calculation

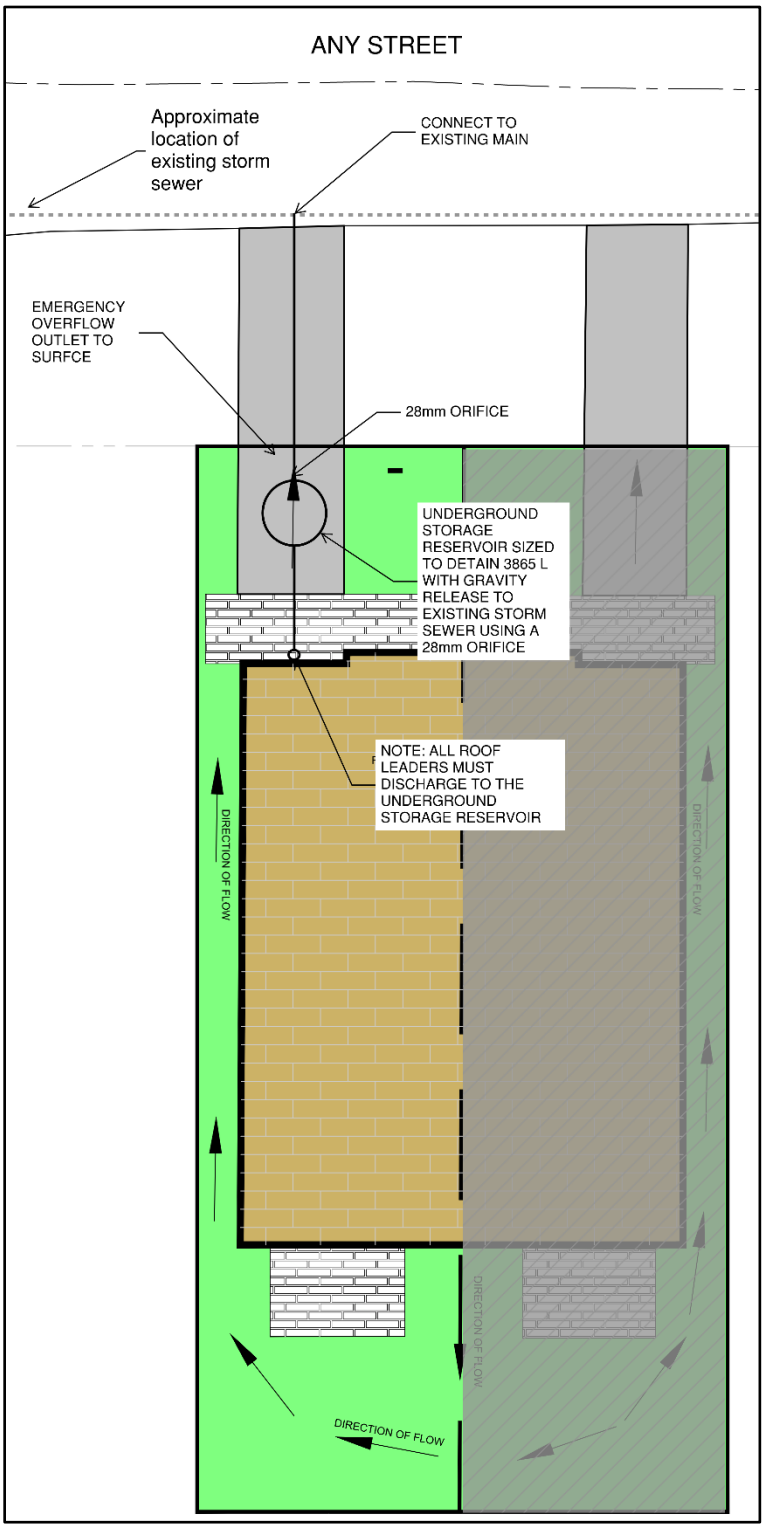

Figure 12: Schematic Underground Storage Configuration

APPENDIX C – ROOFTOP STORAGE – 300 Any Street

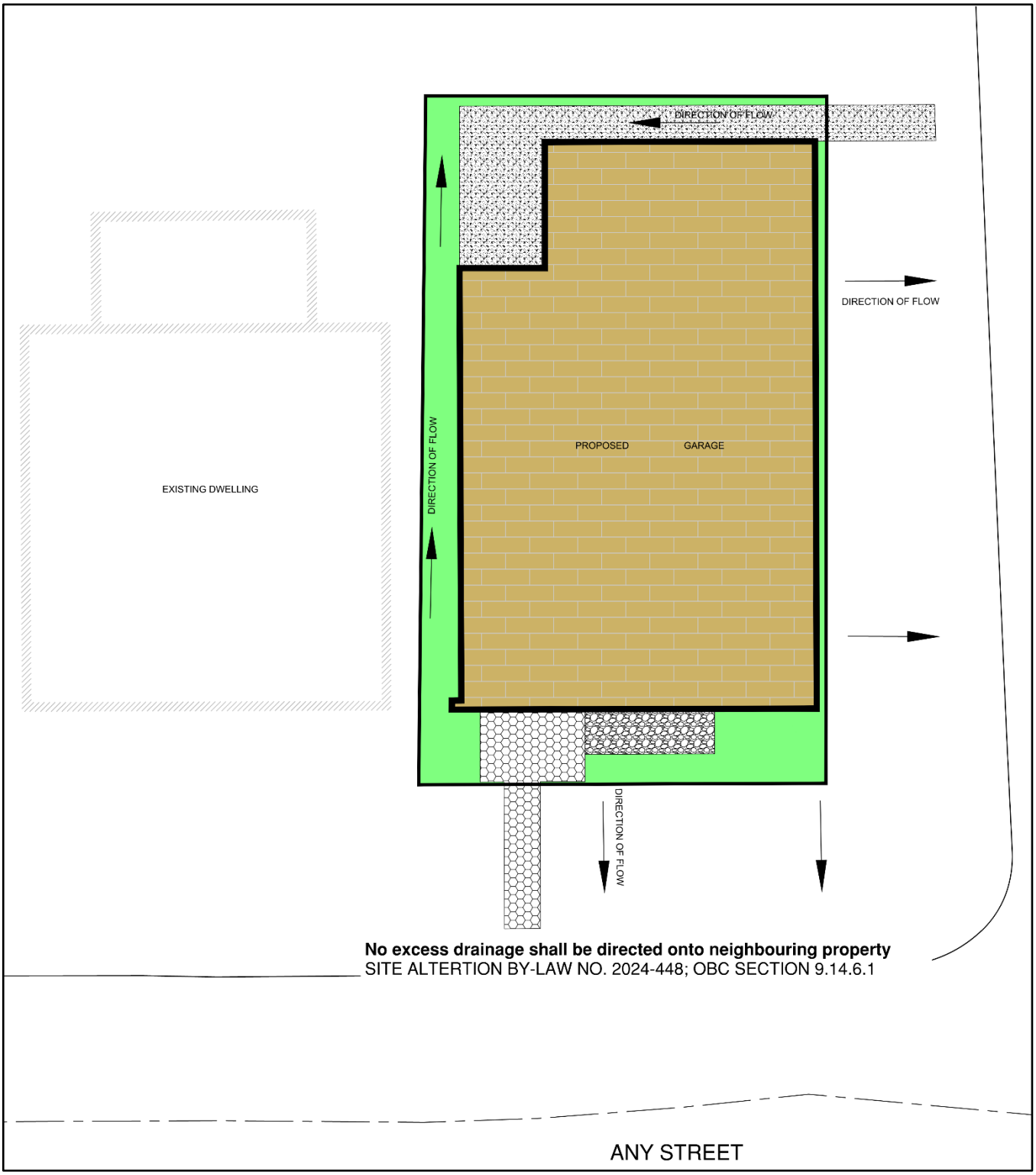

Figure 13: Proposed Development at 300 Any Street

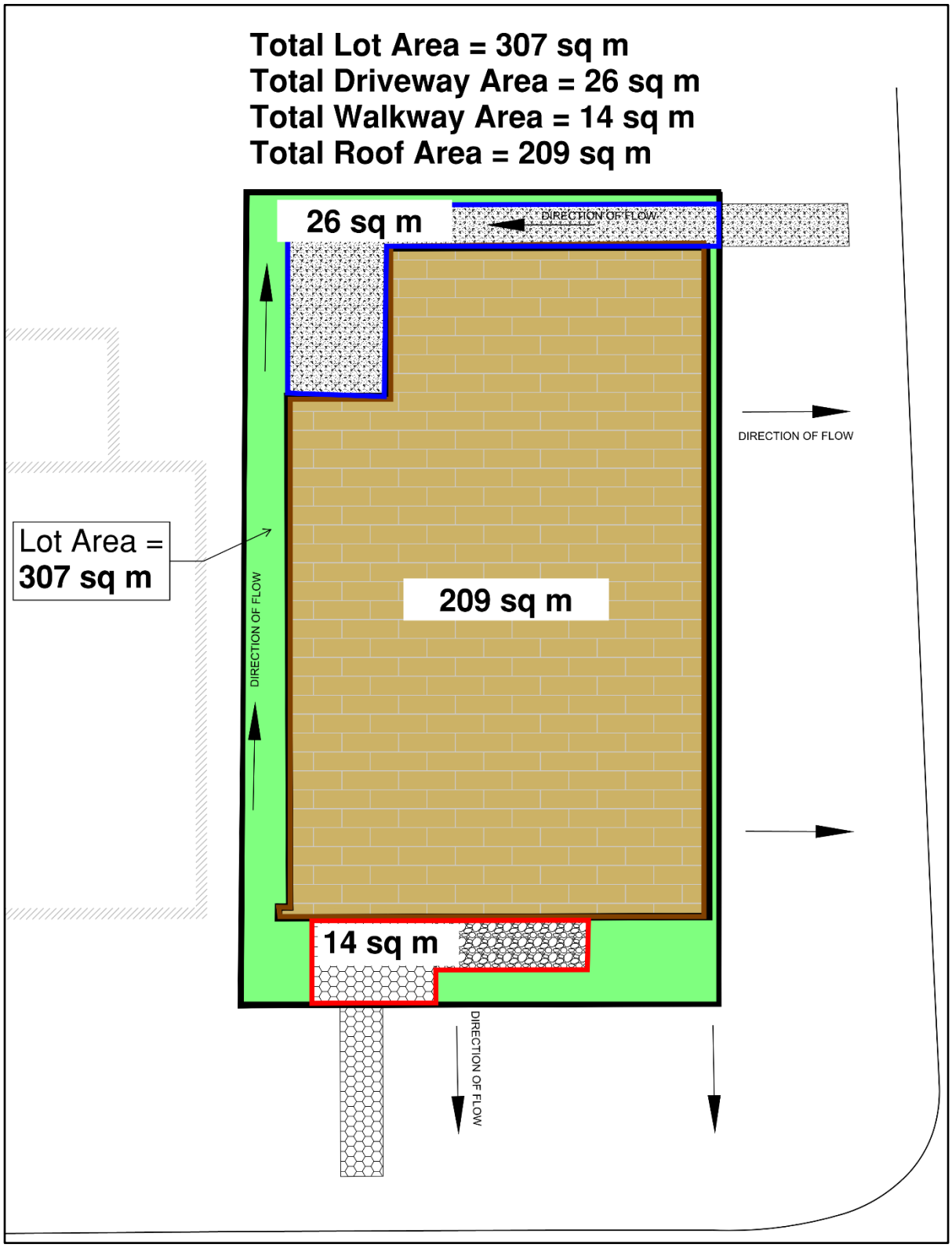

Figure 14: Lot Area, Driveway Area, Walkway Area, and Roof Area Calculation

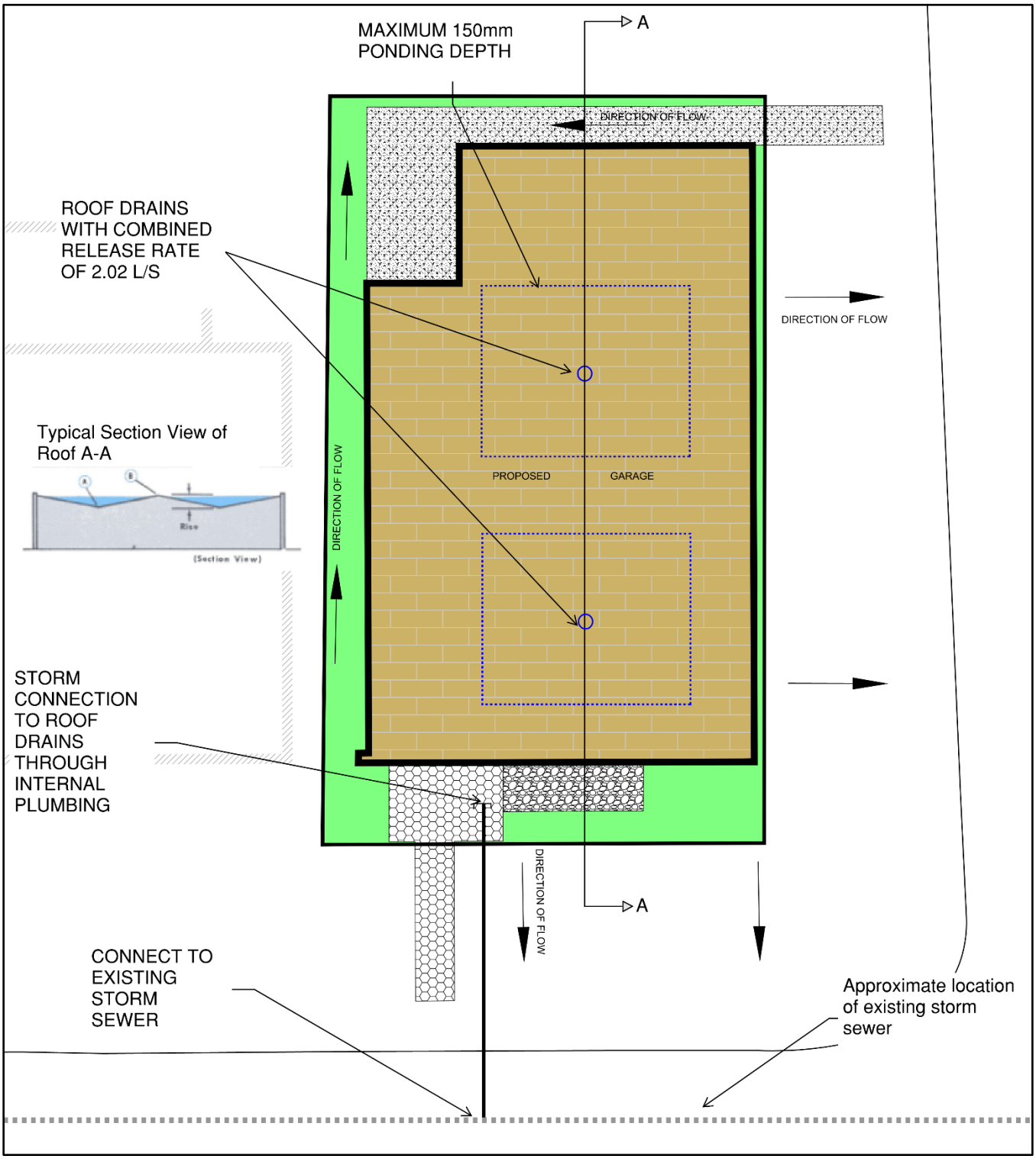

Figure 15: Schematic Rooftop Storage Configuration

APPENDIX D – FRONT TO BACK DRAINAGE – 400 Any Street

Figure 16: Proposed Development at 400 Any Street

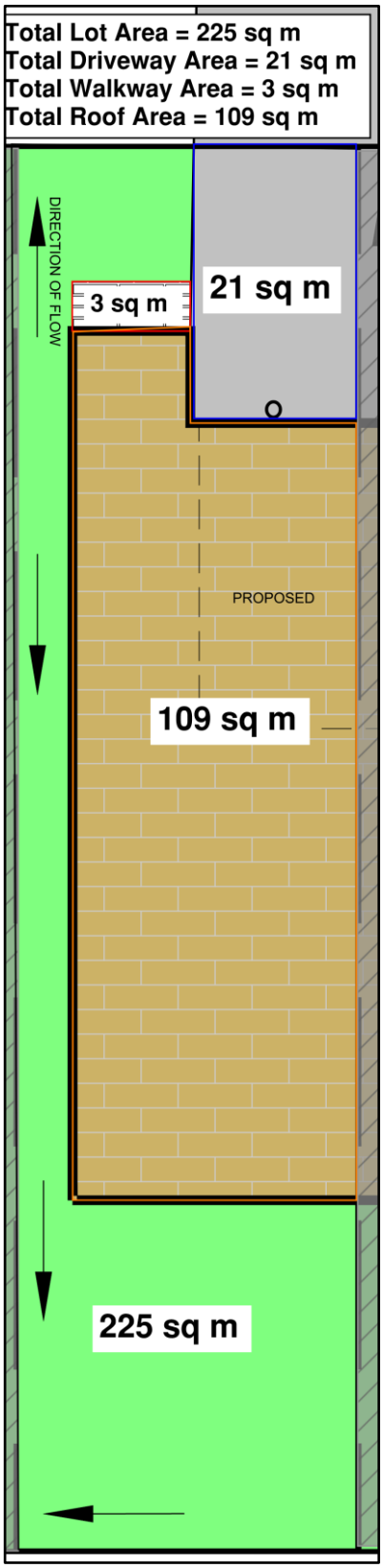

Figure 17: Lot Area, Driveway Area, Walkway Area, and Roof Area Calculation

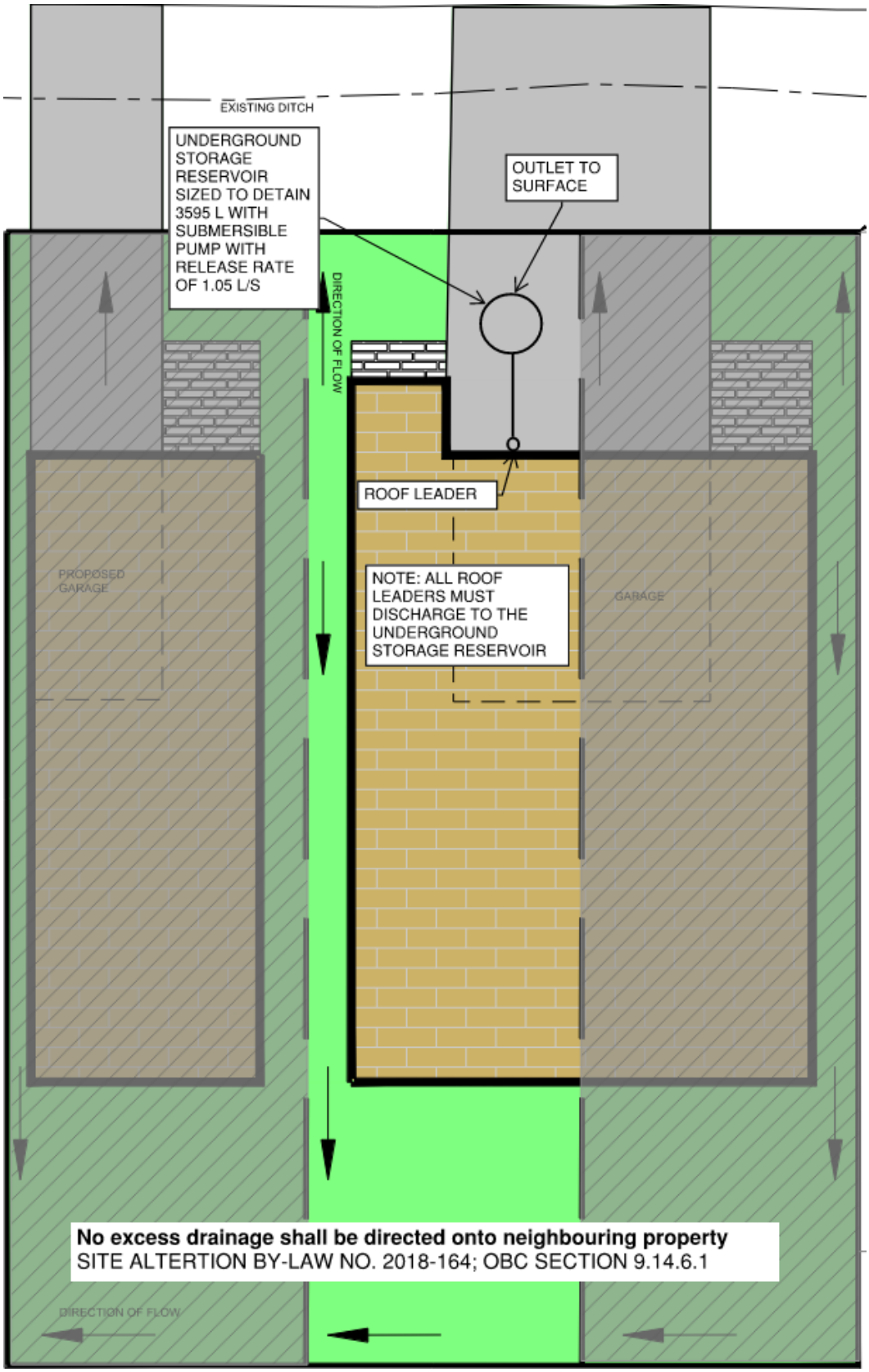

Figure 18: Schematic Underground Storage Configuration