



ENGINEERING STANDARDS AND DESIGN CRITERIA

APRIL 2026

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SECTION A

GENERAL INFORMATION

Section A General Information

A1.00 Introduction

The material presented herein is intended as a guideline in the production of designs for roads and services for all land development projects within the Town of East Gwillimbury. While specific design guidelines are provided herein, the **Ontario Provincial Standard Drawings and Specifications** supply the basis for much of the construction activity and shall be adhered to at all times unless directed otherwise by these design guidelines.

The design of all municipal services in the Town of East Gwillimbury is to be based upon the specifications and standards in effect at the time of submission. It is incumbent upon the Developer's Consulting Engineer to ensure the latest specifications are being utilized. All plans are to be accepted by the Town before they are used for the construction of services. However, acceptance in no way relieves the Developer's Consulting Engineer from providing an adequate and safe design.

A1.01 Purpose of Design

The purpose of this document is to provide a clear and concise description of the Town of East Gwillimbury's Engineering review processes and Engineering design standards. All development related Engineering design proposals are to be prepared in a manner that conforms to the design criteria contained in this document. This document will be periodically updated to include revisions where required. All submissions will be required to conform to the latest revision. The latest revision can be viewed by accessing the Town of East Gwillimbury website at <http://www.eastgwillimbury.ca>.

A1.02 Familiarization

Prior to the commencement of the engineering design, the Consultant shall obtain copies of the Town's current Engineering Standards and Design Criteria Manual, Standard Detailed Drawings and Parkland Design Standards Manual to familiarize themselves with the requirements of subdivision design in the municipality. Meetings are encouraged to be held with the Town's Engineering staff to discuss areas of preliminary concern and other issues prior to commencement of engineering design.

All design work shall adhere to the approved principles as determined through the functional reports provided and adopted during the draft plan approval stage of the process.

A1.03 Definitions

“CONSULTING ENGINEER” or “DEVELOPER’S ENGINEER” means a professional engineer possessing a current certificate of authorization to practice professional engineering as required by the Professional Engineers Act. The consulting firm should also be a member in good standing of the Consulting Engineers of Ontario (CEO).

“DRAFT PLAN APPROVAL” means approval of a draft plan of subdivision by the Town of East Gwillimbury subject to certain conditions in accordance with the Planning Act.

“FUNCTIONAL ACCEPTANCE” shall be the terminology used to describe the date when the underground services within the subdivision have been constructed and are without deficiencies that prevent them from operating as intended to the satisfaction of the Town of East Gwillimbury. Functional Acceptance is required prior to completion of the “Building Permit Checklist”.

“ACCEPTANCE” shall be the terminology used to describe the date when the services are complete and acceptable to the Town of East Gwillimbury subject to the maintenance period requirements of the Subdivision Agreement.

“ASSUMPTION” shall be the terminology used to describe the date when the Town of East Gwillimbury’s Council agrees by By-law that all the conditions of the Subdivision Agreement have been fulfilled and all the maintenance requirements have been completed.

“SOILS CONSULTING ENGINEER” - is a geotechnical engineering firm whose services have been engaged by the Developer or the Developer’s Engineer, usually to provide predevelopment soils investigations as well as a quality control function through the servicing/construction phase.

A2.00 Functional Servicing Report (FSR)

A functional servicing report (FSR) is required in accordance with the Planning Act and the Town of East Gwillimbury’s Official Plan for the draft approval of any plans of subdivision. An FSR may also be required, for other mid to large-scale developments potentially having an impact on servicing, grading and drainage at the discretion of the Director of Engineering.

Prior to the commencement of the FSR, the Owner’s Engineer is encouraged to meet with the Town’s Planning and Engineering staff to discuss the Town’s requirements. It is suggested that, when possible, this be a joint meeting similar to the Pre-Consultation with the Development Review Committee (DRC) requirement.

The FSR shall provide all details, calculations, costs, alternatives, and recommendations necessary that decisions can be logically made.

In cases where the proposed development under consideration forms part of a larger area set aside for future development, the FSR shall demonstrate that the servicing design will accommodate and allow for orderly and efficient future development.

The FSR shall be signed and sealed by a professional engineer.

The FSR shall include all relevant background information with respect to Site Constraints and Existing Conditions such as, but not limited to:

- Topography and drainage;
- All pipelines (Trans Canada, Enbridge, Union Gas, etc.);
- Hydro easements / corridors;
- Trunk sewers and watermains;
- Utilities;
- Environmental features (protected watercourses, top of bank, terrestrials);
- Road Networks.

The FSR should address, but will not necessarily be limited to, the following considerations:

- a) Proposed Draft Plan of Subdivision or Site Plan;
- b) Environmental Impact Study (EIS).
- c) Phasing;
- d) Adjacent developments;
- e) Topography and drainage;
- f) Lot grading design, including overland flow route;
- g) Soils Report/Geotechnical Investigations;
- h) Pumping station locations;
- i) Major trunk sewers;
- j) Sanitary drainage systems; confirm capacity in existing
- k) Water distribution systems; confirm capacity in existing
- l) Storm drainage systems, including Hydraulic Grade Line (HGL) constraints;
- m) Stormwater Management, external drainage areas, overland flow routes watershed drainage areas and watercourse improvements and channelization;

- n) Major roadway alignments, cross-sections, right of way width, and intersections;
- o) Roadway structures;
- p) Railway crossings;
- q) Parkland development;
- r) Trail Systems and active transportation facilities;
- s) Public Realm, Fencing, Entry features;
- u) Applicable Thinking Green Development Standards (TGDS) incorporated into the design;

The FSR shall contain the following:

- a) The Proposed Draft Plan of Subdivision or Site Plan

The proposed Draft Plan or Site Plan must be in a form acceptable to the Planning Branch.

- b) Contour Plan

This plan shall be a plan at a scale of no larger than 1:1000 giving contour lines at sufficient intervals to permit assessment of existing surface drainage patterns. This plan is to extend to the limits of the drainage area to be served by proposed sanitary and storm sewer systems, including lands beyond the boundaries of the subdivision. All elevations shall refer to Geodetic Datum NAD83, UTM zone 17N.

- c) Conceptual Grading Plan

This plan shall be at a scale of no larger than 1:1000 showing a general outline of proposed grading, including overland flow routes. The plan should show all existing vegetation to be preserved. Where parkland is being provided incorporate the park facility fit, to ensure grading meets the requirements of the proposed facilities.

- d) General Servicing Plan

This plan shall be at a scale of no larger than 1:1000 and will be based on the proposed Draft Plan of Subdivision or Site Plan. The plan shall schematically show the proposed underground services and their connection to existing systems. Direction of flow must be indicated on all sewers. This plan is to be accompanied by engineering calculations indicating the quantity of stormwater flow and sanitary flows at the connection to existing systems and/or at proposed outfalls. Consideration must be given to the whole catchment area to ultimately be developed. Overland flow routing, proposed stormwater management facilities, blocks and easements for storm drainage systems shall also be shown.

e) Traffic Management Implementation Plan

This plan shall be at a scale of no larger than 1:1000 and will be based on the proposed Draft Plan of Subdivision or Site Plan. The plan shall identify all right-of-way (ROW) widths, curbs/edge of pavement, right and left turn lanes, bicycle lanes, multi-use trails and entry features within the ROW, sidewalk locations and traffic calming. Any requirements to support approved TDM and Transit services shall also be identified on the Traffic Management Implementation Plan.

f) Soils Report/Geotechnical Investigation

A preliminary soils report/geotechnical investigation from an independent Soils Consultant shall include sufficient information to assess constructability of the development including slope/ground stability, underground servicing systems, founding levels for buildings, engineered fill/earthworks requirements, water table information and a recommended pavement structure as well as any other special considerations applicable to the project location and adjacent properties that may be affected by the proposed development.

g) Hydrogeological Report

A preliminary hydrogeological assessment will include the hydrogeological characterization of the lands, including soils, groundwater levels, groundwater flow direction and water balance calculations. Detailed groundwater balance calculations for predevelopment and potential post-development conditions (based on the proposed development plan) will be completed to assess target water volumes to maintain infiltration for the subject lands and surrounding features. Where appropriate, Low Impact Development (LID) measures to be incorporated into the stormwater management plans for the subject lands.

h) Stormwater Management Report

This report must address the quality and quantity criteria for the watershed or sub-watershed within the proposed development. This report must also address any concerns from the Lake Simcoe Region Conservation Authority (LSRCA) and Ministry of Environment Conservation and Parks (MECP) design criteria for stormwater management (Stormwater Management Planning and Design Manual, 2003 or latest amendment). Minor and major storm systems and flow routes must be identified within the report. The pond block must be adequately sized such that the stormwater management facility meets all Town of East Gwillimbury criteria including the Town's storm water management plan (SWM Plan), Low Impact Development Standards (LIDS) and alternatives to SWM ponds (Refer to Section G).

i) Additional Reports

The Town of East Gwillimbury may require a study and report which evaluates the geographical and hydro-geological characteristics of a rural area where private services are proposed. This study shall identify the suitability of the development area and its component sub-areas to safely accommodate private water supply and sewage disposal systems.

A2.01 ADDITIONAL REPORTS

- a. Soils Report/Geotechnical Investigation
- b. Hydrogeological Report
- c. Stormwater Management Report
- d. Traffic Impact Study;
- e. Tree Inventory and Preservation Report;
- f. Acoustic Report;

a) Soils Report/Geotechnical Investigation

A preliminary soils report/geotechnical investigation from an independent Soils Consultant shall include sufficient information to assess constructability of the development including slope/ground stability, underground servicing systems, founding levels for buildings, engineered fill/earthworks requirements, water table information and a recommended pavement structure as well as any other special considerations applicable to the project location and adjacent properties that may be affected by the proposed development.

b) Hydrogeological Report

A preliminary hydrogeological assessment will include the hydrogeological characterization of the lands, including soils, groundwater levels, groundwater flow direction and water balance calculations. Detailed groundwater balance calculations for predevelopment and potential post-development conditions (based on the proposed development plan) will be completed to assess target water volumes to maintain infiltration for the subject lands and surrounding features. Where appropriate, Low Impact Development (LID) measures to be incorporated into the stormwater management plans for the subject lands.

c) Stormwater Management Report

This report must address the quality and quantity criteria for the watershed or sub-watershed within the proposed development. This report must also address any concerns from the Lake Simcoe Region Conservation Authority (LSRCA) and Ministry of Environment Conservation and Parks (MECP) design criteria for stormwater management (Stormwater Management Planning and Design Manual, 2003 or latest amendment). Minor and major storm systems and flow routes must be identified within the report. The pond block must be adequately sized such that the stormwater management facility meets all Town of East Gwillimbury criteria including the Town's storm water management plan (SWM Plan), Low Impact Development Standards (LIDS) and alternatives to SWM ponds (Refer to Section G).

d) Traffic Management Implementation Plan

This plan shall be at a scale of no larger than 1:1000 and will be based on the proposed Draft Plan of Subdivision or Site Plan. The plan shall identify all right-of-way (ROW) widths, curbs/edge of pavement, right and left turn lanes, bicycle lanes, multi-use trails and entry features within the ROW, sidewalk locations and traffic calming. Any requirements to support approved TDM and Transit services shall also be identified on the Traffic Management Implementation Plan.

e) Tree Inventory and Preservation Report.

Ensure this report will meet the Town's Tree Inventory, Preservation and Compensation Guidelines.

f) Acoustic Report

The Town may also require an Acoustic or Noise Report describing existing noise generators and future conditions as well as proposed and required noise attenuation measures. Vibration mitigation measures should also be identified in the acoustic report if applicable.

SECTION B

SURVEY REQUIREMENTS

SECTION B SURVEY REQUIREMENTS

B1.00 Survey Control Monuments

Prior to the assumption of a subdivision, the Owner's Surveyor shall establish a network of second order horizontal control monuments, as set out in "Ontario Specifications for Horizontal Control Surveys (OS 79)", as well as a network of vertical control benchmarks, as set out in "Ontario Specifications for Vertical Control Surveys (OS 79)" (the Town may require cash in lieu of the Owner's Surveyor establishing control monuments when executing the subdivision agreement).

The same monument may be used as both a horizontal and vertical control monument/benchmark.

The horizontal control monuments, and the vertical control benchmarks, shall be established at approved locations to the satisfaction of the Town, using the following criteria:

- Two (2) horizontal control monuments and two (2) vertical control benchmarks for the first ten hectares (10 ha) (or less) subdivided by the plan, and one (1) additional horizontal control monument and vertical control benchmark for every additional ten hectares (10 ha) (or less) subdivided by the plan.
- In addition, every existing horizontal control monument and vertical control benchmark destroyed during subdivision or site plan construction must be replaced.
- The new horizontal control monuments and vertical control benchmarks (including replacements) shall be installed by an Ontario Land Surveyor. A certificate will be required from an Ontario Land Surveyor stating that the horizontal control monuments and vertical control benchmarks were installed as set out by the "Ontario Specifications for Horizontal Control Surveys (OS 79)" and the "Ontario Specifications for Vertical Control Surveys (OS 79)" respectively. In addition confirmation will be required from the Ministry of Natural Resources and Forestry (MNRF) that the horizontal control monuments and vertical control benchmarks have been accepted into their Cosine Database.
- The horizontal control monument shall be installed in accordance with Town of East Gwillimbury Standard Drawing included in the Appendix to this document.
- The location, description, and pertinent information with respect to the monuments shall be indicated on all engineering drawings.

SECTION C
DRAWING AND SUBMISSION REQUIREMENTS

Section C Drawing and Submission Requirements

C1.00 Drawings

C1.01 Engineer Drawing Requirements

- a) A title/cover sheet is required for the drawings. The standard cover sheet is available digitally in AutoCAD format upon request from the Town Engineering Department. An example of this drawing is located in the Appendix to this document.
- b) The following information shall be included on the cover sheet:
- Key plan with scale.
 - Name of Project (Subdivision or Site Plan).
 - Subdivision T number (i.e., 19T-XXXXX) or Site Plan number (SPA.XX.XX).
 - Developer name and contact Information.
 - Consultant name and contact information.
 - Drawing Index.
 - Legal information (Lot, Concession and M-Plan number if available).
 - Town of East Gwillimbury name and logo.

A Drawing Notes page containing standard notes that apply to the municipality is available digitally. A sample drawing is included in the Appendix to this document.

- c) All drawings shall be prepared using the current version of AutoCAD in use by the Town at the time of the submission. All plans shall be prepared on standard ISO Arch D 610 X 914 mm sheets. Final signed plans shall be plotted on standard bond paper. All plans shall also be submitted in digital format in use by the Town at time of the application.
- d) Standard digital title blocks are to be used and are available in AutoCAD format upon request from the Town Engineering Department. Examples are located in Appendix to this document.
- e) All elevations shown on the drawings are to be of geodetic origin and reference to the geodetic benchmark is required.
- f) All existing and proposed road allowances, lot lines, lot numbers, block numbers, and intended purpose for blocks (i.e., school, park, etc.), easements reserves and street names are to be included on the drawings.
- g) The Town has a street name inventory of all proposed and approved street names that may be used for new public and private streets and lanes. Street names may

be selected from the Town's inventory or new names may be proposed but are subject to approval by the Regional Municipality of York and Council for the Town of East Gwillimbury. Please contact the Planning Branch for the latest inventory.

- h) Regional flood lines are to be indicated on all plans affected.
- i) A north arrow shall be referenced at the top right-hand corner of all drawings. North shall generally point to the top of the drawings.
- j) Stationing shall generally be from left to right.
- k) A key plan drawn to 1:10000 scale shall be shown on all plans with the exception of detail drawings. The area covered by the drawing shall be clearly identified. The key plan shall show at least one major intersection in relation to the project.
- l) All engineering drawings shall be stamped by a Professional Engineer. The Engineer's stamp must be signed and dated, prior to the issuance of drawings for signature by the Town's Director of Engineering
- m) All Civil plans to include locations of existing vegetation and preservation fencing (i.e. grading servicing and ESC)

C1.02 General Service Plan

- a) A drawing showing General Services shall be prepared for all developments at a maximum scale of 1:1000.
- b) The reference geodetic benchmark and the site benchmarks to be used for construction shall be identified on the Cover Sheet and all relevant plans.
- c) A drawing index shall be shown on all General Services Plans to identify the Plan and Profile Drawing Number for each street or easement shown.
- d) All streets shall have the approved street names indicated (once available).
- e) All existing services, utilities and abutting properties are to be shown in dashed/grayscale lines. All proposed services to be constructed are to be shown in solid lines.
- f) All Maintenance Holes will be shown and are to be numbered in accordance with the design sheets. Sanitary Maintenance Holes shall include the letter "A" after the number designation. FDC Maintenance Holes shall include the letter "B" after the number designation. All catchbasins are to be shown.
- g) All existing and proposed storm, FDC and sanitary sewers are to be shown including size, length, grade, direction of flow, material, and type of the sewer. FDC Maintenance Holes shall include the letter "B" after the number designation. Storm sewers 750 mm dia. and larger are to be drawn with two lines. Services must be shown for all lands to be registered. Services are to be terminated at the subdivision limits.

- h) All watermains, valves, valve chambers, sampling stations, flushing stations and hydrants are to be shown. Watermains are to be identified only by size and material.
- i) All curbs and sidewalks are to be shown, including details of connections to existing sidewalk networks.
- j) All fencing is to be indicated by height and type.
- k) All sites for parks, schools, churches, commercial and industrial developments must be shown and clearly identified.
- l) If a subdivision encroaches on an existing floodplain, the approved fill and flood line restrictions must be shown, as specified by the Lake Simcoe Region Conservation Authority.
- m) All existing buildings and structures on the lands including ones which are to be removed are to be shown and labelled.
- n) The location of all traffic control, traffic information signs and line painting is to be clearly shown on separate Traffic Management Implementation Plans (TMIP), not on the General Services Plan. Guide-rail or other traffic protection measures shall be clearly indicated on the TMIP.

C1.03 Plan and Profile Drawings

- a) All Plan and Profile Drawings shall be prepared at a scale of 1:500 horizontally and 1:100 vertically. A complete legend shall be provided on each drawing.
- b) Plan and Profile Drawings are required for all roads, blocks and easements where services are proposed, for all outfalls and for all boundary roadways abutting the development.
- c) All existing or future services, utilities and abutting properties shall be shown in dashed/grayscale lines.
- d) All services to be constructed are to be shown in solid lines.
- e) All road allowances, lots, blocks, easements and reserves are to be identified. Lot and block frontages are to be dimensioned.
- f) All curb, gutter and sidewalks are to be shown and dimensioned on the plan portion of the drawings.
- g) All sewers and culverts shall be shown and dimensioned on the plan and shall also be plotted on the profile of the drawings to true scale size. For all sewers and culverts, the type, size, slope, length, material and direction of flow shall be shown on both the plan and profile portion of all drawings. Storm sewers 900 mm dia. and larger are to be drawn with two lines in the plan portion. The hydraulic grade

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- line for the storm sewer shall be drawn and labeled on the profile portion of the drawings.
- h) All Maintenance Holes shall be shown on the plan and profile portion of the drawings. The Maintenance Holes shall be identified by number on the plan portion and by number, chainage, offset, size, invert elevations, direction, and applicable Ontario Provincial Standard Drawing on the profile portion of the drawing. Sanitary Maintenance Holes shall include the letter "A" after the number designation. Maintenance Holes that have safety platforms or drop connections shall be noted.
 - i) All non-standard Maintenance Holes are to be detailed on the plan portion of the drawing at a scale of 1:50 and in relation to the north arrow.
 - j) All catchbasins and catchbasin connections shall be shown. All grate and invert elevations for rear lot catchbasins are to be shown. Concrete encasement shall be shown on all rear lot catchbasin leads.
 - k) When streets are of a length that requires more than one drawing, match lines are to be used with no overlapping of information.
 - l) The reference drawing numbers for all intersecting streets and match lines shall be shown on all Plan and Profile Drawings.
 - m) All watermains, hydrants, valves, etc., shall be described and dimensioned on the plan portion of the drawings. The watermain is to be plotted to true scale size and shaded on the profile portion of the drawing and shall be described.
 - n) The location of all storm, water and sanitary service connections shall be shown on the plan portion of the drawings.
 - o) The centreline of construction with 20.0 metre stations shall be noted with a small cross on the plan portion of the drawings. Chainage shall generally start on the left side of the sheet and increase from left to right on all drawings. Existing and proposed centreline elevations shall be shown at 20.0 metre intervals along the bottom of the profile.
 - p) The original and proposed ground at centreline of road shall be plotted on the profile. The proposed profile shall be fully described (length, grade, V.P.I. elevations, vertical curve data, etc.) with all elevations shown to two decimal places apart from the V.P.I. which shall be to three decimal places. Chainage for the centreline of construction as well as the chainages for V.P.I., B.V.C., E.V.C. shall be noted on the profile portion of the drawings. Chainages and drawing views should generally run from West to East and South to North

- q) Details of the gutter grades for all intersections, cul-de-sacs and expanded bulbs shall be provided on the plan portion as a separate detail at a scale of 1:200.
- r) Chainage for the centreline of construction, including chainages for P.I., B.C., E.C. and horizontal curve data shall be shown on the plan portion of the drawings.
- s) The proposed pavement structure design and dimensions shall be noted on the plan portion of the drawings.
- t) All existing utilities and services shall be shown on the plan view of the drawings. Utility locates will be required to determine the extent and location of existing utilities. It may be necessary to dig test holes to determine the actual elevations of these services to avoid conflicts with new construction. These elevations shall be shown on the profile portion of the drawings.
- u) Profiles of roadways shall be produced sufficiently beyond the limits of the proposed roads to confirm the feasibility of future extensions, or connections to existing lands.
- v) In addition to the above, the following details shall be shown on the plan portion of the drawings:
 - The curb radii at all intersections unless local road to local road.
 - The location of all luminaire poles and transformers.
 - Any special notes.

C1.04 Lot Grading Plans

- a) All Lot Grading Plans shall be prepared in accordance with the criteria outlined in Section E of this document.
- b) The plans shall be prepared at a scale of 1:500.
- c) The plans must show overall lot fabric with lot and block numbers, street names, right-of-way limits, road curb and gutters, catchbasins, sidewalks and driveway locations. The plans shall show existing topographic information, including existing contours and contour labels at an elevation interval of 0.50 m and shall extend 30 m beyond the limits of the project. Above ground street furniture is not to be shown.
- d) All internal block details shown on this plan are schematic only and are not to be included in the Town of East Gwillimbury approval of the plan. Final building, drainage and grading details for each block shall be subject to the Town's Site Plan Approval. Drainage of all blocks is to be self-contained.

- e) Road grades shall be shown at 20 metre intervals and at all changes in grade. Directional arrows shall be provided indicating the overland flow route. 100-year storm event ponding limits shall also be shown where applicable.
- f) Existing and proposed grades at the lot corners shall be indicated along with elevations at any break points and swales. Existing and proposed retaining walls, including top and bottom elevation, and existing and proposed embankments including slope label and associated elevations shall be shown.
- g) Any lots requiring more than 1.2 metres of fill shall be indicated with an asterisk (*) beside the lot number to show that either engineered fill or extended footings may be required.
- h) The house type and specified house grade is to be shown for all lots. Minimum basement elevations are to be shown where ground water or hydraulic grade line impacts are a concern.
- i) Directional arrows shall be provided on all lots indicating the direction of flow and grade of flow in percent (%) along rear lot lines.
- j) All existing trees are to be shown. All trees are to be clearly identified with appropriate shading as “to be preserved” or “to be removed”. The base elevation and size of all existing trees is also to be shown.
- k) Any existing structures shall be shown with notes clearly identifying whether they are to be retained or demolished/decommissioned.

C1.05 Composite Utility Plans

- a) A Composite Utility Plan (or Plans) is to be prepared in accordance with the criteria outlined in Section J of this document.
- b) The plans shall be prepared at a scale of 1:500.
- c) The plans must show overall lot fabric with lot and block numbers, municipal addresses, street names, right-of-way limits, road curb and gutters, catchbasins, sidewalks, street trees, all aboveground street furniture and driveway locations.
- d) Typical road cross-sections must be included on the plans.
- e) Table J-1- Public Utility Clearance Requirements must be included on all plans.
- f) The location of all utilities (above and below ground) must be clearly shown (hydro, telecommunications, gas, cable, streetlighting, etc.) along with Canada Post mailbox locations.

- g) The location of all utility service locations to lots must be clearly identified along with storm, sanitary and water connections. All utility road crossings, including the number of ducts in each, and whether crossings are to be direct buried, conduit, or concrete encased conduit are to be shown.
- h) Details shall be included indicating location and spacing requirements of services for the various lot types in the development.
- i) A signature block shall be included for each utility to sign indicating acceptance of the layout as shown.

C1.06 Traffic Management Implementation Plan (TMIP)

Traffic Management Implementation Plans at a scale of 1:1000 is to be prepared indicating the location and details for all traffic control, and information signage and line painting, including those required for active transportation facilities.

C1.07 Drainage Plans

Drainage plans shall be prepared at a scale of 1:1000. All drainage plans for the storm, FDC and sanitary sewer design shall be prepared in accordance with the criteria provided in Sections F and G of this document. Maintenance Holes labels shall be presented at a legible text size appropriate for the scale. Note that sewer design sheets must be included in each drawing set and submitted as separate document (PDF) at each submission.

C1.08 Tree Preservation Plan

Prior to any site disturbance taking place, the Town's Community Parks Recreation and Culture Branch shall approve all measures identified in the tree preservation plans. The proposed measures shall be in accordance with the Town's Tree Inventory, Preservation and Compensation Guidelines.

C1.09 Erosion and Settlement Control Plans

Prior to any site disturbance taking place plans will be required indicating the measures that will be put in place to prevent the Erosion and migration of any soil particles from the site. The plans shall clearly indicate the order in which all activities are to take place and shall show the location and details for all Erosion control fences, earth or rock check dams, sediment ponds, mud mats and any other measures necessary to control soil erosion. Topsoil stockpile locations shall also be indicated on the drawings. Sediment pond sizing calculations and temporary outfall details are also to be shown.

C1.10 Detailed Drawings

The Town of East Gwillimbury Standard Drawings shall be used whenever applicable. In the absence of a Standard Drawing the latest revision of the Ontario Provincial

Standard Drawings shall be used. Individual details shall be provided by the Developer's Consulting Engineer for all special features not covered by any of the above. All details shall be reproduced or drawn on standard size sheets and shall be included as part of the engineering drawings.

C1.11 Landscape Drawings

Drawings indicating the location and species of street trees, stormwater management pond landscaping, trails, trailheads, view parks and park and open space landscaping shall be prepared in accordance with the Town's Parkland Design Standards Manual, Landscape Plans Submission Guidelines and the requirements of the Town's Landscape Architect. These plans shall be submitted separately for review/approval to the Town's Community Parks Recreation and Culture Branch.

All final approved landscaping drawings shall be bound and included with the final approved engineering drawings in one package.

C1.12 As Constructed Drawings

General

The "As Constructed" Drawings constitute the original (design) engineering drawings which were accepted by the Town, and which have been amended to incorporate the construction changes and variances to provide accurate information of the works as installed in the development. Submission of As Constructed Drawing information shall be accompanied by revised design calculation sheets which confirm the capacity of the constructed condition of the sewers. As Constructed Drawings shall be prepared in accordance with PEO guidelines and shall be submitted at time of request for Acceptance.

As Constructed Field Survey

The As Constructed Drawing revisions shall be based on a final survey of all the subdivision and/or site plan services and the Developer's Consulting Engineer's construction records. The final survey shall include a final check of the following items:

- a) Location of all Maintenance Holes, including invert, drop structures, and top of cover elevations
- b) Distances and grades of pipes between all sewer Maintenance Holes and sewer pipe sizes.
- c) Changes in sewer pipe sizes and material or class.
- d) Location of all roadway catchbasins;
- e) Location, rim, length and invert elevations for all rear yard and lot catchbasins;

- f) Location of all hydrants including flange elevation.
- g) Location of all valve boxes and valve chambers.
- h) Location of all blow-offs, temporary hydrants, flushing stations and other special watermain appurtenances.
- i) Location of all service connections to all lots and blocks and location of connections from nearest downstream maintenance hole (i.e., +023).
- j) Location of all sidewalks and curbs.
- k) Road centre line elevations as shown on drawings.
- l) Geodetic benchmarks used for construction.
- m) Location of all fencing, guide rails or other protective measures constructed as part of the subdivision development.
- n) Location of all streetlight poles and transformers shall be shown on the Plan and Profiles and General Plan of Services.
- o) Location of all driveways, boulevard tree plantings, streetlight poles and transformers shall be shown on the Utility Coordination Plan.
- p) Storm connection CCTV inspection of all sewer lines including video record provided on DVD and printed report.
- q) Stormwater management ponds and Low Impact Development (LID) facilities including topographic survey, bathometric survey, all related maintenance holes, pipes weirs, and structures or devices including confirmation of the sizes and controls elevations of the devices.
- r) Location of completed pavement marking and installed signage.
- s) Location of constructed trails and walkways.

Drawing Revisions

The original drawings shall be revised to incorporate all changes and variances found during the field survey:

- a) The Registered M Plan Number must be clearly shown on all Record General Plan Drawings.
- b) All sewer and road grades are to be recalculated to two decimal places to reflect the as-built condition.
- c) All screening shall be removed.
- d) All house and lot numbers are to be indicated.
- e) All street names, lot numbering and block identification(s) shall be checked against the Registered Plan and corrected, as necessary.
- f) The Record Drawing revision note(s) shall be placed on all drawings in the revision block and dated based on the date of the surveys.
- g) The Contract Number (Regional or Municipal only) shall be added to the drawings, if applicable.

The information on the As Built Drawings may be checked by the Town of East Gwillimbury at any time. If any discrepancies are found, then the drawings shall be returned to the Developer's Consulting Engineer for rechecking and further revision.

The Developer's Consulting Engineer shall be required to explain in writing any major difference between the design and the "As Built" data and to provide verification that the alteration(s) does not adversely affect the function of the development services.

Tolerances

A maximum vertical plotting tolerance of 0.5 metres on the 1:100 profile portion of the drawings and maximum horizontal plotting tolerance of 5.0 metre on the 1:500 scale drawing shall be considered acceptable without replotting.

All sewer lengths shall be shown to the nearest 0.1 m.

C2.00 Submissions

C2.01 Submissions Prior to Planning Approval

Submission and circulation of engineering drawings prior to planning approval is coordinated through the Town's Planning Branch as part of a Draft Plan of Subdivision or Site Plan Application.

C2.02 First Submission to Engineer Branch (After Planning Approval)

After approval of a planning application, the initial submission of engineering drawings for review by the Engineering Branch shall contain the following information:

The initial submission of engineering drawings shall contain one digital copy (.pdf) and two hard copies of the following:

- a) Approved Draft Plan or Site Plan, Functional Servicing Report, Traffic Management Implementation Plan, Soils Report/Geotechnical Investigation, Tree Preservation Report and/or Plan, Noise Report and any other applicable documents in support of the detailed design. Through review of the detailed engineering submissions, the design of the Draft Plan or Site Plan may change to address proposed conditions. Applicants are advised that the Town may impose changes to the Draft Plan or Site Plan in order to accommodate such circumstances subject to processing and notice requirements under the Planning Act;
- b) Draft M Plans and R Plans showing all lot and block numbering and dimensioning.
- c) A Geotechnical Report prepared by a qualified Soils Consulting Engineer;
- d) A declaration from the Consulting Engineer indicating that he has been retained to design and supervise the construction of the work in the subdivision according to the terms of the Subdivision Agreement.
- e) Complete set of Engineering Drawings noted in Section C1.00.
- f) All detail drawings other than the O.P.S. Detail Drawings.
- g) All drawings pertinent to the design.
- h) All other calculations necessary to check the design.

The above information will be reviewed once all required information has been submitted. One set of drawings and calculations will then be returned to the Consultant with any required revisions noted.

It should be noted that incomplete or partial submissions will not be reviewed by the Town and may be returned unopened to the applicant. Only under prior approval will the Town consider interim or partial submission materials.

C2.03 Subsequent Submissions

Subsequent submissions noted in Section C2.02, Items (e) through (h) inclusive shall be made until the engineering drawings and design is acceptable to the Town. These submissions shall contain the previous comments and mark-ups from the Town and shall contain one digital copy (.pdf) and two hard copies of the following:

- Revised Engineering Drawings.
- Form 1 - Record of Watermains Application.
- CLI -ECA Forms
- Electrical Distribution System and Street Lighting.
- Photometrics Plan.
- Traffic Management Implementation Plan (TMIP).
- Revised Design Sheets.
- Landscape Drawings and Park Grading Plan, if necessary.
- Utility Coordination Plan
- Any revised reports.

The design of the electrical distribution system and street lighting shall be completed by the Owner's Electrical Consultant. This design shall be submitted to the Director of Engineering and shall be approved prior to the final approval of the engineering drawings. All efforts should be made to initiate this design as early in the design process as possible to avoid delays in the final stages of approval. The streetlight poles, standards, and lamps shall be to the Town of East Gwillimbury standards and approved by the Town. The location of the streetlight poles and transformers shall also be shown on the Utility Coordination Plan.

The consultant must also coordinate the planning and construction of the other utilities involved with the subdivision.

It should be noted that incomplete or partial submissions will not be reviewed by the Town and may be returned unopened to the applicant. Only under prior approval will the Town consider interim or partial submission materials.

C2.04 Construction Management Plan

A Construction Management Plan (CMP) is a combination of diagrams, documents, drawings, and specifications, prepared by a Professional Engineer/Designer/Project Manager/Qualified Person, that clearly define the steps that will be taken to demonstrate how the impacts to the community will be minimized and how the impacts associated with any construction project will be managed.

The purpose is to minimize potential problems and ensure a safe positive public experience with development related construction activities by setting minimum standards for work within or immediately adjacent to the public right-of-way, public facilities, residences, etc. We understand that contractors may have some site-specific input/recommendations, however the Owner and Engineer/Project Manager should provide the overall expectations and framework, to be submitted as part of the Town's Development approvals process. The Town will expect an update once the contractor is selected and the construction schedule is confirmed, and if there are any contractor-specific additions to the document. The Construction Management Plan is a living document to be reviewed and updated as required, any changes are to be submitted and

approved by the Town. The Owner and Owner's Engineer/Project Manager shall submit a monthly update report to the Town, (or more frequently, depending on the stage of development) detailing the activities undertaken for the development, until final assumption (i.e. Contractor activities, sediment & erosion control inspections/maintenance, stormwater management facility inspection/maintenance, etc.).

*Additional information regarding project/site specific needs and requirements must be confirmed in collaboration with the Engineering Department.

A Construction Management Plan is required at the time of the first engineering design submission (Subdivision) or first Site Plan submission and shall include*, but not be limited to:

1. Project description
2. Project team & contact information and communication plan
 - a. Contact information is available for surrounding residents to speak directly to a project team member.
3. Signed acknowledgement from owner and owner's engineer that the construction management plan will be adhered to and in the event issues/complaints are not addressed in the timeframes noted or to the satisfaction of the town, the town can immediately stop all works and any charges incurred by the town, including administration fees, will be invoiced back to the owner.
4. Action plan for CMP infractions from contractors, delivery drivers etc.
 - a. Infractions should have scale for repeat offences.
5. Project schedule and gantt chart, including but not limited to:
 - a) Regular construction site meetings (subdivision)
 - b) Timing for agency approvals (i.e. LSRCA, MECP, other)
 - c) Installation of water, sanitary, storm servicing
 - d) Commissioning of water system
 - e) Road base, to base asphalt (subdivision)
 - f) Curb
 - g) Submission of as-built information, materials testing
 - h) Energizing streetlights
 - i) Building permit
 - j) Anticipated occupancy date
 - k) Municipal winter control and waste collection (subdivision)
 - l) Sidewalk
 - m) Trees
 - n) Top course asphalt
 - o) Key milestones within subdivision agreement (acceptance, assumption, etc.)
6. Operating hours & noise control plan
7. Weather contingencies, including but not limited to:
 - a) Seasonal work specifics
 - b) Snow removal – ice control

- c) Safety requirements
- d) Inclement weather – flood control, high winds
- 8. Complaint resolution
 - a) Resident communication letters (template to be copied to the town for review)
- 9. Dust control plan, including but not limited to:
 - a) Mitigation measures to address onsite and off-site dust and mud tracking (i.e. Strategic placement of onsite trucking routes, stockpile locations, consideration of prevailing wind directions etc.)
 - b) Confirmation of dedicated onsite water truck and source water
 - c) Response times to address issues, weekly onsite and off-site cleaning/maintenance
 - d) Neighbourhood communication plan
- 10. Erosion & sediment control plan, onsite and off-site
- 11. Construction dewatering plan, including but not limited to:
 - a) Confirmation if a permit to take water is required and include a copy
 - b) Confirmation of other agency permits and consideration of applicability of municipal by-laws (i.e. Sewer use, noise, etc.)
 - c) Identification of potential impact to adjacent wells and mitigation/monitoring plan
 - d) Method, location, frequency of dewatering (with consideration to contingency for weather etc.)
 - e) Proposed drainage outlet
 - f) Erosion and sediment controls
 - g) Dewatering plan and best management practices for building trades during home construction
- 12. Aerial encroachment
 - a. Crane location and encroachment of the air rights
 - b. Will hoisting be taking place over the row or private property
- 13. Site hoarding
 - a) Consideration of sidewalk overhead hording (falling material from buildings)
 - b) On private side of row
 - c) Stability of hoarding (to avoid collapsing onto row)
 - d) Protection of pedestrians
 - e) Colour/design of hoarding
- 14. Sidewalk and/or road closures
- 15. Material loading/unloading and storage locations
- 16. Site trailer location(s)
- 17. Parking locations
 - a) This is to include parking locations for anyone visiting the site
 - b) On street parking is not permitted regardless of vehicle type
 - c) If on site parking cannot be accommodated, the owner must secure off site parking on private lands
- 18. Truck queuing/staging areas

19. Site phasing should be discussed
 - a) Phasing of the development
 - b) Different construction phasing such as;
 - I. Underground parking excavation staging
 - II. Foundation construction
 - III. Above ground works
20. Shoring plans
 - a) To include shoring material trespassing off site (tiebacks)
 - b) Permission for trespassing (if applicable)
21. Fill management plan, including but not limited to:
 - a) Estimated quantity of excess material leaving the site
 - b) Estimated quantity of material imported to the site
 - c) Report with chemical analysis certifying the chemical and physical characteristics of all imported and exported materials
 - d) Continuous quality monitoring program
 - e) Identifying source site and/or destination site
 - f) Haul routes
22. Traffic management plan
 - a) Road closure/lane reduction (including dates)
 - b) Detours including pedestrian detours
 - c) TMP signage
 - d) Notification (outline the extent of notification for the TMP)
23. Access points (vehicular, materials)
 - a) Gates and security
 - b) Safe operations for ingress/egress
 - c) Traffic control at ingress/egress
24. Site security
25. Vibration monitoring
26. Pre-construction inspection of surrounding buildings/structures

C2.05 Ministry of the Environment Conservation and Parks (MECP) Applications

Storm and Sanitary Sewers

After the engineering design and drawings are prepared to the satisfaction of the Town, two (2) copies of the MECP Application Forms for Sanitary and Storm Sewers and Stormwater Management Facilities shall be submitted to the Town's Director of Engineering. These copies will be signed on behalf of the Town and returned to the Developer's Consulting Engineer. The Developer's Consulting Engineer will then make application to the MECP for approval under the Ontario Water Resources Act.

The Town of East Gwillimbury has been issued a CLI-ECA from the MECP.. Accordingly, sanitary and storm sewers designs are not to be submitted to the MECP for approval.

Please follow the following application process to complete the CLI-ECA application for a given project:

1. Complete the relative online application form(s) in the links provided below, specific to your request for approval.
2. Once the application is complete, an email will be sent to the Applicant with instructions to upload all completed MECP forms, reports and design drawings. The Applicant must click 'Done' in the email once the documents are uploaded to initiate the review process.
3. A review of the submission package will be completed, and any comments and/or approvals will be sent to the Applicant electronically via email. It should be noted that resubmission may be required based on the comments provided.
4. The Applicant will be invoiced directly for any applicable fees for the CLI ECA review and approval process once the review is completed, prior to issuance of approval.

Please note, Storm Water Management Ponds servicing drainage areas greater than 60 hectares shall be submitted directly to the MECP for review and approval.

Watermain

The Town of East Gwillimbury has been issued a Municipal Drinking Water License from the MECP under Part 5 of the Safe Drinking Water Act. Accordingly, watermain designs are not to be submitted to the MECP for approval. A completed "Form 1 – Record of Watermains" is to be submitted to the Town together with a General Services Plan showing the watermains described in the form in lieu of making a submission to the MECP.

C2.06 Other Approvals

The Consultant shall be required to make all submissions and representations necessary to obtain approval from all other authorities having jurisdiction such as Ministry of Natural Resources and Forestry (MNRF), Ministry of Transportation (MTO), Lake Simcoe Region Conservation Authority (LSRCA), Fire Marshall, Medical Officer of Health, Department of Fisheries and Oceans (DFO) etc.). The Town of East Gwillimbury shall be kept informed of the progress of these submissions by copies of all correspondence.

C2.07 Original Drawings

After all approvals have been received from all necessary agencies, the original drawings shall be submitted to the Town. These drawings shall be signed and dated by the Town indicating they have been reviewed by the Town of East Gwillimbury and returned to the Consultant. No changes or revisions may be made to the drawings after the signature of

the Town has been affixed unless the revisions have been formally reviewed and accepted by the Town and initialed by the Town in the Revision Block.

If, after two years from the date of the original approval of the engineering drawings by the Town, the Developer fails to enter into a Subdivision Agreement with the Town of East Gwillimbury, the Town reserves the right to revoke all approvals related to the engineering drawings.

C2:08 Preparation of Subdivision and Site Plan Agreements

A request for a Subdivision Agreement and Site Plan Agreement are coordinated through the Planning Branch. The engineering drawings must be approved by the Town's Director of Engineering, or designate, prior to execution of the Subdivision Agreement and Site Plan Agreement. Should the Owner/Developer wish to prepare the development site prior to entering into a Subdivision or Site Plan Agreement, the Town may allow the Owner/Developer to enter into an Earthworks Agreement and following earthworks a Pre-Servicing Agreement with the Town.

An Earthworks Agreement allows the Owner/Developer to complete clearing and grubbing, topsoil stripping, rough grading, erosion sediment control ponds and stormwater management facilities at discretion of the Director of Engineering.

A Pre-Servicing Agreement allows the Owner/Developer to complete all the site grading works as noted above, construct all underground municipal services (including water and sanitary mains, service connections, storm sewers and appurtenances), permanent stormwater management facilities and roads to base course asphalt.

C2.09 Requirements Prior to Commencement of Construction

Prior to commencement of construction, the Owner's Consulting Engineer shall submit the following information to the Director of Engineering:

- a. Ministry of the Environment, Conservation and Parks (MECP) certificates of approval for Town services to be constructed for the proposed subdivision.
- b. Four sets of all approved engineering, landscaping, and composite utility drawings (one full size and three at 50% reduction) and one digital copy (.pdf).
- c. Construction Management Plan
- d. One copy of the construction specifications.
- e. The proposed contractor.
- f. Copy of the signed contract between Contractor and Owner.
- g. All other information specified in the Agreement(s) as a requirement prior to commencement of construction or other information required by the Director of Engineering.

Following submission of these materials, a pre-construction meeting shall be arranged and held prior to commencement of construction.

C3.00 Requirements for Functional Acceptance

C3.01 Functional Acceptance

The term Functional Acceptance shall be used to describe the date when the underground services within the subdivision have been constructed and are without deficiencies that prevent them from operating as intended to the satisfaction of the Town.

The following must be completed to the satisfaction of the Town prior to issuance of the Functional Acceptance Certificate:

- a) A certificate from the Consulting Engineer that the services included in this agreement have been constructed and installed in accordance with the approved design drawings, specifications, standards, and requirements.
- b) Watermains shall be commissioned to the satisfaction of the Town's Overall Responsible Operator (ORO) and in accordance with Ministry of the Environment, Conservation and Parks (MECP) requirements.
- c) Sanitary sewers shall be flushed, cleaned, passed exfiltration and mandrel testing (if applicable) and inspected by CCTV with reports and video(s) submitted to the Town for review. Any deficiencies noted have been repaired and reviewed.
- d) Storm sewers shall be flushed, cleaned, mandrel tested (if applicable) and inspected by CCTV with reports and video(s) submitted to the Town for review. Any deficiencies noted have been repaired and reviewed.
- e) Rear yard catchbasins and sewer leads have been certified by an O.L.S. that they have been installed in the correct location.
- f) Storm water management facilities are constructed as designed, fully functional and have the required design capacity.
- g) Roads have been constructed with base curb, base asphalt, and connect to an existing publicly maintained road.
- h) Installation of street name and traffic control signs.
- i) Installation of unassumed road and utility information signs.
- j) Construction of emergency access routes.
- k) Overland flow routes have been graded and fenced to prevent them from being blocked by excavated material or building materials.
- l) The plan of subdivision has been registered and a copy has been received by the Town from the registry office.

The Engineering section will issue a Functional Acceptance Certificate or Confirmation of Building Permit Clearance to the Chief Building Official indicating the conditions for Functional Acceptance have been met for the purposes of building permit issuance.

C4.00 Requirements for Acceptance

C4.01 Acceptance

The term Acceptance shall be used to describe the date when the services are complete and acceptable to the Town of East Gwillimbury subject to the maintenance requirements of the Subdivision Agreement.

When the works and services are completed to the satisfaction of the Consulting Engineer, they shall advise the Town of East Gwillimbury in writing that the work is ready for inspection. The Town shall carry out their inspection and advise the Consulting Engineer of any items of work requiring further rectification. When all deficiencies have been corrected to the satisfaction of the Town, and upon receipt of:

- a. Statutory Declaration from the Owner that all contractors and sub-contractors associated with the construction have been paid, including letters from the General Contractor and Engineer confirming that they have been paid or that satisfactory arrangements for payment have been made by the Owner for the work done by the General Contractor and Engineer. certifying that all accounts have been paid.
- b. Copies of all construction testing (Compaction, gradation etc.)
- c. One digital copy (.pdf) and one copy of Record Drawings showing the as-constructed information on all drawings for the site for the Town to review.
- d. One digital copy (.pdf) and one hard copy of the Storm Water Management Operations and Maintenance manual.
- e. Lot grading certificates for all developed lots.
- f. Certification of all retaining walls
- g. Certification of acoustic and Vibration if applicable control measures.
- h. Completion certificates from the Engineering, Landscape, and Electrical Consultants.
- i. Verification Stormwater Management Pond has sufficient capacity.
- j. Electrical Safety Authority (ESA) final report for the streetlight system.

When all works on the project are completed, all deficiencies have been satisfactorily corrected, at least 85% of the dwellings are occupied, and all vacant blocks are stabilized with topsoil, seed and fenced, the Town will issue a Certificate of Acceptance.

The issuance of a Certificate of Acceptance for these works will identify the start date for the confirmed maintenance period. The developer will be responsible for the maintenance of all works and services, unless stated otherwise in the Subdivision Agreement until Assumption.

C5.00 Requirements for Assumption

C5.01 Assumption

Assumption of the subdivision shall be the date on which the Town of East Gwillimbury's Council agrees by Bylaw that all the conditions of the Subdivision Agreement have been fulfilled, all deficiencies have been corrected satisfactorily and all maintenance requirements have been completed.

At the end of the maintenance period and when all works and services are completed to the satisfaction of the Consulting Engineer, the Town of East Gwillimbury shall be advised in writing that the work is ready for inspection. The Town shall carry out their inspection and advise the Consulting Engineer of any items of work requiring further rectification. The following information is required prior to issuance of Final Acceptance.

- a. A Statutory Declaration from the Owner that all contractors and sub-contractors associated with the construction have been paid, including letters from the General Contractor and Engineer confirming that they have been paid or that satisfactory arrangements for payment have been made by the Owner for the work done by the General Contractor and Engineer.
- b. A topographic and bathometric survey of all stormwater management ponds indicating that they have been constructed and cleaned out to design grades, and;
- c. A letter from the Owner's Consulting Engineer and other outside agencies that services included in the Subdivision Agreement have been constructed and installed in accordance with the approved design drawings, and Town specifications, standards, and requirements.
- d. A statement by a registered land surveyor that they have located and/or properly re-established all standard iron bars as shown on the Plan and any reference plan prepared as a result of the subdivision.
- e. Final set of Record Drawings submitted on 3 mil Mylar, along with a PDF copy

For clarification, Assumption of the Subdivision refers to the transfer of maintenance responsibilities for works and services (as outlined in the Subdivision Agreement and the approved Plans) from the Owner to the Town. Assumption does not relieve or diminish the Owner from further obligations and/or responsibilities associated with the Development should problems arise which require additional action/rectification. The Owner's obligations will be terminated or reduced by the release of his funds/letters of credit by the Town, which occurs after the assumption process.

C6.00 Check List for Subdivision Design

Each submission should be accompanied by the following check list:

A. APPROVALS AND PLANNING ISSUES

- Review approved draft plan and conditions of draft approval
- Tree preservation report and recommendation
- Fencing requirements
- EIS, buffer screening or planting
- Traffic report and recommendations
- SWM report
- Functional servicing report
- Noise report
- Phasing information
- Construction access
- Potential approval agencies – LSRCA, Regional Municipality of York , MECP, MNR, MTO, Utility companies

B. GENERAL

- Check submission documents in accordance with requirements in Town Standard Section C:200
- Check all drawings meet requirements in Town Standards Sections C1:00 to C7:00
- List of drawings and key plan on cover page
- Standard notes shown
- Compare Draft plan with engineering drawings and M-Plan ensure compatibility
- Services to lands/lots adjacent to subdivision
- Easement widths to be adequate for maintenance
- Walkway widths and pedestrian conductivity

C. ROADS

- Review traffic report
- Check pavement structures with soils report
- Check geometrics (same as draft plan)
- Check minimum curb radii
- Check correct R.O.W. cross section, services at correct location, pavement and R.O.W. dimensions on plan
- Profile – gradients, vertical curves (spot check elevations)
- Road centreline stations at 20 metres on the plan
- Catchbasin locations/spacing
- Traffic Calming Initiatives
- Depressed curb at intersections and walkway crossings

D. STORM DRAINAGE SYSTEM

- Review drainage system and drainage area drawings (ensure external areas accounted for)
- Review Functional Servicing Report (FSR)
- Compare sewer calculations and drainage area drawings
- Check calculation sheets (sewer and maintenance holes hydraulics)
- Check Maintenance Holes spacing and location – pipe location/alignment
- Alignment of Catchbasins and lot connections
- Sewer profile – spot check pipe size and gradient with calculation sheets, minimum pipe covers and house connections, minimum grade, velocity
- Pipe strength and bedding, special bedding requirements for pipe in fill areas
- Check for conflicts of pipe crossings (especially at intersections)
- Check overland flow calculations and compare the flow routing with lot grading
- Check 100 Yr. HGL computations and compare with the Plan Profile drawings
- Maintenance Holes benching details – structural information if applicable
- Check radius pipe data

E. STORMWATER MANAGEMENT

- Review recommendations in Stormwater Management Report
- Compare Rational Method on sewer calculations to Stormwater Management Report to ensure compatibility
- Check detention pond volume, hydraulics of inflow and outflow structures
- Stormwater quality issues – siltation basin and future maintenance access
- Use the “Reviewer’s Checklist” on the Ministry of Environment (MOE) 2003 SWMP Manual (or latest amendment) to review the design concept of various Stormwater management control facilities and measures
- Operational Manual

F. LOT GRADING

- Overland flow route & capacity – check street cross section and swale capacity calculations, compare swale and road grades to OTTSWM report where appropriate
- Park and SWM pond grading drawings to include details of landscaping and planting prepared by the landscape architect
- Overland flow easement and swale cross section shown
- Check all lots
- As per standards
- Street line, high lot corner elevations
- Specified house grade
- Side and rear lot line elevations
- Retaining wall heights (fence required)
- Check minimum basement elevations – to be minimum 0.5 m above 100 Yr. HGL
- Ensure boundary elevations compatible with adjacent properties – overland flow routes maintained (e.g. watercourse/creeks) – ponding not created – lot swales not discharging to adjacent properties
- Compare to plan/profiles to ensure compatibility

- Sound barriers and vibration mitigation as per acoustic report
- Check 'Erosion & Sedimentation Plan' drawing to ensure natural drainage is maintained and requirements as per environmental report

G. UTILITY COORDINATION DRAWING

- Driveway locations compared to lot grading plan drawings
- Compare with electrical plans re: light poles, transformers, and aboveground site services
- Highlight potential conflict with street tree plantings

SECTION D

TRANSPORTATION

Section D Transportation

D1.00 Road Classification

All roadways in new developments shall be classified in accordance with the Town's current Official Plan which includes the following:

- Provincial Highways;
- Arterial Roads;
- Major Collector Roads;
- Minor Collector Roads;
- Rural Roads;
- Local Roads.

The proposed classification of all streets planned in new development areas shall be confirmed with the Town prior to the commencement of the design. Roadways within urban areas are to be designed and constructed to urban cross-sections. Roadways supporting industrial, commercial, and institutional land uses are also to be built to urban design standards.

D2.00 Supporting Traffic Studies

Prior to or at the time of draft plan approval, the Town will require the proponent to prepare and submit supporting traffic studies, for the Town's approval. The first portion of the study consists of a broad-based external transportation and traffic study, which will examine the property boundary conditions and interconnections with adjacent properties (including signalization issues), assessed under existing and future conditions. This Traffic Impact Study (TIS) must recommend the phasing of traffic signals and arterial road widenings to match development. The traffic study must conform to Regional Municipality of York guidelines if any of the boundary roads are Region roads.

The second portion of the analysis consists of a Functional Internal Traffic Study (FITS) which balances appropriate urban design guidelines with a detailed assessment of internal transportation and traffic geometric design, on-street parking restrictions, off-street or driveway parking issues, stop sign warrants, roadway capacity and classification, lane configurations, boulevard requirements (i.e., snow storage and utility corridors), pedestrian and cycling requirements, vehicle decision making criteria and intersection vehicle sight lines. Active transportation is to be considered an integral part of this process.

The FITS will address, to the satisfaction of the Town, the compatibility of the roadway function and the adjacent proposed land uses. Specifically, appropriate building forms

are required adjacent to and in the vicinity of collector/collector road and collector/arterial road intersections. The traffic study will also verify that sufficient on-street and off-street parking can be provided without impacting driveways, safety and road operations and that appropriate accessibility standards have been complied with. The studies noted above are subject to the Town's approval prior to final acceptance of the proposed draft plan.

D3.00 Geometric Design Elements

The following table summarizes the geometric design elements to be used:

Geometric Detail	Local	Minor Collector	Major Collector
Typical Average Daily Traffic (ADT)	< 1000	1000-4000	<8000
Design Speed (km/h)	60	60	70
Road Allowance Width (min.)	18	20	26
Pavement Width (m) (Face of curb to face of curb)	8.5	9.8	varies
Minimum Grade (%)	0.5	0.5	0.5
Maximum Grade (%)	6	6	6
Pavement Crossfall (%)	2	2	2
Minimum Horizontal Centerline Radius (m)	90	110	160
Minimum Visibility Curves in Sag (K Values)	8	12	12
Minimum Visibility Curves on Crests (K Values)	8	15	15
Minimum Tangent Length between Reverse Horizontal Curves (m)	30	50	50
Intersection Angle (degrees)	85-95	85-95	90
Minimum Tangent Length required at stop controlled intersections – measured from centerline of road (m)	30	40	45

Regional Municipality of York may require greater road allowance requirements for the implementation of their policies (i.e., HOV lanes, bicycle lanes, or rapid transit).

D4.00 Design Elements

D4.01 Typical Road Cross Sections

The typical road cross section to be used shall comply with the Urban Design Guidelines for the subdivision. Typical sections for Local, Minor Collector and Major Collector Roads are included in the Appendix to this document.

D4.02 Vertical Curves

All points of grade change in excess of 1% shall be designed with vertical curves. The minimum tangent length between changes in grade, or between vertical curves shall be 9.0 m.

Combinations of vertical crests and horizontal curves are to be avoided. Saw-toothing of roads is to be discouraged and shall only be used under exceptional circumstances with the approval of the General Manager.

D4.03 Backfall at Intersecting Streets

At all street intersections the normal crossfall of the major street shall not be interrupted by the crown line of the minor street. A 1% or 2% backfall shall be provided on the minor street at all street intersections. This backfall shall continue to the end of the curb return radii on the minor street to facilitate proper drainage of the intersection.

D4.04 Curb Return Radii at Intersections

The minimum curb return radius to be used for all local street intersections is 7.5 metres (this dimension does not need to be labeled on the drawings).

The curb return radii at all other street intersections shall conform to the following dimensions and shall be labeled:

Residential

Local to Local	7.5 m (as noted above)
Local to Minor Collector	9 m
Local to Major Collector	9 m
Minor Collector to Minor Collector	9 m
Minor Collector to Major Collector	9 m
Major Collector to Major Collector	15 m

D4.05 Daylighting Requirements at Intersections

Daylighting at all intersection quadrants shall be included in the road allowances to provide for uniform boulevard widths. Such daylighting shall be included on the proposed plan for registration (M Plan) and on all engineering drawings. Daylighting shall conform to the following requirements:

Residential

Local to Local	5 m x 5 m
Local to Minor Collector	5 m x 5 m
Local to Major Collector	5 m x 5 m
Local to Arterial	15 m X 15 m
Minor Collector to Minor Collector	15 m x 15 m
Minor Collector to Major Collector	15 m x 15 m
Minor Collector to Arterial	15 m x 15 m
Major Collector to Arterial	15 m x 15 m

Industrial, Commercial

Local to Local	10 m x 10 m
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D4.06 Cul-de-sac

Cul-de-sacs should be avoided wherever possible. When deemed appropriate by the Town they shall be constructed with a street line radius of 20.0 metres and a curb face radius of 15.0 metres for residential locations; and street line radius of 21.15 metres and a curb face radius of 16.15 metres for industrial locations; see details in Appendix. Minimum gutter grades of 0.5% shall be maintained along the flow line of the gutters around the cul-de-sac.

The maximum permissible down gradient for a cul-de-sac is 4%.

The maximum length of a cul-de-sac shall be 150 metres. Any dead end must terminate in a cul-de-sac. Hammerheads are not permitted.

D4.07 Temporary Turning Circles

Temporary turning circles will be considered whenever a road is to be continued in the future. The street line and curb radius requirements for temporary cul-de-sacs are the same as for permanent cul-de-sacs; see details in Appendix. When temporary turning circles are required within the subdivision limits, the land within the temporary right-of-way limit must be conveyed to the Town or easements must be provided in favour of the Town. The temporary turning circle is to have complete services to the street line. Signage is to be erected at the terminus of the cul-de-sac indicating that the road will be

extended in the future and a dead-end sign and barricade in accordance with OPSD 973.130 shall be erected.

D4.08 Emergency Access

Emergency access entrances are to be avoided whenever possible and the need for such should be eliminated through road network design techniques. Any combination of streets exceeding 150m in length from a single access point will require a secondary street access. This distance shall be measured along the centre line of the road. Temporary emergency access locations will be permitted to accommodate the phasing of Plans of Subdivision when all other alternatives have been exhausted. The emergency access shall be a minimum of 6.00 metres in width and constructed to a minimum depth of 300mm granular A, 50mm HL 8 asphalt and 40mm HL 3 asphalt. Maximum allowable grade is 6%. P-Gates or Swing Gates are required at both limits of any emergency access. The Owner/Developer is responsible for the removal of any temporary emergency access when it is no longer required (i.e., road network complete for subsequent phase) and must ensure that all municipal services (i.e. curb and boulevard) are restored. The Owner/Developer is to always maintain access routes and ensure that they are not obstructed. The Owner/Developer is responsible for maintenance of all temporary and permanent access prior to Assumption unless otherwise arranged with the Town.

D4.09 Location of Utilities

The placement of utilities within the road allowance shall be in accordance with the Town of East Gwillimbury Standard Road Cross-Section Drawings included in the Appendix to this document.

Composite Utility Drawings shall be submitted to the Town for acceptance of the proposed utility locations.

D4.10 Transit

Designs shall have consideration for transit routes including accommodations for transit facilities, and convenient pedestrian access.

D4.11 Accessibility for Ontarians with Disability Acts

All roads and services within the Town are to be designed to be fully compliant with the AODA. The design engineer shall confirm with the Town and Region latest standards for Tactile Plate Placement at all intersections or where required on Site Plan installations, whether in the public or private domains.

D5.00 Traffic Controls

The proposed location and type of all street name signs, traffic control signs, signalization and pavement markings shall be shown on the Traffic Control Plan. The plan shall be prepared by a Professional Engineer skilled in municipal traffic designs and regulations. All traffic control devices, including warning and regulatory signs, street signs, parking restrictions, etc., shall conform to the Ontario Traffic Manual (OTM) and local by-laws.

D5.01 Signage

All regulatory signs must be installed at the completion of the base course asphalt and maintained by the Developer until “Final Assumption” by the Town.

The Developer will be responsible for installing all street signs and maintaining all signs in the subdivision until assumption of the subdivision by the Town. Temporary street name signs are to be installed by the Developer prior to the first occupancy in the subdivision. Prior to final assumption the Developer will install all permanent street name signs.

Town Emergency Services shall have the authority to designate a Fire Route on any Municipal Property and on any Private Roadway providing access to or egress from an apartment building, hotel, motel, church, nursing home, shopping centre, townhouse, industrial and commercial building and any other structure or lands used for accommodation of the public or for the gathering or assembling of people.

D5.02 Street Name Signs

Location

Street name signs shall be placed at each intersection and shall identify each street at the intersection. The location of the street name signs are shown on the Traffic Control Plan and shall be installed on common posts with the stop signs or other signs wherever possible.

Type

The street name sign blades shall be extruded aluminum having a minimum thickness of 2.3 mm, a height of 150 mm and a length of 610 to 915 mm. unless otherwise specified in Urban Design Guidelines.

The signs shall be mounted on two-piece galvanized steel U-flange posts (2.5 kg/m), with an overall length of 3.5 metres and imbedded 1.20 metres into the ground, unless otherwise specified. Upper post section to be minimum 2.3 metres in length and lower section to be 1.5 metres in length with 0.3 metre overlap for an overall post length of 3.5 metres. Upper post section length will vary depending on OTM sign height requirements.

Lettering for the street name shall be 100 mm in height. The letters of each name/word shall be upper case. Lettering shall be white on a reflective blue background, being engineering grade reflective sheeting (Type I, ASTM). At any intersections with Regional Roads, the street name blade shall be 200 mm in height with 150 mm reflective lettering.

Permanent type street name sign blades on an engineering grade reflective sheeting (Type I, ASTM) be installed at the beginning of the construction stage to allow for a better visibility for emergency services during evening hours.

Fire route signs shall be installed on a post, light standard, building, column, or other similar structures acceptable to the Chief Fire Official. Signs shall be installed no less than 2m to the bottom of the Sign and not more than 3m to the top of the Sign, measured from the travelled portion of the fire route. Signs shall be installed at intervals not exceeding 25m and be installed to the satisfaction of the Chief Fire Official.

D5.03 Regulatory Traffic Control and Advisory Signs

Location

Traffic control and advisory signs shall be located in accordance with the Ontario Traffic Manual (OTM).

The speed limit for all roads under the jurisdiction of the Town of East Gwillimbury is 40 km/hr. Speed Limit signs indicating a maximum speed of 40 km/hr shall be posted by the developer in front of all school and park blocks. 40 km/hr begins, and end signs shall be posted as approved on the Traffic Control Plan as required. The posting of additional speed limit signs will only be required if necessary to address site specific issues.

Type

All regulatory signs are to be in accordance with the Ontario Traffic Manual and constructed of high intensity reflective sheeting materials (type III or IV, ASTM).

Regulatory/warning signs shall be mounted on two-piece galvanized steel U-flange posts (2.5 kg/m) and imbedded 1.20 m into the ground. Where possible, signs shall be mounted on light poles to reduce clutter in boulevards. Upper post section to be minimum 2.6 metres in length and lower section to be 1.5m in length with 0.3 metre overlap for an overall post length of 3.8 metres. Upper post section length will vary depending on OTM sign height requirements. Stop sign to be 2.0m from bottom of sign to top of grade.

All signs must be erected at the completion of the base course asphalt and maintained by the Developer until "Final Assumption" by the Town. Temporary signs may be installed initially, however permanent signs are to be installed upon completion of all boulevard grading and sodding

D5.04 Fire Access Routes

Shall be constructed in accordance Town Consolidated Traffic and Parking By-Law
By-Law Number 2019-136

D5.05 Pavement Markings

Pavement Markings for traffic control shall be provided and conform to the current standards of the Ontario Traffic Manual. All markings are to be completed with approved traffic paint in accordance with OPS specifications. Thermal plastic paint shall be used on all roads once top asphalt is placed.

Pavement markings shall be indicated on the Traffic Implementation plans for all stop bars, pedestrian crossing, active transportation/bike lanes, centre and lane lines, as required or directed by the Town for all subdivision streets.

Painted stop bars are required at all stop conditions. In addition to painted stop bars, painted tails (length of tail line to be 15 m) will be required at the intersection of any road with a road classified of Minor Collector or higher order.

Painted pedestrian crossing walk lines are required at all pedestrian crossings.

Following placement of base asphalt, temporary water-based marking shall be applied and maintained as directed by the Town prior to placement of top course asphalt.

D6.00 Pavement Design

The pavement design for all roads shall be as recommended by a qualified Geotechnical Consultant. The Geotechnical report shall be submitted as part of the Engineering Drawing Submission Package. The minimum pavement design for all streets in new subdivisions shall be as follows:

Local Road	Collector Road
40 mm HL3	40 mm HL3
50 mm HL8	80 mm HL8
150 mm Granular "A"	150 mm Granular "A"
300 mm Granular "B"	450 mm Granular "B"

All depths noted are compacted depths.

All materials shall be compacted as follows:

Item	Compaction Required (% of Standard Proctor Density)
HL3 Asphalt	Minimum 96% (Marshall Density)
HL8 Asphalt	Minimum 96% (Marshall Density)
Granular "A"	Minimum 100%
Granular "B"	Minimum 100%
Backfill	Minimum 95%
Subgrade	Minimum 98%

Granular materials to be spread and compacted in layers with a maximum depth of 200 mm.

A qualified Soils Consultant shall be engaged by the Developer to provide sampling and testing services during construction and to provide confirmation that all roads have been constructed in accordance with the design standards.

Testing and approval of all granular materials at the designated pits prior to placement and subsequent in-situ verification tests shall be performed by the Developer's Geotechnical Consultant.

Prior to the placement of asphalt pavement, the Consulting Engineer must submit the asphalt pavement mix designs to the Town for approval.

Following placement of base course asphalt and prior to application for building permits, the Developer shall have each constructed road core drilled by the qualified geotechnical consultant to confirm and verify asphalt thicknesses are in accordance with Town standards. The location of cores shall be determined in consultation with the Town and shall be performed at alternating lane locations spaced a maximum of 100 m apart.

D6.01 Road Sub-Drains

150 mm diameter perforated, filter cloth wrapped plastic corrugated sub-drains will be required to run continuously along both sides of all roads with curb and gutter. The sub-drains shall be trenched and have granular A bedding. The Town reserves the right to require video inspection of sub-drains in accordance with OPS Specifications. Sub Drains are to be connected to all street catchbasins through use of a 1.5 m solid PVC sleeve at the catchbasins. Sub Drains will be installed in accordance with OPSS.MUNI 405.

D7.00 Concrete Curb and Gutter

Concrete curb and gutter conforming to OPSD 600.040 (for single stage) or OPSD 600.070 (for two stages, with no stirrups in base stage per Town detail) shall be used on all new urban subdivision roads. Concrete strength is to be:

- C2, Minimum of 32 Mpa at 28 days (per CSA A23.1).;
- 355 kg/m³ cement;
- 7% +/- 1.5% air entrainment.

- 60 mm slump.

Driveway depressions shall be formed in the curb according to the location shown on the engineering drawings and as detailed per OPSD 351.010. A mechanical curb cutting machine is not permitted to saw-cut driveway depressions, unless specifically approved by the Town.

All curb and gutter is to be constructed and properly cured in accordance OPS Specifications and with good construction practices. All concrete shall be protected from damage from heavy equipment and vehicles until the required 28-day design strength is achieved.

D8.00 Sidewalks

Sidewalks are required on both sides of all arterial and collector roadways, and at least one side of all local streets. Typically for local roadways with schools, parks, churches, commercial establishments, etc., sidewalks are required on two sides of the street. Special treatment related to urbanization of urban roads is to be considered per existing Town design guidelines.

The sidewalk shall conform in detail and dimensions to OPSD 310.010.

Sidewalks shall be installed at locations as shown on the Typical Road Cross Sections. The width of sidewalks for all local streets shall be 1.5 m (minimum) for non-local roadways, the depth shall be a minimum thickness of 125 mm and increased to 150 mm at residential driveways and 200mm at commercial and industrial driveway. Sidewalks shall be constructed on a 75 mm deep compacted layer of Granular “A” bedding. Full depth expansion joints shall be installed between every third sidewalk bay. Concrete strength is to be:

- C2, Minimum of 32 Mpa at 28 days (per CSA A23.1).;
- 355 kg/m³ cement.
- 7% +/- 1.5% air entrainment.
- 60 mm slump.

All sidewalks are to be constructed and properly cured in accordance with OPS Specifications and with good construction practices. All concrete shall be protected from damage from heavy equipment and vehicles until the required 28-day design strength is achieved.

At street intersections, the curb and the sidewalk shall be depressed to meet the roadway elevation as per OPSD 310.030 with a minimum 0.5 m taper on the curb either side. Sidewalks must not be “dipped” at driveways. Tactile plates will be required at all street intersections and pedestrian crossing locations.

The location of sidewalks and community mailboxes shall be coordinated to ensure that all community mailboxes have direct sidewalk access wherever practical. Prior approval from the Town will be required for any mailboxes proposed without a direct sidewalk connection.

When a sidewalk is constructed adjacent to a curb and gutter, a keyway shall be provided along the back of the curb to support the sidewalk. This type of construction is to be minimized wherever possible.

The design of all sidewalks, trails and walkways is to consider the initiatives outlined in the documents and Regulations related to the AODA, including width of sidewalks, trails and walkways, maximum slopes, landings, railings, etc. The treatment of sidewalks ramps at major intersections should be completed in accordance with standards as implemented by the Regional Municipality of York.

D9.00 Driveways

D9.01 Minimum Driveway Design

“Minimum consolidated depth of requirements for granular base and asphalt in driveways shall be confirmed by a Geotechnical consultant with the following minimum specifications”. Any driveway settlements during the Maintenance period will be the responsibility of the Developer to rectify to the satisfaction of the Town.

a) Single Family Residential

Asphalt	50 mm of HL3 asphalt
Granular	200 mm Granular “A”

b) Commercial, Light Industrial and Apartments

Asphalt	40 mm HL3 surface course 50 mm HL8 base course
Granular	150 mm Granular “A” 300 mm Granular “B”

c) Heavy Industrial Driveways

Asphalt	40 mm HL3 surface course 75 mm HL8 base course
Granular	150 mm Granular “A” 400 mm Granular “B”

D9.02 Driveway Grades

The maximum permissible design grade for any driveway shall be 6%. The minimum grade for any driveway shall be 2%. This maximum grade is not recommended and should be employed only in exceptional cases where physical conditions prohibit the use of a lesser grade. The Maximum permissible as constructed grade for any driveway shall be 8% to allow for a construction tolerance. Negative sloping driveways are not permitted. Driveway Aprons in the boulevard shall adhere to the above criteria.

D9.03 Driveway Depressions

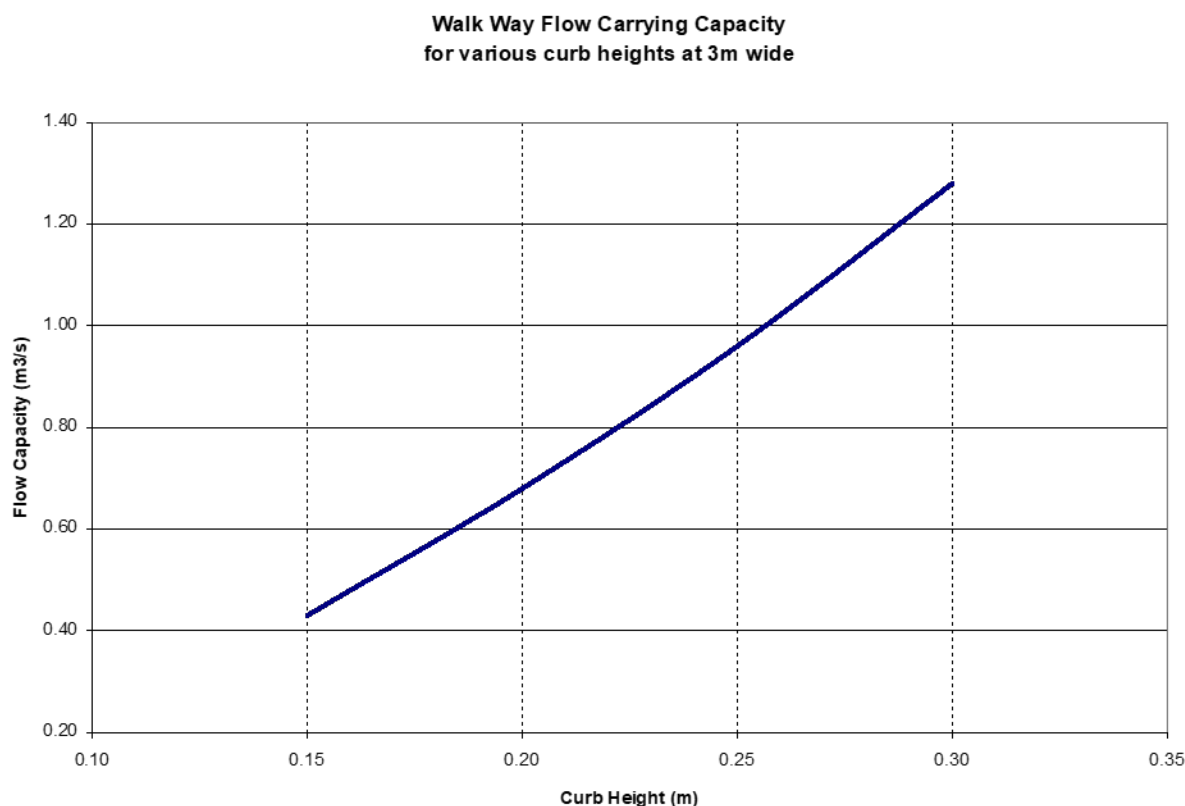
The minimum width of any driveway shall be 2.5 m with the maximum width governed by the Town's Zoning By-law. Curb depressions shall extend 0.3 m beyond each side of the driveway. A minimum 0.3 m separation at the curb (measured from full curb prior to curb depression) shall be provided between driveways within cul-de-sacs and elbows along with corner lots and lots abutting walkways.

D9.04 Walkways

Walkways are to be constructed with concrete sidewalks on a compacted base, as per the standards for sidewalks and as shown in the Town of East Gwillimbury Parks Design Standards Manual.

In special cases where the major system (i.e., overland) stormwater flows are to be conveyed through walkways, a walkway with curbs shall be used. The hydraulic capacity of the walkway as noted in the graph below is not to be exceeded.

Figure D 1: Walkway Flow Carrying Capacity



D10.00 Boulevards

All boulevard grades are to be between 2% and 5%. Terracing or embankments within the road allowance on new subdivision streets shall not be permitted. The final grade of the sod shall match the finished grade of the top of the concrete curb and sidewalk.

All debris and construction materials shall be removed from the boulevard area upon completion of the base course asphalt and shall be maintained in a clean state.

Topsoil shall be clean, weed free and meet the requirements of the Town's Parkland Standards Manual for composition and testing. Test results shall be reviewed and approved by Community Parks Recreation and Culture, prior to placement of topsoil. Topsoil shall be placed on all boulevard areas that are to be sodded. The minimum depth of topsoil shall be 450 mm.

No. 1 Nursery Sod shall be used for all areas that are to be sodded.

D11.00 Placing of Final Surface Course Asphalt

The placement of surface course asphalt shall not commence in any area until all the following conditions are met:

- a. A minimum period of one (1) year has expired from the placement of the base course asphalt.
- b. 85% of the dwellings have received Final Occupancy Permits.
- c. All undeveloped lots are rough graded in accordance with the current and accepted lot grading plans.
- d. All service connections for multiple family commercial, institutional or other blocks are installed.
- e. The approval of the Town is obtained in writing.
- f. All deficiencies and settlements have been repaired. Including approval of all CCTV inspection reports
- g. Favourable weather conditions are present, as defined by OPS 310 specifications.

D12.00 Active Transportation Trails and Master Plan

The Active Transportation and Trails Mater Plan should be consulted during road design to ensure facilities such as multi-use paths and bike lanes are accommodated. The design and construction of active transportation facilities to meet the requirements of Town's Parkland Design Standards Manual and OTM Book 18.

SECTION E

LOT GRADING

Section E Lot Grading

E1. General

These guidelines are provided for guidance in the preparation of drainage plans. Since they are only guidelines, they cannot cover each and every situation that may be encountered in the field. Direct consultation should be made with the Director of Engineering or Designate when the Drainage Plan Designer feels that deviation from these guidelines is warranted.

It is imperative that the overall initial Draft Plan of Subdivision be laid out with regard to the lot grading criteria outlined in this section. In particular lots requiring rear yard drainage swales may require extra depth than the adjacent lots to the rear to allow adequate space to create a rear yard amenity area as outlined in this section.

The approval of a Drainage Plan is related to drainage only. It is the responsibility of the Developer's Engineering and Planning Team to ensure that the Drainage Plan compliments the land and suits the house to be constructed.

E1.01 Objectives

- All areas shall be graded in such a way as to provide proper positive drainage.
- Grading shall be performed in such a way as to preserve existing trees wherever possible, both in development areas and on adjacent lands. Location of existing trees, including base elevation, shall be shown on the grading plans.
- Drainage flows must be directed away from houses.
- Storm drainage is to be directed to approved outlets on public lands and shall not adversely affect adjacent lands.
- The use of rear lot catchbasins and retaining walls should be minimized.

E2.00 Lot Grading Criteria

E2.01 Type of Drainage Pattern

- Back to front drainage is desirable in instances where drainage contributing to each side yard swale is restricted to the lots directly adjacent to the swale and no external flows or flow from the rear yards of neighboring lots is captured by the side yard swale.
- Split lot drainage with rear yard catchbasins is required where difficulties in providing side yard swales are encountered.
- Rear yards which drain through abutting lower back-to-front type lots are permitted where:

- Sufficient fall is available between the adjacent streets to achieve desired grades for swales and yards as per the criteria outlined in this section.
 - The drainage from the upstream lot is limited such that a minimum of 50% of the roof area of the upstream lot drains to the front yard.
- Walkout, back split and front split lots will be permitted where required due to topography constraints. In all cases the grade differential between the front and rear yard specified house grade shall be governed by the sloping required along the side of the building envelope. Grades shall vary from a minimum 2% to a maximum 3:1 slope and shall be confined to the building side yard area. Lots with a front to rear yard grade differential exceeding 2.5 metres are considered extraordinary and will require specific approval from the Town and may require advisory clauses to be inserted into Purchase and Sale Agreements of all perspective Purchasers.
 - In determining maximum permissible grade differential between front and rear property line elevations compatibility of house types and impact on adjacent homes will be considered by the Town. While these standards do not set out maximum allowable grade differentials the Town will limit the grade differential on a site-specific basis based on the particular circumstances unique to each subdivision.

E2.02 Specified House Grade (SHG)

The specified house grade, or building envelope grade, represents the highest lot elevation adjacent to the proposed building. This elevation shall be a minimum of 0.15 m above invert of the highest swale adjacent to the building. Top of foundation for any building will be a minimum of 0.15 m above the specified house grade.

A minimum separation of 150 mm shall be provided between exterior cladding (brick line) and the final ground elevation of all houses. This shall be increased to a minimum of 200 mm for any exterior cladding material other than Masonry Cladding.

The following criteria shall apply to detached and semi-detached units:

- Rear to Front Lot Drainage – The SHG for this type of lot grading will be based on the highest apron swale invert (swale breakpoint) at the rear of the building.
- Split Drainage – The SHG for this type of lot grading will be based on the highest side yard swale invert (swale breakpoint) adjacent to the building.
- Backsplit, Walkout and Front Walkout Drainage – The SHG for this type of lot grading will be noted for the front and rear of the building. The SHG will be based on the highest side yard swale invert (swale breakpoint) adjacent to the building.
- Reduced Setback Lots – The SHG for lots with reduced setbacks should be reviewed by the Designer to ensure lot grading meets the intent of Town Standards

and sound design practices. The methods identified above for determining SHG elevations may not apply to reduced setback lots and other non-conventional lot types. The Designer will be required to determine the most appropriate SHG for the lot type and may be required to supply detailed grading plans for individual lots considered by the Town to be non-conventional.

- The following criteria shall apply to on-street townhouses:
- End Units – The SHG will be based on the criteria noted above for detached and semi-detached units.
- Interior Houses – SHG will be the highest exterior elevation adjacent to the unit and will be a minimum of 0.15m above an adjacent swale, or a minimum of 2.0% above the streetline or lot line elevation.
- Units with common driveways to have the same SHG based on the higher SHG calculated on the basis of the above criteria.
- Grade separation between SHG's to be taken up externally with 3:1 minimum embankment or approved retaining wall construction.
- Split or walk-out house types, front and back SHG's to be established using applicable criteria above.
- Number of units at same SHG shall be as per the following:
 - On road grades of under 2% - no more than four (4) units.
 - On road grades of 2% to 4% - no more than two (2) units.
 - On road grades of over 4% - each unit is considered individually.
- Retaining walls must be used where difference in SHG elevations exceeds 0.5 metres between interior units.

E2.03 Slopes

- The grade difference in the rear yard shall be taken up by the use of two types of slopes:
 - Slopes with a gradient between 2% and 5% which is considered “usable area”;
 - Slopes not greater than three parts horizontal to one part vertical (3:1) to a maximum height of 1.0 metre. Slopes not greater than four parts horizontal to one part vertical (4:1) shall be used for heights greater than 1.0 metre.
- A Rear Yard useable area is to consist of a minimum of 3 m from the back of the house graded at 2% and a further 2 m wide area graded at 2% to 5%. Terracing may start at a minimum distance of 5 m from the back of the house. Rear yard swales are not permitted to be within the usable area.
- The maximum permissible grade along rear lot line between lot corners shall not exceed 6%.

- Yard surfaces shall have a minimum slope of 2%. Yard surfaces shall have a maximum slope of 3:1 to a maximum vertical grade differential of 1.0 metre and 4:1 if the vertical grade differential exceeds 1.0 metre.
- A 1.0-metre-wide flat area is required between 3:1 or 4:1 downward slopes and any property line.
- Where fences are installed at top of slopes a 1m level set back is required for perimeter fencing
- All lots shall have a 0.6-metre-wide unobstructed path draining at a 2% slope away from the house along at least one side of the house. An undisturbed flat area having a width of 0.5 metres shall be provided at the boundary limits adjacent to other properties, in order that the existing boundary elevations shall be maintained. No filling up to or upon private lands shall be tolerated unless written permission is obtained from the adjacent Owner. Where two developments are concurrently underway, the common boundary elevations are to be established to mutually beneficial elevations, agreed to by each party.
- Driveway grades shall not exceed 6% by design. This maximum grade is not recommended and should be employed only in exceptional cases. Driveways shall not slope downward from the street line to the house and shall have a minimum grade of 2% positive drainage away from the building. The maximum permissible as constructed grade for any driveway shall be 8% to allow for a construction tolerance similar to the foundation control tolerance.

E2.04 Swales

- Swales shall have a minimum grade of 2% and maximum side slopes of 3:1.
- Swales shall range in depth from a minimum of 150 mm to a maximum of 450 mm.
- Swales parallel to the rear lot lines shall be located at a distance based on the depth of swale but under no circumstances will the invert of the swale be permitted to be located more than 1.0 metre from the rear lot line unless tree preservation is required.
- Drainage flows which are carried around houses are to be confined in defined swales located as far from the house as possible. The depth of these swales should be kept as close as possible to the minimum of 150 mm.
- The maximum flow allowable in a side yard swale shall be that from three (3) backyards or 750 m², whichever is less.
- Rear Yard Swales:
 - The maximum length of a rear yard swale shall not exceed 60 metres;
 - The maximum area contributing to the rear yard swale shall be 2000 m².

E2.05 Rear Lot Catchbasins

- All rear lot catchbasin grates are to be as per the standard drawing included in Appendix 2 to this document. The centerline of the catchbasin top is to be 1.2 metre from the rear lot line. The catchbasin frame to be set at the elevation of the invert of the lowest swale.
- Rear yard catchbasin leads shall be a minimum diameter of 250 mm. The leads shall be encased in concrete from the catchbasin to the street line.
- All catchbasin leads are to be located a minimum of 0.6 metres from lot line; catchbasin leads to be constructed on one lot. All catchbasin leads are to be on easements having a minimum width of 3.0 metres. The use of “hourglass” easements will be permitted in instances where 3.0 metre widths are not achievable between houses.
- Rear lot catchbasin leads shall be connected directly to Maintenance Holes whenever possible. The layout of the storm sewer shall have consideration to this requirement to maximize the number of RLCB leads which can connect directly to Maintenance Holes.
- When rear lot catchbasins are required, the Designer must consider the impacts that a plugged catchbasin will have with respect to flooding depth and area which will be impacted. The grading design must incorporate allowance for relief outlets in the event that plugging does occur.

E2.06 Sodding and Ground Cover Requirements

- Lots (including drainage ditches or swales) are to be completely topsoiled and sodded with 300 mm of topsoil and No. 1 Nursery Sod.
- Clear stone (19 mm gradation) at a minimum depth of 100 mm may be placed in side yard areas between houses with a distance less than 2.0 metres instead of sod. A transition run-out area to drain the sub-grade shall be provided at the clear stone/sod interface. This shall be detailed on the grading plans. Side Yard swales shall be maintained in the subgrade within any areas receiving clear stone treatment.

E3.00 Retaining Walls

The lot grading design must minimize and ideally eliminate the need for retaining walls. In carrying out the grading design the Designer should not assume that retaining walls will be permitted by the Town. Specific permission from the Town will be required for any retaining walls being proposed. All reasonable alternatives must be investigated prior to the Town being in a position to consider allowing the use of retaining walls. CPRC to approve product and application of retaining walls abutting public lands.

All retaining walls are to be dry-stone (interlocking segmental wet-cast concrete products, stacking type), or cast-in-place reinforced concrete when used to take up grade differentials. Retaining walls shall be designed by a qualified structural engineer and be approved by the Town of East Gwillimbury as per the following table.

Retaining Wall Height	Requirements
Below 0.3m	Considered landscaping, no certification required
0.3m to 0.59m	Detail design and installation certified by a consulting engineer
0.6m to 0.99m	Detail design stamped by a structural engineer and installation certified by developer's consulting engineer
1.0m and higher	Detail design stamped by a structural engineer and installation certified and stamped by a structural engineer

The Consulting Engineer shall be responsible for certifying that each retaining wall is installed in the location as approved by the Town.

All retaining walls shall be constructed on the higher property, adjacent to the property line unless otherwise approved by the Town.

A minimum setback of 0.5 m shall be maintained from the tiebacks to the foundation of any structure.

The location and construction details of all retaining walls must be noted on the engineering drawings and approved by the Town.

All retaining walls 0.6 m or higher require a guard. Guard specification will be dependent upon adjacent/intended usage. All retaining walls which require a fence/security barrier and/or by virtue of their location will be adjacent to a future fence line shall be designed and constructed such that the fence/barrier and/or future fence will not degrade the structural stability of the retaining wall.

All retaining walls abutting public lands shall require a building permit from the Town. The building permit (and associated fee's) are the responsibility of the Developer/Engineering Consultant to obtain from the Town Building department prior to constructing the wall. This building permit and fee requirement is in addition to, and NOT included in any other development approvals.

E4.00 Lot Grading Certification

Prior to Acceptance, the Developer's Engineering Consultant will be required to submit a Lot Grading Certificate for every lot. If retaining walls have been constructed on any lot an additional Certificate will be required for each lot with retaining walls as noted in the above table.

The Lot Grading Certificate and Retaining Wall Certificate shall be provided in a format deemed acceptable by the Town. The Consultant shall verify suitability of format prior to submission. As-built survey points required for all lots abutting separate phases and separate/future developments. In the case that there are lot grading discrepancies the Town has the right to request a survey of the property to confirm the grading is functioning as intended and meets our minimum design requirements.

All Lot Grading Certificates shall include the following:

- Subdivision Name
- Municipal Address
- Lot Number
- Registered Plan Number
- Plot Plan Approval Date
- Date of Field Inspection
- Name of Reviewer
- Seal and Signature of Developers Consulting Engineer and dated
- Certification Stating:
 - Grading generally conforms with that shown on the Approved Plot Plan and Overall Grading Plan for the Subdivision;
 - Minimum of 300 mm of quality topsoil has been placed and the lot has been sodded in accordance with Town Standards;
 - All Valves are operational and adjusted to the finished ground level;
 - Ontario Building Code requirements are satisfied with regard to the required finished ground level relative to the exterior foundation wall of the house; and
 - All downspout discharge elbows are a maximum of 100 mm above splash pads
 - Check box if retaining wall is constructed on lot or not. If yes, attachment of retaining wall certification stating it has been designed using standard engineering principles and constructed per design and meets Ontario Building Code requirements. Certificate to be Signed and Sealed by Developers Consulting Engineer and dated.

SECTION F
SANITARY SEWERS AND APPURTENANCES

Section F Sanitary Sewers and Appurtenances

F1.00 Hydraulic Design

F1.01 Confirmation of Capacity

Prior to commencement of any design for sanitary sewage works within the Town, the Developer's Consulting Engineer shall contact the municipality to ensure that adequate external trunk sewer and treatment plant capacity is available for the proposed development.

F1.02 Sanitary Drainage Plan

The sanitary drainage plan shall be prepared to a scale suitable to show all the tributary areas that are being used to determine the design flows.

The design flow in each Maintenance Hole and length of sewer shall be computed on standard sanitary design sheets. A typical Town of East Gwillimbury Design Sheet is included in the Appendix to this document. For each area entered on the design sheet, the Maintenance Hole numbers, size, grade and material of the sewers and the numbers consistent with the detailed plan and profile for each section of the sanitary sewer shall be shown.

Calculations for the sizing of all sewers shall be carried out on the Town of East Gwillimbury Design Sheet which is included in the design standards document.

F1.03 Calculation of Sewage Flows

All sewers are to be designed for maximum design flow plus an infiltration allowance.

Peak domestic sewage flows are to be calculated using the following formula:

$$Q(d) = \frac{PqM + IA}{86,400}$$

Where,

$Q(d)$ = Peak domestic sewage flows (including extraneous flows in L/s)

P = Design population

q = Average daily per capita domestic flow in L/cap/day
(exclusive of extraneous flows)

M = Peaking factor

I = Unit of peak extraneous (infiltration) flows in L/ha/s

A = Gross tributary area in hectares

For Residential Development the peaking factor shall be calculated based on the Harmon Formula:

$$M_d = \frac{1 + 14}{4 + P^{0.5}}$$

Where,

P = Population, in thousands

M_d (Maximum) = 4.0

M_d (Minimum) = 2.0

For Industrial Development the peaking factor shall be calculated as follows:

$$M_i = 6.6604 \times \text{Area} - 0.1992$$

Where,

M_i = industrial peaking factor

A = gross lot area (ha)

F1.04 Average Daily Flows

The following average daily flows are to be used in calculating the design flows for sewer sizing:

Residential	=	350 L/c/d
Industrial	=	35,000 L/ha/d
Commercial	=	28,000 L/ha/d
Institutional	=	18,000 L/ha/d

F1.05 Extraneous Flows

An infiltration allowance of 0.26 L/sec/ha shall be used in determining the design flows. The Town requires all sewers to be constructed to achieve a reduction of infiltration to zero allowable. All sewers will be tested in accordance with the current version of Regional Municipality of York Sanitary Sewer System Inspection, Testing and Acceptance Guidelines.

F1.06 Design population

The design population for residential developments shall be derived using the proposed Plan of Subdivision and the following densities:

Single Detached Dwellings=	3.36 ppu
Semi-Detached Dwellings =	3.36 ppu
Townhouses	= 2.78 ppu
Apartments	= 1.76 ppu

In the absence of a proposed Plan of Subdivision, populations should be estimated based on drainage areas and the land uses identified in the Town's Official Plan or Master Servicing Studies.

An average population of 50 persons/ha shall be used for all employment areas.

F2.00 Sanitary Sewer Design

F2.01 Sanitary Drainage Policies

This section outlines the policies, design criteria and applicable parameters for the design and implementation of sanitary sewers within the Town of East Gwillimbury. These policies are to be adhered to in the design of all sanitary infrastructure. This is a dynamic document and may be subject to change to ensure sustainable development conditions. The Town has built in flexibilities in the document. Therefore, it is recommended that the proponent consult with Town staff prior to conducting analysis or design.

F2.02 Planning, Policies and Design Criteria

Design of the sanitary sewer system and respective infrastructure must satisfy the most current version of the following criteria:

- a. MECP Design Criteria for sanitary, Storm Sewers and forcemains for alterations authorized under Environmental Compliance Approval (latest amendment)
- b. MECP Design Guidelines for Sewage Works (latest amendment)
- c. MECP Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA) for Municipal Sewage Collection System -ECA Number:117-W601 (latest amendment)
- d. Any other applicable legislation/regulation/standard

F2.03 Location

All sanitary sewers shall be located as shown on the Standard Road Cross-Section. The standard location shall generally be 1.5 m (minimum) offset from the centerline of the road pavement.

All sanitary sewers are to have a minimum horizontal separation of 2.5 m and a vertical clearance of 0.5 m from watermains in accordance with Ministry of the Environment, Conservation and Parks (MECP) Regulations.

Combined sewers (storm and sanitary) are not permitted.

F2.04 Pipe Capacities

Manning's formula shall be used in determining the capacity of sewers.

$$Q = \frac{1000AR^{2/3}S^{1/2}}{n} \quad V = \frac{R^{2/3}S^{1/2}}{n}$$

Where "Q" is in litres/second, "V" is in metres/second, "R" is in metres, "S" is in metres/metre, and "A" is in square metres.

The roughness coefficient "n" shall be 0.013 for all types of sewers.

The table below provides the allowable sanitary sewer capacities and gradients. This table shall be used to determine the maximum and minimum slopes for sanitary sewers. Although the Manning's Formula is to be used as a basis for sewer design, the values listed in the table will supersede the results of Manning's calculations, where applicable. In the case of partial pipe flow, the actual velocity is to be checked against the minimum allowable velocity at the design flow rate.

Table 0-1: Allowable Sanitary Sewer Capacities and Gradients

Diameter (mm)	Q Max (m ³ /s)	Slope Min (%)	Slope Critical (%)	Slope Max (%)
200	0.042	0.50	1.54	8.2
250	0.074	0.50	1.43	6.1
300	0.12	0.50	1.34	4.8
375	0.20	0.50	1.25	3.5
450	0.32	0.50	1.17	2.8

Flow Velocities

Minimum acceptable velocity = 0.6 m/s

Maximum acceptable velocity = 3.0 m/s

F2.05 Minimum Pipe Size

The minimum allowable size for a sanitary sewer shall be 200 mm in diameter.

F2.06 Minimum and Maximum Grades

The absolute minimum and maximum grades for sanitary sewers shall be in accordance with the table included in Section F2.02 subject to achieving minimum acceptable velocity at the design flow. The minimum grade for the first upstream leg shall not be less than 1.0%. The maximum grade for the first upstream leg shall not be greater than 2.0% unless the sewer is to be extended in the future.

F2.07 Minimum and Maximum Depths

The depth of the sewer shall be measured from the final centreline finished road elevation to the top of the sanitary sewer. The minimum depths of sewers for residential areas shall be 2.7 m.

The maximum depth of sewers with direct lateral connections shall be 6.0 m (measured from finished centerline of road elevation to invert of sewer) without approval of the Director of Engineering. In cases where deeper sewers are required these shall be considered trunk sewers and no direct lateral connections will be permitted. Separate local sewers constructed above the trunk sewers will be required for connection of laterals. Maintenance Holes are to be common wherever possible with drop structures.

F2.08 Curved Sewers

The use of radius pipe or deflected pipe is not permitted.

F2.09 Termination Points

All sewers shall be terminated at the subdivision limits when external service areas are being considered in the design with suitable provision in the design of the terminal Maintenance Holes to allow for future extension of the sewer.

Sanitary sewer outfall Maintenance Holes will be constructed with a full downstream bulkhead, to be removed prior to the first occupancy upon written permission from the Town. Removal of Bulkheads may require sewer flushing and video inspection to be completed immediately prior to removal to confirm to the Town and/or Region the system is free of debris and water.

F2.10 Pipe Crossing

A minimum clearance of 150 mm shall be provided between the outside of the pipe barrel at the point of crossing for storm and sanitary sewers. A minimum clearance of 0.5 m shall be provided for all sewer and watermain crossings.

In the event the minimum clearances cannot be obtained, the designs must adhere to Ministry of the Environment, Conservation and Parks (MECP) policies. In addition, the pipes shall be concrete encased to ensure that the pipes are properly bedded.

F2.11 Changes in Pipe Size

No decrease of pipe size from a larger upstream to a smaller downstream will be allowed regardless of the increase in grade. Special consideration may be given for trenchless installation subject to the approval of Director of Engineering.

F2.12 Pipe Bedding

The class of pipe and the type of bedding shall be selected to suit loading and proposed construction conditions. Details and types of bedding and backfill are illustrated in OPSD 802.010 and 802.030. For flexible pipe, bedding material shall be compacted 19mm crusher run limestone (CRLS) placed to 300mm above the crown of the pipe. For rigid pipe, bedding material shall be compacted 19mm (CRLS) placed to springline and sand placed 300mm above the crown of the pipe. The width of the trench at the top of the pipe must be carefully controlled to ensure that the maximum trench width is not exceeded unless a higher class of bedding or higher strength pipe is used. The recommendations of a Geotechnical Engineer will be required in determining strength of pipe required and construction methods to be used. In soft or wet conditions, additional Geotechnical investigation and testing may be necessary to determine the appropriate bedding and backfill measures.

F3.00 Maintenance Holes

F3.01 Location

Maintenance Holes shall be constructed at the following locations:

- At changes in pipe size.
- At pipe junctions.
- At changes in pipe slope.
- At changes in pipe alignment.
- At changes of pipe material (example: PVC to concrete);
- At intermediate intervals as per Section F3.02.

The outside wall of any Maintenance Hole structure located within the roadway shall not be located closer than 1.5 m to a curb. The Maintenance Holes shall be oriented in such a way that the access cover is offset towards the centerline of the road. Maintenance Holes should not be constructed in sidewalks or multi use paths.

F3.02 Maximum Spacing

The maximum spacing between Maintenance Holes is as follows.

Pipe Size (mm)	Maximum Maintenance Holes Spacing (m)
200 to 750	110
825 to 1,200	125
1,200 and over	150

F3.03 Maintenance Hole Types

Maintenance Holes shall be constructed of pre-cast concrete with monolithic base and pre-benched sealed couplings for all pipes.

The Ontario Provincial Standard (OPS) Maintenance Holes details shall be used for Maintenance Holes design, where applicable. In all cases where the standard drawings are not applicable, the Maintenance Holes shall be individually designed and detailed by a licensed structural Engineer.

A reference shall be made on all profile drawings to indicate the type and size of all sanitary Maintenance Holes.

Pre-cast Maintenance Holes shall conform to ASTM Specification C478 latest revision.

The joints of all Maintenance Hole sections shall be wrapped on the exterior of the Maintenance Hole with a waterproofing membrane in accordance with Regional Municipality of York I&I reduction criteria.

Maintenance Holes are to be backfilled with sand to the underside of the frost zone within the road base. The upper 1.50m of maintenance holes shall be backfilled with native material to the underside of road base

F3.04 Maintenance Holes Frame and Cover

Maintenance Holes covers shall be the “closed” type “A” per OPSD 401.010 and shall be embossed with the word “Sanitary”.

All Maintenance Holes constructed in the vicinity of low points, overland flow routes, cul-da-sac’s or outside of the paved roadways shall have watertight covers, in accordance with Regional Municipality of York I&I reduction criteria.

All Maintenance Holes located within the travelled portion of the roadway shall have the rim elevation initially set flush with the base course asphalt. A maximum of 300 mm height of modular rings shall be permitted on all Maintenance Holes in new subdivisions.

Prior to the placement of the final course asphalt, the Maintenance Holes frame shall be adjusted to suit the final surface asphalt elevation. Maintenance Hole adjustment units are to be parged on the outside only with a sand/cement masonry parging material and once cured and prior to backfilling, the outside surface of the adjustment units shall also be coated with a bitumen or other approved waterproofing membrane.

F3.05 Head Losses

The minimum drop for inverts in any Maintenance Holes shall be 0.050 m for sewers turning 45 degrees or less and 0.100 m for any sewer turning 90 degrees. The maximum change in direction permitted for any sewer is 90 degrees (i.e., No acute angle turns will be permitted). Minimum drops in accordance with Ministry of the Environment, Conservation and Parks (MECP) policies will be considered in extreme situations where approved by the Town.

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

Hydraulic calculations shall be submitted for all junction and transition Maintenance Holes on sewers where there is a change in velocity of greater than 0.6 m/s proposed. In addition, hydraulic calculations may be required for Maintenance Holes where in the opinion of the Town, there is insufficient invert drop provided across any Maintenance Hole.

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

F3.06 Maintenance Hole Design

- All Maintenance Hole access openings shall be located on the side of the Maintenance Hole parallel to the flow for straight run Maintenance Holes, or on the upstream side of the Maintenance Holes at all junctions.
- The Maintenance Holes shall be centered on the sanitary sewer main.
- The maximum change in the direction of flow in any sanitary sewer Maintenance Hole shall be no more than 90 degrees. A change of flow direction at acute interior angles will not be permitted.
- All sanitary Maintenance Holes shall have monolithic pre-benched bases to the obvert of the pipe with premanufactured connections (Kor-n-Seal or equivalent).

- Safety platforms shall be required in all Maintenance Holes in accordance with OPS Specifications.
- All Maintenance Holes to have watertight joints and adjustment rings. At the Town's discretion external water proofing by use of Denso sealants or approved equivalents may be required.
- If the top step of a Maintenance Holes is to be placed in the adjustment section, the step is to be pre-installed and not field installed (drilled). Top steps for flat cap Maintenance Holes are to align with lower section steps
- Maintenance Hole adjustment units shall be minimum of 2 and maximum of 6 units with a maximum height of 300mm total height of adjustment units between top of precast Maintenance Hole and underside of Frame and Cover at finished top asphalt grade.

F3.07 Drop Structures

Drop structures shall be used when invert levels of inlet and outlet sewers differ by 0.9 m or more. Wherever feasible, sewer systems should be designed to avoid the use of drop structures. Internal drop structures are not permitted. Precast drop structures are permitted. All drop structures shall be constructed in accordance with OPSD 1003.020.

F4.00 Sanitary Service Connections

F4.01 General

All sanitary sewer connections for single, semi-detached and townhouse lots shall be PVC DR-28 single service pipes and shall conform to Ontario Provincial Specifications. All connections are to have a watertight PVC (cleanout) test fitting installed at the property line. The sewer connection shall extend 1.5 m inside of the property line and terminate with a watertight plug. The pipe is to be green in colour and marked with a 50 mm x 100 mm x 2.4 m stake painted green.

All sanitary laterals shall be inspected via CCTV from the main to point of access in the dwelling unit 30-days PRIOR to Occupancy of the dwelling unit. The video report and a certification by the Consulting Engineer confirming the acceptable installation of the sanitary lateral shall be provided to the Town PRIOR to occupancy of the dwelling unit. The Consulting Engineer will also be required to confirm that the sanitary lateral conforms with the Regional Municipality of York I&I reduction criteria.

F4.02 Location

The proposed location of the sanitary sewer service shall be shown on the Plan and Profile Drawings and Composite Utility Plans. The location shall be as per the standard drawing included in the Appendix to this document.

F4.03 Size

Service connections for single family and semi-detached (or linked) units shall be 125 mm in diameter.

Service connections for multiple family blocks, commercial, institutional, and industrial areas shall be sized according to the intended use.

F4.04 Connection to Main

The connection to the main sewer shall be made with an approved manufactured tee. Connections to existing sewer mains shall be made using approved saddles, insert tees are not permitted unless approved by the Town.

Connection to Maintenance Holes will be allowed only if the invert is connected no higher than the obvert of the outlet pipe in the Maintenance Holes and properly benched.

No service connection of a size greater than half the diameter of the main shall be cut into the main sewer. A Maintenance Hole shall be installed on the main sewer at the intersection of a service connection which has a size greater than half the diameter of the main sewer except as provided below.

A 125 mm or 150 mm service connection will be permitted to connect to a 200 mm and 250 mm main sewer provided an approved manufactured tee is installed and provided the invert of the service connection is above the spring-line of the main sewer.

F4.05 Depth

The depth of the service connections for single family units, semi-detached units and townhouses at the property line measured from the finished centreline road elevation shall be:

- Minimum – 2.50 m;
- Maximum – 3.00 m (unless proposed house types require deeper service depths).

Risers shall be used when the obvert depth of the sewer main exceeds 4.50 m. The riser section shall be brought to a depth of within 2.7 m of centreline road grade. Approved Controlled Settlement joints shall be provided for all risers.

F4.06 Grades

<u>Size of Pipe</u>	<u>Minimum Grade</u>	<u>Maximum Grade</u>
125 mm	2%	8%
150 mm	1%	6%

F4.07 Connection to Multiple Family and Other Blocks

An inspection Maintenance Hole is required on private property located 1.50 m from the property line to the center of the frame and cover on all connections to multiple family and other blocks.

F4.08 Connection to Commercial/Industrial/ Institutional Blocks

An inspection of Maintenance Holes is required on private property located 1.50 m from the property line to the centre of the frame and cover.

F4.09 Connection to Park Blocks

An inspection Maintenance Hole is required on the park block located 1.50 m from the property line to the centre of the frame and cover.

F5.00 Pipe Materials

A list of acceptable pipe materials is included in the Appendix to this document.

F6.00 Sanitary Pumping Stations

Sanitary pumping stations shall be constructed to the most recent Town Standards and Requirements. Pumping stations shall meet all Regional Municipality of York, MECP Standards and Town's CLI-ECA.

All pumping stations shall provide bypass pumping, external auxiliary electric power supply. The auxiliary power supply shall be capable of meeting the full power demand of the pumping station and shall be provided by an internal combustion engine driven generator utilizing an alternate fuel source (natural gas preferred or diesel if approved by the Town). External auxiliary power supply units shall be fully enclosed and "silenced" units meeting all Ministry of the Environment, Conservation and Parks (MECP) emission requirements (Thermal, Exhaust Gas and Acoustic requirements).

The Town typically requires Gorman Rupp end suction centrifugal pumps be specified for municipal sanitary pumping station projects.

F7.00 CLI-ECA

The Town's CLI-ECA requires the Town to have an Operations and Maintenance (O&M) manual for all sewage works. The O&M manual shall be submitted and approved prior to Assumption.

Under the terms of the new CLI-ECA ,signage is to be established to notify the public at the nearest publicly accessible point(s) downstream of any Combined Sewer Overflow (CSO) outfall location and any Sanitary Sewer Overflow (SSO) when overflow is piped to a specified outlet point, where applicable. If the nearest publicly accessible point is more than 100 m away, then signage shall be established at the CSO or SSO outfall location. The signage shall include the following minimum information:

- a) Type of collection system
- b) Identification of Potential hazards and limitations of water use as applicable.
- c) ECA number and/or asset ID
- d) The owner's contact information

F8.00 INFLOW& INFILTRATION REDUCTION CRITERIA

F8.01 GENERAL

All sanitary sewers and laterals shall be designed to be watertight and free from leakage in accordance with York Region's I&I Reduction Standards, as amended from time to time.. Designs shall be looked at to reduce the number of pipe joints, maintenance holes, maintenance hole connections.

The Town may consider alternative I&I reduction measures depending on site specific conditions.

F8.02 Testing Requirements

Refer to section I for testing requirements.

SECTION G
STORM DRAINAGE
&
STORMWATER MANAGEMENT

Section G Storm Drainage & Stormwater Management

G1.00 Storm Drainage Policies

This section outlines the policies, design criteria and applicable parameters for the design and implementation of storm drainage facilities within the Town of East Gwillimbury. These policies are to be adhered to in the design of all stormwater management facilities, including sewers, surface drainage and related environmental facilities and water resources components. This is a dynamic document and may be subject to change to ensure sustainable development conditions. The Town has built in flexibilities in the document. Therefore, it is recommended that the proponent consult with Town staff prior to conducting analysis or design.

G1.01 Planning, Policies and Design Criteria

The most current version of the following Ministry of the Environment Conservation and Parks (MECP), and Lake Simcoe Region Conservation Authority (LSRCA) guidelines, policies and standards, as well as the Lake Simcoe Protection Act apply to the design of storm drainage facilities in the Town of East Gwillimbury (Town).

- MECP (i.e., Stormwater Management Planning and Design Manual, March 2003 or latest amendment);
- LSRCA Watershed Development Policies (updated and approved June 2020 or latest amendment);
- Existing Watershed or Sub watershed plans within the Town.
- MECP Environmental Compliance Approval For a Municipal Stormwater Management System - ECA Number: 117-S701 (latest amendment)
- MECP Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA) for Municipal Storm Collection System -ECA Number:117-W601 (latest amendment)
-

MECP Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under Environmental Compliance Approval (latest amendment) MECP Design Guidelines for Sewage Works (latest amendment) Development proponents are also required to confirm design criteria and obtain approvals from any other relevant ministries or agencies (i.e., Ministry of Transportation, Ministry of Natural Resources, Department of Fisheries and Oceans, Lake Simcoe Region Conservation Authority, etc.).

The planning and design of stormwater management (SWM) facilities shall be discussed with the Town and the LSRCA early in the planning process and shall focus on minimizing the number of pond facilities. Water quality and quantity control in new development areas are to be provided in Town-owned municipal blocks. In the case of infilling proposals, on-site SWM concepts may be considered by the Town in conjunction with any

potential off-site storm drainage improvements. Off-site storm drainage improvements will be determined during the pre-consultation process.

The planning and design of each pond shall also focus on opportunities to integrate the pond with the surrounding topography and land uses.

The planning and design of SWM works is to have full regard for riparian rights of both upstream and downstream Landowners and potential responses of the receiving waterbody. Any change in flow rates, or water levels that would occur as a result of the development, SWM drainage areas and/or in-stream works to neighboring private properties must be adequately addressed. Written permission from affected Landowners must be sought in cases where acknowledged impacts are proposed and any governing legislation, in this regard, must be strictly followed.

G1.02 Levels of Service

The level of service to be provided by the storm drainage system is listed in the table below unless stipulated otherwise. The planning of access routes for emergency services (i.e., police, fire, ambulance) may result in higher levels of service as determined by the Town.

Table 0-1: Levels of Service for Major and Minor Systems

Item	Level of Service	Comments
Storm Sewers	1:5 year storm	catchbasin density such that sewers capture and convey the 1:5 year storm, while minimizing flow on streets
Hydraulic Gradeline	1:100 year storm	no closer than 0.5 m between 1:100 year storm hydraulic gradeline and finished basement floor elevations
Foundation Drain Collector	Greater of 1:100 year or Regional Storm	not susceptible to backwater or surcharging
Major System	1:100 year storm	large drainage areas may require classification as a floodplain using regulatory storm criteria (LSRCA) overland flow cannot exceed width or flow capacity of right-of-way
Stormwater Management	1:100 year storm	unless otherwise directed by Town
Critical Infrastructure	Regional Storm or Greater	very special cases to be specified at the discretion of the Town

Storm sewers are to be initially sized for the 1:5 year storm. The Town of East Gwillimbury Storm Sewer Design Sheet is included in the Appendix. Subsequent hydraulic gradeline analyses and stormwater management may increase sewer sizes and/or require catchbasin inlet controls to be used.

G1.03 Hydrology and Hydrologic Modelling

The estimation of peak design flow rates can be done using the Rational Method or computer model simulation. The Rational Method should be used to design storm sewers and estimate peak flow rates from small urban areas. Computer analyses are best suited to large urban areas, rural areas and designing municipal SWM facilities.

The Modified Rational Method may be used to design detention storage for small sites, generally less than 5 ha. The following method is described in the Hydrology Handbook (1996). A trapezoidal hydrograph is obtained by setting rising and receding limbs equal to t_c . The volume of required detention storage is the area between the trapezoidal inflow hydrograph and the outflow hydrograph, the latter being the allowable controlled discharge. Storage volume is then computed as:

$$V_p = Q_p D - Q_o (D + t_c)/2$$

Where,

D = duration of rainfall (minutes)

Q_p = the runoff peak for that duration (m^3/s)

Q_o = the maximum allowable discharge from the area (m^3/s)

t_c = time of concentration (minutes)

Source: Hydrology Handbook (ASCE Manuals and Reports on Engineering Practice No. 28), Second Edition pp580-582, Copyright 1996, ISBN 0-7844-0138-1

The time of concentration (t_c) shall be determined as outlined in Section 32.2.

The minimum and maximum duration of design storms are 4 hours and 24 hours respectively. Hyetographs of the design storms selected by the Town (distribution based on the Toronto-Pearson data and a 10 minute discretization) are provided in the Appendix to this document for the following storms:

24 hour SCS (Type II);

4 hour Chicago distribution;

24 hour Chicago distribution (where requested).

The Town or LSRCA may request other design storm lengths and distributions for evaluation during the pre-consultation process.

Rainfall IDF curves to be used as defined by the equation:

$$I = a \times (b+t)^{-c}$$

Where,

I = Rainfall intensity (mm/hr)

t = Time of Concentration (minutes)

The coefficients for a, b and c values are shown below:

Return Period	a	b	c
Pond Bypass	160	4	0.800
1:2 year	648	4	0.784
1:5 year	930	4	0.798
1:10 year	1021	3	0.787
1:25 year	1100	2	0.776
1:50 year	1488	3	0.803
1:100 year	1770	4	0.820

G2.00 Stormwater Management Pond Design

Stormwater management ponds are required to meet provincial SWM prerequisites as set out by MNR, MECP and LSRCA.

SWM pond locations, functions and design criteria shall be confirmed through consultation with the Conservation Authority and the Town. Where Stormwater Master Plans have been completed, the design criteria shall follow the approved Master Plan. End-of-pipe facilities are acceptable to the Town when the designs are safe, maintainable, integrated with the surrounding landscape, and aesthetically pleasing.

The Town concedes the overall design requirements to the most recent provincial direction, as is acceptable to the LSRCA. Exceptions to this are in circumstances that involve:

- Matters of public safety and aesthetics.
- Operation and maintenance requirements.
- Protecting the riparian rights of private Landowners.
- Protection of municipal infrastructure.
- Conflicts with land use.
- Responses of the receiving water body.

In these cases, the Town may invoke additional release rate stipulations and design requirements over and above those required by other agencies.

The Town requires integration of stormwater management pond grading design with the surrounding landscape. Where possible, SWM ponds are to be integrated with parks and open space systems. Safety aspects must be given special consideration. This includes identifying the use of gentle slopes in areas where passive recreation takes place, increasing density of appropriate plantings and vegetation on steeper slopes, handrails/guardrails at headwalls and placing signs which inform of the function and potential hazards of SWM ponds.

Subject	Criteria
Side Slopes	Maximum permissible side sloping is 4:1. 3:1 slopes will be considered above the 1:100 year water level only in situations with extenuating circumstances. A safety shelf with maximum 7:1 side slopes is required for at least 3.5 m (plan view), on either side of the Normal Water Level (NWL). A minimum 3 m wide strip at a maximum crossfall of 4% is to be provided around the property boundary of the SWM block for the purposes of grass cutting. A horizontal terrace of 3.0 m required for continuous slope changes in elevation greater than 3.0 m. Berms of wet ponds are to be designed as proper dams (clay core, toe drains, etc.).
Depths	Maximum permanent pool depth – 2.5 m. Maximum water level fluctuation – 2.0 m (active storage area). Minimum freeboard – 0.25 m, or 20% of the maximum water fluctuation, if greater.
Outlets	A bottom draw low flow outlet structure with reverse sloped control pipe is required for the extended detention outflow. A minimum orifice size of 75 mm diameter is permitted to avoid clogging issues. Emergency overflow with spill capacity for the Regional Storm Event is required. In lieu of modeling the Regional Storm Event, the peak overflow can be estimated by assuming 0.1 m³/s/ha of drainage area. Where public safety or severe property damage may be at risk arising from dam failure, the Town may ask for the emergency overflow to convey more than 0.1 m³/s/ha. Safety grates shall be provided on all storm sewer inlet and outlet pipes and safety railings shall be provided along the top of all headwalls 600 mm in height or greater.
Landscaping	Suitable landscape plantings are required to discourage access, break accidental falls, and to provide for both aesthetics and environmental enhancement, and are subject to the requirements of the Town of East Gwillimbury. Retaining walls are not permitted without approval of the Director of Engineering and only in exceptional circumstances.
Fencing	The Town prefers not to unnecessarily require fencing around pond blocks, but instead, allow for casual public access to facilities, subject to maintaining public safety. Bollards or gates to discourage vehicular access to maintenance roads must be installed. Fencing is required along the limit of lots adjacent to SWM facilities. Specific approval will be required from the Town for consideration of fenced facilities. Where approval for fencing SWM ponds is given by the Town, 1.8 m high black vinyl-coated fencing, posts and hardware shall be used.
Signage	Signage to educate and advise the public of facility must be erected at all potential access points to the satisfaction of the Town. The signage shall comply with the Town's CLI-ECA (117-S701) and include the following minimum information: ○ Identification that the site contains a Stormwater Management Facility; ○ Identification of potential hazards and limitations of water use, as applicable; ○ Identification of the purpose of the Facility; ○ ECA approval number and/or asset ID; and ○ Owner's contact information. ○ Any other information added through amendments to the CLI-ECA

Subject	Criteria
Safety Stations	Safety stations shall be implemented in stormwater management facilities in accordance with the following: ○ A minimum of one (1) safety station is required for each road frontage to a facility; and ○ A minimum of one (1) safety station is required for each entry/access for pedestrian trails. ○ Safety stations are preferred to be located above the 100-year return frequency water level.

G2.01 Operational and Maintenance Features

The SWM pond designs are to incorporate features that allow the Town to operate and maintain the facility. It is strongly recommended that the Design Engineer arrange a pre-consultation meeting with the Town's Director of Engineering or designate once a preliminary pond design has been prepared in order to discuss maintenance operations and features, specifically clean-out procedures and sediment management and removal. These features include:

Subject	Criteria
Access Road	Must provide access to the permanent pool level of the sediment forebay and wet cell, road to be designed per Geotechnical recommendation Max. gradient of 8%, crossfall of 2%. Min. width of 4.0m, unless otherwise approved per site condition Min inside turning radius of 10.0 m. Bollards or gates to discourage vehicular access to the maintenance road must be installed. Where trails are to be integrated with access roads, surfaces shall be paved per engineering standards for asphalt
Sediment Drying Area	A sediment drying area shall be provided adjacent to the maintenance access, located as close as possible to forebay. Surface area equivalent to bottom area of forebay. Grade area at a 2.0 to 5.0% slope with surface drainage directed to the facility.
Flow Control Structures	Must be located at any easy access point for maintenance and cleaning purposes. Must be protected from public access. Must blend into surrounding landscape (railings are to be avoided where possible).
Pond Drain Down	If possible, a gravity outlet outfitted with a valve is to be provided for the drawdown of the pond. The valve must be directly accessible in a chamber or structure. If a gravity outlet is not available, a perforated pipe leading to a dewatering sump is to be provided. The sump is to be located as close to the pumping outlet as possible. A gravity outlet or dewatering sump is to be provided in the forebay for drain down into the wet cell.
Bypass Sewer	To be installed between inlet and outlet. Outfitted with a normally closed valve or gate, in an accessible location for maintenance vehicles.
Emergency Shut Off	A valve is required on the extended detention outlet in order to temporarily shut off the pond outlet during emergency contaminant spill conditions.
Gauges	Staff gauges to be installed at the time of assumption to monitor water levels. Location installation of gauge to be confirmed with Wastewater Operations Department.

G2.02 Operations and Maintenance Manual

A SWM Facility Operations and Maintenance Manual is to be prepared for the Town by proponents of new SWM facilities. The manual is to describe how each facility operates in the short term and long term, inspection, and maintenance requirements of the facilities. The manual shall also include estimated yearly maintenance costs for the facilities along with supporting calculations. Any collection system SWM components, such as oil and grit separators are to be included in the manual.

A list of typical items that should be included in the manual are described below:

- Location.
- Design Drawings.
- Type of SWM Facilities.
- Pond Specifics:
 - How does the facility work (describe methodology of typical events);
 - Design Values for Facility (volumes, elevations, discharges, design event, over topping, etc.);
 - Detention Time/Drain Down Time;
 - Reduced Scale Plan of Facility;
 - Inspection checklist (what to check, frequency);
 - Sediment management (anticipated volume, frequency of removal, disposal, testing);
 - Instructions for drawdown/dewatering (valve operation details);
 - Maintenance (grass cutting, weed/vegetation control, vegetation replanting, garbage/debris removal, etc.);
 - Design life and maintenance schedules;
 - Operational and maintenance requirements to protect sources of drinking water; and
 - Annual cost estimate for all maintenance activities.

Additional items as per the Town's CLI-ECA 117-S701 (latest amendment), the Ministry of the Environment, Conservation and Parks (MECP) latest Stormwater Management Planning and Design Manual should also be included as deemed appropriate for the particular facility.

G3.00 Submission Requirements for SWM Design Reports

The following is a list of documentation which should be included within SWM design reports submitted to the Town for review. These reports are submitted to support the final design of quality and/or quantity control facilities. These reports shall clearly identify how applicable recommendations from Master Servicing, Functional Servicing, Geotechnical, Environmental or Hydrogeological Reports have been incorporated into the final design of the facility.

- a) Site Location Plan.
- b) Existing and proposed catchment area plan which delineates internal/external drainage areas and labels areas and catchment reference numbers.
- c) Engineering plans for stormwater facilities which should identify the following:
 - Permanent, extended detention and highest water levels on plan view and include all ponding levels for various return periods in tabular form.
 - Section/details of major overland flow routes.
 - Section/details of maintenance access roads.
 - Section/details of erosion protection at inlet/outlet structure(s) and on spillways.
 - Fencing limits (incl. Type and height);
 - Location of facility signage.
 - Borehole location and existing groundwater elevation.
 - Existing and proposed grading elevations and transition slopes.
 - Sediment forebay details including lining and separation berm.
 - Details of sediment drying area and/or by-pass pipe for cleaning purposes
 - Section/details of inlet/outlet structures.
- d) Landscaping/restoration plans and details.
- e) Erosion and sediment control plans and details.
- f) Excerpts from Master and Functional Studies which outline requirements for quantity/quality control and any facility design requirements.
- g) Identify any deviations from the Town Design Criteria including an explanation based on site specific conditions.
- h) Pre and post development hydrologic modeling schematic to illustrate all components of each model.
- i) Table summarizing pre and post development catchment parameters (i.e., catchment number, area, percent impervious, CN value, etc.).
- j) Table summarizing stage, storage and discharge characteristics of the facility.
- k) Table summarizing pre and post development peak flows and storage volumes based on output from hydrologic modeling or comparison to volumes and target peak flows identified in Master and Functional Servicing Studies.
- l) Table to summarize and compare required permanent pool and extended detention storage requirements to volumes provided in the facility.

- m) Table to compare calculated 1:100-year hydraulic grade line elevations within storm sewer system to estimated underside of basement floor slab elevations.
- n) Sample or supporting calculations for the following:
 - Extended detention drain-down time (hours);
 - Major system overland flow and velocity to confirm conveyance within R.O.W. and/or defined flow routes.
 - Erosion control sizing and flow velocity at inlet/outlet structures and spillways.
 - Sediment forebay length and width in conformance with MECP manual.
 - Major system inlet grating sizing (assuming 50% blockage).
- o) Hard and digital copies of input/output files from hydrologic modeling (digital files may be provided on CD or via e-mail);
- p) Identify erosion and sediment control methods to be implemented before, during, and after municipal servicing construction up to the end of servicing maintenance period, including schedule for implementation/decommissioning and maintenance requirements.
- q) Any hydraulic gradeline (HGL) above the storm sewer obverts is to be shown on the sewer profile drawings.

G4.00 Stormwater Conveyance System Sizing

G4.01 General

Urban stormwater conveyance systems may include open channels and swales, storm sewers, Maintenance Holes and catchbasins, foundation drainage collectors, roadways, and road allowances. The design of stormwater conveyance systems shall follow “dual drainage” principles, which consist of:

- The minor drainage system which conveys runoff from the 1:5-year return period storm.
- The major drainage system which conveys runoff from storms greater than the 1:5-year return period up to the 1:100-year storm.

G4.02 Major Drainage System Design

A continuous overland flow drainage route is to be identified on the engineering drawings and grading plans. Overland flooding shall be conveyed within the right-of-way (ROW) of the road during a 100-year event. Overland flow from public property onto swales on private property is not permitted. Blocks dedicated through ownership to the Town will be required to convey the 100-year overland flow from roadways to open watercourse systems. These blocks shall be designed for stability and safety to the satisfaction of the Town. Any inlet grating associated with the major drainage system is to include a 50% blockage factor in its design.

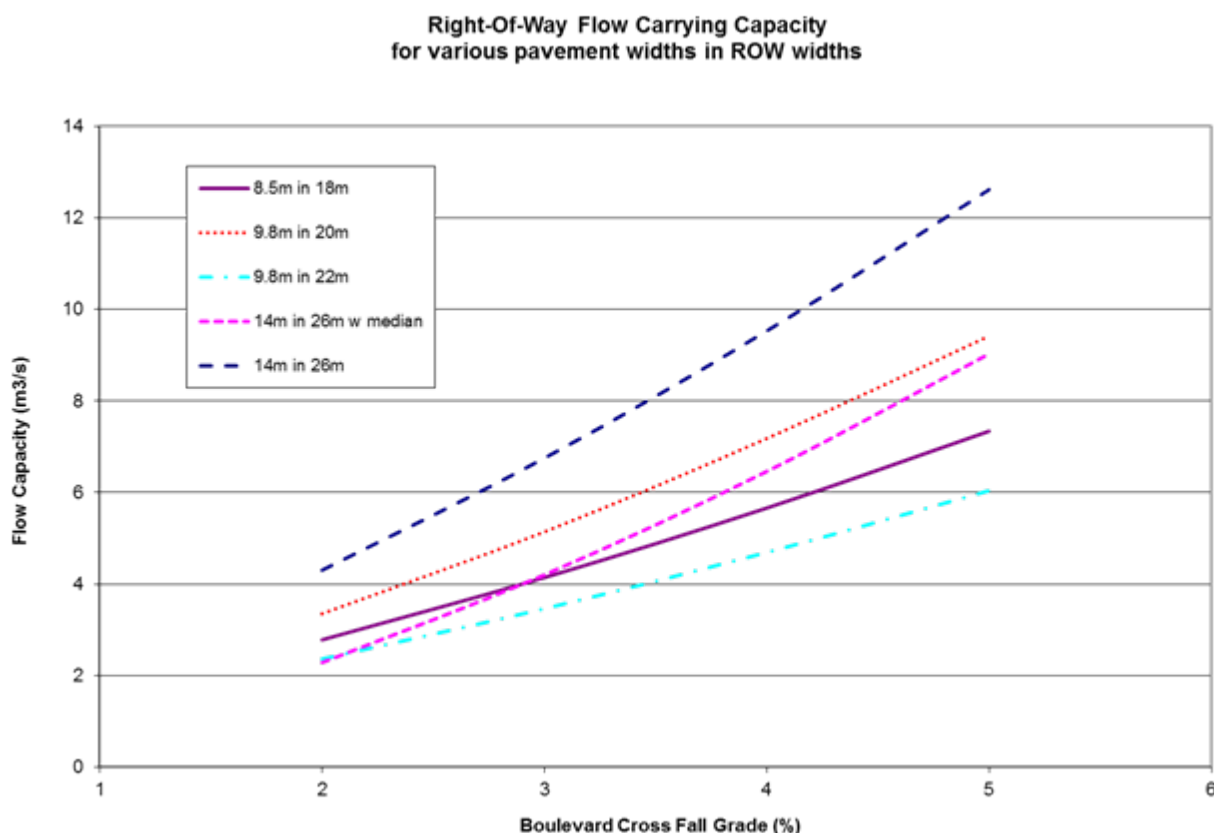
Any 1:100-year storm sewer capture situations are to be avoided where possible. In cases where no other options are available, redundancy in the system must be provided such that a localized spill point is provided before flooding of private properties occurs. If a spill point does not exist, additional high-capacity inlets are required to provide redundancy.

Roadway Major System

Generally, road right-of-ways vary in width from 18.0 metres to 26.0 metres and have a gradient in the supercritical range of 0.5% to 6%. The flow carrying capacity is predominately influenced by the boulevard cross-slopes, whereby steeper boulevards provide for deeper flow. Designers should set the boulevard slopes accounting for the need to convey overland flow but must have regard for other constraints which affect boulevard cross slopes (i.e., maximum permissible driveway grades). Boulevard slopes of 2% are to be used unless a steeper slope is required for overland flow conveyance.

The following graph provides the right-of-way flow carrying capacity for various pavement/ROW widths, in m^3/s . The figure shall be used to confirm the capacity of the overland conveyance system relative to the expected design flows.

Figure 0-1: Right-of-Way Flow Carrying Capacity for Various Pavement Widths



Walkways are hydraulically similar to roadways but rely more on curb height instead of boulevard slope. Where required, curb heights for walkways can be installed between 0.15 metres and 0.30 metres. Minimum and Maximum longitudinal walkway gradients are 0.5% to 6%.

Swales and Open Channels

Swales and open channels can play an important role in both the major overland flow systems and the minor systems. They are to be designed to be aesthetically pleasing, safe, resistant to erosion and easy to maintain. Design velocities are to be calculated using Manning's equation and need to consider critical depth.

The following table provides acceptable values for Manning's "n":

Grass Channel (>0.5 m deep)	0.025
Grass Swale (<0.5 m deep)	0.030
Rip-Rap Channel (>1 m deep)	0.035
Rip-Rap Channel (<1 m deep)	0.040

Generally, grassed surfaces are adequate for velocities up to 1.0 m/s to 1.5 m/s and more robust erosion protection is required for velocities beyond this range.

G4.03 Minor Drainage System Design

The design of the minor drainage system shall include both the capture and conveyance of the 1:5-year storm event. The system must provide un-surcharged conditions during the minor event. The minor system design shall include capacity for connection of foundation drains or weeping tiles and the storm sewers shall be at an appropriate depth to provide connection to foundation drains. As an alternative to connecting foundation drains or weeping tiles to the storm sewer, a Foundation Drain Collector (FDC) sewer system may be considered by the Town. The use of sump pumps is to be avoided where possible however, they will be considered if they are the only viable option available. All roof downspouts are to discharge to grass areas, where possible to encourage infiltration. Any deviation from this will require approval from the Town.

A hydraulic gradeline (HGL) analysis shall be completed and submitted for review and approval. The analysis shall determine the number and location of storm sewer inlet control devices required to ensure protection against system surcharging and subsequent basement flooding by maintaining the HGL for the 1:100-year storm event not less than 0.5m below basement elevations.

Storm sewers should be sized to convey the peak design flow in accordance with Manning's equation, whereby the friction slope is assumed the same as the bed slope of the pipe.

$$Q = \frac{1000AR^{2/3}S^{1/2}}{n} \quad V = \frac{R^{2/3}S^{1/2}}{n}$$

Where,

Q = flow (L/s)

V = velocity (m/s)

R = hydraulic radius (m)

S = slope (m/m)

A = nominal cross-sectional area of the sewer (m²)

The sizing of sewers at slopes greater than the critical slope is limited by inlet capacity and not friction slope. The following table (Table G-2) lists the maximum allowable flow rate for each sewer size. The table also lists the maximum pipe slopes based on a full flow velocity of 6.0 m/s. The critical slope is based upon the pipe flowing 85% full. The values listed in the table must be incorporated into storm sewer design sheets and carried through to Hydraulic Grade Line calculations.

Rational Method

The Rational Method is most appropriate when used to estimate peak flow rates from small urban areas. Its accuracy increases with imperviousness and decreases with the size of the drainage area. Its application should be limited to situations where the time of concentration is less than approximately 30 minutes.

Initial Time of Concentration

The initial time of concentration, to be used to determine total time of concentration, should be calculated using the following methods, subject to the runoff coefficient:

<u>Method</u>	<u>Condition</u>
Airport Method	C < 0.4
Bramsbys-Williams	C > 0.4

Airport Method:

$$T_c = \frac{(1.1 - C)L^{0.5}}{S_w^{0.33}}$$

Where,

T_c = Time of Concentration (minutes)

C = runoff coefficient

L = length (m)

S_w = slope (%)

Bramsbys Williams Method:

$$T_c = \frac{0.057L}{S_w^{0.2}A^{0.1}}$$

Where,

T_c = Time of Concentration (minutes)

L = length (m)

S_w = slope (%)

A = Area (ha)

A 10-minute inlet entry time at the head of the system is to be utilized unless large external drainage areas exist.

Minimum Sizes

The minimum size for a storm sewer main shall be 300 mm in diameter, and as stipulated by Q Maximum in the table (Table G-2) below.

Minimum and Maximum Grades

The minimum and maximum grades for all storm sewers shall be in accordance with the table (Table G-2) below. The minimum grade for the first upstream leg shall not be less than 1.0%.

Table G-2: Allowable Storm Sewer Capacity and Gradients

Diameter (mm)	Q Maximum (m ³ /s)	Slope Minimum (%)	Slope Critical (%)	Slope Maximum (%)
300	0.12	0.34	1.34	19.00
375	0.20	0.25	1.25	14.10
450	0.32	0.20	1.17	11.10
525	0.47	0.20	1.12	9.00
600	0.66	0.20	1.07	7.50
675	0.88	0.20	1.03	6.40
750	1.1	0.20	0.99	5.60
825	1.5	0.20	0.96	4.90
900	1.8	0.20	0.93	4.40
975	2.2	0.20	0.91	3.90
1,050	2.7	0.20	0.89	3.60
1,200	3.7	0.20	0.85	3.00
1,350	5.0	0.20	0.81	2.60
1,500	6.5	0.20	0.79	2.22
1,650	8.2	0.20	0.76	1.96
1,800	10	0.20	0.74	1.74
1,950	13	0.20	0.72	1.57
2,100	15	0.20	0.70	1.42
2,250	18	0.20	0.69	1.29
2,400	21	0.20	0.67	1.19
2,700	28	0.20	0.65	1.02
3,000	37	0.20	0.62	0.88

The Town may consider flatter grades for large sewers, in special circumstances, provided a minimum velocity of 1 m/s can be attained.

Runoff Coefficients

The Table (Table G-3) below lists example Rational Method Runoff Coefficients as a function of the imperviousness of the catchment being considered. Composite runoff coefficients are to be calculated as a function of both total imperviousness and storm return period. The total imperviousness ratios listed in the table below are for example purposes only and designers should calculate actual runoff coefficients on a site-specific basis for all designs.

Table G-3: Typical Runoff Coefficients

	Return Period	1:5	1:25		1:100
	C_{perv}	0.20	0.30		0.40
	C_{imp}	0.90	0.95		1.00
	Typical				
	Impervious	Composite "C"			
Field/Woodlot	0%	0.20	0.30		0.40
Parks	10%	0.27	0.37		0.46
Estate Res.	35%	0.45	0.53		0.61
Single Res.	55%	0.59	0.66		0.73
Semi-Det. Res.	65%	0.66	0.72		0.79
Townhouses	75%	0.73	0.79		0.85
Apartments	60%	0.62	0.69		0.76
School	60%	0.62	0.69		0.76
Church	70%	0.69	0.76		0.82
Industrial	80%	0.76	0.82		0.88
Commercial	90%	0.83	0.89		0.94

Roughness Coefficients

Manning's formula shall be used in determining the capacity of all storm sewers and as outlined above.

The value of the roughness coefficient 'n' used in the Manning's formula shall be as follows:

All smooth walled pipes	0.013
Concrete Box Culverts	0.015
Corrugated Steel (culverts only)	0.024
Polyvinyl Chloride pipe (PVC)	0.013
High Density Polyethylene pipe (smooth walled)	0.013

Flow Velocities

Minimum full flow velocity = 0.8 m/sec
Maximum full flow velocity = 6.0 m/sec

G4:04 Foundation Drain Collector Systems

In areas where it cannot be demonstrated that the hydraulic gradeline for the 1:100-year storm will be at least 0.5 metres below the finished basement floor elevations of the dwellings, a separate dedicated foundation drain collector sewer (FDC) will be constructed to carry flows from the weeping tile collector systems. The FDC will have a protected free outlet above the 1:100 year or the regional storm water elevation for the receiving watercourse at the discretion of the Town. No other sources of flow are allowed.

G5.00 Stormwater Conveyance System Design

G5.01 Pipe Cover

Typically, a minimum cover of 2.7 metres (from future road grade) is required to the top outside edge of the pipe barrel for the storm sewer. However, where specifically approved by the Town, minimum frost cover of 1.4 metres may be provided on storm sewers where servicing limitations exist, or where FDCs are used.

The maximum depth of sewers with direct lateral connections shall be 6.0m (measured from finished centerline of road elevation to invert of sewer). In cases where deeper sewers are required these shall be considered trunk sewers and no direct lateral connections will be permitted. Separate local sewers constructed above the trunk sewers will be required for connection of laterals. Maintenance Holes are to be common wherever possible with drop structures.

G5.02 Location

All storm sewers shall be located as shown on the Standard Road Cross-Section. The standard location shall generally be 1.5 m offset from the centerline of the road pavement.

All storm sewers are to have a minimum horizontal separation of 2.5 m and a vertical clearance of 0.5 m from watermains in accordance with MECP regulations.

G5.03 Termination Points

All sewers shall be terminated at the subdivision limits when external drainage areas are considered in the design with suitable provision in the design of the terminal Maintenance Holes to allow for the future extension of the sewer.

At the discretion of the Town storm sewer outfall maintenance holes may require half downstream bulkhead. Bulkheads to be removed at Acceptance approval (Maintenance)

G5.04 Sewer Alignment

All storm sewers shall be laid in a straight line between Maintenance Holes unless radial pipe has been designed as outlined in Section G6.09.

G5.05 Pipe Crossings

A minimum clearance of 150 mm shall be provided between the outside of the pipe barrel at the point of crossing for storm and sanitary sewers. A minimum clearance of 0.5 m shall be provided for all sewer and watermain crossings.

In the event the minimum clearances cannot be obtained, the designs must adhere to MECP policies AND the pipes shall be concrete encased to ensure that the pipes are properly bedded.

G5.06 Changes in Pipe Size

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

G5.07 Pipe Bedding and Backfill

The class of pipe and the type of bedding shall be selected to suit loading and proposed construction conditions. Details and types of bedding and backfill are illustrated in OPSD 802.010 and 802.030. For flexible pipe, bedding material shall be compacted 19mm crusher run limestone (CRLS) placed to 300mm above the crown of the pipe. For rigid pipe, bedding material shall be compacted 19mm (CRLS) placed to springline and sand placed 300mm above the crown of the pipe. The width of the trench at the top of the pipe must be carefully controlled to ensure that the maximum trench width is not exceeded unless a higher class of bedding or higher pipe strength pipe is used. The recommendations of a Geotechnical Engineer will be required in determining strength of pipe required and construction methods to be used.

G6.00 Maintenance Holes

G6.01 Location

Maintenance Holes shall be constructed at the following locations:

- At changes in pipe size.
- At pipe junctions.
- At changes in pipe slope.
- At changes in pipe alignment.
- At changes of pipe material (example: PVC to concrete);
- At intermediate intervals as per Section G6.02.

The outside wall of any Maintenance Holes structure located within the roadway shall not be located closer than 1.5 m to a curb. The Maintenance Holes shall be oriented in such a way that the access cover is offset towards the centerline of the road. Maintenance Holes are not permitted in sidewalks or multi-use paths.

G6.02 Maximum Spacing of Maintenance Holes

Pipe Size	Maximum Spacing
300 mm to 750 mm	110 m
825 mm to 1200 mm	125 m
1350 mm to 1800 mm	150 m
over 1800 mm	210 m

G6.03 Maintenance Holes Types

Maintenance holes shall be constructed of pre-cast concrete. The standard maintenance hole details as shown on the OPS Drawings shall be used for maintenance holes. In cases where the standard drawings are not applicable, the maintenance holes shall be individually designed, detailed and the design shall be stamped by a Licensed Professional Engineer.

A reference shall be made on all Profile Drawings to the OPSD type and size of all storm Maintenance Holes.

Precast Maintenance Holes shall conform to ASTM Specification C478 latest revision.

G6.04 Maintenance Holes Frame and Covers

Maintenance Holes covers shall be the “open” type “B” per OPSD 401.010.

All Maintenance Holes located within the travelled portion of the roadway shall have the rim elevation initially set flush with the base course asphalt. A maximum of 300 mm height of modular rings shall be permitted on all Maintenance Holes in new developments.

Prior to the placement of the final course asphalt, the Maintenance Holes frame shall be adjusted to suit the final surface asphalt elevation.

G6.05 Maintenance Holes Design

- a. All Maintenance Hole chamber openings shall be located on the side of the Maintenance Holes parallel to the flow for straight run Maintenance Holes, or on the upstream side of the Maintenance Holes at all junctions.
- b. The Maintenance Hole shall be centered on the sewer main.
- c. All Maintenance Hole shall be benched throughout to the crown of all pipes on a vertical projection from the spring line as detailed in the OPS Drawings.
- d. Safety platforms shall be required in Maintenance Hole in accordance with OPS Specifications. Where practical, safety platforms shall be located 0.5 m below the drop structure inlet pipe.
- e. If the top step of a Maintenance Hole is to be placed in the adjustment section, the step is to be pre-installed and not field installed (drilled). Top steps for flat cap Maintenance Hole are to align with lower section steps
- f. Galvanized steel safety chains and fittings are to be provided on the downstream side of a Maintenance Holes where the outlet pipe is 1200 mm diameter or greater. The chains shall be attached to the face of the Maintenance Holes at the 10 o'clock and 2 o'clock positions on either side of the outlet pipe.
- g. Maintenance Hole adjustment units shall be minimum of 2 and maximum of 6 units with a maximum height of 300mm total height of adjustment units between top of precast Maintenance Hole and underside of Frame and Cover at finished top asphalt grade.

G6.06 Drop Structures

Drop structures shall be used when invert levels of inlet and outlet sewers differ by 0.9 m or more. The size of the drop pipe shall be one size smaller than the storm sewer diameter and shall have a maximum size not exceeding 300 mm in diameter. Wherever feasible, sewer systems should be designed to avoid the use of drop structures. Internal drop structures are not permitted. Precast drop structures are permitted. All drop structures shall be constructed in accordance with OPSD 1003.020.

G6.07 Head Losses Through Maintenance Holes

The maximum change in the direction of flow in any sewer Maintenance Holes shall be no more than 90 degrees. Sewers up to 600 mm in diameter may be turned a maximum of 90 degrees. Sewers greater than 600 mm in diameter may be turned a maximum of 45 degrees. In extreme cases, deviations from the above guidelines may be permitted by the Town provided acceptable supporting hydraulic calculations are provided.

Suitable drops shall be provided across all Maintenance Holes to compensate for the loss of energy due to the change in flow velocity and for the difference in the depth of flow in the sewers. Hydraulic calculations are required where the change in velocity through a Maintenance Holes is 0.6 m/s or greater.

The minimum drops across Maintenance Holes shall be as follows:

Change of Direction	Minimum Drop
Straight Run	0.030 m
1 to 45 degrees	0.050 m
46 to 90 degrees	0.100 m

G6.08 Prefabricated Wyes

The use of prefabricated Wyes is recommended for junctions in storm sewers under the following conditions:

Main pipe must be 900 mm in diameter or larger. (If less than 900 mm in diameter a Maintenance Hole is required for the junction.)

Diameter of Branch Pipe	Maximum Distance from Point of Junction to 1st M/H Upstream on Branch Pipe
Less than 750 mm dia.	15 m
750 mm to 1350 mm dia.	120 m
Larger than 1350 mm dia.	180 m

G6.09 Radius Pipe

- No radial pipe will be allowed for pipe having a diameter of less than 675 mm. For pipes 675 mm and larger radial pipe will be considered by the Town based on the specific application being proposed.
- No wedge pipe will be permitted in any case.
- Minimum radii for radial pipe shall be per manufacturers' specifications.

G7.00 Catchbasins

G7.01 Location and Spacing

The design of catchbasin location and type shall take into consideration lot areas, lot grades, pavement widths, road grades and intersection locations. The recommended maximum allowable catchbasin spacing is as follows:

Pavement Width	Road Grade	Recommended Spacing
Up to 10m	Up to 4%	85m
Up to 10m	Over 4%	65m
Over 10m	Up to 3.5%	75m
Over 10m	Over 3.5%	50m

- The minimum catchbasin density which must be provided is to be 6 catchbasins per impervious hectare of area.
- A double catchbasin is required where drainage is received from more than one direction, as at a low point, unless overland relief is provided no more than 0.05 m above the catchbasin frame.
- All catchbasins at street intersections shall be located on the tangent section of the curb at a minimum of 0.6 m distant from the beginning or the end of the radial portion of the curb.
- Catchbasins shall not be located in driveway curb depressions.
- Leads for catchbasins located close to Maintenance Holes should be connected directly to the Maintenance Holes.
- Catchbasin leads shall be 250 mm diameter for single and rear lot catchbasins and 300 mm diameter for double catchbasins.
- All catchbasin leads shall be connected to storm sewers with prefabricated tees as per OPSD standards.
- All catchbasin lead connections to Maintenance Holes shall be done with prefabricated PVC Maintenance Hole adapters.
- Catchbasin leads shall have a minimum grade of 1%.
- Catchbasin inlet control devices are to be PVC with “diamond” orifices and bolted to the catchbasin side.

G7.02 Catchbasin Capture

- Calculations to estimate the catchbasin capture to the sewer system are to consider the type of grate, whether the catchbasin is in a “sag”, the catchbasin lead diameter and any inlet control device.
- Double catchbasins are required at all sags, unless there is a nearby point of relief, no greater than 0.05 m higher than the grate. Capture rates are to consider the depth of flow over the grate based on the depth of flow over the downstream point of relief.

G7.03 Catchbasin Types

- Catchbasins must be of the precast type as shown on the OPS Drawing 705.010 or 705.020 and be backfilled with sand.
- All rear lot catchbasins are to be sumpless, with “v” shaped benching to the invert of the outlet.
- Special catchbasins and inlet structures shall be fully designed and detailed by the Consulting Engineer.
-

G7.04 Catchbasin Leads

Type	Minimum Size of Connection	Minimum Grade of Connection
Single Catchbasin	250 mm	1%
Double Catchbasin	300 mm	1%
Rear Lot Catchbasin	* 250 mm	1%

* All rear lot catchbasin leads shall be encased in concrete from the catchbasin to the street line.

G7.05 Catchbasin Frame Covers

- All catchbasin frame and covers shall be per OPSD 400.020.
- Rear lot catchbasin frame and cover shall be as per the Standard Drawing included in the Appendix.
- The use of riveted bar grates (bridge deck grating) in roadways will only be considered in special circumstances at the discretion of the Town. These must be bicycle safe and designed to withstand traffic loads.

G8.00 Storm Service Connections**G8.01 General**

Storm service connections are to be provided to all lots for the purpose of connecting foundation drain collectors. All storm sewer connections for single, semi-detached and Townhouse lots shall be PVC DR-28 single service pipes and shall conform to Ontario Provincial Specifications. All connections are to have a PVC (Cleanout) test fitting installed at the property line. The sewer connection shall extend 1.5 m inside of the property line and terminate with a plug. The pipe is to be white in colour and marked with a 50 mm x 100 mm x 2.4 m stake painted white.

The use of sump pumps is discouraged but will be considered by the Town if they are deemed to be the only viable option available. The storm sewer system shall be designed such that the 1:100-year storm does not surcharge the sewers. The HGL shall be a minimum of 0.5 m below the elevation of the lowest finished basement level.

G8.02 Location

The proposed location of the storm sewer service shall be shown on the Plan and Profile Drawings and Composite Utility Plans. The location shall be as per the Standard Drawing included in the Appendix.

G8.03 Size

Service connections for single family and semi-detached (or linked) units shall be 150 mm in diameter and installed at a minimum grade of 2%. Service connections for multiple family blocks, commercial, institutional, and industrial areas shall be sized according to the intended use.

G8.04 Connection to Main

The connection to the main sewer shall be made with an approved manufactured tee. Approved saddles shall be used for connecting to existing sewer mains.

Connection to Maintenance Holes will be allowed only if the invert is connected no higher than the obvert of the outlet pipe in the Maintenance Holes and properly benched.

No service connection of a size greater than half the diameter of the main shall be cut into the main sewer. A Maintenance Hole shall be installed on the main sewer at the intersection of a service connection which has a size greater than half the diameter of the main sewer except as provided below.

A 150 mm service connection will be permitted to connect to a 250 mm main sewer provided an approved manufactured tee is installed and provided the invert of the service connection is above the spring-line of the main sewer.

G8.05 Depth

The depth of the service connections for single family units, semi-detached units and Townhouses at the property line measured from the finished centre line road elevation shall be:

- Minimum – 2.50 m;
- Maximum – 3.00 m (unless proposed house types require deeper service depths).

Risers shall be used when the obvert depth of the sewer main exceeds 4.50 m. The riser section shall be brought to a depth of within 3.0 m. Controlled settlement joint fittings shall be used for all riser connections per OPSD 1006.010.

G8.06 Connection to Multiple Family and Other Blocks

An inspection Maintenance Hole shall be required on the private property located 1.50 m from property line to centre of the frame and cover on all connections to multiple family and other blocks.

G8.07 Connection to Commercial/Industrial/Institutional Blocks

An inspection Maintenance Hole shall be required on private property located 1.50 m from the property line to the centre of the frame and cover.

G9.00 Inlets, Outfalls and Special Structures

Inlet and outfall structures, including headwalls shall be designed and detailed by a licensed Structural Engineer.

Grates will be provided on all inlet and outlet structures and shall be designed and detailed when standard drawings are not appropriate. All metal parts shall be galvanized to adequately protect against corrosion.

G9.01 Inlets

Inlet structures must be fully designed and detailed on the engineering drawings. Inlet grates shall generally consist of galvanized inclined parallel bars or rods set in a parabolic shape as determined with input from the Town.

Precaution must be taken in the design of grating for structures to minimize the risk of entanglement or entrapment of a person.

Gabions, rip rap or concrete shall be provided at all inlets to protect against erosion and to channel flow to the inlet structure.

G9.02 Outlets

The OPSD 804.030 standard headwall shall be used for all storm sewers less than 900 mm in diameter. For sewers 900 mm in diameter and larger the headwall shall be in accordance with OPSD 804.040 or individually designed. All headwalls shall be equipped with a grating over the outlet as per OPSD 804.050.

Gabions, rip rap, concrete or other erosion protection shall be provided at all outlets to prevent erosion of the watercourse and the area adjacent to the headwall.

G9.03 Safety Railings

Safety railings shall be provided along the top of all headwalls 0.6 m in height or greater. Railings may also be required along shorter headwalls where a risk to pedestrian safety has been identified. The site-specific conditions must be reviewed in determining the requirement for safety railings and must have due regard to public health and safety.

G10.00 Pipe Materials

A list of acceptable pipe materials is included in the Appendix.

SECTION H

WATERMAIN AND APPURTENANCES

Section H Watermains and Appurtenances

H1.00 Hydraulic Design

H1.01 General

All watermains shall be sized to meet the greater of the maximum day plus fire flow or the maximum hour demand. Watermains in subdivisions shall have a minimum of two (2) connections to the existing water network. The Town will require a computer analysis for all or any phased portion of the proposed watermain systems. Boundary conditions for modeling purposes shall be obtained by carrying out on-site hydrant flow tests in consultation with the Town. All data shall be provided to the Town.

Watermains and watermain networks shall be designed that water will not remain unused in the system for more than 3 days under average demand. In order to demonstrate a 3-day turnover the design shall provide a hydraulic analysis. The design analysis shall provide calculations to determine requirements for automatic flushing stations including location and size. The Town has the right to require watermain looping, automatic flushing stations, blow offs and flushing hydrants (temporary dead end).

On private property where the Town is concerned there could be a degradation in water quality, the Town reserves the right to require perimeter isolation. This consists of a testable device on the water service installed at property line per the owner's expense. The designer will be responsible for addressing the water quality on the private side; the Designer shall consult with the Wastewater Department.

On site plans greater than 2 HA in size with a private water watermain connection to Municipal supply system which serves more than one commercial building, a testable device is to be installed at the property line per the Owners expense. The device is to be maintained in accordance with manufacturer's suggested requirements at the Owners expense.

When a backflow preventer is required, a drawing shall be submitted to the Town for approval. All backflow preventers must be certified by a third-party licensed Water Operator at the expense of the Owner. Certification must be witnessed by Town staff and records submitted.

H1.02 Fire Flow

The requirements for fire flows shall be discussed and agreed upon with the Town prior to proceeding with the detailed design. The Town may require the Developer to determine site specific requirements based on the "Water Supply for Fire Protection, A Guide to Recommend Practice," prepared by the Fire Underwriters Survey of the Insurance Bureau of Canada. The Town will determine if the site-specific requirements are to be met in place of the Town's minimum fire flow requirements. In general, the following summarizes the minimum fire flows required:

- Single family 7000L/min
- Townhouse/Row house 7500 L/min
- Apartment 9000 L/min
- Institutional 10,500 L/min
- Commercial 12,000 L/min
- Industrial 15,000 L/min

The Town may at its discretion require calculations to be provided as outlined in “Water Supply for Fire Protection - A Guide to Recommended Practice” prepared by the Fire Underwriters Survey of the Insurance Bureau of Canada, or, per AWWA Manual M31 - Distribution System Requirements for Fire Protection.

H1.03 System Pressures

The maximum sustained operating pressure shall not exceed 700 kPa (100 psi). If pressure in a localized area is above this level, a pressure reducing valve shall be installed on the watermain or on each service downstream of the water meter within that area at the Town's discretion.

Under normal conditions of maximum hour demand, the pressure shall not drop below 275 kPa (40 psi) at any point in the water system.

Under conditions of simultaneous maximum day and fire flow demands, the pressure shall not drop below 140 kPa (20 psi) at any point in the water system.

H1.04 Flow Design

The Hazen-Williams Formula in accordance with the current Ministry of the Environment design criteria shall be used for the design of water distribution systems.

The Hazen-Williams equation is as follows:

$$H_L = \frac{C_f L Q^{1.852}}{C^{1.852} D^{4.87}}$$

Where,

H_L	=	headloss due to friction (m or ft)
C_f	=	unit conversion factor (4.73 for Imperial, 10.7 for Metric)
L	=	watermain length (m or ft)
D	=	diameter (m or ft)
Q	=	watermain flow (m ³ /s or cfs)
C	=	Hazen-Williams Factor: C = 100 for 150 mm watermain and smaller C = 110 for 200 mm and 250 mm watermain C = 120 for 300 mm watermain and bigger

H1.05 Domestic Demand

Domestic water demand shall be calculated on the basis of an average day consumption rate of 350 Litres/capita/day, or as directed by the Town.

Maximum Day and Peak Hour factors shall be 2.0 and 2.75 respectively, or as recommended by the Ministry of the Environment.

The following population densities should be used for determining expected populations in residential developments:

Single Detached Dwellings	=	3.36 ppu
Semi-Detached Dwellings	=	3.36 ppu
Townhouses	=	2.78 ppu
Apartments	=	1.76 ppu

H1.06 Industrial, Commercial, and Institutional (ICI) Water Demands

The follows rates average day demands shall be used for ICI uses:

Industrial	=	35,000 L/ha/d
Commercial	=	28,000 L/ha/d
Institutional	=	18,000 L/ha/d

H1.07 Locations

Watermains shall be located in boulevards as shown on the Town of East Gwillimbury Standard Roadway Cross-Sections.

H1.08 Depth of Cover

The minimum depth of cover shall be 1.7 metres measured from top of pipe to centerline road grade.

H1.09 Bedding and Backfill

Watermain bedding shall be clear sand, extending to 300mm above the crown of pipe per OPSD 802.010.

H1.10 Horizontal Separation between Sewers and Watermains

Watermains shall be designed to have a minimum clear distance of 2.50 metres from any sewer or Maintenance Holes.

H1.11 Watermain Crossing Sewers and Other Utilities

Watermains shall normally cross above sewers with sufficient vertical separation to allow for proper bedding of the watermain (minimum 0.3 metres).

When it is not possible for a watermain to pass over a sewer, the watermain passing under the sewer shall have a vertical separation of 0.50 metres below the sewer and the top of the watermain. The sewer must be adequately supported to prevent settling and displacement of the joints.

Watermains crossing over or under other utilities must be designed with a vertical separation of 150 mm between the outside edges of the watermain and the utility.

H1.12 Dead-Ends & Automatic Flushing Stations

Watermain distribution systems shall be designed in grid patterns and looped to avoid dead-end sections. Dead-end watermains are to be avoided.

In extreme situations, as determined by the Town, where it is determined that dead-end watermains are unavoidable automatic flushing units shall be installed at the end of the watermain. The automatic flushing units shall be as per the Standard Drawing included in the Appendix to this document. Water service connections shall be grouped at the end of the dead-end watermain as much as possible or a 50 mm copper loop shall be constructed to provide adequate circulation. Calculations shall be provided to demonstrate that there is adequate water usage during low flow periods in order to maintain adequate chlorine residual levels within the watermain.

Where Automatic flushing stations are required a water meter shall be installed a water meter pit to measure the volume of water discharged. The designer will be responsible for providing calculations that indicate the volume of water to be discharged, sizing of the automatic flushing unit and timer settings to be used. The owner's contractor will be responsible for installing and setting up the device. The owner will be charged for all water use. Subsequent changes to the automatic flushing station will be made by Town based on approved information submitted by the Owner's Consulting Engineering firm.

Automatic flushing stations discharge requirements

- a. cannot be used to discharge directly into ditches or the natural environment where possible
- b. Normal conditions for an automatic flushing unit it is assumed the unit discharges to storm sewer into a stormwater management pond where remaining chlorine can be dissipated before being discharged into the natural environment. In any case where there are large volumes of water being discharged into the storm system or the system is sensitive, further consultation is to take place with the Town.

- c. Temporary connection of automatic flushing units shall be consulted with the Town
- d. No discharge to sanitary is permitted

Temporary dead-ends on watermains that are to be extended in the future shall be equipped with a 50 mm blow-off at the end of the watermain per OPSD 1104.030 and a flushing hydrant will be installed as specified by The Town.

H1.13 Location Identification

A tracer wire shall be provided along the top of all watermains to permit field tracing of the watermain. The wire is to be secured to the top of the watermain at every fitting and valve and at intervals not to exceed 3.0 metres with fiberglass or nylon tape. All tracing wires shall be 12-gauge, stranded copper wire (THWN) complete with outer plastic coating.

Tracer wire (2) shall be connected to valve in chamber and the tracer wire is to be carefully extended along the bottom of the chamber, up the backside of the steps along the chamber wall and secured to the valve chamber wall with a clip with 1.5m of slack. Wire is not to be fastened to the steps.

Tracer wire at hydrants is to be placed inside the secondary valve box and not run to the hydrant. A 1.5m loop of slack tracer wire shall be coiled in the top of the secondary valve box immediately beneath the valve box cap.

Tracer wire is to be continuous with no joints. Where joints are needed (between rolls) they are to be soldered together plus wrapped in dielectric tape over wrapped with vinyl tape. The use of an approved waterproof splice kit suitable for wet locations may also be acceptable subject to approval from the Town.

Confirmation of the continuity of the tracer wire installation is to be provided in writing by the Owner's Consulting Engineer as part of the commissioning of the watermain system.

H1.14 Joint Restraint

Mechanical joint restraints are to be installed on bell and spigot joints for all watermains constructed in fill material and at all tees, horizontal bends, vertical bends, hydrants, end of mains and valves. Where watermains are adjacent to deep storm and sanitary mainline sewers, cross sections will be required to illustrate that proposed watermain is founded on undisturbed ground. The use of concrete thrust blocks is generally discouraged, and they will only be permitted where deemed absolutely necessary by the Town. All mechanical restraint systems shall be installed with cathodic protection as outlined in Section H7.00.

MinH2.00 Valve Requirements

H2.01 Number, Location and Spacing

Three valves are required on tee intersections and four valves are required on cross intersections as noted on the Town's design details. All valves are to be located in chambers. The valve chambers are to be located in the boulevards and out of the pavement. Under no circumstances will valve chambers be permitted in driveways and are not to be installed in sidewalks and/or the roadway. Anti-stagnation valves are to be installed at boundary valve locations.

Valve spacing along a watermain shall not exceed 300 m, or for every 40 lots, whichever is less.

Where watermain cross railways and water courses, valves shall be required on either side.

H2.02 Size

In all cases, the size of the line valves shall be the same size as the watermain diameter.

H2.03 Valve Chambers

All valves shall be located in chambers and shall be resilient wedge gate valves as approved by the Town. Valves shall have a non-rising stem and a 50 mm square operating nut, opening counterclockwise. The valves shall have mechanical joint fittings.

The cover and plug shall be aligned over top of the valve operating nut. Where the valve and cover are offset (under extenuating circumstances only), the chamber is to be cored with a valve box for operation. The minimum permitted chamber size shall be 1500 mm in diameter, except where otherwise specified and approved in writing by the Town.

Any valves deeper than 2.4 m require the operating nut to have a valve stem extension.

All chambers are to have the tracer wire extend from the valve along the bottom of the chamber up the backside of the steps along the chamber wall and securely fastened to the Chamber wall with clips as per H1.13.

Wherever possible, valve chambers shall be provided with a storm drain connection to the storm sewer. The diameter of the drainpipe shall be 150 mm and include a P-Trap. Where it is not possible to provide a direct connection to the storm sewer 300 mm X 300 mm X 300 mm sumps shall be provided in the base of the chamber located directly below the chamber access hole. Where there is no drain, all connections within the chamber are to be wrapped in Denso adhesive.

H2.04 Special Valves

Drain valves and air release valves may be required based on specific site conditions. These requirements will be determined during the design review process.

H3.00 Fire Hydrant Requirements

H3.01 Spacing

Fire hydrants shall be provided at 120 m maximum spacing in residential areas and 90 m maximum spacing in industrial/commercial areas. For residential areas hydrant shall be spaced such that all lot areas are within a 75 m radius from a hydrant.

Hydrants are to be located at high points in the watermain system, where possible, to minimize the requirement for air release valves.

H3.02 Type

All fire hydrants shall be Canada Valve or Clow Canada – M-67/M93 Brigadier only and are to be equipped with one (1) 100 mm pumper port with manufacturer's "Stortz" fitting facing the street. The side ports shall be 65 mm diameter. Hydrants are to be supplied with a hose nozzle cap chain and S-hook and are to be painted chrome yellow. Hydrant side port caps are to be painted John Deere green. The top cap of the hydrant body shall also be painted John Deere Green. The Stortz cap shall be painted black.

All hydrants shall be installed in accordance with OPSD 1105.010, have open drainage holes and be installed with mechanically restrained joints (without thrust blocks). The hydrant base is to be installed in open-graded granular material enclosed with a geotextile fabric to ensure free draining of the boot. In areas of known high water table, the hydrant drain holes shall be plugged and the Town shall be advised. This is to be reflected on the Record Drawings.

The hydrant is to be set at such a height that the distance from the finished ground around the hydrant to the bottom of the flange is between 75 mm and 100 mm.

All hydrants shall be fitted with anti-tampering devices of a type required by the Town.

H3.03 Branch Valves and Boxes

All hydrants shall be controlled by a 150 mm diameter branch valve attached to the supply main with an anchor tee. Where this would place the secondary valve in the road, the valve is to be placed in the boulevard and have restraining rods back to the tee on the main.

H3.04 Location of Hydrants

Hydrants shall be located on the projection of a lot line and offset from the street line in accordance with the standard cross-section.

Hydrants shall be 1.20 m minimum distance from the edge of any driveway or house service location. Other aboveground utilities such as light standards, transformers or street signs shall not be located any closer than 3.0 m to a hydrant.

The hydrant is to be set at such a height that the distance from the finished ground around the hydrant to the bottom of the flange is between 75 mm and 100 mm.

During construction all hydrants are to be accessible once commissioned. No material, bins or fencing shall block visibility or accessibility of the hydrants from adjacent roadway and minimum 1.0 m area around is to be maintained cleared. Pumper nozzle to face roadway.

H3.05 Hydrant Flow Testing

The Developer's Consulting Engineer shall carry out a flow test in accordance with the Ontario Fire Code at all hydrants in the new system. Following the flow test the Developer's Consulting Engineer is to provide a written report to confirm that the minimum flows and residual pressures will be met at the time of building permit package and follow-up flow testing at the time of subdivision assumption.

H4.00 Service Connections

H4.01 General

A single water line shall be installed to service each residential property. Services for other uses are to be adequately sized and identified on the engineering drawings. Services shall be installed according to OPSD 1104.010 and 1104.020. Water servicing tapping of the main is to be to a charged main only, dry tapping will not be permitted.

H4.02 Material

All domestic water service connections shall be constructed of Type 'K' Copper meeting the requirements of CSA 137.1. No joints or fittings will be permitted on the copper service.

H4.03 Minimum Size

Single water lines serving only one residence shall be a minimum of 25 mm (1") in diameter.

H4.04 Location

Single services shall be provided for all single and semi-detached lots and on- street townhouse units. The location shall be shown on all Plan and Profile Drawings and the Composite Utility Plans.

The minimum cover over water services shall be 1.7 m.

A minimum clearance of 1.0 m shall be provided from all water services to any storm sewer or catchbasin. If this is not achievable the water service shall be insulated.

H4.05 Markers

All connections shall be marked with 50 mm X 100 mm X 2.4 m stakes painted blue.

H4.06 Connections to Supply Main

The maximum size of connection that can be tapped into a 150 mm diameter watermain is 50 mm in diameter. A stainless-steel saddle shall be used in all cases.

Water service connections larger than 50 mm in diameter shall be made by installing a tee on the supply main.

H4.07 Curb Stops

The curb stops on all water service connections 50 mm in diameter and less shall be located at the property line and a minimum distance of 0.5 m away from the outer edge of the driveway where possible. Curb stops are not permitted to be constructed in driveways and/or sidewalks. Curb stops are to be brass (lead free) ball valves.

H5.00 Commercial and Industrial Connections

All commercial and industrial connections shall branch into separate domestic and fire lines in a valve chamber located in the boulevard. Each line shall have individual shutoff valves. The specific requirements related to connections for ICI blocks are to be developed in conjunction with the consulting engineer based on the expected use and scale of the site, buildings, etc. Generally, it will be necessary to have back flow prevention devices and meter chambers installed at the street line. No branching of water lines between the street and the meter will be permitted.

A separate by-pass for domestic and fire lines are normally required, except under specific circumstance. Further, all sites are to be metered and the specific requirements are to be discussed with Operations staff during the site plan review. (The manufacturer and type of meter are subject to the discretion of the Operations department.)

Refer to Standard Drawing Included in the Appendix Standard Drawings W-3.

H6.00 Connection to Park Blocks

All park blocks are to be serviced with a minimum 50 mm diameter water connection, or as instructed by Community Parks Recreation and Culture. Further, all parks are to be metered and the specific requirements are to be discussed with Town staff during plan review.

H7.00 Corrosion Protection

For any installation of water pipe systems, an investigation of the soil conditions shall be undertaken to determine the corrosive potential of the native soils and to provide recommendations with regard to corrosion protection. All ferrous watermain, ferrous fittings, tracer wires and water service connections shall have corrosion protection provided by means of sacrificial anodes. Anode size shall be determined by the corrosive potential soil analysis or at a minimum as provided below. In addition to sacrificial anodes a Zinc Nut (Protector Cap) shall be placed on every second bolt of all mechanical fittings unless otherwise directed below.

H7.01 Tracer Wires

Cathodic protection shall be provided for all tracer wires on PVC and CPP watermain. One 2.3 kg zinc anode is to be installed for every 500 m of tracer wire, as per the Standard Drawings. The location for the anodes shall be shown on the construction drawings.

H7.02 Service Connections

One 2.3 kg zinc anode is to be installed on each copper service connection. If the service is connected to a ferrous watermain, an insulated main stop must be used. Also, an insulated fitting shall be installed between the curb and the street line if the building being serviced is located 7.6 m or more from the property line.

H7.03 Valves, Hydrants and Fittings on Non-Ferrous Watermain

One 2.3 kg zinc anode is to be installed on every valve, hydrant and fitting connected to a non-ferrous watermain. Fittings shall include bends, tees, crosses, sleeves, reducers, plugs, caps, joint restrainers, and couplings, etc. All thermite weld connections shall be coated with Roybond 747 Primer and Royston "Handy Cap" or approved equal. Alternatively, mechanical joint fittings may be cathodically protected by installing 175 g "Protector Caps", or approved equal, on each mechanical joint bolt.

H7.04 Valves, Hydrants and Fittings on Ferrous Watermains

All valves and fittings installed on ferrous watermains shall be cathodically protected by a 14.5 kg magnesium anode. Bonding cables shall be provided on each side of the fitting to the existing watermain. Bonding cables shall be No. 6, seven-strand, coated copper wire, connected to the fittings and watermain by a thermite weld (Cad weld).

All thermite weld connections shall be coated with Roybond 747 Primer and Royston “Handy Cap” or approved equal.

H7.05 Connecting Non-Ferrous Watermains to Ferrous Watermains

When connecting a non-ferrous watermain to a ferrous watermain, the ferrous watermain shall be cathodically protected by a 14.5 kg magnesium anode.

H8.00 Materials

A list of acceptable materials is included in the Appendix to this document.

H9.00 Water Sample Stations

Water quality sampling stations shall be shown on the drawings and installed in locations as required by the Town. Water sample stations to be Test Tap Sample Station supplied Cromer Industries or approved equivalent. Installation to be per manufactures instructions.

H10.00 Anti-Tampering Devices

Anti-tamper devices (ATD) are to be installed by the Town or licensed watermain contractor following approval of commissioning. ATD's are to be removed at Acceptance.

SECTION I

TESTING PROCEDURES

Section I Testing Procedures

I1.00 General

The following testing procedures are minimum requirements for inspection, testing and acceptance of new storm sewer, sanitary sewer and watermain systems constructed in the Town. These guidelines are based on requirements and procedures from the Ontario Provincial Standard Specifications (OPSS) and American Society of Testing Materials (ASTM). The Regional Municipality of York I/I program guidelines shall apply to all municipal and private sanitary sewer installations. All testing criteria identified in the Regional Municipality of York SDIP criteria shall be followed unless specifically identified otherwise by the Town of East Gwillimbury Design Criteria or in writing from the Director of Engineering.

I2.00 Storm Sewers

I2.01 Video Inspection

All newly constructed storm sewers shall be CCTV inspected upon satisfactory completion of all other testing. The CCTV Inspection and reports shall be performed in accordance with OPSS.MUNI.409 or as otherwise requested by the Director of Engineering. This is required prior to the Town's issuance of "Certificate of Completion".

CCTV inspection of Storm Maintenance Holes shall be conducted on all maintenance holes that are deeper than 5.0 metres or as requested by Engineering staff if visible inspection cannot be completed from surface. CCTV inspection of Maintenance Holes shall provide a full 360-degree video of the entire internal portion of the structure for the full depth, including video inside of connections for drop structures.

At the discretion of the Director of Engineering, additional video inspections and records may be required prior to "Final Acceptance."

Should the CCTV Inspection of the Sanitary Lateral for any dwelling unit indicate a sewer defect within the sanitary lateral, the storm lateral for the same lot will also require video inspection and report on the condition of the storm lateral.

I2.02 Pipe Testing

All PVC storm sewer pipe testing shall be per Regional Municipality of York

"Sanitary Sewer System Inspection, Testing and Acceptance Guidelines- Section 2.7 Mandrel Deflection Testing" (Oct. 2011 or latest amendment thereto).

I3.00 Sanitary Sewers

I3.01 Video Inspection

All newly constructed sanitary sewers shall be CCTV inspected upon satisfactory completion of all other testing, per Regional Municipality of York “Sanitary Sewer System Inspection, Testing and Acceptance Guidelines – Section 2.8 CCTV Inspections” (Oct. 2011 or latest amendment thereto) and “Inflow and infiltration reduction Standard for Sewers Servicing New Developments”. This is required prior to the Town’s issuance of “Certificate of Completion”.

CCTV inspection of Sanitary Maintenance Holes shall be conducted on all maintenance holes that are deeper than 5.0 metres or as requested by Engineering staff if visible inspection cannot be completed from surface. CCTV inspection of Maintenance Holes shall provide a full 360 degree video of the entire internal portion of the structure for the full depth, including video inside of connections for drop structures.

At the discretion of the Director of Engineering, additional video inspections and records may be required prior to “Final Acceptance.”

CCTV inspection of 100% of sanitary sewer service laterals is required, from the mainline sewer to the building face. This inspection is required prior to issuance of occupancy for each building. Laterals shall be flushed prior to CCTV inspection and free of debris at the time of video. If any debris is present during the CCTV inspection the lateral shall be flushed again and re-video till the lateral is free of all debris. Should the CCTV Inspection of the Sanitary Lateral for any dwelling unit indicate a sewer defect within the sanitary lateral, the storm lateral for the same lot will also require video inspection and report on the condition of the storm lateral.

I3.02 Pipe Testing

All sanitary sewer pipe testing shall be per Regional Municipality of York “Sanitary Sewer System Inspection, Testing and Acceptance Guidelines” (Oct. 2011 or latest amendment thereto) and “Inflow and infiltration reduction Standard for Sewers Servicing New Developments”. Air Testing shall be completed on all PVC pipe.

I4.00 Watermain

All testing and commissioning procedures are to be as outlined in the latest amendment of the Drinking Water Quality Management Standards of the Town of East Gwillimbury. The standards to be applied will be those in effect at the time of watermain commissioning and shall not be based on standards in place at time of drawing approval or finalization of the subdivision agreement. Watermain testing shall conform to MECP Watermain Disinfection Procedure.

SECTION J

UTILITIES & STREETLIGHTING

Section J Utilities & Streetlighting

J1.00 General

The Town of East Gwillimbury requires that the use of aboveground utility furniture be minimized in all new developments. All utility surface features are to be installed, wherever possible, at projections of lot property lines. The use of common utility poles may be required provided that a continuous visual appearance can be provided at the interface with neighboring developments. The proponent shall consult with the Director of Engineering prior to proceeding with design of streetlighting and utility design for any subdivision.

J1.01 Standard Requirements

All primary hydro, telephone, gas and cable T.V. lines shall be placed underground in locations as shown on the typical road sections listed in the Standard Drawings. Design of these utilities shall conform to the regulations of the respective authority and as specified in the Town Engineering Standards and Design Criteria (latest amendment).

J.200 Composite Utility Drawings

All utilities are to be shown on the Composite Utility Plan and to be submitted for the review and approval of the Town. This drawing shall be prepared at a scale of 1:500, unless otherwise approved and show locations of all municipal services including sewers, watermains, laterals, maintenance holes, catchbasins, street trees, sidewalks and driveways in addition to utilities including street lighting poles with identification numbers all above and underground services and Canada Post mailbox locations. It is the Consulting Engineer's responsibility to ensure there are no conflicts resulting from the design of the various utilities and the municipal roads and services.

All details of any entranceway features and structures within the proposed right-of-way are to be indicated on the Composite Utility Drawing, as circulated to the various utilities. The drawings shall also indicate the presence of any pumping stations or other such facilities that may necessitate particular service requirements.

- a. The Composite Utility Plan is to be approved by all individual utility agencies identified on the drawing and Canada Post, prior to final approval by the Town. Any revisions to the approved Composite Utility Plans will require approval of each agency. This shall be done by noting the revision in the title block of the drawing and having the title block of the drawing initialed by a representative of each agency.
- b. Community mailboxes shall be placed in locations approved by the Town and Canada Post. Community mailboxes shall have direct sidewalk access

wherever practical. Prior approval from the Town will be required for any mailboxes proposed without a direct sidewalk connection.

- c. The Composite Utility Plan is to show municipal addresses as soon as these are available, as well as lot numbers.
- d. A minimum 1.5 metre separation is to be maintained between edge of driveway and all street furniture unless otherwise approved by the Town.
- e. All gas services are to be installed at the opposite side of the lot from Hydro Service.
- f. Underground hydro shall clear maintenance holes and catchbasins by minimum of 1.0 metre; otherwise, concrete encasement is required.
- g. All hydro cables to be concrete capped over split duct at watermain and hydrant connection crossings.
- h. Gas mains shall clear underground structures by 300 mm minimum.
- i. Underground hydro to have 1.0 metre horizontal clearance at hydrant locations. A reduction to 0.8 metre will be permitted for 18.0-metre-wide road allowances.
- j. The offices of Bell, Hydro, Gas, Cable T.V. and the Town's Operations Department must be contacted for precise locates before any digging can commence in the boulevard areas.
- k. The typical cross-section shall be shown or referenced on the Utility Drawing.
- l. A maximum of two (2) items of street furniture will be permitted on any lot.
- m. For utility clearances, refer to Table J-1. Table J-1 and the notes below are to be included on the Composite Utility Drawings.

The following represents the minimum clear separation distance for public utilities:

b) **Table 0-1: Public Utility Clearance Requirements**

Condition/Utility		Gas Line	Hydro	Telephone Cable T.V.	Water/Sewer Lines
1	Minimum Vertical Distance	0.3 m	0.3 m	0.3 m	1.2 m
2	Minimum Horizontal Distance	0.9 m	0.9 m	0.3 m	1.2 m
3	Minimum Distance Below Ditch Inverts	0.6 m	0.9 m	0.3 m	1.7 m

4	Minimum Distance from Structure/Chambers	0.3 m	0.3 m	0.3 m	0.6 m
5	Minimum Distance from Hydrants	0.3 m	1.0 m	0.3 m	0.6 m

In addition, the policies for Special Protection are as follows:

Hydro Lines

- Over 15 kv, install in ducts (concrete encased if under ditch);
- Under 15 kv, usually direct burial except ducted under roads and concrete encased duct under ditches.
- Duct preferred on private property.
- For all voltages, install in concrete encased duct around underground structures.

Telephone and Cable T.V.

- Usually, direct burial but may use concrete encased duct for three or more cables.

Dedicated Fibre Optic Service Conduit

- The Developer is to provide one 50 mm diameter PVC conduit on collector roads, where directed by the Town, dedicated for Town use, and constructed in common trench with other utilities. The conduit is required to facilitate fiber optic servicing of existing and future municipal or community-oriented facilities. The conduit location in the joint utility trench is noted in Town standard detail.

J3.00 Streetlighting Design

J3.01 Street Lighting Design

The street lighting system shall be designed by a qualified Consulting Engineer in accordance with the Illumination Engineering Society of North America (IESNA) latest edition recommendations. All street lighting systems for roadways shall meet the requirements of the Town and Hydro One.

J3.02 Streetlight Poles and Fixtures

A Standard Drawing is included in the Appendix to this document which identifies typical pole and fixture information.

J3.03 Shop Drawing Review

The Developer's Utility Consulting Engineer shall be responsible for the review/approval of any required shop drawings submitted by the Contractor/supplier for verification or compliance to the lighting design and Town specifications.

J3.04 Energization of Street Lighting System

The Developer's Utility Consulting Engineer or Contractor shall make all necessary arrangements with Hydro One for the connection of the lighting system.

J3.05 Alternate Street Lighting Designs

It is the Town's expectation that the above noted street lighting standards will be applied to all residential subdivisions. In cases where the proponent would like the Town to consider street lighting designs which deviate from the above noted Standards, the proponent must provide the Town with justification to support the requested deviation. If the Town is agreeable to considering an alternate design, the design must conform to the specifications noted below. Roadway lighting shall be designed using the values found in the IESNA Reference Guide Figure 22-8 and abbreviated in the following table:

Road Classification (IESNA R2 & R3)	Luminance Values		
	Average Maintained Illuminance Values (Lux)	Illuminance Uniformity Ratio (Average to Minimum)	Uniformity (maximum to Minimum)
Local Residential	7	6:1	10 to 1
Collector residential	9	4:1	8 to 1
Arterial	13	3:1	

A photometric layout will be required and must include the following information:

- a) Lighting levels extending past the property line to the nearest building (light trespass on adjacent residential properties is to be kept to a minimum utilizing full cut off flat lens luminaires and house-side shields if required)
- b) A summary table of the illumination and uniformity values resulting from the design in accordance with parameters indicated in the above table (i.e., average, average to minimum, etc.) shall be provided. In addition to the above noted requirements, the table must show the photometric layout LLF (Light Loss Factor) used when calculating the proposed lighting levels. Lighting drawings and photometric information including statistical data shall be designed/reviewed/approved by a Professional Engineer.

- c) In the longitudinal direction, the distance between grid lines should be one-tenth (1/10) of the spacing between luminaires, or 5.0 m, whichever is smaller. At intersections the grid spacing is 2.0 m throughout the calculation area.
- d) In determining the position of a light standard, the designer shall take into consideration the location of driveways, living room windows and other aspects of a particular site. The objective is to provide a sense of security and to minimize spill and other disturbances to residential properties.
- e) The street lighting design submission package is to be submitted to the Town and shall include a cost estimate for the proposed street lighting installation works (including wiring, poles, pedestals, etc.).
- f) The Developer's Utility Consulting Engineer shall be responsible for the review/approval of any required shop drawings submitted by the Contractor/supplier for verification or compliance to the lighting design and Town specifications.
- g) The design shall specify type of pole, conduit, luminaire, lamp wattage and size of conductor being used. Details of pole installation and luminaire(s) wiring are to be provided.
- h) Designer shall specify on the drawings the location of transformers, means of disconnects, power and control centers and other related infrastructure.
- i) Pole spacing shall be supported by detailed photometric calculations. Maximum spacing shall not exceed 50 m and be no less than 33 m apart.
- j) The engineer shall include specification sheets on luminaires, arms, and poles to be installed as part of submission.

J3.06 Street Lighting Luminaires

Street lighting luminaires are to be LED type 3000k-3500k, minimum 50,000 hours life span complete with individual long-life solid-state photocell sensors. Decorative street lighting luminaires are to be Coach style complete without the polycarbonate panels per King Luminaire K601 series, Eaton/Cooper Lighting Springdale series, or Philips Lumec L40U series. Standard street lighting luminaires are to be GE, Evolve series, Eaton/Cooper, XNV series, LED Roadway, NXT series or approved equivalent.

SECTION K

EASEMENT REQUIREMENTS

Section K Easement and Block Requirements

Where underground services or utilities are placed outside road allowances or blocks of land under the ownership of the Town, permanent easements in favour of the utility owner are required. Blocks of land shall be sufficient dimensions to accommodate the proposed facility, access from a public right of way, and maintenance requirements. Block widths shall permit open excavation to accommodate future maintenance and shall consider the use of trench boxes, soils angle of repose, space required for casting of excavated material and construction staging. Site specific conditions including the location and elevation of existing or proposed foundations which may affect future maintenance or replacement works are to be addressed in determining the block requirements.

The minimum width of blocks of land for open drainage channels shall be the width of top of open channel plus 3.0 m along one side of the channel for maintenance requirements. The top width of the channel is to be determined using 4:1 side slopes or flatter without the use of retaining walls.

Valley lands (crest of slope to crest of slope) may be contained within blocks of land to be conveyed to the Town of East Gwillimbury, or the appropriate authority, as a condition of development. Blocks of land shall include 3.0 m platform widths on both sides. Blocks of land will not be considered as part of parkland dedication requirements.

With the exception of easements required for rear lot catchbasin leads, any easements proposed for utilities, storm sewers, sanitary sewers and watermain shall be reviewed with the Town prior to the first submission.

K1.01 Rear Yard Catchbasin leads

Easements will be required for all rear lot catchbasin leads. All catchbasin leads shall be constructed 0.6 metres offset from the lot property line and located on one lot. The lead shall be 250 mm minimum in diameter and concrete encased from the rear lot catchbasin to the street line. Rear lot catchbasin leads shall connect to storm sewer Maintenance Holes wherever possible.

Easement widths shall be a minimum of 3.0 metres wide for leads with a maximum cover of 2.7 metres. The easement shall be centered over the pipe. Where 3.0-metre-wide easements cannot be attained between dwellings, “hourglass easements” will be permitted with the width of the easement decreasing between the dwellings based on the side yard setbacks permitted for the dwellings (typically 1.8 metres minimum). The easement width beyond the house envelope based on minimum front and rear yard setbacks shall be the standard 3.0 metre width.

For leads being constructed with a cover deeper than 2.7 metres, the easement widths shall be increased based on consultation with the Town.

All rear yard catchbasin easements shall comply with the requirements of Section G7:04.

K1.02 Storm, Sanitary Sewer and Watermain Easements

Ideally easements between adjacent lots shall be located on one side of the common lot line. Pipes shall generally be centered on the easement for easements containing one pipe. Easements straddling lots lines may be permitted if deemed appropriate by the Town. The minimum width of all easements shall be determined in consultation with the Town.

All pipes with a diameter of less than 900 mm constructed within easements between side lot lines shall be concrete encased as set out in Section K1.03. All pipes 900 mm or larger in diameter constructed between side lot lines shall be increased in strength by one class from that required based on the earth loading.

The bearing capacity of native soils must be preserved for all pipes being constructed between proposed buildings. This shall be achieved by:

- Extending the building foundations to the depth of the underside of pipe adjacent to the building.
- Placing the pipe in a sleeve constructed by tunneling.
- Installing the pipe by vertical trenching with steel sheeting left in place and cut off 0.3 metres above the building footing. The depth of the steel sheeting below the pipe invert is to be determined by a Geotechnical Engineer. Sufficient struts are to be left in place to ensure that the steel sheeting does not move during the backfilling operation.

The trench excavation and reinstatement or tunneling operation is to be monitored by a Geotechnical Engineer and certification will be required that the soils have the required bearing capacity to support the building being proposed adjacent to the pipe installation.

K1.03 Concrete Easement

Concrete encasement shall have a square cross-section with a concrete thickness of not less than 0.15 metres.

K1.04 Pipes Constructed in Sleeves

In lieu of concrete encasement of pipes, the Town will consider allowing pipes to be constructed in steel sleeves. The specific instances where this will be permitted along with the detailed requirements must be determined in consultation with the Town.

SECTION L

EROSION AND SEDIMENT CONTROL

Section L Erosion and Sediment Control

L1.00 General

New urban development's generally produce increased sediment loading to the surrounding environment, particularly during construction. In order to avoid the inherent detrimental side effects from development (i.e., poor water quality and aesthetics, restricted channel conveyance, etc.), sediment control measures shall be instituted. Some of these measures typically include, sediment traps (temporary or permanent), vegetation screens, catch basin filter bags, and phased stripping of developable lands. In all cases, it is recommended that sediment loading be controlled as per guidelines published by the local Conservation Authority and the "Erosion and Sediment Control Guideline for Urban Construction", 2019 develop by Toronto and Region Conservation Authority. Additional information may be obtained from the National Guide to Erosion and Sediment Control on Roadway Projects, May 2006, which may be obtained from the Transportation Association of Canada (TAC).

Copies of Erosion and Sediment Control Guideline for Urban Construction", 2019 are available at the Sustainable Technologies Evaluation Program (STEP) Website at www.sustainabletechnologies.ca.

Regulations governing sediment and erosion control fall under the jurisdiction of all levels of government and agencies and include but are not limited to the following legislation.

- Federal Fisheries Act;
- Canadian Navigable Waters Act (CNWA);
- Canadian Environmental Assessment Act (CEAA);
- Canadian Environmental Protection Act (CEPA);
- Species at Risk Act;
- Lakes and Rivers Act;
- Provincial Policy Statements;
- Planning Acts:
- Ontario Water Resources Act (OWRA);
- Oak Ridges Moraine Conservation Plan Act;
- The Greenbelt Act; and
- Conservation Authorities Act (CAA) - Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses Regulation under Section 28(1).

It is the Owner's responsibility to obtain the most current version of the by-law, permit requirements, and submit the application to the Planning and Development Department.

L2.00 Report and Design

The Sediment and Erosion Control Plans shall support the information provided in the Stormwater Management Report. The report and plans shall be signed and stamped by

a Professional Engineer. As a minimum all Sediment and Erosion Control Plans should address the items included in Tables 8.1 and 8.2 of the "Erosion and Sediment Control Guideline for Urban Construction (2019 or latest amendment)" and CSA W202 "Erosion and Sediment Control Inspection and Monitoring Standard". All Sediment and Erosion Control Plans should also address and/or provide locations and details for the following: airborne dust mitigation measures, mud mats, silt fences, temporary swales, temporary ponds, concrete washout locations, and tree preservation zones.

The Sediment and Erosion Control Plan is to show all calculations and requirements for erosion and sediment control before, during, and after construction when not included in the accompanying Stormwater Management Report.

The base drawing for this Plan is to be the Lot and Rough Grading Plan. The plan(s) size shall be A1 and at a 1:500 scale for single family development or 1:200 scale for multiple family or ICI developments. Superimposed on these drawings, the Engineer is to indicate any temporary and/or permanent control devices and/or ditches and ponds required to keep all materials and surface runoff contained on site.

Quantity calculations, dimensions, and construction materials shall be shown on the Sediment and Erosion Control Plan.

All permanent sediment and erosion control devices are to be shown on the Plan and Profile Drawing while any temporary construction is to be shown on the Sediment and Erosion Control Plan.

L3.00 Sediment and Erosion Control

L3.01 Stockpiles

Any topsoil or earth material stockpiles to remain after area grading is completed shall not be located on any Town property or lands to be conveyed to the Town. The ESC plans shall indicate the proposed location, side slopes and volume of material. The maximum height of any stockpile shall be 8.0 m and the maximum side slope shall be 2:1. The maximum height for a stockpile may be reduced depending on the proximity to existing residential dwellings. Stockpiles shall be located in a manner to maximize the separation distance to existing residences, municipal streets and environmental features. Temporary swales shall be utilized to direct runoff from stockpiles to appropriate ESC measures. After area grading is complete, stockpiles shall be stabilized with hydroseed to the satisfaction of the Director of Engineering.

L3.02 Silt Fence

Silt Fences shall be installed along the limits of area grading activity where surface water drains toward adjacent property, infrastructure, or environmental features. A double row of silt fence with staked straw bales in between (refer to LSRCA ESC-5 Detail) shall be constructed where area grading is adjacent to a watercourse, wetland or other environmentally sensitive feature. The double row shall be separated by a minimum 5.0 m vegetated strip. Silt fence shall be constructed in accordance with OPSD 219.130. Silt fencing shall be maintained and remain in place until final lot or block grading and restoration. The ESC plans shall indicate the location of silt fencing and refer to Town standards.

L3.03 Temporary Drainage Swales

Temporary drainage swales shall be used during area grading or after completion to direct surface runoff to sediment control facilities or other drainage outlets. Swales shall be sized to convey the post development, peak flow from the 5-year storm event. Swales shall have a minimum gradient of 1.0% with 3:1 side slope. Swales shall be maintained and remain in place until final grading and restoration. The location, gradient, direction of flow, and a typical cross-section of the drainage swale shall be provided on the ESC plans.

L3.04 Rock Check Dams

Rock check dams shall be installed on all temporary drainage swales and at all concentrated flow points. At concentrated flow points, the check dams shall be installed with a sediment trap upstream of the dam as per OPSD 219.220. The maximum spacing for check dams shall be 30 metres. Rock check dams shall be constructed in accordance with OPSD 219.210 and 219.211. Rock check dams shall be maintained and remain in place until final grading and restoration. The ESC plans shall show the location of rock check dams and refer to Town standards.

L3.05 Temporary Sediment Control Facilities

Temporary sediment control facilities shall be used for all area grading activities which exceed 2.0 ha in size. During area grading activities, temporary facilities shall be installed upstream or in same location of permanent stormwater management facilities. These facilities shall be sized with a permanent pool storage volume of 125 to 185 m³ per hectare of contributing drainage area and an additional active storage volume of 125 m³ per hectare (refer to LSRCA guideline "Technical Guideline for Stormwater Submissions"). Containment berms shall be constructed with at least 0.3 m of free board above the maximum water level, 3:1 side slope 2.0 m top width, and an emerging spillway. The maximum depth of flow in the spillway shall be 0.3 m and the spillway shall be lined with

riprap erosion protection sized for peak velocities from the 5-year storm event. The outlet pipe and the design of the facility shall conform to the typical drawings on pages C-58 and C-59 in Appendix C of the LSRCA guideline "Technical Guideline for Stormwater Submissions". The outlet structure controls shall be sized to release the active storage volume over a minimum 48 hours period. Sediment control facilities shall be maintained and remain in place until final grading and restoration. A cross-section of the facility and outlet structure shall be indicated on the ESC plans, along with details of the flow controls and active and permanent water levels.

L3.06 Restoration

Within two weeks after area grading is complete, the disturbed areas including topsoil stockpiles and temporary drainage swales shall be restored with approved vegetation using hydroseed or sodding. The only exception to this requirement will be lot or block areas which are under an active building permit application. All hydroseeding for restoration shall be completed prior to mid-September or at the discretion of the Director of Engineering. The method of hydroseeding shall be approved by the Commissioner. The proposed seed mix shall be specified on the ESC plans. Areas which do not establish cover shall be hydroseeded again at the discretion of the Commissioner.

L3.07 Storm Drain Inlet Protection

After the storm sewer system is installed, sediment control barriers shall be installed on all roadway, rear lot and ditch inlet catchbasins. Sediment barriers for inlets shall consist of a filter cover, filter barrier sox, sediment bag insert or approved equivalent. Bulkheads at storm sewer outfalls are acceptable as a sediment barrier provided the height does not exceed one third of the pipe diameter. Bulkheads must be removed prior to building occupancy. Sediment barriers for inlets shall be maintained and remain in place until contributing lot or block areas have been re-vegetated or until building program commences, at which time all catchbasin sediment control must be removed and a regular program of street and catchbasin cleaning shall be implemented. The ESC plans shall indicate the type of inlet sediment barrier proposed, maintenance requirements and recommendations for removal or replacement during or after a winter season.

L3.08 Construction Access Mud Mats

The location of temporary construction access roadways shall be shown on the ESC plans. At minimum mud mats shall be installed on all access roadways at the point of connection to a municipal right-of-way. The mud mat shall be a minimum 10m in width, 50m in length and be constructed in accordance with standard drawing R-212. The mud mats shall be maintained, and stone replaced if deemed necessary. The Town reserved the right to require additional measures to control mud/dust tracking as deemed necessary by the Direct of Engineering.

L3.09 Temporary Connections to Storm Sewer

After installation of the municipal storm sewer system and road base, the lot or block areas are typically pre-graded to a lower elevation relative to the top of road. This situation may create areas of storm drainage ponding. To alleviate this situation, temporary connections to the storm sewer shall be provided to ensure all areas have a positive drainage outlet. These connections shall be sized to convey the 5-year storm event and the inlet structures shall be complete with sediment traps or facilities in accordance with the size of the contributing area. The inlet structure shall consist of an appropriately sized perforated riser pipe. The riser pipe shall be wrapped in filter fabric and surrounded with 50 mm dia. clear stone. The temporary connections shall be maintained until removal. The ESC plans shall indicate the location and details of each connection along with requirement for removal.

L3.10 Construction Dewatering

Discharge from dewatering of excavations for construction of municipal services shall be safely directed to ESC measures. Temporary piping, swales or filter rings shall be constructed to ensure that erosion from pump hose discharge is minimized and to direct the discharge to ESC measures. Adequate erosion protection shall be provided at all concentrated discharge points and rock check dams shall be installed on all temporary swales. Sediment bags shall be used on the end of discharge hoses where the discharge from the dewatering area has a sediment load. Discharge from well point dewatering systems may be discharged directly to a storm sewer subject to approval of the Director of Engineering. Approval will require water quality laboratory testing and comparison to Regional and Town sewer use by-laws. Dewatering operations are to adhere to Section 34 of the Ontario Water Resources Act and Water Taking Regulation O.Reg. 387/04 including requirements for Permit to Take Water.

L3.11 Concrete Washouts

The location of concrete washouts shall be shown on the ESC plans and designed by consulting engineer with detailed provided on the ESC drawings. The number and size of concrete washouts should be determined by the consulting engineer taking into consideration the size of the proposed development and anticipated activities. Concrete washouts are to be identified by signage and have a delineation barrier. Concrete washouts are to be cleaned out on a weekly basis or more frequently as needed, with removed material disposed of offsite to a facility able to accept concrete waste / debris.

L4.00 Phasing

ESC measures shall be designed and implemented for the phases identified in table L4.04. ESC measures for each phase shall be clearly identified on the ESC plans. A summary of the ESC measures for each phase shall be provided in chart form on the ESC plans. The summary chart shall include information on timing for installation, inspection/maintenance requirements and timing for removal of ESC measures. A sample summary chart has been included in L4:04. The requirements for installation, inspection, maintenance, and removal are indicated for each phase in the following sections.

L4.01 Phase 1-Topsoil Stripping and Area Grading

Phase 1 shall include all ESC measures that must be in place before or during topsoil stripping or area grading activity. ESC measures that must be in place prior commencing any topsoil stripping or area grading include silt fence, mud mat, temporary drainage swales, rock check dams and temporary sediment control facilities. All tree protection fencing to be installed and approved prior to ESC measures. The developer's consultant shall arrange an inspection with Town staff once installation of Phase 1 measures is complete and prior to any grading or stripping activity. Any deficiencies noted during this inspection shall be repaired prior to starting grading or stripping. The developer's consultant shall undertake weekly inspections of the Phase 1 ESC measures and after each rainfall event. The developer's consultant shall provide weekly written inspection reports to the Town Inspector noting deficiencies and repairs to ESC measures. The developer shall arrange for regular maintenance of measures to remove accumulated sediment and undertake repairs to ensure proper function.

The Sediment and Erosion Control Plan must be submitted with the final submission of the Plan and Profile Drawings. The Plan must also be approved by the local conservation authority before any earthwork begins on the site.

L4.02 Municipal Servicing Construction

Phase 2 shall include all ESC measures that will be undertaken after area grading is completed and during or after construction of municipal servicing. ESC measures that must be in place after area grading and servicing construction include restoration of graded areas and topsoil stockpiles, temporary connections to storm sewer system, and sediment traps. Phase 2 measures shall also include the removal of identified Phase 1 measures and replacement with measures such as temporary drainage swales, rock check dams or others as required on the ESC plans. The developer's consultant shall undertake weekly inspections of the Phase 2 ESC measures and after each rainfall event. The developer's consultant shall provide weekly written inspection reports to the Town Inspector noting deficiencies and repairs to ESC measures. The developer shall arrange

for regular maintenance of measures to remove accumulated sediment and undertake repairs to ensure proper function.

L4.03 Building Construction

Phase 3 shall include the maintenance and repair of all Phase 1 or Phase 2 ESC measures that will remain in place until building construction is complete. Phase 3 shall also identify the removal of any ESC measures necessary to allow building construction to proceed. The timing for any such removals shall be just prior to building construction. The developer's consultant shall arrange an inspection with the Town Inspector of all remaining measures prior to building construction. Any deficiencies noted during this inspection shall be repaired prior to building construction. The developer's consultant shall undertake weekly inspections of the remaining measures and after each rainfall event. The developer's consultant shall provide weekly written inspection reports to the Town Inspector noting deficiencies and repairs to ESC measures. The developer shall arrange for regular maintenance measures to remove accumulated sediment and undertake repairs to ensure proper function.

L4.04 Sample Summary Table for ESC Phasing

ESC Measure	Timing for Installation	Inspection/Maintenance Requirements	Timing for Removal
Phase 1 – Topsoil Stripping and Area Grading			
• Silt Fence • Mud Mat • Drainage Swales • Check Dams • Sediment Control Facility • Topsoil Stockpile • Others as required	Prior to topsoil stripping	Consultant to arrange inspection with Town staff once installation is complete. Consultant to undertake weekly inspections and after each rainfall event, including weekly reporting. Regular maintenance to remove accumulated sediment and repair ESC measures.	Just prior to final grading, replacement with Phase 2 measures, or construction of municipal services.
Phase 2 – Municipal Servicing Construction			
• Restoration Hydroseeding • Sediment Traps • Drainage Swales • Temporary Connections to Storm Sewer • Others as required	After area grading and installation of storm drainage system is complete.	Consultant to undertake weekly inspections and after each rainfall event, including weekly reporting. Regular maintenance to remove accumulated sediment and repair ESC measures.	Just prior to final grading or building construction.

ESC Measure	Timing for Installation	Inspection/Maintenance Requirements	Timing for Removal
Phase 3 –Building Construction			
- Maintenance and repairs to all remaining ESC measures as per detailed inspection with Town Inspector. - Removal of identified Phase 1 and 2 measures.	Prior to building construction, ESC measures to be repaired as per Town deficiency list.	Detailed Inspection of all remaining ESC measures with Town Inspector. Consultant to undertake weekly inspections and after each rainfall event, including weekly reporting. Regular maintenance to remove accumulated sediment and repair ESC measures.	Just prior to final topsoil and sodding of lot/block areas.

APPENDIX 1

LIST OF ACCEPTABLE MATERIALS

Appendix 1 – List of Acceptable Materials

1.0 Storm Sewers

Storm Sewer mains shall be Concrete or PVC (Polyvinyl Chloride) plastic pipe. PVC plastic pipe will be permitted for storm sewers 450 mm in diameter and smaller. All storm sewer mains over 450 mm diameter shall be constructed with reinforced concrete pipe.

PVC pipe and fittings shall conform to CSA Specification B182.1 or B182.2, or latest revisions thereof. Dimension ratio (DR) of PVC sewer pipe shall be 35 or 28 depending on depth and installation conditions.

Concrete pipe shall conform to the requirements of CSA Specification A257-M 1982 for the classes shown below:

- o) Non-reinforced Concrete Pipe, CSA Standard A257.1 Class 1, 2, and 3;
Reinforced Concrete Pipe, CSA Standard A257.2 Strength Class 50-D, 65-D, 100-D and 140-D.

Watertight bell and spigot connections will be required for all pipe joints.

Catchbasin Leads

Catchbasin leads shall be constructed with Concrete or PVC SDR 35 pipe.

Concrete pipe shall conform to the requirements of CSA Specification A257-M 1982 for the classes shown below:

- a) Non-reinforced Concrete Pipe, CSA Standard A257.1 Class 1, 2, and 3;
Reinforced Concrete Pipe, CSA Standard A257.2 Strength Class 50-D, 65-D, 100-D and 140-D.

PVC pipe shall conform to the requirements of CSA Specification CSA B182.4.

Watertight bell and spigot connections will be required for all pipe joints.

2.0 Sanitary Sewers

Sanitary sewer shall be constructed of reinforced concrete pipe or PVC pipe.

The type and classification shall be clearly indicated on all profile drawings on each sewer length.

PVC pipe shall only be used on sanitary sewers up to and including 450 mm in diameter and shall conform to CSA Specification B182.1 or B182.2, or latest revisions thereof. Dimension ratio (DR) of PVC sewer pipe shall be 35 or 28 depending on depth of bury and installation conditions.

Reinforced concrete shall be used for sewers 525 mm diameter and larger and shall be steel reinforced and conform to CSA Specification A275.2, latest revision thereof, Class 50-D, 65-D, 100-D, or 140-D as required.

3.0 Storm and Sanitary Laterals

Sanitary

Sanitary laterals shall be 125 mm PVC Pipe, green in colour conforming to CSA Specification B182.1 or B182.2, or latest versions thereof.

Storm

Storm laterals shall be 150 mm PVC Pipe, white in colour conforming to CSA Specification B182.1 or B182.2, or latest revisions thereof.

Dimension ratio (DR) of PVC lateral pipe shall not exceed 28.

4.0 Watermain and Appurtenances

Watermain pipe up to and including 300 mm in diameter shall be PVC manufactured in accordance with the latest edition of AWWA C900. Minimum Class 150 (DR 18) shall be used.

Fittings

Allowable watermain fittings are as follows:

- b) Cast iron, cement lined and manufactured in accordance with the latest edition of AWWA C907 with mechanical joint ends.

PVC manufactured in accordance with the latest edition of AWWA C900.

Brass Fittings

All brass components in any fittings shall be lead free.

Service Connections

All domestic water services shall be Type 'K' Copper.

Fire Hydrants

Hydrants shall be Canada Valve or Clow Canada – M-67/M93 Brigadier **only** and are to be equipped with one (1) 100 mm pumper port with manufacturer's "Storz" nozzle facing the street. The side ports shall be 65 mm diameter.

Hydrants are to be supplied with a hose nozzle cap chain and S-hook and are to be painted "Chrome" yellow. Hydrant side port caps are to be painted John Deere green.

The top cap of the hydrant body shall also be painted John Deere Green. The Stortz cap shall be painted black.

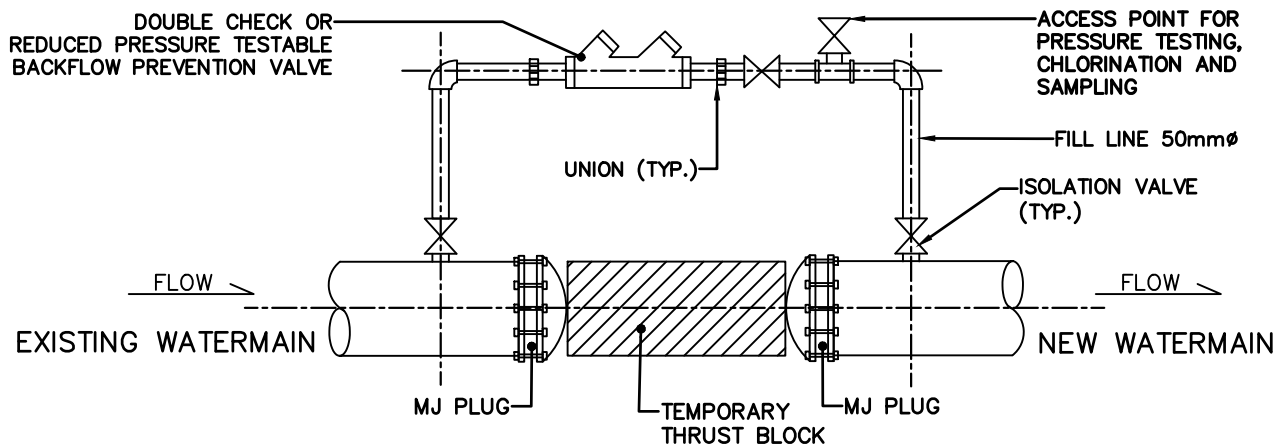
All hydrants shall be fitted with anti-tampering devices of a type required by the Town.

Valves

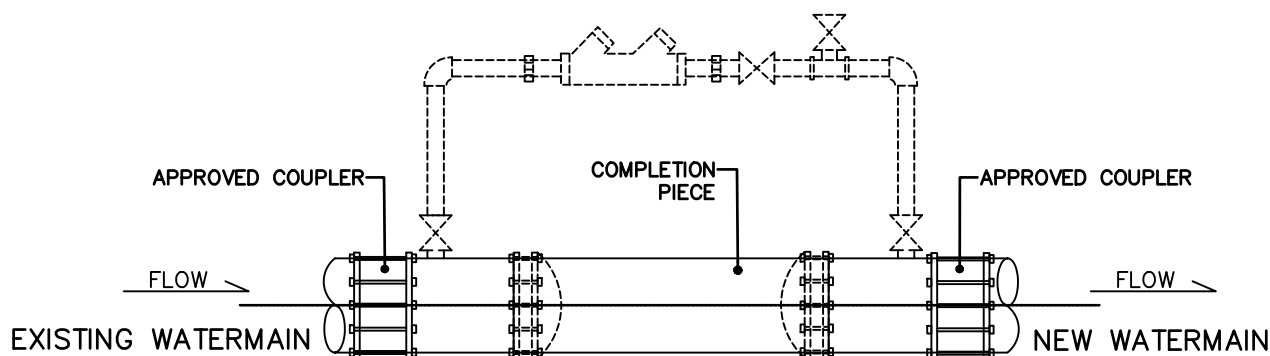
All valves shall be resilient wedge gate valves as approved by the Town. They shall have a non-rising stem and a 50 mm square operating nut opening counterclockwise.

APPENDIX 2

STANDARD DRAWINGS



BACKFLOW PREVENTION ASSEMBLY
(FOR WATERMAIN TESTING & SAMPLING PRIOR TO COMMISSIONING)



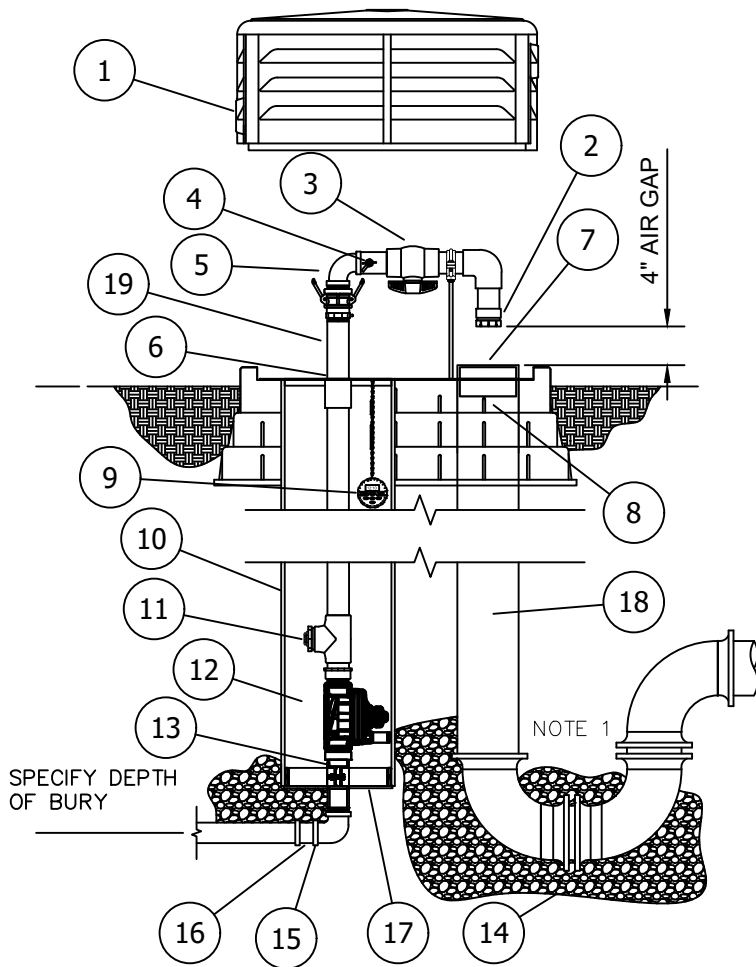
WATERMAIN COMPLETED ASSEMBLY

NOTES:

1. WATERMAIN COMMISSIONING SHALL BE IN ACCORDANCE WITH THE TOWN'S OPERATIONS & MAINTENANCE MANUAL FOR WATER DISTRIBUTION SYSTEMS
2. THE BACKFLOW PREVENTION ASSEMBLY SHALL BE REMOVED DURING WATERMAIN PRESSURE TESTS.
3. THE FINAL CONNECTION OF THE WATERMAIN SHALL BE COMPLETED ONLY AFTER AUTHORIZATION BY THE MUNICIPALITY.
4. THE WATERMAIN SHALL BE DRAINED BY CONTROLLED MEANS. SUFFICIENT TRENCH DE-WATERING CAPACITY SHALL BE USED WHEN THE EXISTING AND NEW WATERMAINS ARE DRAINED PRIOR TO THE FINAL CONNECTION TO ENSURE NO BACKFLOW INTO EITHER WATERMAIN.
5. THE WATERMAIN SHALL BE CUT BACK TO REMOVE THE TAPPING POINTS OF THE BACKFLOW ASSEMBLY.
6. ALL NEW PIPING AND APPURTENANCES PLACED IN THE CONNECTION SHALL BE NEW, UNUSED AND BE THOROUGHLY DISINFECTED WITH 1% SOLUTION OF SODIUM HYPOCHLORITE OR EQUIVALENT.
7. ON NON-METALLIC WATERMAINS, THE TRACER WIRE SHALL BE CONNECTED TO THE COUPLER ONLY IF THE COUPLER IS NOT IN CONTACT WITH A METALLIC WATERMAIN OTHERWISE TERMINATE TRACER WIRE WITH AN ANODE.
8. A PHYSICAL SEPARATION MUST BE MAINTAINED AT ALL CONNECTION POINTS OF NEW WATERMAINS TO THE EXISTING SYSTEMS UNTIL BACTERIOLOGICAL TESTS HAVE PASSED. A SAMPLING TAP MUST BE PROVIDED AT THE END OF EACH BRANCH OR STUB.
9. ONLY THE MUNICIPAL STAFF SHALL OPERATE MUNICIPAL-OWNED VALVES.
10. THIS DETAIL IS FOR SCHEMATIC INFORMATION ONLY. THE ACTUAL CONFIGURATION USED MUST SATISFY THE INTENT OF THIS DRAWING.

TOWN OF EAST GWILLIMBURY STANDARD DRAWING				NO.	REVISION	DATE
WATERMAIN PHYSICAL SEPERATION DETAIL	DWG No.					
	W-100					
DRAWN:	APPROVED:	SCALE:	DATE:			
K.C	K.B	N.T.S.	JAN 2026			





ITEM	ITEM / DESCRIPTION	OPTIONAL	BY OTHERS
1	UV RESISTANT LOCKABLE LID		
2	DIFFUSER / TRAP		
3	2" PVC BALL VALVE		
4	SAMPLING POINT		
5	2" STAINLESS STEEL QUICK DISCONNECT		
6	REMOVABLE ACCESS PLATE		
7	DECHLOR BASKET	X	
8	6" SEWER PIPE CONNECTION		
9	CONTROLLER		
10	SDR 35 PVC PIPE		
11	AUTOMATIC DRAIN		
12	2" AUTOMATIC VALVE		
13	O-RING CONNECTOR		
14	1" CLEAN ROCK		X
15	2" BRASS FIP INLET		X
16	2" MIP x COMPRESSION ADAPTER		X
17	DEBRIS PLATE		
18	6" PVC SEWER PIPE & P TRAP		X
19	SCHEDULE 80 PVC PIPE		

LAYOUT NOTES:

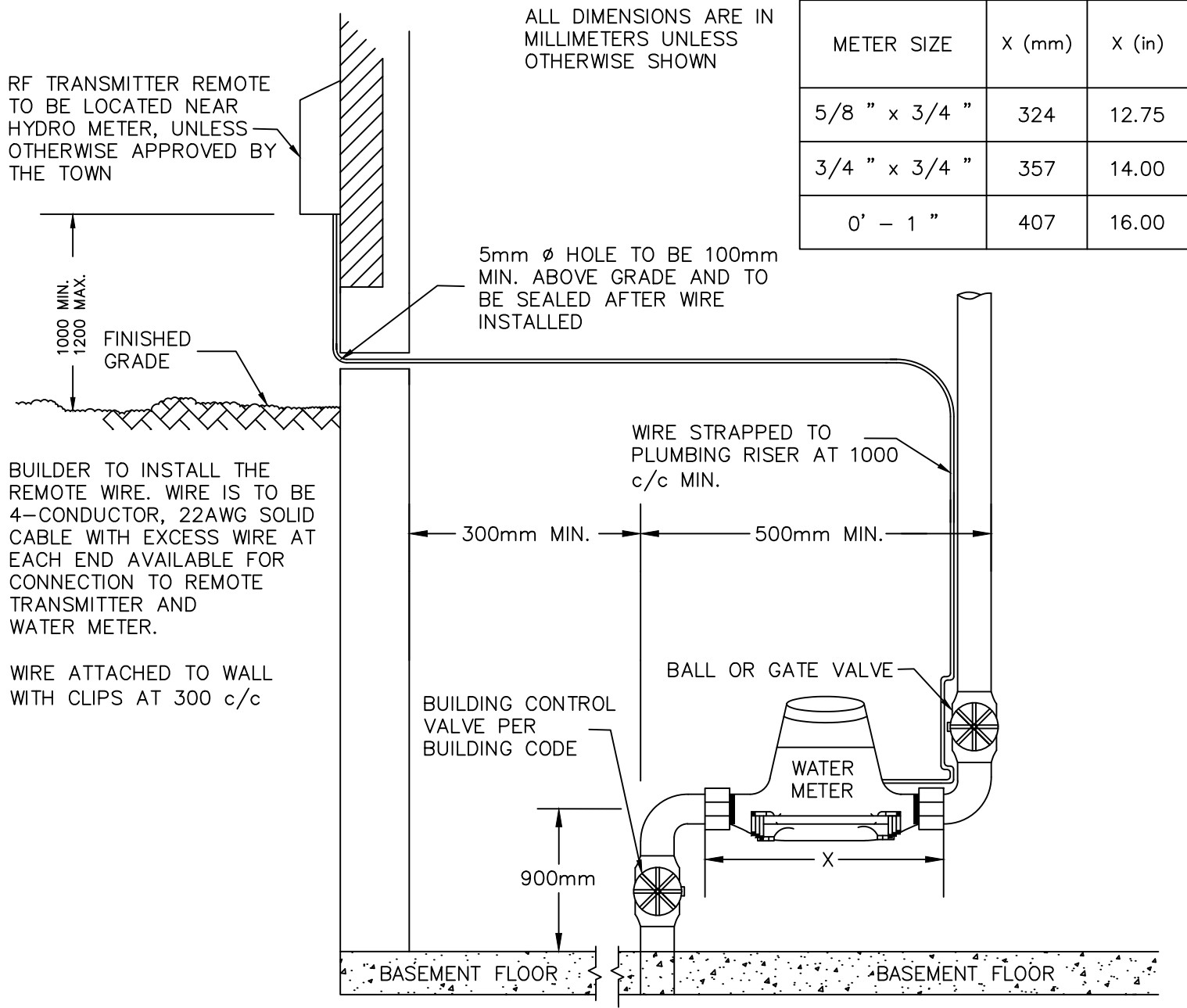
- 1.) KUPFERLE RECOMMENDS THE INSTALLATION OF A 6" DWV P TRAP

1. AUTOMATIC FLUSHING DEVICE SHALL HAVE A 2" STAINLESS STEEL FIP INLET THAT WILL LEAD VERTICALLY TO THE BOTTOM OF A 2" AUTOMATIC FLUSHING VALVE.
2. THE FLUSHING VALVE SHALL CONTROL THE FLOW OF WATER THROUGH THE HYDRANT AND ITS DIAPHRAGM WITH THE EXTENSION AND RETRACTION OF A DC LATCHING SOLENOID AND HAVE A 220 PSI RATING.
3. EACH UNIT SHALL BE FURNISHED WITH A STAND-ALONE VALVE CONTROLLER. THE VALVE CONTROLLER WILL NOT REQUIRE A SECOND HAND-HELD DEVICE FOR PROGRAMMING. CONTROLLER MUST HAVE MINIMUM OF 12 POSSIBLE FLUSHING CYCLES PER DAY. CONTROLLER SHALL BE SUBMERSIBLE TO 12 FEET, OPERATE WITH A 9 VOLT BATTERY, AND HAVE RESIN-SEALED ELECTRICAL COMPONENTS. THE SOLENOID SHALL HAVE NO LOOSE PARTS WHEN REMOVED FROM THE VALVE.
4. EACH UNIT SHALL HAVE A ALL STAINLESS STEEL SAMPLING POINT. REMOVAL OF THE 2" VALVE SHALL BE POSSIBLE VIA AN O-RING CONNECTOR LOCATED BENEATH THE VALVE AFTER THE ABOVE GROUND DISCONNECTION OF THE STAINLESS STEEL ACCESS PLATE.
5. VALVE ASSEMBLY SHALL BE HOUSED IN A PVC ENCLOSURE AND EACH UNIT SHALL BE SELF-DRAINING, NON-FREEZING. ALL ABOVE-GROUND COMPONENTS SHALL BE CONTAINED WITHIN A UV-RESISTANT LOCKING COVER.
6. UNIT MODEL # SHALL BE 9800 AS MANUFACTURED BY KUPFERLE FOUNDRY COMPANY, ST. LOUIS MO (1-800-231-3990), OR APPROVED EQUAL.

NOTE: FLUSH WATER LINES FREE OF DEBRIS BEFORE INSTALLATION

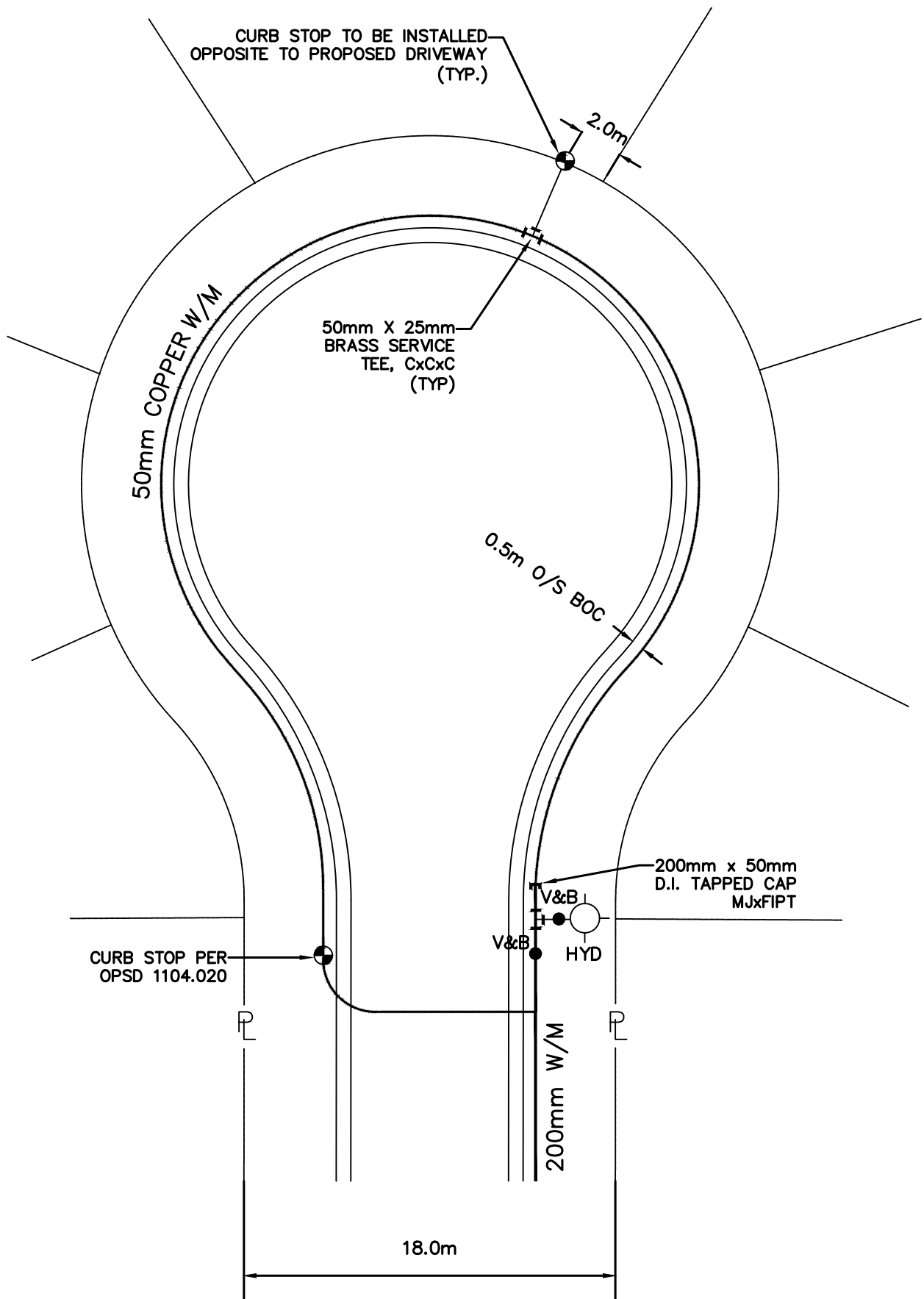
TOWN OF EAST GWILLIMBURY STANDARD DRAWING				NO.	REVISION	DATE
AUTOMATIC FLUSHING STATION				DWG No.		
				W-101		
				DRAWN:	APPROVED:	SCALE:
				K.C.	K.B.	N.T.S.
				DATE:		
				JAN 2026		





NOTES:

1. METER SIZE & TYPE AS DETERMINED BY THE TOWN
2. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PIPING & VALVES AND SHALL PROVIDE BRONZE THREADED (FIP) COUPLINGS FOR METER CONNECTION.
3. METER MUST BE INSTALLED HORIZONTALLY
4. ALL VALVES MUST BE VISIBLE, ACCESSIBLE, AND OPERATIONAL.
5. ALL INSTALLATIONS SHALL HAVE REMOTE RECEPTACLE. LOCATIONS APPROVED BY THE TOWN.
6. A FREE AND UNOBSTRUCTED PASSAGEWAY MUST BE PROVIDED AND MAINTAINED WITH NO PARTITION, NO FURNACE, NO WATER TANK, OR STORED MATERIAL WITHIN 500mm OF THE METER.



TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

DATE

50mm WATERMAIN LOOP
IN CUL DA SAC

DWG No.

W-103

DRAWN:

K.C

APPROVED:

K.B

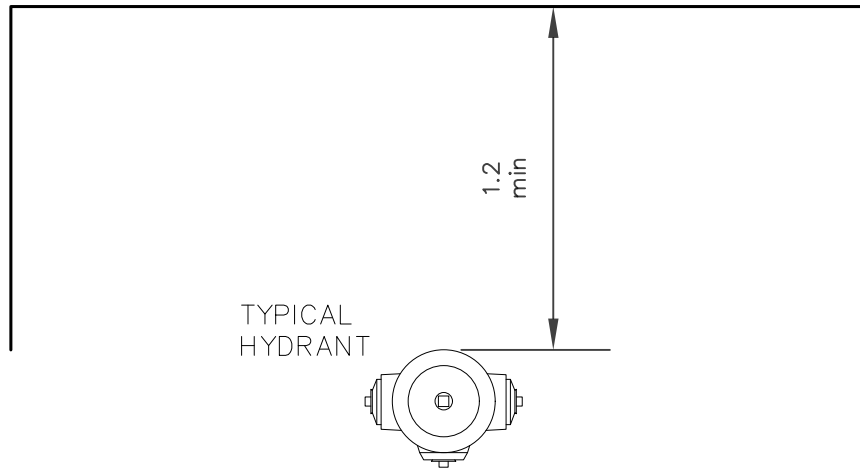
SCALE:

N.T.S.

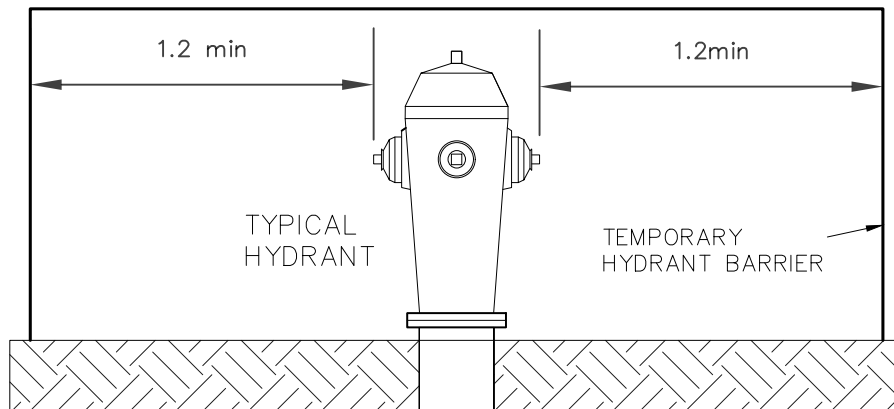
DATE:

JAN 2026





PLAN VIEW



ELEVATION VIEW

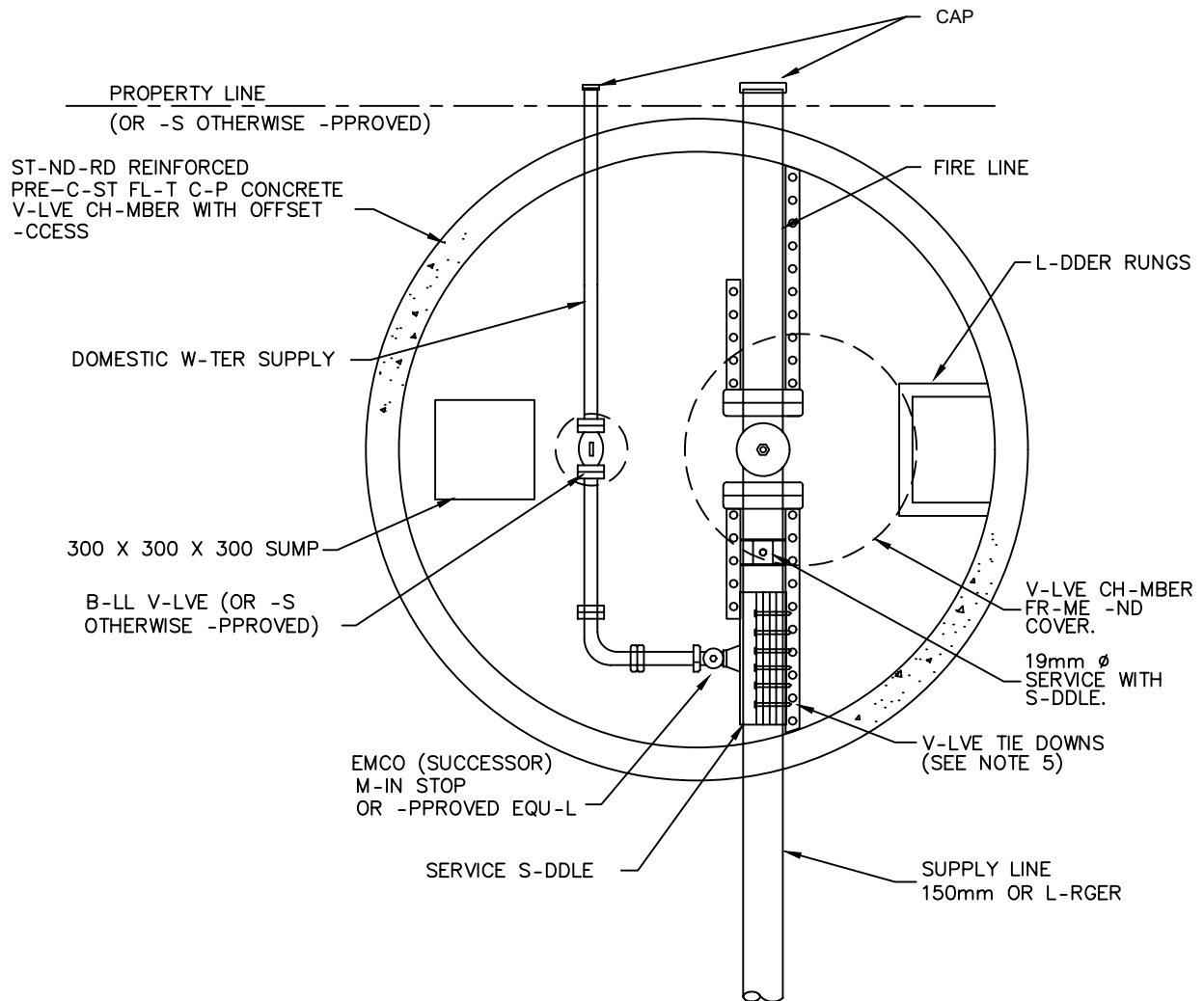
NOTES:

1. A MINIMUM OF 1.0m SEPARATION IS REQUIRED BETWEEN THE TEMPORARY BARRIER AND THE OUTSIDE EDGE OF THE HYDRANT FLANGES.
2. ALL BARRIER MATERIALS ARE TO BE FREE OF SCREWS, NAILS, OR SHARP EDGES.
3. NO CONSTRUCTION MATERIALS OR EQUIPMENT IS TO BE LOCATED IN FRONT OF THE HYDRANT OR BARRIER.
4. THE BARRIER IS TO BE SECURELY FASTENED TO THE GROUND TO RESTRICT MOVEMENT.
5. REPAIRS OR RECTIFICATIONS TO THE BARRIER ARE TO BE PREFORMED IMMEDIATELY UPON NOTICE FROM THE FIRE DEPARTMENT, TOWN STAFF, OR TOWN REPRESENTATIVES.

TOWN OF EAST GWILLIMBURY STANDARD DRAWING				NO.	REVISION	DATE
TEMPORARY HYDRANT BARRIER	DWG No.					
	W-104					
DRAWN:		APPROVED:	SCALE:	DATE:		
K.C		K.B	N.T.S.	JAN 2026		



East Gwillimbury

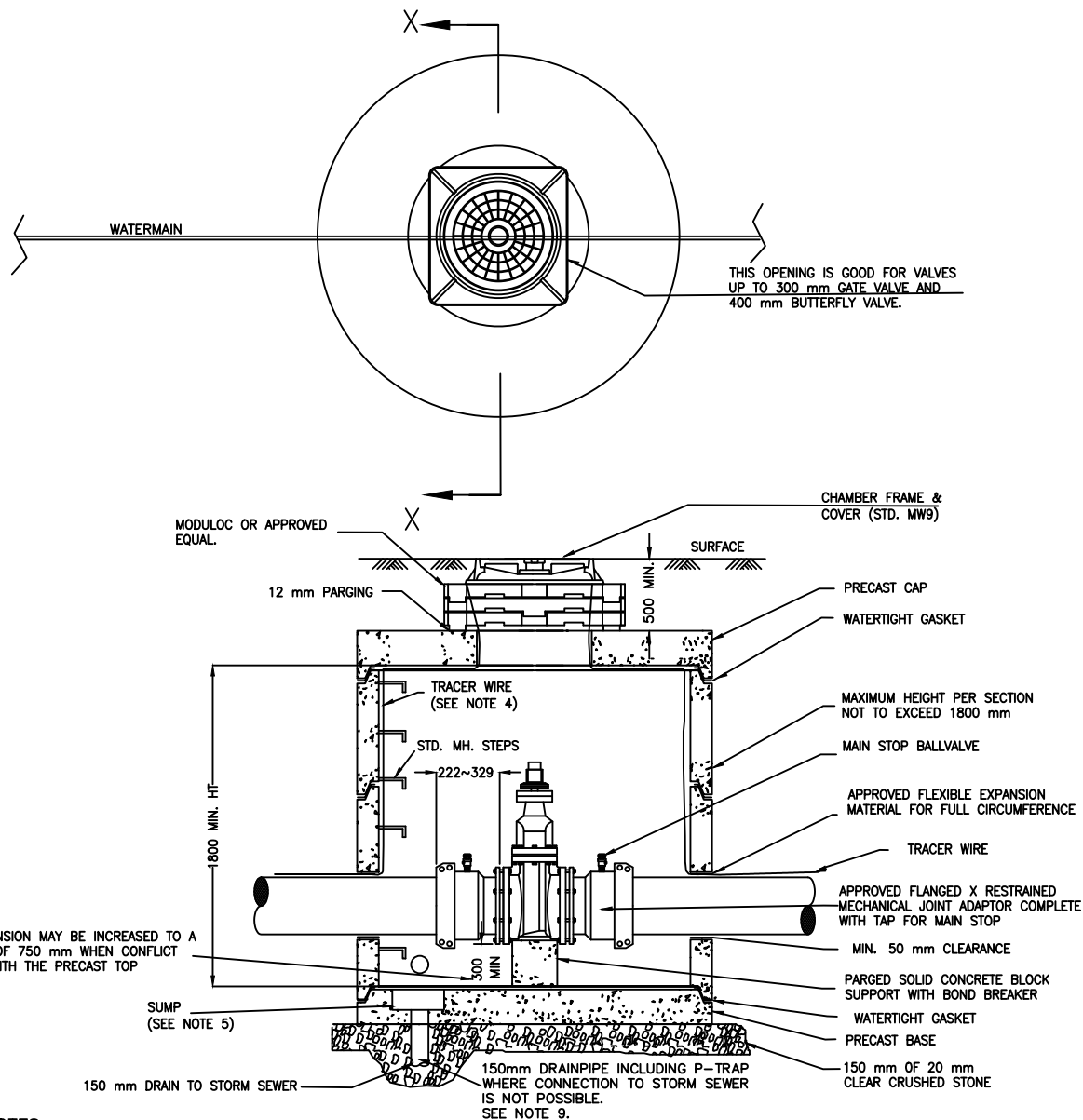


NOTES:

1. V-LVE CH-MBER EXC-V-TION TO BE B-CKFILLED WITH GR-NUL-R 'B'.
2. UNDER NO CIRCUMST-NCES WILL V-LVES BE PERMITTED IN DRIVEW-YS -ND -RE NOT TO BE INST-LLED IN SIDEW-LKS/-ND OR RO-DW-Y.
3. C-P TO BE DRILLED FOR SLIDING V-LVE BOX TO BE SET -T GROUND ELEV-TION. V-LVE BOX TO -LIGN WITH V-LVE BELOW GR-DE. BOTH V-LVES NEED TO BE -CCESSIBLE FROM THE SURF-CE.
4. -LL PIPES P-SSING THROUGH PRE-C-ST CH-MBER W-LLS TO BE SE-LED WITH NON-SHRINK-BLE MORT-R
5. -LL TIE DOWNS TO BE C-DMIUM OR ZINC CO-TED
6. THE FINISHED ELEV-TION OF V-LVE BOXES -ND CH-MBER M-NHOLES SH-LL BE SET FLUSH WITH FINISHED GR-DE
7. -LL V-LVES TO BE FL-NGE TYPE WITH PL-IN END -D-PTERS.
8. -LL W-TER LINE SIZING TO BE CERTIFIED BY - CONSULT-NT TO VERIFIY -LL -PPLIC-BLE CODES -ND OR LEGISL-TION H-S BEEN MET.
9. -LL ITEMS REFERENCE -RE TO CONFORM TO -LL CURRENT O.P.S.D. ST-ND-RDS.

TOWN OF EAST GWILLIMBURY STAND-RD DRAWING		NO.	REVISION	D-TE
FIRE AND COMMERCIAL SERVICE VALVE CHAMBER	DWG No.			
	W-105			
	DR-WN:	-PPROVED:	SC-LE:	D-TE:
	K.C	K.B	N.T.S.	J-N 2026

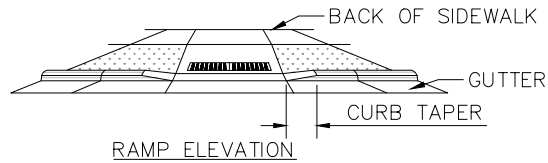




GENERAL NOTES:

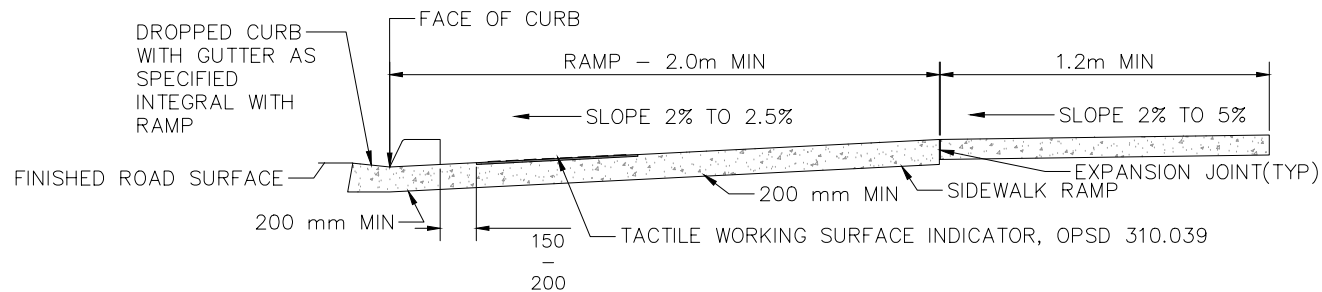
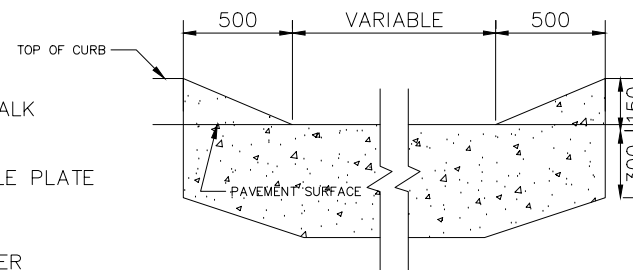
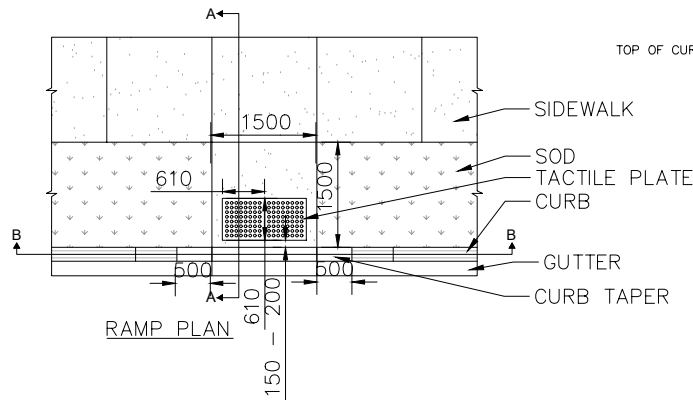
1. REFER TO WATERWORKS SPECIFICATIONS, H2.00 VALVE REQUIREMENTS
2. MINIMUM PERMITTED CHAMBER SIZE SHALL BE 1500MM, EXCEPT WHERE OTHERWISE SPECIFIED AND APPROVED IN WRITING BY THE TOWN
3. VALVE SHALL BE ALIGNED DIRECTLY UNDER THE CENTRE PLUG AND ACCESSIBLE FROM THE SURFACE
4. TRACER WIRE SHALL EXTEND FROM THE VALVE ALONG THE BOTTOM OF THE CHAMBER UP THE BACKSIDE OF THE STEPS ALONG THE CHAMBER WALL AND SECURELY FASTENED TO THE CHAMBER WALL WITH CLIPS PER DESIGN CRITERIA H1.13
5. WHEREVER POSSIBLE VALVE CHAMBERS SHALL BE PROVIDED WITH STORM DRAIN CONNECTION TO THE STORM SEWER REFER TO H2.03
6. WHERE THERE IS NO DRAIN, ALL CONNECTIONS WITHIN THE CHAMBER ARE TO BE WRAPPED IN DENSO ADHESIVE
7. ALL VALVES ARE TO BE LOCATED IN BOULEVARDS
8. UNDER NO CIRCUMSTANCES WILL VALVES BE PERMITTED IN DRIVEWAYS AND ARE NOT TO BE INSTALLED IN SIDEWALKS/AND OR ROADWAY.
9. SUMPS SHALL BE PROVIDED IN BASE OF CHAMBER LOCATED DIRECTLY BELOW THE CHAMBER ACCESS HOLE 300X300X300. USE ONLY AS DIRECTED BY ENGINEER.

TOWN OF EAST GWILLIMBURY STANDARD DRAWING				NO.	REVISION	DATE
PRECAST VALVE CHAMBER	DWG No.	W-106				
	DRAWN:	APPROVED:	SCALE:	DATE:		
	K.C	K.B	N.T.S.	JAN 2026		



NOTES:

1. SLOPE OF RAMP SHALL NOT EXCEED 8%.
2. CROSS SLOPE OF RAMP SHALL NOT EXCEED 2% IN EITHER DIRECTION.
3. DROPPED CURB AT RAMP SHALL BE MODIFIED TO ELIMINATE 30 MM STEP AT GUTTER LINE.
4. MINIMUM THICKNESS OF RAMP IS 200MM. MINIMUM THICKNESS OF SIDEWALK IS 150MM.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.



TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

D - TE

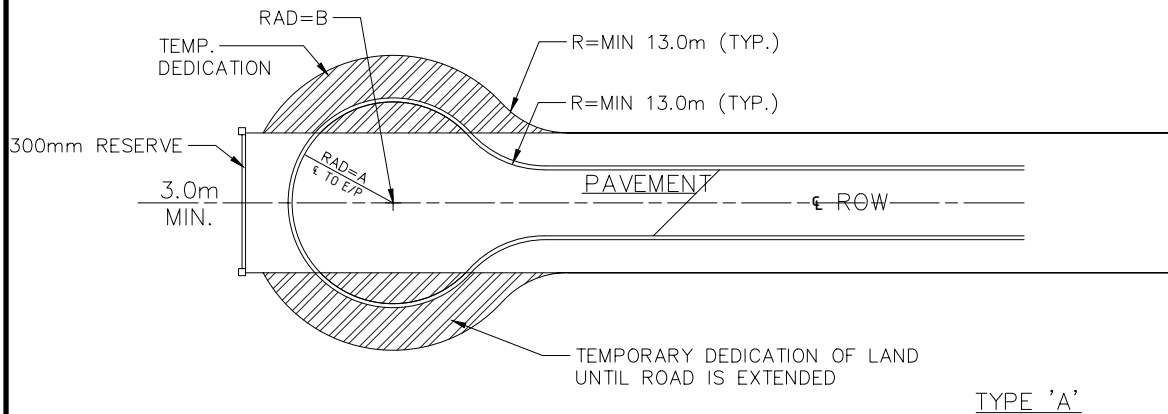
CONCRETE SIDEWALK RAMPS

DWG No.

R-200

DR - WN: K.C. -PPROVED: K.B. SC - LE: N.T.S. D - TE: J-N 2026

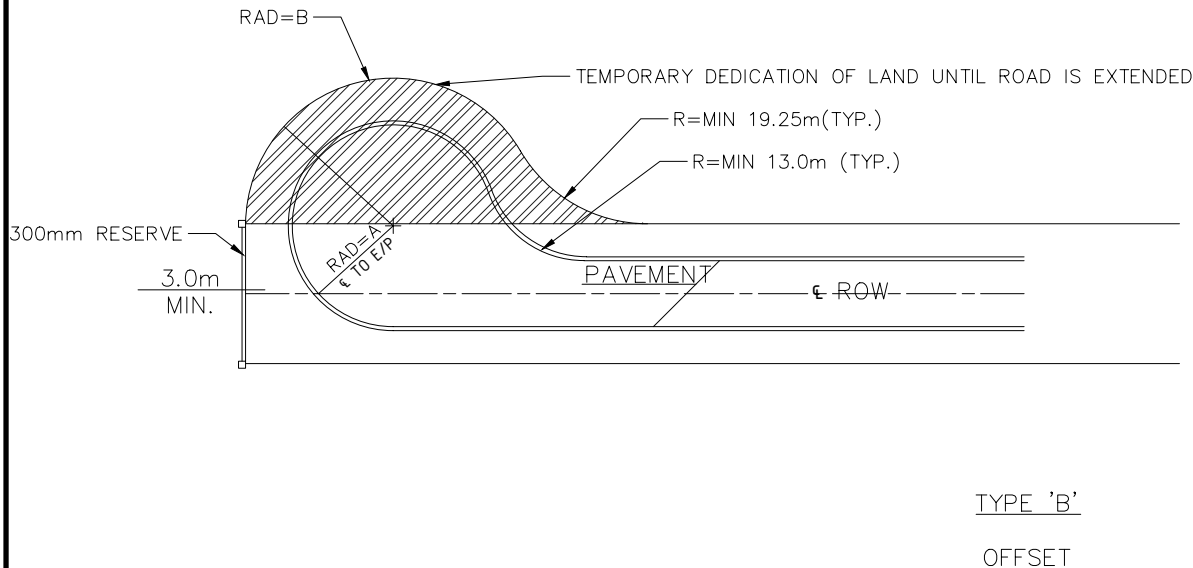




ROAD TYPE	MINIMUM RADIUS	
	A	B
RESIDENTIAL	13.0m	19.0m

NOTES

1. ASPHALT CURB & GUTTER MAY BE PERMITTED ON THE RADIUS OF A TEMPORARY CUL-DE-SAC THAT IS INTERNAL TO A DEVELOPMENT BUT WILL NOT BE PERMITTED ON TEMPORARY CUL-DE-SACS AT LIMITS OF A DEVELOPMENT
2. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE NOTED.



TOWN OF EAST GWILLIMBURY STANDARD DRAWING

TEMPORARY CUL-DE-SAC

DWG No.

R-201

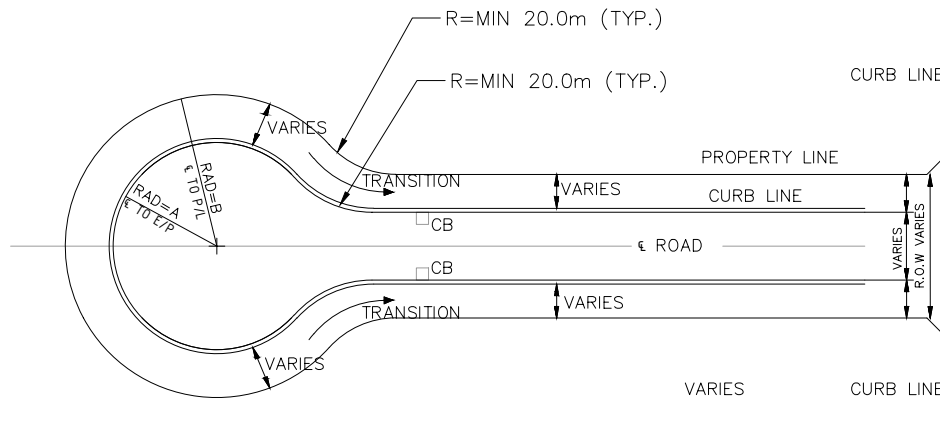
DR-WN:	APPROVED:	SC-LE:	D-TE:
K.C	K.B	N.T.S.	J-N 2026

NO.

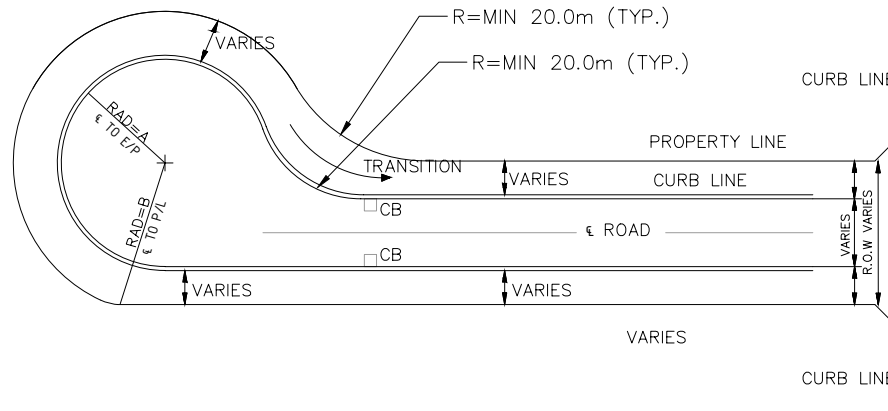
REVISION

D-TE





TYPE 'A'
SYMMETRICAL



TYPE 'B'
OFFSET

MINIMUM RADIUS

ROAD TYPE	A	B
RESIDENTIAL	15.0m	VARIES

NOTES

1. CATCHBASINS TO BE PLACED AT THE BEGINNING OF THE BULB.
2. DETAIL OF GUTTER GRADES OF CUL-DE-SACS TO BE SHOWN ON PLAN PROFILE DRAWINGS.
3. CUL-DE-SAC DRAINAGE TO BE DIRECTED TOWARDS THE BEGINNING OF THE BULB.
4. MINIMUM GUTTER SLOPE TO BE 0.50%.
5. BOULEVARD WIDTH TO BE MAINTAINED.
6. ALL DEAD END STREETS MUST TERMINATE WITH A CUL-DE-SAC.
7. ALL DIMENSIONS ARE IN MM AND/OR M UNLESS OTHERWISE NOTED.

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

RESIDENTIAL CUL-DA-SAC

DWG No.

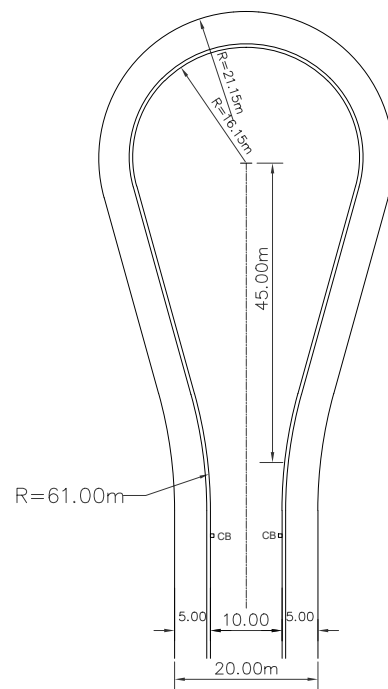
R-202

DR-WN: K.C
-PPROVED: K.B
SC-LE: N.T.S.
D-TE: J-N 2026

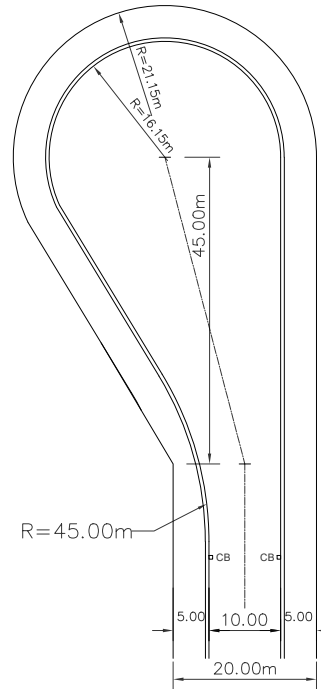
NO. REVISION

D-TE





SYMMETRICAL



OFFSET

NOTES

1. CATCHBASINS TO BE PLACED AT THE BEGINNING OF THE BULB.
2. DETAIL OF GUTTER GRADES OF CUL-DE-SACS TO BE SHOWN ON PLAN PROFILE DRAWINGS.
3. CUL-DE-SAC DRAINAGE TO BE DIRECTED TOWARDS THE BEGINNING OF THE BULB.
4. MINIMUM GUTTER SLOPE TO BE 0.50%.
5. BOULEVARD WIDTH TO BE MAINTAINED.
6. ALL DEAD END STREETS MUST TERMINATE WITH A CUL-DE-SAC.
7. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

D - TE

INDUSTRIAL CUL-DA-SAC

DWG No.

R-203

DR - WN:

K.C

-PPROVED:

K.B

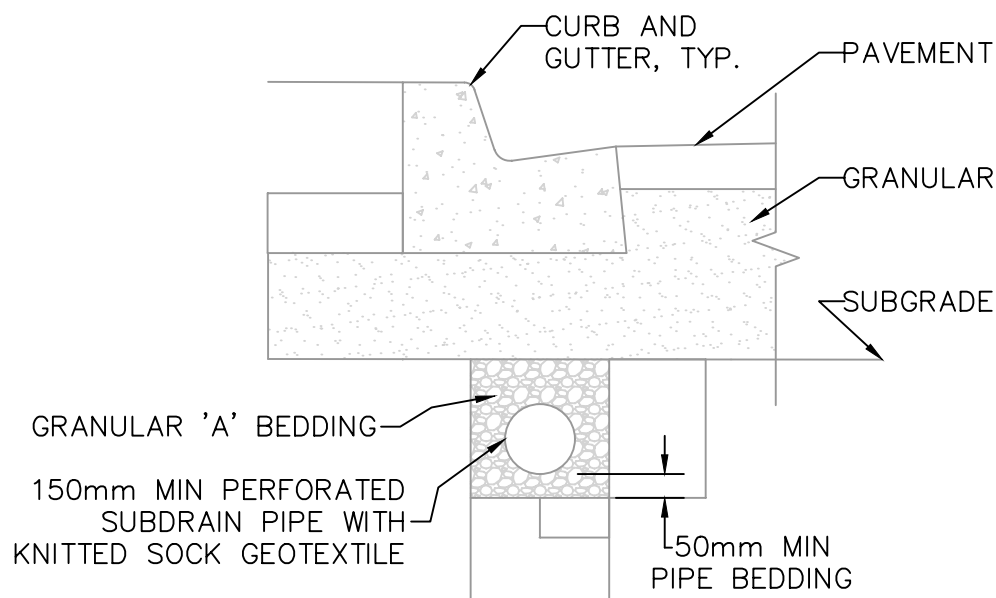
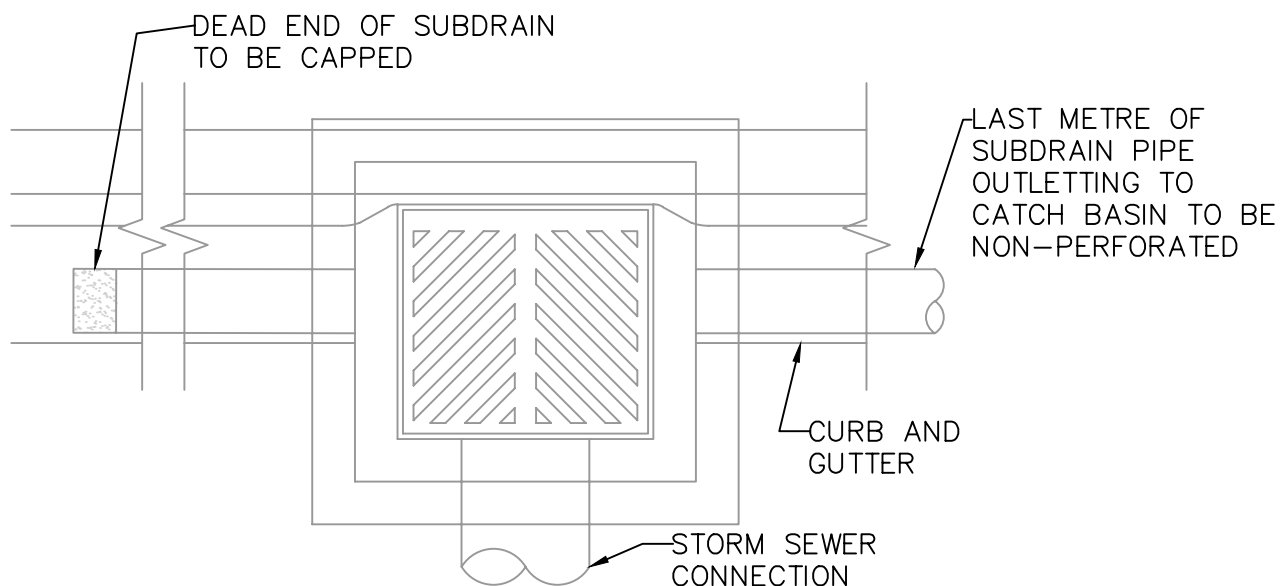
SC - LE:

N.T.S.

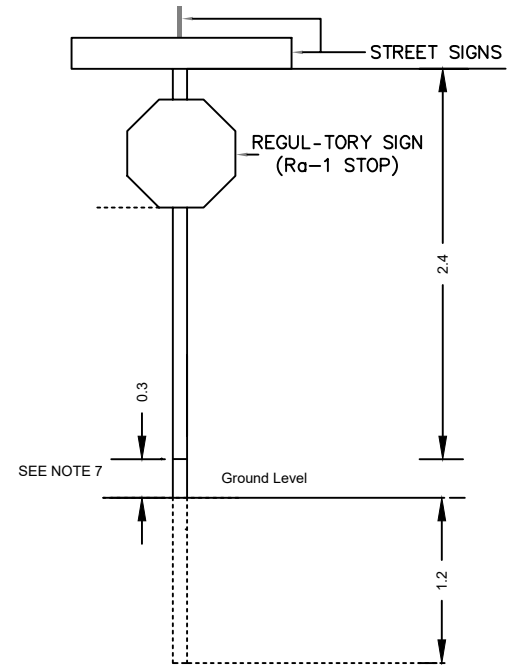
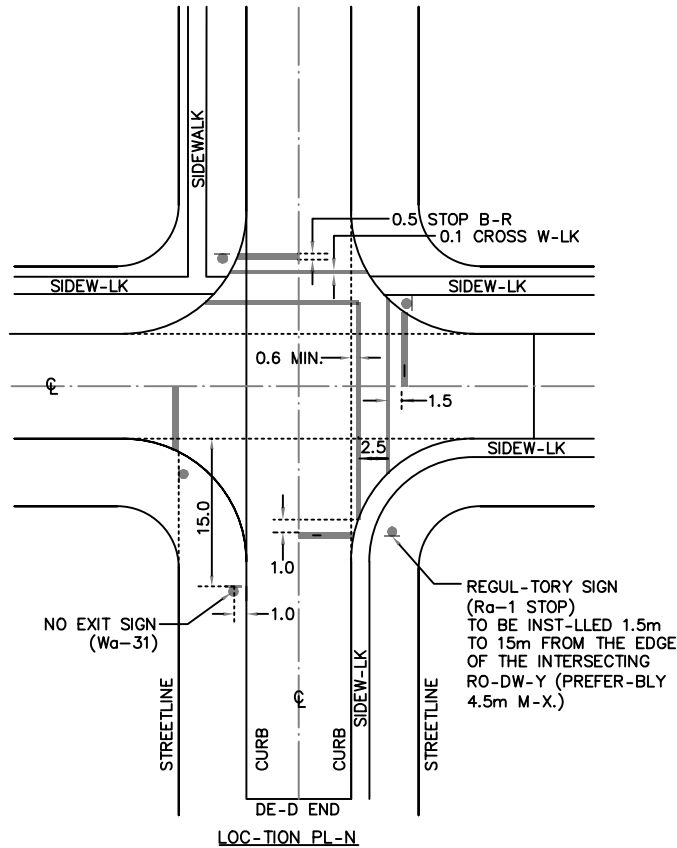
D - TE:

J-N 2026





TOWN OF EAST GWILLIMBURY STAND-RD DRAWING				NO.	REVISION	D-TE	
SUBDRAIN INSTALLATION DETAIL	DWG No.						
	R-204						
DR-WN:	-PPROVED:	SC-LE:	D-TE:				
K.C	K.B	N.T.S.	J-N 2026				



INST-LL-TION DET-IL

*SIGN OFFSET TO BE 0.50m FROM B-CK OF CURB F-CE SIDEW-LK.

NOTES:

1. REGUL-TORY/W-RNING SIGNS -S PER OHT- REG. 615/616 OR -MENDMENTS THEREOF.
2. STOP SIGNS (Ra-1) POSTS SH-LL BE 75mm X 3.66m -LUMINUM COMPLETE WITH TOP C-P.
3. STOP SIGNS SH-LL BE B-NDED TO THE POST WITH - MINIMUM 12.7mm X 0.76mm ST-INLESS STEEL B-NDING -ND FL-RED LEG ST-INLESS STEEL BR-CKETS (B-NDRIT BR-CKETS OR EQUIV-LENT).
4. -LL REGUL-TORY SIGNS SH-LL CONFORM WITH THE CURRENT VERSION OF THE ONT-RIO TR-FFIC M-NU-L (O.T.M.)
5. -LL REGUL-TORY -ND W-RNING SIGN BL-NKS SH-LL BE -LUMINUM -ND BE HIGH DENSITY REFLECTORIZED SURF-CES.
6. SIGN POSTS TO BE B-CKFILLED WITH 19mm CRUSHER-RUN LIMESTONE.
7. U-CH-NNEL POST 1.5m INST-LLED LE-VING 0.3m STUB EXPOSED -BOVE GR-DE. MECH-NIC-LLY F-STENED WITH G-LV-NIZED BOLTS

-LL DIMENSIONS -RE EXPRESSED IN METERS (m) UNLESS OTHERWISE NOTED.

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

D-TE

TRAFFIC AND PAVEMENT MARKING
SIGNAGE INSTALLATION DETAIL

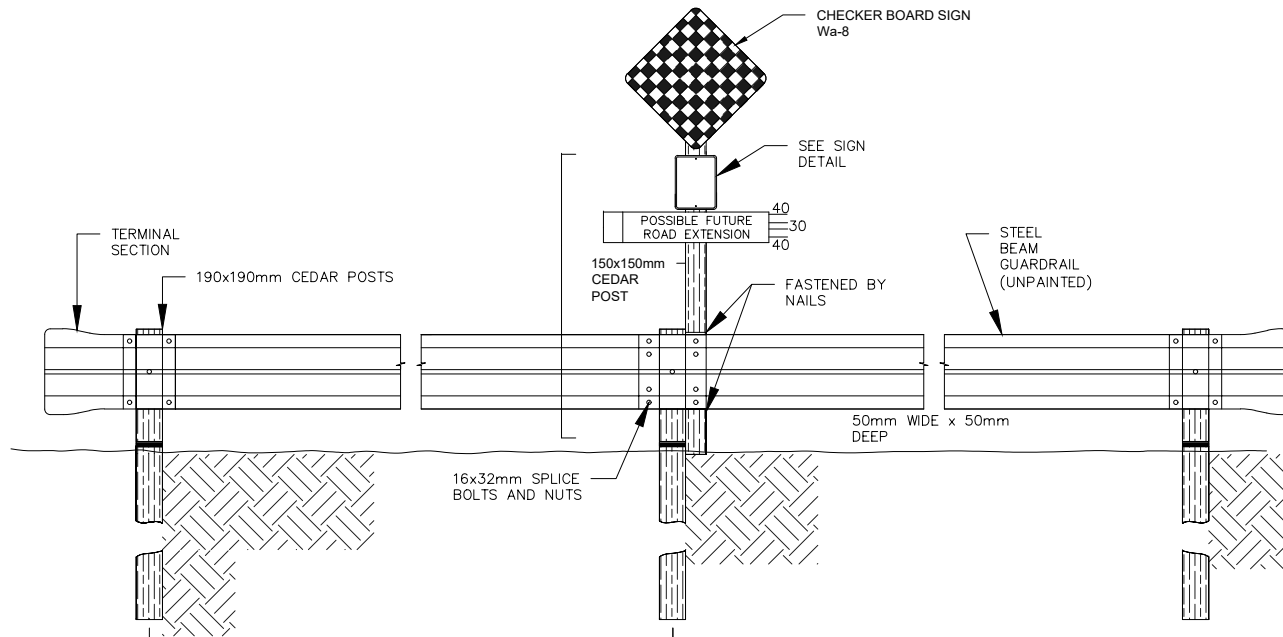
DWG No.

R-205

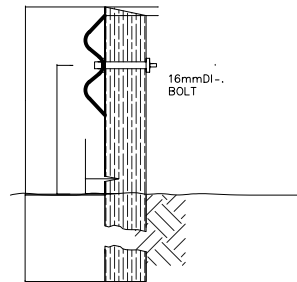
DR-WN:	-PPROVED:	SC-LE:	D-TE:
K.C	K.B	N.T.S.	J-N 2026



ALL DIMENSIONS IN MILLIMETERS AND/OR METERS, DRAWING NOT TO SCALE



BARRICADE DETAIL



POST DETAIL

NOTES:

1. STEEL BEAM RAIL AS PER OPSD 912.101 AND OPSD 912.532.
2. RAIL TO BE GALVANIZED 300g/m² BOTH SIDES.
3. BARRICADE TO BE LOCATED 1.5m BEYOND EDGE OF PAVEMENT
4. FOR PAVEMENT WIDTHS IN EXCESS OF 8.5m, ADDITIONAL SECTIONS TO BE ADDED TO THE STEEL BEAM SO THAT THE ENDS OF TERMINAL SECTIONS ARE AT FACE TO FACE OF CURB

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

D - TE

DEAD END BARRICADE

DWG No.

R-206

DR - WN:

K.C

-PPROVED:

K.B

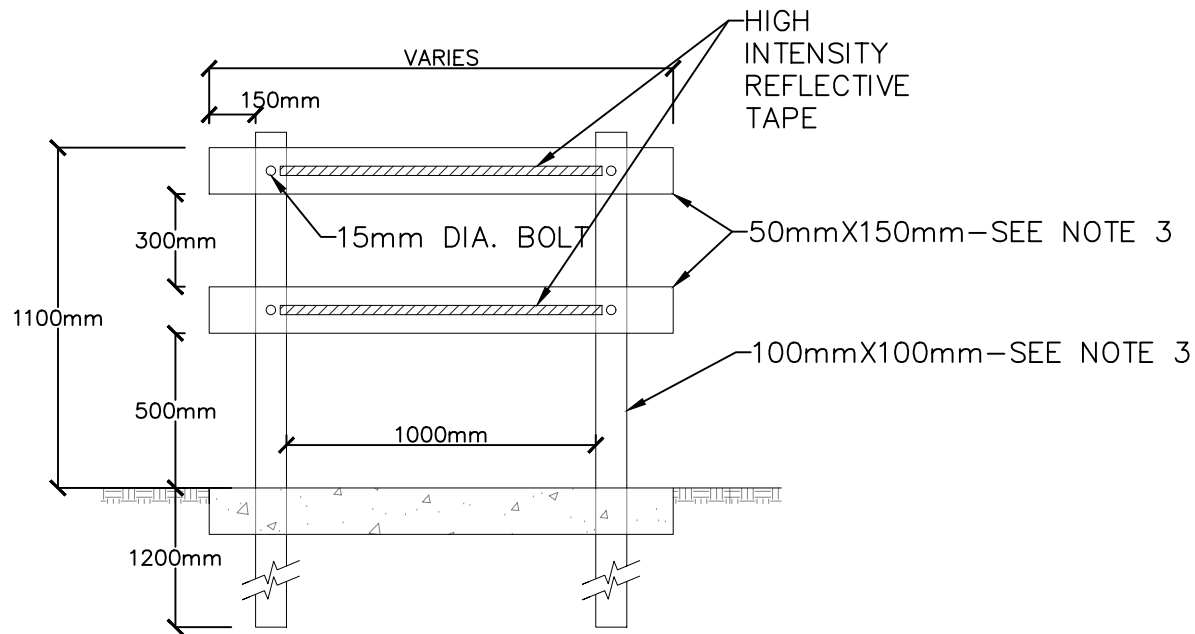
SC - LE:

N.T.S.

D - TE:

J-N 2026





NOTES

1. TO BE USED AT END OR SIDE OF SIDEWALK WHERE GRADE DIFFERENCE WOULD CAUSE PEDESTRIAN HAZARD.
2. HIGH INTENSITY REFLECTIVE TAPE TO BE APPLIED TO CROSS PLANKS.
3. CROSS CEDAR PLANKS OR PRESSURE TREATED PLANKS TO BE PAINTED WHITE
4. SIDEWALK ENDS OR CLOSED SIGN TO BE MOUNTED

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO.

REVISION

D-TE

TEMPORARY SIDEWALK BARRICADE

DWG No.

R-207

DR-WN:

K.C

APPROVED:

K.B

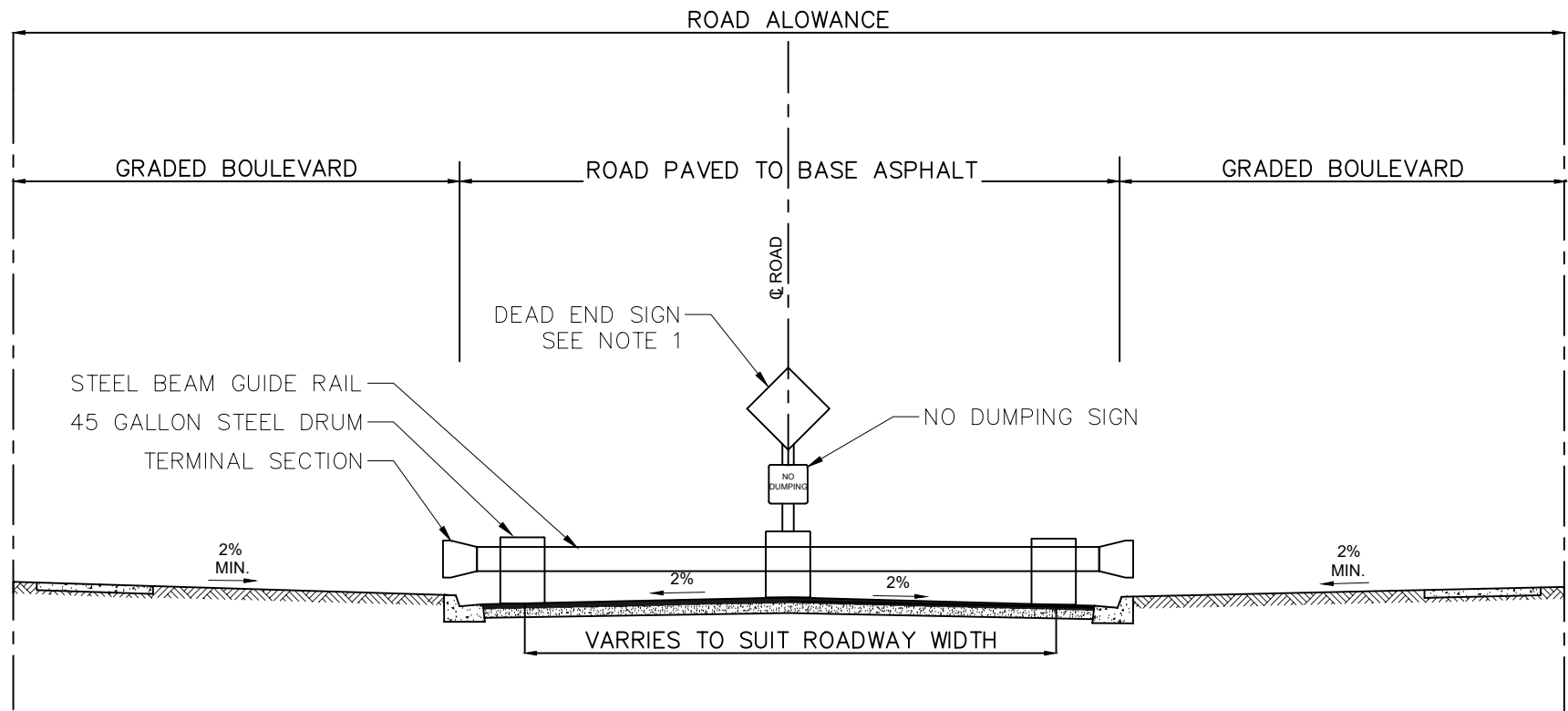
SC-LE:

N.T.S.

D-TE:

J-N 2026





NOTES

1. DEAD END SIGN AS SPECIFIED IN THE ONTARIO TRAFFIC MANUAL (OTM)
2. STEEL BEAM GUIDE RAIL TO BE GALVANIZED
3. DEAD END BARRICADES REQUIRED WHERE A ROAD ENDS WITHOUT A TURNING CIRCLE

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

D - TE

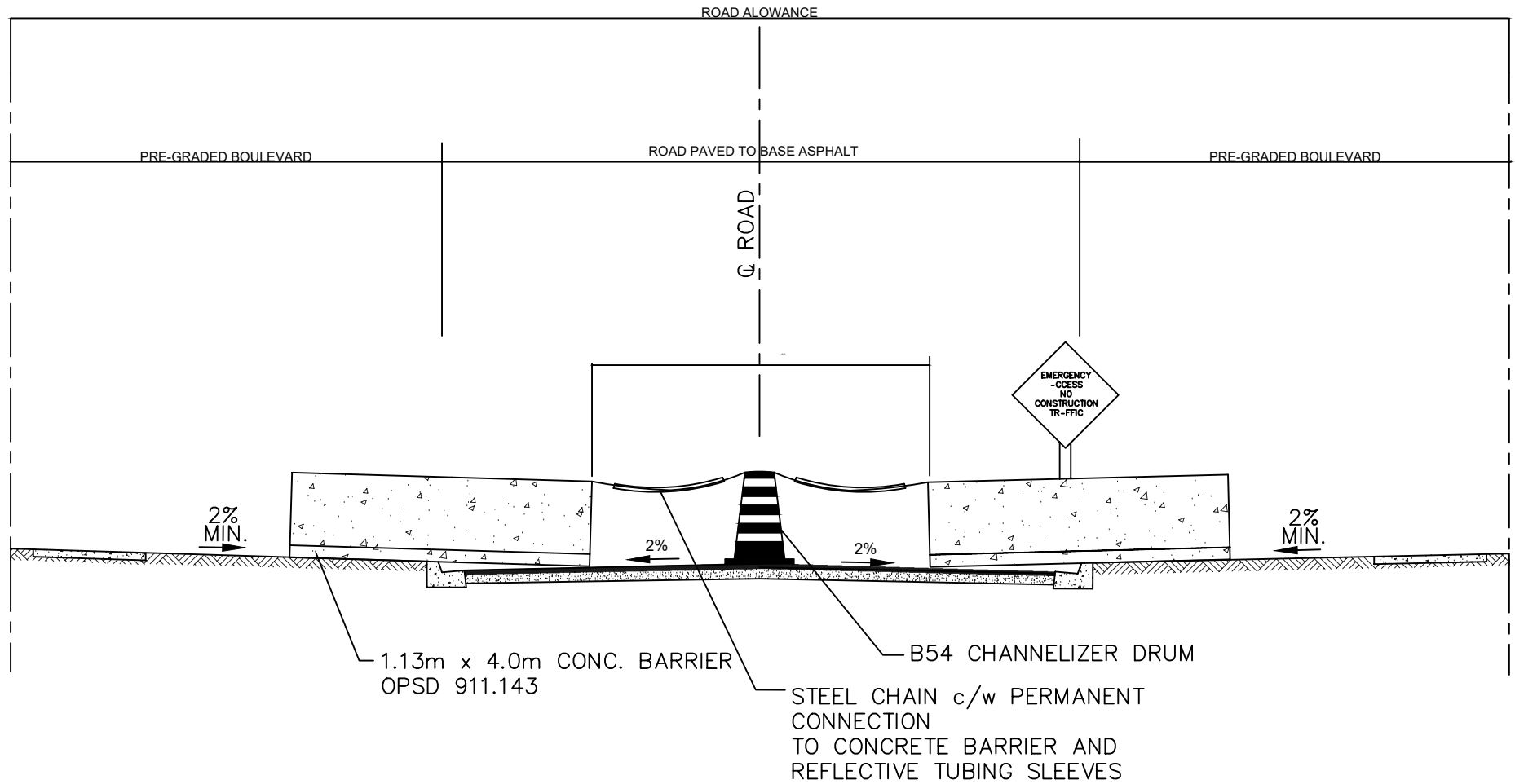
TEMPOARY ROAD BARRICADE

DWG No.

R-208

DR - WN:	APPROVED:	SC - LE:	D - TE:
K.C	K.B	N.T.S.	J-N 2026





TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

D - TE

TEMPORARY ROAD BARRICADE WITH
EMERGENCY ACCESS

DWG No.

R-209

DR - WN:

K.C

-PPROVED:

K.B

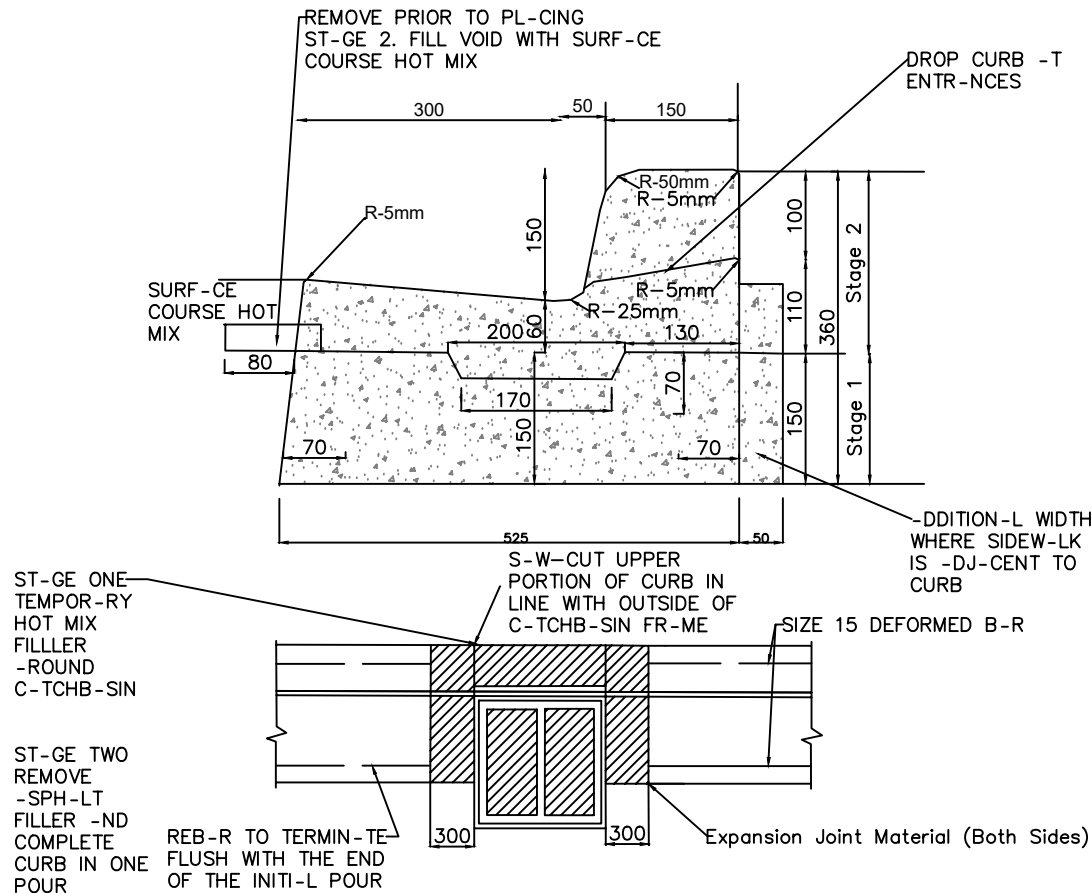
SC - LE:

N.T.S.

D - TE:

J-N 2026





NOTES:

1. FLEXIBLE -ND COMPOSITE P-VEMENT SH-LL BE 5MM -BOVE THE -DJ-CENT EDGE OF GUTTER
2. WHERE THE SIDEW-LK IS CONTINUOUS TO THE CURB, -T ENTR-NCES LOWER THE -DDITION-L HEIGHT OF THE CONCRETE -T THE RE-R OF THE CURB TO 150MM
3. FOR SLIPFORMING PROCEDURES - 5% B-TTER IS -CCEPT-BLE
4. TRE-TMENT -T ENTR-NCES SH-LL CONFORM WITH OPSD 351.01
5. OUTLET TRE-TMENT SH-LL CONFORM WITH OPSD -610 SERIES
6. THE LENGTH OF TR-NSITION FROM ONE CURB TYPE TO -NOTHER SH-LL BE 3.0M . EXCEPT WHEN IN CONJUNCTION WITH GU-RDR-IL , IT SH-LL CONFORM TO 900-SERIES
7. -LL DIMENSIONS -RE IN MM UNLESS OTHERWISE SHOWN

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

D-TE

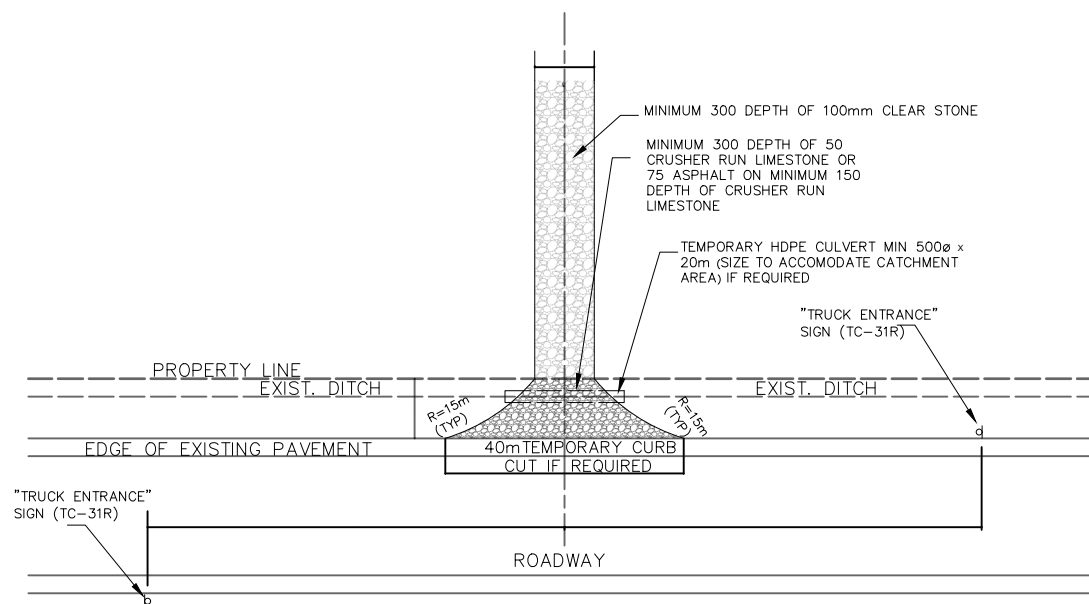
STANDARD CONCRETE BARRIER CURB
WITH STANDARD GUTTER TWO STAGE
CONSTRUCTION

DWG No.

R-210

DR-WN: -PPROVED: SC-LE: D-TE:
K.C K.B N.T.S. J-N 2026





NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE NOTED.
2. TEMPORARY "TRUCK ENTRANCE" SIGNS(TC-31) SHALL BE INSTALLED ON THE SHOULDER, 150M IN ADVANCE OF THE ACCESS (NOTE: SEE DETAILS ON USE OF THESE SIGNS IN THE ONTARIO TRAFFIC MANUAL BOOK 7.) THE SIGNS IN THE ONTARIO TRAFFIC MANUAL, BOOK 7.) THE APPLICANT WILL BE RESPONSIBLE FOR THE COST OF OBTAINING, ERECTING AND MAINTAINING THESE SIGNS.
3. TEMPORARY CONSTRUCTION ACCESS SHALL BE REMOVED FROM THE REGIONAL ROAD ALLOWANCE AND ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION.
4. MUD MAT SHALL BE MINIMUM 10M IN WIDTH, 50M IN LENGTH

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

DATE

MUD MAT

DWG No.

R-211

DRAWN:

K.C

APPROVED:

K.B

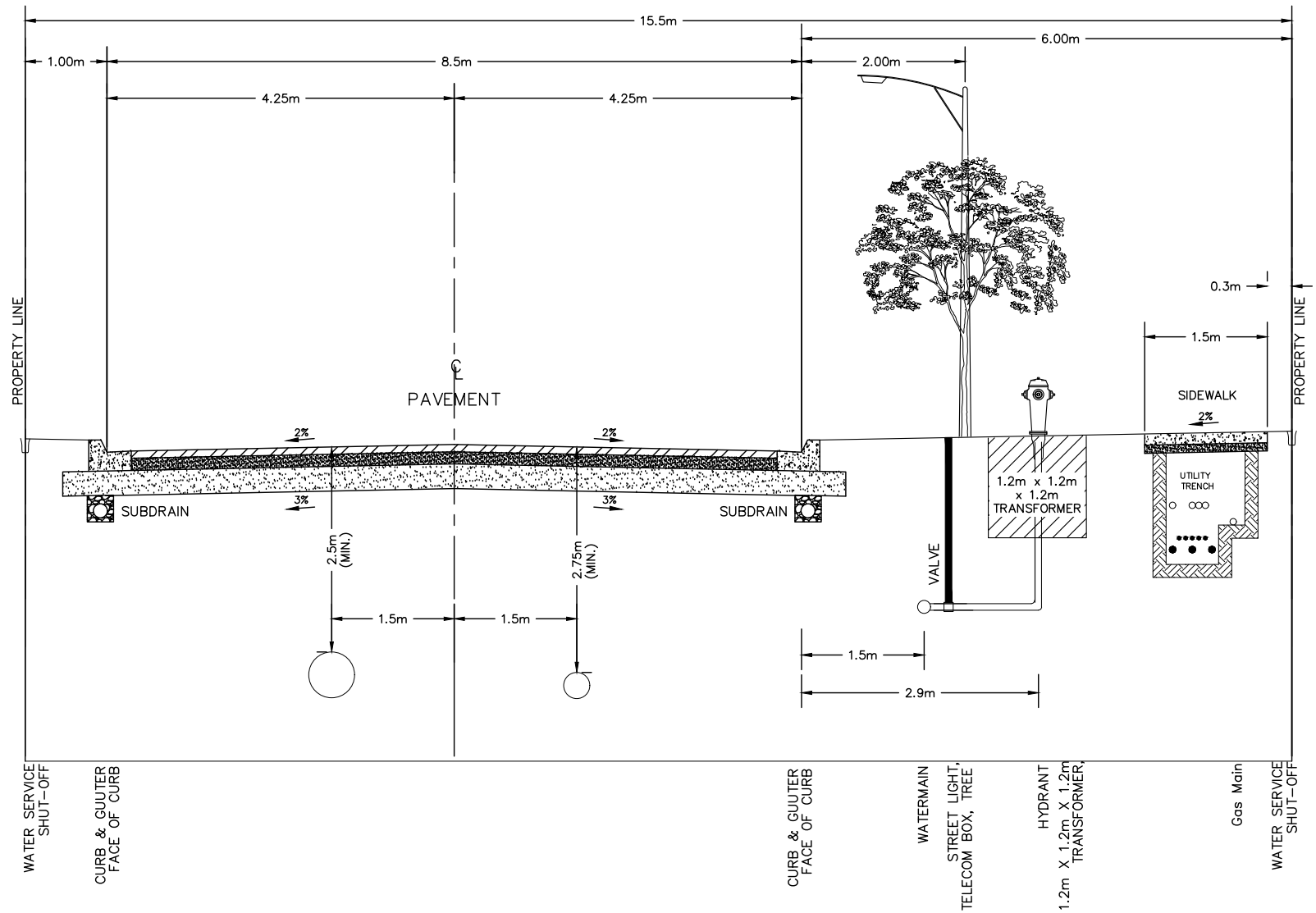
SCALE:

N.T.S.

DATE:

JAN 2026





NOTE: ONLY PERMITTED WHEN ADJACENT TO EXISTING ROW

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

DATE

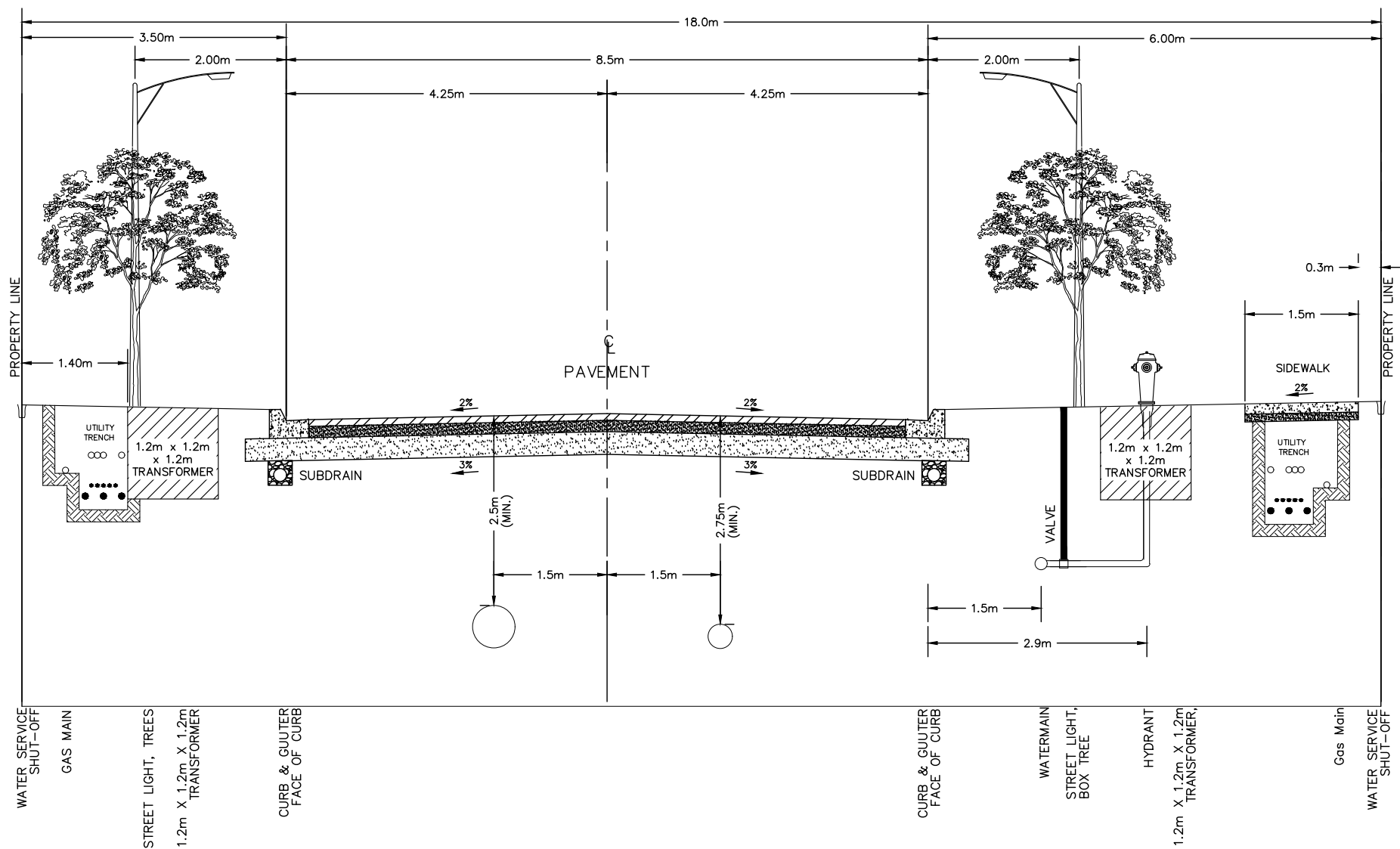
15.5M R.O.W LOCAL ROAD

DWG No.

R-212

DRAWN: K.C
APPROVED: K.B
SCALE: N.T.S.
DATE: JAN 2026





TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

DATE

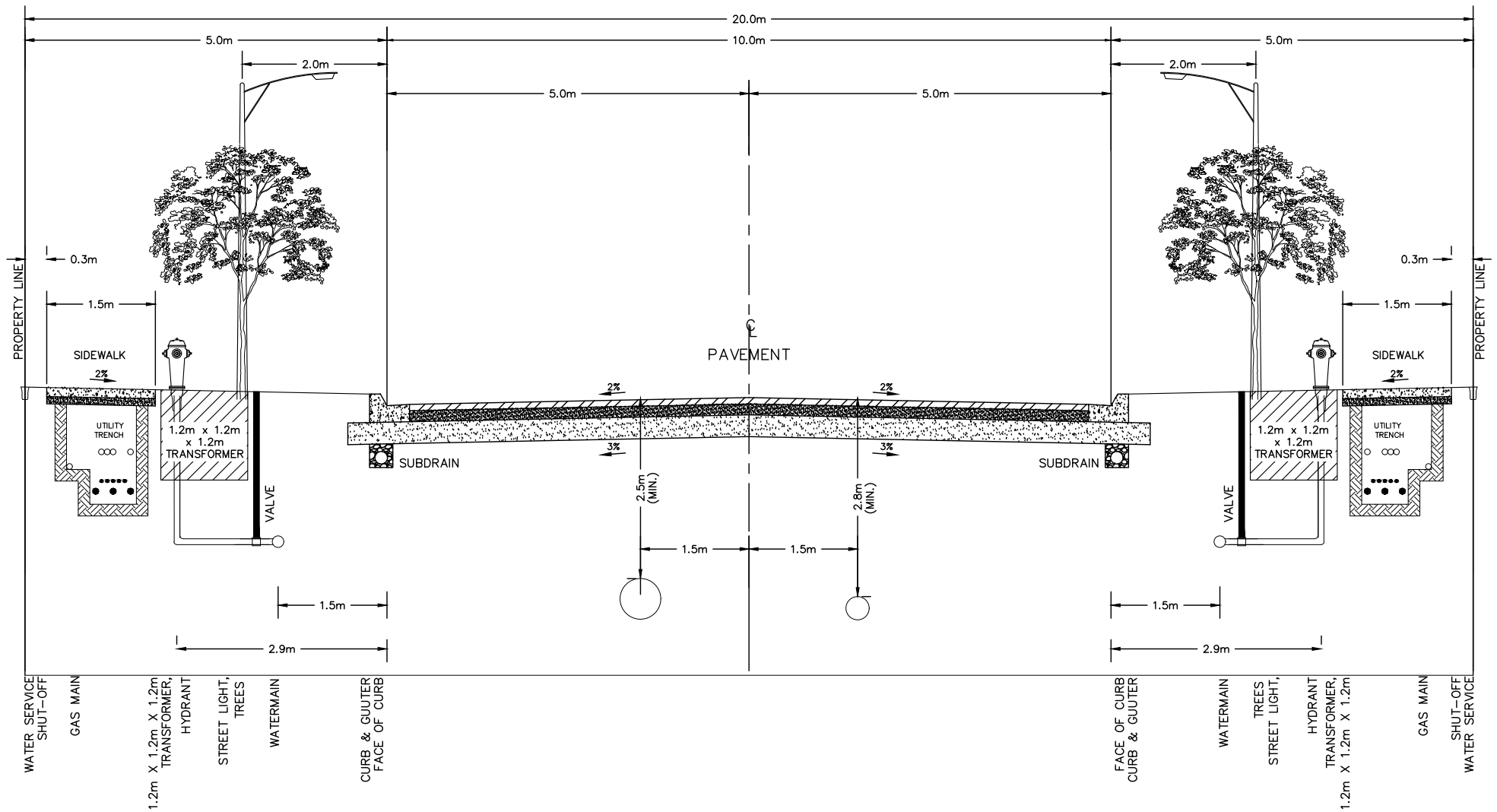


18.0M R.O.W LOCAL ROAD

DWG No.

R-213

DRAWN: K.C. APPROVED: K.B. SCALE: N.T.S. DATE: JAN 2026



TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

DATE

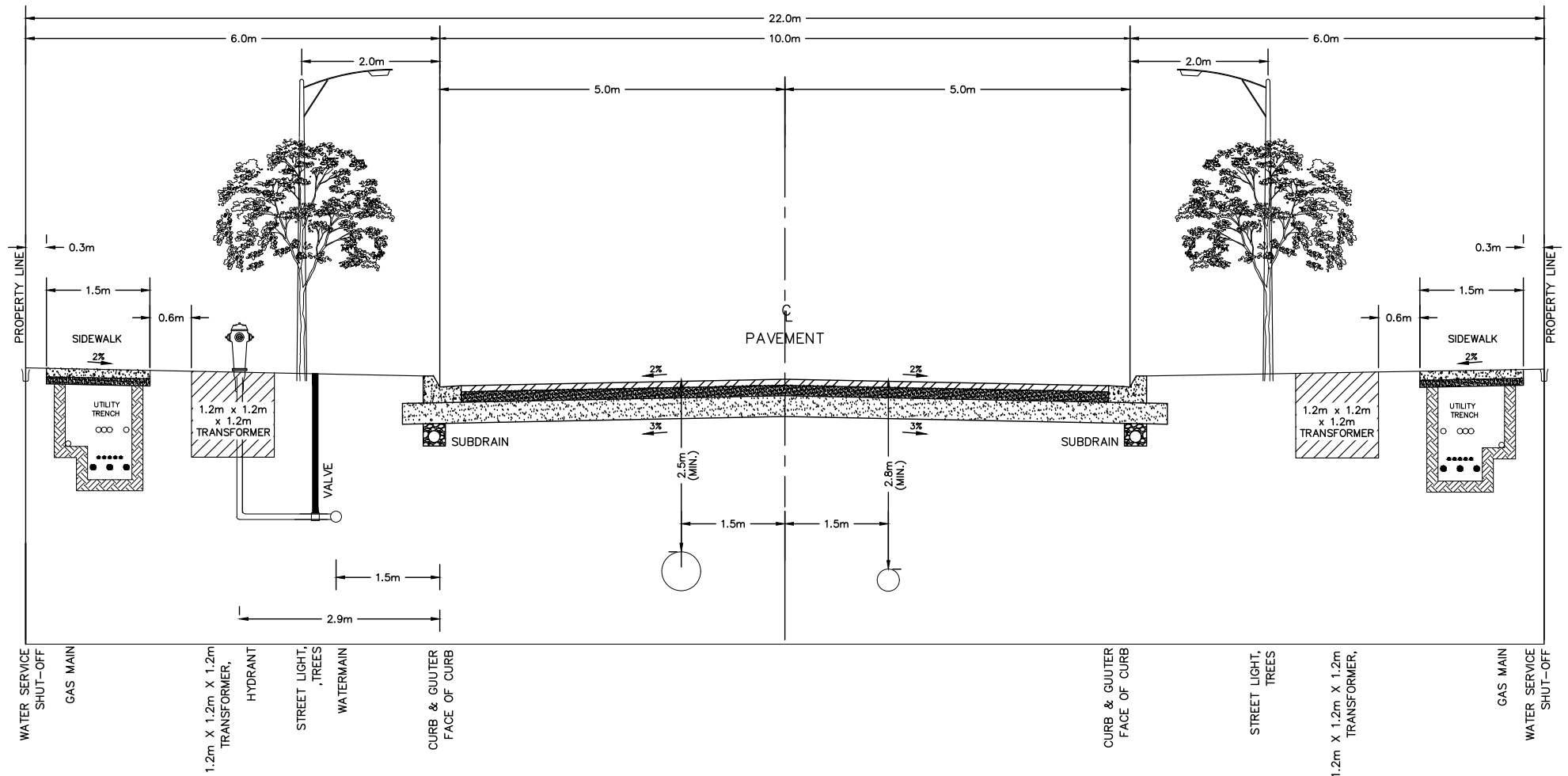
20.0M R.O.W COLLECTOR ROAD

DWG No.

R-214

DRAWN: K.C. APPROVED: K.B. SCALE: N.T.S. DATE: JAN 2026





TOWN OF EAST GWILLIMBURY STANDARD DRAWING

22.0M R.O.W COLLECTOR ROAD

DWG No.

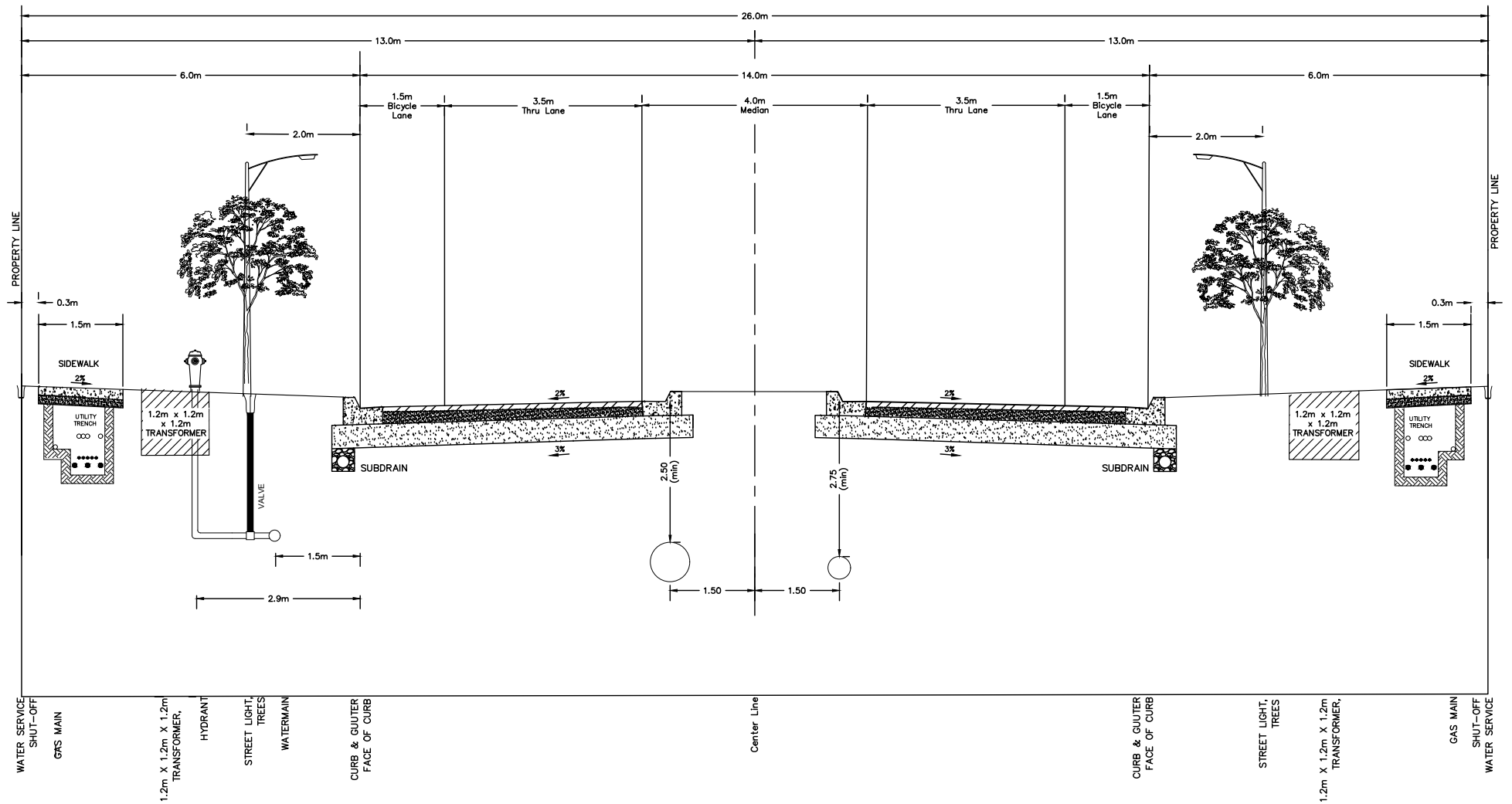
R-215

DRAWN: K.C
APPROVED: K.B
SCALE: N.T.S.
DATE: JAN 2026

NO. REVISION

DATE





TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

DATE

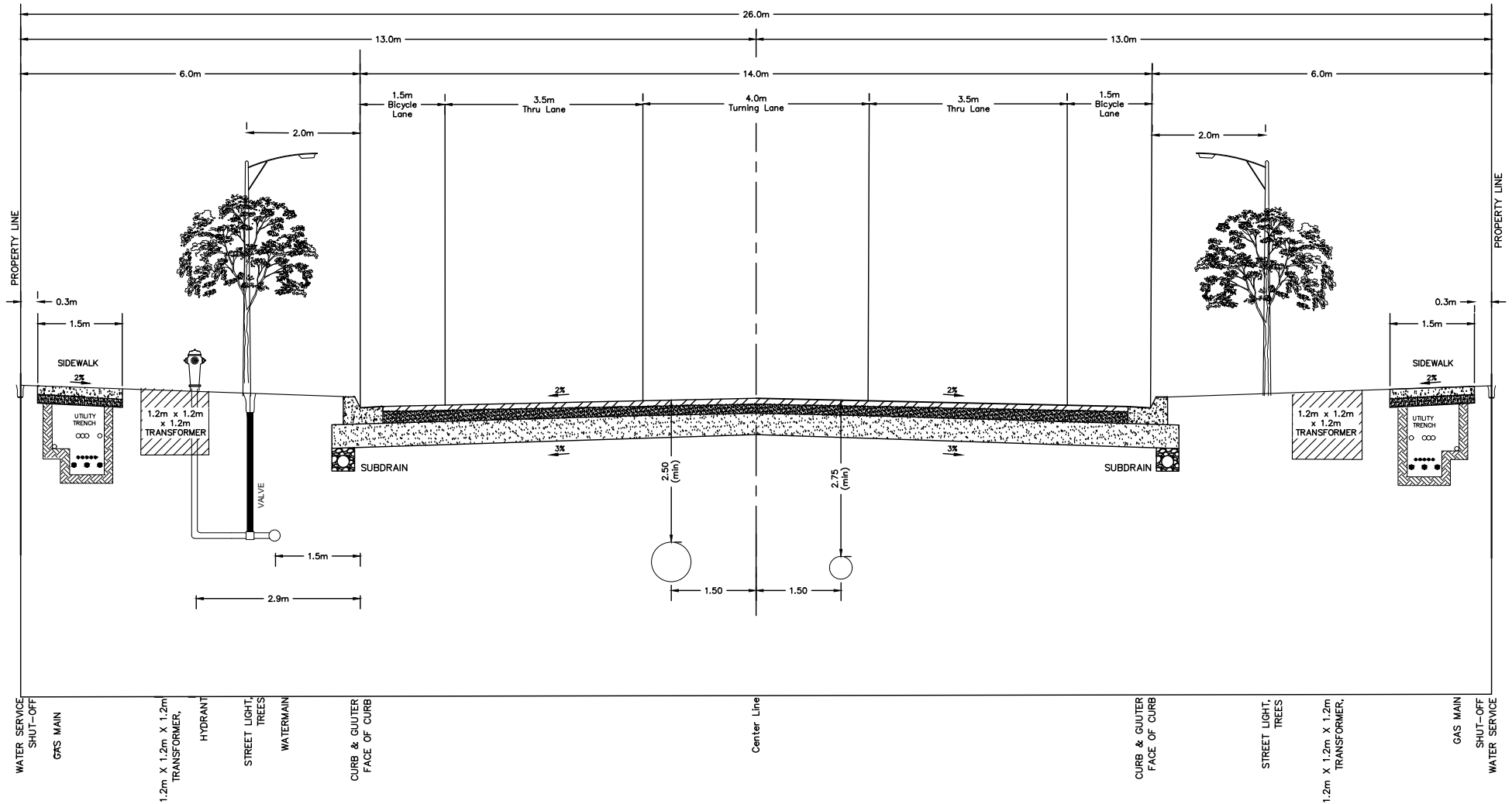
26.0M R.O.W COLLECTOR ROAD
WITH MEDIAN

DWG No.

R-216

DRAWN: M.B. APPROVED: K.B. SCALE: N.T.S. DATE: JAN 2026





TOWN OF EAST GWILLIMBURY STANDARD DRAWING

26.0M R.O.W COLLECTOR ROAD
TURNING LANE

DWG No.

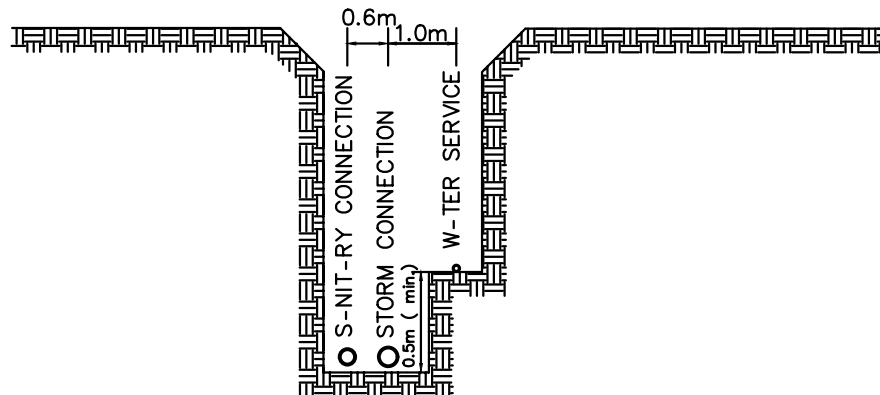
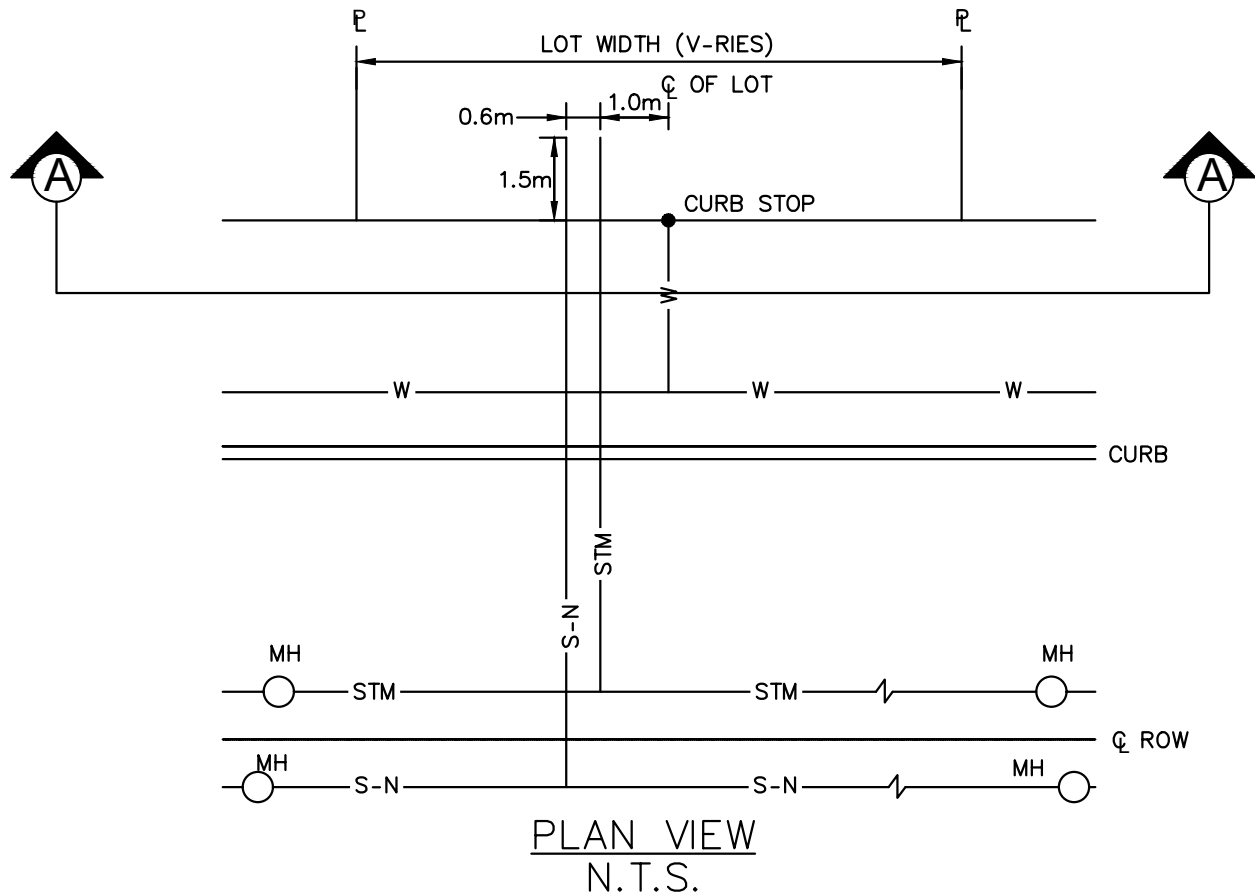
R-217

DRAWN: M.B. APPROVED: K.B. SCALE: N.T.S. DATE: JAN 2026

NO. REVISION

DATE

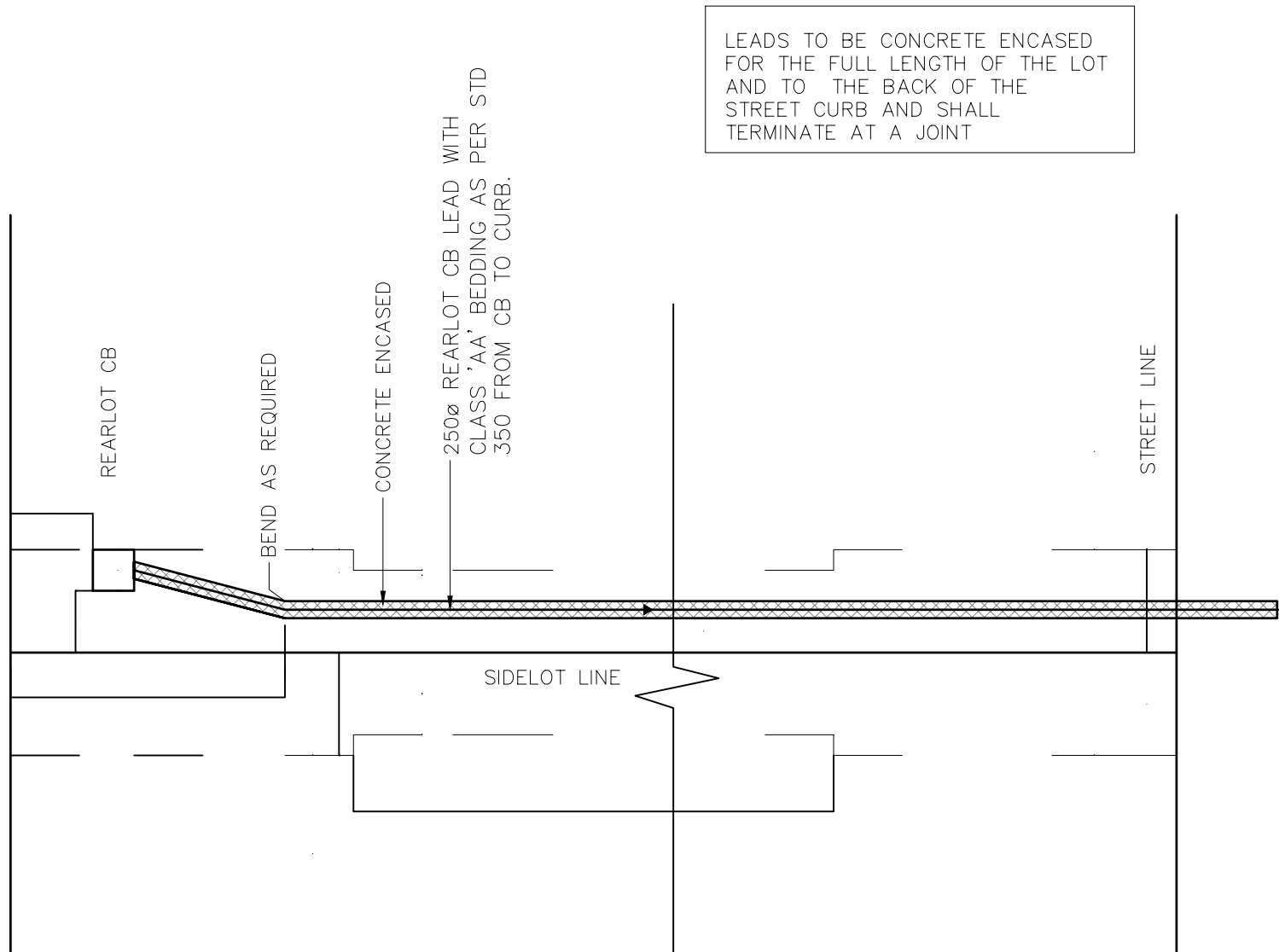




NOTES:

1. -LL EXC-V-TIONS MUST BE C-RRIED OUT -CCORDING TO THE OCCUP-TION-L HE-LTH -ND S-FETY -CT, R.S.O. 1990 c.O.1 -ND REGUL-TIONS FOR CONSTRUCTION PROJECTS (O.Reg. 213/91)
2. -LL TRENCHES TO BE B-CKFILLED TO TOWN OF E-ST GWILLIMBURY ST-ND-RDS -ND COMP-CTED TO 95% ST-ND-RD PROCTOR DENSITY (S.P.D.).

TOWN OF EAST GWILLIMBURY STAND-RD DRAWING				NO. REVISION		D-TE
RESIDENTIAL SERVICE LAYOUT CONNECTION	DWG No. S-300					
	DR-WN:	-PPROVED:	SC-LE:	D-TE:		
	K.C	K.B	N.T.S.	J-N 2026		
						



TOWN OF EAST GWILLIMBURY STANDARD DRAWING

NO. REVISION

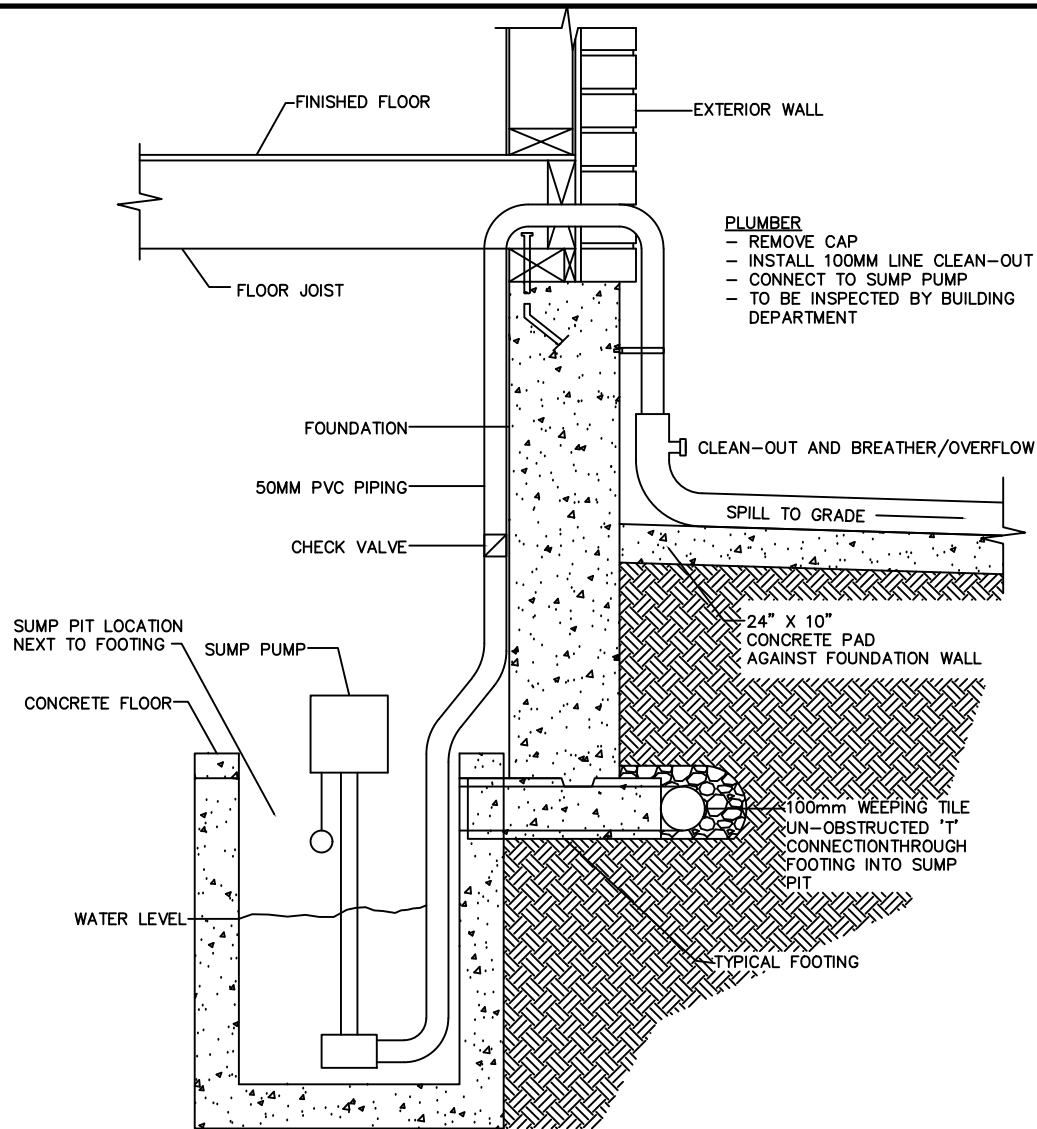
D - TE

REARLOT CATCHBASIN DETAIL

DWG No.			
S-301			
DR - WN:	APPROVED:	SC - LE:	D - TE:
K.C	K.B	N.T.S.	J-N 2026







NOTES 1. FOR USE IN RURAL AREAS ONLY.

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

SUMP PUMP WITHOUT CONNECTION

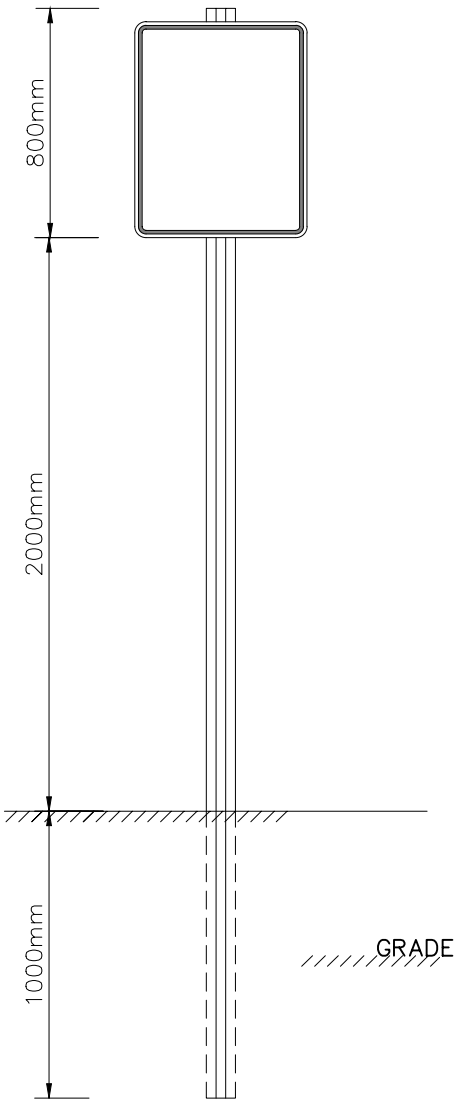
DWG No.

S-303

DRAWN:	APPROVED:	SCALE:	DATE:
K.C	K.B	N.T.S.	JAN 2026

NO. REVISION

DATE



SIGN REQUIREMENTS

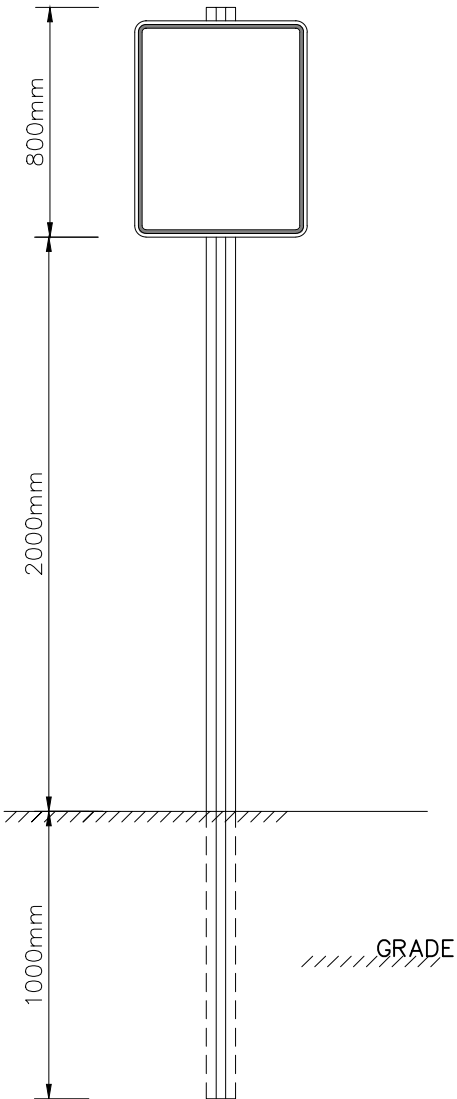
SIGN(S) MUST BE PLACED AT ALL POND ENTRANCES.

MOUNTING

SIGN(S) TO BE MOUNTED TO 3.8m U-CHANNEL GALVANIZED STEEL POST

TOWN OF E-ST GWILLIMBURY STANDARD DRAWING				NO.	REVISION	D - TE
STORMWATER MANAGEMENT POND WARNING SIGN WET PONDS	DWG No.					
	SWM-400					
	DR - WN:					
	APPROVED:					
	K.C					
	SC - LE:	N.T.S.	D - TE:			
	K.B		J - N 2026			





SIGN REQUIREMENTS

SIGN(S) MUST BE PLACED AT ALL POND ENTRANCES.

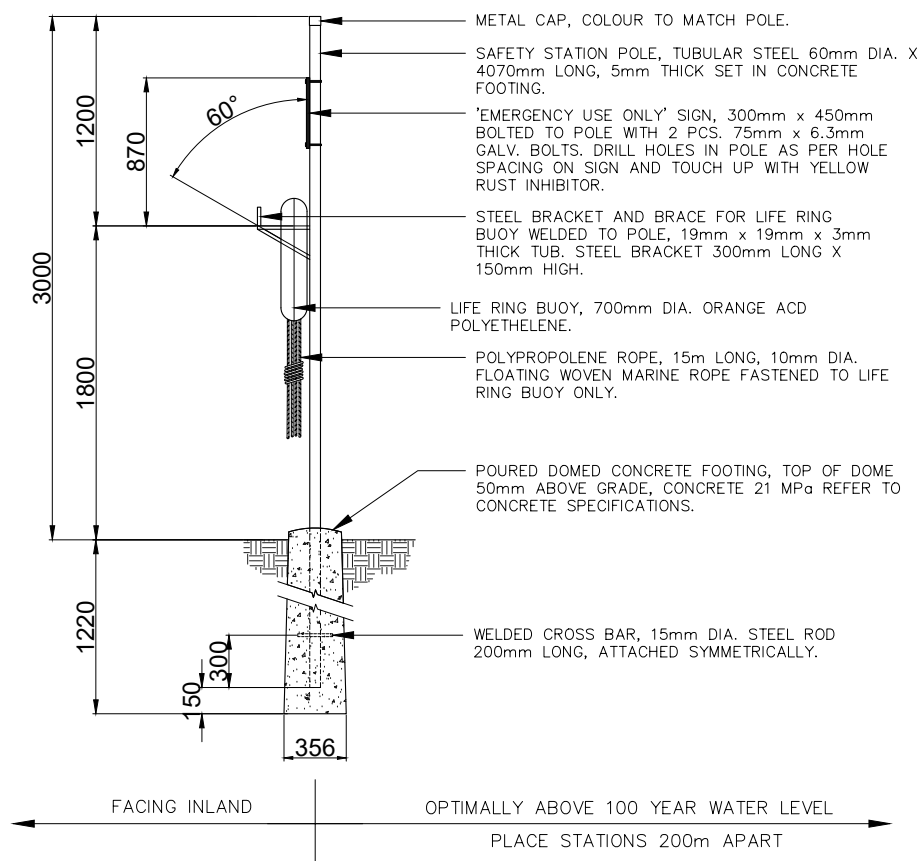
MOUNTING

SIGN(S) TO BE MOUNTED TO 3.8m U-CHANNEL GALVANIZED STEEL POST

TOWN OF E-ST GWILLIMBURY STANDARD DRAWING				NO.	REVISION	D - TE
STORMWATER MANAGEMENT POND WARNING SIGN DRY PONDS	DWG No. SWM-401					
	DR-WN:	APPROVED:	SC-LE:	D-TE:		
	K.C	K.B	N.T.S.	J-N 2026		
				 East Gwillimbury		

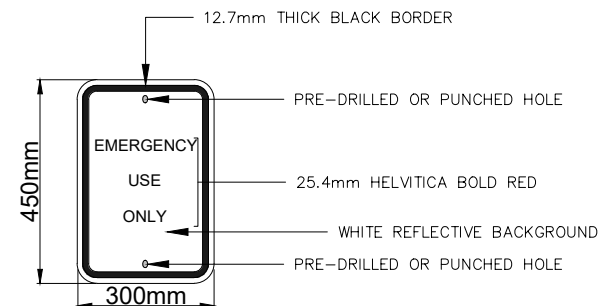


TOWN OF E-ST GWILLIMBURY STANDARD DRAWING				NO.	REVISION	D - TE	
STORMWATER MANGEMENT POND WARNING SIGN SANITARY SEWER OVERFLOW	DWG No.						
	SWM-402						
DR - WN:	-PPROVED:	SC - LE:	D - TE:				
K.C	K.B	N.T.S.	J - N 2026				



NOTES

1. FINISH OF POST AND ALL OTHER STEEL COMPONENTS AND FITTINGS TO BE SAFETY YELLOW GLOSS ENAMEL POWDER COAT APPLICATION. PRIOR TO POWDER COATING, ALL SURFACES TO BE CHEMICALLY CLEANED AND TREATED WITH PARKER BONDERITE AND CHLOROTHENE SOLVENT OR APPROVED EQUAL. POWDER COATING MUST BE A POLYESTER 2000 SERIES APPLIED IN A THICKNESS OF 4-5 MILS BY ELECTROSTATIC COAT AND OVEN CURED TO A SMOOTH AND EVEN SURFACE.
2. NO PLASTIC COMPONENTS ARE TO BE USED EXCEPT WHERE NOTED.



ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT AS NOTED

TOWN OF EAST GWILLIMBURY STANDARD DRAWING

SAFETY STATION FOR PONDS AND WATERWAYS

DWG No.

SWM-403

DR-WN:	APPROVED:	SC-LE:	D-TE:
K.C	K.B	N.T.S.	J-N 2026

NO. REVISION

D-TE



APPENDIX 3
SANITARY SEWER DESIGN SHEET

Last Revised: _____

[illegible]

APPENDIX 4
STORM SEWER DESIGN SHEET

Project / Subdivision _____

Consulting Engineer _____

Project No. _____

Last Revised: _____

Design Equations

NOTE: Section G of the Standards and Design Criteria Manual is to be referenced for Maximum Allowable Pipe Capacity

STORMDS 01/06

APPENDIX 5

DESIGN STORMS

Design Storm**1:2, 4 Hour Design Storm**

Use for peak flow analysis (i.e., HGL).

Ptotal = 34.8 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs	Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs
0.167	2.3	1.167	4.8	2.167	11.0	3.167	2.9
0.333	2.5	1.333	6.1	2.333	7.2	3.333	2.6
0.500	2.7	1.500	8.6	2.500	5.4	3.500	2.4
0.667	3.0	1.667	15.0	2.667	4.4	3.667	2.2
0.833	3.5	1.833	82.0	2.833	3.7	3.833	2.1
1.000	4.0	2.000	25.0	3.000	3.2	4.000	2.0

1:5 Year, 4 Hour Design Storm

Use for peak flow analysis (i.e., HGL).

Ptotal = 46.3 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs	Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs
0.167	2.8	1.167	6.2	2.167	14.0	3.167	3.6
0.333	3.1	1.333	7.9	2.333	9.2	3.333	3.3
0.500	3.4	1.500	11.0	2.500	6.9	3.500	3.0
0.667	3.8	1.667	20.0	2.667	5.6	3.667	2.7
0.833	4.4	1.833	113.0	2.833	4.7	3.833	2.6
1.000	5.1	2.000	24.0	3.000	4.1	4.000	2.5

1:10 Year, 4 Hour Design Storm

Use for peak flow analysis (i.e., HGL).

Ptotal = 54.2 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs	Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs
0.167	3.4	1.167	7.2	2.167	16.0	3.167	4.3
0.333	3.7	1.333	9.2	2.333	11.0	3.333	3.9
0.500	4.1	1.500	13.0	2.500	8.1	3.500	3.6
0.667	4.6	1.667	22.0	2.667	6.6	3.667	3.3
0.833	5.2	1.833	136.0	2.833	5.6	3.833	3.2
1.000	6.0	2.000	38.0	3.000	4.9	4.000	3.1

1:25 Year, 4 Hour Design Storm

Use for peak flow analysis (i.e., HGL).

Ptotal = 62.2 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs	Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs
0.167	4.1	1.167	8.3	2.167	18.0	3.167	5.1
0.333	4.4	1.333	10.0	2.333	12.0	3.333	4.6
0.500	4.8	1.500	14.0	2.500	9.2	3.500	4.2
0.667	5.4	1.667	24.0	2.667	7.6	3.667	3.9
0.833	6.1	1.833	160.0	2.833	6.5	3.833	3.8
1.000	7.0	2.000	40.0	3.000	5.7	4.000	3.6

1:50 Year, 4 Hour Design Storm

Use for peak flow analysis (i.e., HGL).

Ptotal = 72.3 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs	Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs
0.167	4.3	1.167	9.2	2.167	21.0	3.167	5.4
0.333	4.7	1.333	12.0	2.333	14.0	3.333	4.9
0.500	5.1	1.500	16.0	2.500	10.0	3.500	4.5
0.667	5.7	1.667	29.0	2.667	8.3	3.667	4.1
0.833	6.5	1.833	190.0	2.833	7.0	3.833	3.9
1.000	7.6	2.000	50.0	3.000	6.1	4.000	3.8

1:100 Year, 4 Hour Design Storm

Use for peak flow analysis (i.e., HGL).

Ptotal = 78.1 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs	Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs
0.167	4.3	1.167	9.7	2.167	23.0	3.167	5.6
0.333	4.7	1.333	13.0	2.333	15.0	3.333	5.0
0.500	5.3	1.500	18.0	2.500	11.0	3.500	4.5
0.667	5.9	1.667	33.0	2.667	8.7	3.667	4.2
0.833	6.8	1.833	203.0	2.833	7.3	3.833	4.0
1.000	7.9	2.000	58.0	3.000	6.3	4.000	3.8

Pond By-Pass Design, 4 Hour Design Storm

Use for peak flow analysis (i.e., pond by-pass).

P_{total} = 7.9 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs	Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs
0.167	0.5	1.167	1.0	2.167	2.4	3.167	0.6
0.333	0.5	1.333	1.3	2.333	1.6	3.333	0.5
0.500	0.6	1.500	1.9	2.500	1.2	3.500	0.5
0.667	0.6	1.667	3.4	2.667	0.9	3.667	0.5
0.833	0.7	1.833	19.4	2.833	0.8	3.833	0.4
1.000	0.9	2.000	5.8	3.000	0.7	4.000	0.4

1:2 Year, 24 Hour SCS Design Storm

Use to compute stormwater detention volumes.

Ptotal = 52.12 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs	Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs
0.20	.51	6.20	1.02	12.20	10.67	18.20	.76
0.40	.51	6.40	1.02	12.40	6.60	18.40	.76
0.60	.51	6.60	1.02	12.60	4.83	18.60	.76
0.80	.51	6.80	1.02	12.80	4.57	18.80	.76
1.00	.51	7.00	1.02	13.00	3.30	19.00	.76
1.20	.51	7.20	1.02	13.20	2.79	19.20	.76
1.40	.51	7.40	1.02	13.40	2.79	19.40	.76
1.60	.51	7.60	1.02	13.60	2.79	19.60	.76
1.80	.51	7.80	1.02	13.80	2.79	19.80	.76
2.00	.51	8.00	1.02	14.00	2.79	20.00	.76
2.20	.51	8.20	1.52	14.20	1.52	20.20	.51
2.40	.51	8.40	1.52	14.40	1.52	20.40	.51
2.60	.51	8.60	1.52	14.60	1.52	20.60	.51
2.80	.51	8.80	1.52	14.80	1.52	20.80	.51
3.00	.51	9.00	1.52	15.00	1.52	21.00	.51
3.20	.51	9.20	1.52	15.20	1.52	21.20	.51
3.40	.51	9.40	1.52	15.40	1.52	21.40	.51
3.60	.51	9.60	1.52	15.60	1.52	21.60	.51
3.80	.51	9.80	1.52	15.80	1.52	21.80	.51
4.00	.51	10.00	1.52	16.00	1.52	22.00	.51
4.20	1.02	10.20	3.05	16.20	1.02	22.20	.51
4.40	1.02	10.40	3.05	16.40	1.02	22.40	.51
4.60	1.02	10.60	3.05	16.60	1.02	22.60	.51
4.80	1.02	10.80	3.05	16.80	1.02	22.80	.51
5.00	1.02	11.00	3.05	17.00	1.02	23.00	.51
5.20	1.02	11.20	4.06	17.20	1.02	23.20	.51
5.40	1.02	11.40	5.84	17.40	1.02	23.40	.51
5.60	1.02	11.60	13.21	17.60	1.02	23.60	.51
5.80	1.02	11.80	28.96	17.80	1.02	23.80	.51
6.00	1.02	12.00	60.45	18.00	1.02	24.00	.51

1:5 Year, 24 Hour SCS Design Storm

Use to compute stormwater detention volumes.

Ptotal = 62.43 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs	Time hrs	Rain mm/hr	Time hrs	Rain mm/hrs
.20	.76	6.20	1.27	12.20	12.19	18.20	1.27
.40	.76	6.40	1.27	12.40	7.62	18.40	1.27
.60	.76	6.60	1.27	12.60	5.59	18.60	1.27
.80	.76	6.80	1.27	12.80	5.08	18.80	1.27
1.00	.76	7.00	1.27	13.00	3.81	19.00	1.27
1.20	.76	7.20	1.27	13.20	3.05	19.20	1.02
1.40	.76	7.40	1.27	13.40	3.05	19.40	1.02
1.60	.76	7.60	1.27	13.60	3.05	19.60	1.02
1.80	.76	7.80	1.27	13.80	3.05	19.80	1.02
2.00	.76	8.00	1.27	14.00	3.05	20.00	1.02
2.20	.76	8.20	1.78	14.20	1.78	20.20	1.02
2.40	.76	8.40	1.78	14.40	1.78	20.40	1.02
2.60	.76	8.60	1.78	14.60	1.78	20.60	1.02
2.80	.76	8.80	1.78	14.80	1.78	20.80	1.02
3.00	.76	9.00	1.78	15.00	1.78	21.00	1.02
3.20	.76	9.20	1.78	15.20	1.78	21.20	.76
3.40	.76	9.40	1.78	15.40	1.78	21.40	.76
3.60	.76	9.60	1.78	15.60	1.78	21.60	.76
3.80	.76	9.80	1.78	15.80	1.78	21.80	.76
4.00	.76	10.00	1.78	16.00	1.78	22.00	.76
4.20	1.27	10.20	3.30	16.20	1.27	22.20	.76
4.40	1.27	10.40	3.30	16.40	1.27	22.40	.76
4.60	1.27	10.60	3.30	16.60	1.27	22.60	.76
4.80	1.27	10.80	3.30	16.80	1.27	22.80	.76
5.00	1.27	11.00	3.30	17.00	1.27	23.00	.76
5.20	1.27	11.20	4.57	17.20	1.27	23.20	.76
5.40	1.27	11.40	6.60	17.40	1.27	23.40	.76
5.60	1.27	11.60	15.24	17.60	1.27	23.60	.76
5.80	1.27	11.80	33.27	17.80	1.27	23.80	.76
6.00	1.27	12.00	69.60	18.00	1.27	24.00	.76

1:25 Year, 24 Hour SCS Design Storm

Use to compute stormwater detention volumes.

Ptotal = 95.96 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hr	Time hrs	Rain mm/hr	Time hrs	Rain mm/hr
.20	1.02	6.20	2.03	12.20	18.80	18.20	2.03
.40	1.02	6.40	2.03	12.40	11.68	18.40	2.03
.60	1.02	6.60	2.03	12.60	8.38	18.60	2.03
.80	1.02	6.80	2.03	12.80	8.13	18.80	2.03
1.00	1.02	7.00	2.03	13.00	5.59	19.00	2.03
1.20	1.02	7.20	2.03	13.20	4.83	19.20	1.52
1.40	1.02	7.40	2.03	13.40	4.83	19.40	1.52
1.60	1.02	7.60	2.03	13.60	4.83	19.60	1.52
1.80	1.02	7.80	2.03	13.80	4.83	19.80	1.52
2.00	1.02	8.00	2.03	14.00	4.83	20.00	1.52
2.20	1.02	8.20	2.79	14.20	2.79	20.20	1.52
2.40	1.02	8.40	2.79	14.40	2.79	20.40	1.52
2.60	1.02	8.60	2.79	14.60	2.79	20.60	1.52
2.80	1.02	8.80	2.79	14.80	2.79	20.80	1.52
3.00	1.02	9.00	2.79	15.00	2.79	21.00	1.52
3.20	1.02	9.20	2.79	15.20	2.79	21.20	1.02
3.40	1.02	9.40	2.79	15.40	2.79	21.40	1.02
3.60	1.02	9.60	2.79	15.60	2.79	21.60	1.02
3.80	1.02	9.80	2.79	15.80	2.79	21.80	1.02
4.00	1.02	10.00	2.79	16.00	2.79	22.00	1.02
4.20	2.03	10.20	5.08	16.20	2.03	22.20	1.02
4.40	2.03	10.40	5.08	16.40	2.03	22.40	1.02
4.60	2.03	10.60	5.08	16.60	2.03	22.60	1.02
4.80	2.03	10.80	5.08	16.80	2.03	22.80	1.02
5.00	2.03	11.00	5.08	17.00	2.03	23.00	1.02
5.20	2.03	11.20	7.11	17.20	2.03	23.20	1.02
5.40	2.03	11.40	10.41	17.40	2.03	23.40	1.02
5.60	2.03	11.60	23.37	17.60	2.03	23.60	1.02
5.80	2.03	11.80	51.56	17.80	2.03	23.80	1.02
6.00	2.03	12.00	107.44	18.00	2.03	24.00	1.02

1:100 Year, 24 Hour SCS Design Storm

Use to compute stormwater detention volumes.

Ptotal = 112.42 mm

Time hrs	Rain mm/hr	Time hrs	Rain mm/hr	Time hrs	Rain mm/hr	Time hrs	Rain mm/hr
.20	1.27	6.20	2.29	12.20	21.84	18.20	2.29
.40	1.27	6.40	2.29	12.40	13.72	18.40	2.29
.60	1.27	6.60	2.29	12.60	9.91	18.60	2.29
.80	1.27	6.80	2.29	12.80	9.40	18.80	2.29
1.00	1.27	7.00	2.29	13.00	6.60	19.00	2.29
1.20	1.27	7.20	2.29	13.20	5.59	19.20	1.78
1.40	1.27	7.40	2.29	13.40	5.59	19.40	1.78
1.60	1.27	7.60	2.29	13.60	5.59	19.60	1.78
1.80	1.27	7.80	2.29	13.80	5.59	19.80	1.78
2.00	1.27	8.00	2.29	14.00	5.59	20.00	1.78
2.20	1.27	8.20	3.30	14.20	3.30	20.20	1.78
2.40	1.27	8.40	3.30	14.40	3.30	20.40	1.78
2.60	1.27	8.60	3.30	14.60	3.30	20.60	1.78
2.80	1.27	8.80	3.30	14.80	3.30	20.80	1.78
3.00	1.27	9.00	3.30	15.00	3.30	21.00	1.78
3.20	1.27	9.20	3.30	15.20	3.30	21.20	1.27
3.40	1.27	9.40	3.30	15.40	3.30	21.40	1.27
3.60	1.27	9.60	3.30	15.60	3.30	21.60	1.27
3.80	1.27	9.80	3.30	15.80	3.30	21.80	1.27
4.00	1.27	10.00	3.30	16.00	3.30	22.00	1.27
4.20	2.29	10.20	6.10	16.20	2.29	22.20	1.27
4.40	2.29	10.40	6.10	16.40	2.29	22.40	1.27
4.60	2.29	10.60	6.10	16.60	2.29	22.60	1.27
4.80	2.29	10.80	6.10	16.80	2.29	22.80	1.27
5.00	2.29	11.00	6.10	17.00	2.29	23.00	1.27
5.20	2.29	11.20	8.13	17.20	2.29	23.20	1.27
5.40	2.29	11.40	11.94	17.40	2.29	23.40	1.27
5.60	2.29	11.60	27.43	17.60	2.29	23.60	1.27
5.80	2.29	11.80	59.94	17.80	2.29	23.80	1.27
6.00	2.29	12.00	126.49	18.00	2.29	24.00	1.27

APPENDIX 6

TYPICAL ENGINEERING DRAWINGS



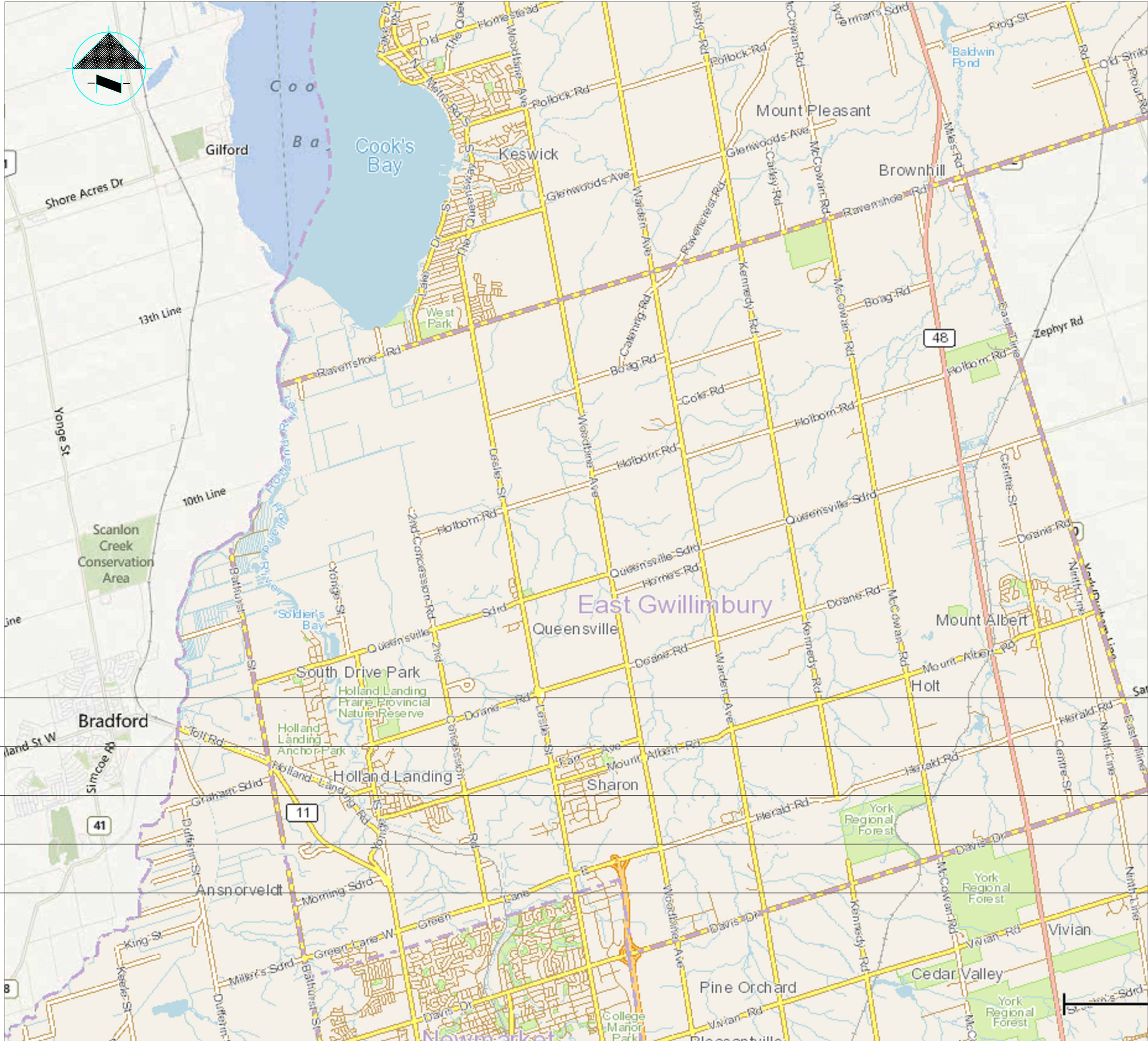
East Gwillimbury

TOWN OF EAST GWILLIMBURY
XYZ DEVELOPMENT INC.

PROJECT NUMBER _____

TOWN OF E.G. PROJECT # _____
PLANNING PROJECT # _____

DEVELOPER
CIVIL
LANDSCAPE
ELECTRICAL



SITE LOCATION
SCALE: NTS

[illegible]

FOR GENERAL NOTES REFER TO DWG. No. GN-1

THE LOCATION OF ALL UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON CONTRACT DRAWINGS, AND WHERE THE LOCATION OF THE ABOVEGROUND UTILITIES AND ELEVATION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED, PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND ELEVATION OF SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITIES OF DAMAGE.

ALL AREAS DISTURBED DURING CONSTRUCTION OF SEWER TO BE RESTORED TO ORIGINAL CONDITION OR BETTER, TO THE SATISFACTION OF THE TOWNSHIP ENGINEER. ALL EXPOSED EARTH SHALL BE RESEEDED AND SOILED TO BE TOPPED WITH 300mm TOPSOIL AND SOILED AFTER PER OPS 218.010. ALL EXISTING SERVICES TO BE ADJUSTED TO SUIT NEW GRADES.

No.		Date	By	Appr'd
Benchmarks				
No.	Elevation	Description		



Surveyed by:	Checked by:	Project No.
Drawn by:	Approved by:	
Designed by:	Date:	Drawing No.
Scale Horiz. 1:500 Vert. 1:100		Sheet No.
		- OF -

APPENDIX 7

RISK MITIGATION

Risk Mitigation

1.0 Application

All new construction being undertaken within the Town of East Gwillimbury shall comply with the following guidelines. Where a subdivision or other development has been constructed at the time of the adoption of these guidelines, but not yet fully occupied and services have not yet been fully assumed and/or accepted by the Town, and the development shall be deemed not in compliance with the guidelines, the developer shall be ordered to comply, with these guidelines.

2.0 Firebreak Requirements

- a. To assist in firefighting activities, no more than six (6) consecutive lots in a subdivision townhouse unit or other development shall be built on simultaneously. No construction shall proceed for the building or structure located on the 6th lot until such time that the building or structure on both sides are substantially completed with all external finishing including cladding, soffits, roofing, garage doors, and windows having been completed and inspected by the Chief Fire Official.
- b. The Chief Fire Official may designate additional firebreak lots in a subdivision, townhouse blocks or other development if in their opinion additional fire breaks are necessary to ensure construction site fire safety.
- c. The minimum lot width of a firebreak lot shall be a minimum of 40 feet. In the case of smaller lots, where link homes or semi-detached homes are being constructed, a double foundation shall be used as a firebreak, so that two (2) lots are left un-built and act as a firebreak.
- d. The Building Department for the Town shall be contacted prior to any construction commencing on the site. Individual Municipal requirements shall be reviewed and complied with, including the provision of firebreaks where required by the Municipality.
- e. All firebreak lots are to be clear of all combustible materials and sign installed indicating the lot, plan and municipal address along with the builder

3.0 Fire Safety Plan

Prior to beginning construction, a fire safety plan shall be prepared and approved by the Chief Fire Official. This fire safety plan shall be in graphic form and shall be clearly mounted on a highly visible wall in the construction offices.

The fire safety plan shall include the following:

- a. The designation and organization of site personnel to carry out fire safety duties. This shall include a watchman during the idle periods. It is strongly recommended that site personnel check-in and check-out with site

superintendents. This would assist with the accountability of persons working on the site.

- b. Emergency procedures in the event of a fire shall include: sounding the alarm, notifying the Emergency Services, instructing site personnel on procedures to follow upon hearing the alarm and firefighting procedures.
- c. An emergency list of critical phone numbers, i.e., Emergency Services, Builder's home numbers shall be mounted in an easily accessible area in the construction trailer.
- d. Procedures for the control of fire hazards on the site (see sections on propane storage, waste handling and hot work).
- e. The maintenance of firefighting equipment and facilities (see section on fire extinguishers and water supply- Ontario Fire Code Section 6).

Note: All site personnel shall comply with and carry out the requirements of Section 3 of this document.

4.0 Site Security

Guard services shall be provided when required as per Emergency Services, or as a condition of insurance.

Where guard service is provided, the guard(s) shall be trained in;

- a. Notification procedures to call Emergency Services and management personnel,
- b. Knowledge of fire protection equipment, and
- c. Familiarization with fire hazards. Guards shall be informed of any special status of emergency equipment or hazards.

Video surveillance shall be provided for and maintained in good working order by the developer

Security fences shall be provided when required by the Town of East Gwillimbury.

Entrances (doors and windows) to a structure under construction, alteration, or demolition, shall be secured as required by the Town of East Gwillimbury.

**FIRE CODE
ONTARIO REGULATION 213/07
INCLUDES AMENDMENTS CURRENT TO JANUARY 1, 2015
REGULATION MADE UNDER THE
FIRE PROTECTION AND PREVENTION ACT, 1997
S.O. 1997, CHAPTER 4, AS AMENDED**

While the Ontario Fire Code deals with many provisions other than those stipulated here which all must be adhered to, the following excerpts are highlighted in this guideline as being particularly relevant to construction site fire safety and will be enforced to the fullest extent allowable by The Ontario Fire Code.

ONTARIO FIRE CODE – PART A

Section 1.2 Compliance

Article 1.2.1.1. “Unless otherwise specified, the owner is responsible for carrying out the provisions of this Code.”

ONTARIO FIRE CODE – PART B

Subsection 2.1.1. Scope and Application

Article 2.1.1.1. “This part provides measures for the safety of persons and buildings, the elimination or control of fire hazards in and around buildings, the maintenance of certain life safety systems in buildings, the establishment of a fire safety plan in certain buildings and the installation of smoke alarms and carbon monoxide alarms.”

Section 2.1.2. Classification of Buildings or Parts of Building by Major Occupancy

Article 2.1.2.2. “Activities that create a hazard and that are not allowed for in the original design shall not be carried out in a building unless approved provisions are made to control the hazard.”

Note: The following activities shall be avoided:

- (a) Paint Storage
- (b) Lumber Storage
- (c) Keeping Straw in Basements
- (d) Open Air Burning

Note: “Approved” is defined in the Code to mean approved by the Chief Fire Official.

Section 2.4 Fire Hazards

Article 2.4.1.1.(1) “Combustible materials shall not be accumulated in or around a building in such quantity or such location as to create a fire hazard.”

Note: This would include straw and hay which will be disposed of immediately.

Article 2.4.1.1.(4) “Combustible materials shall not be stored on a roof or adjacent to any building so as to create a fire hazard to the building or its occupants.”

Article 2.4.1.3.(1) “Materials subject to spontaneous ignition, such as greasy or oily rags, shall be deposited in a receptacle conforming to Sentence (3) or be removed from the premises.”

Article 2.4.1.3.(3) “A receptacle required in Sentences (1) and (2) shall:
(a) be constructed of noncombustible materials,
(b) have a close-fitting, self-closing metal cover,
(c) if the floor material upon which it is placed is combustible, have a flanged bottom or legs not less than 50 mm high, and
(d) not be placed closer than 1 m to combustible materials, except as permitted in Clause (c).

Article 2.4.3.1.(1) “If conditions are such that smoking would create a fire or explosion hazard, smoking shall not take place except in approved smoking areas.”

Note: “Approved” in this section means approved by the Chief Fire Official.

Article 2.4.3.2. “The areas where smoking is not permitted shall be identified by signs having black lettering 50 mm high, with 12.5 mm stroke on a yellow background, except that symbols of 150 mm x 150 mm may be used in lieu of lettering or covered by instructions established under a fire safety plan and available to all persons.”

Note: An example of where such lettering or instructions will be required is a propane storage area where propane is being used.

Article 2.4.4.3. “Devices having open flames shall be securely supported in non-combustible holders and located or protected so as to prevent accidental contact of the flame with combustible materials.”

Note: An example of such a device is a propane salamander.

Article 2.4.4.4.(1) “Open-air burning shall not take place unless:

- (a) it has been **approved**, or
- (b) the open-air burning consists of a small, confined fire that is
 - (i) used to cook food on a grill, barbecue or spit,
 - (ii) commensurate with the type and quantity of food being cooked, and
 - (iii) supervised at all times.”
- (2) “Sentence (1) does not apply to the use of an appliance that:
 - (a) meets the requirements of the Technical Standards and Safety Act, 2000,
 - (b) is for outdoor use,
 - (c) if assembled, has been assembled in accordance with the manufacturer’s instructions, and
 - (d) if installed, has been installed in accordance with the manufacturer’s instructions.”

Article 2.4.6.1. “Temporary electrical wiring shall not be used where it presents a fire hazard.”

Note: Frayed extension cords may not be used.

Section 2.5 Emergency Services Access to Buildings

Article 2.5.1.1.(1) “This section applies to fire access routes:

- (a) required to be constructed under the Building Code;
- (b) required by municipal by-law; or
- (c) required by this Code

Article 2.5.1.2.(1) “Fire access routes and access panels or windows provided to facilitate access for firefighting operations shall not be obstructed by vehicles, gates, fences, building materials, vegetation, signs or any other form of obstruction.”

Article 2.5.1.2.(2) “Emergency Services sprinkler and standpipes connections shall be clearly identified and maintained free of obstructions for use at all times.”

Note: This article will also apply during construction and upon conditional occupancy.

Article 2.5.1.3. “Fire access routes shall be maintained so as to be immediately ready for use at all times by Emergency Services vehicles.”

Section 2.6 Service Equipment

Article 2.6.1.7. “Heating, ventilating and air-conditioning systems, including appliances, chimneys and flue pipes, shall be operated and maintained so as not to create a hazardous condition.”

Note: This includes salamanders, furnaces and electric heaters.

Article 2.6.1.10.(1) “No work on ducts involving the use of hot work equipment shall be performed unless:
(a) the system has been shut down,
(b) the duct has been cleaned of any accumulations of combustible deposits, and
(c) any combustible lining and covering material that could be ignited by the work has been removed.”

Article 2.6.1.11. “Precautions shall be taken, where necessary to ensure that there is no damage to fuel supply piping or equipment that would result in fuel leakage or a fire hazard during renovations or excavations.”

Section 5.6 Compressed Gas Cylinders

Article 5.6.1.2.(1) “Cylinders containing compressed gas shall be protected against mechanical damage.”

Article 5.6.1.2.(2) “Cylinders containing compressed gas shall be stored to hold them securely in place
(a) on racks,
(b) by nesting, or
(c) by approved methods or devices”

Article 5.6.1.3. “Except when being transported, acetylene cylinders shall be kept in an upright position.”

Article 5.6.1.4. “Cylinders containing compressed gas which are in storage shall be protected against valve damage.”

Note: “Approved” in this section means approved by the Chief Fire Official.

Note: Cylinders shall be stored in one location and taken to the job site as required and shall be returned to the storage area after use. All compressed gas cylinders, both full and empty, must be accounted for.

There shall be compliance with CAN. 1-B149.2 – M80 Ontario Propane Storage Handling and Utilization Code at all construction sites, specifically, there shall be compliance with the following:

(a) Subsection 12.5.5. Cylinders at Construction Sites

Article 12.5.5.1. “A cylinder awaiting use shall be stored outdoors and any cylinder storage area shall meet the requirements of Subsection 12.5.4. except that fencing as required by Clause 12.5.4.1. is not mandatory, provided the cylinder is stored in an area free of vehicular or equipment travel and protected by construction barriers or equivalent.”

Section 5.17 **Hot Works**

Article 5.17.3.1.(1) “Hot work operations in buildings shall be carried out in areas that
(a) are free of combustible and flammable contents, and
(b) that have walls, ceilings and floors of noncombustible construction or that are lined with noncombustible materials.”

Article 5.17.3.3.(3) “At least one portable extinguisher conforming to Section 6.2. shall be provided in the hot work area.”

Note: Regard should be to all of Section 6.2. which contains the standards for portable extinguishers. Only a portion of that section has been reproduced below.

Note: All contractors performing hot work shall ensure that the work area is free of combustibles prior to beginning the job. If combustibles cannot be moved out of the work area, they shall be covered with labelled fire retardant tarps. Care should be taken to ensure that cutting or soldering operations will not ignite adjacent combustibles.

Note: Site superintendents shall ensure that a fire watchman is left at the work area for a minimum of 30 minutes after hot work is completed. This fire watchman should be the responsibility of the subcontractor.

Section 6.2 **Portable Extinguishers**

Article 6.2.1.2. “Portable extinguishers shall be kept operable and fully charged”

Article 6.2.1.6. “Portable extinguishers in proximity to a fire hazard shall be located as to be accessible without exposing the operator to undue risk.”

Article 6.2.4.1. “Portable extinguishers shall be provided to protect every building, each hazardous occupancy inside the building and each hazardous process or operation located outside.”

Article 6.2.7.1.(1) "Maintenance and testing of portable extinguishers shall be in conformance with NFPA 10, 'Portable Fire Extinguishers'"

Article 6.2.7.2. "Portable fire extinguishers shall be inspected monthly."

Article 6.2.7.3. "Portable extinguishers having defects shall be repaired and, if necessary, recharged to ensure the extinguishers will operate effectively and safely."

Note: The "subsection" referred to is Subsection 6.2. The entire section is found in the Ontario Fire Code.

Note: The location and number of portable extinguishers required shall be approved and accessible at all times.

Note: "Approved" in this section means approved by the Chief Fire Official.

Section 6.6 Water Supplies for Fire Protection

Article 6.6.1.1. "Private and public water supplies for fire protection installations shall be maintained to provide the required flow under fire conditions."

Subsection 6.6.4. Hydrants

Article 6.6.4.1. "Municipal and private hydrants shall be maintained in operating condition."

Article 6.6.4.2. "Hydrants shall be maintained free of snow and ice accumulations."

Article 6.6.4.3. "Hydrants shall be readily available and unobstructed for use at all times."

PART 8 – Demolition

Subsection 8.1.1. Application

Article 8.1.1.1. "This part applies to the prevention or control of fire during any demolition and the protection from fire of neighbouring occupied spaces and neighbouring properties."

Subsection 8.1.2. Requirements

Article 8.1.2.1.(1) "Subject to Sentence (2), before demolition of a building or part of a building is commenced, building services other than water supply for

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- firefighting shall be terminated at a point located outside the building or part under demolition”
- Article 8.1.2.1.(2) “Instead of being terminated under Sentence (1), a service provider’s connection shall be relocated and protected from damage if it is determined that
- (a) terminating the service at a point outside the building or part under demolition would interfere with service to a part of the building that is not under demolition or service to another building that is not under demolition or
 - (b) maintaining the service is necessary for demolition purposes.
- Article 8.1.2.1.(3) “No steps shall be taken under Sentence (1) or (2) in respect of a service provider’s connection unless that service provider and all other service providers whose connections will be affected by the termination or relocation of that connection have been notified.”
- Article 8.1.2.2.(1) “During periods when demolition operations will create a fire hazard to parts of the building not under demolition or to neighbouring occupied spaces or neighbouring properties, a firewatch shall be conducted.”
- Article 8.1.2.2.(2) “If a fire watch is required, the demolition site shall be toured by firewatch personnel at least once each hour.”
- Article 8.1.2.2.(3) “Facilities shall be provided to enable firewatch personnel to
- (a) ensure that a fire warning is sounded to notify occupants, and
 - (b) communicate with the Emergency Services .”
- Article 8.1.2.2.(4) “Firewatch personnel shall be equipped with portable illumination and protective equipment.”
- Article 8.1.2.3.(1) “Combustible salvage, waste material and rubbish shall not be accumulated on site in such quantity or such location as to cause a fire hazard.”
- Article 8.1.2.4. “Rubbish shall not be burned on the premises unless permitted in accordance with Article 2.4.4.4.”
- Note: Regard should be had to Article 2.4.4.4. which can be found in its entirety in the Ontario Fire Code.
- Article 8.1.2.5. “The installation, operation and maintenance of hot work equipment shall be carried out in accordance with Section 5.11.”

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- Article 8.1.2.6.(1) "Where a building being demolished floor by floor is equipped with a standpipe system, the system, together with fire department connections, valves, couplings and hose, shall be maintained in operable condition on all storeys below the one being demolished, except for the storey immediately below it".
- Article 8.1.2.6.(2) "If no fire department standpipe connections exist in a building under demolition that is 4 storeys or more in building height, a temporary standpipe connection shall be provided."
- Article 8.1.2.6.(3) "If no standpipe system exists in a building under demolition that is 8 storeys or more in building height, a temporary standpipe shall be provided."
- Article 8.1.2.6.(4) "Standpipe systems shall be kept in such condition that they may be connected near street level, to a fire department pump, so as to supply water to every outlet on each floor."
- Article 8.1.2.6.(5) "If a building under demolition that is over 84 m in height, the primary water supply serving the standpipe system, including fire pumps, shall be maintained in operating condition."
- Article 8.1.2.7.(1) "During demolition, firefighting access routes shall be maintained in accordance with Section 2.5."
- Article 8.2.7.1.(2) "Unobstructed access to fire hydrants, portable fire extinguishers and fire department connections for standpipe and sprinkler systems shall be maintained during demolition."
- Article 8.2.7.1.(3) "If a demolition site is fenced so as to prevent general entry, provision shall be made for access by fire department equipment and personnel."
- Article 8.2.7.1.(4) "Elevating devices shall be accessible for the use of firefighters for buildings under demolition that are more than 36 m in building height, measured between grade and the floor level of the top storey."
- Note: Refer to Section 2.5 which can be found in its entirety in the Ontario Fire Code.
- Article 8.1.2.8.(1). "Portable extinguishers shall be provided in buildings under demolition in accordance with Subsection 6.2.6. as if the building were graded for ordinary hazard under Subsection 6.2.5."
- Note: Refer to Subsections 6.2.5. and 6.2.6. which can be found in their entirety in the Ontario Fire Code.

- Article 8.1.2.8.(2) “In addition to the other requirements of this Code, if a building is under demolition, portable extinguishers shall be provided
- (a) adjacent to hot works operations,
 - (b) in areas where combustibles are stored,
 - (c) near or on any internal combustion engines,
 - (d) adjacent to areas where flammable liquids, combustible liquids or gases are stored or handled,
 - (e) adjacent to temporary oil-fired or gas-fired equipment, and
 - (f) adjacent to bitumen heating equipment.”
- Article 8.1.2.8.(3) “The extinguishers required by Sentence (2) shall have a minimum rating of:
- (a) 2A:10B:C on moveable equipment, and
 - (b) 4A:40B:C in all other locations.”
- Article 8.1.2.8.(4) “Portable extinguishers required in Sentences (1), (2) and (3) shall be maintained in conformance with Section 6.2”
- Article 8.1.2.9. “Smoking shall not take place in, on or near a building under demolition, except as provided in Subsection 2.4.3.”
- Article 8.1.2.10.(1) “Internal combustion engines, other devices capable of producing ignition and devices associated with either of the foregoing shall be kept at sufficient distance from combustible material so as to prevent ignition.”
- Article 8.1.2.10.(2) “The clearance between combustible material and temporary heating equipment, including flues, shall comply with
- (a) the minimum clearance, if any, shown on certified heating equipment, or
 - (b) the minimum clearance specified in the Building Code, if no minimum clearance is shown on the heating equipment.”
- Article 8.1.2.11. “Fabrics and films used to temporarily enclose buildings shall be securely fastened to prevent them from being blown against heaters or other ignition sources.”
- Article 8.1.2.12. “Unless otherwise approved, at least two exits shall be accessible and usable at all times.”
- Article 8.1.2.13. “A means shall be provided that is capable of alerting persons throughout a building under demolition and the property of which the building is located of a fire emergency.”

Note: “Approved” in this section means approved by the Chief Fire Official.

Note: Refer to Section 6.2. which can be found in its entirety in the Ontario Fire Code.