



TAY TOWNSHIP

P.O. Box 100, 450 Park Street
Victoria Harbour, ON L0K 2A0

Engineering Design Standards



Prepared by the Operational Services Department
Revised 2025



DESIGN STANDARDS

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1.1 Engineering Design and Drawing Requirements

Introduction

The purpose of this document is to outline the minimum design requirements for the construction of municipal services in the Township of Tay. These requirements are intended to provide guidance to the designer and does not relieve the Developer and their Consulting Engineer of the responsibility for submitting a completed product demonstrating competent engineering design in full compliance with all applicable legislation (as amended) and/or industry best management practices. In cases of discrepancy, the more stringent standard shall prevail.

Any deviation from the minimum Township Standards shall be specifically referred to by the applicant and/or their agent with a copy of written approval of the Township attached.

1.1.1 Specifications for Engineering Drawings

Size: Drawings to be Metric Standard A1 (594 mm x 841 mm) or Imp. Equivalent

Format: Same as Township standard sheets unless otherwise approved.

Materials for Preliminary Submissions:

- A digital copy by way of a Township accepted electronic submission method (pdf).

Materials for Final Submission and As-Constructed Drawings:

- Bond for Final Submission
- Bond for As-Constructed
- Black Ink (permanent)
- A digital copy by way of a Township accepted electronic submission method (pdf).

1.1.2 General Drawing Requirements

All engineering drawings shall be prepared in metric and in a neat and legible fashion. The design information presented on these drawings shall be completed in ink.



The standard Township of Tay title block as shown in the detail drawings shall be used on all engineering drawings. A title sheet is required for the engineering drawings.

- Storm and Sanitary Drainage Area Plans may be prepared on a paper size other than Metric Standard A1 in order for the entire drainage system to be presented on one sheet.
- The lot numbering and block identification on all engineering drawings shall be the same as shown on the Registered Plan for the area.
- All elevations shown on the engineering drawings are to be of geodetic origin (stating NAD 1927 or NAD 1983). Aerial photo interpretation methods for securing existing contours and elevations shall not be accepted by the Township for base plan information on engineering drawings. A local benchmark (stating NAD 1927 or NAD 1983) note shall appear in each drawing.
- All plan and profile drawings are to be prepared so that each road can be filed separately. The road names shall be identified on the plan portion of the drawings.
- When roads are of a length that requires more than one drawing, match lines are to be used with no overlapping of information.
- The reference drawing numbers and centreline stations for all intersecting roads and match lines shall be shown on all plan and profile drawings.
- A north arrow and key plan shall be included on the top right-hand side on all drawings.
- All engineering drawings shall be stamped by a Professional Engineer. The Engineer's stamp shall be signed and dated.
- The drawings are to be stamped Accepted for Construction and signed by the Manager of Engineering or designate prior to the issuance of drawings for construction.
- All Landscape Plan drawings shall be stamped by a certified Landscape Architect.
- Existing information shall be shown light or background line weight. Proposed information shall be shown bold or foreground line weight.



- In general east-west roads shall have zero chainage at their westerly limit and north-south roads shall have their zero chainage at their southerly limits. The intersection of centrelines of roads shall be used as zero chainage. Chainage on a plan-profile shall increase from left to right.

1.1.3 Computer Aided Drawings (CAD)

All Drawings shall be prepared using the Township of Tay Standard CAD Format.

The Engineering Design Drawing file(s) shall be georeferenced. The standard coordinate system for Tay is Universal Transverse Mercator (UTM) Zone 17 with the North American Datum 1983 (NAD83). The drawing units for all features in the file shall be in metric, set to meters and un-scaled (1:1).

The Township's Standard Symbol, Line Type, Line Thickness and Layering Scheme shall be followed for all Drawings. The line work shall be distinctive, easily readable and the lines' thickness shall accurately represent the width of the infrastructure that it represents (i.e. line thickness for sewers shall be drawn to represent the width of the Outside Diameter of the pipe).

Electronic files shall be submitted for review and acceptance. The Final Submission and As-Constructed submission shall also include a CAD file that meets the Township's format; if layering, line type & thickness or format is not adhered to the submission shall be deemed incomplete.

- The Final Submission and As-Constructed digital drawing file shall be georeferenced. The standard coordinate system for Tay is Universal Transverse Mercator (UTM) Zone 17 with the North American Datum 1983 (NAD83). The drawing units for all features shall be in metric, set to meters and un-scaled (1:1).




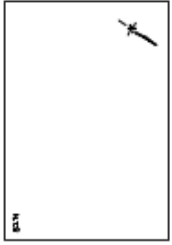


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	SUBDIVISION NAME SUBDIVISION TYPE XXXX-XXXXXX		
<p>TOWNSHIP OF TAY OPERATIONAL SERVICES DEPARTMENT 450 PARK STREET VICTORIA HARBOUR, L0K 2A0 (705) 534-7248</p>	<p>TOWNSHIP OF TAY OPERATIONAL SERVICES DEPARTMENT 450 PARK STREET VICTORIA HARBOUR, L0K 2A0 (705) 534-7248</p>	<p>KEY PLAN</p> <p>STANDARD DRAWING NAMES</p> <p>N.1'S</p>	<p>DEVELOPER</p> <p>NAME ADDRESS E-Mail ADDRESS PHONE #</p>
<p>DEVELOPER'S CONSULTING ENGINEER</p> <p>NAME ADDRESS E-Mail ADDRESS PHONE #</p>	<p>STANDARD DRAWING NAMES</p> <p>TITLE - TITLE, KEY PLAN, LIST OF DRAWINGS SHEET</p> <p>LP - LEGAL PLAN</p> <p>GSP1 - GENERAL SERVICES PLAN</p> <p>SANI - SANITARY DRAINAGE PLAN</p> <p>STMI - STORM DRAINAGE PLAN</p> <p>SWMP - STORMWATER MANAGEMENT POND PLAN</p> <p>GP1 - GRADING PLAN(S)</p> <p>ESCP - EROSION and SEDIMENT CONTROL PLAN</p> <p>PP1 - PLAN and PROFILE(S) STA. 000.00 to 111.11</p> <p>SD1 - STANDARD DETAILS</p> <p>GNI - GENERAL NOTES</p> <p>CUP1 - COMPOSITE UTILITY PLAN</p> <p>SLP1 - STREET LIGHTING PLAN</p> <p>LP1 - LANDSCAPE and PLANTING PLAN</p>	<p>NO.</p> <p>1</p> <p>REVISION</p> <p>Operational Services Department</p>	<p>APPR'D</p> <p>DATE</p> <p>07/23</p>
<p>TOWNSHIP OF TAY</p> <p>STANDARD TITLE PAGE</p>	<p>APPR'D:</p> <p>DRAWN:</p>	<p>DATE: 07/2023</p> <p>SCALE: NTS</p>	<p>STD. No. 1.1-01</p>



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1.2 General Servicing Plans

A General Servicing Plan drawing showing aboveground services and appurtenances shall be prepared for all developments at a maximum scale of 1:1,000.

When more than one General Servicing Plan drawings are required, then the division of drawings shall reflect the limits of the Registered Plans as closely as possible. Where more than one plan is prepared, a supplementary General Servicing Plans at a smaller scale shall be prepared to show the entire plan of subdivision on one drawing.

- The reference Geodetic Benchmark and the Site Benchmarks to be used for construction shall be identified on the General Plan of Services.
- A Key Plan at a scale of 1:10,000 shall be shown on all General Servicing Plans drawings and the area covered by the drawing shall be clearly identified.
- A drawing index shall be shown on all General Servicing Plans to identify the Plan and Profile Drawing number for each road or easement shown.
- All road allowances, lots, blocks, easements, and reserves are to be shown and are to be identified in the same manner as shown on the Registered Plan.
- All existing services, utilities and abutting properties are to be shown in light or background weight lines.
- All services to be constructed are to be shown on the General Servicing Plans in solid lines.
- Dimensioning of utilities and roadways is not required on the General Servicing Plans.
- All sites for parks, schools, churches, commercial and industrial development shall be shown.
- If a subdivision encroaches on an existing floodplain, the approved fill line restrictions shall be shown on all applicable drawings.

General Servicing Plans shall indicate (but not be limited to) the following:

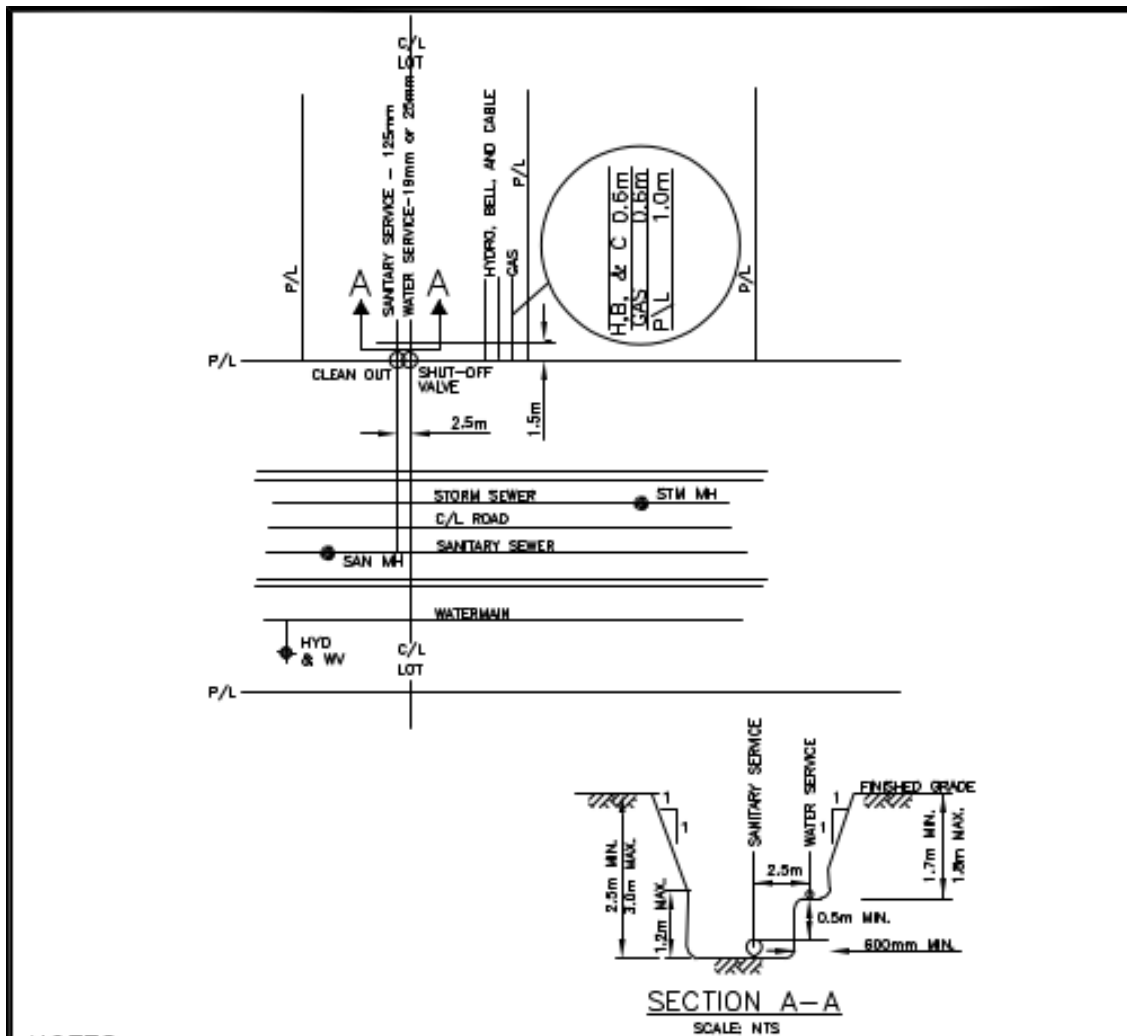
- horizontal control data



- roadways with curb lines and road names
- typical residential building envelopes (complete with driveway locations)
- any required easements and blocks
- watermain with notes indicating material, diameter, and length;
- water valves, curb stop valves, hydrants, connections, and services
- maintenance access hole numbers
- both sanitary and storm sewers with direction of flow and notes indicating diameter, length, grade
- signage: - traffic control
 - road names
 - school zones
- traffic barricades
- fencing indicating height and type
- retaining walls
- community mailboxes with number of units serviced
- hydro vaults, Bell Telephone, and cable boxes
- streetlights
- boulevard trees
- sidewalks, walkways and trailways




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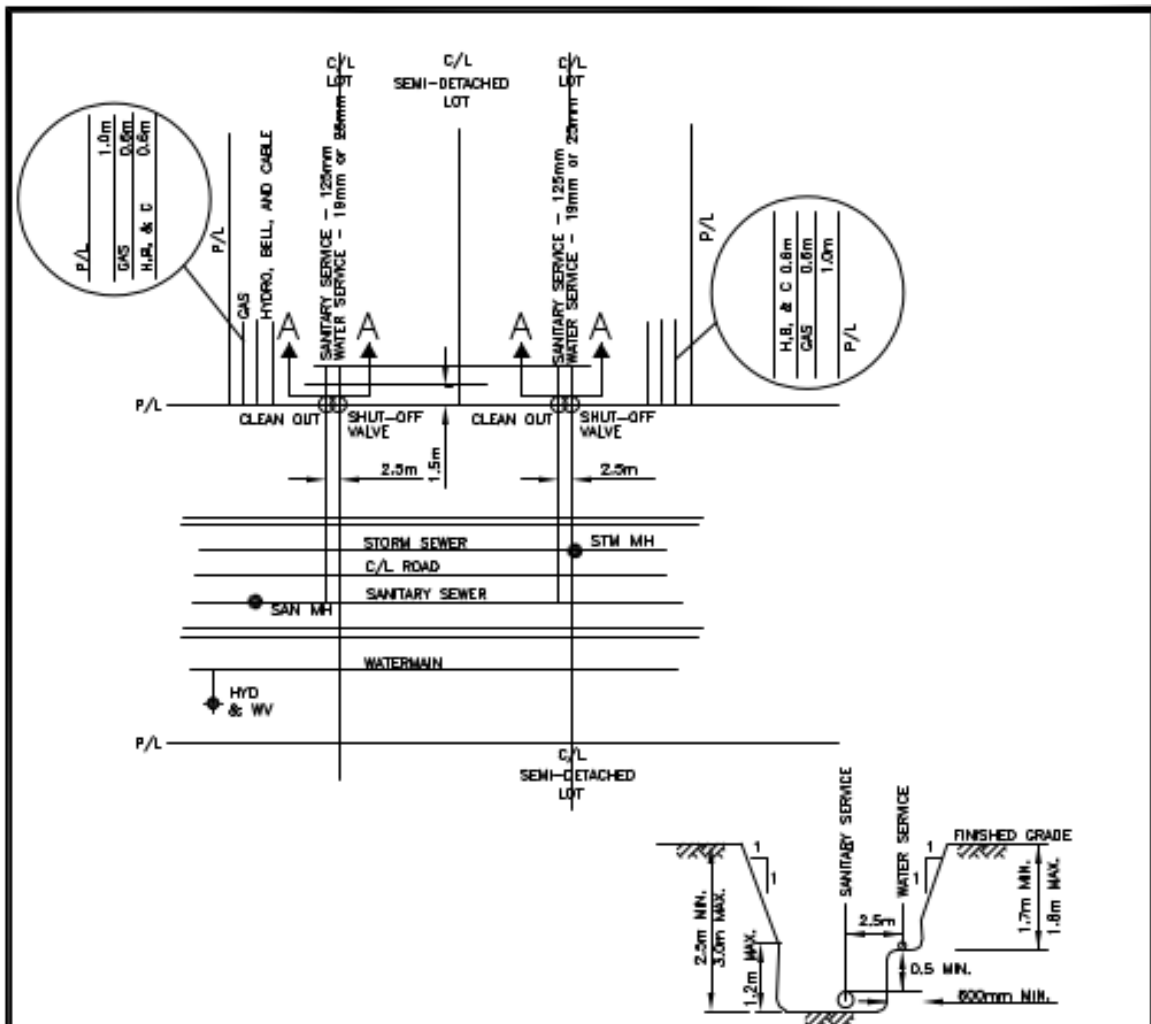


NOTES:

1. SERVICE TO EXTEND 1.5m INSIDE PROPERTY LINE.
2. UNDER NO CIRCUMSTANCE SHALL SERVICES CROSS ONE ANOTHER.
3. THE MINIMUM SIZE FOR STORM DRAIN CONNECTION SHALL BE 150mm^Ø INSTALLED AT A MINIMUM GRADE OF 2% FROM THE STORM SEWER TO THE BUILDING ENVELOPE.
4. ALL UNDERGROUND SERVICE CABLES TO BE PLACED MINIMUM 1.0m BELOW FINISHED GRADE AT LOTS.
5. CLEANOUT AND SHUT-OFF VALVES TO BE PLACED ON PROPERTY LINE.
6. ALL DIMENSIONS ARE IN MILLIMETERS OR METERS UNLESS OTHERWISE SPECIFIED.

NO.	REVISION	APR'D	DATE
1	Water Service Size - 19mm or 25mm		07/23

	TOWNSHIP OF TAY	APR'D:	DATE: 07/2023
	SERVICE LOCATION SINGLE FAMILY RESIDENTIAL	DRAWN:	SCALE: NTS
		STD. No. 1.2-01	



NOTES:

1. SERVICE TO EXTEND 1.5m INSIDE PROPERTY LINE.
2. UNDER NO CIRCUMSTANCE SHALL SERVICES CROSS ONE ANOTHER.
3. THE MINIMUM SIZE FOR SANITARY LATERALS SHALL BE 125mm^Ø INSTALLED AT A MINIMUM GRADE OF 2% FROM THE SANITARY SEWER TO THE BUILDING ENVELOPE. P.V.C. PIPE TO BE WHITE.
4. ALL UNDERGROUND SERVICE CABLES TO BE PLACED MINIMUM 1.0m BELOW FINISHED GRADE AT LOTS.
5. CLEANOUT AND SHUT-OFF VALVES TO BE PLACED ON PROPERTY LINE.
6. ALL DIMENSIONS ARE IN MILLIMETERS OR METERS UNLESS OTHERWISE SPECIFIED.

SECTION A-A

SCALE: NTS

NO.	REVISION	APR'D	DATE
1	Water Service Size – 19mm or 25mm		07/23

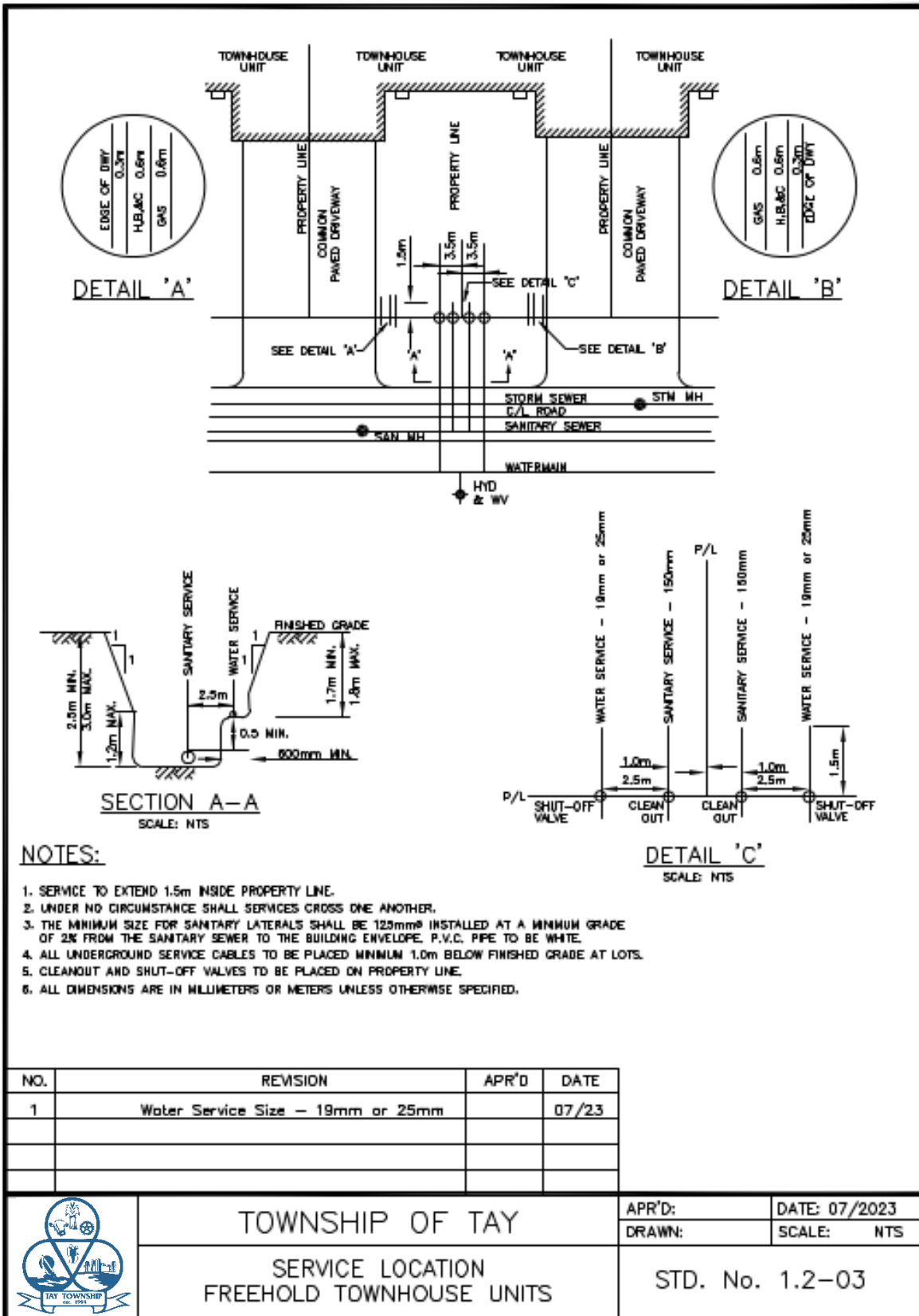


TOWNSHIP OF TAY

SERVICE LOCATION
SEMI DETACHED RESIDENTIAL

APR'D:	DATE: 07/2023
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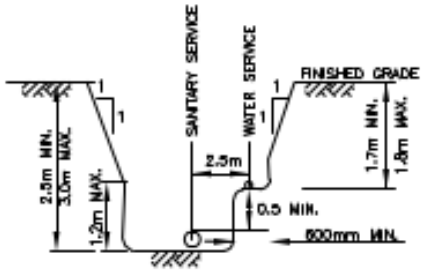
STD. No. 1.2-02



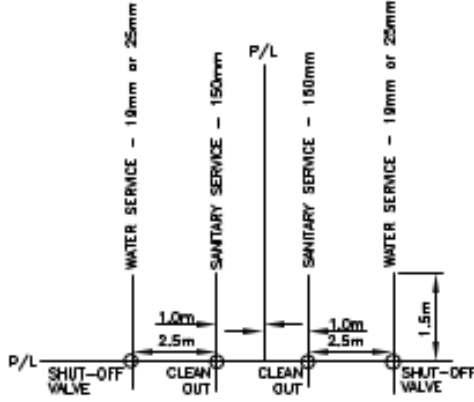
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DETAIL 'B'



SECTION A-A
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DETAIL 'C'
SCALE: NTS

NOTES:

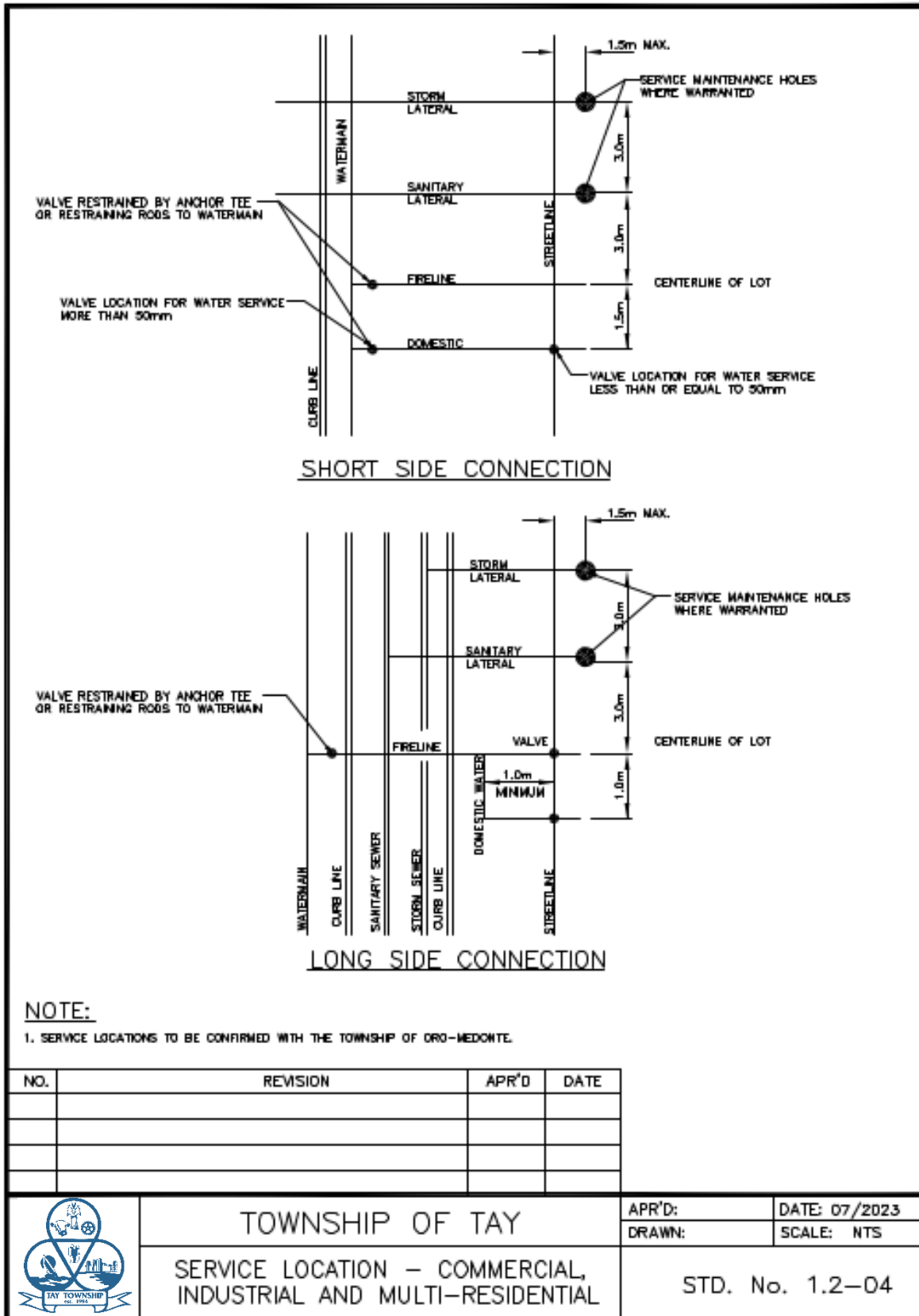
1. SERVICE TO EXTEND 1.5m INSIDE PROPERTY LINE.
2. UNDER NO CIRCUMSTANCE SHALL SERVICES CROSS ONE ANOTHER.
3. THE MINIMUM SIZE FOR SANITARY LATERALS SHALL BE 125mm^Ø INSTALLED AT A MINIMUM GRADE OF 2% FROM THE SANITARY SEWER TO THE BUILDING ENVELOPE, P.V.C. PIPE TO BE WHITE.
4. ALL UNDERGROUND SERVICE CABLES TO BE PLACED MINIMUM 1.0m BELOW FINISHED GRADE AT LOTS.
5. CLEANOUT AND SHUT-OFF VALVES TO BE PLACED ON PROPERTY LINE.
6. ALL DIMENSIONS ARE IN MILLIMETERS OR METERS UNLESS OTHERWISE SPECIFIED.

NO.	REVISION	APR'D	DATE
1	Water Service Size - 19mm or 25mm		07/23



TOWNSHIP OF TAY
SERVICE LOCATION
FREEHOLD TOWNHOUSE UNITS

APR'D:	DATE: 07/2023
DRAWN:	SCALE: NTS
STD. No. 1.2-03	





- GENERAL – CONSTRUCTION
- A. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH TOWNSHIP OF TAY STANDARDS, O.P.S.D. AND O.P.S.S. WHERE CONFLICT OCCURS, TOWNSHIP STANDARDS ARE TO GOVERN.
 - B. TRENCH BACKFILL (OPSD 802.XXX AS APPLICABLE) TO BE SELECT NATIVE MATERIAL OR IMPORTED SELECT SUBGRADE TO OPSS 1010.
 - C. BACKFILL TO BE PLACED IN MAXIMUM 200 mm THICK LIFTS AND COMPACTED TO 95% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD).
 - D. PIPE BEDDING TO BE GRANULAR 'A' PIPE COVER TO BE GRANULAR 'B' MAX. AGGREGATE SIZE 25mm FOR RIGID PIPE AND GRANULAR 'A' FOR FLEXIBLE PIPE. (MINIMUM BEDDING DEPTH 150 mm, MINIMUM COVER 300mm, COMPACTED TO A MINIMUM 95% SPMDD).
 - E. CLEAR STONE WRAPPED IN FILTER FABRIC CAN BE SUBSTITUTED FOR BEDDING MATERIAL IF APPROVED BY THE TOWNSHIP OF ORO-MEDONTE.
 - F. ALL MAINTENANCE HOLES ARE 1500 mm DIAMETER FOR A MINIMUM OF 1.8M FROM THE BOTTOM OF THE CHAMBER UNLESS OTHERWISE SPECIFIED.
 - G. ALL TOPSOIL AND EARTH EXCAVATION TO BE STOCK PILED OR REMOVED TO A SITE APPROVED BY THE TOWNSHIP OF TAY OR THE TOWNSHIP'S ENGINEERING CONSULTANT.
 - H. THE OWNER'S ENGINEER SHALL PROVIDE BENCH MARK ELEVATIONS AND HORIZONTAL ALIGNMENT REFERENCE FOR THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DETAILED LAYOUT OF THE WORK.
 - I. ALL PROPERTY BARS TO BE PRESERVED AND REPLACED BY O.L.S. AT CONTRACTOR'S EXPENSE IF REMOVED DURING CONSTRUCTION.
 - J. ALL MAINTENANCE HOLE AND CATCHBASIN FRAMES AND COVERS TO BE SET TO BASE COURSE HL4 ASPHALT ELEVATION AND RAISED PRIOR TO PLACEMENT OF FINAL COURSE HL3 ASPHALT TO THE SATISFACTION OF THE TOWNSHIP.
 - K. THE CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR THE SUPPLY OF TEMPORARY WATER AND POWER.
 - L. DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS-517 AND 518 TO MAINTAIN ALL TRENCHES IN A DRY CONDITION. CONTRACTOR RESPONSIBLE FOR OBTAINING AN M.E.C.P. PERMIT AS REQUIRED.
 - M. ALL ENGINE DRIVEN PUMPS TO BE ADEQUATELY SILENCED, SUITABLE FOR OPERATION IN A RESIDENTIAL AREA.
 - N. DISTURBED AREAS TO BE REINSTATED TO PREVIOUS CONDITION OR BETTER.
 - O. THE CONTRACTOR IS RESPONSIBLE FOR PRESERVATION OF ALL EXISTING FACILITIES AS WELL AS ALL UTILITY COMPANIES PRIOR TO COMMENCING WORK AND CO-ORDINATE CONSTRUCTION ACCORDINGLY.

NO.	REVISION	APP'D	DATE	TOWNSHIP OF TAY		APP'D:	DATE: 07/2023
				NOTES – CONSTRUCTION		DRAWN:	SCALE: NTS
						STD. No. 1.2-05	



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1.3 Overall Grading Plan Design and Construction

1.3.1 General Requirements

- All elevations to be referenced to geodetic datum.
- The grading of all lands within the site are to be compatible with the elevation of the surrounding lands.
- A 0.6 m strip shall be left undisturbed along the boundary of the subdivision unless grading is required to eliminate drainage issues on adjacent properties
- All lots and blocks within the subdivision are to be shown and are to be numbered in accordance with the plan proposed for registration.
- Existing contours are to be shown at maximum 0.5 m intervals.
- The Overall Grading Plan shall identify all locations where the depth of fill sections and cut sections are in excess of 450 mm.
- All grassed embankments shall have a maximum slope of 3:1.
- The grade of grassed or other landscaped areas shall have a maximum slope of 7% and a minimum slope of 2%.
- Swale grades on grassed areas shall have a min. slope of 2% and a max. slope such that contained flow velocity does not exceed 1.25 m per second.
- The maximum suggested length for any drainage swale is 75 m.
- The minimum depth for any drainage swale shall be 150 mm.
- The maximum depth for any drainage swale shall be 750 mm.
- The maximum side slope on any drainage swale shall be 3:1.
- All driveways shall have positive drainage from the property line to the edge of pavement.

1.3.2 Overall Grading Plan Drawings

The Overall Grading Plans shall indicate, but not be limited to the following:



- A legend indicating existing elevations and proposed elevations.
- Cross sections as required to clarify the proposed grading, particularly in relation to adjacent lands.
- Silt Control fencing shall be shown within the 0.6 metre undisturbed strip along the boundary of the subdivision.
- Existing contours at maximum 0.5 m intervals within the subdivision and extended outside the subject lands far enough to determine the existing drainage pattern.
- Existing elevations at existing road sections, parking areas, structures, trees, watercourses, or other elevations necessary to establish the grading and drainage patterns.
- Arrows are to be used to indicate direction of the surface drainage.
- Roadway dimensions and curb radii.
- Centreline elevations of proposed and existing roads at 20 m intervals.
- Curbs and curb depressions with dimensions.
- Sidewalks, walkways and trailways.
- All lots, blocks, and easements within the subdivision, numbered in accordance with the plan proposed for registration.
- Physical structures such as embankments, stairs, play areas, splash pads, etc.
- All terracing required with the intermediate grades specified.
- All swales, other than the normal side yard swales, along with percent grade and the invert elevation of the swale at regular intervals.
- Lot fabric of subject lands.
- Arrows indicating the direction of the surface water run-off from all lots.
- Driveway locations, water service curb stop locations and building envelopes.
- Proposed elevations at front and rear building envelope.
- Proposed retaining wall(s) location, material, and height.
- Proposed fencing type, material, and height.
- Proposed and existing culverts;



- Proposed grades for major and minor overland flow routes;
- Proposed elevations at the corners of each lot, block and point of grade change.
- Proposed elevations at side yard highpoints (as applicable).
- Proposed 0.5 m contours for grading within large blocks and parks.
- Proposed locations for building envelopes and envelopes for private sewage disposal where required.
- Proposed elevations on paved surfaces, around proposed buildings, along swales, along roadways, parking areas, driveways, catch basin rim elevations, and other elevations necessary to establish the grading and drainage patterns.
- Proposed and existing storm sewer / drainage structures, including rim elevations.
- Rear lot catch basins shall also include the invert elevation of the outlet pipe.

1.3.3 Construction Requirements

Prior to the commencement of construction, the Developer shall construct a Construction Access (and as necessary an Emergency Access) in accordance with these Standards and such that vehicles, equipment, and materials delivery do not route through existing residential developments (wherever possible). The routing shall be Approved in Advance by the Township.

Prior to commencing rough grading, the Developer shall implement the approved erosion and sediment control plans as outlined in the Township Standards.

Where the proposed grading plan identifies fill over registered lots - Engineered Fill shall be placed and supervised by the Developer's Geotechnical Consultant.

- All block grading shall conform to the stormwater management report. The Developer shall be responsible for the grading and maintenance of all blocks until assumption of the subdivision.



- Blocks intended for future development shall be graded to preliminary grade and drain appropriately, compatible with adjacent roadways and abutting properties; complete with appropriate erosion stabilization and sediment control measures.
- Where earth cuts and fills in excess of 450 mm are required within the lots and blocks of the new development, area rough grading shall be performed prior to road construction.
- All swales shall be topsoiled (minimum 100 mm) and sodded.
- All retaining walls in excess of 1.0 m to be certified by a Professional Engineer.
- Lot drainage is to be self-contained within the subdivision limits, where possible.

The Developer's Consulting Engineer in conjunction with their Geotechnical Engineering Consultant shall be responsible for approval and certification of the following:

- certification that all silt and sediment protection measures have been put in place and are being monitored regularly and repaired as necessary, in accordance with the Township Standards.
- certification that the areas of engineered fill have been filled and compacted in accordance with the Township Standards.
- certification that the overall site grading plan conforms to the storm drainage plan and that all earthen and granular material conforms to the requirements set out in the geotechnical report.
- certification that the final block grading plan conforms to the storm drainage plan. The block grading plan and certification shall be submitted with the building permit application.

1.4 Road Classification and Design

1.4.1 Road Patterns

All new roads shall have regard for the following:



- All new Township roads shall provide access, where possible, from two connecting directions to every private property, with qualified exception. Connecting pedestrian ways may be required by Official Plan policy, despite exceptions for roads.
- Existing non-conforming roads are permitted to continue as an exception unless indicated otherwise by planning process, or where infrastructure has been configured for continuity, or the access is required to bring adjacent development into conformity.
- An exception to may be considered where: the second access is only available in future development – in which case such access shall be planned for and pre-serviced with a temporary cul-de-sac, or extenuating natural topographic features prevent the reasonable design of road and related services in connecting patterns, or Environmental Policy Areas or other environmentally regulated areas prevent second access, or the necessary lands cannot be acquired.

1.4.2 Road Classifications

All roads in new developments shall be classified according to the traffic volume expected and to the intended use of the roadway. For predominantly residential areas 2 classifications shall be noted as follows: Urban and Local Residential.

For industrial areas the roads shall be classified Local Collector and Industrial and Major Collector and Industrial dependent upon length of road, traffic volume expected and expected amount of truck traffic. The proposed classification of all roads in the development shall be confirmed with the Township prior to the commencement of the design.

Road Allowances shall be a minimum of 20 m wide. Where the subdivision adjoins or incorporates an existing County Road or Township arterial road as shown on the Township's Official Plan, the Developer shall deed to the County or Township sufficient widening to make these Road Allowances a minimum of 30.5 m, or additional widening if deemed necessary by the Township or County.



The following table is presented as a guide to the determination of the road classifications:

<u>CRITERIA</u>	<u>RESIDENTIAL</u> <u>Urban/ Local</u>	<u>MINOR COLLECTOR</u> <u>and INDUSTRIAL</u>	<u>MAJOR COLLECTOR</u> <u>and INDUSTRIAL</u>
Source Provided	Land Access	Land Access	Traffic
Movement	Traffic Movement	Traffic / Trucking	Traffic / Trucking
Length of Trip	Short	Medium	Long
Flow	Interrupted	Interrupted	Through
Interconnections	Local	Local and Collector	Collector
Estimated A.A.D.T.	0—1,000	1,000—3,000	over 3,000

1.4.3 Roadway Design

All roadways shall be required to satisfy Fire Access Route Design as per OBC Div. B 3.2.5.6 and designed in accordance with the most recent Township Standards.

The minimum pavement design for all roadways shall be:

- subgrade compacted to 95% Standard Proctor Density
- 300 mm. compacted depth of Granular “B”
- 150 mm. compacted depth of Granular “A”
- 50 mm. compacted depth of HL4 Asphalt base course
- 40 mm. compacted depth of HL3 Asphalt surface course

All driveways shall be paved with asphalt or an approved alternate from the edge of the roadway to the garage. The minimum asphalt pavement design for all driveways shall be:

- subgrade compacted to 95% Standard Proctor Density
- 150 mm compacted depth of Granular “A”
- 50 mm compacted depth of HL3 asphalt

- The minimum width of a roadway for two-way traffic with **no** on-street parking shall be 7.0 m from E/P to E/P.



- All roads serving multiple-family projects shall be designed to facilitate passage of emergency and service vehicles. Curb returns having an 8.0 m. radius and inside bends having at least a 12.0 m radius are required. On dead end roads provision shall be provided for vehicle turning.
- Minimum road grade shall be 0.5% and Maximum road grade shall be 6.0%.
- Minimum driveway grade shall be 2% within the right-of-way and 2% on private property. Maximum driveway grade shall be 8%. This maximum grade shall only be used when necessary due to site conditions.
- The location of driveway entrances on Township roads in new Subdivisions Developments shall be such that the minimum sight distance is maintained in both directions.

The following criteria shall apply to new driveway entrances in new residential development:

<u>Posted Speed Limit</u>	<u>Minimum Sight Distance</u>
<u>km/h</u>	<u>metres</u>
40	45
50	65

1.4.4 Geometric Design Requirements

All roads designed and constructed shall conform to the Transportation Association of Canada (TAC) Geometric Design Standards, unless expressly approved otherwise.

Super-elevation of a road shall not be permitted without approval. Edge of pavement radius at intersections shall be at least 10m (15m on industrial roads). Ninety (90) degree curves or corners, where alignment permits them, shall not be less than 15m radius to the inside edge of pavement.



Where lesser roads enter into collector, arterial or through roads, special consideration shall be given to: Improved Visibility, Wider Turning Radius, Acceleration Lane and Ramps, and Deceleration Ramps. Each case is to be considered on its traffic, flow pattern, type, and quantity.

1.4.5 Horizontal Curves

Horizontal alignment is to conform to the requirements as outlined in Table 1. In general, “right angle bends” shall not be permitted on local roads except in the case of “Courts” or “Crescents” serving no more than 50 residential lots. Where permitted, these bends shall not have a deflection angle greater than 110 degrees.

1.4.6 Vertical Curves

All points of grade change in excess of 1% shall be designed with vertical curves as outlined in current MTO publications.

- The minimum visibility curves to be used are outlined in the geometric details for each roadway classification in Table 1.
- The minimum tangent length of any road grade shall be 9 metres.

1.4.7 Backfall at Intersecting Roads

At all road intersections the normal crossfall of the major road shall not be interrupted by the crown line of the minor road. A 1 to 2 per cent backfall shall be provided on the minor road at all road intersections. This backfall shall continue to the end of the curb return radii to facilitate proper drainage of the intersection. Overland flow routing of storm drainage through the intersection shall be maintained.



1.4.8 Curb Return Radii at Intersections

Curb Return Radii at Intersections shall conform to dimensions presented in Table 1.

Geometric Design Requirements

Table 1

Road Classification	Residential		Collector / Industrial			
	Urban / Local		Local / Major		2 Lane	4 Lane
ROW Width (m)	20.0		20.0 / 26.0		20.0	26.0
Road Width (m) (face of curb)	8.5 / 7.0		9.0 / 15.0		9.0	15.0
Design Speed (km/h)	50		60		60	60
Posted Speed (km/h)	40 or 50		50 / 60		50	60
Stopping Sight Distance (m)	45 (40kph)	65 (50kph)	135 (50kph) 170 (60kph)			
Horizontal Curve Radius (m)	90		90 / 130		90	130
Maximum Grade (%)	6		6		6	6
Minimum Grade (%)	0.5		0.5		0.5	0.5
Crest Curve	6		6		6	6
Sag Curve - unlit	12		12 / 18		12	18
Sag Curve - illuminated	5		12		12	12
Crossfall from Centerline	2 %		2 %			
Standards at Intersections	Intersecting Roads					
Design Element	Urban Res. - Urban Res.	Local Res.- Local Res.	Local collector - Local collector	Local collector - Major collector	Major collector - Major collector	
Intersection angle (degrees)	70-110	70-110	80-100	80-100	80-100	
Curb Radius - minimum (m)	12.5	12.5	12.5	15	18	
Daylight Triangle - minimum (m)	5	5	15	15	18	
Max grade for through road (%)	3	3	3	2	2	
Tangent on approach (from limit of daylighting) - min (m)	30	50	60	75	75	
NOTES:						
1. Additional daylighting requirements shall be designed by the Developer's Consulting Engineer according to the particular situation, but shall not be less than those detailed above						
2. All designs shall consider requirements of other Road Authorities (MTO, County, other Municipality) where applicable						

1.4.9 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.



Township Residential Roads (Urban and Local) - being Subdivision Roads of > 50 kph intersecting Township Residential Roads (Urban and Local) - being Subdivision Roads of > 50 kph, the minimum daylighting requirement shall be a 5.0 m x 5.0 m triangle.

In the event a Township Residential Roads (Urban and Local) should intersect a road of another Municipality, consultation with the adjacent Municipality shall take place and be documented as to the agreed to provision for the minimum daylighting requirement included in the design.

For intersecting Township Urban Collector and Arterial Roads and Township Roads intersecting County roads, the minimum daylighting requirements shall be a 15.0 m x 15.0 m Daylighting Triangle. For all other intersections, the size of the daylighting or visibility triangle is a function of the number and width of lanes, the various design speeds on the intersecting roads and the R.O.W. widths on both roads.

Except where provision is made otherwise, clearing, and grubbing (including stumps) within the full width of the R.O.W. is required.

On some low volume, rural roads, permission may be granted to clear a minimum width, sufficient to accommodate the construction of the road and ditches.

Where a physical obstruction interferes with the day lighting, visibility, safety, aesthetic view or drainage of the road, the developer or Developer may be requested to remove it from the R.O.W. Where the road is being constructed under agreement with the Township, such removal is the responsibility of the Developer and is to be considered as a condition of the agreement.

If such an obstruction is located off the R.O.W., it is the responsibility of the developer to gain proper permission prior to removal. Where brushing of the R.O.W. is required to meet the Township Standard, the Township may request an easement on the affected land to maintain visibility.



In all cases, the alignment, vertical and horizontal curves, stopping sight distances, etc., the Developer's Consulting Engineer shall submit detailed calculations for sizing of daylighting triangles at these intersections in accordance with the design criteria prepared by the Ministry of Transportation Ontario, Chapter E (at Grade Intersections) and / or the current Transportation Association of Canada (TAC) Design Manual.

1.4.10 Cul-de-sacs

Cul-de-sacs are **discouraged** by the Township because of the life safety risks encountered and shall be avoided whenever possible.

If a cul-de-sac is planned, then consideration shall be given to reserve an easement that may be used at a future date to link the end of the road to another road.

Permanent cul-de-sacs shall be constructed in accordance with the details provided in the standard drawings and shall be designed with a minimum grade of 1% from the centre of the bulb to the curb.

Minimum gutter grades of 1% shall be maintained along the flow line of all gutters around the cul-de-sac. The design road grade on the cul-de-sac shall be such that the drainage is directed away from the end of the cul-de-sac and towards the beginning of the bulb area where catch basins are to be located.

All cul-de-sacs, bulbs and intersections shall be detailed at a scale larger than the road plan. The details shall show gutter, crown, and other grades sufficient to determine that the road shall properly drain and shall be used as a basis for layout.

The radius from the edge of the driving surface to the centre of the cul-de-sac shall not be less than 13.0m for Local Residential roads and 15.0m for Urban Residential roads.



Fire hydrants shall be located at every intersection of a cul-de-sac and through road and uniformly filled in along the road with no distance greater than 150 m between fire hydrants. The maximum length of a cul-de-sac without emergency access shall be 150 m. and any length greater than 150 m. shall have maintainable emergency access (as a dedicated block) of not less than 6.0 meters min. in width - hard surfaced and fenced.

1.4.11 Temporary Turning Circles

Temporary turning circles may be considered whenever a road is to be continued in the future in a phased Plan of Subdivision. Details for the requirements of temporary turning areas are provided in the Standard Drawings. Temporary turning circles shall conform to the Local Residential Cul-De-Sac Standard Drawing – 1.4-04.

1.4.12 Driveway Entrances

For residential properties only one (1) entrance per lot shall be permitted.

Driveway Entrance Widths shall be:

- Single Family Residential:
 - Single Driveways – 3.0m in width minimum
 - Double Driveways – 6.0 m in width maximum
Driveway within the Lot of greater than 6.0 m width may be considered provided Zoning provisions and drainage design allow.
 - Maximum Residential Driveway widths at the property line and contained within the Road Allowance shall be 6.0 m.

The Developer is responsible for the grading, gravelling and the paving of all driveways from the curb or edge of pavement to the property line or to the sidewalk (where sidewalks are proposed within the development).

Driveway entrances shall be offset from the property line: a.) in accordance with the zoning provisions or b.) a minimum of 1.5 m.



Driveway entrances shall be offset a minimum of 1.5 m. from all utility boxes, utility poles, fire hydrants and other 'street furniture' as may be required to be installed within the Township Road allowance.

The minimum consolidated depth requirements for the granular base and asphalt in driveways shall be as follows:

- Single-Family Residential - asphalt 50 mm of HL3 asphalt
- 150 mm of Granular "A"

Alternate driveway surface types (i.e. paving stones, patterned concrete pads, etc.) shall be subject to approval by the Township prior to construction.

Where driveway entrances are accessed by roads with open ditches:

- Driveway Entrance Culverts shall be Ultra Rib - Smooth Wall plastic pipe.
- The minimum length of each driveway culvert shall be 7.0 m and the minimum diameter shall be a minimum of 400 mm in diameter.
- The maintenance and repair of such culverts shall remain the responsibility of the Developer until such time as the Services have been Assumed by the Township at which time the Homeowner shall assume responsibility for their repair and replacement.
- The construction of driveway headwalls at each (either) end of the driveway culvert shall not be permitted, unless otherwise approved by the Township.

1.4.13 Driveway Grades

Driveway grading shall be in accordance with OPSD 350.010 for industrial, commercial and apartment entrances and OPSD 351.010 for residential entrances. The maximum permissible design grade for driveways on private lands shall be 8%. These maximum grades are not recommended and shall be employed only in exceptional cases where physical conditions prohibit the use of lesser grades. The minimum driveway grade shall be 2% within the right-of-way and 2% on private property.



The use of reverse grade (negative sloping) driveways shall only be considered in estate residential developments or under special circumstances.

Where reverse grade (negative sloping) driveways are permitted, a positive slope of at least 2% shall be maintained from the garage over a minimum distance of 7.0 metres and / or driveway catchbasins and drains shall be required.

Driveway catchbasins and drains shall be designed and sized such that no driveway ponding exists, and no drainage or ponding occurs in proximity to the structure.

1.4.14 Driveway Depressions

The width and location of the depressions in the curb and gutter for single-family residential driveways shall be as detailed on OPSD 351.010 with particular attention being placed on the location of the garage and the direction of traffic flow.

Driveway depressions are to be placed when concrete Barrier Curb and Gutter (OPSD600.010) is initially poured. Double driveway depressions (6.0 metres minimum width) are to be placed for all single-family residential lots.

Driveway depressions shall be located at a minimum distance that required as per zoning conditions or a minimum of 1.5 m from a side lot line. The minimum clear distance between the edge of driveway and a utility structure or hydrant shall be 1.5 m.

1.4.15 Special Road Works

Whenever it is necessary to cut through an existing Township Road, the Developer shall be responsible for properly compacting the backfill material and restoring the surface pavement to its original conditions immediately upon completion of backfilling operations. Joints between existing and new asphalt to be sealed with Denso Re-instatement Tape or equivalent.



Work shall not commence until the Township has been notified.

Before making detours, permission is required from the General Manager of Operational Services and Manager of Engineering. Where the road is not part of the Township road system, approval from the appropriate road authority shall also be necessary.

In all cases the Fire, Police Departments, School Bus Companies and Ambulance Service shall be notified by the Developer or their Contractor.

NOTE: All works shall be undertaken in accordance with Township By-laws.

1.4.16 Sub-grade

All organic material within 1.2m of the final road-grade shall be stripped and removed prior to placing granular backfill. All material used as backfill shall be clean fill subject to borrow material specifications and shall not include organic material or building rubble.

Frost tapers, transition zones, culvert installations shall be constructed with an assumed frost depth of 1.5m and shall be built in accordance with O.P.S.S.

All rock shatter shall be to a minimum of 0.3m. Where small knobs of rock are in the sub-grade, they shall be excavated to the prevailing sub-grade depth.

The Township reserves the right to ask for pre-engineering in the form of bore holes, test pits, profiles, and drainage studies, etc. prior to final Township approval to proceed with engineering design.

1.4.17 Pavement Design

In general, pavement design shall be completed by the Developer's Geotechnical Consultant in accordance with the most recent Township of Tay Development Engineering Policies, Process and Design Standards, OPSS and OPSD.



The minimum pavement design for all roads in new subdivisions shall be as detailed on the Standard Drawings. In all cases, the Developer's Geotechnical Consultant shall design, sample, and test a suitable pavement section for each particular site.

Soil sampling shall be carried out in the presence of the Developer's Geotechnical Consultant or their Inspector at intervals not exceeding forty (40) metres along the centreline of the subdivision road. The composition and design thickness of the pavement section shall be determined from:

- Mechanical sieve analysis of the subgrade soil
- Frost susceptibility
- Drainage
- Traffic volumes

Copies of all test results and proposed road designs shall be submitted with the Engineering Drawings. In no case shall a pavement design be less than the minimum Township of Tay standard as shown on the standard drawing for the particular road classification be considered acceptable.

Prior to the placement of asphalt pavement, the Developer's Consulting Engineer shall submit to the Township for approval, the asphalt pavement mix designs. The pavement design shall be sufficient to provide for ultimate wheel loads over the road, prior to placement of surface course asphalt. In all cases base course asphalt shall be OPSS HL4 with a min. A.C. content of 5%.

1.4.18 Top Course Asphalt Placement

Prior to placement of top course asphalt, the following works shall be completed:

- all sidewalk, curb, and boulevard work
- raise maintenance hole and catch basin frames
- install delineation for raised frames 40 mm above asphalt lift
- flush and sweep surface and evenly apply tack coat;
- base course asphalt pad as required in accordance with OPSS
- final sewer video inspection



- place top course asphalt in accordance with OPSS

The following conditions shall also be met:

- a minimum period of one year has expired from the completion date for the placement of the base course asphalt
- 70% of the dwellings have received provisional Occupancy Certificates
- all undeveloped lots shall be rough graded in accordance with the overall grading plan
- all service connections for multiple-family, commercial, institutional blocks shall not be installed without the approval of the Township (obtained in writing)

In all cases top (final) course asphalt shall be OPSS HL3 with a min. A.C. content of 5%

1.4.19 Curbs and Gutters

In general, all new Township roads shall be constructed to an urban cross-section, with mountable curb and gutter to OPSD 600.030 on local roadways and barrier curb and gutter to OPSD 600.010 on collector or higher order roadways.

Prior to final acceptance all curb breakage shall be rectified by removing a minimum 1.0 m section of curb and replacing.

A driveway entrance is required for each lot. Curb depressions are required at each intersection as per OPSD 310.030.

A minimum of 300 mm of Granular 'B' material compacted to 95% Standard Proctor Density shall be required as a base for all curb installations.

Minimum Grade on Curb: 0.75% is desirable with 0.5% the minimum.

1.4.20 Guiderail – as per OPSD designs

Guiderail is required on all embankments in excess of three (3) metres in height.



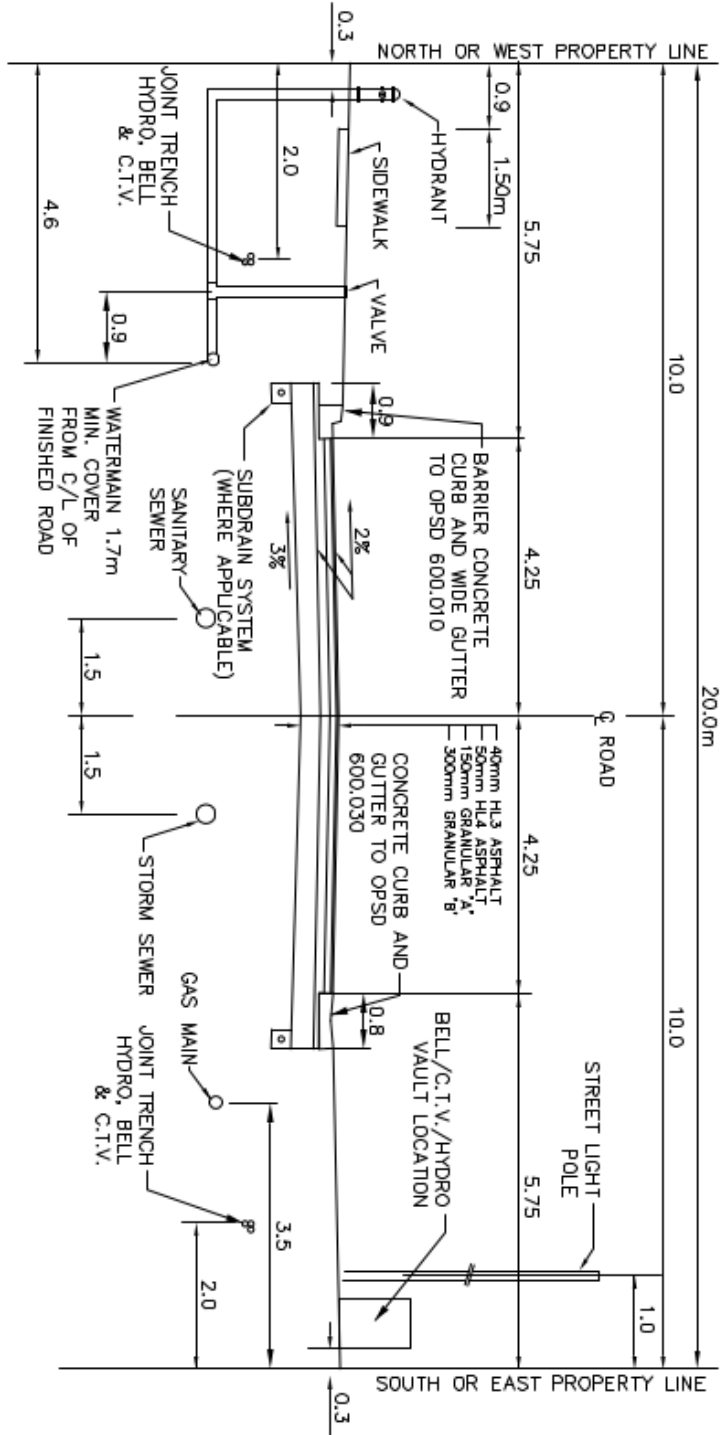
The roadway shoulders shall be widened an additional 0.5m to accommodate the guiderail. The type of structure shall be as follows:

- In Rural Settings: Three-cable Guide Rail or Box Beam Guardrail
- Adjacent to Water: Steel Beam Guiderail or Box Beam Guiderail

Guiderail shall be installed at all four (4) corners of bridge structures and Hazard Markers shall be erected on bridge structures.



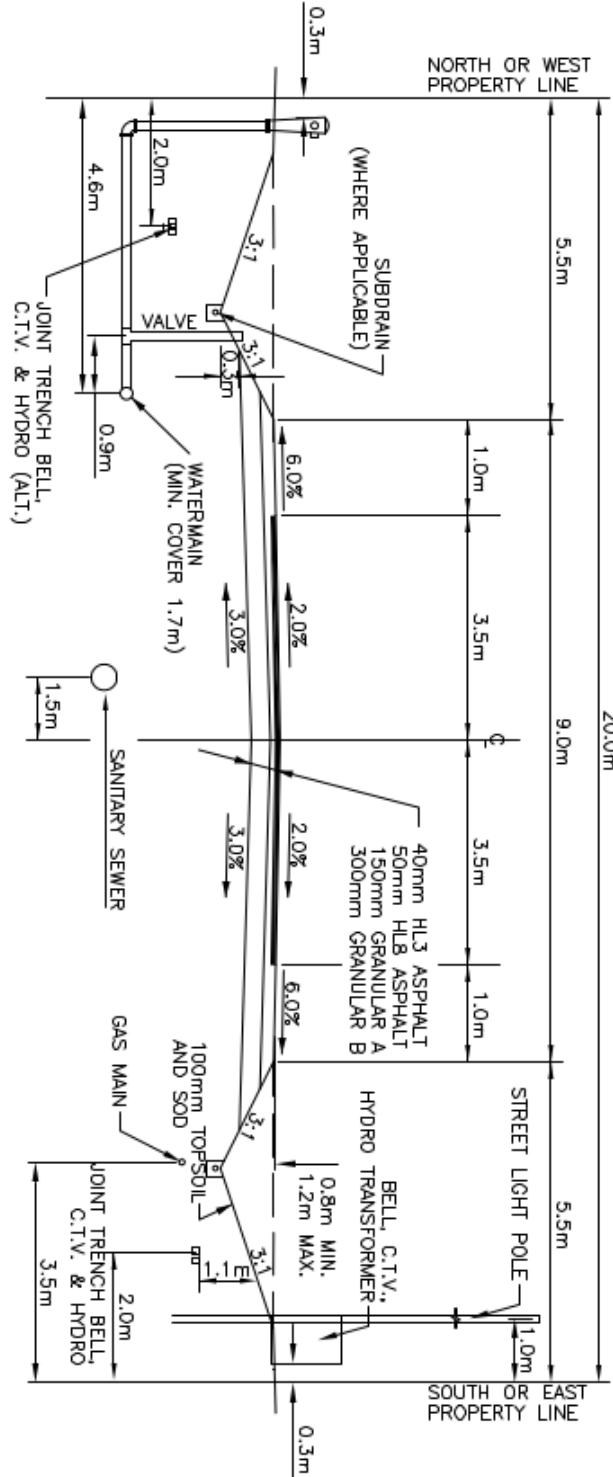
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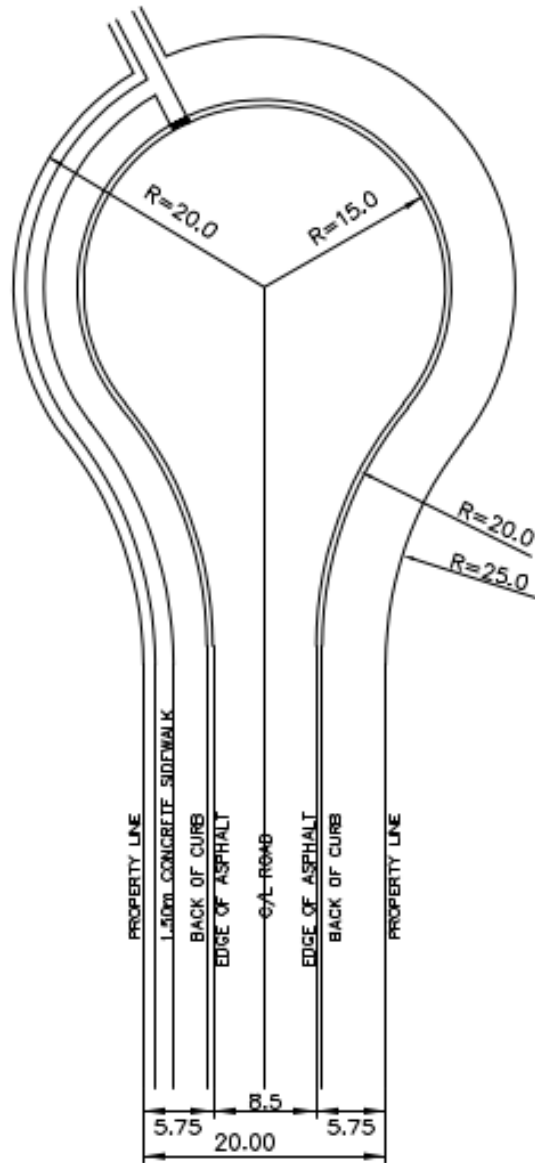
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER TOWNSHIP OF TAY DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
3. ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWNSHIP WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
4. BOTH CURB TYPE OPSD 600.010 & OPSD 600.030 ARE PRESENTED. ONLY 1 TYPE SHALL BE USED.
5. WHERE ONE SIDEWALK IS CONSTRUCTED IT SHALL BE ON THE NORTH AND WEST SIDE OF THE ROAD.
6. TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
7. BOULEVARD - 100mm TOPSOIL & NURSERY SOD (OR SEED AND MULCH IF APPROVED)
8. HYDRO, BELL AND C.T.V. MAY RUN JOINT TRENCH AT STANDARD 2.0-2.6m OFFSET LOCATION. HYDRO, BELL, C.T.V. AND GAS TO HAVE 0.9m COVER.

		TOWNSHIP OF TAY URBAN RESIDENTIAL 20.0m ROAD ALLOWANCE 8.5m ASPHALT SURFACE		APR'D: DRAWN:	DATE: 07/2023 SCALE: NTS
NO.	REVISION	APPR'D	DATE	STD. No. 1.4-01	
1	1.50m Concrete Sidewalk		07/23		
2	100mm Topsoil		07/23		



- NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
 2. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER THE TOWNSHIP OF TAY DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
 3. SERVICES * ARE LOCATED AS PER STANDARD - SHOULD SERVICES BE AVAILABLE (* Water, Sewer, Gas, Buried Hydro / Bell and C.T.V.).
 4. ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWNSHIP WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
 5. ALL WATER CURB STOPS TO BE PLACED ON STREETLINE.
 6. A 3.0m WIDE PLATFORM AREA SHALL BE CONSTRUCTED FOR EACH FIRE HYDRANT.
 7. TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
 8. HYDRO, BELL AND C.T.V. MAY RUN JOINT TRENCH AT STANDARD 2.0-2.6m OFFSET LOCATION. HYDRO, BELL C.T.V. AND GAS HAVE 0.9m COVER.

NO.	REVISION	APR'D	DATE	TOWNSHIP OF TAY	APR'D:	DATE: 07/2023
				LOCAL RESIDENTIAL	DRAWN:	SCALE: NTS
				20.0m ROAD ALLOWANCE		
				9.0m ASPHALT SURFACE		
				STD. No. 1.4-02		



NOTES:

1. DETAIL OF GRADING OF BULB AREAS OF CUL-DE-SAC TO BE SHOWN ON PROFILE DRAWINGS.
2. CUL-DE-SAC DRAINAGE TO BE DIRECTED TOWARDS THE BEGINNING OF THE BULB.
MINIMUM DITCH GRADE TO BE 2%.
3. 1.50m CONCRETE SIDEWALK TO BE PLACED ON NORTH OR EAST SIDE OF ROAD.
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

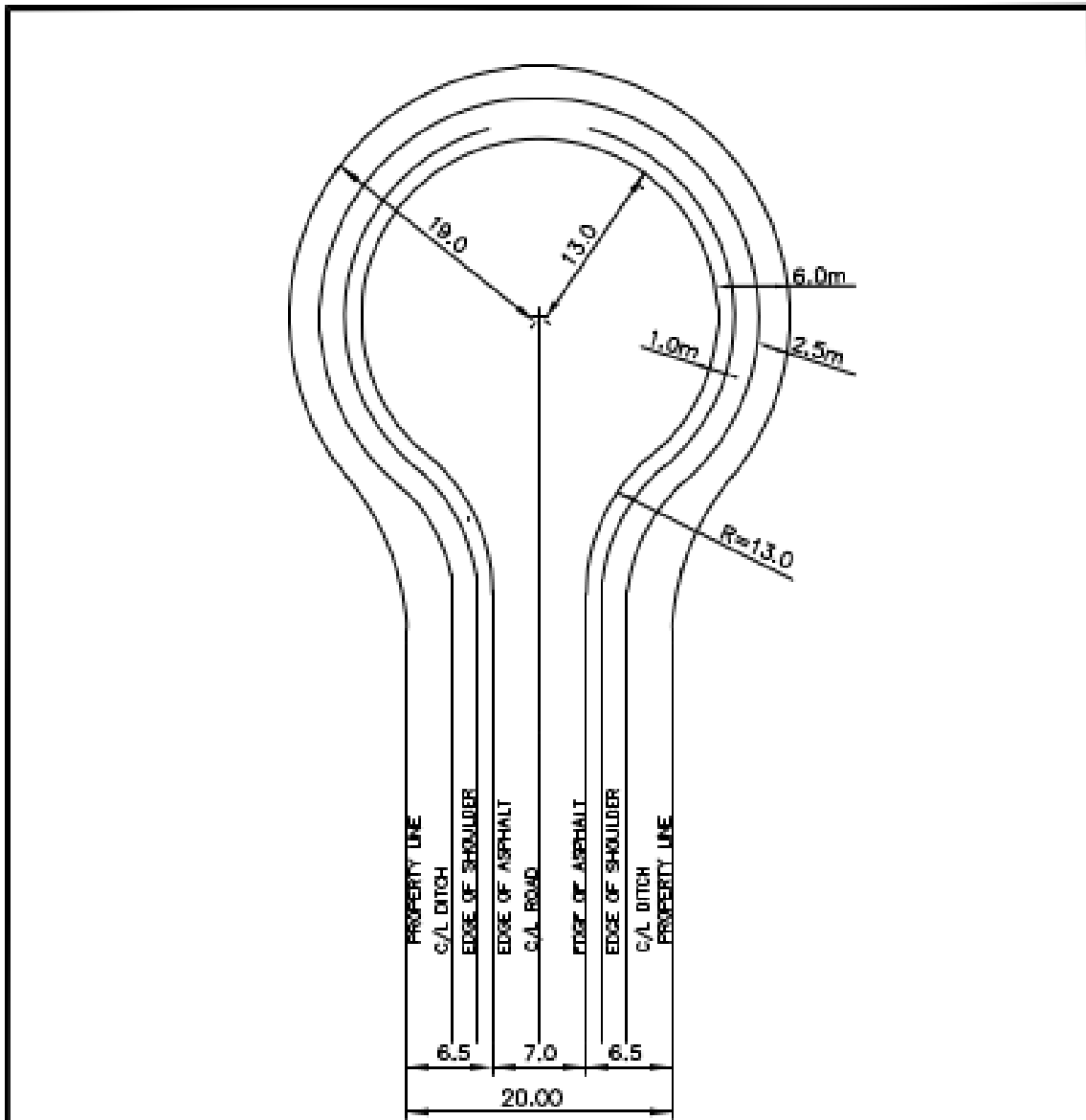
NO.	REVISION	APR'D	DATE
1	1.50m Concrete Sidewalk		05/23



TOWNSHIP OF TAY
URBAN RESIDENTIAL CUL-DE-SAC
20.0m ROAD ALLOWANCE
8.5m ASPHALT SURFACE

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS


STD. No. 1.4-03

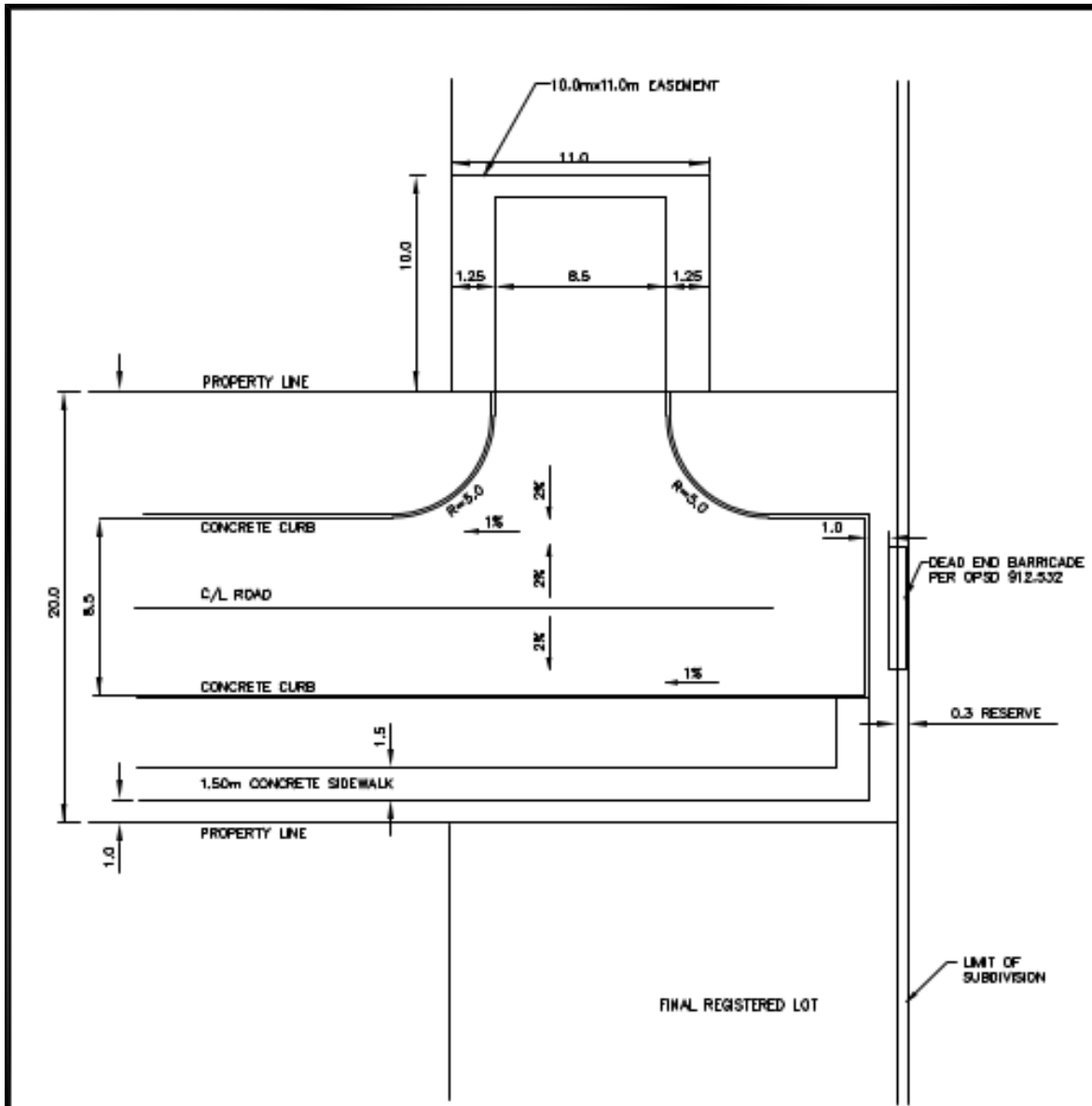


NOTES:

1. DETAIL OF GRADING OF BULB AREAS OF CUL-DE-SAC TO BE SHOWN ON PROFILE DRAWINGS.
2. CUL-DE-SAC DRAINAGE TO BE DIRECTED TOWARDS THE BEGINNING OF THE BULB. MINIMUM DITCH GRADE TO BE 2%.
3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

NO.	REVISION	APR'D	DATE
1	ASPHALT BULB INCREASED TO 13.0m		07/23

	TOWNSHIP OF TAY	APR'D:	DATE: 07/2023
	LOCAL RESIDENTIAL CUL-DE-SAC 20.0m ROAD ALLOWANCE 7.0m ASPHALT SURFACE	DRAWN:	SCALE: NTS
		STD. No. 1.4-04	



NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. GUTTER TO BE DETAILED ON ENGINEERING DRAWINGS. MINIMUM GRADE TO BE 1%.
3. THE LOCATION OF 1.50m SIDEWALK TO BE DETAILED ON THE ENGINEERING DRAWINGS.
4. ALL CURB RADI ARE TO FACE OF CURBS.

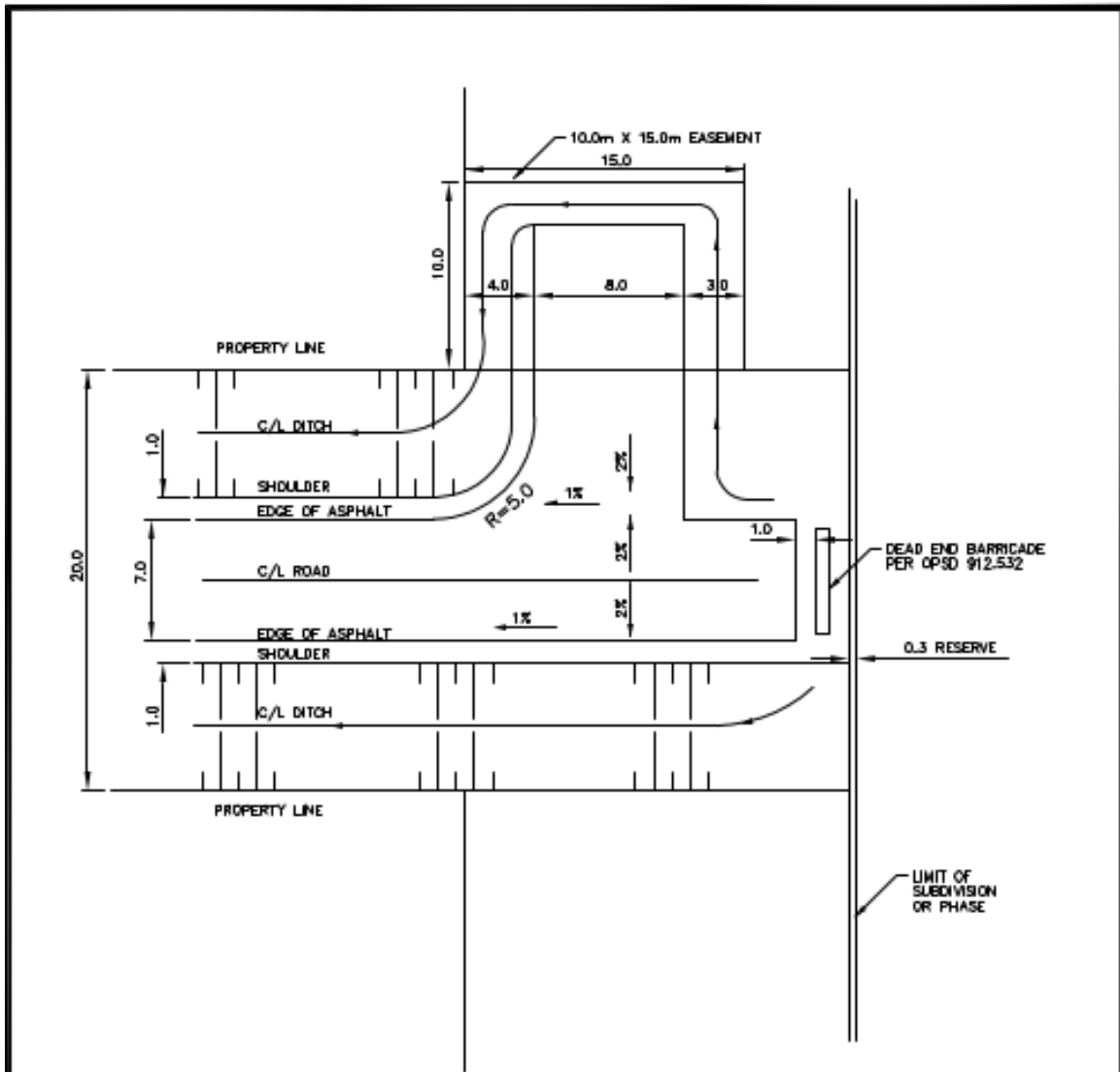
NO.	REVISION	APR'D	DATE
1	1.50m Concrete Sidewalk		07/23



TOWNSHIP OF TAY
TEMPORARY TURNAROUND
URBAN RESIDENTIAL

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS


STD. No. 1.4-05

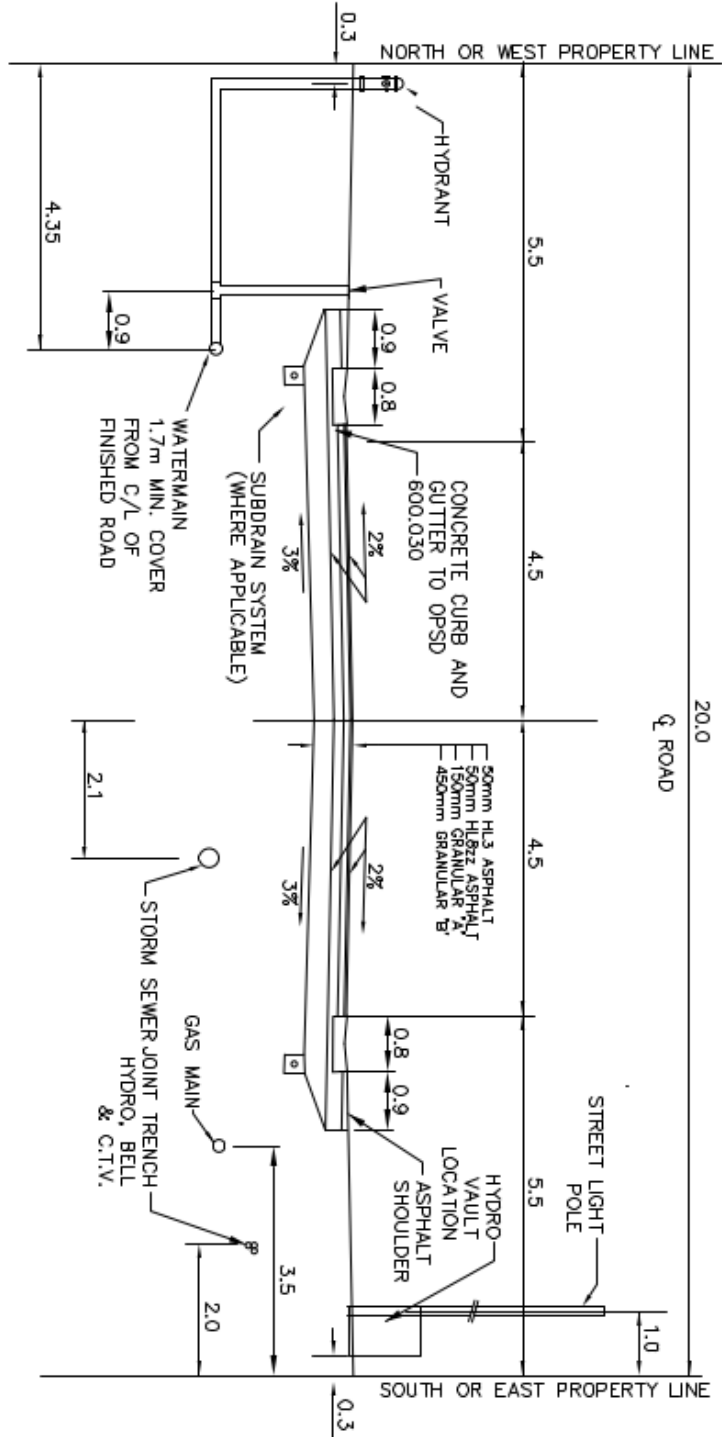


NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

NO.	REVISION	APR'D	DATE

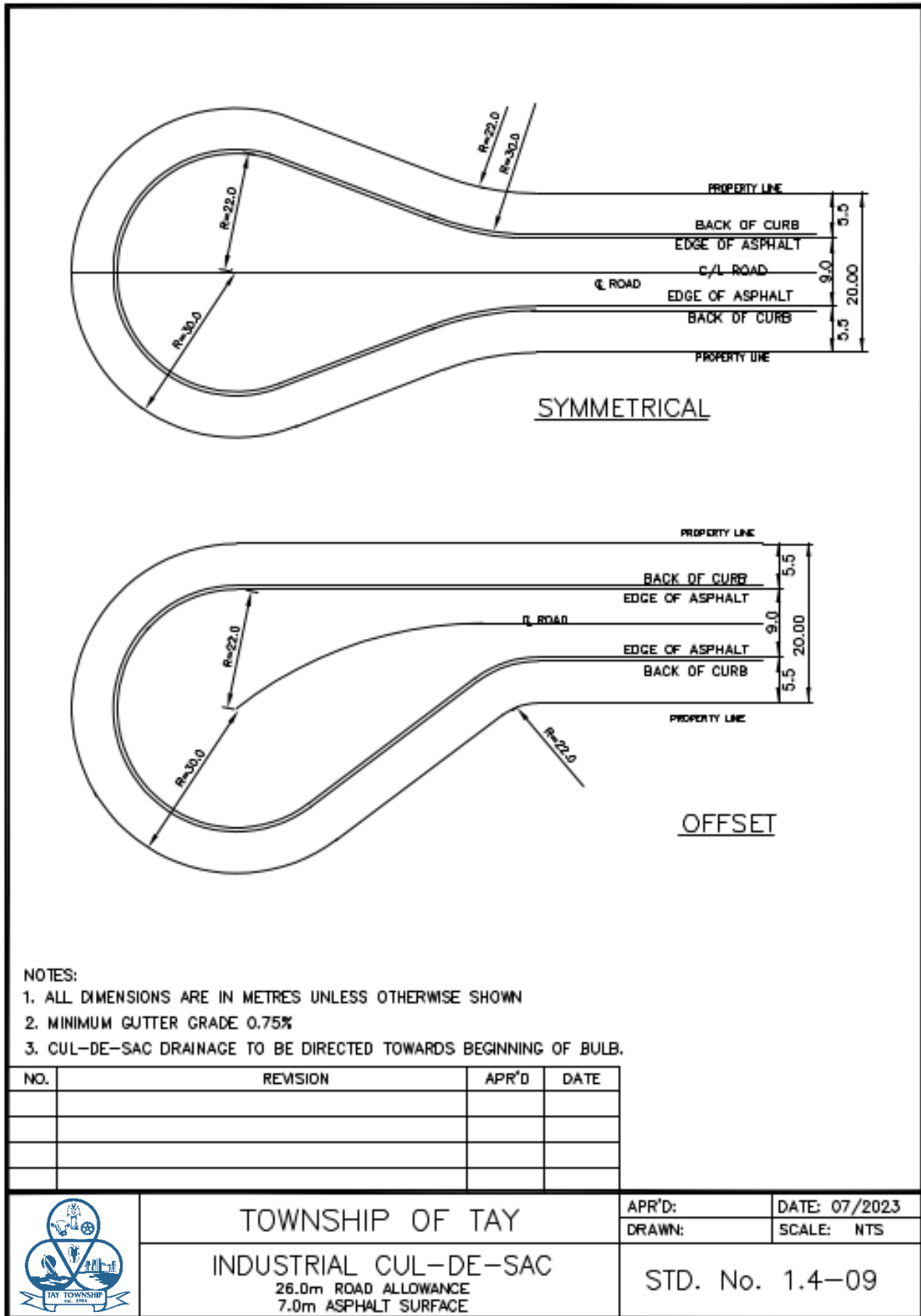
	<p>TOWNSHIP OF TAY</p>	APR'D:	DATE: 07/2023
	<p>TEMPORARY TURNAROUND LOCAL RESIDENTIAL</p>	DRAWN:	SCALE: NTS
		<p>STD. No. 1.4-06</p>	



NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER THE TOWNSHIP OF TAY DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
3. ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWNSHIP WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
4. WHERE ONE 1.50m CONCRETE SIDEWALK IS CONSTRUCTED IT SHALL BE ON THE NORTH AND EAST SIDE OF THE ROAD.
5. TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
6. HYDRO, BELL AND C.T.V. MAY RUN JOINT TRENCH AT STANDARD 2.0-2.6m OFFSET LOCATION. HYDRO, BELL, C.T.V. AND GAS TO HAVE 0.9m COVER.

NO.		REVISION		APPR'D		DATE	
TOWNSHIP OF TAY				APPR'D:		DATE: 07/2023	
LOCAL COLLECTOR and INDUSTRIAL				DRAWN:		SCALE: NTS	
20.0m ROAD ALLOWANCE / 9.0M ASPHALT SURFACE						STD. No. 1.4-08	



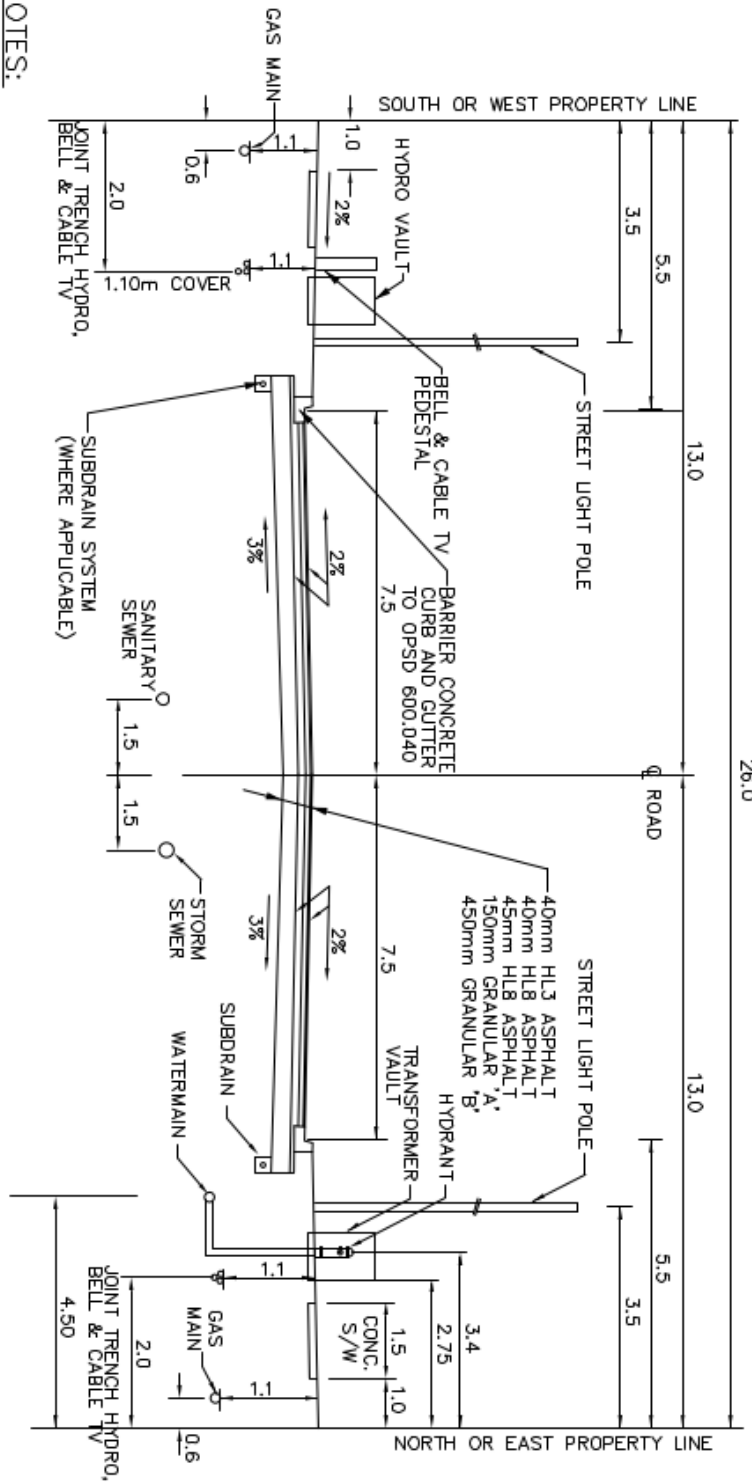
- NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN
 2. MINIMUM CUTTER GRADE 0.75%
 3. CUL-DE-SAC DRAINAGE TO BE DIRECTED TOWARDS BEGINNING OF BULB.

NO.	REVISION	APR'D	DATE



TOWNSHIP OF TAY
INDUSTRIAL CUL-DE-SAC
26.0m ROAD ALLOWANCE
7.0m ASPHALT SURFACE

APR'D:	DATE: 07/2023
DRAWN:	SCALE: NTS
STD. No. 1.4-09	

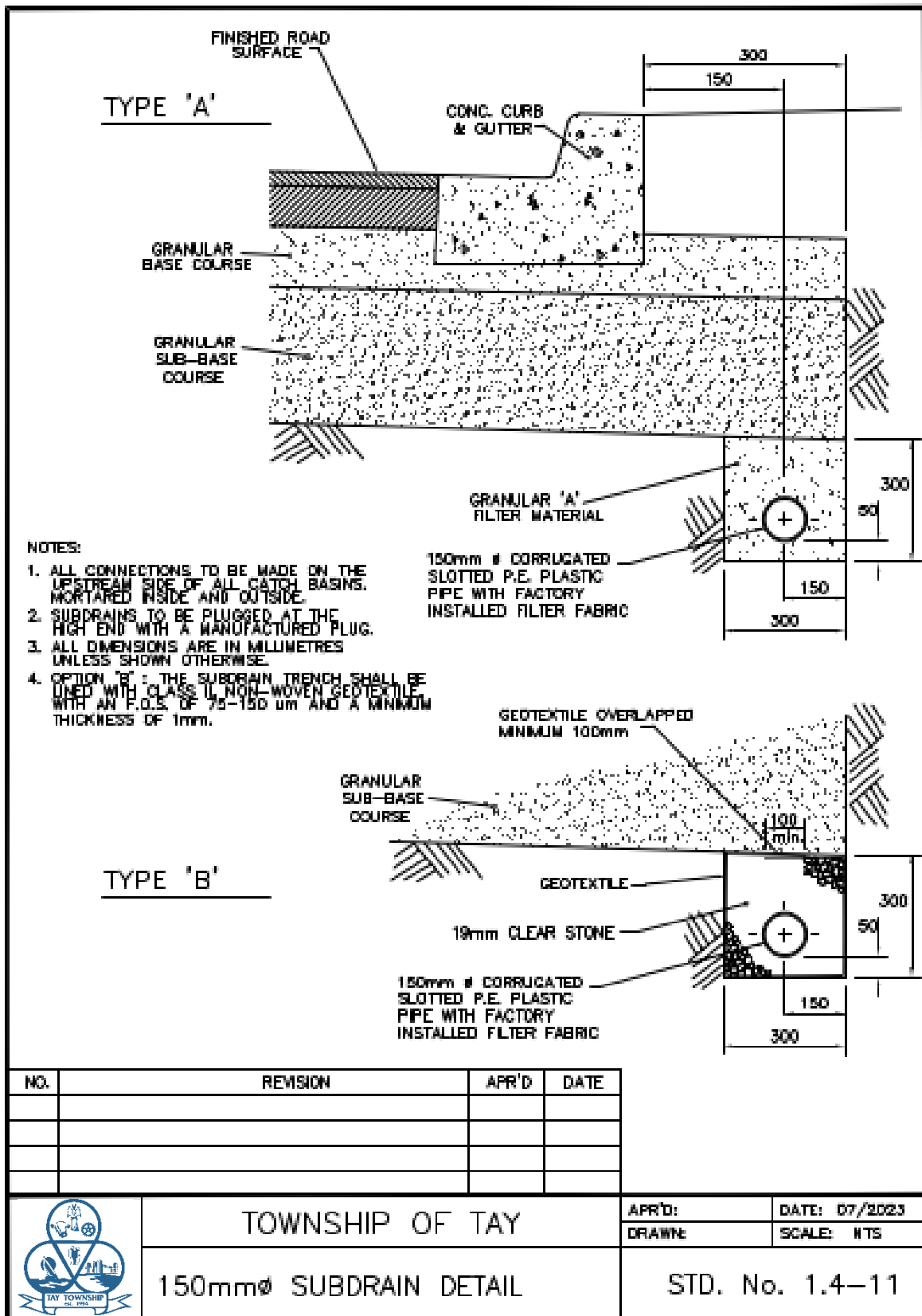


NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER THE TOWNSHIP OF TAY DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
3. ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWNSHIP WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
4. WHERE 1.50m CONCRETE SIDEWALK IS CONSTRUCTED IT SHALL BE ON THE NORTH AND EAST SIDE OF THE ROAD.
5. TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
6. HYDRO, BELL AND C.T.V. MAY RUN JOINT TRENCH AT STANDARD 2.0-2.6m OFFSET LOCATION, HYDRO, BELL, C.T.V. AND GAS TO HAVE 0.9m COVER.

NO.	REVISION	APPR'D	DATE

TOWNSHIP OF TAY	
MAJOR COLLECTOR and INDUSTRIAL	
26.0m ROAD ALLOWANCE / 15.0m ASPHALT SURFACE	
APPR'D:	DATE: 07/2023
DRAWN:	SCALE: NTS
STD. No. 1.4-10	





	NO. _____ REVISION _____ APR'D _____ DATE _____	APR'D _____ DATE _____	TOWNSHIP OF TAY TYPICAL INTERSECTION REQUIREMENTS	APR'D: _____ DATE: 07/2023 DRAWN: _____ SCALE: NTS STD. No. 1.4-12
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From TABLE -1-

INTERSECTION TYPE	CURB	D
ROAD "A" TO ROAD "B"	R	D
URBAN RESIDENTIAL TO URBAN RESIDENTIAL	10.0	5
LOCAL RESIDENTIAL TO LOCAL RESIDENTIAL	12.5	5
LOCAL COLLECTOR TO LOCAL COLLECTOR	12.5	15
LOCAL COLLECTOR TO MAJOR COLLECTOR	15.0	15
MAJOR COLLECTOR TO MAJOR COLLECTOR	18.0	18

NOTES:
 1. ALL ROADS TO INTERSECT AT 90°.
 2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.



ROADS

- A) SUBGRADE AND BOULEVARD MATERIAL TO BE COMPACTED TO A MINIMUM DRY DENSITY OF AT LEAST 95% SPMD. SUBGRADE TO BE PROOF ROLLED AND CERTIFIED PRIOR TO PLACING GRANULAR 'B'.
- B) GRANULAR 'A' AND 'B' BASE TO BE COMPACTED TO 100% OF THE MATERIAL'S RESPECTIVE SPMD.
- C) ROADWAYS TO BE CONSTRUCTED WITH MIN. 300MM GRANULAR 'B' TYPE 1, 150 MM GRANULAR 'A', AND 50 MM HLB BASE 40 MM HL3 SURFACE COURSE ASPHALT. ALL SUBDRAINS TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 405.
- D) SELECT SUBGRADE MATERIAL, OR IMPORTED GRANULAR MATERIAL APPROVED BY THE ENGINEER, COMPACTED TO 98% S.P.M.D.D. TO BE USED AS FILL IN ALL AREAS WHERE PROPOSED PIPE INVERTS ARE HIGHER THAN EXISTING GRADE OR AS INSTRUCTED BY THE ENGINEER.
- E) ALL GRANULARS AND ASPHALT MATERIALS AND PLACEMENT TO BE IN ACCORDANCE WITH OPSS 314 AND OPSS 310
- F) JOINTS WITH EXISTING ASPHALT TO BE SAW CUT STRAIGHT PRIOR TO PLACING ASPHALT AND DENSO TAPE APPLIED TO EXISTING ASPHALT.
- G) STOP SIGNS AND STREET SIGNS TO TOWNSHIP STANDARDS.
- H) REINSTATEMENT OF ALL DISTURBED BOULEVARDS TO INCLUDE REGRAVING, 100mm TOPSOIL AND SOD TO OPSS 570 AND 571.
- I) CONCRETE CURB AND GUTTER TO OPSS 600.030 OR OPSS 600.070 AND OPSS 353
- J) 1.50m CONCRETE SIDEWALK TO OPSS 310.010, 310.030 AND OPSS 351. SUBBASE TO CONSIST OF MINIMUM 150 mm OF GRANULAR 'A';
- K) 150 mm DIAMETER PIPE SUBDRAINS SHALL BE PROVIDED AS PER TOWNSHIP of TAY STANDARD DETAILS 1.4-01, 1.4-08 or 1.4-10 AS APPLICABLE AND ON BOTH SIDES OF THE ROAD WHERE APPLICABLE.
- L) SUBDRAIN TO BE INSTALLED 200 mm BELOW CURB IN GRANULAR 'A' TRENCH AND CONNECTED TO EACH CB OR CBMH.
- M) SUBDRAINS TO BE PERFORATED OTHER THAN THE 2.0 m SECTION IMMEDIATELY UPSTREAM OF ALL STRUCTURES WHICH SHALL BE NON-PERFORATED.

NO.	REVISION	APR'D	DATE	TOWNSHIP OF TAY	APR'D: DRAWN:	DATE: 07/2023 SCALE: NTS



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1.5 Erosion and Sediment Control Measures

Prior to commencement of any work on site, the Developer is required to implement an Erosion and Sediment Control Plan (ESCP) consisting of a report and drawing(s) as required, to be approved by the Township and appropriate Conservation Authority.

Erosion and sediment control measures shall be designed in accordance with the Township of Tay Standard Details 1.5-01 through 1.5-05.

Additional requirements may be necessary where creek or stream crossings for underground services, bridge or culvert construction across active streams, channel diversions and outfalls to active streams are encountered. Plans shall outline measures to reduce impact on the streams including the timing of construction activities to minimize disruption as required by NVCA, LSRCA, MNRF and DFO, where applicable.

1.5.1 Erosion and Sediment Control Plan (ESCP) Measures and Requirements

The ESCP shall address specific requirements for each stage of construction as follows:

- Tree removal
- Clearing and grubbing
- Topsoil stripping and rough grading
- Construction of services
- Road and building construction

The ESCP shall be designed and implemented in order to effectively reduce on-site erosion and prevent off-site transport of silt, both overland and via the municipal storm sewer system, or into treed and / or environmentally sensitive areas within or external to the development. The ESCP shall include provision to minimize windblown dust and to minimize and manage mud tracking on to adjacent roads.



- All erosion and sediment controls are temporary measures constructed prior to other site work which shall be maintained until assumption of the subdivision. Prior to assumption of the subdivision all temporary measures shall be removed and all disturbed areas stabilized.
- All Silt and Sediment Control Fence shall be maintained on a regular basis.
- All erosion and sediment control devices are to be inspected by the Developer's Consulting Engineer once per month and after each rainfall of 1 cm or greater to ensure that they are in proper working condition.
- A permanent record of these inspections shall be kept and an inspection report forwarded to the Manager of Engineering as part of the monthly Site Inspection and Reporting.
- All disturbed ground left inactive shall be stabilized by seeding, sodding, mulching, or covering, or other equivalent control measure. The period of time of inactivity shall not exceed thirty (30) days, unless otherwise authorized by the Township.
- All activities on the site shall be conducted in a logical sequence to minimise the area of bare soil exposed at any one time.
- The phasing of individual developments shall be taken into account during the design of the control measures including locations for topsoil stockpiles. A primary consideration shall be to expose the least possible area of land for the shortest possible timeframe.

1.5.1.1 Silt and Sediment Control Fence

Silt and Sediment Control Fence shall be installed along all down-slope sides of a site along the edges of a drainage channel passing through the site, and along the perimeter of all other areas sensitive to sediment accumulation.

Silt and Sediment Control Fence shall be installed wherever surface runoff drains onto adjacent properties, completely around the base of topsoil stockpiles and along the perimeter of all other



areas sensitive to sediment accumulation (e.g. watercourses, valleys, woodlots, areas to remain undisturbed etc.).

All Silt and Sediment Control Fence installation shall be constructed in accordance with Township of Tay Standard Drawings STD. No. 1.5-01 - Light Duty Silt Barrier Fence or STD. No. 1.5-02 - Heavy Duty Silt Barrier Fence.

1.5.1.2 Topsoil Stockpile Protection

Runoff shall be controlled by Silt and Sediment Control Fence or other approved measures and devices.

If the Stockpile is to remain for more than 30 days, Stockpiles shall be stabilized by vegetative cover, or other means.

All Stockpiles containing more than 100m³ of material shall be located a minimum of 10m away from a roadway, drainage channel or an occupied residential lot.

The maximum side-slopes for topsoil stockpiles shall be 5 horizontal to 1 vertical.

The maximum Stockpile height shall be approved by the Township in consideration of the surrounding land uses and duration the Stockpile is to be in place.

1.5.1.3 Temporary Sediment Basins

Sediment Basins shall be constructed on sites having a disturbed drainage area of greater than two (2) hectares.

Temporary Sediment Basins may also be required for sites smaller than two (2) hectares where watercourses or environmentally sensitive areas have been identified or those having an average slope greater than 12%.



Temporary Sediment Basins shall be designed to settle out particles that are 0.04 mm in diameter or larger from surface water runoff and storm sewer flows and shall be sized to meet LSRCAs criteria of minimum 125 m³/ha, 24hr detention and 125 m³/ha permanent pool storage volume or the ultimate pond criteria.

Temporary Sediment Basins are to have filter fabric / clear stone wrapped perforated riser outfalls with anti-seepage collars and rip rap overflow weirs.

1.5.1.4 Catchbasin Sediment Control

All catchbasins shall be provided with a sediment control barrier.

Sediment removal is required when the depth from the underside of frame to top of the accumulated sediment is reduced to 300mm.

Under appropriate drainage circumstances, all non-low point roadside catchbasins shall be provided with sediment protection by double wrapping the catchbasin grate with a woven geotextile. All low point catchbasins shall utilise alternative sediment control measures so that the drainage outlet is not completely blocked.

Regular weekly cleanings of the sump or the use of sediment bag shall be undertaken for these catchbasins.

All Catchbasin Sediment Controls shall be inspected by the Developer's Consulting Engineer once per week and after each rainfall of 1 cm or greater and maintained on a regular basis.

1.5.1.5 Stone Pad Construction Entrance / Access (Mud Mat)

In order to reduce the tracking of mud onto a paved road, a pad of crushed stone shall be constructed at the site entrance and exit leading onto any existing road. The stone pad shall be a minimum of 450mm thick, 30m long and 5m wide. The first 15m from the entrance/exit shall be



constructed with 50mm clear stone. The remaining 15m shall be constructed with 150mm riprap.

This stone pad shall be maintained as required given the site conditions to ensure mud tracking is kept to a minimum. In some cases, the drawings shall specify a mandatory truck haul route.

1.5.1.6 Rock Check Dams

To be installed in swales and ditches in accordance with OPSD 219.210 and 219.211 where runoff drains to adjacent properties or to prevent silt and sediment migration within the site as required.

1.5.1.7 Vegetative Buffer Strips

A minimum 3m wide vegetative buffer strip shall be provided along the limits of the development adjacent to existing road boulevards and existing residential properties. Where a sediment control fence is required, it shall be constructed in front of the buffer strip.

1.5.2 Drawings and Report Requirements

1.5.2.1 Drawings

ECSP Drawings shall be comprised of, and include the following:

- Scale at 1:500 or 1:1000
- Location of buildings, existing and proposed, within and adjacent to the property
- All natural features within and adjacent to the property (woodlots, watercourses, valley lands etc.)
- Trees to be preserved
- Existing contours at 0.5 m intervals
- Proposed interim and final elevations



- Areas to be disturbed
- Direction of overland flow
- Staging of construction and implementation of control measures
- Proposed erosion and sediment control measures (silt fence, rock check dams, sediment basins, interceptor swales, stone mud mats, straw bales, etc.)
- Topsoil stockpile locations with estimated quantities, max. height and angle of side slopes
- Detail drawings

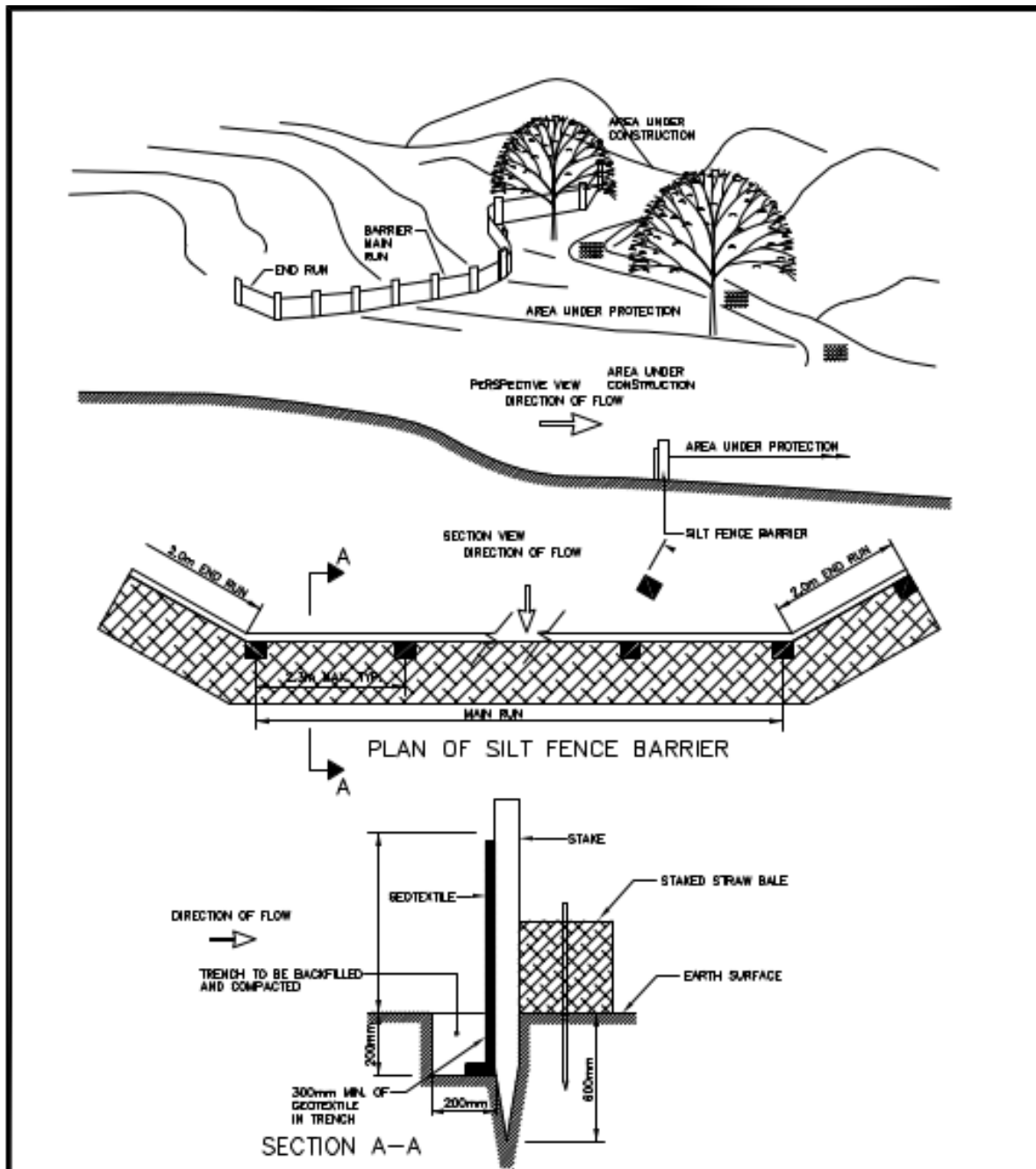
1.5.2.2 Report

A brief report shall accompany the drawings which, at a minimum, outline staging of construction and implementation of the proposed erosion and sediment control measures, a description of measures to be undertaken, silt basin calculations, features to be protected and an inspection and maintenance program.


The report shall also recommend measures to control dust such as road cleaning, watering, work restrictions on windy days, minimizing disturbed areas and other measures.

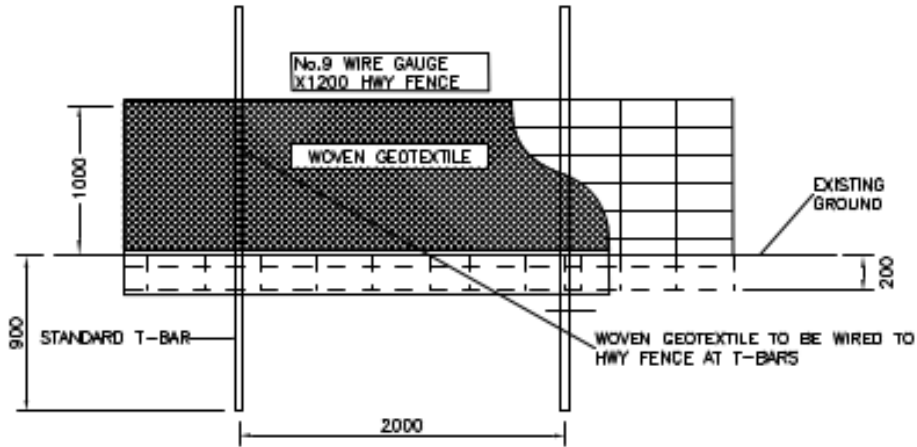


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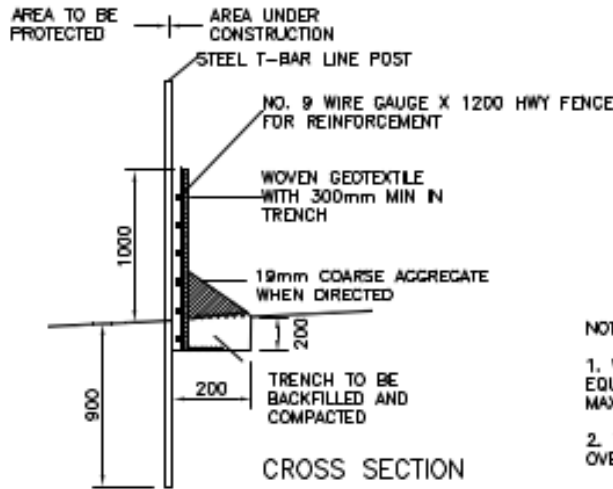


NO.	REVISION	APR'D	DATE

	TOWNSHIP OF TAY	APR'D:	DATE: 07/2023
	LIGHT DUTY SILT FENCE BARRIER	DRAWN:	SCALE: NTS
		STD. No. 1.5-01	



ELEVATION



CROSS SECTION

NOTES:

1. WOVEN GEOTEXTILE TO HAVE A MINIMUM EQUIVALENT OPENING SIZE OF 0.15mm AND MAXIMUM EQUIVALENT OPENING SIZE OF 0.25mm
2. WOVEN GEOTEXTILE TO HAVE A HORIZONTAL OVERLAP OF 1000mm AT JOINTS.
3. END RUNS SHALL BE TURNED UPSTREAM AT 30°

NO.	REVISION	APR'D	DATE

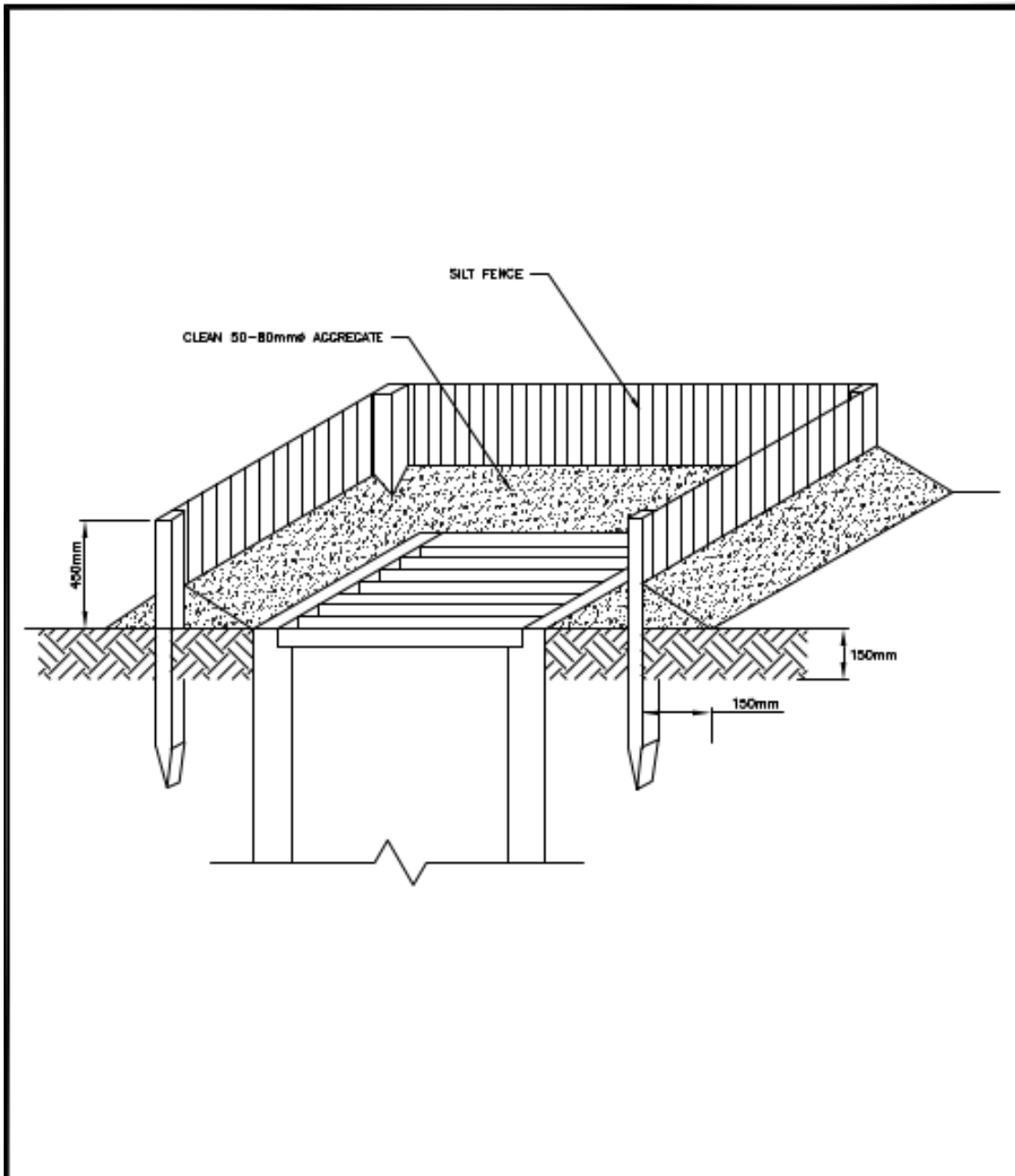


TOWNSHIP OF TAY

HEAVY DUTY SILT FENCE BARRIER

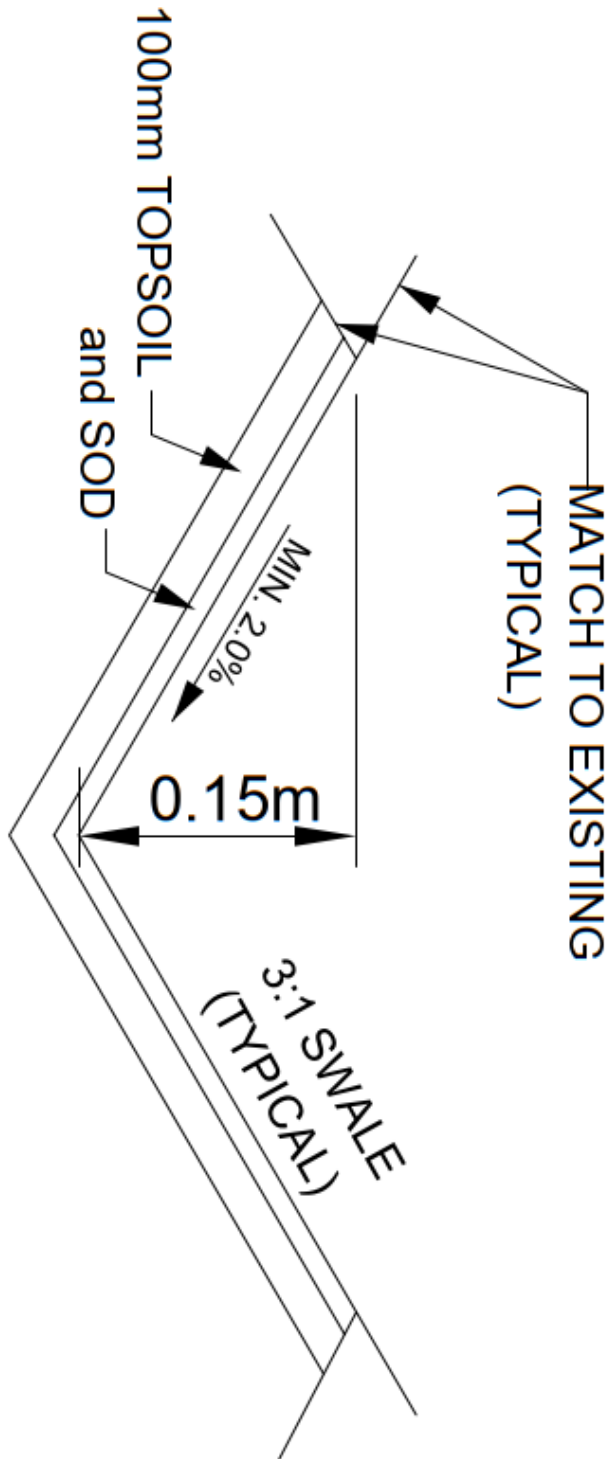
APR'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.5-02



NO.	REVISION	APR'D	DATE

	TOWNSHIP OF TAY SEDIMENT CONTROL MEASURE AT CATCHBASINS AND CATCHBASIN MANHOLES	APR'D:	DATE: 07/2023
		DRAWN:	SCALE: NTS
		STD. No. 1.5-03	



TYPICAL SWALE DETAIL

SCALE: NTS

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

NO.		REVISION		APR'D		DATE	
TOWNSHIP OF TAY						APR'D:	DATE: 07/2023
TYPICAL SWALE DETAIL						DRAWN:	SCALE: NTS
						STD. No. 1.5-05	



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1.6 Stormwater Management

The Township has set out the following objectives for effective stormwater management infrastructure design and construction:

- Prevent loss of life and minimize impact to adjacent properties
- Prevent inconvenience from surface ponding and flooding
- Prevent adverse impacts on the local groundwater systems and base flows in receiving watercourses
- Prevent downstream flooding and erosion
- Prevent pollution discharges to watercourses / waterbodies
- Prevent soil losses and sediments to enter sewer systems and watercourses / waterbodies resulting from construction activity
- Prevent impairment of aquatic life and habitat
- Promote orderly development in a cost-effective manner.

Stormwater management requirements generally shall reflect distinct solutions and vary depending upon the watershed, and in some cases the storm sewer shed, that the site is located. Site-specific requirements can be obtained from the Township. A stormwater management report shall be required for all development applications.

Site specific stormwater management reports shall be consistent with all applicable background reports prepared by the Township or Conservation Authority (i.e. Watershed Planning Studies, Master Drainage Plans, Stormwater Management Master Plan, etc.), including the Lake Simcoe Protection Plan and the Township of Tay Comprehensive Stormwater Master Plan.

In general, stormwater management reports shall address the following:

- stormwater quantity and quality
- sediment and erosion control and base flow maintenance



- Stormwater Management Pond Planting Plan

1.6.1 Quantity Control

The Township implements a Major and Minor system approach to stormwater conveyance and control, comprised as follows:

- *Minor (conveyance) System* - 5-year return period – storm sewers, catch basins, driveway culverts and surface swales.
- *Major (overland) System* - 100-year return period – streams, valleys, man-made channels, roadways, roadside ditches, and ponds.

In general, quantity control measures are to be designed in accordance with the MECP Stormwater Management Planning and Design Manual and / or the latest version of NVCA or LSRCA criteria where applicable.

In addition to introducing pond storage into a stormwater management system, increased flows resulting from increased impervious areas may be mitigated by utilizing measures such as: discharging rainwater leaders onto grassed areas, providing temporary rooftop and parking lot storage, or using grassed swales rather than piped flow.

Other factors, such as snowmelt run-off with large volume and longer duration and potential adverse downstream effects due to uncoordinated timing of peak flows shall be considered when designing stormwater management facilities.

Underground storage tanks and 'super pipe' systems for stormwater storage are discouraged as part of the Township system due to inherent long term, high replacement and maintenance costs and may only be considered in exceptional cases and typically on in I.C.I. Site Plan developments.



Joint use facilities i.e. detention ponds over recreational playing fields and passive parks, **may** be considered on an individual basis subject to suitably designed control measures and the intended park use.

The degree of control on the quantity of run-off from a proposed development shall be as follows:

- The post-development peak flow shall not be greater than the corresponding pre-development peak flow for the 1 : 5 year, 1 : 10 year, 1 : 25 year and 1 : 100-year storms. Other regulatory agencies may require other storm flows to be analyzed (i.e. 2 year and/or Regional flows).

1.6.2 Runoff Quantity

- Rural Catchments – shall be modelled using the SCS 24 hr design storm to generate peak flow value.
- Urban Catchments – shall be modelled using the Chicago 4 hr design storm.

In general, the SCS Design Storms shall be used for determining the hydrographs for undeveloped / rural watersheds and for checking detention storages required for quantity control.

The Chicago Design Storms shall be used for determining hydrographs in urban areas and also for checking detention storage. In most cases, the Developer's Consulting Engineer shall be required to run both sets of design storms to make sure that the more stringent is used for each individual element of the drainage system (pipe flow, road flow, channel flow, detention storage).



The time step for discretization of the design storm can vary according to the size of the sub-watershed but shall not exceed the estimated time of concentration. The maximum rainfall intensity shall be compatible with that of real storms on record.

All parameter assumptions used in the OTTHYMO input shall be clearly identified in the stormwater management report.

1.6.3 Quality Control

In general, water quality controls are to be designed in accordance with the MECP Stormwater Management Planning and Design Manual – (as amended), MECP Design Criteria for Sanitary Sewers, Storm Sewers and Force Mains for Alterations Authorized Under Environmental Compliance Approval (as amended) the Lake Simcoe Protection Plan and NVCA or LSRCA criteria, as applicable. Prior to initiating design, the Developer's Consulting Engineering shall contact the Township for acceptability of specific measures in consideration of long-term maintenance and effectiveness.

1.6.4 Watershed Area

The watershed area shall be determined from contour plans and shall include all areas that naturally drain into the system and any fringe areas not accommodated in adjacent storm drainage systems, as well as other areas which may become tributary by reason of regrading. This information shall be confirmed with the Manager of Engineering prior to the start of the design of the internal servicing of the site.

1.6.4.1 External Catchment Areas

A plan shall be prepared to a scale of 1 : 1,000 to 1 : 2,000 depending on the size of the watershed area, to show the nature of the drainage of the lands surrounding the development



site and to show all external drainage areas that are contributory to the drainage system for the development.

The external drainage areas shall be divided into smaller tributary areas and the area and the location to which the tributary area is considered to drain in the design shall be clearly shown.

The plan shall clearly show all existing contours used to justify the limits of the external drainage areas.

The uses as identified in the latest Zoning By-law and Official Plan shall be used to determine the correct values of the run-off parameters for all external areas in the design and to determine the specific areas to which these values apply in lieu of precise information on development as a whole or any part of a watershed area.

This external drainage area plan shall be prepared and shall be submitted to the Manager of Engineering at the functional report stage and prior to the commencement of the detailed storm sewer design.

1.6.4.2 Internal Catchment Areas

An internal storm drainage plan shall be prepared to a scale of 1:1,000 and shall include all roads, lots, blocks, and other lands within the development.

The proposed storm sewer system shall be shown on this plan with all maintenance holes numbered consecutively from the outlet.

These maintenance holes shall be the tributary points in the design and the area contributing to each maintenance hole shall be clearly outlined on this plan.

The area, in hectares, of each contributing area (to the nearest hundredth) and the run-off parameter used shall be shown in a circle located within the contributing area.



In cases where areas of different run-off parameters may be tributary to the same maintenance hole, the areas and the parameters shall be separately indicated on the plan.

In determining the tributary area to each maintenance hole, the proposed grading of the lots shall be considered to maintain consistency in the design.

In the case of large areas under single ownership or blocks requiring future site plan agreements, the design shall be prepared on the basis of the whole area being contributory to one maintenance hole in the abutting storm sewer. Should more than one private storm connection be necessary to serve the property, the appropriate area tributary to each connection shall be clearly shown and taken into account in the storm sewer design.

The storm drainage plan shall indicate but not be limited to the following:

- existing contours
- drainage patterns of adjacent lands
- runoff coefficients and areas (ha) of tributary areas outside the development and for each section of the storm sewers within the development
- direction of runoff
- road names
- maintenance hole numbers
- sewer sizes, slope, and directions of flow
- any catch basins or swales, on the lots or blocks, required to collect the runoff
- temporary or permanent quantity and quality stormwater management facilities
- major and minor overland flow routes
- culverts and other drainage appurtenances



1.6.5 Stormwater Pond Requirements

The design of stormwater management ponds shall be completed with consideration of the following aesthetic and landscape design criteria:

- Stormwater management dry ponds shall be designed to limit the maximum depth of water to 1.8 m above the lowest point of the stormwater basin. An additional 0.3 m freeboard is required above the maximum flood level. The maximum depth of the extended detention zone shall not exceed 1.0 m above the lowest point of the pond.
- Maximum side slope shall be 5:1 from the bottom of the dry pond to the limit of maximum extended detention, with a minimum horizontal length of 3.0 m. The minimum allowable gradient on the bottom of the basin shall be 1.0% and the maximum gradient shall be 5%.
- Stormwater management wetlands shall be designed to limit the maximum depth of water to 2.1 m above the lowest point of the stormwater basin excluding micro-pools. An additional 0.3 m freeboard is required above the maximum flood level.
- The maximum depth of the extended detention zone shall not exceed 1.0 m above the permanent pool elevation. Maximum peak flow attenuation zone shall not exceed 1.8 m above the permanent pool elevation.
- The permanent pool depth shall range between a minimum depth of 0.15 m to a maximum depth of 0.45 m.
- A maximum 5:1 slope below the permanent pool level shall be permitted around the entire stormwater management wetland. A maximum 5:1 slope above the permanent pool level shall be permitted around the entire stormwater management wetland. The slope shall extend from the permanent pool level to the limit of maximum extended detention. The horizontal distance of this slope shall be a minimum of 3.0 m.
- Stormwater management wet ponds shall be designed to limit the maximum depth of water to 3.3 m above the lowest point of the stormwater basin. An additional 0.3 m freeboard is required above the maximum flood level. The maximum depth of the



extended detention zone shall not exceed 1.0 m above the permanent pool elevation. The permanent pool depth shall range between a minimum depth of 1.0 m to a maximum depth of 1.5 m.

- A maximum 5:1 slope shall be permitted around the entire stormwater management wet pond. The slope shall extend from the bottom of the permanent pool to the limit of maximum extended detention.
- Where stormwater management facilities to be owned by the Township, fencing shall be required at the discretion of the Township. At a minimum, demarcation of property boundaries is required. Fencing, signage and/or property demarcation shall be to Township Standards.
- In situations where existing natural areas are proposed to be used for stormwater management, exemptions to the depth and slope criteria may be provided to minimize disturbance to the natural feature, at the discretion of the Township.
- Designed pedestrian access areas shall not exceed a maximum slope of 12:1.
- Notwithstanding the above slope and depth criteria, in the case of headwall design, the depth of water related to adjoining side slopes may vary and fencing is required for safety purposes.
- Areas subject to the collection of contaminants or spills shall be fitted with adequate oil / grit separators.
- Maintenance access requirements are to be determined on a site-by-site basis; however, the following general criteria are recommended: Controlled maintenance access routes shall be provided to both inlet and outlet structures and forebays. A minimum 6.0 m wide surface to accommodate maintenance vehicles within a minimum 10 m turning radius (inside radius) and a flat 10 m loading areas is required. Maintenance access routes shall not exceed a maximum slope of 10:1. The design of maintenance routes and loading areas shall be to the approval of the General Manager of Operational Services and Manager of Engineering.



- Sediment drying area may be required adjacent to the forebay area to facilitate dewatering of sediment prior to removal to an approved disposal location.
- Maintenance by-pass shall be provided via a maintenance hole upstream of the entry to the pond to divert all flow from the pond during maintenance and sediment removal procedures.
- Graduated poles shall be installed in all wet cells for measuring sediment accumulation and set to design grade.

1.6.6 Storm Sewer Design

Storm sewers, designed and constructed in accordance with the most recent requirements and specifications of the Township, shall be of adequate size and depth to provide service for the development of lands within the upstream watershed and/or for the drainage of any areas designated by the Township. Storm drainage shall be directed to an outlet considered adequate in the opinion of the Township and applicable agencies.

Channel works, bridges, culverts and all other drainage structures or works shall be designed, approved, and constructed in accordance with the most recent drawings and specifications of all applicable agencies having jurisdiction, such as the Township, LSRCA, NVCA, MECP, MTO, MNRF, DFO, etc.

1.6.6.1 Hydrology and Design Flows

Storm sewers shall be designed to drain all lands based on the Rational Method. The Rational Method calculations shall be checked using a model approved by the Township where the drainage area is greater than 10 hectares. The larger of the flows is to be used in the design of the sewer system unless approved otherwise.

$$Q = 0.0028 C I A \text{ where:}$$

Q = Flow in cubic metres per second
A = Area in Hectares
C = Run-off coefficient



I = Intensity in mm/hr

Storm sewers shall generally be designed to accommodate 1 : 5-year storm flows.

1.6.6.2 Intensity of Rainfall

The intensity of rainfall is to be determined from the MTO - **ONTARIO I D F Look-Up**

http://www.mto.gov.on.ca/IDF_Curves/map_acquisition.shtml

Intensity Calculation:

Where $I = A \times t^B$

I is in mm/hr, t is time of concentration in hours; **A** and **B** are as follows:

<u>Storm Return Period</u>	<u>A</u>	<u>B</u>
2 year	22.5	-0.728
5 year	29.9	-0.725
10 year	34.8	-0.724
25 year	40.9	-0.723
50 year	45.5	-0.722
100 year	50.0	-0.722

1.6.6.3 Time of Concentration

The minimum initial time of concentration is to be 10 minutes.

Pre-Development Areas:

To calculate the initial time of concentration (**tc**) for upstream, undeveloped lands, the following formulas may be used: Bransby-Williams or Airport Method. The most appropriate method shall be determined at the discretion of the Township.

1.6.6.4 Run-off Coefficient

The Developer's Consulting Engineer shall submit calculations and drawings

(as required) to support the run-off coefficients used for storm sewer design with the Rational



Method.

In general, run-off coefficients shall be as follows:

Parks over 4 hectares	0.20*
Parks 4 hectares and under	0.25*

* Parks with increased impermeable area shall require a higher run-off coefficient.

Single-family Residential (Urban)	0.45
Single-family Residential (Suburban)	0.40
Semi-detached Residential	0.60
Townhouses, Maisonettes, Row Houses, etc.	0.70
Apartments	0.75
Schools and Churches	0.75
Industrial (local)	0.75
Industrial (urban)	0.90
Commercial	0.90
Heavily Developed Areas	0.90
Paved Areas	0.95

A minimum run-off coefficient of 0.55 is to be used for undeveloped upstream area where future residential development is expected and 0.75 where future industrial, high-density residential or commercial development is expected.

1.6.6.5 Drainage Area

Drainage systems shall be designed to accommodate all upstream drainage areas considering interim and ultimate conditions.



1.6.7 Pipe Sizing and Specifications

1.6.7.1 Pipe Capacities

Manning's formula shall be used in determining the capacity of all storm sewers. The capacity of the sewer shall be determined on the basis of the pipe flowing full.

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

- concrete pipe 0.013
- concrete box culverts 0.013
- corrugated metal 68 x 13mm corrugations 0.024
- corrugated metal 25% paved invert 0.021
- PVC pipe 0.013
- HDPE smooth wall ribbed pipe 0.013

1.6.7.2 Flow Velocities (Flowing full)

For circular pipes the minimum acceptable velocity is 0.8 m/s and the maximum acceptable velocity is 3.5 m/s during the 5-year storm event.

1.6.7.3 Minimum Sizes

The minimum size for an on-street storm sewer shall be 300 mm diameter.

1.6.7.4 Minimum Grades

Regardless of flow velocities obtained, the minimum design grades for pipe storm sewers shall be as follows:

Sewer Size (diameter)	Minimum Grade
≤ 375 mm	0.40%
450 mm ≤ 525 mm	0.30%
600 mm ≤ 1200 mm	0.20%



> 1200 mm	0.15%
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1.6.7.5 Depth of Storm Sewers

The depth of a deep storm sewer shall be sufficient to provide a suitable outlet for the building foundation weeping tiles. The minimum cover to the top outside pipe barrel of a deep storm sewer shall generally be 2.5 to 3.0 metres. The minimum cover to the top outside pipe barrel of a shallow storm sewer system shall not be less than 1.5 metres from the centre-line of the roadway unless alternate measures are implemented as approved by the Township.

1.6.7.6 Location

The storm sewers shall be located as shown on the standard Township road cross-section drawings. This standard location shall be generally 2.1 metres north or east of the centreline of the road allowance. In the case of crescents, looped and curvilinear roads, this standard location may be varied to the extent that the storm sewer remains on the same side of the centreline of the road (i.e., left or right) to avoid crossing the sanitary sewer trenches at the changes in direction of the road.

1.6.7.7 Pipe Crossings

A minimum clearance of 0.20 metres shall be provided between the outside of all pipe barrels at all points of crossing. In cases where the storm sewer crosses a recent utility trench at an elevation higher than the elevation of the utility, a support system shall be designed to prevent settlements of the storm sewer, or alternatively the original trench shall be re-excavated to the top of the utility and shall be backfilled with non-shrinkable fill (low strength concrete) to adequately support the storm sewer. When the storm sewer passes under an existing utility, adequate support shall be provided for the utility during and after construction to prevent damage to that utility.



1.6.7.8 Radius Pipes

Radius pipe shall be allowed for storm sewers 1050 mm in diameter and larger provided that a maintenance hole is located at the beginning or at the end of the radial section. The minimum centre line radius allowable shall be in accordance with the minimum radii table as provided by the pipe manufacturer.

1.6.7.9 Limits of Construction

Sewers shall be terminated with a maintenance hole at the upstream subdivision limits when external drainage areas are considered in the design. The design of the terminal maintenance holes shall allow for the future extension of the sewer.

When external areas are not included in the sewer design, the sewer shall extend at least halfway across the frontage and/or flankage of any lot or block in the subdivision.

1.6.7.10 Sewer Alignment

Storm sewers shall be laid in a straight line between maintenance holes unless radius pipe has been designed. Joint burial (common trenching) with sanitary sewers may be considered when supported by the recommendations of a soils report prepared by the Developer's Geotechnical Engineering Consultant.

1.6.7.11 Changes in Pipe Size

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

1.6.7.12 Pipe Material Classification and Bedding

All storm sewer mains shall generally be constructed of reinforced concrete with suitable strength class recommended by the Developer's Consulting Engineer. Smooth wall ribbed PVC



may be used for mains up to 900 mm diameter. Storm sewer leads from catch basins shall be constructed with non-reinforced concrete pipe or PVC pipe.

The class of pipe and the type of bedding shall be selected to suit loading and proposed construction conditions. For rigid pipe, Class B bedding (compacted Granular A bedding and cover over the sewer) in accordance with OPSD shall be used.

Embedment for flexible pipe shall be Granular A in accordance with OPSD.

Alternate granular materials for pipe bedding may be specified, subject to the approval of the Township, however clear stone bedding is generally not permitted. In areas where it is difficult to control the infiltration of ground water into the sewer trenches clear stone bedding may be considered provided it is completely wrapped in a suitable geotextile, selected, and installed in accordance with the manufacturer's requirement.

The width of trench at the top of the pipe shall be carefully controlled to ensure that the maximum trench width is not exceeded unless additional bedding or higher strength pipe is used. Where poor soil conditions and high ground water levels are present, the Consulting Engineer shall prepare special designs for the Township's approval.

- Reinforced concrete pipe shall conform to the requirements of OPSS 1820.
- Polyvinyl chloride (PVC) pipe products shall conform to the requirements of OPSS 1841. The pipe shall be manufactured with factory assembled spigot gasket and integral bell joints.
- Polyethylene pipe products shall conform to the requirements of OPSS 1840.

1.6.8 Maintenance Hole Requirements

Maintenance holes shall be precast concrete and shall be designed and constructed in accordance with the most recent OPSS and OPSD. Where the standard drawings are not applicable, the maintenance holes shall be individually designed and detailed.



1.6.8.1 Location and Spacing

Maintenance holes shall be located at each change in alignment, grade, or pipe material, at all pipe junctions, at the beginning or end of all radius pipe sections, and at intervals along the pipe to permit entry for maintenance to the sewer.

1.6.8.2 Maximum Spacing

The maximum spacing between maintenance holes shall be as follows:

Pipe Size (diameter)	Maximum Maintenance Hole Spacing (m)
≤ 600 mm	100 m.
$675 \text{ mm} \leq 1200$ mm	120 m.
> 1200 mm	150 m.

1.6.8.3 Maintenance Hole Design

- Minimum size of maintenance holes to be 1500 mm diameter from the base to 1.80m in height (min.) at which point a taper transition to 1.20m can be made.
- All maintenance hole chamber openings shall be located on the side of the maintenance hole parallel to the flow for a straight run maintenance hole, or on the upstream side of the maintenance hole at all junctions.
- The change in direction of flow in any maintenance hole shall not be permitted at acute interior angles.
- Safety gratings shall be provided in all maintenance holes when the depth of the maintenance hole exceeds 5.0 m. The maximum spacing between safety gratings shall not exceed 5.0 m.
- The obvert(s) on the upstream side of a maintenance hole shall not be lower than the obvert of the outlet pipe.
- The maximum change in direction of flow in maintenance hole, for sewer sizes 1050 mm



diameter and over, shall be 45°.

- Where the difference in elevation between the obvert of the inlet and outlet pipes exceeds 0.6 m, a drop structure shall be placed on the inlet pipe.
- All storm sewer maintenance holes shall be benched to the obvert of the outlet pipe for pipe sizes 600 mm or less and to the spring line of the outlet pipe for pipe sizes 675 mm and greater.
- The minimum width of benching in all maintenance holes shall be 230 mm.
- All maintenance holes and catch basin structures shall have frost straps in accordance with OPSD 701.100.
- Maintenance holes in boulevards shall be located, wherever possible, a minimum of 1.5 m from the face of curb or other service.
- Minimum size of any maintenance hole stack shall be 685 mm square.

1.6.8.4 Elevations for Maintenance Hole Frames and Covers

All maintenance holes, located within the travelled portion of a roadway, shall have the rim elevation set flush with the surface of the base course asphalt. The concreting and setting of the frame and cover shall be completed in accordance with the details provided in the standard drawing.

- Modular Maintenance Hole Lift Rings shall be IPEX Lifesaver HDPE type or equivalent.
- A maximum of 300 mm of modular lift rings shall be permitted on maintenance holes in new subdivisions.
- Prior to the placement of the final lift of asphalt, maintenance hole frames shall be reset to final elevations.

1.6.8.5 Head Losses and Drops

Suitable drops shall be provided across all maintenance holes to compensate for the loss in energy due to the change in flow velocity and for the difference in the depth of flow in the



sewers.

In order to reduce the amount of drop required, the designer shall, wherever possible, restrict the change in velocity between the inlet and outlet pipes to 0.6 metres/sec.

Hydraulic calculations shall be submitted for all junction and transition maintenance holes on sewers where the outlet is 1,050 mm or greater.

In addition, hydraulic calculations may be required for maintenance holes where the outlet pipe is less than 1,050 mm dia. if, in the opinion of the Township, there is insufficient invert drop provided across the maintenance hole.

Regardless of the invert drop across a maintenance hole as required by calculation, the obvert of the outlet pipe shall not be higher than the obvert of the inlet pipe in any maintenance hole.

The minimum drops across maintenance holes shall be as follows:

Change in Direction	Minimum Drop (mm)
Straight run	30
$\leq 45^\circ$	50
$> 45^\circ \leq 90^\circ$	80

1.6.8.6 Frame and Grate

All maintenance hole frames shall be as per OPSD 401.010 with Type A closed cover labeled Storm.

1.6.9 Catch Basin Requirements

1.6.9.1 Location and Spacing

Catch basins shall be selected, located, and spaced in accordance with the conditions of design.

The design of the catch basin location and type shall take into consideration the lot areas, the lot



grades, pavement widths, road grades and intersection locations.

All catch basins and their leads shall be of the single or double type. To ensure that the capture or inlet capacity matches that of the storm sewer, the spacing of catch basins on roads may be varied.

If detailed analysis of the major-minor system and SWM analysis of the pipe system indicate the need for inlet controls, additional constrictions shall be implemented. Since reduction in the size of the standard catch basin covers is not desirable, an orifice plate can be located in the catch basin. This is applicable to private development only. Orifice plates are not permitted within the Township right-of-way.

Catch basins shall be generally located upstream of sidewalk crossings at intersections and upstream of all pedestrian crossings.

Catch basins shall not be located in driveway curb depressions.

Double catch basins shall be required when the catch basin intercepts flow from more than one direction.

Rear yard catch basins shall be eliminated whenever possible.

Maximum spacing for catch basins including cul-de-sac gutters shall be as follows:

Pavement Width (m)	Maximum Spacing (m)	
	≤ 4% Grade	> 4% Grade
≤ 8.5	90	60
> 8.5 ≤ 9.8	80	55
> 9.8 ≤ 12.2	75	50
> 12.2	60	40

1.6.9.2 Catch Basin Types

Catch basins shall be pre-cast concrete and shall be designed and constructed in accordance



with the most recent OPSS and OPSD.

Special catch basins and inlet structures shall be fully designed and detailed by the Developer's Consulting Engineer.

Double catch basins are to be installed at the low point of any road.

1.6.9.3 Catch Basin Leads

- For single catch basins, the minimum size of connection shall be 300 mm diameter and the minimum grade shall be 1.0%.
- For double catch basins, the minimum size of connection shall be 375 mm diameter and the minimum grade shall be 1.0%.
- For rear lot catch basins, the minimum size of the connection shall be 300 mm diameter and the minimum grade shall be 1.0%.

In general, catch basins located in close proximity to a maintenance hole shall have their leads connected to the maintenance hole.

Catch basin leads may not exceed 30.0 m when connected to the maintenance hole or sewer. Alternatively, a longer lead can be connected to the sewer and a 1500 mm diameter maintenance hole / catch basin used in lieu of the normal 600 mm. square catch basin.

1.6.9.4 Frame and Grate

The frame and cover for catch basins in roadway or walkway areas shall be as detailed in OPSD 400.030. In specific instances, where stormwater management conditions, due to road grade and surface flows, OPSD 400.100 *may* be determined to be detailed.

Catch basins located in grassed areas shall have a Birdcage Grate per OPSD 400.120.



1.6.9.5 Catch Basins at Intersections

All catch basins at road intersections shall be located on the tangent section of the curb at a minimum of 0.6 metres distant from the beginning or the end of the radial portion of the curb.

1.6.9.6 Elevations for Catch Basin Frames and Grates

All catch basins located within the travelled portion of a roadway, shall have the frame elevation set flush with the surface of the base course asphalt.

The adjusting and setting of the frames and grates shall be completed in accordance with the details provided in OPSD 704.010 upon placement of surface course asphalt.

Temporary asphalt curbing shall be placed in accordance with OPSD 601.010 - Type "D", between the two adjacent expansion joints.

Prior to placing surface course asphalt, temporary asphalt curbs shall be removed and replaced by concrete curb.

Catchbasin Lift Rings shall be IPEX Lifesaver HDPE type or equivalent.

1.6.10 Downspouts, Foundation Drains and Sump Pumps

1.6.10.1 Downspouts

- Downspouts on all single family, semi-detached and townhouse residential units shall be discharged onto grassed or garden areas and away from wells or tile bed areas.
- Downspouts shall not encroach over / onto other adjacent private lands.
- Downspouts shall discharge onto splash pads of a hardened impervious material and shall not discharge onto driveways, walkways or over top of septic holding tanks.



- Downspouts from all commercial, industrial, institutional, and high-density residential buildings shall be discharged onto grassed or garden areas, if possible and if acceptable to the Township.

1.6.10.2 Foundation Drains

The Township requires that a sump pump system be installed in every building.

In every case, the underside of footing shall be set above the seasonal high ground water level, as determined in the geotechnical report.

1.6.10.3 Sump Pumps

Where sump pumps are installed in residential developments with open ditches:

- sump pump discharges shall not be placed within the Township's ditch lines of the road allowances.
- Sump pump discharge pipelines shall not be connected to a storm sewer system.
- Sump pump discharges shall be directed to rear or side yard drainage swales and shall not discharge onto driveways, walkways or over top of septic holding tanks.

1.6.11 Channel, Culvert, and Overland Flow

For channel, culvert, bridge and/or erosion control projects the proponent is responsible for obtaining all necessary approvals from the governing agencies, such as the NVCA, LSRCA, MNRF, DFO and/or MECP.

1.6.12 Culverts and Bridges

1.6.12.1 Culvert and Bridge Hydraulic Capacity

Only arterial and collector roads should, if feasible, be permitted to cross the major system watercourses. It is also recommended that designers consider the need to design culverts and



bridges on such arterial and collector roads for at least the 1:100-year storm flow, if not for the Regional Storm flow. If smaller culverts or bridges are provided, the backwater effects for the 1:100 year and Regional Storm flows shall be determined. Concrete box culverts shall be designed and placed for all watercourse crossings subject to the approval of the Township. MNRF, DFO, NVCA and/or LSRCA approval may be required for watercourse/valley crossings under their regulations.

Road Classification	Design Flood Frequency
Arterial	1:100 Year to Regional
Collector	1:50 Year
Urban Local	1:25 Year
Rural Local	1:25 Year
Temporary Detour	1:10 Year
Driveway	1:5 Year

NOTE: All culverts shall be of sufficient length to provide for a preferred 5:1 (maximum 3:1) slope off the driving surface to the ditch invert.

Bridges and other major drainage structures shall require special designs as determined by the Township. Hydraulic calculations shall be required.

The frequency and magnitude of flooding or erosion shall not be increased on upstream or downstream properties.

All Driveway Entrance Culverts shall be Ultra Rib - Smooth Wall plastic pipe.

The minimum length of each driveway culvert shall be 7.0 m and the minimum diameter shall be a minimum of 450 mm in diameter or larger according to the Stormwater Management requirements.

Driveway culverts are to be minimum 3.0 m from hydro poles and utility boxes.



1.6.12.2 Open Channels

The proposed criteria for an open channel design shall be submitted to the Township for approval prior to the actual design being undertaken. Open channels shall be defined as major system overland flow channels, minor system outfall channels or natural channels. Major system overland flow channel designs may be required to accommodate the Regional Storm or the 100-year storm for new development.

The Developer's Consulting Engineer shall also be responsible for obtaining the approval of the design from the MNRF, DFO, NVCA, LSRCA and the MECP, if the open channel concept is favourably considered.

Natural Channel design criteria shall be determined on a site by site basis.

The following guidelines shall be considered:

Open Channels	Minimum Velocity	Maximum Velocity
Grass lined – Natural	0.7 m/s	1.5 m/s
Grass lined – Maintained	0.7 m/s	1.5 m/s
Gabion lined	0.7 m/s	2.5 m/s
Concrete lined	0.7 m/s	4.0 m/s

1.6.12.3 Watercourse Erosion and Bank Instability

Where erosion or bank instability is already evident in an area to be developed or re-developed, the Township requires that the situation be stabilized by appropriate remedial measures.

Where development may potentially cause significantly increased downstream erosion, the Township shall require the Developer to mitigate further damage by appropriate remedial and preventative measures.



Where designing remedial erosion or bank stabilization works, preservation of the watercourse dynamics and natural valley aesthetics shall be secondary only to achieving a sound technical solution. The proposed design shall reference the MNRF Natural Channel Design Manual.

A normal bank flow channel has a capacity of about the 1:2-year flood. Protection to this level shall be adequate provided care is taken to prevent any damage by higher floods and provided that the channel bank is not coincident with a higher valley bank. In this latter case, it may be necessary to protect the bank to a level as high as the 1:100-year flood or even the flood resulting from the Regional Storm.

The proposed criteria for an erosion or bank stability design shall be submitted to the Conservation Authority and / or Township for approval prior to the actual design being undertaken.

1.6.12.4 Floodline Calculations

All floodline calculations shall be performed by a recognized engineering method and are to conform to the Ministry of Northern Development, Mines, Natural Resources and Forestry Flood Plain Management in Ontario Technical Guidelines in consultation with the Township.

An acceptable method would include the HEC 2 computer model.

All supporting documentation is to be included in the submission including a hard copy of the computer printout and a digital copy containing all input and output files.

1.6.12.5 Overland Flow Routes

An overland flow route continuous to the nearest major channel shall be established through all areas and shall be contained within either the road right-of-way or by easements.



If the overland flow route travels across downstream property not municipally owned, the developer shall obtain the necessary agreement(s) from downstream owner(s) accepting the increased quantity of runoff.

The depths of flooding permitted on roads and at intersections during the 1:100-year storm are as follows:

- no building shall be inundated at the ground line, unless the building has been flood proofed
- for all classes of roads, the depth of water at the gutter shall not exceed 0.3 m.

Flow across road intersections shall not be permitted for minor storms (generally 1:10 year). To meet the criteria for major storm run-off, low points in roads shall have adequate provision for safe overland flow.

1.6.13 Inlet / Outlet and Special Structures

Inlet and outlet structures shall be fully designed on the engineering drawings. The details provided shall include the existing topography, proposed grading, and the work necessary to protect against erosion.

1.6.13.1 Inlets

Inlet structures shall be fully designed by the Developer's Consulting Engineer, should OPSD structures not be deemed to be suitable. Inlet grates shall generally consist of inclined parallel bars or rods set in a plane at approximately 180 degrees with the top away from the direction of flow. Gabion, riprap, or concrete shall be provided at all inlets to protect against erosion and to channel the flow to the inlet structure.

Hydraulic design calculations for inlet structures shall be performed in accordance with guidelines established by the Ministry of Transportation Drainage Manual.



The design of any culvert on a new or reconstructed watercourse where an inlet grating is required shall provide a measure of safety and minimize the risk of entanglement or entrapment of a person. As well, grating shall be designed to prevent debris from entering the stormwater system.

1.6.13.2 Outlets

The OPSD headwall standards shall be used for all storm sewers up to 2,400 mm diameter. For sewers over 2,400 mm the headwalls shall be individually designed.

- All headwalls shall be equipped with a grating over the outlet end of the pipe and a railing across the top of the headwall for the protection of the public.
- Outfall grates shall consist of horizontal bars or rods spacing shall not exceed 150mm clear. All metal parts from inlet/outlet grates to be protected from rusting.
- All outlets shall blend in the direction of flow of the watercourse with the directional change being taken up in the sewer rather than the channel.
- Storm sewer outfalls shall not be connected to existing or proposed road crossing culverts.
- Storm sewer outfalls shall be terminated at separate headwall structures, adjacent to the outlet side of road crossing culverts.
- Gabions, Terra-fix blocks, riprap, concrete or other erosion protection shall be provided at all outlets to prevent erosion of the watercourse and the area adjacent to the headwall.
- The extent of the erosion protection shall be indicated on the engineering drawings and shall be dependent upon the velocity of the flow in the storm sewer outlet, the soil conditions, the flow in the existing watercourse and site conditions.



1.6.14 Storm Sewers – As-Constructed Drawings

All actual storm system invert elevations shall be indicated on the As-Constructed drawings. If the difference is greater than 150 mm from the design vertical alignment, affected portions of the sewer or overland drainage route shall be redrawn in profile.

Any maintenance hole which differs from the proposed horizontal location by more than 1.50 m shall be redrawn in both plan and profile.

In addition, the following shall be indicated on the As-Constructed drawings:

- pipe/culvert size, grade, type, class;
- chainage from MH along main to service tees.

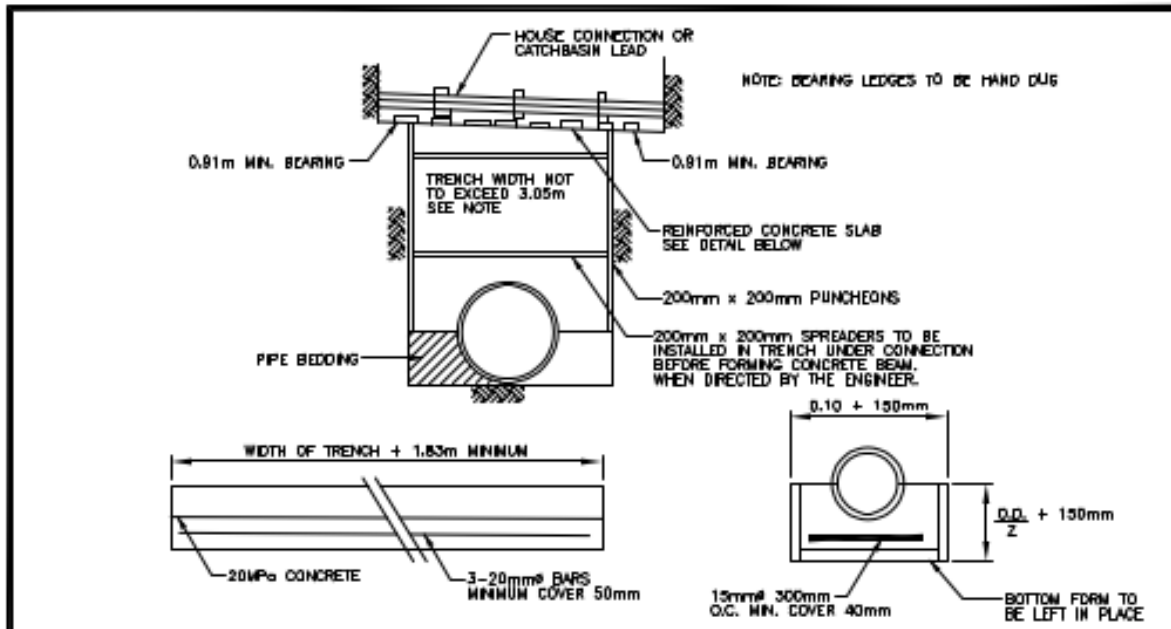
NOTE: If As-Constructed grade of sewer differs by more than 1% of the design grade, the Developer's Consulting Engineer shall submit revised hydraulic calculations.

1.6.15 Testing and Acceptance

A CCTV inspection (including flushing) as per OPSS 409 shall be conducted upon satisfactory completion of all other testing, prior to the Township's recommendation for issuance of Substantial Completion and Maintenance and prior to the placement of the final (surface) course of asphalt. A CCTV inspection (including flushing) shall also be required prior to the issuance of Final Acceptance and Assumption if 18 months have lapsed since the placement of surface course asphalt.

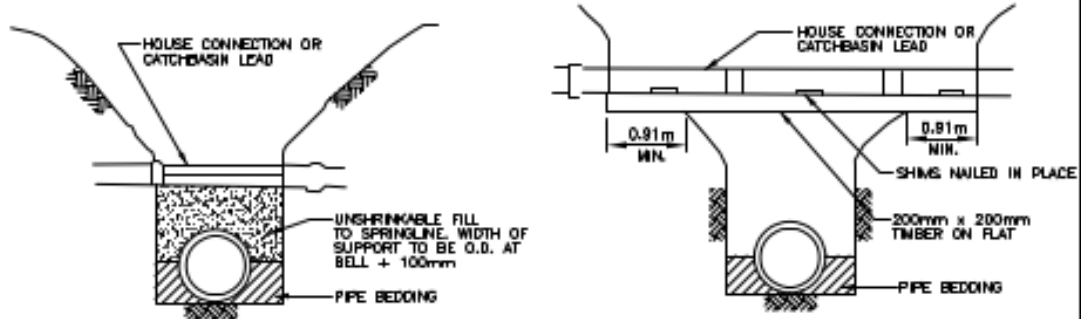


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REINFORCED CONCRETE SUPPORT FOR HOUSE CONNECTIONS AND CATCHBASIN LEADS WHEN WIDTH OF TRENCH EXCEEDS 1.52m BUT LESS THAN 3.05m

NOTE: WHEN WIDTH OF TRENCH EXCEEDS 3.05m METHOD OF SUPPORTING HOUSE CONNECTIONS AND CATCHBASIN LEADS WILL BE AS DIRECTED BY THE ENGINEER.



SUPPORT FOR CONNECTION CROSSING TRENCH WHEN WIDTH OF TRENCH IS LESS THAN 1.52m

NOTES:

1. WHERE HOUSE CONNECTIONS OR CATCHBASIN LEADS CROSS A SEWER TRENCH, THEY WILL BE SUPPORTED ON A NEW 20mm x 200mm TIMBER WHICH HAS A MINIMUM BEARING OF 0.91m AT EACH END ON UNDISTURBED GROUND. CONNECTION MUST BE PROPERLY SHIMMED OR BEDDED ON 20MPa CONCRETE FILL TO SPRINGLINE AS PER DETAILS.
2. TO BE USED WHEN INSTALLING SEWER OR WATERMAIN ON EXISTING R.O.W.
3. ALL DIMENSIONS ARE IN MILLIMETERS OR METERS.
4. FOR ALL CROSSING OF GAS MAINS, CONTRACTOR TO CONTACT GAS COMPANY FOR LOCATES AND INSPECTIONS.

NO.	REVISION	APR'D	DATE



TOWNSHIP OF TAY
SUPPORTS FOR HOUSE CONNECTIONS AND CATCH BASIN LEADS

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.6-01



STORM SEWERS

- A) M.H., CBMH AND DICBMH TO OPSD – 701.XXX (AS APPROPRIATE) C/W SUMP UNLESS NOTED OTHERWISE.
- B) STEPS TO OPSD 405.010.
- C) M.H. FRAMES AND GRATES TO OPSD-401.01 OPEN COVER.
- D) C.B.'S TO OPSD – 705.010, 705.020
- E) DICB'S TO OPSD – 705.030, 705.040, 706.010, 706.020, 706.030, 706.040
- F) C.B. AND CBMH FRAMES AND GRATES TO OPSD – 400.020 OR IN SPECIFIC CIRCUMSTANCES 400.100 AND REAR LOT 400.120.
- G) PIPE SUPPORT AT M.H.'S, CB'S AND CBMH'S TO OPSD – 708.020.
- H) C.B. LEADS – 300mm DIA SINGLE AND 375mm DIA DOUBLE TO OPSD – 708.010, 708.030.
- I) PROTECTION DURING CONSTRUCTION TO OPSD – 808.010.
- J) BEDDING AND COVER TO OPSD – 802.010. (FLEXIBLE PIPE) GRANULAR 'A' EMBEDMENT MATERIAL OR OTHER APPROVED HOMOGENEOUS GRANULAR MATERIAL OR OPSD – 802.030, 802.031 AND 802.032 (RIGID PIPE) GRANULAR 'A' BEDDING AND GRANULAR 'B' (MAXIMUM AGGREGATE SIZE 25mm) COVER.
- K) TRENCH BACKFILL TO BE SELECT NATIVE MATERIAL AS APPROVED BY ENGINEER OR IMPORTED GRANULAR MATERIAL.
- L) BACKFILL AND EMBEDMENT MATERIAL TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S SPMD.

NO.	REVISION	APP'D	DATE	TOWNSHIP OF TAY	APP'D: DRAWN:	DATE: 07/2023 SCALE: NTS





**STORM WATER MANAGEMENT
MINIMUM DESIGN CRITERIA**

OBJECTIVE	PRELIMINARY DESIGN – B.M.P. (1)			FINAL DESIGN			APPROVALS REQUIRED		
	CONSTRUCTION MITIGATION SYSTEM	PERMANENT SYSTEM DESIGN	BUFFER	FLOOD CONTROL MAJOR SYSTEM	RUNOFF CONTROL PREPOST	STORM SYSTEM (MINOR)	QUALITY CONTROL B.M.P. (1)	CONSTRUCTION MITIGATION	PERMANENT FACILITY
<p>NON Quality & construction concerns only</p>	<ul style="list-style-type: none"> - Erosion & sediment control (2) - 2 yr. storm, 1 hr. detention Ponds - storage – 125 m³/ha - overflow – 5 yr. storm - retain particles > 40 microns - length to width ratio of 3:1 - Stabilization prior to winter 	<p>MTOMOE Standards (2)</p> <ul style="list-style-type: none"> - 5 yr. pre/post - 100 yr. flood - Integrate with watershed plan 	15 metres (5)	100 yr.	5 yr.	5 yr.	<p>Aesthetics See (1) and (4)</p>	<ul style="list-style-type: none"> - Site plan condition - No C of A - Agencies concur - Contingency plan 	<ul style="list-style-type: none"> - Transfer Program C of A
<p>NORMAL Quality & construction concerns</p>	<ul style="list-style-type: none"> - 24 mm rainfall - Ponds - storage – 125 m³/ha - overflow – 5 yr. storm - retain particles > 40 microns - length to width ratio of 3:1 - Stabilization prior to winter - Erosion & sediment control (2) 	<p>Quantity</p> <ul style="list-style-type: none"> - 5 – 10 yr. pre/post - 100 yr. flood <p>Quality</p> <ul style="list-style-type: none"> - 24 mm rainfall - Ponds – see construction mitigation - Integrate with watershed plan 	<p>15 metres for quantity (5)</p> <p>30 metres for quality (5)</p>	100 yr.	5 – 10 yr.	5 yr.	<p>Warm fish, cold fish, rec. uses see (1) and (4)</p>	<ul style="list-style-type: none"> - Site plan condition - No C of A - Agencies concur - Contingency plan 	<ul style="list-style-type: none"> - Transfer Program C of A
<p>SENSITIVE Stressed habitat & water use concerns Policy 2</p>	<ul style="list-style-type: none"> - Enhanced control erosion & sediment (2) - Phasing & restoration - Limited & restrictive - Ponds – enhanced design 	<p>Quantity</p> <ul style="list-style-type: none"> - 5 – 25 yr. pre/post - 100 yr. flood <p>Quality</p> <ul style="list-style-type: none"> - Receiving water assessment - Retain up to 90% particles by wt. - Integrate with watershed plan 	<p>30 metres for quantity (5)</p> <p>30 metres for quality (5)</p>	100 yr.	5 – 25 yr.	5 yr.	<p>See (1) Habitat concerns enhanced measures</p>	<ul style="list-style-type: none"> - C of A - Site plan condition - Contingency plan 	<p>C of A (MOE)</p>



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1.7 Water Supply Distribution

Watermain shall be designed and constructed in accordance with the most recent requirements and specifications of the Township, MECP, and AWWA.

Watermain shall be of adequate size to provide service for the development of adjacent lands designated by the Township.

Prior to the commencement of any design for new watermain within the Township, the applicant shall obtain confirmation from the drinking water system owner that adequate water supply exists for the development proposed.

1.7.1 Watermain Design Criteria

All watermain shall be sized to meet the greater of: the maximum daily demand plus fire flow or the peak hourly demand and fire flow.

1.7.1.1 Watermain Pressure

The maximum sustained operating pressure shall not exceed 700 kPa (100.0 psi).

If localized area pressure exceeds this level, a pressure-reducing valve shall be installed on each service connection within that area or as a design consideration to be included within the main.

Under normal conditions of maximum day demand, the pressure shall not drop below 345 kPa (50 psi) at any point in the water system.

A design consideration shall be required to increase (boost) pressure when 345 kPa (50 psi) cannot be maintained throughout the distribution 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.



1.7.1.2 Friction Factors

The following “C” values shall be used in the Hazen-Williams equation, for the design of water distribution systems regardless of pipe materials.

<u>Pipe Diameter (mm)</u>	<u>C-Factor</u>
150	100
200 to 300	110
400 to 600	120
Over 600	130

The above C-factors represent long-term values. A C-factor of 140 shall be used to calculate maximum velocities for transient pressure estimations, or for checking pump motor sizes for runout conditions.

In evaluating existing systems for expansion, the C-factors shall be determined by actual field tests, wherever possible.

The Hazen-Williams equation shall be used to calculate the flow in watermain as follows: $Q = 0.84918 (C) (A) (R)^{0.63} (S)^{0.54}$

Where: Q = Discharge (m³/sec.)

C = Coefficient of Roughness

A = Cross-Sectional Flow Area (m²)

R = Hydraulic Radius (m)

S = Slope of Energy Grade Line (m/m)

1.7.1.3 Domestic Demand

Domestic water demand shall be calculated on the basis of an average day consumption rate of



450 litres per capita per day and utilize County and Township approved densities based on development charges studies as updated.

The maximum day and peak hour factors shall be determined from the latest MECP design guidelines although the following are considered minimums:

Maximum daily demand factor: 2.0

Peak hourly demand factor: 4.5

Peak flows other than domestic flows shall be determined on an individual basis.

1.7.1.4 Commercial and Institutional Water Demands

An average day flow of 28 cu.m. per hectare per day shall be used for design purposes to estimate the water consumption for large commercial areas unless more specific data is available.

When specific planning information is available, water consumption for individual commercial and institutional sites may be calculated from the following table:

<u>Use</u>	<u>Water Usage</u>
Shopping Centers	2500 - 5000 L/1000 m ² /day
Hospitals	900 -1800 L/bed/day
Schools	70 - 140 L/student/day
Campgrounds	225 - 570 L/campsite/day

The peak water usage rates in campgrounds varies with the type of facilities provided (showers, flush toilets, clothes washers, etc.) and the ratio of these facilities to the number of campsites. A peak rate factor of 4 shall be used. This factor shall be applied to the average expected water usage at full occupancy of the campsite.



1.7.1.5 Industrial Water Demands

An average design flow of 36 cu.m. per hectare per day shall be utilized for design purposes to estimate the average consumption rate for industrial areas unless more specific data is available.

1.7.1.6 Fire Flows

The requirements for fire flows shall be discussed and agreed upon with the Director of Environmental Services and the Chief of Fire and Emergency Services prior to proceeding with detailed design.

The Water Supply Distribution system shall be designed and constructed to meet the requirements of NFPA 24.

1.7.2 Selection of Watermain Sizing

All I.C.I. and Multi-Residential watermain to have a minimum water service size of 150 mm diameter and to be sized according to the anticipated water demand.

For all watermain designed to carry fire flows, the following minimum sizing for watermain shall apply: For Residential areas - 150 mm diameter

For Commercial areas - 200 mm diameter

For Industrial areas * - 300 mm diameter minimum

In general, the following standardized watermain sizes shall be used in the Township:

150 mm, 200 mm, 300 mm, 400 mm, 500 mm, 600 mm

1.7.3 Depth of Watermain

Curb and Gutter Roads - 1.7 m minimum to obvert, measured below finished centre line road grade.



- | | |
|---------------------|---|
| Open Ditch Roads | - The cover over the watermain and the service connections shall not be less than 1.7 metres. |
| Unimproved Roads | - 1.7 m minimum to obvert, measured below a future design centre line road grade. |
| Watercourses, Creek | - Adequate frost protection shall be provided below stream bed. Generally, 1.7 m minimum to obvert, measured below the watercourse invert shall be considered acceptable. |

1.7.4 Location of Watermain

Watermain shall be located as shown on the standard Township road cross-section. This location shall generally be on the north or west sides of the road.

1.7.4.1 Horizontal Separation of Watermain and Sewers

Under normal conditions watermain shall be designed with a minimum clear horizontal separation of at least 2.5 m from any sewer or sewer maintenance hole. The distance shall be measured from the nearest edges of the pipes or structures.

1.7.4.2 Separations of Watermain and Sewers – Special Conditions

Under unusual conditions (where a significant portion of the construction shall be in rock, or where congestion with other utilities shall prevent a clear horizontal separation of 3.0 m) a watermain may be laid closer to a sewer, provided the elevation of the crown of the sewer is at least 0.5 m below the invert of the watermain. Such separation shall consist of in-situ material or compacted native earth backfill.

In rock trenches, facilities shall be provided to permit drainage of the trench to minimize the effect of the impounding of surface water and/or leakage from sewers in the trench.



1.7.4.3 Watermain Crossing Sewers

Under normal condition watermain shall cross above sewers with at least 0.5 m vertical separation.

When it is not possible for the watermain to cross above the sewer main, the watermain passing under a sewer shall be protected as follows:

- A vertical separation of at least 0.50 m shall be provided between the outside face of the sewer and the top of the watermain.
- The sewer shall be adequately supported to prevent excessive deflection of joints and settling.
- The length of watermain pipe under the sewer shall be centered at the point of crossing so that the joints shall be equidistant and as far as possible from the sewer. Watermain pipe joints shall be located 1.5 metres (minimum) from the centreline of the sewer (both sides).

1.7.4.4 Utility Crossings

Watermain crossing over or under other utilities shall be designed with a 300 mm minimum clear separation between the outside edges of the watermain and the utility.

1.7.4.5 Dead-Ends

Water distribution systems shall be designed in grid patterns or looped to avoid dead-end sections.

Minimum pipe size and material for loops shall be 150 mm diameter PVC or designed in accordance with a specific location at the discretion of the Township.

1.7.4.6 Extra Mains and Extra Fittings

No roadway leading out of a subdivision shall be completed and accepted by the Township until connecting watermain are installed complete to the subdivision limits.



Extra fittings shall be installed at any point on the watermain requested by the Township to provide for future connections.

1.7.5 Pipe Classification and Bedding

Acceptable materials for watermain pipe up to and including 300 mm diameter are as follows:

- Polyvinyl Chloride Pipe (PVC) manufactured in accordance with the latest edition of CSA B137.3. A minimum Class 150, DR 18 pipe shall be used.
- Fittings shall be of cast iron or ductile iron; cement lined, manufactured to AWWA C110. All fittings shall be supplied with mechanical joint ends.
- Polyethylene pressure pipe shall be to OPSS 1842.
- 25 mm dia. residential services shall be polyethylene pipe.

The class of pipe and the type of bedding shall be selected to suit loading and proposed construction conditions. Pipe bedding and cover shall be homogeneous granular materials in accordance with OPSD requirements for flexible pipe.

The width of trench at the top of the pipe shall be carefully controlled to ensure that the maximum trench width is not exceeded unless additional bedding or higher strength pipe is used.

Where poor soil conditions and high ground water levels are present, the Developer's Consulting Engineer shall prepare special designs for the Township's approval.

1.7.6 Thrust Restraint

Adequate restraint shall be provided at all fittings and deflections in the water distribution system to prevent pipe movement and subsequent joint failure.

The Developer's Consulting Engineer shall provide thrust restraint calculations on the drawings.



Mechanically restrained joints shall be used for all PVC watermain, including dead-end valves. The recommended type of restraint in the design shall depend on anticipated soil conditions. Concrete thrust blocks shall only be permitted with restraints to support hydrants.

1.7.7 Corrosion Resistance

Denso Paste-Petrolatum Tape Primer or equivalent shall 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.

1.7.8 Tracer Wires and J Clips

A tracer wire shall be provided along the top of all Polyvinyl Chloride (PVC) watermain to permit future field tracing.

- Tracer wires shall be attached to the top of the watermain and secured with J Clips and shall be looped up and outside each valve box and drilled in at the top, including hydrant valves and shall also be connected to the bottom flange of all hydrants.
- Tracer wires shall be No. 12 gauge stranded copper (TWH) complete with plastic coating.

1.7.9 Fire Hydrants

- All fire protection design requirements shall be reviewed with the Director of Environmental Services and the Chief of Fire and Emergency Services at the preliminary design stage.
- Fire hydrants shall be AVK, McAvity or C.V. Mueller open left with 2 CSA hose ports, one 33 B pumper port and a breakaway type 6" MJ base.
- The hydrant lead shall be minimum 150 mm ductile, Class 52 with a resilient seated gate valve shut off ("Open Left" by Clow or Mueller) placed right after teeing off main.



- The hydrants shall have all drain holes plugged and be installed as per OPSD 1105.010.

1.7.9.1 Branch Valves and Boxes

- All hydrants installed on watermain up to and including 300 mm diameter shall be installed with a 150 mm diameter branch valve attached to the watermain with an anchor tee.
- All hydrants installed on watermain greater than 300 mm in diameter shall be controlled by a 150 mm diameter, branch valve directly secured to the supply main with flanged fittings or restraining tie-rods.

1.7.9.2 Hydrant Spacing

Hydrants shall be installed on all watermain 150 mm in diameter and larger with the following maximum allowable spacing:

- 150 m in residential areas, or to provide for a maximum hose length or 75 m.
- 90 m in industrial and commercial areas.

1.7.9.3 Location of Hydrants

Wherever possible, hydrants shall be located at corners, 4.0 m back from the streetline intersections at the edge of daylighting.

All hydrants shall normally be for a 2.0 m depth of trench with provisions for extension at the surface for adjustment to proposed streetline grades.

Hydrants shall be bedded in 19 mm screened crushed stone and braced with poured concrete to the satisfaction of the Township.

Hydrants shall be located 1.20 m minimum distance from the edge of any driveway or house service connection.



A hydrant shall be placed at the end of every cul-de-sac and dead-end road as well as at the high points in roads.

A 3.0-metre-wide platform area shall be constructed in the ditches fronting each fire hydrant. The minimum culvert length shall be 7.0m metres and minimum diameter shall be Ultra Rib smooth wall plastic culvert 450 mm in diameter or sized according to the Stormwater Management requirements.

1.7.9.4 Hydrant Ports

In all locations hydrants shall be equipped with 114 mm dia. Pumper Ports and 2 - 64 mm dia. side ports.

1.7.9.5 Direction of Opening

- All hydrants shall be equipped with a non-rising stem and shall open in a counter clockwise direction.

1.7.9.6 Colour of Hydrants

All hydrants shall be factory painted as specified on the standard detail drawings.

The hydrant body and caps shall be painted reflectorized yellow.

Private hydrants shall be painted red.

1.7.9.7 Hydrant Markers

Each hydrant is to be provided with a standard marker for easy identification in the winter.

1.7.9.8 Hydrant Appurtenances

One hydrant wrench, valve key and seal kit shall be provided per subdivision development.



1.7.10 Valves

1.7.10.1 Type

Gate valves shall be used on all watermain.

- Gate valves shall be an AVK, Mueller or Clow resilient wedge type with sliding type valve box or approved equal. All valves shall be of the approved type with non-rising stem and a 50mm square operating nut opening counter clockwise.
- All valves on 200mm dia. watermain or smaller shall have mechanical joint ends.
- All valves larger than 300mm dia. shall be installed inside chambers and shall have flanged ends. A flange to plain end spacer and a Victaulic coupling shall be installed inside the chamber to permit removal of the valve if necessary.
- All valves to be wrapped in Denso Paste – Petrolatum Tape Primer.

1.7.10.2 Size

All line valves shall be the same size as the watermain.

1.7.10.3 Number, Location and Spacing

Generally, three valves are required at a tee intersection and four valves are required at a cross intersection with the valves being located at a point where the streetline projected intersects the watermain.

All valve boxes and valve chambers shall be located in boulevards and out of pavement areas wherever possible.

Where roads extend for greater than normal distances without intersections, the Township may require an extra valve in the main at an intermediate point.



All valves at points of termination of a stage of construction shall be braced with two additional lengths of watermain pipe beyond the gate valve.

Watermain terminations shall be plugged and braced.

Where watermain valves are located under travelled road surfaces, the top of the operating box shall be set flush with the paved surface.

Where the depth of the water valve exceeds 2.0, valve stem extensions shall be specified.

1.7.10.4 Valve Boxes and Chambers

- All valves on watermain 300 mm in diameter and smaller shall have valve boxes and specified direct bury operators shall be used.
- All valve boxes shall be three-piece, sliding-type, size 'D'.
- All valves on watermain 400 mm or larger in diameter shall be installed within concrete chambers set flush with finished grade. The top of the roof slab of valve chambers shall be at least 0.60 m below the profile of the finished pavement.

1.7.10.5 Air Relief Valves

- Air relief valves shall be installed at all significant high points of the water distribution system.
- Air relief valves shall be double-acting type, combination air release/vacuum valve.
- Air relief valves shall be housed within a chamber as illustrated in the Standard Detail Drawings and drained to storm sewers where possible. The chambers are to be equipped with "P" traps to prevent movement of gasses.

1.7.10.6 Drain Valves

Drain valves shall be located at the low points of all watermain 400 mm in diameter and greater.



These valves shall be constructed in a separate chamber.

1.7.11 Service Connections

Individual service connections shall be installed to each unit within the development. Semi-detached lots shall be provided with two separate water service connections.

1.7.11.1 Minimum Sizing

The minimum size of service connection to be provided for a single-family residence located less than 30 metres from the supply main shall be 25 mm in diameter.

For other situations requiring a specific evaluation, the following factors shall be used to determine the minimum size of service connections:

- peak water consumption of the building to be serviced.
- total length of service that shall be required to reach the building.
- elevation of the building with respect to the elevation of the watermain.
- available head in the watermain.
- loss of head in the service connection.
- required head at the point of water usage.

1.7.11.2 Location

Water service connections shall be installed to the mid-point of the frontage of all single-family lots as shown on the Standard Drawings.

The location of water service connections for semi-detached lots and freehold townhouses shall be as shown on the Standard Drawings to avoid locating the service under the driveways.



After construction, the end of the connection shall be marked by a suitable length of 50 mm x 100 mm lumber extending from the end of the connection to a point 0.9 m above grade. The top of this marker shall be painted blue.

1.7.11.3 Location of Curb Stop or Control Valve

The curb stops on all water service connections 50 mm in diameter and less shall be located at the road limit as shown on the Standard Drawing.

The control valve on water service connections 100 mm in diameter and larger shall be located at the supply main with the valve secured to the supply main by means of anchor tees, flanged fittings, or approved restraining tie rods, as illustrated on the standard detail drawings.

Water service valve boxes shall not be located in driveways. In the event the designed driveway and water service box locations conflict as a result of the final house sitting, the water service box shall be moved to a location to the satisfaction of the Township.

1.7.11.4 Connection to Supply Main

Water service connections 50 mm in diameter and smaller may be tapped into the supply main with the following restrictions:

- For PVC watermain, a stainless steel saddle shall be used for all connections.
- The maximum size of a direct tapped connection into a 150 mm watermain is 32 mm in diameter. Larger sized service connections shall be connected by a cast iron fitting factory-tapped for the required service connection size.
- Water service connections 100 mm in diameter and larger shall be made by installing a tee on the supply main.
- Service connections for industrial, commercial, institutional, or multiple dwelling use shall be considered on an individual basis. Fire connections may be required for industrial, commercial, institutional, or multiple dwelling lots.



1.7.11.5 Materials and Fittings

As specified by the Township of Tay in this document.

Refer to Township Standard Drawing No. 1.7-09.

1.7.11.6 Meters

A water meter and remote reading unit complete with a backflow preventer shall be installed for each water service connection. The location of the water meter shall be approved by the Township prior to the issuance of a building permit. Water services for private property shall be installed on the property to be served and in no case cross a property line into or pass through other private property.

Refer to Township Standard Drawing No. 1.7-10.

1.7.12 As-Constructed

- All actual watermain obvert elevations at 30 m intervals shall be indicated on the As-Constructed drawings.
- If the difference is greater than 150 mm from design vertical alignment, affected portions of the watermain shall be redrawn in profile.
- If horizontal alignment changes exceed 1.0 m the affected portions of the watermain shall be redrawn in plan.

In addition, the following shall be indicated on the As-Constructed drawings:

- pipe size, type, class
- swing ties to all main appurtenances (valves, bends, tees, etc.)
- chainage from appurtenance along main to main stops
- swing ties from lot corners to the curb stop valve box and the invert elevation of each curb stop

NOTE: The As-Constructed digital drawing file shall be georeferenced.

The standard coordinate system for Tay is Universal Transverse



Mercator (UTM) Zone 17 with the North American Datum 1983 (NAD83).

The drawing units for all features in the file shall be in metric, set to metres.
and un-scaled (1:1).

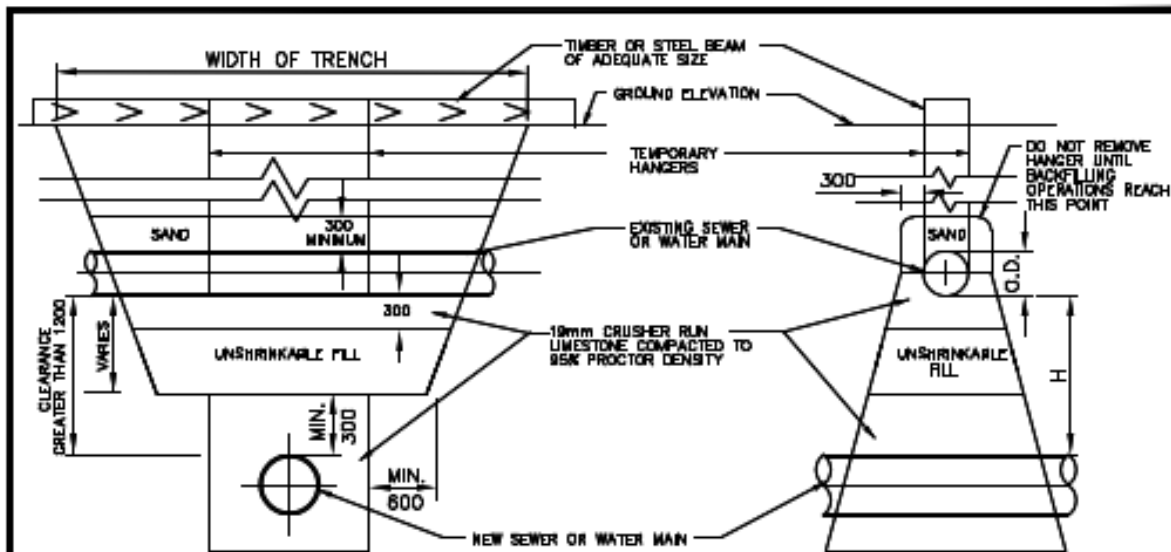
1.7.13 Testing and Acceptance

Connections to existing watermain or water service connections shall not be made until the new watermain has been tested, swabbed, chlorinated and flushed to the satisfaction of the Township and written permission is received from the Township.

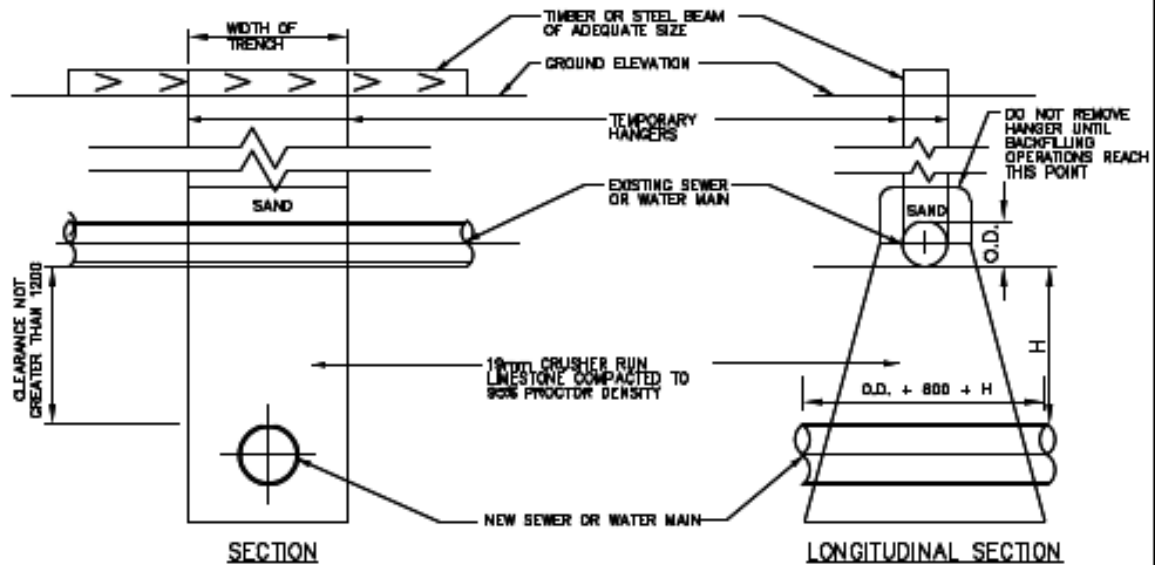
Watermain commissioning shall be performed in accordance with the Township document “Watermain Commissioning Protocol (as amended) , and the MECP Watermain Disinfection Procedure (as amended) prior to acceptance of the system as substantially performed.



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CLEARANCE GREATER THAN 1200



SECTION

LONGITUDINAL SECTION

NOTES:

CLEARANCE NOT GREATER THAN 1200

1. THIS DETAIL TO BE USED IN DRY STABLE CONDITIONS ONLY.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.

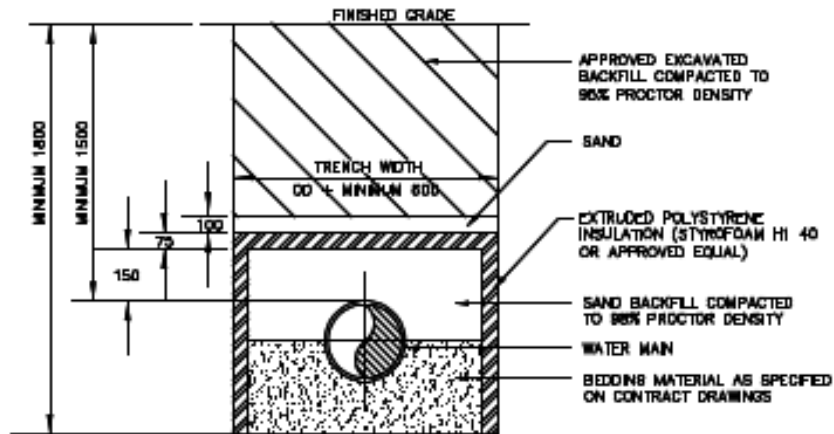
NO.	REVISION	APR'D	DATE



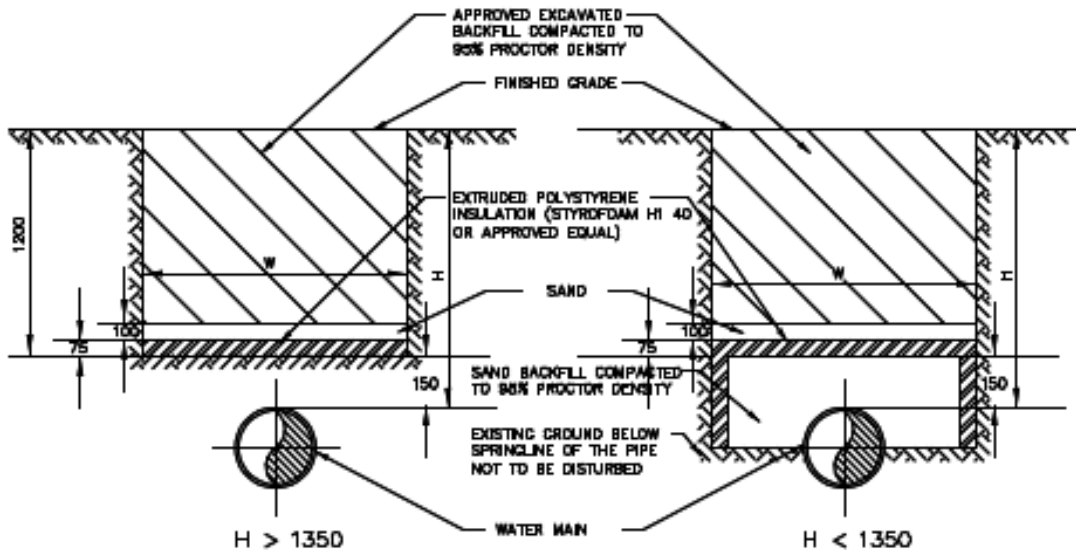
TOWNSHIP OF TAY
SUPPORTS FOR WATERMAIN AND
SEWERS CROSSING NEW TRENCHES

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.7-01



INSULATION OF NEW SERVICES




INSULATION OF EXISTING SERVICES

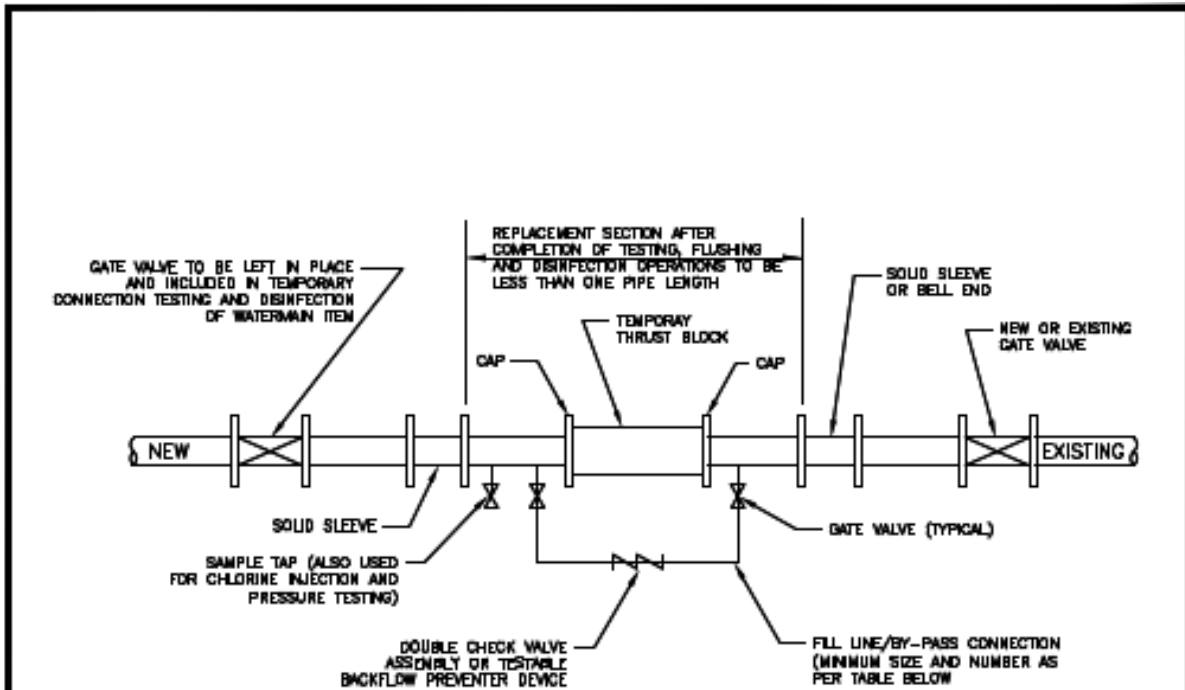
$W = OD + 2(1500-H) \text{ OR } OD + 600\text{mm}$ WHICHEVER IS GREATER
 WHERE W = INSULATION WIDTH
 OD = OUTSIDE DIAMETER OF PIPE TO BE INSULATED
 H = DEPTH OF PIPE TO BE INSULATED
 (MINIMUM 1200mm)

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.

NO.	REVISION	APR'D	DATE

	TOWNSHIP OF TAY	APR'D:	DATE: 07/2023
	METHOD OF INSULATING WATER MAIN	DRAWN:	SCALE: NTS
		STD. No. 1.7-02	



TYPICAL TEMPORARY CONNECTION FOR WATERMAINS
NTS

PIPE DIAMETER	FLOW REQUIRED TO PRODUCE 0.78m/s (APPROX.) VELOCITY IN MAIN	SIZE OF TAP (mm)			NUMBER OF OPEN 84mm HYDRANT OUTLETS
		25	38	51	
mm	l/s	NUMBER OF TAPS ON PIPE			
100	6.3	1	—	—	1
150	12.6	—	1	—	1
200	25.2	—	2	1	1
250	37.9	—	2	2	1
300	56.8	—	—	3	2
400	109.9	—	—	4	2

REQUIRED FLOW AND OPENINGS TO FLUSH PIPELINES (276kPa/40 PSI RESIDUAL PRESSURE IN WATERMAIN)

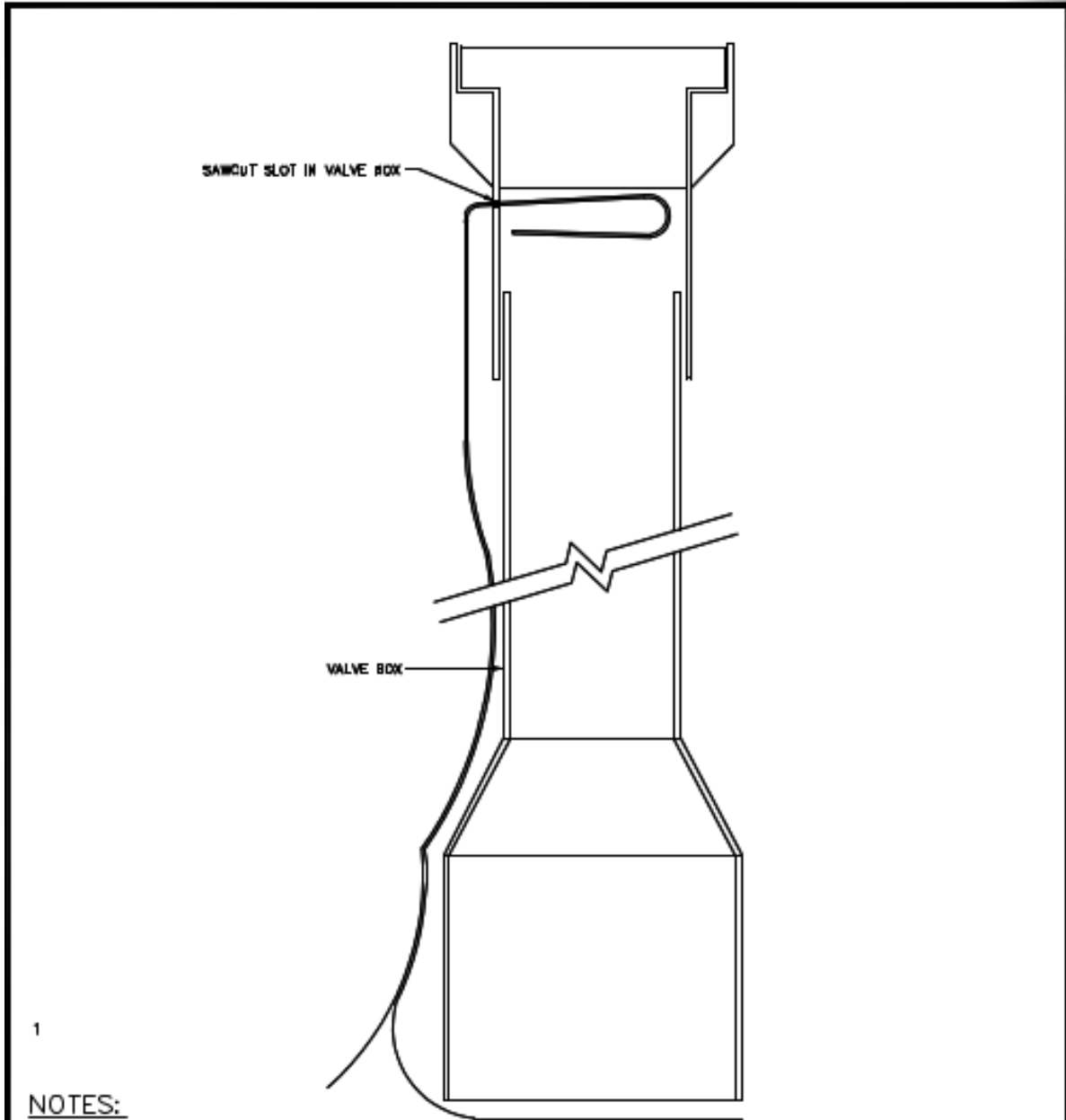
NO.	REVISION	APR'D	DATE



TOWNSHIP OF TAY
TEMPORARY CONNECTION
FOR WATERMAIN

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.7-03



1

NOTES:

1. TRACER WIRE TO BE COATED No. 12 GAUGE STRANDED C.S.A. TYPE T.W.H. COMPLETE WITH TRACER WAY INC. (PIQUE SUPPLY CORP.) "J" CLIPS - @ 1.5m DISTANCE / 4 CLIPS PER PIPE LENGTH.
2. TRACER WIRE TO BE INSTALLED OUTSIDE LOWER VALVE BOX AND BROUGHT INTO UPPER SECTION OF VALVE BOX AND LOOPED TO BE MINIMUM 450mm IN LENGTH.
3. CONNECTORS USED FOR SPLICING TRACER WIRE SHALL BE WING NUT TYPE, WITH NYLON SHELL AND NON-CORROSIVE STEEL WIRE SPRING.

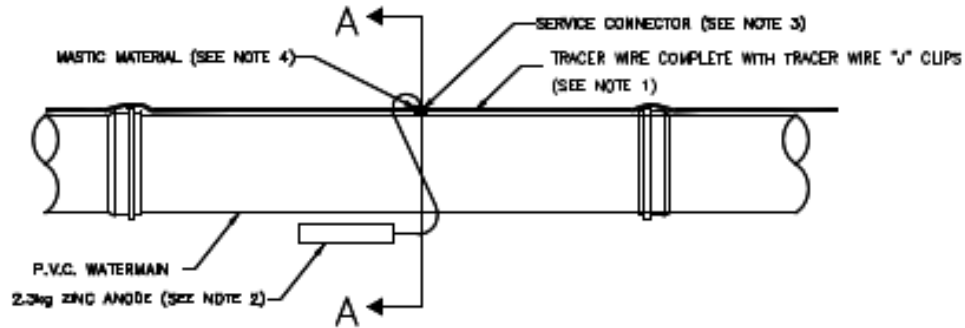
NO.	REVISION	APR'D	DATE
1	Addition of "J" Clips to Tracer Wire Installation		07/23



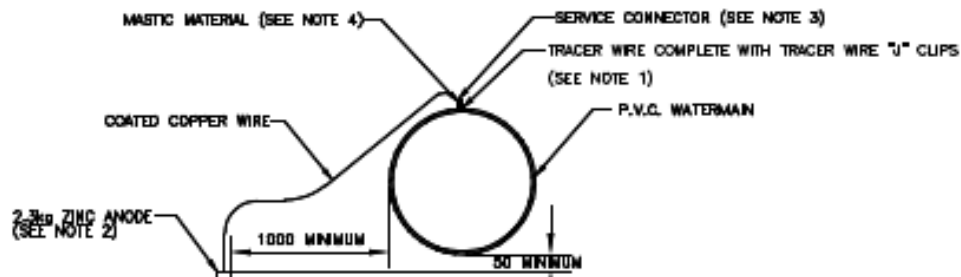
TOWNSHIP OF TAY
TRACER WIRE ARRANGEMENT AT VALVE BOX FOR P.V.C. WATER MAIN

APR'D: _____ DATE: 07/2023
DRAWN: _____ SCALE: NTS

STD. No. 1.7-04



ELEVATION



SECTION A-A

NOTES:

1. TRACER WIRE TO BE COATED No. 12 CUAGE STRANDED C.S.A. TYPE T.W.H. COMPLETE WITH TRACER WIRE INC. (PIQUE SUPPLY CORP.) "J" CLIPS - @ 1.5m DISTANCE / 4 CLIPS PER PIPE LENGTH.
2. ONE 2.3 kg ZINC ANODE TO BE SUPPLIED AND INSTALLED IN A MANNER APPROVED BY THE TOWNSHIP OF TAY, ENGINEER FOR EVERY 500m OF TRACER WIRE INSTALLED.
3. SERVICE CONNECTOR TO BE A 'BURNDY SERVIT', TYPE K.S. MODEL KS20 COPPER OR APPROVED EQUAL.
4. CONNECTOR SPLICE TO BE WRAPPED WITH 'SCOTCHGILL' ELECTRICAL PUTTY OR APPROVED EQUAL.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
6. THE LOCATION OF EACH TRACER WIRE ANODE MUST BE DETAILED ON THE CONTRACT DRAWINGS.

NO.	REVISION	APR'D	DATE
1	Addition of "J" Clips to Tracer Wire Installation		07/23

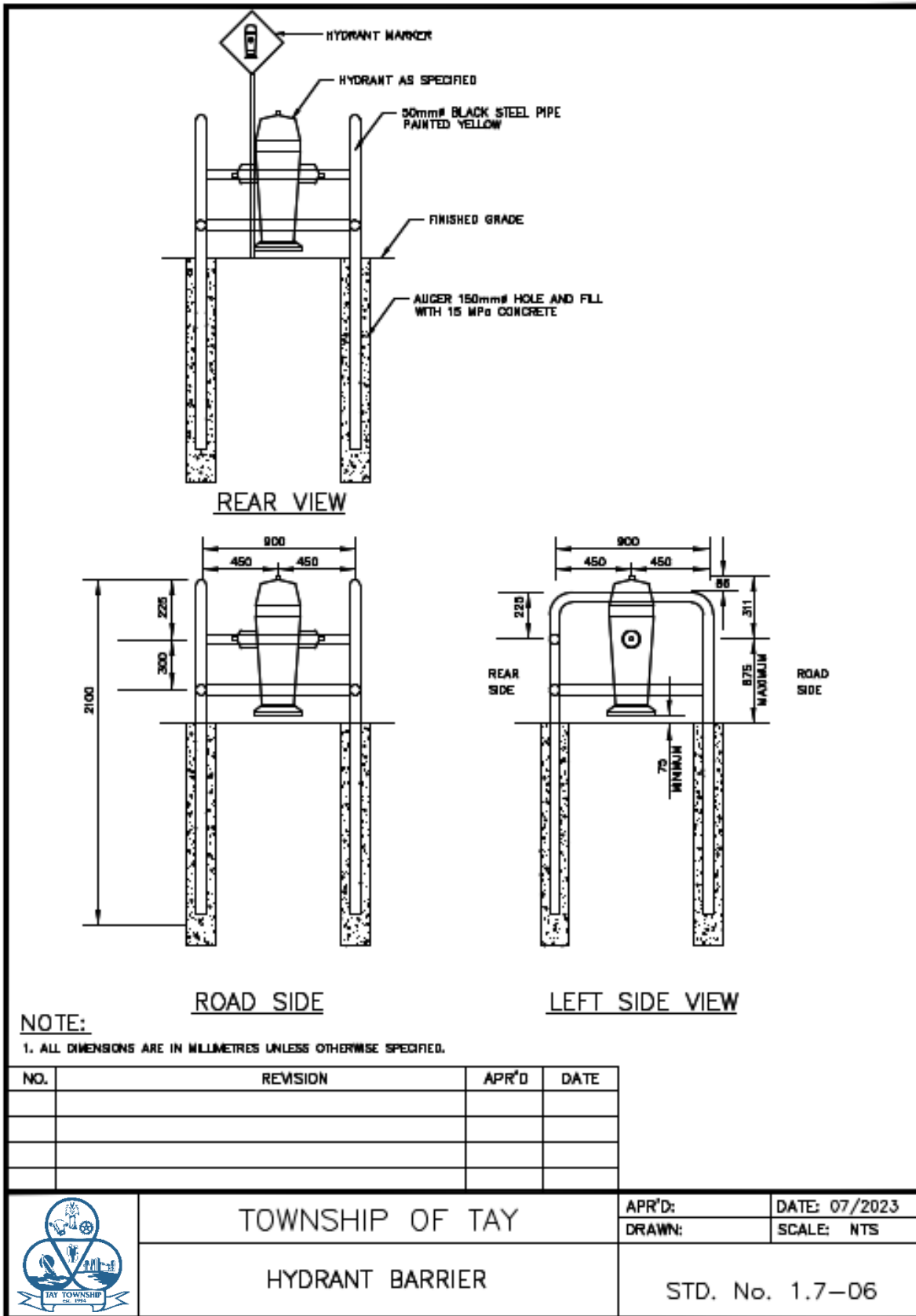


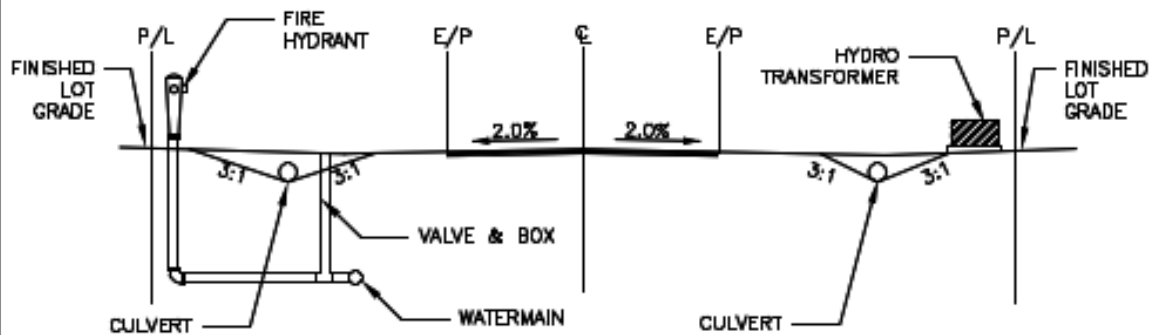
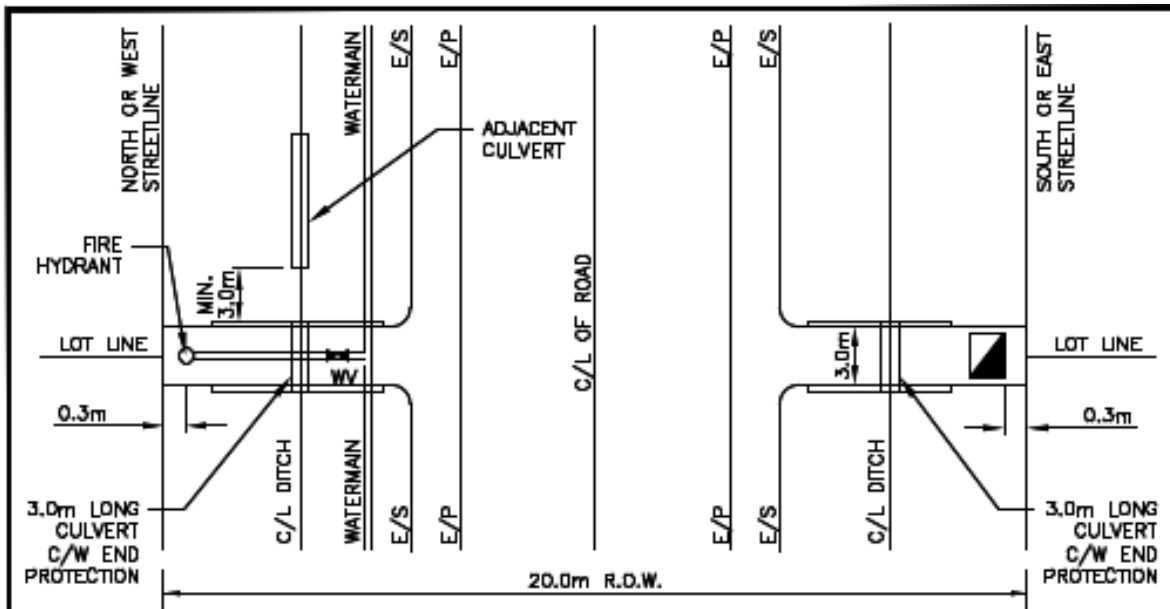
TOWNSHIP OF TAY

CORROSION PROTECTION FOR TRACER WIRES ON P.V.C. WATER MAINS

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.7-05





NOTE:
THE CULVERTS END PROTECTION ARE TO BE CONSTRUCTED IN ACCORDANCE WITH DRIVEWAY STANDARDS, WITH THE FOLLOWING EXCEPTIONS:

THE CULVERT TO BE A MINIMUM LENGTH OF 3.0 METRES TO PROVIDE A PLATFORM TO ALLOW PEDESTRIAN TRAFFIC. THE CULVERT MAYBE INCREASED IN LENGTH BUT THE PLATFORM AREA SHOULD NOT BE LARGE ENOUGH TO ACCOMMODATE VEHICULAR TRAFFIC.


THE DIAMETER OF THE CULVERTS WILL BE IN ACCORDANCE WITH THE STORM DRAINAGE PLAN.

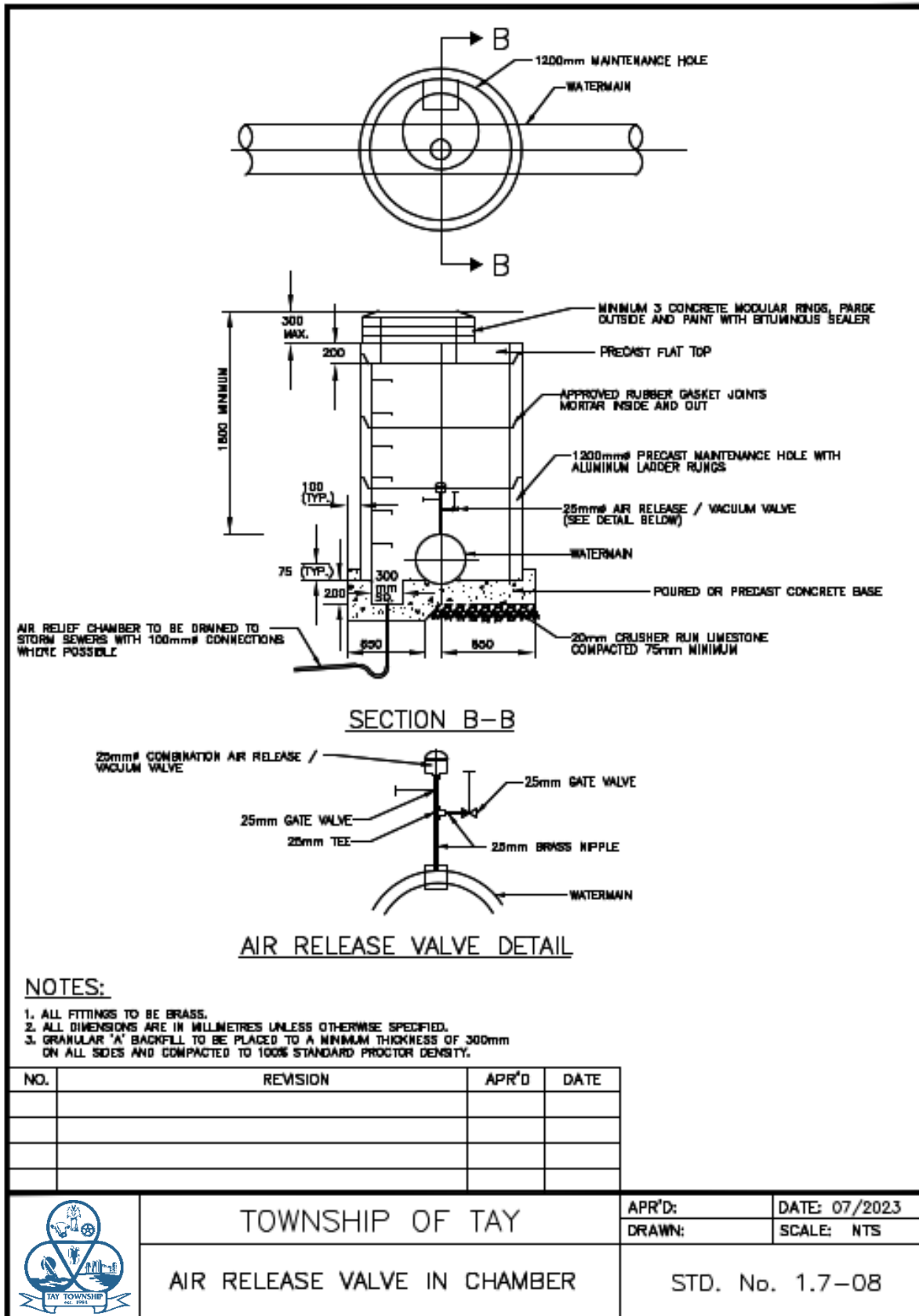
MINIMUM 3.0 METRE SEPARATION BETWEEN ACCESS CULVERT AND ADJACENT CULVERT.

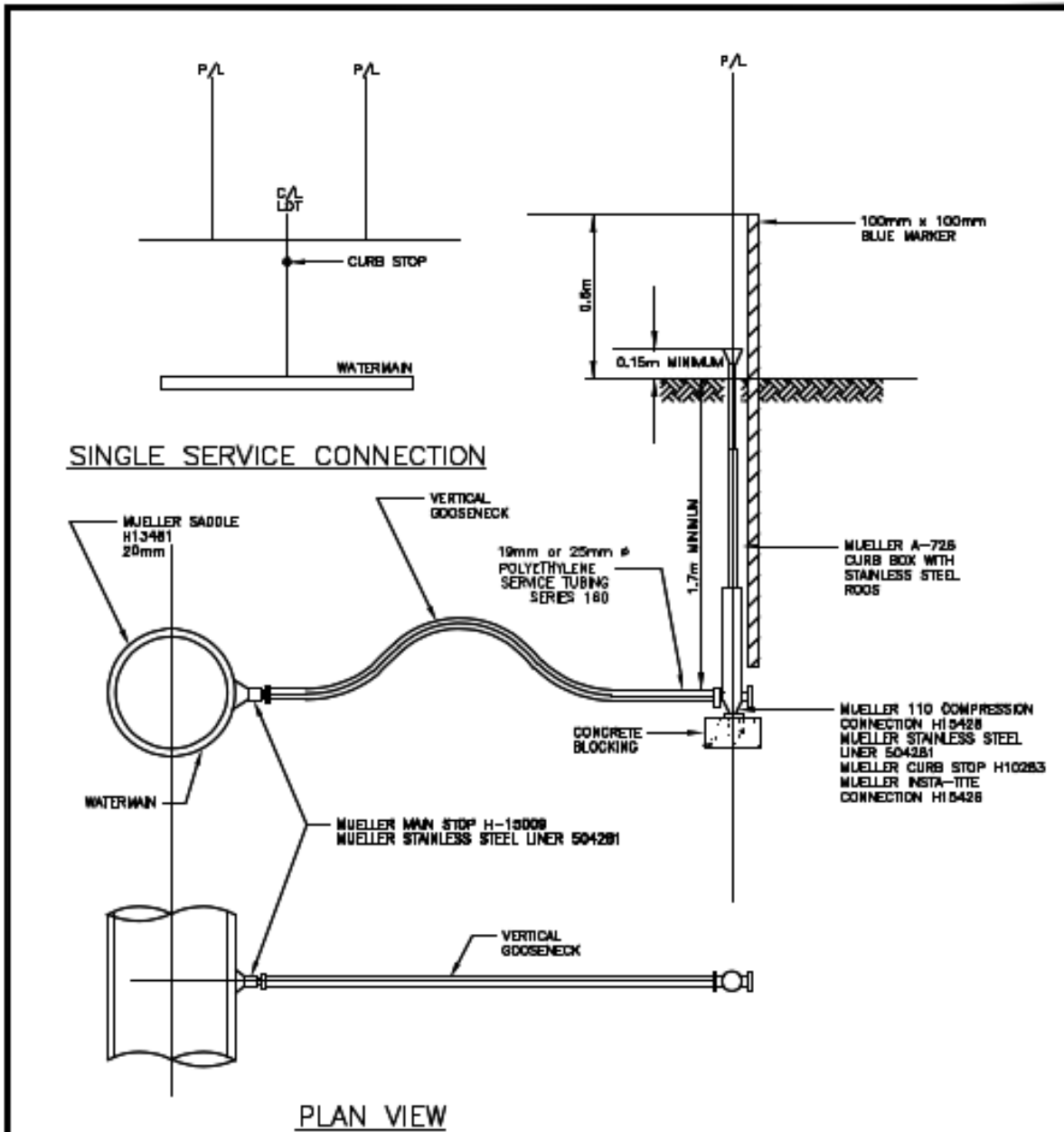
TOP OF VALVE BOX TO BE FLUSH WITH ACCESS SURFACE.

THE VALVE STEM MAY REQUIRE AN EXTENSION TO ACCOMMODATE A STANDARD VALVE KEY.

NO.	REVISION	APR'D	DATE

	TOWNSHIP OF TAY	APR'D:	DATE: 07/2023
	ACCESS CULVERTS FOR FIRE HYDRANTS AND HYDRO TRANSFORMERS	DRAWN:	SCALE: NTS
		STD. No. 1.7-07	





NOTE:

APPROVED CATHODIC PROTECTION SHALL BE USED WHERE REQUIRED BY ENGINEER.

NO.	REVISION	APR'D	DATE
1	19mm or 25mm dia. Polyethylene Water Service		07/23

	TOWNSHIP OF TAY	APR'D:	DATE: 07/2023
	POLYETHYLENE WATER SERVICE CONNECTION DETAIL	DRAWN:	SCALE: NTS
		STD. No. 1.7-09	



WATERMANS

- A. BEDDING AND COVER TO OPSD-802.010, GRANULAR 'A' EMBEDMENT MATERIAL OR OTHER APPROVED HOMOGENEOUS GRANULAR MATERIAL.
- B. TRENCH BACKFILL TO BE SELECT NATIVE MATERIAL AS APPROVED BY ENGINEER OR IMPORTED GRANULAR MATERIAL.
- C. THRUST BLOCKS TO OPSD-1103.010 AND 1103.020 WHERE SUITABLE SOILS ARE ENCOUNTERED.
- D. SERVICE CONNECTIONS TO OPSD-1104.010, 100 mm GRANULAR 'A' EMBEDMENT AND COVER OVER PIPE. TERMINATE AT PROPERTY LINE AT CENTER OF LOT C/W CURB STOP AND BOX, TESTING TAIL TO SURFACE ATTACHED TO A 38mm x 89mm MARKER POST PAINTED BLUE.
- E. HYDRANTS TO OPSD-1105.010. DRAIN PLUGS SHALL BE INSTALLED.
- F. BACKFILL AND EMBEDMENT MATERIAL TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD).
- G. MINIMUM COVER ON WATERMAIN AND SERVICES TO BE 1.7 m.
- H. GATE VALVES, BENDS AND HYDRANT LEADS AND FITTINGS TO BE CONNECTED WITH ROMAX GRIP RING RESTRAINING CLAMP.
- I. CLEARANCE BETWEEN WATERMANS AND SEWERS TO BE A MINIMUM OF 0.5 m VERTICAL WHERE WATERMAIN IS BELOW SEWER OR 2.5 m MINIMUM HORIZONTAL SEPARATION. WATERMAIN SHALL BE ABOVE WHERE POSSIBLE. WHERE WATERMAIN IS ABOVE SEWER, THE MINIMUM SEPARATION TO BE 0.5 m (BEDDING MATERIAL).
- J. SERVICE TO OPSD - 1104.010 AND SHALL BE DIRECT TAP.
- K. FOLLOWING TESTING, CONTRACTOR SHALL OPERATE EACH WATER SERVICE TO VERIFY FULL FLOW AND PRESSURE AT THE CURB STOP TO THE SATISFACTION OF THE ENGINEER.
- L. GENERAL INSTALLATION AND TESTING OF WATERMAIN AND APPURTENANCES TO BE IN ACCORDANCE WITH O.P.S.S. 701 AND ALL SPECIFICATIONS REFERENCED WITHIN THESE SECTIONS.

NO.	REVISION	APR'D	DATE	TOWNSHIP OF TAY	APR'D: DRAWN:	DATE: 07/2023





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1.8 Sanitary Collection Sewers

Prior to the commencement of a design for any sanitary sewage works, the applicant shall obtain confirmation from the Township that adequate treatment plant capacity is available for the development proposed.

Where sanitary service is provided by way of private systems, confirmation of the capacity to accommodate the sanitary flows from the development shall be required by the plant owner / operator and shall be confirmed by the Developer's Consulting Engineer.

Sanitary sewers designed and constructed in accordance with the most recent requirements and specifications of the Township are required to carry domestic, commercial and industrial sewage from each area of the development under consideration. Flow is to be by gravity, in general. Pumped systems may be considered only where other alternatives are not possible and only with the approval of the Township.

1.8.1 Sanitary Drainage Plans

All tributary areas used for the determination of the design flows shall be shown on a plan at the scale of 1:1,000. The plan shall indicate the land use, area and population density or number of units.

Standard sanitary sewer design sheets shall be used to compute the design flow for each leg of sewer. Each sanitary drainage area on the plan shall show an identification number along with population and area.

All actual sanitary sewer invert elevations shall be indicated on the As-Constructed drawings. If difference is greater than 150 mm from the design vertical alignment, affected portions of the sewer shall be redrawn in profile. Any maintenance hole which differs from proposed horizontal location by more than 1.50 m shall be redrawn in both plan and profile.



In addition, the following shall be indicated on the As-Constructed drawings:

- pipe size, grade, type, class;
- chainage from MH along main to service tees;
- dimensions from lot corners and elevations for service laterals.

NOTE 1: The As-Constructed digital drawing file shall be georeferenced. The standard coordinate system for Tay is Universal Transverse Mercator (UTM) Zone 17 with the North American Datum 1983 (NAD83). The drawing units for all features in the file shall be in metric, set to metres and un-scaled (1:1).

NOTE 2: If As-Constructed grade of sewer differs by more than 1% of the design grade, the Developer's Consulting Engineer shall submit revised hydraulic calculations.

1.8.2 Sanitary Drainage System Design

1.8.2.1 Design Flows

The design flow in each length of sewer shall be computed on the standard sanitary sewer design sheets. For each area entered on the design sheet, the maintenance hole numbers, the size and grade of the sewers, and the plan and profile drawing reference number for each section of the sanitary sewer shall also be shown.

Calculations shall be based on the following:

1.8.2.2 Infiltration Rates

A peak design flow of 0.23 L/s/ha shall be used for infiltration. To satisfy self-cleaning requirements in sanitary sewers, assume dry weather infiltration reduces to zero for several days during dry months.



1.8.2.3 Residential Sewage Flows

The following formula shall be used to calculate the sewage flow for residential areas:

$$Q_{(d)} = \frac{PqM}{86.4} + IA$$

Where: $Q_{(d)}$ = Peak domestic flow plus extraneous flows, in L/s

P = Design population, in thousands

q = Average daily per capita flow, in L/cap/d

M = Peaking factor

I = Unit of peak extraneous flow, in L/s/ha

A = Gross tributary area, in hectares

An average daily per capita flow of 450 L/c/d shall be used for new development.

The value of peak extraneous flow shall be 0.23 L/s/ha.

The peaking factor shall be calculated based on the Harmon formula,

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

Where: P = population, in thousands

Maximum M – 4.0

Minimum M – 1.5

The design population shall be derived from the drainage area and expected maximum population over a design period of 20 years.

For areas where the lands are zoned for specific residential use, but detailed planning information is not available, the following population densities shall apply for calculation of sewage flows only.

<u>Type of Housing</u>	<u>Units/Hectare</u>
Single Family Residential,	12
Multiple Residential	42



When the number and type of housing units within a proposed development are known, the calculation of population for the proposed development shall be based on the following.

<u>Type of Housing</u>	<u>Person/Unit</u>
Single Family Dwelling,	2.58
Semi-detached & Duplex	2.58
Townhouse	2.34
Apartment	2.10

Future land use and population shall be based on the approved Official Plan and Secondary Plans of the area and the County of Simcoe Approved Land Budget for Tay.

1.8.2.4 Commercial Sewage Flows

A minimum design flow of 28 m³/ha/day shall be used for the design of all local sewers, with a peak factor of 1.60.

- A peak design flow of 0.10 L/s/ha shall be used for infiltration.
- The area shall be based on the gross lot area.

1.8.2.5 Industrial Sewage Flows

An average day design flow of 36 m³/ha/day for industry shall be used (excludes infiltration and peaking effects).

- The area shall be calculated using the gross area included in the industrial block or development.
- Peak flow and infiltration factors shall be applied as per the latest MECP Design Guidelines.

1.8.2.6 Institutional Sewage Flows

A design flow of 28 m³/ha/day shall be used for the design of all local sewers, with a peak factor of 1.60.

- A peak design flow of 0.10 L/s/ha shall be used for infiltration.



- The area shall be calculated using the gross area included in the institutional site.

1.8.2.7 Pipe Capacities

Manning's formula shall be used in determining the capacity of all sanitary sewers. The capacity of the sewer shall be determined on the basis of the pipe flowing full.

- For all types of pipe a roughness coefficient of $n = 0.013$ shall be used.

1.8.2.8 Flow Velocities

- Minimum acceptable velocity = 0.6 m/s
- Maximum acceptable velocity = 3.0 m/s
- The velocity change in a maintenance hole shall not exceed 0.6 m/s.

1.8.2.9 Pipe Grades

The maximum and minimum grades for pipes shall be the grade necessary to meet the maximum and minimum velocity requirements except that the required grade for the minimum velocity requirement shall not exceed 2% or the road grade where the road grade exceeds 2%.

1.8.2.10 Minimum Sizes

The minimum size for an on-street sanitary sewer shall be 200 mm diameter.

1.8.2.11 Depth of Sanitary Sewers

The minimum desirable design grades shall be 0.5% for all local sewers and 1% for the first upstream leg.

The depth of the sewer shall be measured from the final centreline finished road elevation to the top of the sanitary sewer.



In all instances, the proposed sanitary sewer shall be installed at a depth sufficient to also service lands external to the site as determined by the Township.

For residential, commercial, and institutional areas the minimum depth shall be 2.8 m.

For industrial areas, the minimum depth shall be 2.15 m.

Sanitary sewers shall be located below basement floor elevations to allow for the installation of sewer laterals. Generally, the sanitary sewer shall be at least 1.0 m below the basement floor elevations.

1.8.2.12 Location

All sanitary sewers shall be located as shown on the typical Township roadway cross sections.

In general, this location is along the centreline of the roadway. A minimum horizontal clearance of 2.5 m is required between the sanitary sewer and watermain.

1.8.2.13 Storm Sewer and Watermain Crossings

A minimum clearance of 0.50 m shall be provided at the point of crossing between the outside of the pipe barrels of all sewers, services and watermain. The sanitary sewer connections are required to go under the storm sewer.

1.8.2.14 Limits of Construction

Sewers shall be terminated with a maintenance hole at the upstream subdivision limits when external drainage areas are considered in the design. The design of the terminal maintenance holes shall allow for the future extension of the sewer.

1.8.2.15 Sewer Alignment

Sanitary sewers shall be laid in a straight line between maintenance holes unless radius pipe has been designed. Joint burial (common trenching) with storm sewers may be considered when



supported by the recommendations of a soils report prepared by the Developer's Geotechnical Engineering Consultant.

1.8.2.16 Changes in Pipe Size

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

1.8.2.17 Pipe Bedding

The class of pipe and the type of bedding shall be designed to suit loading and proposed construction conditions. Details are illustrated in the OPSD standard Bedding and Backfill details. In general, Type B bedding and cover (compacted Granular A bedding and cover over the sewer) shall be used for rigid pipe sewers.

Embedment for flexible pipe shall be homogeneous Granular A material in accordance with OPSD requirements.

The width of trench at the top of the pipe shall be carefully controlled to ensure that the maximum trench width is not exceeded unless additional bedding or higher strength pipe is used.

Alternate granular materials for pipe bedding may be specified, subject to the approval of the Township, however clear stone bedding is generally not permitted. In areas where it is difficult to control the infiltration of ground water into the sewer trenches clear stone bedding may be considered provided it is completely wrapped in a suitable geotextile, selected and installed in accordance with the manufacturer's requirement.

Where poor soil conditions and high ground water levels are present, the Developer's Consulting Engineer shall prepare special designs for the Township's approval.



1.8.2.18 Materials

For single family and semi-detached units, multiple family, and other residential blocks, the service connections shall be PVC.

All bends on sanitary service connections shall be long radius, sweep bends.

Sanitary sewers shall be constructed of reinforced concrete pipe, Polyvinyl Chloride (PVC) pipe or polyethylene.

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

Reinforced concrete pipe shall be used for sewers 600 mm diameter or larger. PVC pipe may only be used for sanitary sewers up to and including 600 mm in diameter.

- Reinforced Concrete Pipe shall be steel reinforced and conform to OPSS 1820.
- Polyvinyl Chloride Pipe (PVC) shall conform to OPSS 1841.
- Dimension ratio (DR) of PVC sewer pipe shall not exceed 35.
- Polyethylene pipe shall conform to OPSS 1840.

For sewer applications requiring pressure pipe, pipe design shall reference the latest MECP guidelines.

1.8.2.19 Maintenance Hole Requirements

Maintenance holes to be precast concrete and shall be designed and constructed in accordance with the most recent OPSS and OPSD. Where the standard drawings are not applicable, the maintenance holes shall be individually designed and detailed.

1.8.2.20 Location and Spacing

Maintenance holes shall be located at each change in alignment, grade, or pipe material, at all pipe junctions and at intervals along the pipe to permit entry for maintenance to the sewer.



Maximum spacing of maintenance holes shall be 110 m for sewers 900 mm or less in diameter and 180 m for sewers 975 mm or greater in diameter.

1.8.2.21 Maintenance Hole Details

- Minimum size of maintenance holes to be 1500 mm diameter from the base to 1.80m in height (min.) at which point a taper transition to 1.20m can be made.
- All maintenance hole chamber openings shall be located on the side of the maintenance hole parallel to the flow for straight run maintenance hole, or on the upstream side of the maintenance hole at all junctions.
- The maintenance holes shall be centered on the sanitary sewer main.
- The maximum change in direction of flow in any sanitary maintenance hole shall be 90 degrees. Flow direction changes at acute interior angles shall not be permitted.
- A maximum invert drop of 0.25 m within the maintenance hole shall be allowed only if the design of the sewer cannot be modified to reduce the drop or modified to accommodate a drop structure.
- Wherever feasible, sewer systems shall avoid the use of drop structures.
- If the design of the sewer system is such that the difference in elevation between the maintenance hole inlet and outlet exceeds 0.6 m, then a drop structure shall be required.
- When pipe size does not change through a maintenance hole and the upstream flow velocity does not exceed 1.5 m/s, the following minimum invert drops across the maintenance hole shall be made to compensate for hydraulic losses:

Change in Direction	Minimum Drop (mm)
Straight run	30
$\leq 45^\circ$	50
$> 45^\circ \leq 90^\circ$	80

- When the upstream flow velocity exceeds 1.5 m/s, the drop required through a maintenance



hole shall be calculated using the standard calculation sheet, Hydraulic Calculations for Maintenance Holes” found in the latest MECP Design Guidelines.

- For all junction and transition maintenance holes, the drop required shall be calculated using the standard calculation sheet “Hydraulic Calculations for Maintenance Holes” found in the latest MECP Design Guidelines.
- The obvert(s) on the upstream side of a maintenance hole shall in no case be lower than the obvert(s) on the downstream side of the maintenance hole.
- All maintenance holes shall be benched as detailed on the Standard Drawings.
- All maintenance holes shall have frost straps in accordance with OPSD 701.100.
- When any dimension of a maintenance hole exceeds those on the Standard Drawings, the maintenance hole shall be individually designed and detailed.
- Safety grates shall be required in all maintenance holes greater than 5.0m in depth.
- Safety grates shall not be more than 5.0m apart and constructed in accordance with the Standard Drawings. Whenever practical, a safety grates shall be located 0.5m above drop structure inlet pipes.

1.8.2.22 Frame and Grate

All maintenance holes located within the travelled portion of a roadway shall have the rim elevation initially set flush with the surface of the base course asphalt. The concreting and setting of the frame and cover shall be completed in accordance with the applicable OPSS/OPSD.

Modular Maintenance Hole Lift Rings shall be IPEX Lifesaver HDPE type or equivalent.

A minimum of two modular rings and a maximum of 300 mm of modular rings shall be permitted on maintenance holes in new subdivisions.

Prior to the placement of the final lift of asphalt, maintenance hole frames shall be reset to final elevation.



Where maintenance holes are located in areas to be flooded by the major design storm, maintenance hole covers shall be watertight and the maintenance hole is to be suitably vented. All other maintenance hole covers shall be as per OPSD 401.010 with Type A closed cover labelled "Sanitary".

1.8.2.23 Service Connections

All sanitary sewer service connections for single and semi-detached dwellings and townhouse units shall be individual services.

The proposed location(s) for each sanitary sewer service connection(s) shall be shown on the plan and profile drawings and shall be in accordance with the locations specified on the Standard Drawings.

Sanitary connections shall be in accordance with the following Standards:

- OPSD 1006.010 Sewer Service Connection for Rigid Pipe;
- OPSD 1006.020 Sewer Service Connection for Flexible Pipe.

Residential connections shall terminate at the center of the property line with a test fitting, plug suitably braced to withstand test pressures and 89 mm x 38 mm marker placed from the invert of the connection to 600 mm above grade painted green. All service connections shall be equipped with a clean out to the surface as illustrated in the Standard Detail Drawings.

1.8.2.24 Connection to Main

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

No service connection of a size greater than half the diameter of the main sewer 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



where a 150 mm service connection shall be permitted to connect to a 200 mm or 250 mm main sewer providing an approved manufactured tee is installed and provided that the invert of the service connection is above the spring line of the main sewer.

1.8.2.25 Size

Sanitary connections are to be sized as follows:

Single family residential:

- single 125 mm diameter (min.) PVC SDR 28
- Joints; Bell and Spigot with rubber gasket.
- Watertight test fitting, plugged and braced at property line.
- PVC pipe to be green in colour.

Industrial / Commercial / Institutional and Apartment Blocks:

- designed in accordance with Section 1.2.
- An inspection maintenance hole shall be required on private property 1.50 m from property line to centre of rim.

1.8.2.26 Depth

The depth of the service connections for single-family units and semi-detached units at the property line, measured from the final centreline road elevation shall be a minimum of 2.60 m.

Risers shall be used when the depth to obvert of the sewer main exceeds 4.50 m. The riser connection shall not exceed 3.0 m in depth.

1.8.2.27 Grade

The minimum and maximum grades for sanitary sewer service connections shall be as follows:

Size of Connection	Minimum Grade (%)	Maximum Grade (%)
125	2.0	8.0



150	1.0	6.0
200	0.5	6.0

1.8.2.28 Joints and Bedding

Joints and bedding for connections are to be equivalent to joints and bedding as specified for sanitary sewer pipe.

1.8.3 Testing and Acceptance

All testing shall be carried out from maintenance hole to maintenance hole including house service connections as work progresses. An infiltration or exfiltration test as per OPSS 410 shall be completed on all sewers 1200 mm in diameter and smaller. The Township shall determine which test is to be undertaken. Low pressure air testing may be considered.

1.8.3.1 Deflection Test

A deflection test shall be performed on all sewers constructed using PVC pipe material.

A Deformation Gauge (Pig) Test as per OPSS is required on all pipe works prior to Substantial Completion and Maintenance, but not until a minimum of thirty (30) days after installation.

1.8.3.2 Video Record

Closed Circuit Television (CCTV) inspection (including flushing) as per OPSS 409 shall be conducted upon satisfactory completion of all other testing, prior to the Township's recommendation for issuance of Substantial Completion and Maintenance and prior to the placement of the final (surface) course asphalt.

A CCTV inspection (including flushing) shall also be required prior to the issuance of Final Acceptance and Assumption if a lapse of eighteen (18) months since surface course asphalt placement.



A permanent record in DVD form shall be supplied to the Township, illustrating a continuous record of the sewer installations, service connections, maintenance hole, etc.

A report identifying any unusual or sub-standard condition(s) shall also be submitted to the Township.

1.9 Plan and Profile Drawings

Plan and Profile drawings are required for all Township roadways, blocks, and easements where services are proposed within the development, for all outfalls beyond the development to the permanent outlet, for all boundary roadways abutting the development and for other areas where utilities are being installed below grade. Plan and Profile drawings are to be drawn to a maximum horizontal scale of 1:500 and a maximum vertical scale of 1:50 and are to include the following:

- complete legend
- all existing or proposed services, utilities and abutting properties are to be shown in light or background weight lines
- all services to be constructed are to be shown in solid lines
- the profile portion of the drawing shall be a vertical projection of the plan portion whenever possible
- all road allowances, lots, blocks, easements, and reserves are to be shown and are to be identified in the same manner as on the Registered Plan
- pavement / road base designs for the particular roadway are to be indicated on all plan and profile drawings
- all curb and gutter and sidewalks shall be shown and dimensioned on the plan portion of the drawing



- where multiple drawings are required for one road, match lines shall be used and tied in to the nearest full station and such station shall be indicated with no overlap or duplication of information
- where intersecting roads or easements are shown on a plan-profile, only the diameter of the pipe and direction of flow of the intersecting sewers shall be shown. This also applies to easements for which a separate plan and profile has been drawn.
- on profile portion of drawings, the type of sewer, diameter, length, and grade shall be shown
- on profile portion of drawings, the watermain diameter and length, shall be shown
- only the type, direction of flow and diameter of pipe shall be shown in the plan portion;
- all maintenance holes shall be shown on the plan and on the profile portions of the drawing and be identified by chainage and I.D. number and shall also be referred to the applicable Standard Drawing or to a special detail on the profile portion of the drawing. All invert elevations shall be shown on the profile with each having reference to the north arrow
- all sewer maintenance holes which have safety platforms are to be noted
- all drop connections are to be noted and referred to the Standard Drawing
- all catch basins and catch basin connections shall be shown. Catch basins are to be numbered for easy reference. All rim and invert elevations for rear lot catch basins are to be shown
- all watermain, hydrants, valves, bends, and fittings, etc. shall be shown, described, and dimensioned on the plan portion of the drawing. In addition, the watermain shall be plotted to true scale size on the profile portion of the drawing, complete with details on the depth of cover
- the location of all storm, water and sanitary service connections shall be shown on the plan portion of the drawing using different symbols for each service. These services need only be dimensioned when the location differs from the standard location as shown on the Township Standard Drawings. The connections to all blocks in the development shall be fully described and dimensioned (size, length, grade, invert elevations, materials, class of pipe, bedding, etc.)



- the existing and proposed centreline road grades shall be shown every 20 m with stations shown measured in metres (i.e. STA 0+000.00, STA 0+020.00) and at even 10 m intervals indicated in vertical curves
- beginning and end of curve stations, intersections and end stations shall also be shown to two (2) decimal points
- the original ground at centreline and the proposed centreline road profile shall be plotted on the profile. The proposed centreline road profile shall be fully described (length, grade, P.I. elevations, vertical curve data, high point chainages, low point chainages, etc.)
- details of the gutter grades around all 90 degree crescents, intersections and cul-de-sac shall be provided on the plan portion of the drawing as a separate detail at a scale of 1:100
- special notes necessary to detail construction procedures or requirements are to be shown
- chainage for the centreline of construction is to be shown on the profile portion of the drawing. P.V.I., B.H.C., E.H.C., B.V.C. and E.V.C. chainages are to be noted
- the basement elevation of all existing dwellings on roads where sewers are to be constructed shall be noted on the profile
- all existing services, utilities and features shall be shown on the plan portion. Those services and utilities below grade that are critical to the new construction shall also be shown in the profile. Test holes may be required to determine actual elevation of these services and utilities
- profiles of roadways shall be produced sufficiently beyond the limits of the proposed roads, to confirm the feasibility of possible future extensions
- the location of all luminaire poles shall be clearly shown on the plan portion
- the proposed location and type of all road names and traffic control signs shall be shown on the plan portion
- proposed locations and types of all trees to be shown on the plan portion
- where possibility of conflict with other services exist, connections are to be plotted on the profile or a crossings chart included



- the detail information from all borehole logs is be plotted on the profile drawings and located on the plan



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	NO. 1 2	REVISION Manager of Engineering Operational Services Department	APR'D	DATE 05/23 05/23	<h2 style="margin: 0;">TOWNSHIP OF TAY</h2> <h3 style="margin: 0;">STANDARD PLAN and PROFILE SHEET</h3>	APR'D: DRAWN:	DATE: 07/2023 SCALE: NTS
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TOWNSHIP of TAY OPERATIONAL SERVICES DEPARTMENT TYPICAL SUBDIVISION TYPICAL STREET STA. 21490 TO 24490	TOWNSHIP of TAY OPERATIONAL SERVICES DEPARTMENT TYPICAL SUBDIVISION TYPICAL STREET STA. 21490 TO 24490
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TOWNSHIP of TAY
Operational Services Department

STANDARDS FOR PLAN & PROFILE DRAWINGS

- * For Township purposes only.
- * General Township of Tay Standards for specific details.
- * Signs and Line Types are limited OFF when the representation.



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1.10 Utility Coordination, Composite Utility Plan and Electrical Services Design

1.10.1 Utility Coordination

The appropriate utility company or their approved contractor shall install the services for Telecommunications, Hydro, Gas, and Cable TV.

The Developer shall bear the cost of all surcharges for underground installation made and shall grant all necessary easements for their services. Where possible, utilities shall be kept 1.0m behind curbs and vertical and horizontal alignment shall conform to plan and inspection prior to backfill.

Compaction of backfill for utility trenches shall be 95% Standard Proctor Density within boulevards and 100% for driveways and under travelled roads.

Utility crossings for new roads shall be placed prior to placement of granular road base material. Utility crossings for existing roads shall be augured or bored under the existing road structure. Should it not be feasible to auger or bore, utility crossings for existing roads shall have the asphalt surface saw cut and removed for a width of the trench plus a minimum of 0.5m out from each side of the trench walls.

No disturbance by road cut shall be allowed on any new road surface within the first three (3) year period after assumption by the Township.

1.10.1.1 Canada Post

The Developer's Consulting Engineer shall submit and liaison directly to Canada Post for the locating of their proposed facilities. All proposed locations shall be shown on the Composite Utility Plan. Temporary Post Boxes shall be placed in accordance with the approved final



location. All community mailbox facilities shall be provided with a paved single lane lay-by and a streetlight.

1.10.2 Composite Utility Plan

The Composite Utility Plan shall be prepared in the same format as the “General Plan of Services” and show all the same aboveground information as well as the proposed location of driveways, streetlights, manholes, catchbasins, fire hydrants, valves, Bell Canada, Hydro, Gas, Cable TV, and Canada Post facilities. All locations shall be established and resolved by the Developer’s Consulting Engineer in conjunction with the Utility companies and in accordance with the locations shown on the typical cross-section.

1.10.3 Electrical Services Design

It is the Developer’s responsibility to make direct arrangements engage an Electrical Engineer (Developer’s Electrical Consultant) to design and construct the primary and secondary electrical distribution system, together with all necessary plans.

Where Site Plan proposals about County or Provincial roads, lighting level plans with supporting computer printouts shall be submitted to the respective road authorities for their approval, if required.

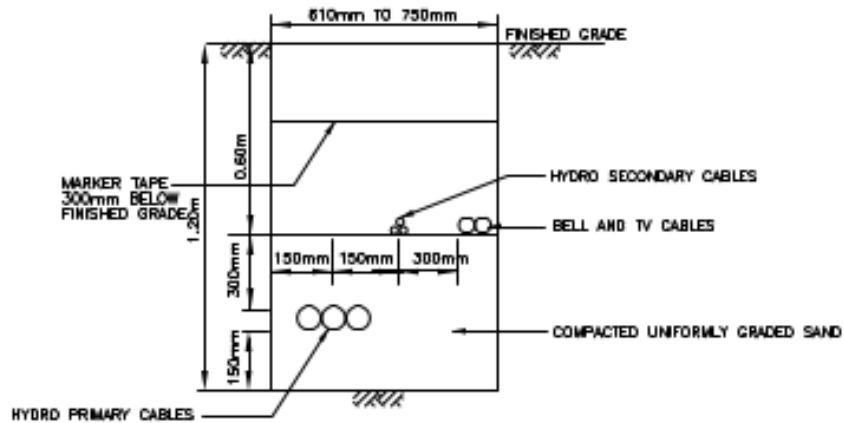
Electrical distribution systems shall generally be designed as buried systems. All requirements for the design of the electrical distribution and streetlighting system shall be agreed upon with the Township and the appropriate Electrical Authority.

Plans shall be submitted showing the location of (but not limited to): hydro poles, pole mounts, pole mounted transformers, underground ducts and wiring, pad-mounted type transformers, transformer size, duct banks, size of wiring etc.

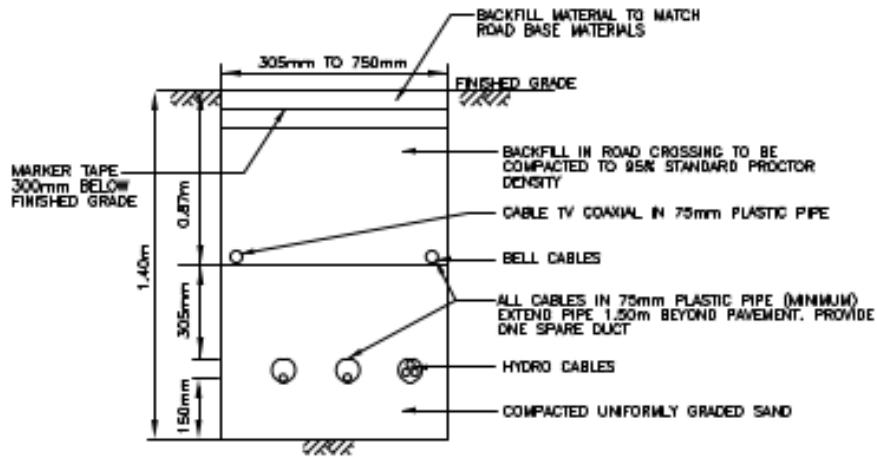
Electrical distribution systems shall not be constructed over the watermain.



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TYPICAL JOINT USE TRENCH



TYPICAL ROAD CROSSING

1. BACKFILL TO CONSIST OF 150mm OF CLEAN MASON SAND ABOVE CABLES/DUCTS AND CLEAN NATIVE MATERIAL.
2. WARNING TAPE TO BE PLACED PRIOR TO PLACING THE FINAL 300 mm OF BACKFILL.
3. JOINT TRENCH ON OPPOSITE SIDE OF WATERMAIN.

NO.	REVISION	APR'D	DATE



TOWNSHIP OF TAY
JOINT UTILITY TRENCH
AND ROAD CROSSING SECTIONS

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.10-01



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1.11 Streetlighting

Streetlights are required for all roadways and most walkways in the Township, and other locations as directed by the Township. Streetlighting systems are the responsibility of the Developer to construct, and the Developer shall engage an Electrical Consultant to design the Streetlighting system.

The Streetlighting system designs shall be prepared by the Developer's Electrical Consultant and submitted to the Township for approval. The illuminance method as outlined in the American National Standard Practise for Roadway Lighting ANSI/IES RP-8-14 (2014) or latest edition is to be used as a guideline.

All streetlighting shall consist of Dark Sky Friendly (Full Cut-Off) luminaires and fixtures. Designs shall show that fixtures have no up-light focus. Fixtures shall be designed in such a way that there is a minimum horizontal and "zero" vertical lighting focus.

The photometrics of fixtures shall be submitted for review with preliminary design submissions of development plans.

Where photometric analysis determines a more appropriate or alternative wattage or spacing, consideration may be given to the alternative design provided that illumination levels do not compromise traffic or pedestrian safety.

The Developer shall arrange with Hydro One for the connection of all lighting systems. The estimated cost of the total installation shall be approved by the Township.

The Developer shall provide easements wherever they are required.

1.11.1 Streetlight Locations

- Where possible, pole locations are to be placed on the projection of side lot lines.



- Where community mailboxes are proposed within a plan of subdivision, streetlights shall be located immediately adjacent to them.
- The maximum allowable spacing between streetlights shall be 60 m or as approved by the Township.
- Streetlights are to be provided such there is adequate illumination at all intersections.
- Streetlights are to be provided at the end of every cul-de-sac.
- No streetlights shall be placed within 3.0 m of a transformer.
- Staggered arrangement of luminaire poles is not acceptable.
- On curving roadways, lights are to be placed on outer radii where possible with spacing to be reduced by 30%.
- Proposed lighting levels adjacent to Provincial and County roads are to be reviewed and approved by the appropriate Road Authority.

1.11.2 Light Source, Fixture and Pole

- All luminaries shall comply with all applicable requirements of CSA Standard C22.2 No. 250 13-12, "Light Emitting Diode (LED) Equipment for Lighting Applications.
- All luminaries shall be manufactured by CREE Lighting Inc. – XSPA Type (Wattage as per Approved Streetlighting Designs.)
- Landmark luminaries shall be used on collector and arterial roads.
- Each light shall be controlled by a dusk to dawn photo electric cell.
- For local roads poles for 7.35 m mounting height are to be direct burial type round concrete Stresscrete #TEC-30-BPR-CSA "Concrete Poles" complete with 2.4 m aluminium tapered elliptical arm, made by Sylvania or equivalent, 100mm by 175mm hand hole and cover, ground lug at the hand hole and two below grade wiring apertures as per Township Standard Drawing No. 1.11-01.
- Stresscrete or approved equal poles of appropriate height and class, with tapered single elliptical aluminium arms of appropriate length, are to be used on collector and arterial



roads.

- Streetlights shall be controlled by an electrical panel mounted in Pedestal Solutions Inc. SLT Base Pedestal complete with Meter adjacent to a hydro transformer in accordance with Township Standard Drawings No. 1.11-01 and 1.11-02. Installation to meet current Ontario Hydro Guidelines.

1.11.3 Approval and Construction

Approval of plans for streetlighting shall be obtained from the Township. Electrical Safety Authority (ESA) approval for the installed streetlighting system shall be obtained by the developer. The Developer shall guarantee and maintain the lighting until Final Acceptance and Assumption of the development. The Township, upon energization of the streetlighting, shall pay energy charges.

1.11.4 Decorative Streetlighting

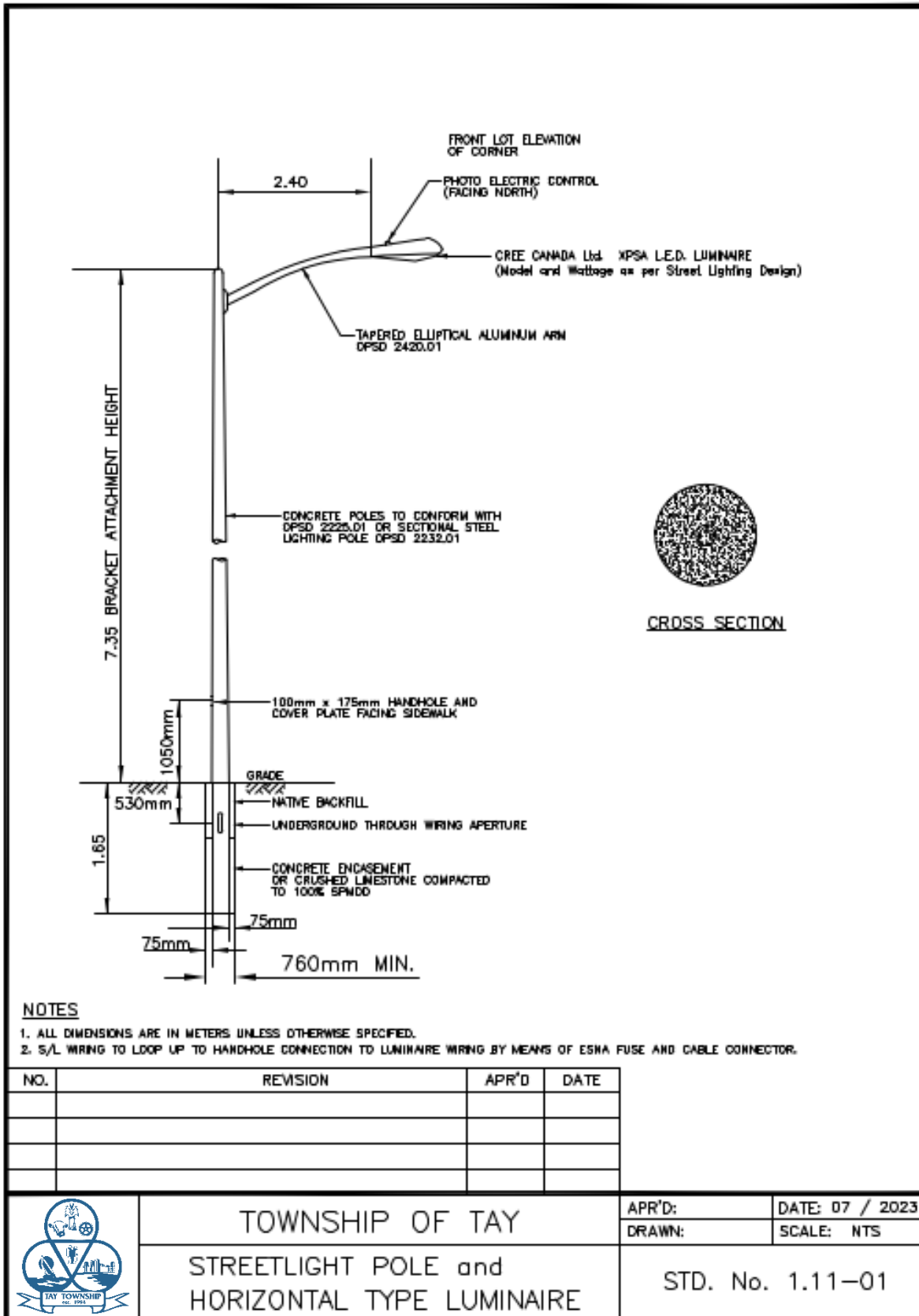
Upon specific request to the Township, decorative streetlighting may be considered on a case-by-case basis.

Decorative streetlighting is to generally conform to the requirements of Section 1.11 and all subsections as previously described, with the following revisions:

- Poles to be Stresscrete Octagonal Class B-Medium Duty Pole, Eclipse Black (S11) polished concrete finish
- Luminaries to be CYCLONE L.E.D. - CLE – 17T4 (Black in Colour)
All other Luminaire specifications require Specific Approval(s)
- Arm to be Aluminous 72" Decorative Scroll Arm, black colour
- Power pedestal to be Pedestal Solutions Inc. Part #SLS Short Streetlighting Pedestal equipped with Square D 12 Breaker 120/240 VAC Single Phase Panel



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NO.	REVISION	APR'D	DATE	TOWNSHIP OF TAY
1	PEDESTAL CHANGE	DJS	08/19	STREET LIGHT PEDESTAL
		DRAWN:	DATE: 07/2023	SCALE: NTS
				STD. No. 1.11-02

**SLT Pedestal with Meter Base and 12 Oct. Panel
(Typical Layout)**
with Front Covers Installed

Front View
with Front Covers Removed

Rear View

UTILICON
UP1420
Non-vented Performance Meter Base
Model No. 1420
Call 781-366-1111

PARTECH AUTOMATIC
PANEL AUTOMATIC
Model No. 1420
Call 781-366-1111

Typical Material Notes:

- 1. All materials shall be of standard commercial grade unless otherwise specified.
- 2. All materials shall be of standard commercial grade unless otherwise specified.
- 3. All materials shall be of standard commercial grade unless otherwise specified.
- 4. All materials shall be of standard commercial grade unless otherwise specified.
- 5. All materials shall be of standard commercial grade unless otherwise specified.
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1.12 Traffic Signs / Signals and Pavement Marking

1.12.1 Signs

Prior to construction, an information sign shall be placed at every access point to the subdivision detailing:

- noting that the subdivision is Unassumed
- the Name of the Subdivision
- the Developer and phone #
- the General Contractor and phone #
- the Developer's Consulting Engineer and phone #
- phone numbers for each of these companies shall be posted on this sign.

The following types of signs shall be posted on Township R.O.W.'s:

- Municipal Numbering
- Road Name Signs
- Traffic Control and Advisory Signs
- Municipal Information Signs

All signs so installed shall be done so in accordance with the latest edition of the Ontario Traffic Control Manual and standard road name signs approved by the Township of Tay.

Unless specifically authorized by the Township, no sign, fingerboard, notice, or advertisement of any kind shall be posted or deposited on road allowance under the jurisdiction of the Township.

1.12.1.1 Municipal Address Numbering

The Developer is responsible for obtaining designated Municipal Address Numbering for each and every lot from the Municipal Office. The designated Municipal Address Numbering shall be shown on the Overall Lot Grading Plan inside the box designating the location of the house. The



required location for the installation of Municipal Address Numbering signage is shown on Township Standard 1.12-02.

1.12.1.2 Road Name Signs

The naming of all newly created roads under the jurisdiction of the Township shall meet with the Township's approval and shall not be in conflict with any existing road name.

All road names shall be submitted to the Township for approval in accordance with the Township's Street Naming Policy.

Unless specifically stated otherwise, it is the responsibility of the Developer to supply and erect road name, regulatory and parking control signs in a location approved by the Township as shown in Township 1.12-03.

1.12.1.3 Traffic Control and Advisory Signage

All Traffic Control and Advisory Signs shall conform to the current revised standards of the Ontario Traffic Manual.

1.12.1.4 Access / Haul Route / Information and Directional Signage – During Construction

The Developer shall indicate supplier and contractor Access and Haul Routes, Informational and Directional Signs to be used during construction. The location all pertinent information shall be erected and maintained at every access point to the subdivision, as needed to satisfy the Township, and such that there is the least amount of disturbance to the adjacent landowners.

The Developer is responsible to maintain this signage until Final Acceptance and Assumption by the Manager of Engineering or otherwise directed by the Township.



Upon completion of base course asphalt, the Developer shall place signage at each point of ingress / egress to the subdivision stating the following:

**THIS ROAD UNASSUMED BY THE TOWNSHIP OF TAY
USE AT OWN RISK**

Each sign shall be 450 mm wide by 600 mm high with black letters on white reflectorized background, mounted on “U” channel posts, 3.65 metres in height.

1.12.1.5 Location of Signage

Traffic control and advisory signs shall be located as shown on the Township of Tay Standard Drawings. In cases where the positioning of the signs is not covered by the standard drawings, the location shall be in conformance with the Ontario Traffic Manual or the Highway Traffic Act Regulations for Ontario.

All signs, with exception of “Parking” signs, shall be mounted approximately at right angles to the direction of and facing the traffic that they are intended to serve. On curved alignments the angle of placement shall be determined by the course of the approaching traffic rather than by the roadway edge at the point where the sign is located. Signs for different purposes shall not be placed closer together than 30 m.

Parking signs shall be mounted facing 30 – 45 degrees to the flow of traffic.

1.12.1.6 Erection of Signage

All traffic control signs shall be mounted on galvanized steel punch out type or Uniflange type posts, 3.65 m in length. Channel posts shall be a minimum 14 gauge thick and a minimum width of 45 mm. The posts shall be pre—punched with a minimum of 24 holes at 50 mm centres compatible with standard bolthole arrangements for traffic control signs. Signs shall be individually erected on separate posts.

Traffic control signs shall be erected by the Developer at the completion of the base course



asphalt road construction and prior to the issuance of Building Permits. Signs shall be maintained by the Developer until Final Acceptance and Assumption by the Township.

1.12.2 Traffic Signals

Where it has been determined by a qualified Traffic Engineer that traffic signals are required; the traffic signals shall be designed on individual site-specific basis and shall conform to Ontario Traffic Manual, Book 12.

1.12.3 Pavement Markings

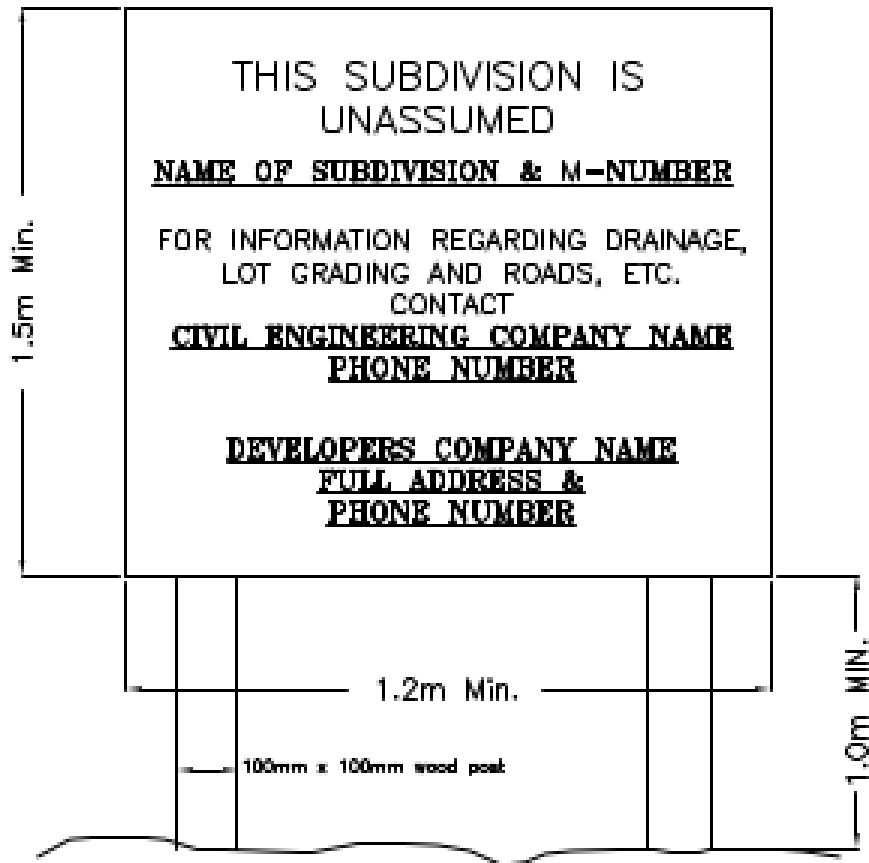
The Developer shall design pavement markings for all roadways over two lanes in width or as required by the Township. The design shall be in accordance with the Ontario Traffic Manual, Book 11 and approved by the Township.

The pavement markings shall be installed on both the top course of asphalt and the base course of asphalt. The Developer shall be responsible for stop bars on roadways that are up to two lanes in width.

All roadway markings shall be installed in accordance with OPSS 532.



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NOTES:

1. **INFORMATION SIGNS:**
ALL INFORMATION SIGNS SHALL BE ON A MIN. OF 19mm PLYWOOD BLANKS WITH WHITE ENGINEERING GRADE BACKGROUND AND BLACK LEGEND.
2. **MOUNTING:**
ALL SIGNS ARE TO BE MOUNTED ON 100mmx100mm POSTS AND ARE TO BE LOCATED WITHIN THE RIGHT OF WAY IN A LOCATION THAT WILL NOT BLOCK RIGHT LINES TO THE MOTORING PUBLIC.

NO.	REVISION	APP'D	DATE

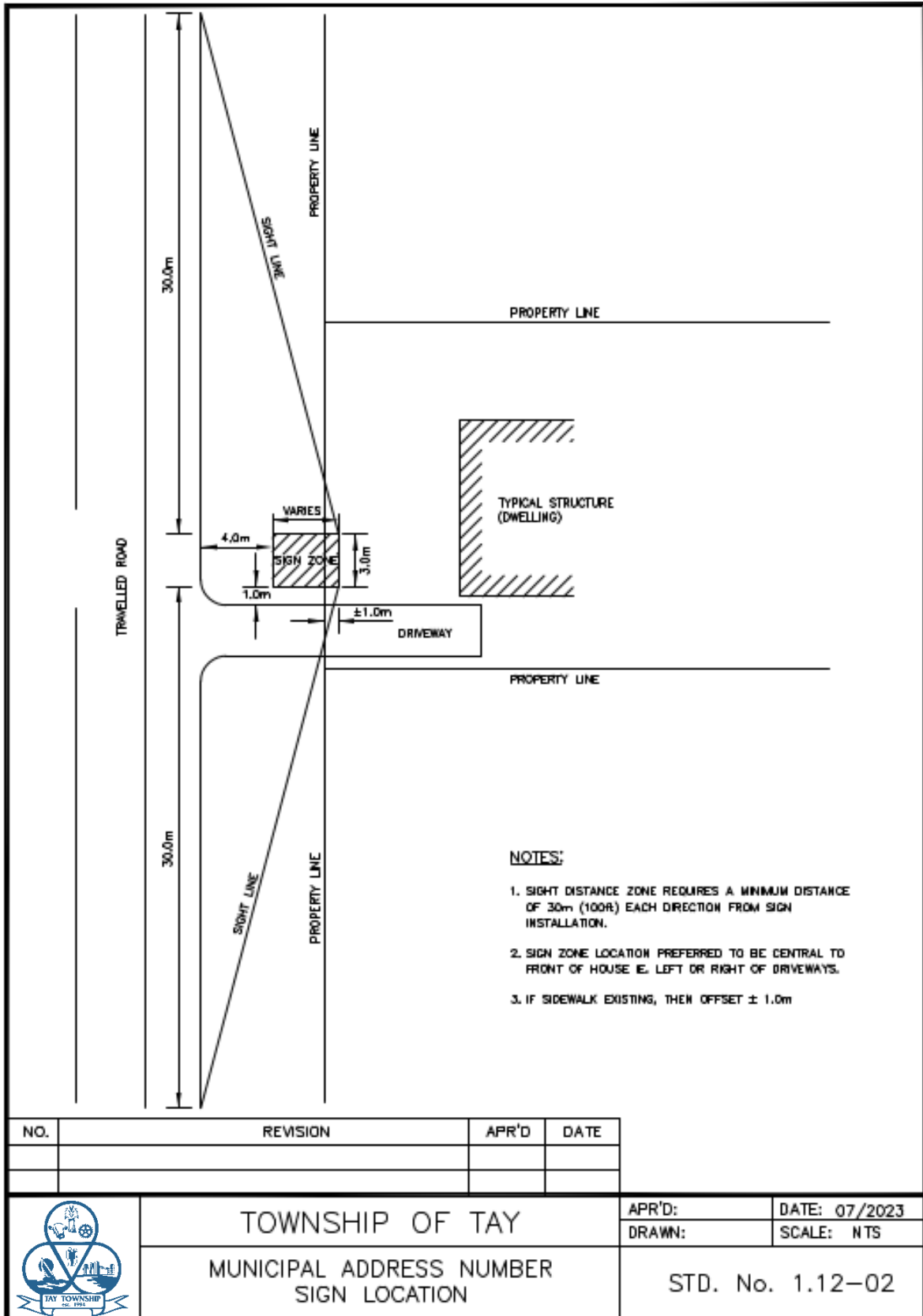


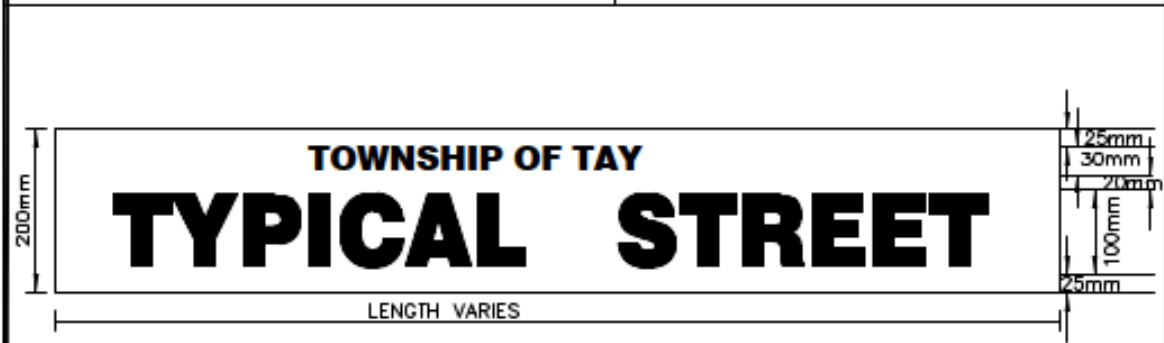
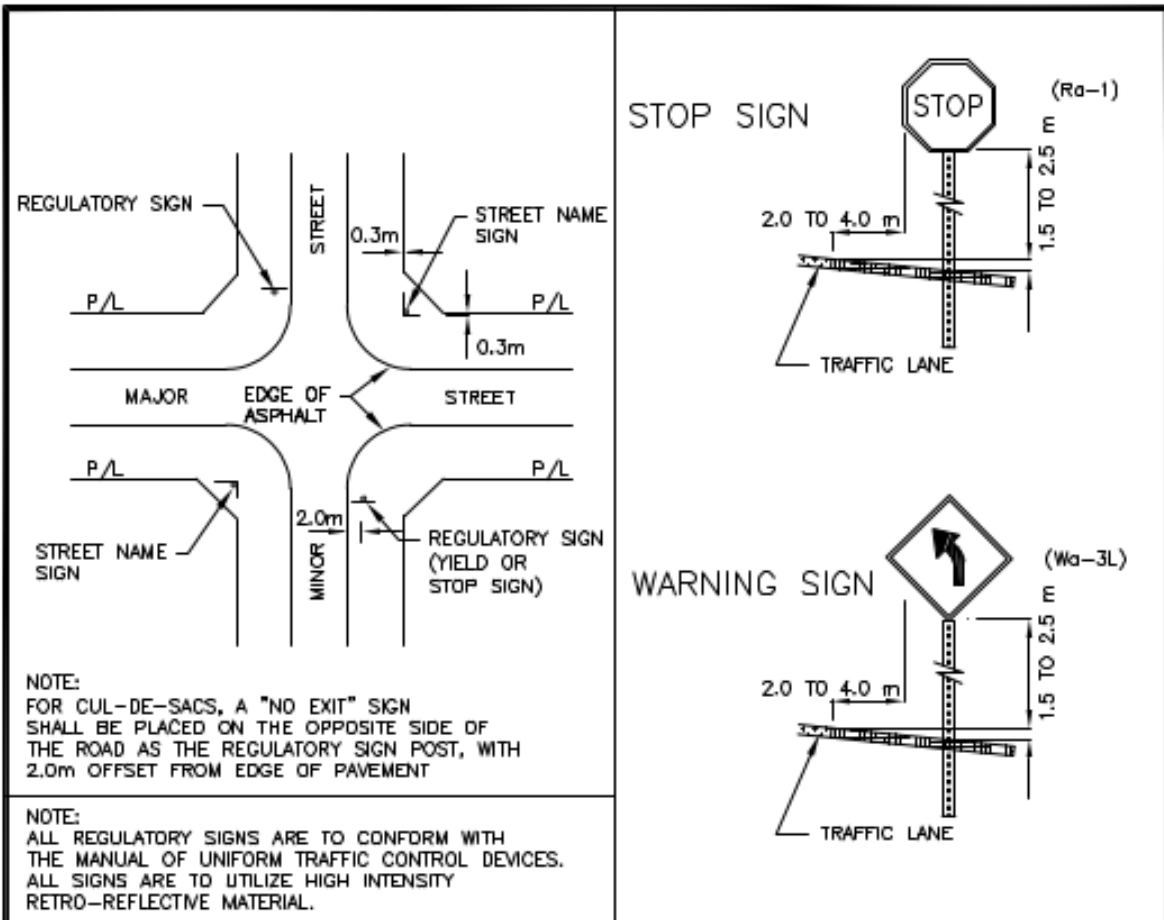
TOWNSHIP OF TAY

SUBDIVISION INFORMATION SIGN

APP'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.12-01





THE STREET NAME SIGN SHALL BE PAINTED GREEN WITH WHITE RETRO-REFLECTIVE LETTERING.

NO.	REVISION	APR'D	DATE

	TOWNSHIP OF TAY	APR'D:	DATE: 07 / 2023
	STANDARD STREET NAME AND REGULATORY SIGNS	DRAWN:	SCALE: NTS
		STD. No. 1.12-03	



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1.13 Sidewalks, Walkways, Trailways and Fences

1.13.1 Sidewalks

Sidewalks may be required in subdivision developments and may be also required where specified by the Director of Development Services as walkway links through parkland, and as connective links between cul-de-sacs and other points of pedestrian movement. Sidewalks shall be constructed in accordance with Township Standards.

Where the development generates the need, in the opinion of the Director of Development Services, sidewalks may be required on existing roads external to the plan or roads where reverse frontage is proposed.

Sidewalks shall be constructed as required within the plan for the proper circulation of pedestrian traffic and shall be in accordance with the most recent requirements and specifications of the Township of Tay.

The Township requires that all concrete sidewalks be constructed as indicated on the approved Engineering Drawings, prior to the release of the first conditional or unconditional Occupancy Certificate in accordance with the Subdivision Agreement and no later than one (1) year after the completion of base course asphalt.

1.13.1.1 Location

Should sidewalks be required, the sidewalks shall be constructed on Township of Tay roads as shown on the Township's Road Cross-Section(s) – Section 1.4.

Placement of the sidewalk shall generally be in the following priority:

- North and east side of road to take advantage of the sun.
- Minimum driveway crossings.



- Reduced road crossings.
- Inner side of Road Elbows.
- Through the access easements on cul-de-sacs.
- Where practicable, on the same side as streetlights are located.

1.13.1.2 Specification

All sidewalks shall be of a Universal Barrier Free design throughout their length and at all intersections and crossings. The standard width for residential development is 1.5m. The sidewalk shall be constructed 25mm higher than the finished sod on the downstream side and flush to the finish sod on the upstream side.

Concrete strength used in sidewalks shall be 30 MPa concrete with $7.0\% \pm 1.5\%$ air entrainment. Concrete sidewalks shall normally be a minimum of 150mm thick, 150mm thick across residential driveways and 200mm thick across commercial or industrial driveways. Sidewalks shall comply with OPSD 310.010, 310.020, 310.030, 350.010, 351.010 and OPSS 351 on a 150mm compacted Granular "A" base.

Sidewalks shall not be constructed on organic soils. Sidewalk profile and cross fall shall be such that it does not interfere with the proposed drainage pattern.

1.13.2 Walkways and Trailways

The Developer may be required to design and construct a trail system or walkways and linkages to existing trail systems. Walkways shall be required adjacent to parkland, in general. Walkway easements adjoining parallel roads or acting as service access shall be fenced, gated, signed, and planted according to Township Standards. The provision of new trails shall support a Township wide trails network.

The Township's trails network shall generally be comprised of the following:



- multi-use urban trails, 3.0 m width (hard surface, multiple user);
- multi-use rural soft surface trails, 3.0 m width (crusher fines, multiple users);
- greenway trails, 2.0 m width (soft surface, 4-season multi-use trails);
- road-based active transportation routes.
- Proposed trails shall link together local points of interest, all open space amenities, civic institutions and connect to the regional trails network.
- To the extent possible the route shall utilize public open spaces, unopened road allowances / rights-of-way, blocks, and easements away from roadways.
- In the event trails are located along roadways additional right-of-way width may be required by the Township.
- Trails connecting through settlement areas located within the road right-of-way shall be paved multi-purpose cycle ways.
- Trails through sensitive natural features shall be designed as soft surface paths and located to avoid fragile areas.
- Entrance points to the trail system shall be marked with signage coordinated with the Township.

The minimum standard for the multi-use urban trail shall be:

- 3.0 m width of 50 mm HL3 asphalt;
- 200 mm Granular “A” base compacted to 95% SPDD.

1.13.3 Fences

Fences shall be constructed in accordance with the most recent requirements and specifications of the Township as shown on the standard drawings.

Fences are required:

- alongside yard flankage and/or rear yards backing onto roadways unless noise attenuation barriers are required
- along public walkways in accordance with Township Standards



- as designated by the Manager of Engineering
- noise attenuation fences per approved report

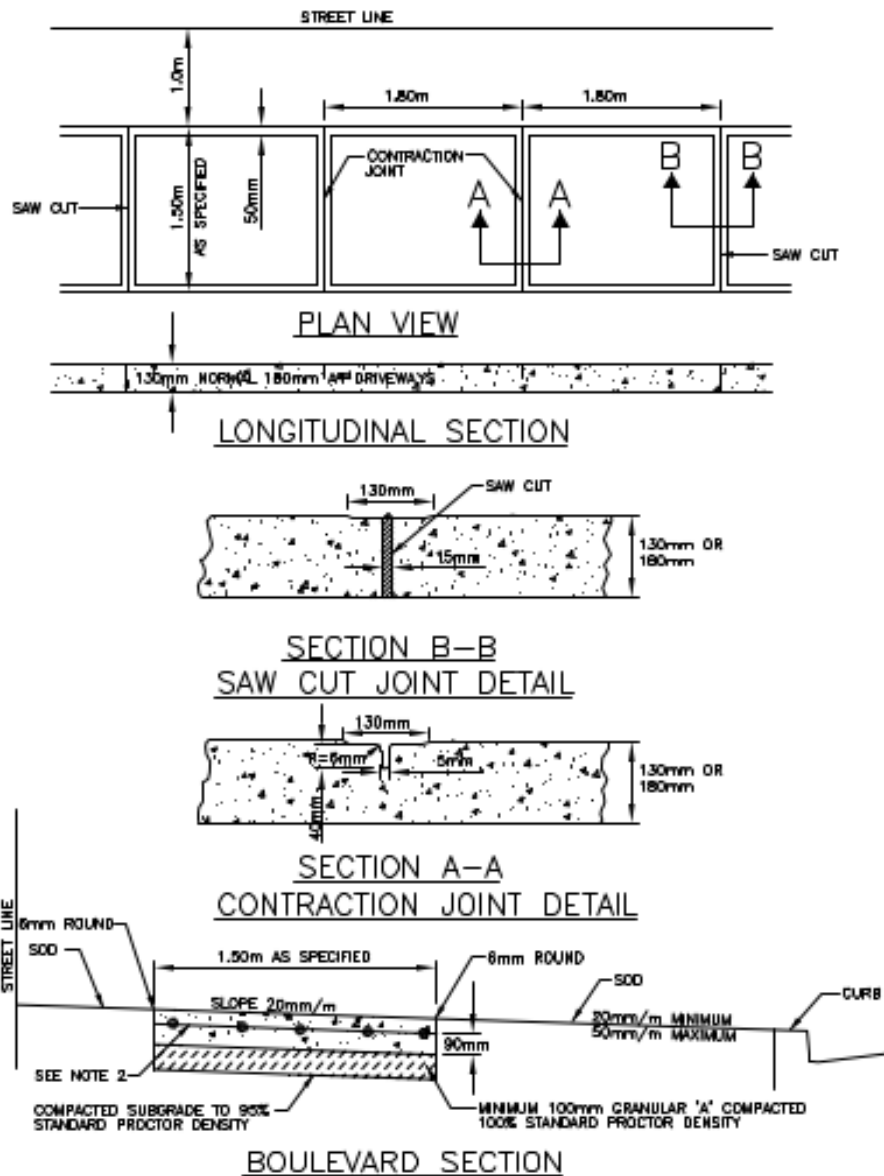
The minimum requirements for residential chain link fence heights are in accordance with the following: **Adjacent Land Use** **Fence Height (m)**

Parklands/Woodlands	1.2
Public Walkways	1.2 in front of dwellings 1.8 between dwellings and rear yards
Pools	As per Township Pool By-law
Abutting Agricultural Lands	1.5 - 10 strand, galvanized 'farm fence' with strand spacing of 0.15m hor. and 0.30 ver.

Note: All Chain Link Fence shall be Galvanized



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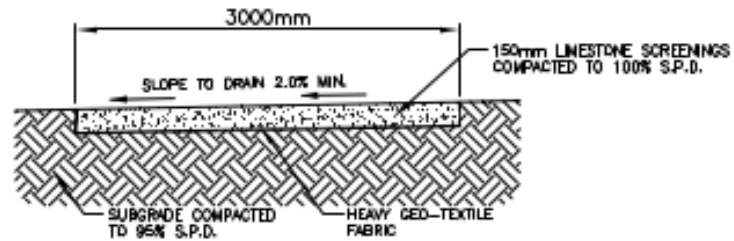


NOTES:

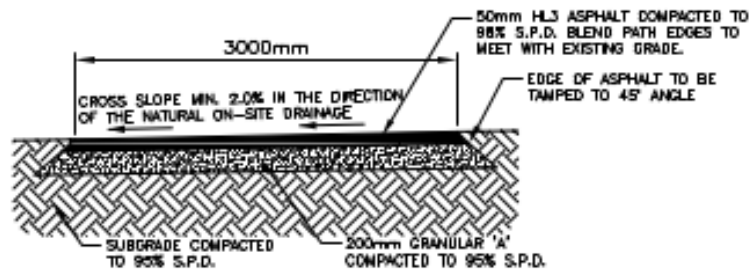
1. CONCRETE TO BE 25 MPa, 5-7% AIR ENTRAINMENT WITH 20mm MAXIMUM AGGREGATE SIZE.
2. FOR COMMERCIAL, INDUSTRIAL AND APARTMENT DRIVEWAYS, SIDEWALK TO BE REINFORCED WITH 152mm x 152mm MW 18.7 METRIC WELDED WIRE MESH.
3. SAW CUT JOINTS ARE ALSO REQUIRED WHERE SIDEWALK ADJUTS OTHER CONCRETE STRUCTURES, WALKS, CURBS, UTILITY POLES, HYDRANTS, MAINTENANCE HOLES AND AT CERTAIN LOCATIONS AT DISCRETION OF THE TOWNSHIP OF ORD-MEDONTE.
4. CONTRACTION JOINTS TO BE FORMED AFTER THE CONCRETE HAS RECEIVED ITS INITIAL SET.
5. ALL DIMENSIONS ARE IN MILLIMETERS OR METERS UNLESS OTHERWISE SPECIFIED.

NO.	REVISION	APR'D	DATE

	TOWNSHIP OF TAY	APR'D:	DATE: 07/2023
	CONCRETE SIDEWALK	DRAWN:	SCALE: NTS
		STD. No. 1.13-01	



LIMESTONE WALKWAYS



ASPHALT WALKWAYS

NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. EXTEND GRANULAR 'A' TO ANGLE OF REPOSE, APPROX. 200mm BEYOND EDGE OF PAVED SURFACE.
3. ENSURE POSITIVE DRAINAGE ON ASPHALT PATHWAY.
4. SURFACE WATER MUST NOT BE COLLECTED ON PATHWAY. POSITIVE DRAINAGE FROM PATHWAY MUST BE GENERATED AND INTEGRATED INTO OVERALL DRAINAGE PLAN.

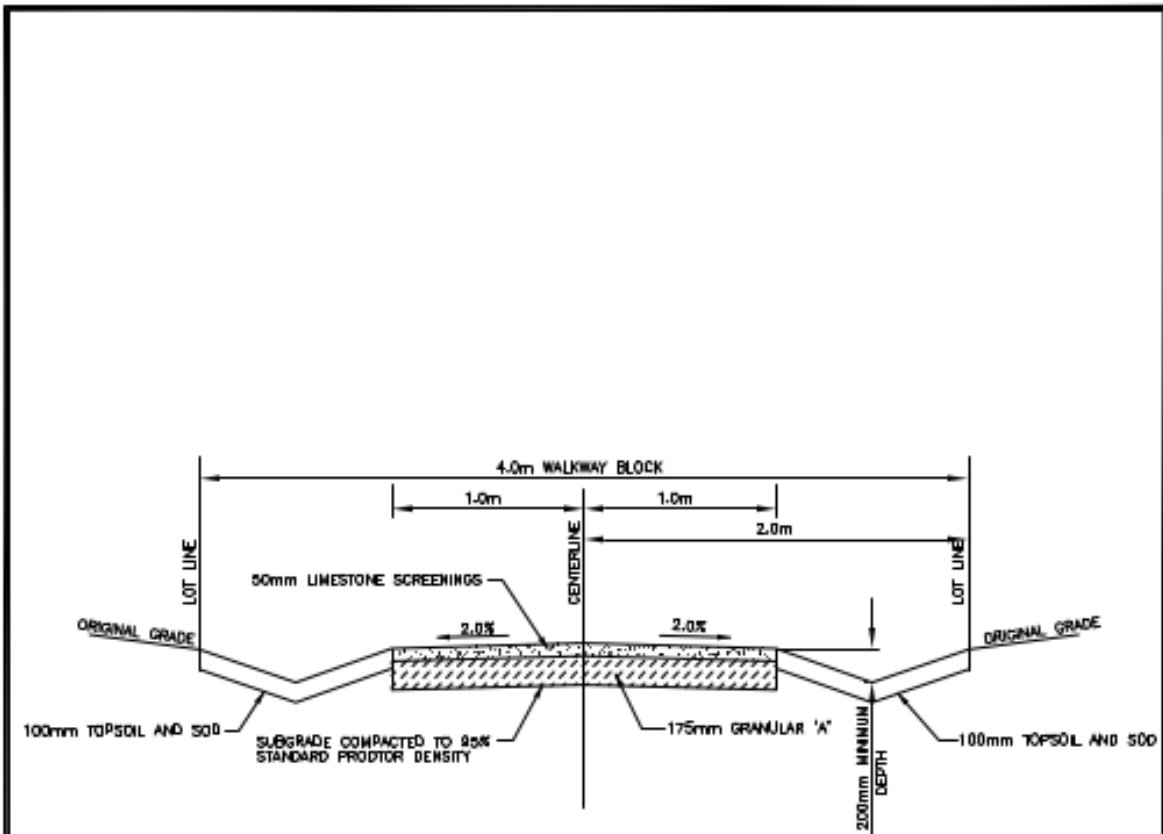
NO.	REVISION	APR'D	DATE



TOWNSHIP OF TAY
PEDESTRIAN WALKWAYS –
ASPHALT & LIMESTONE

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.13-02



NOTES:

1. ALL GRANULAR MATERIALS TO BE COMPACTED TO 100% STANDARD PROCTOR DENSITY.
2. PROPOSED LONGITUDIAL GRADE OF WALKWAY TO BE IDENTIFIED ON ENGINEERING DRAWINGS. MINIMUM LONGITUDINAL GRADE TO BE 1.5%.

NO.	REVISION	APR'D	DATE

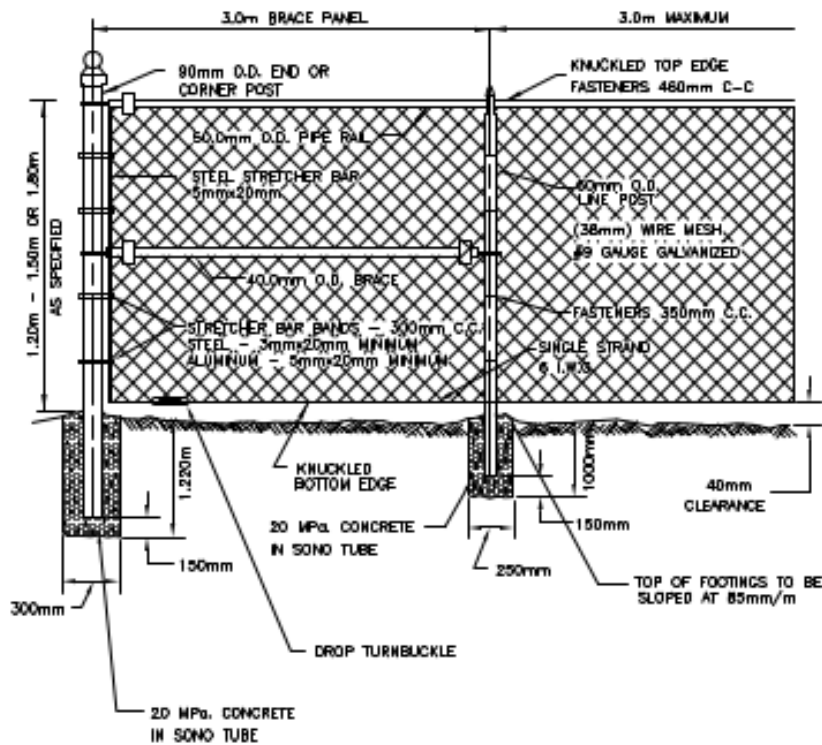


TOWNSHIP OF TAY

PEDESTRIAN WALKWAY – GRANULAR

APR'D:	DATE: 07 / 2023
DRAWN:	SCALE: NTS

STD. No. 1.13-03



NOTES:

1. LENGTH OF POSTS

FENCE POST LOCATION	1.20m FENCE	1.50m FENCE	1.80m FENCE
END, CORNER OR RESTAINING	2.30m	2.60m	2.90m
LINE POST	2.05m	2.36m	2.65m

2. FASTENERS - # 1.W.G. GALVANIZED STEEL OR ALUMINUM WIRE.

3. ALL POSTS, PIPE RAILS AND FASTENERS TO BE GALVANIZED.

4. BRACE RAILS TO BE ELIMINATED ON 1.20m HIGH FENCE.

5. ALL DIMENSIONS ARE IN MILLIMETERS OR METERS.

6. FENCE FABRIC SHALL BE TYPE 1 STEEL FABRIC 3.0mm DIA. STEEL WIRE, STYLE 3 LIGHT STEEL WIRE, GALVANIZED BEFORE WEAVING.

7. FENCING REQUIREMENTS FOR PUBLIC WALKWAYS ARE TO BE RANGE FROM 1.2m TO 1.8m. A FENCE HEIGHT OF 1.2m IS TO BE SPECIFIED BETWEEN STREETLINE AND THE FRONT OF THE DWELLING. FENCING HEIGHTS BEYOND THE FRONT OF THE DWELLING ARE TO 1.8m.

NO.	REVISION	APR'D	DATE

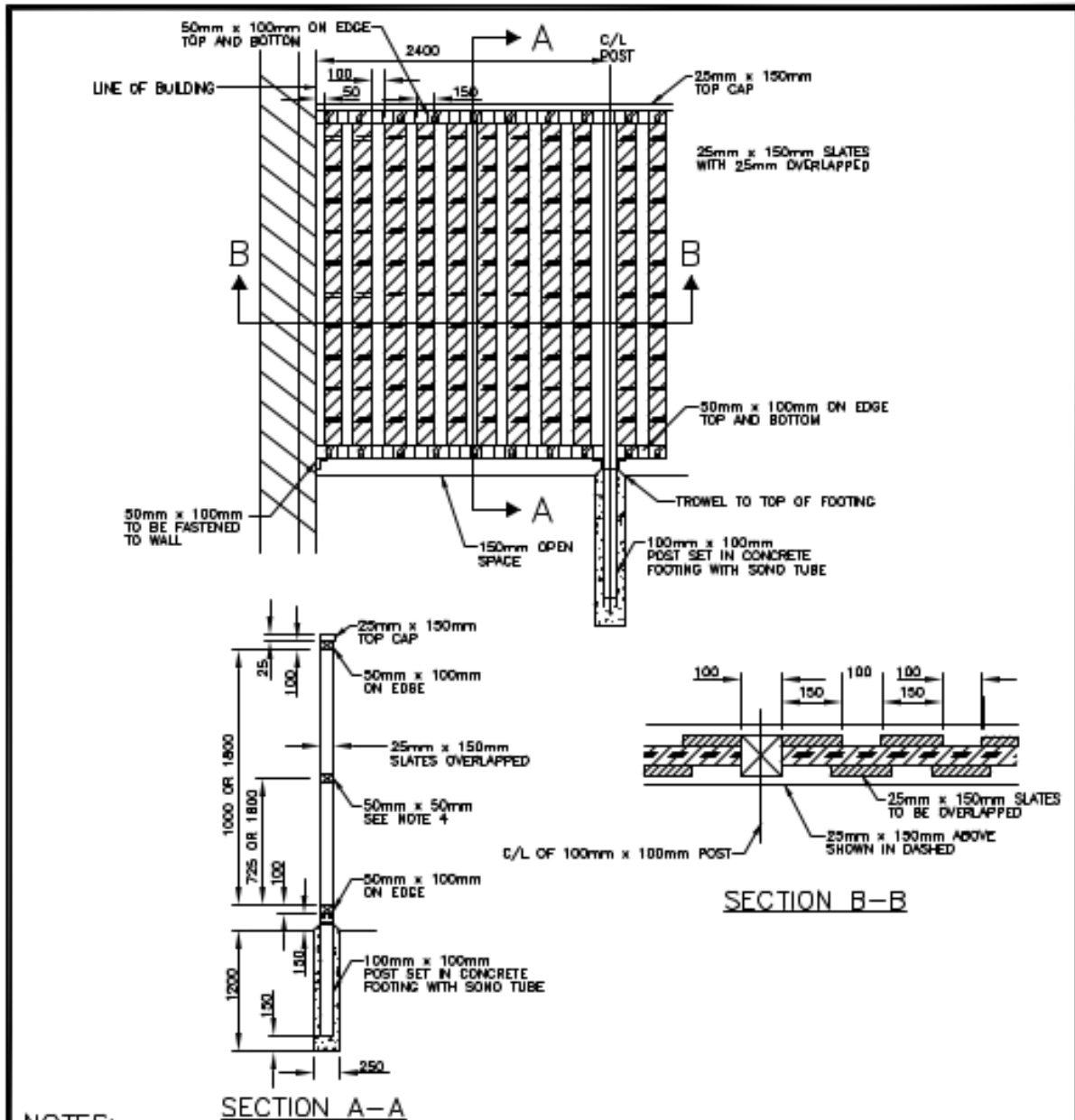


TOWNSHIP OF TAY

CHAIN LINK SECURITY FENCE

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.13-04



NOTES:

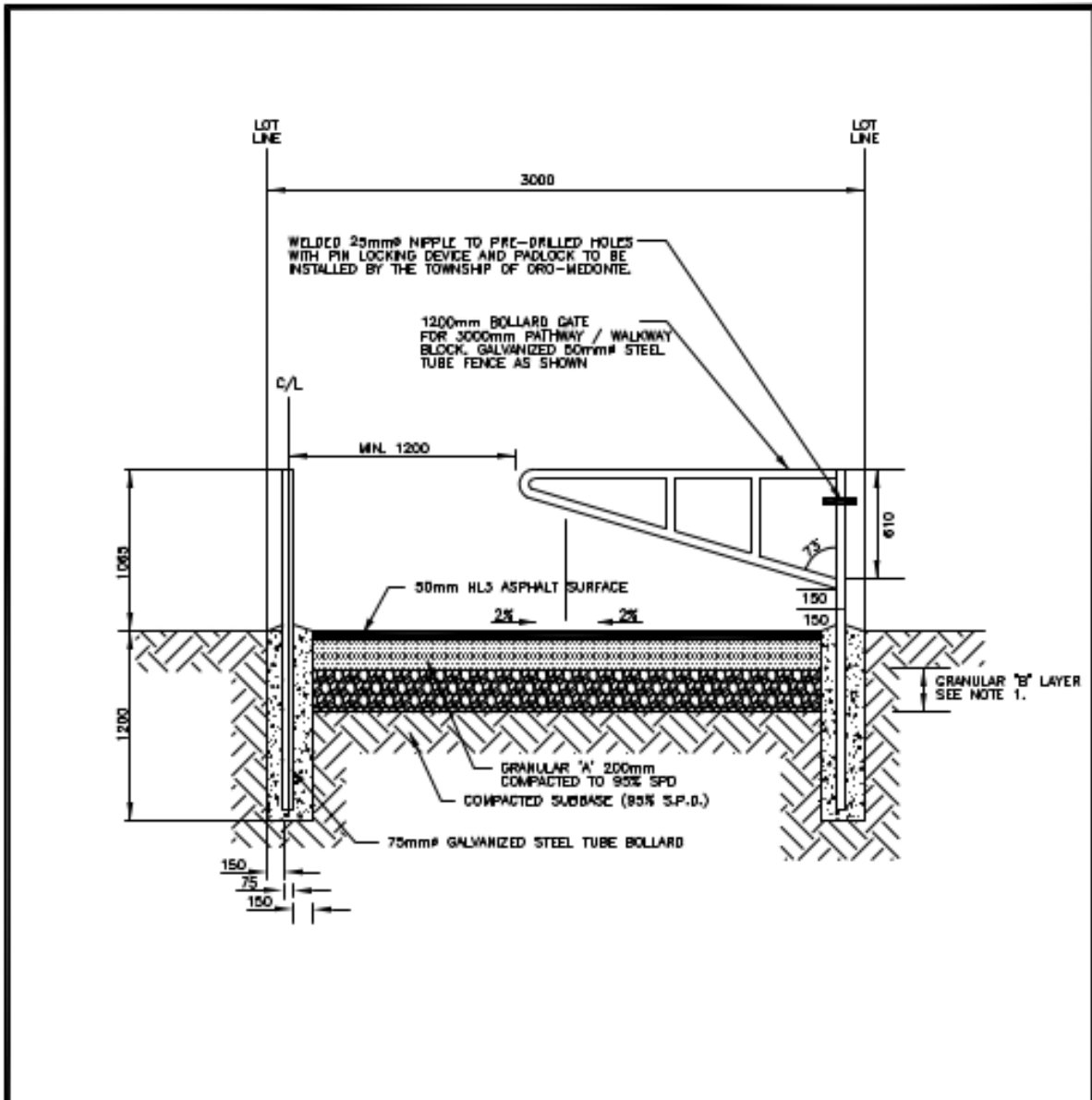
1. USE CONSTRUCTION GRADE CEDAR OR PRESSURE TREATED. DO NOT USE SPRUCE OR HEMLOCK.
2. USE APPROVED WOOD STAIN.
3. USE STEEL ZINC COATED TWISTED NAILS No. 11 GAUGE 84mm x 76mm.
4. FOR FENCE 1.8m OR HIGHER 50mm x 50mm MUST BE USED AS SHOWN IN SECTION A-A.
5. USE GALVANIZED FENCE BRACKETS.
6. FOR WALKWAYS, THE FENCE HEIGHT SHOULD BE 1.2m HIGH BETWEEN STREETLINE AND FRONT WALL OF DWELLINGS ON ADJACENT LOTS AND 1.8m FOR THE REMAINDER.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

NO.	REVISION	APR'D	DATE



TOWNSHIP OF TAY
WOOD PRIVACY FENCE

APR'D:	DATE: 07/2023
DRAWN:	SCALE: NTS
STD. No. 1.13-05	



NOTES:

1. 200mm GRANULAR 'B' COMPACTED TO 100% S.P.D. TO BE PROVIDED ONLY WHEN MAINTENANCE OR EMERGENCY VEHICLE ACCESS.
2. 100mm GATE SLEEVE RESTS ON 75mm# GALVANIZED POST.
3. ADD SPURS (LAGS) TO BOTH GALVANIZED POLES TO PREVENT THE TUBING FROM TURNING IN THE CONCRETE FOOTING.
4. FOR 6.0m EMERGENCY ACCESS / WALKWAY TWO (2) STANDARD BOLLARD GATES ARE REQUIRED.
5. ALL SWING GATES TO BE INSTALLED ON RIGHT-HAND SIDE AT ENTRY AND AT LEAST 2500mm IN FROM SIDEWALK EDGE OR 6000mm IN FROM CURB EDGE.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

NO.	REVISION	APR'D	DATE



TOWNSHIP OF TAY
VEHICLE ACCESS / PEDESTRIAN
WALKWAY GATE

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.13-06



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1.14 Easements and Blocks

1.14.1 General Requirements

The Township shall require conveyance of easements or dedication of blocks, without consideration, free and clear of all liens and encumbrances and shall not be part of parkland dedication calculations, to the minimum width requirements, or greater as determined by the Director of Development Services.

All construction and maintenance shall be done in a safe expedient manner with restoration to be in keeping with the adjacent land use. Under normal conditions, notice shall be given to the owner of the land indicating nature and duration of the construction and/or maintenance.

Unless otherwise stipulated, an easement or block shall be granted to The Corporation of the Township of Tay by a proper legally registered document being sufficiently prepared and the easement or block being particularly described to allow registration in the Land Registry Office for the County of Simcoe. In the case of easement, the document shall define the reasons for extending the grant-of-easement.

Easements or Blocks of land shall not be considered as part of parkland dedication requirements as required by the Planning Act.

1.14.2 Easement Width Requirements

Subject to specific conditions required by the Township, the width of an easement shall be a minimum of 6.0m or twice the depth of the pipe at its deepest point, whichever is greatest. Additional easement widths may be required depending on the critical depth of swales proposed.

- Easements for underground services shall be located on one side of the common lot line between adjacent lots and shall not straddle common lot lines.



- Rear and side yard swale easements designed to convey external or Township drainage shall be centered over the common lot line between adjacent lots.
- Buildings, including footings or building extensions, shall not encroach the limits of Township easements.

1.14.3 Block Conveyances

Block Conveyances may be required for, but not limited to the following reasons:

- Rear and side yard piped storm drainage systems, including catch basins, French drains, maintenance holes and other appurtenances.
- Storm sewers, watermain and sanitary sewers (other than private connections).
- Where underground services are required beyond the limits of a subdivision or site plan.
- All overland flow routes, open channels, and defined drainage systems accommodating a major storm.
- Walkways and bicycle paths.
- Valleys, streams, open channels, watercourses (whether flowing or intermittent), seepage areas, wetlands, natural bodies of water and floodplain lands identified by the Township as being environmentally significant requiring protection or designated as hazard or open space lands.
- Stormwater management facilities, including, but not limited to: detention/retention ponds, Low Impact Development (LID) features, infiltration facilities which are to be owned and operated by the Township.
- Fire and Emergency Services access to road sections, parklands, recreational areas, etc.

1.14.4 Block Width Requirements

Blocks of land shall be of sufficient dimension to accommodate the proposed facility, access from a public right-of-way and maintenance requirements.

The minimum width of blocks of land for open drainage channels shall be the width of the top of



open channel plus 7.5 m along one side of the channel for maintenance requirements.

Valley lands (crest of slope to crest of slope) may be contained within blocks of land to be conveyed to the Township, as a condition of development. Blocks in this case shall include 3.0 m platform widths at the top of slope and on both sides.

1.14.4.1 Storm and Sanitary Sewer Mains

The minimum width of blocks for storm and sanitary sewers shall be in accordance with the following:

<u>Size of Pipe</u>	<u>Depth of Invert</u>	<u>Minimum Width of Block</u>
250 to 375 mm	3.0 m maximum	6.0 m
450 to 675 mm	3.0 m maximum	6.0 m
750 to 1500 mm	3.0 m maximum	6.0 m
1650 mm and up	4.0 m maximum	4.0 m plus 3 times O.D. of pipe

Where two pipes are to be located on one block, the minimum width of block shall be the width of block required for the larger of the two pipes plus 1/2 the width of block for the smaller pipe, rounded to the next 1.0 m increment. Additional block width may be required to ensure adequate separation between the two pipes and a minimum separation of 3.0 metres between the block limit and the nearest pipe.

1.14.4.2 Storm Connections for Rear Yard Catch Basins

The minimum width of blocks for leads to rear yard catch basins shall be 5.0 m for pipe sizes ranging from 250 mm to 450 mm in diameter. For pipe sizes greater than 450 mm, the above criteria shall apply. The lead shall be centred on the block.

1.14.4.3 Watermain

The minimum width of blocks for watermain shall be in accordance with the following:



<u>Size of Pipe</u>	<u>Depth of Invert</u>	<u>Minimum Width of Block</u>
Up to 600 mm	3.7 m maximum	6.0 m
675 mm and up	3.7 m maximum	9.0 m

1.14.4.4 Fire and Emergency Services

- The minimum width of Blocks for Fire and Emergency Services shall be minimum 6.0m. with 12.0m centre line turning radii as required and a length of minimum 90m or as per the Ontario Building Code, whichever is greater.
- The Block shall be graded and hard surfaced sufficient to allow for year-round access and maintenance of Fire and Emergency Services vehicles.
- The Block shall be fenced for its full length with no encumbrances.
- Constructed in conformance with 1.4.10 Cul-De-Sacs (Std. Dwg. 1.4-04).

1.14.5 Grading Plans for Blocks

Shall be drawn to a scale of 1 to 500 or larger showing existing contours established from field elevations.

The grading plans shall indicate but not be limited to the following:

- existing contours and elevations within the plan and at a minimum distance externally far enough to determine the existing drainage pattern. In addition to the above, grading plans for parks are to indicate existing contours at 0.5m intervals along with all existing trees, structures, watercourses, etc.
- proposed contours for grading within large blocks and parks
- any other points necessary to give proper picture of the proposed drainage scheme including tops of catchbasins, bottoms of swales and top and bottom of retaining walls



- percent road grades for all roads within the development and the distance of the particular grade shall also be included.
- overland flow routes.
- easements including dimensions and descriptions
- fencing and retaining walls
- drainage types in accordance with typical details
- cut off swales and catchbasins to intercept interim block drainage and external drainage
- areas of engineered fill
- proposed driveway entrances, streetlight poles, hydro transformers, underground utility vaults, CATV and Bell pedestals, fire hydrants and valves.

1.15 Landscaping / Streetscaping

1.15.1 General Requirements

The developer is required to prepare Landscape and Streetscape Plans, prepared by a qualified Landscape Architect, to be approved by the Township on a site by site basis.

Due to varying Lot Configurations, the planting design shall address the many variations in lot configurations. The required spacing of trees and minimum setbacks allows that most lots shall have two (2) trees, some may only have one (1) and some may have none.

In general, at least two trees shall be planted in front of each single-family dwelling, semi-detached unit, and townhouse block. A minimum of two (2) trees shall be placed along the flankage side of each corner lot.

Trees shall be placed so that its mature form shall not conflict with other essential services and functions.



Because the presence of utilities, community mail boxes and the curb can interfere with the preferred placement of street trees, the street tree planting scheme shall be flexible enough to accommodate on-site adjustments.

Detailed Cost Estimates shall be required for all approved Landscape / Streetscape Plans. This estimate shall be used for security purposes.

All plans shall be consistent with the Township of Tay Development Engineering Policies, Process and Design Standards and shall require Township approval prior to implementation.

1.15.2 Tree Planting Requirements

Once driveways, utilities and light standards have been installed, the exact location of street trees shall be determined on site by the Landscape Architect and approved by the Township prior to planting.

The Developer is responsible to plant trees on each lot, 2.0 m from property lines and abutting the development, in accordance with the specifications established pursuant to the Subdivision Agreement. No trees/plantings are to be located on Township road allowances. Should an exception be requested, the location and type(s) shall be confirmed with the Township.

Minimum clearances for Street Trees:

- 2.0m from the backside of the curb
- 3.0m from water hydrants
- 3.0m from driveways
- 3.0m from neighbourhood mailboxes
- 3.0m from fences
- 3.0m from hydro transformers



- 5.0m from streetlight poles
- Behind the daylight triangle as per Section 1.4.8 and /or the Geometric Design for Ontario Highways
- 18.0m from face of all warning and regulatory signs

1.15.3 Timing of Landscape / Streetscape Planting Works

All trees shall be placed during either the spring or fall dormant season in unfrozen soil.

1.15.4 Quality and Source

All boulevard trees shall be #1 quality nursery grown stock, 2.25 m. to 4.0 m. in height with a minimum trunk diameter of 50 mm. measured at a minimum of 1.0 m. above ground level. All trees shall be free from physical damage, insects, pests, and diseases and shall have at least three quarters of the root system intact.

1.15.5 Landscape Plans

The Landscape Plans shall be prepared by a qualified Landscape Architect.

The Landscape Plans shall be drawn and stamped by a Full Member of the Ontario Association of Landscape Architects.

All Landscape Plans shall be drawn at a minimum scale of 1:500.

Landscape Plans shall show all landscaping details as required by the Site Plan Agreement. A schedule of plant species and sizes shall be identified on Landscape Plans.

All maintenance holes, catch basins, hydrants, valves, streetlights, and other servicing features that appear above grade shall also be shown on the Landscape Plans.

The Landscape Plans shall include but not limited to the following drawings:

- Existing Natural Features Assessment;



- Tree Survey/Vegetation Analysis;
- Tree Preservation Plan and Details;
- Streetscape and Buffer Planting Plans and Details;
- Detailed Parkland Development Plans and Details;
- Trails Development and Details;
- Landscaping Restoration Details;
- Stormwater Management Facility Planting Plan;
- Lighting Plans;
- Planting Plans.

The Developer may request jointly obtaining a Landscape Architect with the Township (all costs are to be borne by the Developer).

1.15.6 Streetscape Plan

The Streetscape Plan shall show the following:

- existing trees and natural features to remain;
- building envelopes, driveways, and sidewalks;
- walkways, trails, and easements;
- required fencing including privacy, acoustic and chain link;
- proposed plantings;
- location of streetlighting;
- location of public utility boxes and easements and hydrants;
- heights of existing and proposed retaining walls, fences etc.

Planting / Construction details shall be required for all landscape elements to be implemented as part of the development.

All Landscape / Streetscape and Stormwater Management Facility Planting Plans shall require Township approval prior to implementation of the plans.



Developers are required to display approved Landscape plans at the sales pavilions for the homebuilders in any new subdivision.

The following notes pertaining to layout requirements and are to be included on all Landscape / Streetscape and Naturalization Submission Drawings:

NOTE 1: Depicted on this plan are the species and the approximate location of street trees. Once driveways, utilities and light standards have been installed, the exact location of street trees shall be staked on site by the Landscape Architect and approved by the Township prior to planting.

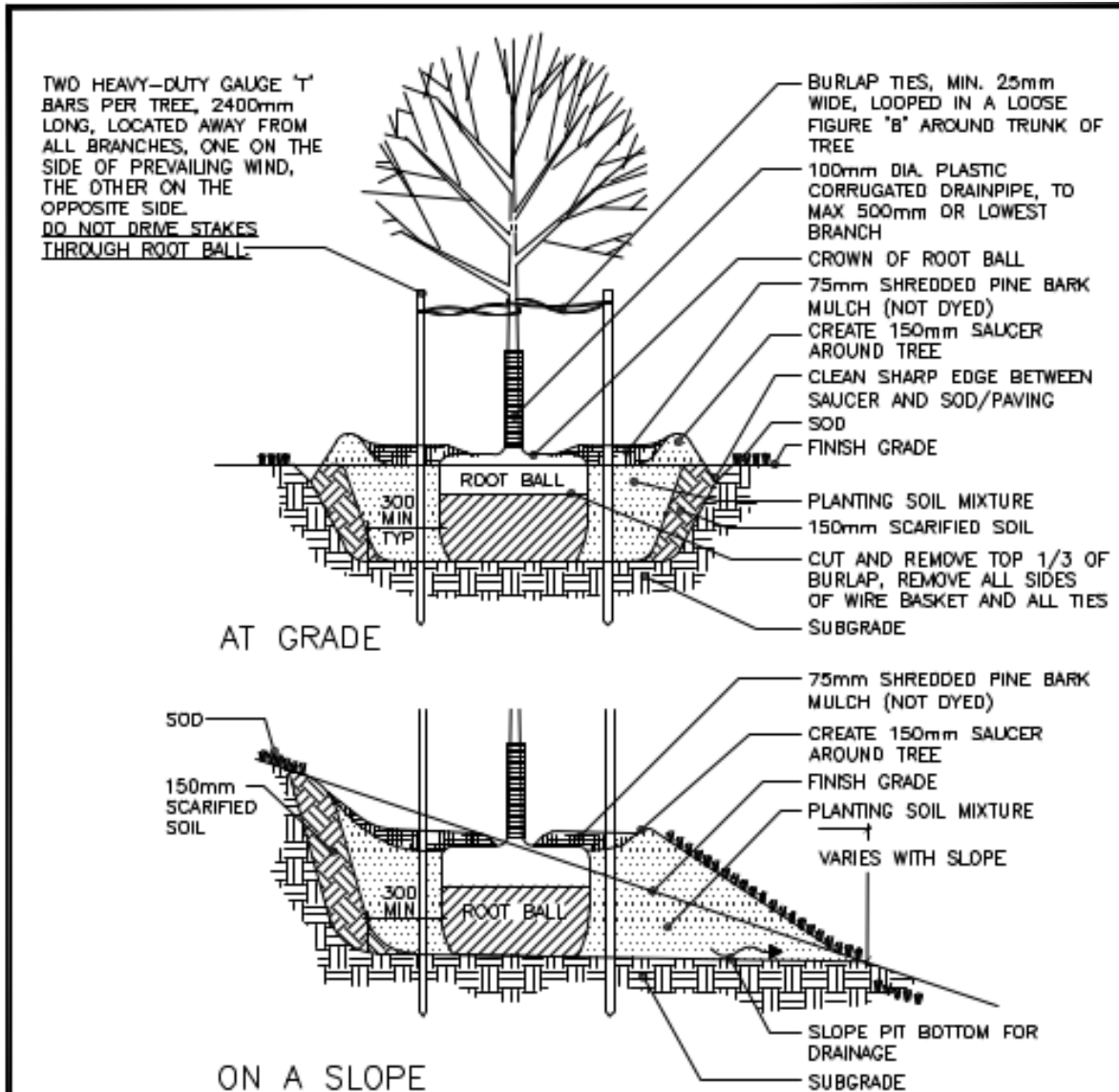
NOTE 2: The tree pits and planting beds for all trees and shrubs located within 2.0 m of underground utilities are to be hand dug.

NOTE 3: All plant material shall conform to the Canadian Standards for Nursery Stock and shall be guaranteed until Final Acceptance and Assumption of the subdivision works by the Township.

NOTE 4: All plantings and hard landscape features are to be staked out on site and approved by the Landscape Architect and Township prior to installation. Any deviations from the approved Landscape Plan(s) require Township approval.



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NOTES

1. DO NOT ALLOW AIR POCKETS WHEN BACKFILLING.
2. POSITION CROWN OF ROOT BALL 50mm ABOVE FINISH GRADE TO ALLOW FOR SETTLING.
3. DO CORRECTIVE PRUNING TO RETAIN NATURAL FORM OF TREE AS DIRECTED BY THE LANDSCAPE ARCHITECT.
4. FOR TREES PLANTED WITHIN PLANTING OR SHRUB BEDS, DELETE SAUCER AROUND BASE OF TREE.
5. ALL DIMENSIONS ARE IN MILLIMETRES.
6. NO TREE PITS SHALL BE LEFT OPEN OVERNIGHT.

NO.	REVISION	APR'D	DATE



TOWNSHIP OF TAY

DECIDUOUS TREE PLANTING

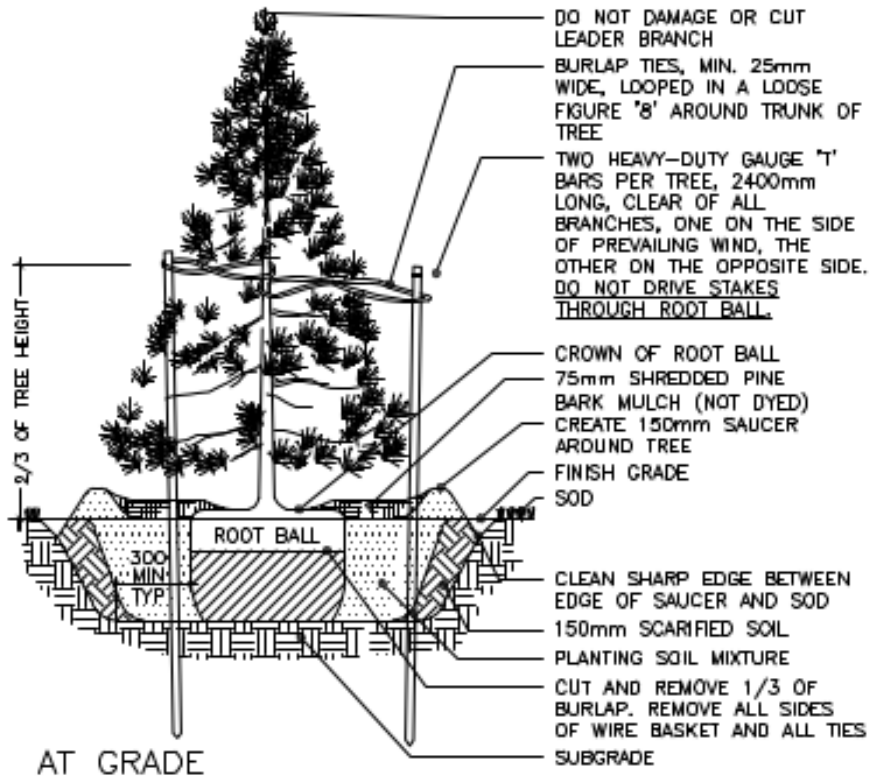
APR'D:	DATE: 07/2023
DRAWN:	SCALE: NTS

STD. No. 1.15-01

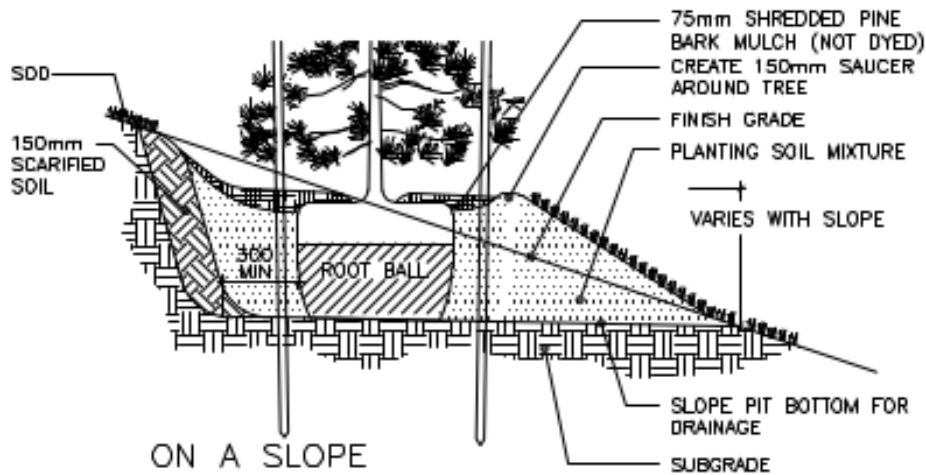


NOTES

1. DO NOT ALLOW AIR POCKETS WHEN BACKFILLING.
2. POSITION CROWN OF ROOT BALL 50mm ABOVE FINISH GRADE TO ALLOW FOR SETTLING.
3. FOR TREES PLANTED WITHIN PLANTING OR SHRUB BEDS, DELETE SAUCER AROUND BASE OF TREE.
4. ALL DIMENSIONS IN MILLIMETRES.
5. NO TREE PITS SHALL BE LEFT OPEN OVERNIGHT.



AT GRADE



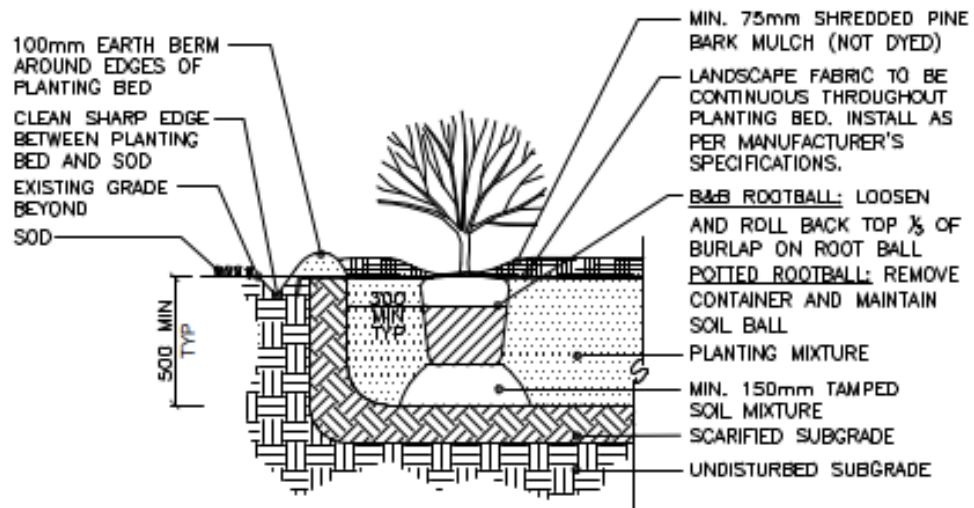
ON A SLOPE

NO.	REVISION	APR'D	DATE

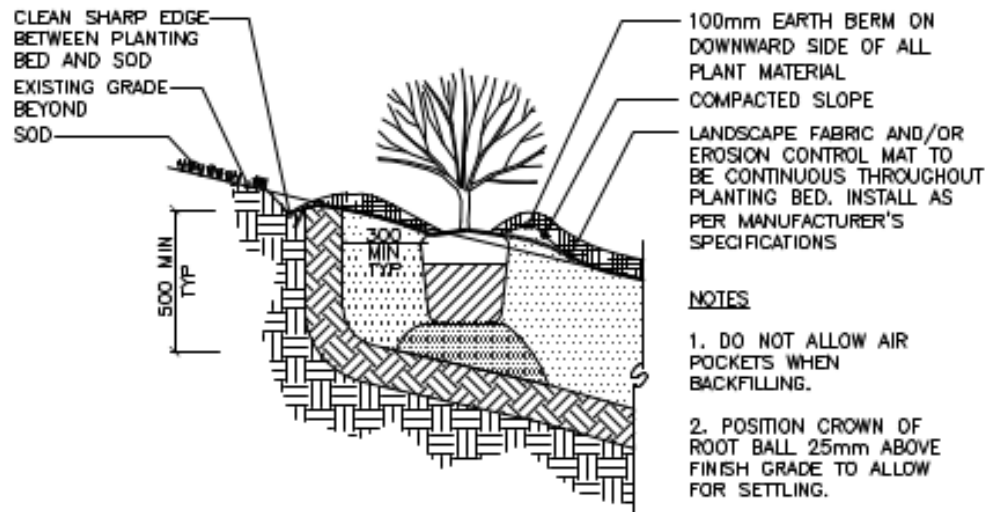


TOWNSHIP OF TAY
CONIFEROUS TREE PLANTING

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS
STD. No. 1.15-02



TYPICAL SHRUB PLANTING



PLANTING ON 3:1 SLOPE DETAIL

NOTES

1. DO NOT ALLOW AIR POCKETS WHEN BACKFILLING.
2. POSITION CROWN OF ROOT BALL 25mm ABOVE FINISH GRADE TO ALLOW FOR SETTLING.
3. ALL DIMENSIONS IN MILLIMETRES.

NO.	REVISION	APR'D	DATE



TOWNSHIP OF TAY

SHRUB PLANTING

APR'D: DATE: 07/2023
DRAWN: SCALE: NTS

STD. No. 1.15-03



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1.16 Parkland Development

The Parkland Development Plan shall be approved by the Director of Operations and Community Services prior to construction of works within the Parklands.

Final Acceptance and Assumption of all Parkland shall be signed-off by the Director of Operations and Community Services prior to Assumption

1.16.1 Services

The Developer shall provide to the satisfaction of the Township, a water service connection, sanitary sewer lateral connection and storm sewer lateral connection to the street line for the park, if required by the Township. Metering requirements for water service connections shall be confirmed with the Township.

Where required by the Township, underground primary or secondary electrical cables shall be placed from the road allowance to designated locations within parkland.

1.16.2 Grading

- Parkland shall be fine graded in accordance with the approved grading plan.
- Care shall be taken to avoid damage to trees or features that are to remain.
- All graded areas shall be covered with a minimum of 150 mm of screened topsoil and shall be seeded and fertilized in accordance with the specifications of the Parkland Development Plan.
- All topsoil stripped from parklands shall remain on-site and not removed or sold. All park blocks less than 0.4 ha. shall be sodded on 150 mm of topsoil.
- All stones and debris shall be removed and disposed of by the Developer prior to the seeding or sodding of a park.
- The Developer shall provide chain link fencing along park boundaries or walkways as



required by the Township.

- Building materials or equipment or debris shall not be stored on Parkland
- Stripped topsoil from other areas of the development shall not be stockpiled on Parkland.

1.16.3 Timing of Construction

All park blocks shall be graded and seeded or sodded within one year of the completion of the base course asphalt road construction in the area adjacent to the park. Seeding shall be carried out during the desirable months for seeding of May or September. Boulevard grading and sodding on road allowances adjacent to parklands shall be completed at the same time as the park seeding.

1.16.4 Maintenance

The Developer shall be responsible for the maintenance, watering, fertilizing, and mowing of the parklands to Township Standards until Final Acceptance and Assumption.

1.16.5 Parkland Development Plan Drawings

The Developer shall be responsible to prepare a detailed Parkland Development Plan for approval by the Township, for all lands to be dedicated for park purposes.

This plan shall show all existing trees and features that are in conformity with the end use of the park and that are to remain. All other trees shall be removed by the Developer subject to Township approval.

Prior to preparing the Parkland Development Plan(s), the Developer shall meet with the Director of Operations and Community Services and other Township staff as required to review Township recreational needs, i.e. soccer pitches, ball diamonds, playground equipment, benches, gardens, signage, etc.



The Parkland Development Plan may require greater detail beyond a grading and utilities servicing plan, depending on the size and complexity of the Parkland Development.

The Parkland Development Plan shall be prepared at a scale of 1:500 and form part of the approved Engineering Drawings, indicating the following, at a minimum:

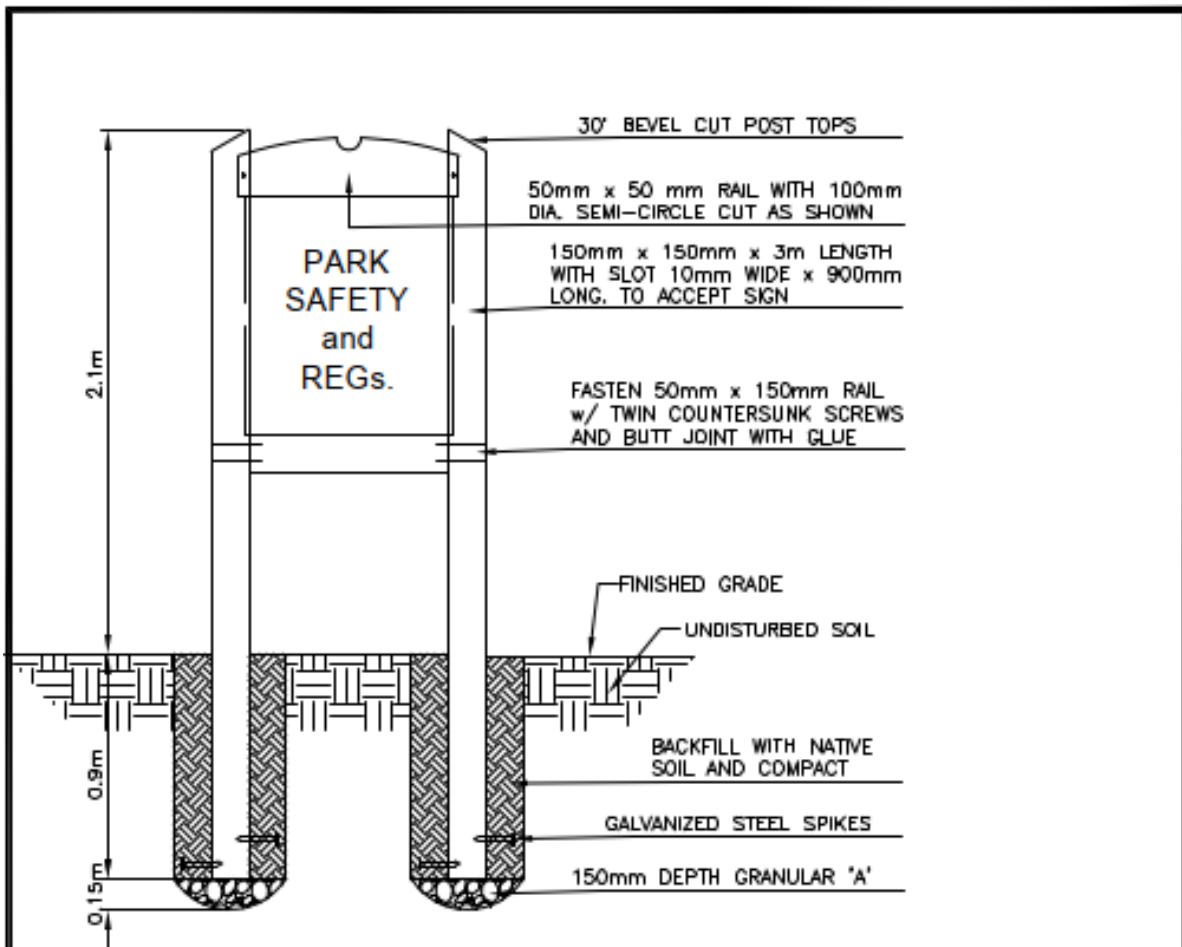
- existing contours at maximum 0.5 m intervals
- drainage structures and direction of overland drainage
- species and size of existing plant material to remain and be protected
- species and size of plant material to be removed
- proposed underground services
- layout of all proposed recreation facilities
- layout of parking lot and spaces (including handicapped parking)
- layout of all trails
- proposed site amenities including benches, bike racks, trash receptacles, signs, washrooms, playground equipment
- perimeter fencing
- park lighting
- all surface treatments
- all proposed plant materials

The Developer may be required to design and construct some or all of the items identified in the Parkland Development Plan.

A Parkland Development Plan Cost Estimate based on estimated quantities with corresponding unit prices is required along with the Parkland Development Plan drawing submission.



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NOTES

1. ALL HARDWARE TO BE HOT DIPPED GALVANIZED.
2. ALL WOOD TO BE SANDBLASTED RED CEDAR.

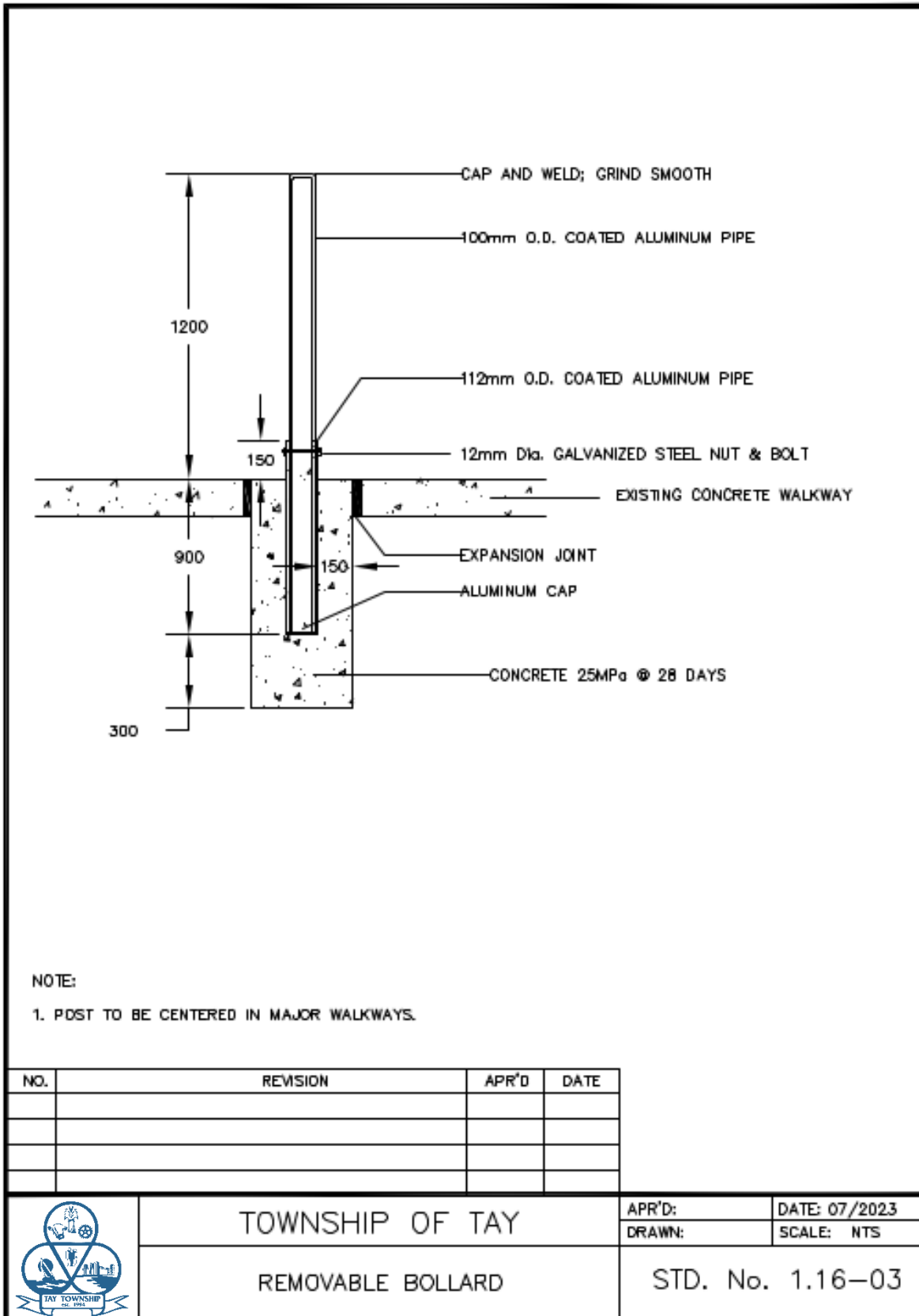
TOWNSHIP of TAY
Operational Services

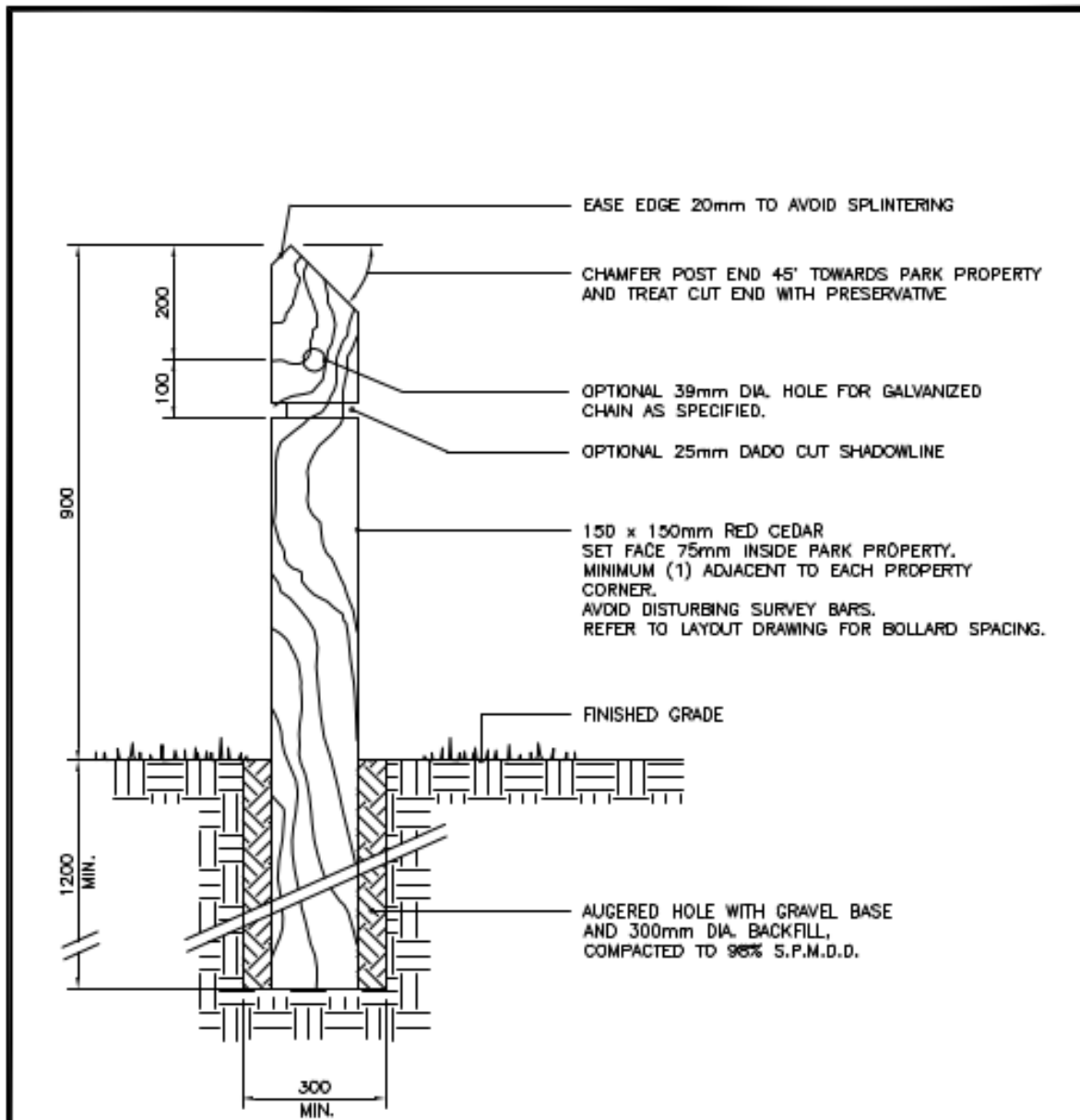
STANDARD PARK SIGN

- * For illustration purposes only.
- * Sign Panel, Lettering, Post Colours and Township Logo colour scheme to be confirmed with Recreation and Community Services prior to placement of any Park signage.

NO.	REVISION	APR'D	DATE
1	Operational Services		07/23

	TOWNSHIP OF TAY	APR'D:	DATE: 07/2023
	PARK SAFETY & REGULATION SIGN	DRAWN:	SCALE: NTS
		STD. No. 1.16-02	





NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

NO.	REVISION	APR'D	DATE

	TOWNSHIP OF TAY	APR'D:	DATE: 07/2023
	TIMBER BOLLARD	DRAWN:	SCALE: NTS
		STD. No. 1.16-04	



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1.17 Standard Detail Drawings and General Notes

The Township of Tay Standard Drawings, Standard Details and General Notes shall be utilized whenever applicable.

The use of the latest revision of the Ontario Provincial Standard Drawings may be utilized as specified in this document or when approved by the Township.

These drawings shall be reproduced as part of the engineering drawings for the development and shall be referred to by number on the affected plan and profile drawings.

The Developer's Consulting Engineer shall be responsible to check the suitability of the details provided on these Standard Detail Drawings and General Notes for the application proposed.

Individual details shall be provided by the Developer's Consulting Engineer for all special features not covered by the Township of Tay Standard Drawings.

These special details shall be drawn on standard sized sheets and shall be included as part of the engineering drawings.

The minimum scale to be used for special maintenance holes or sewer details shall be 1:25.



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	NO. 1 2	REVISION Manager of Engineering Operational Services Department	APR'D	DATE 07/23 07/23	TOWNSHIP OF TAY STANDARD DETAILS SHEET	APR'D: DRAWN: DATE: 03 / 2016 SCALE: NTS
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TYPICAL SWM POND MAINTENANCE ROAD SECTION

NTS

TYPICAL SIDE INSULATION DETAIL

NTS

TYPICAL ENTRANCE DETAIL

NTS

TOWNSHIP of TAY
Operational Services Department

TYPICAL STANDARD DETAILS

The "Typical Details" shown in this drawing are for illustration purposes ONLY. Actual design, manufacturing specifications and other details are to be constructed and in design and correct installation.



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1.18 As-Constructed Drawings

The As-Constructed drawings constitute the original engineering drawings that have been amended to incorporate the construction changes and variances in order to provide accurate information on the works as installed in the development.

The As-Constructed Drawings shall be submitted, prior to the Final Acceptance and Assumption of the subdivision, by the Township.

These drawings shall show the location both horizontally and vertically of everything, which is on, and under the lands to be accepted by the Township.

These drawings shall be sealed and signed by a Registered Professional Engineer and stamped As-Constructed and dated.

The Township may perform spot checks of elevations and locations.

Should the Township find major differences, the As-Constructed drawings shall be returned to the Developer's Consulting Engineer to be corrected.

NOTE 1: The As-Constructed submission shall include a list of substantive grades, invert and material changes for ease of review.

NOTE 2: The As-Constructed digital drawing file shall be georeferenced.

The standard coordinate system for Tay is Universal Transverse Mercator (UTM) Zone 17 with the North American Datum 1983 (NAD83). The drawing units for all features in the file shall be in metric, set to metres and un-scaled (1:1).

NOTE 3: The As-Constructed digital drawing file shall be circulated to the



Environmental Services Department in the above noted form for inventory of linear infrastructure purposes.

NOTE 4: Drawings shall be supplied in the standard hard copy format shall conform to the most recent AutoCAD requirements found in the Township Standards.

1.18.1 As-Constructed Field Survey

The As-Constructed revisions shall be based upon a final survey of all the subdivision services and the Developer's Consulting Engineer's construction records. The final survey of the subdivision services shall include a field check of the following items:

- Location and invert elevations of all sewer maintenance holes.
- Distances between all sewer maintenance holes.
- Location of all roadway catch basins.
- Location, rim and invert elevations for all rear yard and lot catch basins.
- Location of all sidewalks and curbs.
- Location and ties to all valve boxes and valve chambers.
- Location of all hydrants.
- Location to all special watermain appurtenances (i.e., blow offs, etc.)
- Road centreline elevations.
- Site benchmarks.
- Location of all service connections to all lots and blocks and location of connection from nearest downstream maintenance hole (i.e. 0 +023).
- Storm and Sanitary Sewer pipe sizes and percentage grades.
- Location of all fencing constructed as part of the subdivision services.
- Streetscape / Landscape / SWM Pond and Naturalization plantings.
- Parkland Development Plan.



Locations of the applicable street furniture described above shall also include swing ties to three fixed reference points and dimensioned on the As-Constructed drawings.

1.18.2 Drawing Revisions

The original drawings shall be revised to incorporate all changes and variances found during the field survey and to provide the ties and additional information to readily locate all underground services.

All sewer and road grades are to be recalculated to two decimal places.

All Street line invert elevations of storm and sanitary house connections to each block shall be noted on the drawing.

All road names, lot numbering and block identification shall be checked against the Registered Plan and corrected if required.

The As-Constructed revision note shall be placed on all drawings in the revision block. The title sheet of the Engineering Drawings shall be clearly marked **As-Constructed**.

1.18.3 Submissions

Upon completion of all construction work and the As-Constructed revisions, the original drawings shall be submitted to the Township for their permanent records.

The submission of the As-Constructed drawings and digital format to the Township shall be completed before Final Acceptance and Assumption of the subdivision shall be granted.

The Developer's Consulting Engineer shall provide a written declaration to the Township stating that the As-Constructed works represented in the As-Constructed Drawing set are in accordance with the terms of the Subdivision Agreement, approved Engineering Drawings prior to Final Acceptance and Assumption being granted.



1.18.4 Tolerances

A maximum vertical plotting tolerance of 0.2 m on the 1:50 vertical profile portion of the drawings and a maximum horizontal plotting tolerance of 1 metre on the 1:500 scale drawing shall be considered acceptable without replotting.

The information shown on the As-Constructed drawings may be checked by the Township at any time up to two years after Final Acceptance and Assumption of the subdivision and if discrepancies are found between the information shown on the drawings and the field conditions, 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-Constructed data and to provide verification that alteration does not adversely affect the design of the subdivision services.

NOTE 1: All Sanitary and Storm Sewer lengths are to be shown to the nearest 0.5 m.

NOTE 2: If the As-Constructed grade of either the Sanitary Sewer or Storm Sewer differs by more than 1% of the design grade, the Developer's Consulting Engineer shall submit revised hydraulic calculations.

1.18.4.1 Storm Sewers

All actual storm system invert elevations shall be indicated on the As-Constructed drawings. If the difference is greater than 150 mm from the design vertical alignment, affected portions of the sewer or overland drainage route shall be redrawn in profile. Any maintenance hole which differs from the proposed horizontal location by more than 1.50 m shall be redrawn in both plan and profile.



In addition, the following shall be indicated on the As-Constructed drawings:

- pipe/culvert size, grade, type, class;
- chainage from MH along main to service tees.

1.18.4.2 Sanitary Sewers

All actual sanitary sewer invert elevations shall be indicated on the As-Constructed drawings. If difference is greater than 150 mm from the design vertical alignment, affected portions of the sewer shall be redrawn in profile. Any maintenance hole which differs from proposed horizontal location by more than 1.50 m shall be redrawn in both plan and profile.

In addition, the following shall be indicated on the As-Constructed drawings:

- pipe size, grade, type, class;
- chainage from MH along main to service tees;
- dimensions from lot corners and elevations for service laterals.

1.18.4.3 Watermain

All actual watermain obvert elevations at 30 m intervals shall be indicated on the As-Constructed drawings.

If the difference is greater than 150 mm from design vertical alignment, affected portions of the watermain shall be redrawn in profile.

If horizontal alignment changes exceed 1.0 m the affected portions of the watermain shall be redrawn in plan.

In addition, the following shall be indicated on the As-Constructed drawings:

- pipe size, type, class
- swing ties to all main appurtenances (valves, bends, tees, etc.)
- chainage from appurtenance along main to main stops



- swingties from lot corners to the curb stop valve box and the invert elevation of each curb stop

1.18.4.4 Roadways

All actual roadway centre line elevations, at a maximum 20 m interval, shall be indicated on the As-Constructed drawings. Gutter elevations shall be indicated for cul-de-sacs and intersections to show drainage into storm system. If horizontal road alignment changes more than 1.0 m or vertical geometry changes greater than 150 mm the plan and/or profile shall be redrawn as appropriate.

In addition, the following shall be indicated on the As-Constructed drawings:

- driveways, lay-bys, curb depressions
- road signage
- lane marking and stop bar locations



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THE CORPORATION OF THE TOWNSHIP OF TAY



LOT GRADING PROCEDURE

Revised: 2025

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Section 3.0 – Preparation of the Lot Grading and Drainage Plan
Section 4.0 – Outside Agencies
Section 5.0 – Design Criteria
Section 6.0 – Mandatory General Notes
Section 7.0 – Grading Deposit and Release
Section 8.0 – As-Built Lot Grading / Certification
Section 9.0 – Maintenance

APPENDIX A: Example Lot Grading/Drainage Plan
APPENDIX B: Lot Grading/Drainage Plan Review Checklist
APPENDIX C: Lot Grading/Drainage Certification Check List
APPENDIX D: Lot Grading /Drainage Plan Certificate

Section 1.0 – Introduction

When a structure is constructed or altered, it is essential that the lot be graded properly to ensure that surface drainage is directed away from the structure such that it does not adversely affect the neighbouring properties including Private, Municipal, County or Provincial roadsides or their lands. It is also important that the structure elevation be such that there is no risk of hydrostatic pressure acting on any of the components.

Section 2.0 – Requirements

The Township of Tay requires that all lots for which a building permit application has been made to construct, raise or in some cases add to an existing structure have a Lot Grading/Drainage Plan if they meet the following requirements:

1. New dwellings
2. Sheds, garages, additions, or similar that are Greater than 50 m²

A building permit application will not be accepted without the Lot Grading/Drainage Plan **and** a completed Lot Grading/Drainage Plan Review Checklist (Appendix B).

A building permit will **not** be closed until the Engineer Lot Grading sign off (if applicable) is received and accepted by the Engineering Department.

It is the responsibility of the owner/applicant seeking a building permit to determine if this procedure applies to their specific proposed construction prior to submitting the building permit application.

Entrance Permits may be required as part of the Building Permit Application

No Entrance Permit is required if:

- The dwelling is part of a New Unassumed Plan of Subdivision *or* there is a current Permitted Existing Entrance.

Section 3.0 – Preparation of the Lot Grading and Drainage Plan

With the submission of a building permit application, the Owner/Applicant shall submit two copies of the Proposed Lot Grading/Drainage Plan and one copy of the Lot Grading/Drainage Plan Review Checklist (Appendix B) to the Township for acceptance.

An approved Lot Grading/Drainage Plan designer must meet one of the following qualifications: Certified Ontario Land Surveyor (**OLS**), Professional Engineer (**P. Eng.**), a Landscape Architect (**OALA**) or a Certified Engineering Technologist (**C.E.T.**) qualified in grading and drainage design. They shall design the Plan so that it conforms to all requirements of this Procedure.

It is the responsibility of the Lot Grading/Drainage Plan designer to notify the Township prior to finalizing the Lot Grading/Drainage Plan if drainage issues are a concern within a Township of Tay public right of way. If deemed necessary by the General Manager of Operational Services or their designate, the applicant for a building permit may be required to provide additional reports justifying unusual drainage conditions and or conditions in support of the building permit applications prior to the issuance of the building permit. The report(s) shall be prepared by an individual qualified and experienced in the works required.

Recommendations with the report(s) shall also make provision for any extra works required and as deemed necessary by the General Manager of Operational Services.

Section 4.0 – Outside Agencies

If the subject property falls within a Ministry of Transportation Highway Corridor or a County of Simcoe Road Corridor, any necessary approval permits will be required from the Ministry of Transportation or County of Simcoe prior to the issuance of a building permit.

The following are MTO and County Roadways and will need the respective permit approvals:

MTO:

Hwy 12

Hwy 93

Simcoe County:

Vasey Road

Old Fort Road

Section 5.0 – Design Criteria

All Lot Grading/Drainage Plans must include:

The signature and seal of an Ontario Land Surveyor, Professional Engineer, Landscape Architect or Certified Engineering Technologist (C.E.T.) qualified in grading and drainage design is required, indicating the means by which the Owner/Applicant will ensure that the subject lot is to be properly graded and drained, and does not adversely affect neighbouring properties including Private, Municipal, County or Provincial lands.

The Lot Grading/Drainage Plan Review Checklist (Appendix B) is to be completed by the Owner's Lot Grading/Drainage Plan designer and a copy of the checklist is to be included in the Lot Grading/Drainage Plan submittal package.

Each Lot Grading/Drainage Plan must include the following:

1. A north arrow shall be shown. All drawings received shall be to scale, Metric 1:200 or 1:250 and drawn in ink. **Freehand drawings will not be accepted.**
2. Name of street, civic address, lot number and registered plan, plus sufficient detail to describe the location in the Title Block
3. The distances around the perimeter of the property are to be labeled.
4. The location of the buildings, existing and/or proposed, with distances to the property line including proposed setbacks.
5. The location of all sump pump and other drainage discharge points.

6. All elevations should be to Geodetic Datum where possible. If not possible then the point of reference (Temporary Benchmark), which is to be identified, shall be a fixed object in the immediate area.
7. Identification of existing elevations on the road, ditch, boulevards, curbs, subject lot and adjoining lands. Sufficient existing grades on adjacent properties must be shown to indicate the drainage pattern.
8. The existing grade elevations at all lot corners and significant changes in grades along property lines shall be clearly indicated. Indicate the proposed grade elevations at all corners of the structure, property lines and particularly at each corner of the lot and include on proposed elevation in the centre of the sewage system envelope.
9. Provide a Structure Elevation Table, which specifies the following proposed elevations:
 - a) Top of Finished First Floor
 - b) Top of Garage floor (if applicable)
 - c) Top of Foundation Wall
 - d) Top of Basement Slab (or any other slab-on-ground, shall be a minimum 400mm above "estimated seasonal high groundwater table elevation")
 - e) Underside of Footing
 - f) The estimated seasonal high groundwater table elevation
10. No structures(s) with habitable living area located adjacent to Georgian Bay shall be located closer than 15 meters of the 178.0 m G.S.C elevation and have any structure opening below the 178.5 m G.S.C. elevation.
11. When reasonably possible, the perimeter elevation of the proposed structure must be at least 300mm higher than the edge of adjacent municipal road.
12. Swales shall be located entirely within the limits of the lot and shall match existing grades at the lot lines, unless part of subdivision plan, then common swales between properties as indicated on the subdivision's overall site grading plan.
13. Swales and slopes must be detailed with sufficient information to show the direction of drainage and the amount of slope. The minimum gradient for all rear and side yard swales shall be 2% with a minimum depth of 150mm. A 1% minimum gradient will be considered where there are soil conditions that allow infiltration.
14. Drainage flows shall be directed away from all structures at a minimum distance of 5.0 meters at a minimum grade of 2%.
15. Any sediment and erosion control measures deemed necessary to prevent migration of silt and sediment from the subject lot to any adjacent lot, including municipal and/or public right-of-ways shall be indicated on the Lot Grading/Drainage Plan and shall be implemented and maintained by the owner. Special care shall be taken to ensure that silt and sediment laden surface water does not enter any watercourses or environmentally sensitive areas, either overland or through the storm drainage system.

16. Interim grading measures may be required during construction to ensure that drainage does not adversely affect the neighbouring properties. Rough grading of the property shall be completed such that drainage is contained on site or controlled to a positive outlet.

17. In many areas within the Municipality, the municipal drainage systems are limited or non-existent. As such the lot grading design must consider ways and means to keep any increase in surface water run-off from the subject site to a minimum, utilizing acceptable surface water retention techniques. In areas where positive storm drainage is not available within the Municipal Road Allowance the property Owner may be required to provide a soak away pit and/or grade the boulevard to a sufficient outlet to the satisfaction of the Director of Public Works in such a way that ponding does not occur on the paved surface of the road.

18. Where a retaining wall or other similar structures are proposed on the property, it shall be shown complete with top and bottom of wall elevations and material. Retaining walls are not to encroach onto Municipal property. Retaining walls along lot lines shall be constructed wholly within the subject lot. The Ministry of Natural Resources and the Department of Fisheries and Oceans must be contacted to determine if approval is required for construction of retaining walls adjacent to Georgian Bay.

19. Minimum driveway grade shall be 2% and shall not exceed a maximum grade of 8%, measured from the garage or dwelling face to the edge of roadway pavement.

20. Where landscaping improvements are proposed adjacent to the driveway (i.e. driveway edging), driveway edging must be flush with the driveway surface (and back of curb, if applicable) property line to the edge of pavement/curb-line. Where sidewalks exist along the frontage of the property, driveway edgings must be flush with the driveway surface for a minimum of 600mm beyond the back of sidewalk.

21. Proposed Septic area to be identified on plan including elevation.

22. New Entrance included on drawing

23. Overhead Wires identified

24. Fence and Swales, where applicable

Section 6.0 – Mandatory General Notes

The following general notes are to be included on every drawing:

1) "Sediment and erosion control measures shall be implemented to prevent migration of silt and sediment from the subject lot to any adjacent lot, including municipal or public right-of-way. Special care shall be taken to ensure that silt and sediment laden surface water does not enter any watercourses or environmentally sensitive areas, either overland or through the storm drainage system. The Owner/Builder/Applicant shall comply with all directives issued by any applicable environmental agency".

2) "Interim grading measures may be required during construction to ensure that drainage does not adversely affect the neighbouring properties. Rough grading of the property shall be completed such that drainage is contained on site or controlled to a positive outlet".

3) "All downspouts, sump pump and other drainage discharge points shall discharge on to a splash pad or approved equivalent".

4) "The Owner/Builder/Applicant is responsible for obtaining utility and servicing locates prior to any works".

5) "This Lot Grading/Drainage Plan has been designed/completed such that Municipal, County and Provincial lands adjacent to or in the vicinity of this lot are not affected".

6) "A copy of the "Accepted for Municipal Purposes" Lot Grading/Drainage Plan is to be on site for reference at all times during construction".

7) If there is an overall lot grading plan in existence for the lot (i.e., part of a registered subdivision) then the following clauses must be included:

"This Lot Grading/Drainage Plan is in conformance with the overall lot grading plan for this subdivision"

8) If there is not an overall lot grading plan in existence for the lot then the following clauses must be included:

"This Lot Grading/Drainage Plan has been designed/completed such that surface drainage (water) from the lot will not adversely affect neighbouring properties".

9) "The structure elevations have been set such that there is no risk of hydrostatic pressure affecting the structure"

10) Foundation is required to be clearly marked as per Lot Grading Plan for inspection

- Property Bar must be set as control elevation

Section 7.0 – Grading Deposit and Release

A Grading Deposit of three thousand (\$3,000) per lot must be provided with all applications to ensure the Township receives a satisfactory Lot Grading/Drainage Plan Certificate indicating satisfactory completion of the grading and drainage works.

Upon receipt of the Lot Grading/Drainage Plan Certificate by the Operational Services General Manager and provided all criteria of this Procedure have been met, the Owner/Applicant may apply in writing for the release of the Grading Deposit, without interest.

Tay Township will not release the Lot Grading Deposit without the certification of completion and final inspection.

Once Tay Township has received the certification of completion for the Lot Grading, Tay Township's Engineering Department will complete a final inspection.

These inspections require the ground and grade to be visible, (weather dependent), and as such, may be delayed in winter months.

The Grading Deposit will only be released to the person who paid/posted the deposit, minus any deductions from damages, where applicable.

Section 8.0 – As-Built Lot Grading / Certification

The Township and their agents are provided with the authority/power of entry onto the lands for the purposes of lot grading review.

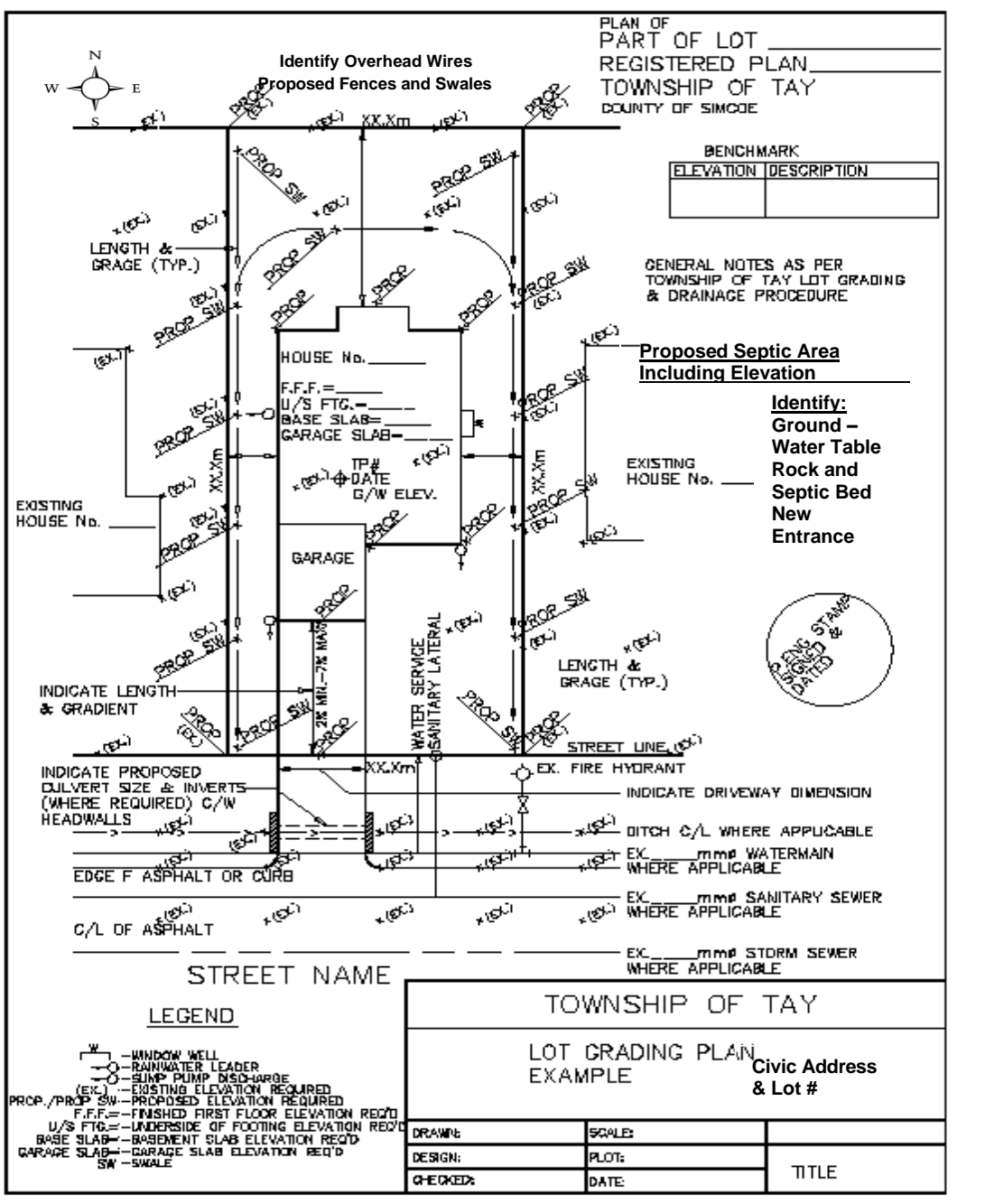
Upon completion of site grading and prior to landscaping, including fencing, the Owner/Builder/Applicant shall be required to submit the Lot Grading/Drainage Plan Certificate, which has been certified by the Lot Grading/Drainage Plan designer to the Operational Services Department. The Lot Grading/Drainage Plan Certificate will confirm that the lot grading, drainage works, and structure elevations have been completed in conformance with the design prepared by the Lot Grading/Drainage Plan designer

Section 9.0 - Maintenance

It is anticipated that some backfill settlements may occur over several years after construction, and as such, it is the responsibility of the Owner to repair any settlements in order to maintain positive drainage away from the structure at all times.

Sump pump discharge shall be installed on all buildings related to the approved Lot Grading/Drainage Plan. It is also the responsibility of the Owner to maintain all downspouts and to ensure that no subsequent modifications to the grading of the lot are made which will adversely affect the drainage of adjacent properties.

APPENDIX A
EXAMPLE
LOT GRADING/DRAINAGE PLAN



**APPENDIX B
LOT GRADING/DRAINAGE PLAN REVIEW
CHECKLIST**



Tay Township Building Department

Lot Grading/Lot Drainage Plan Review Checklist

Owners Name & Lot Location: _____

Company: _____

Phone Number: _____

Contact Person: _____

Email Address: _____

The following list of items is the minimum requirements for review and acceptance of the lot grading/drainage plan. Plans not meeting these requirements will be deemed incomplete and returned. *This checklist must be completed and submitted by the Lot Grading/Drainage Plan designer as part of the plan submittal package. Any items which do not apply to the project must be marked N/A (Not Applicable).*

- Plan Size: Ledger or Standard A1
- New Entrance Identified on plan
- Plan Scale: Metric 1:200 or 1:250
- North arrow
- Lot location information including Street Name and Legal Description
- Location of existing and proposed buildings, including existing site features such as fence etc.
- Location of all sump pump and other drainage discharge points
- Swales located within limits of lot
- Geodetic elevations or temporary benchmark
- Existing elevations of road, ditch, boulevards, curbs and adjacent properties
- Existing elevations of all lot corners and significant changes in grade along property line
- Structure Elevation Table to include
 - Finished first floor
 - Garage floor
 - Top of foundation wall
 - Top of slabs on grade
 - Underside of footing
- Engineer, if required, has sealed the plans (See section 7.0)
- Proposed elevations at all corners of house, Property line and centre of the sewage system envelope.
- Minimum 2% grade away from structures at minimum distance of 5.0m.
- Review available storm drainage of the road
- Swales minimum 2% grade and 150mm deep
- Reduce surface run-off where appropriate
- Driveway culvert shown and labeled with material, size, length and inverts
- Driveway grade to be between 2% and 8%
- Driveway to conform with any applicable Township of Tay requirements
- Driveway edging flush from EOP/ curb to P/L
- General Notes as per section 6.0 of the Infill Lot Grading/Drainage Procedure
- Grading along property lines matches any previously submitted plans for adjacent properties or approved subdivision lot grading plan
- Test pit includes HGWL ESHGWL, and date measured
- Setbacks of all proposed and existing structures to property lines
- Slab on grade minimum 400mm above ESHGWL
- Environmental controls shown

APPENDIX C
LOT GRADING/DRAINAGE CERTIFICATION
CHECK LIST



450 Park Street

Victoria Harbour, ON L0K 2A0
Tel: 705-534-7248 Fax: 705-534-4493

Tay Township Building Department Lot Grading/Lot Drainage Certification Checklist

Owners Name & Lot Location: _____
 Company: _____ Phone Number: _____
 Contact Person: _____ Email Address: _____

The following list of items is the requirements for review and acceptance of the lot grading/drainage. Plans not meeting these requirements will be deemed incomplete and returned. This checklist must be completed and submitted by the Lot Grading/Drainage Plan designer as part of the plan submittal package. Any items which do not apply to the project must be marked N/A (Not Applicable).

Please Review and Mark Checklist	<u>YES</u>	<u>NO</u>	<u>N/A</u>
1. Lot grading plan attached			
2. Pre-sod grade check was determined to be satisfactory			
3. Sod or alternative ground cover has been placed and sufficiently established.			
• Front yard and boulevard (sod only)			
• Side yards (Sod or approved alternative ground cover)			
• Rear yard (Sod or approved alternative ground cover)			
4. Final grades have been verified and comply with lot grading plan			
• Apron/garage floor			
• Lot corners			
• Side yards			
• Grade breaks			
• Top of foundation wall			
• Underside of footing			
5. All swales are well defined			
6. Splash pads have been placed at all roof leaders and sump pump			
Discharges			
Finished grades are minimum 150mm (6") below cladding			
No settlements			
7. The drainage has not adversely affected surrounding properties			
8. The as built lot grading conforms to the approved design			
○ If grading does not conform to approved design,			
○ As- built drawing is attached for review			

**APPENDIX D
LOT GRADING/DRAINAGE PLAN
CERTIFICATE**

TAY TOWNSHIP SAMPLE

Consultants Letterhead to Be Used

Date:

The Township of Tay
Operational Services
450 Park Street
P.O. Box 100
Victoria Harbour
Ontario, L0K 2A0

Attention: General Manager of Operational Services

Dear Sir:

RE: Municipal Address _____
Lot or Block No. _____
Registered Plan No. _____
Certification of Final Lot Grading

Based on an actual field survey completed on (date) it is my professional opinion that the grading on the above property is consistent with all the grading requirements indicated on the lot grading plan. I hereby certify that:

1. All adjacent properties are not negatively impacted
2. Where rainwater roof leader downspouts and sump pumps discharge onto concrete splash pads, the locations and outlets are in accordance with the approved lot grading plan.
3. The lot grading is in conformity with the submitted and approved grading plan.

Sincerely,

Name of Design Firm
Signature of Designer
Name of Designer

(Stamp and Seal by design professional)



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Engineered Lot Grading - Plans of Subdivision

The grading of all lots and blocks in new developments / plans of subdivision shall be carefully monitored by the Developer's Consulting Engineer in order to provide sites that are suitable for the erection of buildings and to provide satisfactory drainage from all lands within the development. In this regard, the design of the grading for all developments shall be of primary concern to the Township and the following criteria shall be used in the preparation of all LG Plans for new development in the Township.

Should an LG Plan for Lots within an Unassumed Plan of Subdivision, be designed by a qualified professional other than the Developer's Consulting Engineer, the Developer's Consulting Engineer shall review and sign-off on the design prior to submission of said design to the Township for review and approval.

All lot drainage shall be in conformance with the Stormwater Management Report, overall Subdivision Grading Plans and Township Standards. The Developer's Consulting Engineer shall be responsible for ensuring the grading of lots is completed to the satisfaction of the Township.

Infill Development – Urban / Settlement Areas / Rural

Including: Reconstruction / Additions / Detached Structures / Septic Systems

Infill Development shall be deemed to be:

- a) Residential Development occurring outside of an active Plan of Subdivision
- b) Residential Development of lands governed by a Subdivision Agreement
- c) Residential Development of lands not governed by a Subdivision Agreement
- d) Residential Development within a Settlement Area or Lots created by Consent

NOTE: Subject to the provisions contained in this section Infill Development – Urban / Settlement Areas / Rural shall comply with the remainder of



Section 1.19 for Design and Detail Standards where applicable.

Waterfront / Shoreline Development Area

Including: Reconstruction / Additions / Detached Structures / Septic Systems

No structure(s) with habitable living area located adjacent to Georgian Bay shall be closer than 15 metres of the 178.00 m Geodetic Survey of Canada (G.S.C) elevation or have any structure opening below the 178.50 m G.S.C. elevation.

Waterfront / Shoreline Development Area residential development shall be deemed to be:

- a) Residential / Recreational Waterfront development of lands.
- b) Residential / Recreational development of lands contained within an identified Shoreline Residential Area.

NOTE 1: Subject to the provisions contained in this section Waterfront / Shoreline Development Area construction shall comply with the remainder of Section 1.19 for Design and Detail Standards where applicable.

NOTE 2: The Average Annual High-Water Mark of Georgian Bay (178.00 m G.S.C elevation).

Additional Requirements

The following requirements (but not limited to) shall be evaluated and included in the LG design for Infill and Waterfront / Shoreline Development:

- Finished grade elevations shall remain as close to original grade elevations as is practicable.
- Alterations to grades shall be designed and constructed such that no adverse effects result on the adjacent lot(s).



- Post-construction flows shall not exceed the flows for pre-construction conditions, unless demonstrated to the satisfaction of the Township that uncontrolled flows will not have adverse effects on adjacent properties or existing drainage patterns.
- The capacity and alignment of boundary swales shall not adversely affect adjacent properties.
- The maximum slope between dwellings for basement walkouts in any direction shall be 3:1 with a grade differential not exceeding 2.5 m.
- Identification of:
 - the location and direction of flow of watercourses within property boundaries.
 - the location of wetlands or floodplains within property boundaries.
 - Well locations shall be shown for adjacent lots where the proximity to the construction of on-site services may be a factor or may be affected.
 - Septic System locations shall be shown for adjacent lots where the proximity to the construction of on-site services may be a factor or may be affected.
 - Setback from the Average Annual High-Water Mark shall be delineated.

NOTE 1: If an existing drainage course (either seasonal or year-round) is located within the property then the location shall be shown on the Lot Grading Plan. Any change to or redirection of the existing drainage may require approvals by additional agencies and / or a consultant's report outlining the method of construction and the effect of the redirection.

NOTE 2: Where sanitary and water service connections are not already in place along the municipal road allowance and / or stubbed to the property lines, these services shall be installed by a Qualified Contractor and both inspected and witnessed by the Township's Operational Services Department at the Owner's / Applicant's expense. Connection locations shall be noted on the Lot Grading Plan.



NOTE 3: A Driveway Entrance Permit and / or Road Occupancy Permit allowing for access to a lot of record may be required should an approved entrance not already exist. Determination as to the location and width of the driveway, and culvert sizing shall be made by the Operational Services Department. Delineation of the Driveway Location, Grade and Culvert Location / Size shall be included on the Lot Grading Plan. *(See Entrance Permit on Page 246 of the Township of Tay Engineered Design Standards)*

NOTE 4: To prevent the migration of silt and sediment into watercourses and water bodies during construction, it is the responsibility of the Owner for the importation and stockpiling of fill material shall be accomplished such that material storage is protected by way of Silt and Sediment Control Measures including (but not limited to) silt fence, straw bales and appropriate stockpile locations of construction and landscape soils. Material shall not be stored in areas designated as floodplain or areas located within the Average Annual High-Water Mark as delineated on the Lot Grading Plan.

NOTE 5: Shoreline development including (but not limited to) docks, decks, stairs, boathouses and alterations to the natural landscape may require additional review or permits from other regulatory agencies.

Engineered Lot Grading Design

- The direction of storm water flow in swales shall be indicated with an arrow and percentage grades.
- Elevations are to be in relation to geodetic benchmarks or approved alternative.
- All easements, blocks and rights-of-way are to be indicated on plan.



- Any water course running through or abutting the proposed development including the identification of the regional storm water levels shall be shown.
- All lots identified with engineered fill shall have a notation indicating Engineered Fill on the proposed lot grading plan and the fill location(s) delineated.
- Lot Grading plans shall be stamped by the Developer's Consulting Engineer to confirm conformance with these criteria and the overall grading plans.
- Lot Grading plans shall be designed in such a way so as to preserve existing trees wherever possible.
- Front yards shall be graded to drain towards the road wherever possible.
- Rear to front lot grading is permitted preferred with a maximum of three rear lots out letting between any two lots.
- All boulevard areas shall be graded with a constant slope from the curb to the road limit (minimum slope to be 2%, maximum slope to be 5%) and all curb stops, maintenance hole covers, and valve boxes, etc. shall be set flush with the finished sod surface.
- Downspouts, sump discharge and swales shall not outlet to/overtop driveways or be directed to septic beds or septic tanks.
- All rear yard drainage shall be directed away from the houses in defined swales which outlet at the curb, sidewalk or a rear yard swales.
- Overland flow routes shall be provided for all rear yard catch basins which shall protect all structures in the event of catch basin blockage or a major storm event.
- Drainage within the proposed development limit is to be provided internally. Any proposed drainage over abutting / adjacent lands shall only be permitted in with express written agreement with the adjacent property owner(s) and is to be included as part of the subdivision agreement and legally registered.
- The grading along the limit of the proposed development shall be carefully controlled to avoid disturbance to the adjoining areas. In general, lot drainage shall be directed away from top of banks or valley slopes.



- The lot grading design shall include provisions for drainage conditions on an adjacent property that can be best resolved by permitting drainage through the proposed development. Express written agreement allowing for drainage provisions is to be included in the subdivision agreement and legally registered.
- All lot surfaces shall be constructed to a Minimum grade of 2.0%.
- A minimum of 5.0m abutting the rear of the house shall be graded at 2-7% slope.
- All lot surfaces shall be constructed to a maximum average grade of 12% (calculated from the difference in lot elevations between the rear wall of the house and property line - embankments included).
- Maximum slope between all terraces and embankments shall be 3:1 when the vertical difference does not exceed 1 metre and 4:1 when the vertical differences exceed 1 metre. Between successive terraces, an intermediate level area of at least 1.50 metres in width shall be provided.
- The maximum flow allowable to any side yard swale shall be that from the equivalent of three lots or 0.5 hectares, whichever is the lesser.
- The maximum area contributing to a rear yard swale that may be discharged directly onto a road allowance shall be the equivalent of three rear yards or 0.50 hectares, whichever is the lesser.

Swales providing internal drainage from each lot shall have:

- Minimum slope of 2.0%.
- Minimum depth of a swale shall be 150 mm. @ 3h:1v
- Maximum depth for a side yard and mid-yard swale shall be 450 mm. @ 4:1
- Maximum depth for a rear yard swale shall be 750 mm. @ 5:1
- The Maximum side slope on any swale shall be 3:1.
- Mid-yard Cut-Off Swales (typ. Rear to Front draining lots) shall be sized and located such as to capture and redirect flow away from residential structures.
- All drainage swales shall be located on lot lines unless the adjacent property is not



undergoing development. In such cases drainage swales shall be located entirely within the lot being developed. This applies predominantly to Lots being developed adjacent to previously developed Lots that are not included in the Plan of Subdivision or Lots being developed / re-developed as an Infill Lot.

- Each lot shall have at least one side yard with a maximum slope of 7% for 1.5 m continuous width from front to rear yard.
- The % grade around houses shall be a minimum of 2% away from houses from a point 150 mm below top of foundation wall or as required by the Ontario Building Code (OBC).
- Rear yard catch basins shall be eliminated wherever possible. When approved, rear yard catch basins and outlet pipes shall be located such that the outlet and the catch basin are located entirely on the same lot. In general, rear yard catch basins shall be located 2.0 metres from the lot lines.

Driveways

- Houses shall be sited and driveways located to maximize the amount of off-street parking available to the residence.
- Wherever possible, the driveways shall be on the higher side of the lot.
- Driveways shall be set back a minimum of 1.5 m from any tree or above ground Utility device (hydrants, hydro vaults, light standards, etc.).
- The maximum grade for driveways shall be 8% and the minimum grade shall depend upon the nature of the surface and not be less than 2%.
- Where sidewalks exist or are proposed, driveway grades are to be compatible with approved sidewalk grades.
- Driveway locations shall not extend past lot line projections within a right-of-way.
- Curb Stops, valves or hardware shall not be located within the driveway.
- Downspouts, sump pumps and drainage swales are not permitted as discharge outlets onto driveways.



- Driveway locations shall be in accordance with the approved Engineering Drawings.
- Driveways shall not be constructed over or within sewage envelopes.

For more information regarding driveways and culverts and minimum requirements, please refer to the Township of Tay website www.tay.ca

Sodding and Seeding

The subdivision shall be sodded / seeded according to the following:

- all swales, ditches, drainage easements, and slopes 10% or greater shall be sodded using 100 mm screened topsoil and No. 1 nursery sod;
- all residential lots shall have a minimum of 100 mm screened top soil and sod for the front yard and within 5.0m of the rear of the building
- hydro-seed application over a minimum of 100 mm screened top soil may be used as an alternative for the remainder of the rear yard.
- where the combined side yard between buildings is less than 3.0 m combined or 1.5 m on any one side, the surface treatment shall be 75 mm of clear stone over a vegetation suppressing geotextile.

Retaining Walls

Retaining Walls greater than 600mm in height are discouraged and shall be reviewed when the LG Plan design warrants.

Retaining walls shall be constructed according to the following:

- all retaining walls shall comply with the Township's Zoning By-law requirements
- where retaining walls are required to adjust grade elevations
- retaining walls shall be constructed on the higher lot such that the wall and tie-backs do not cross property lines
- all retaining walls are to be constructed **wholly on private property and only one property, and not on property to be assumed by the Township**



- a detailed drawing of the design (including but not limited to): location, property line(s), height of wall, tiebacks shall be submitted for approval. Construction details of retaining walls shall be included with the LG Plan and be approved by the Township of Tay.
- the maximum height of any retaining wall constructed on a property line between two (2) residential lots shall be 1.0 m in exposed height
- retaining wall height shall be measured from finished grade to the highest point of the wall.
- retaining walls constructed with an exposed face height of greater than 1.0 m in exposed height shall be constructed with a minimum distance of 2.0 m from the side or rear lot line.
- should the exposed height of a retaining wall exceed 1.0 m in exposed height at any point then the exposed height of the retaining wall shall be deemed to be 1.0m in exposed height for its entire length
- retaining wall design and construction of greater than 1.0 m in exposed height shall be certified by a Professional Engineer.

NOTE: If the retaining wall has an exposed height of greater than 1.0 m, and is adjacent to public property, access to a building, or private property to which the public is admitted, a building permit in accordance with the Ontario Building Code Act may be required.

Engineered Fill

Should the existing site conditions require the placement of Engineered Fill, the following provisions shall be adhered to:

- Prior to the submission of a Building Permit application, a Geotechnical Engineer shall certify that based on their field investigation, the compacted Engineered Fill is capable of safely sustaining an allowable bearing pressure as per the Ontario Building Code.



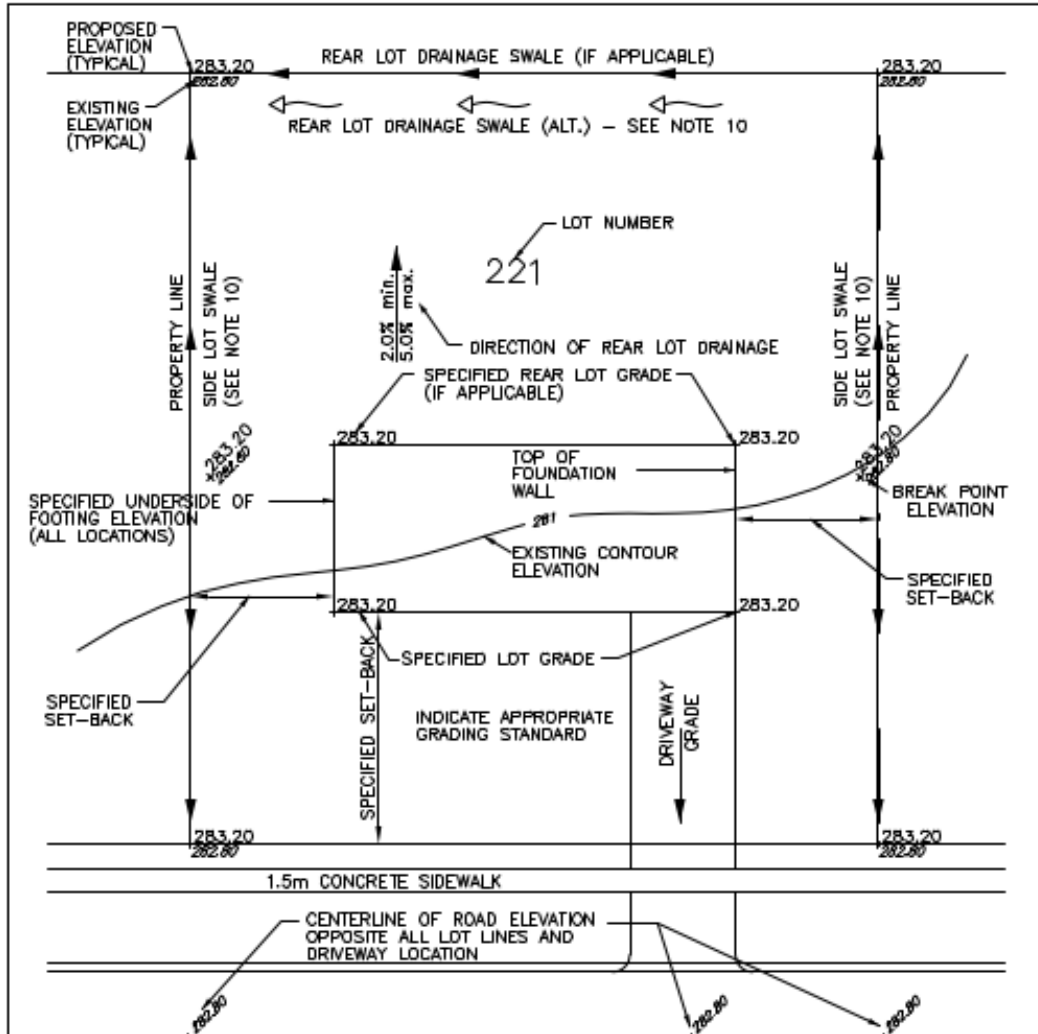
- The designer of the LG Plan shall clearly identify the proposed Engineered Fill envelope on the LG Plan.
- Prior to footings construction, the geotechnical consultant shall inspect the excavation and certify that the soil is the proper allowable bearing pressure.
- A copy of this inspection report shall be submitted to the Building Department prior to proceeding with footing construction
- All Engineered Fill shall follow and comply to the Township of Tay By-Law No. 98-43.



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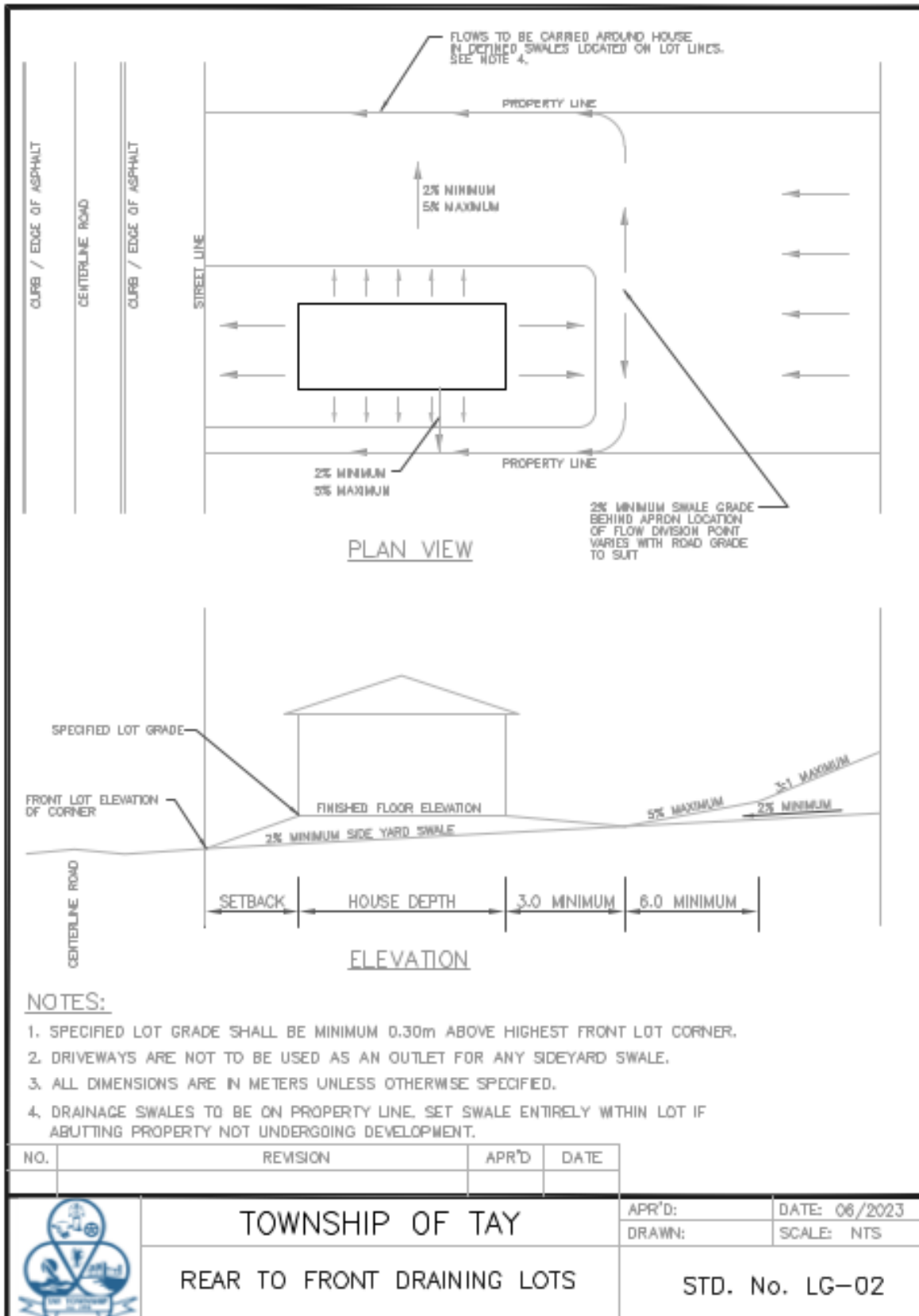
LOT GRADING TYPICAL DRAWINGS

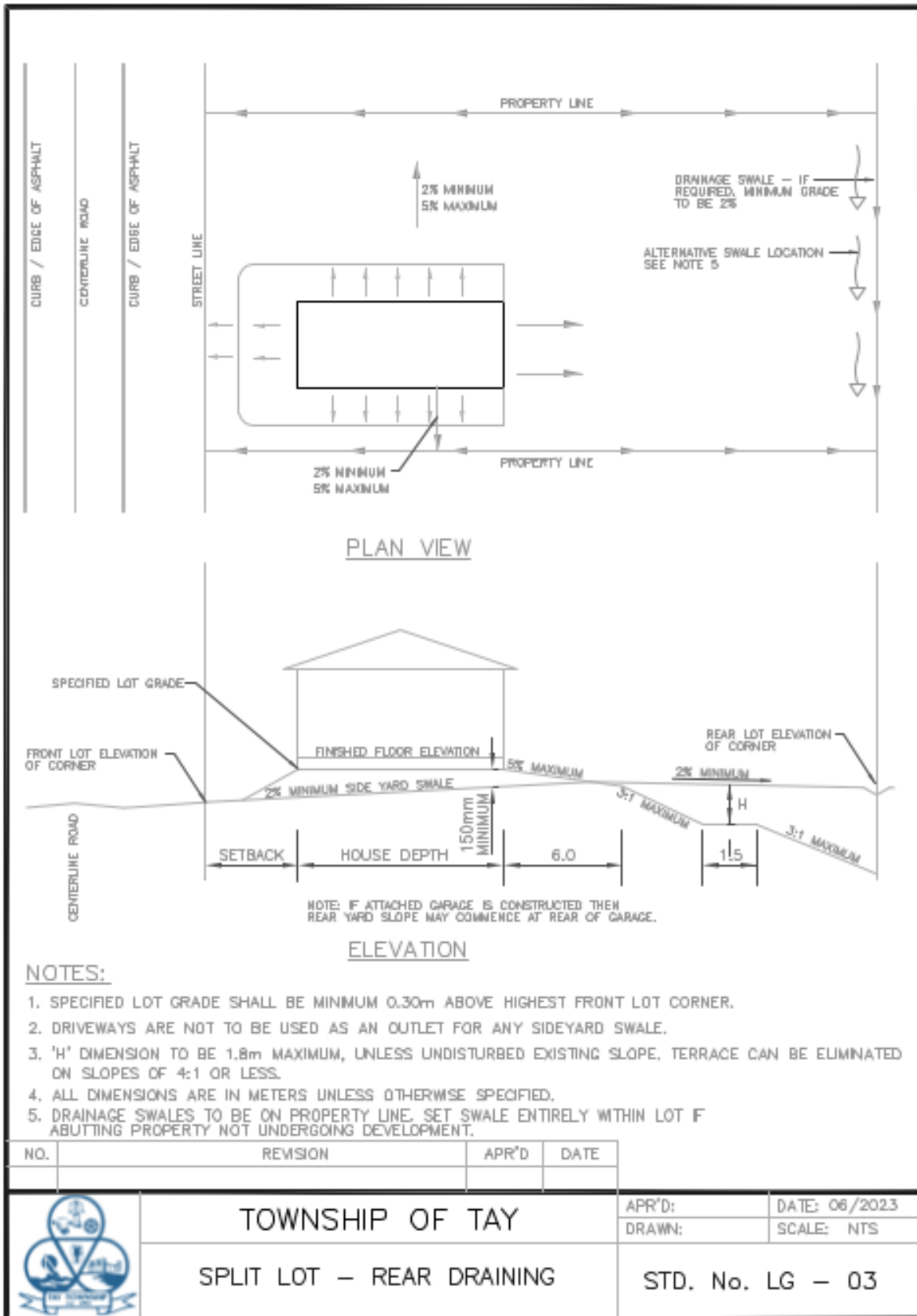


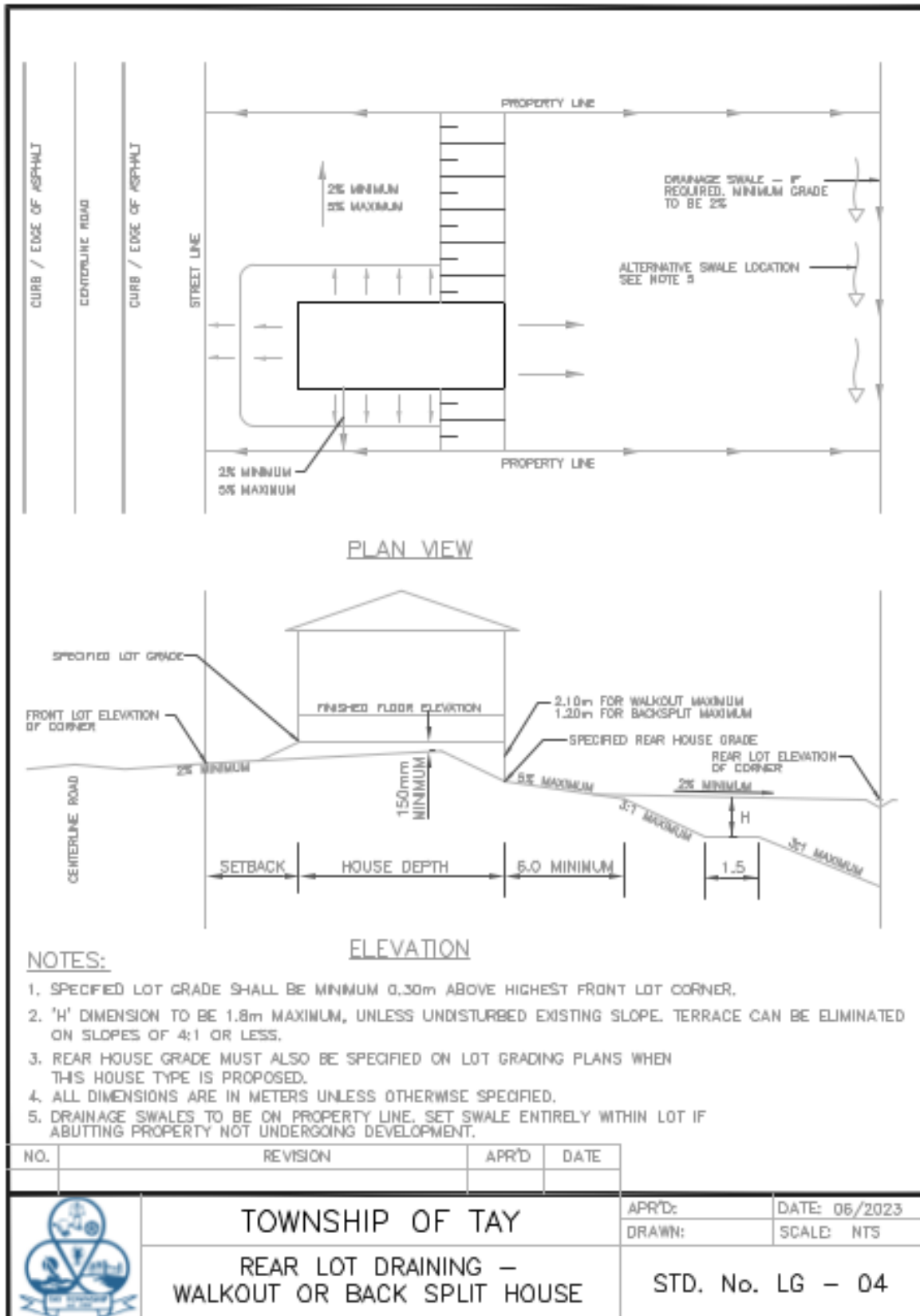
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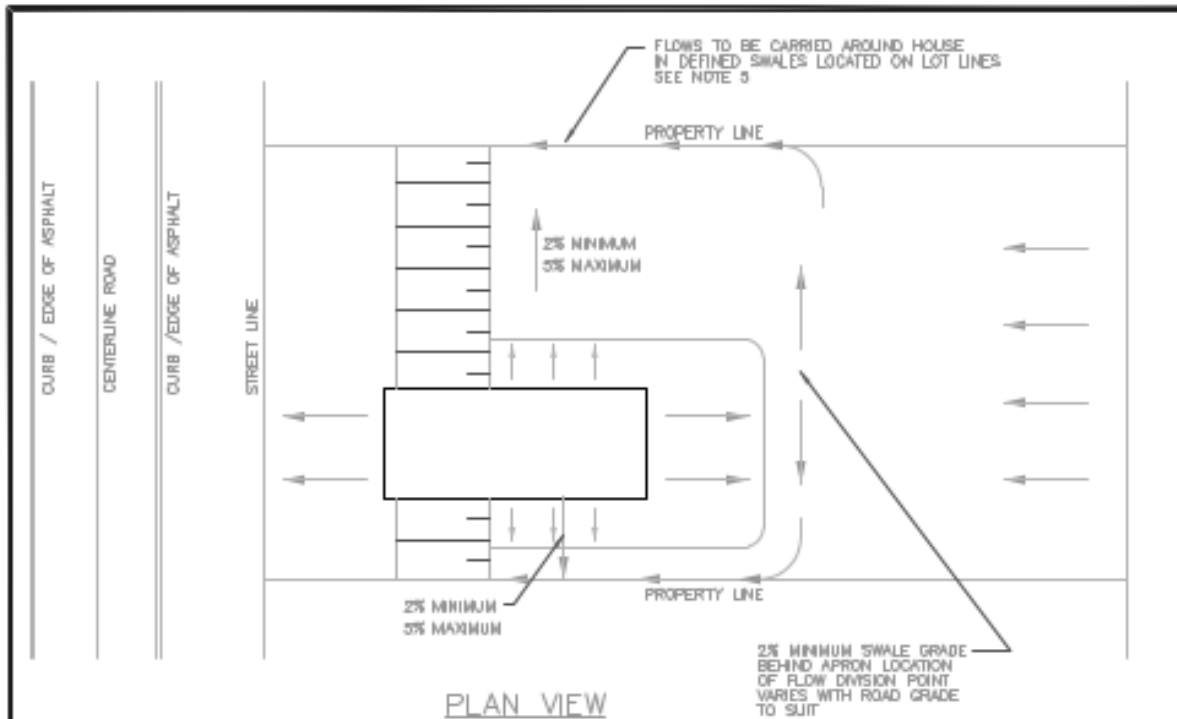
1. ALL CATCHBASIN LOCATIONS MUST BE SHOWN ON GRADING PLAN.
2. ALL EASEMENTS MUST BE SHOWN ON GRADING PLAN.
3. PROVIDE MAIN FLOOR AND BASEMENT ELEVATIONS.
4. SPECIFY PROPOSED GRADES ON SWALES.
5. IDENTIFY PROPOSED LOCATION AND DIMENSION OF SEPTIC TILE BED AND RESERVE BED AREA (WHERE REQUIRED).
6. PROVIDE REGISTERED PLAN NUMBER.
7. MAXIMUM DRIVEWAY GRADE TO BE 8%.
8. SHOW SERVICE LATERAL INVERT ELEVATION AT STREET LINE AND CURB STOP LOCATION (WHEN APPLICABLE)
9. SHOW ALL UTILITY INSTALLATIONS IN BOULEVARD.
10. DRAINAGE SWALES TO BE ON PROPERTY LINE. SET SWALE ENTIRELY WITHIN LOT IF ABUTTING PROPERTY NOT UNDERGOING DEVELOPMENT.

NO.	REVISION	APR'D	DATE
TOWNSHIP OF TAY TYPICAL LEGEND FOR LOT GRADING PLAN		APR'D:	DATE: 07/2023
		DRAWN:	SCALE: NTS
		STD. No. LG-01	

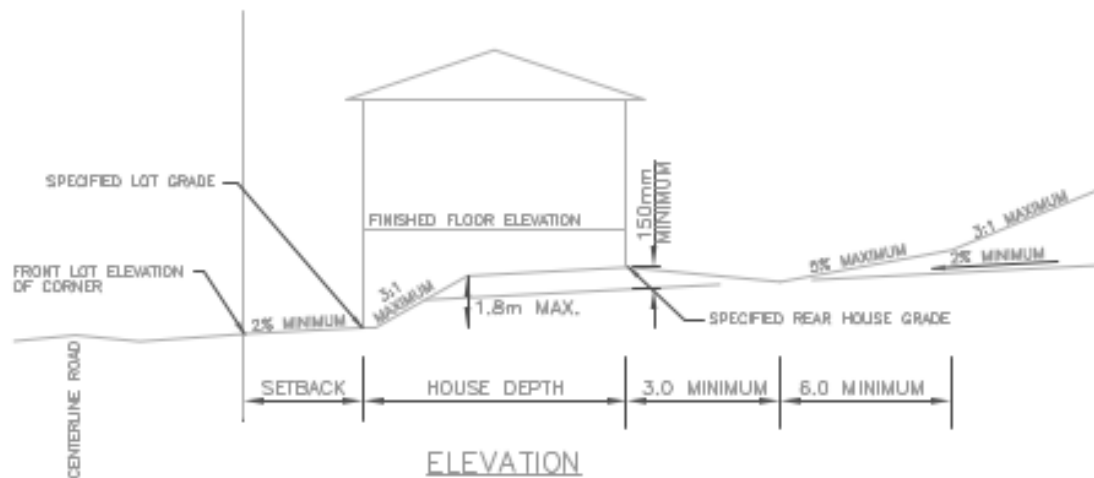








PLAN VIEW



ELEVATION

NOTES:

1. SPECIFIED LOT GRADE SHALL BE MINIMUM 0.30m ABOVE HIGHEST FRONT LOT CORNER.
2. DRIVEWAYS ARE NOT TO BE USED AS AN OUTLET FOR ANY SIDEYARD SWALE.
3. REAR HOUSE GRADE MUST BE SPECIFIED ON LOT GRADING PLANS WHEN THIS HOUSE TYPE IS PROPOSED.
4. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
5. DRAINAGE SWALES TO BE ON PROPERTY LINE, SET SWALE ENTIRELY WITHIN LOT IF ADJUTING PROPERTY NOT UNDERGOING DEVELOPMENT.

NO.	REVISION	APR'D	DATE



TOWNSHIP OF TAY
FRONT LOT DRAINING –
FRONT SPLIT HOUSE

APR'D:	DATE: 06/2023
DRAWN:	SCALE: NTS

STD. No. LG – 05



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1.20 Industrial / Commercial / Institutional Site Plan Design

1.20.1 Site Plan Agreement

The Developer of lands under Site Plan Control, as specified in the Township's Official Plan and Site Plan Bylaw, may be required to enter into a "Site Plan Agreement" with the Township prior to the commencement of construction of any building or service within the parcel of land. For all proposed site plan developments, the Developer shall secure site plan approval from the Township.

The Township is also responsible for the collection of revenue for water consumption and therefore the "metering" arrangement for the subject property shall be approved by the Township.

1.20.2 Submission and Site Inspection Requirements

The Developer shall retain a qualified Professional Engineer (Developer's Consulting Engineer) to prepare all engineering drawings and to supervise the construction of all engineering services (municipal or private water and sanitary services, grading and stormwater management works, roadwork within a ROW and retaining walls).

The Developer's Consulting Engineer shall act as the Developer's representative in all matters pertaining to the design and construction of the services in the development.

The Developer's Consulting Engineer shall be required to submit a Retainer Letter to the Township in the format included in these criteria outlining their duties and responsibilities.

The Developer's Consulting Engineer shall deal directly with other commenting Authorities, (i.e. County of Simcoe, Ministry of the Environment Conservation and Parks, Ministry of Northern Development, Mines, Natural Resources and Forestry, Department of Fisheries and Oceans,



Ministry of Transportation, County of Simcoe, Lake Simcoe Region Conservation Authority, Nottawasaga Region Conservation Authority, etc.) for works that fall within their respective jurisdictions.

Depending on the complexity of the proposed development, requirements of the above noted drawings may be combined, or waived, at the discretion of the Township.

Additional Site Plan drawings shall be prepared when requested by the Township. Prior to receiving a building permit, all plans shall be approved by the Township.

Supporting documents required as follows; Stormwater Management Report, Traffic Impact Study, Functional Servicing Report, Noise Attenuation Report, Hydrogeological Report, Floodplain Study, Environmental Impact Study, Natural Heritage Evaluation, Photometrics Plan and Archaeological Impact Study.

Should the site be located in an unassumed subdivision then the Developer's Consulting Engineer may be required to review and approve the Site Plan and Stormwater Management Report prior to Proponent's Site Plan submission to the Township. The Developer's Consulting Engineer shall certify that the site grading conforms to the approved Grade Control Plan, the overland flow route is maintained and that the allowable storm water release rate is not exceeded.

1.20.3 Drawing and Design Requirements

Drawings showing grading and the location, size, grade, invert elevations, material, and bedding requirements for all storm, sanitary and watermain service connections shall be prepared and submitted to the Township for approval. Engineering drawings shall also be prepared for all sanitary and storm sewers and watermain that are required to be constructed within road allowances or registered easements to service the subject property. These drawings are to be prepared to the Township requirements.



In each instance, the following Drawing Sets, Reports and Studies, and supporting calculations shall be required in digital form by way of a Township accepted electronic submission method:

Site Plan Drawing Sets, Reports and Studies:

- Site Servicing Plan *
- Site Grading and Drainage Plan * *
- Erosion and Sedimentation Control Plan * *
- Standard Detail Sheet
- Geotechnical Report
- Engineering Cost Estimate
- Architectural Elevations
- Electrical and Site Photometric Plan (As Required)
- Landscape Plan (As Required)
- Traffic Analysis (As Required)

Depending on complexity of the Site and Design Requirements:

1. Site Servicing Plans may include entrance and pavement details, fire routes, turning movements and other elements provided all of the design details are legible.
2. Site Grading and Drainage and Erosion and Sediment Control Plans may be condensed into one (1) drawing provided all design details are legible.

All Site Plan Drawings shall be prepared from one base plan prepared at a minimum scale of 1:500 and which shall contain some or all the following information:

- Stamp and Signature of the Developer's Consulting Engineer
- Municipal Address, Lot Numbers, and Registered Plan numbers
- A key plan at a scale of 1:10,000 showing the site location
- A North Arrow
- Details for the referenced Geodetic Benchmark used to establish vertical control and the



site benchmarks for construction

- Site statistics
- Property dimensions
- Road widenings and Restoration Notes
- Easements
- Vehicular loading and parking facilities
- The outline of all buildings with the building numbers and unit numbers indicated and garage locations within the unit
- Storage areas and enclosures for garbage and waste materials
- Fire routes, truck delivery and other large vehicle drive paths
- Location of Siamese Connections and/or Standpipes
- Sidewalks, Walkways and Ramps
- Proposed roadways / driveways and all points of access
- Sufficient detail on adjacent lands to ensure their protection
- Existing land features (trees, watercourses, roads, services, etc.)

In addition to the information above: Site Plan, Site Grading Plan, Site Services Plan, Drainage Area Plan, Elevation Plan, Erosion and Sedimentation Control Plan, Landscape Plan, Geotechnical Report, Traffic Analysis and Engineering Cost Estimate shall require specific details described below.

1.20.4 Site Servicing Plan and Design

The Site Services Plan shall show, at a minimum, the location, size, and grade (as applicable) of the following services and information:

- all existing underground services on roads / easements adjacent to the property
- storm and sanitary service connections with grade and invert information
- the basement and finished floor elevations of all proposed buildings



- storm, sanitary and watermain services with length, grade, material, and bedding requirements to be constructed within the development
- proposed sanitary and storm maintenance holes with invert and rim elevations
- hydrants, valves, and water meters within the development
- sanitary, storm and water service connections to individual units, as applicable
- roof water leaders and method of discharge
- adequate snow storage volume(s) and location(s)
- driveway location(s) / traffic flow directions
- Fire Route Location / Pavement Standard and Adequate Turning Radii
- all construction notes required to describe the construction detail or requirements
- the locations of prime and reserve tile-beds, including mantles (where required)
- proposed wells and septic beds to be decommissioned;
- illumination standards / description and photometric plan
- proposed landscape features

NOTE 1: Driveways shall be set back a min. of 3.0 m from any tree or above ground Utility device (hydrants, hydro vaults, light standards, etc.).

NOTE 2: All watermain shall be designed and constructed in accordance with the requirements of the Ontario Plumbing Code, N.F.P.A. 24 and Township Standards. The watermain design shall be submitted to the Township of Tay Fire Department for approval of the watermain layout and the hydrant locations. The provisions of the Ontario Water Resources Act may apply to the watermain works.

NOTE 3: All sanitary sewers shall be designed in accordance with the requirements of the Ontario Building Code and Township Design Criteria. The Ontario Water Resources Act, R.S.O., 1990, provisions may apply to sanitary and storm sewer works.



1.20.5 Stormwater Management

All storm sewers shall be designed in accordance with the requirements of the Ontario Building Code and the Township Design Criteria. The provisions of the Ontario Water Resources Act, R.S.O., 1990, may apply to sanitary and storm sewer works.

Stormwater management techniques shall be employed on all sites in accordance with requirements identified in this document.

All storm sewers shall be located within the limits of the roadway.

All storm sewer connections shall be sized according to the requirements of the Ontario Building Code (OBC) and shall be installed on a minimum grade of 2.0%.

Oil / Grit Separator Chambers are to be used to augment other measures for water quality treatment and are mandatory on sites. Oil / Grit Separator Chambers shall be placed in large parking areas, located adjacent to all fuelling areas, located where there is to be fuel and chemical storage location(s) or where there is to be a stormwater discharge within 30 metres of a watercourse.

The rainwater leaders from all commercial, industrial, institutional, and high-density residential buildings shall be discharged onto grassed or landscaped areas. Alternatively, rainwater leaders may be directed to on-site detention facilities to achieve the necessary stormwater quantity control as calculated in the stormwater management report.

- Yard catch basins shall be provided where required for landscaped area drainage
- Catch basin maintenance holes may be used for roadway drainage
- Where requested, easements for utilities shall be provided at no cost to the utility company
- Roof-top flow restriction devices shall not be permitted unless the approved structural design allows for them to be installed



As a guideline, the degree of control on the quantity of run-off from a proposed development shall be:

- The post-development peak flow shall not be greater than the corresponding pre-development peak flow for the 1 : 5 year, 1 : 10 year, 1 : 25 year and 1 : 100 year storms.
(Other regulatory agencies may require other storm flows to be analyzed)

Where on site stormwater quantity controls are required, a stormwater management report addressing the points listed below shall be submitted:

- a control device (orifice) shall have a diameter of no less than 75 mm in order to prevent clogging of the opening.
- control devices shall be installed on the upstream side of the maintenance hole.
- storm connections from the building roof and foundation drains shall be made downstream of the maintenance hole and/or catch basin inlet controls.
- ponding limits and available storage are to be depicted on the site servicing drawings and maximum ponding depth in parking areas is not to exceed 200 mm.
- an overland flow route shall be clearly marked. The grading of parking lots and landscaped areas shall provide a safe overland flow route to the surrounding Township right of way during storms exceeding the design storm event.
- roof drains can be utilized with controlled discharge.
- details and concepts are to conform to the Urban Drainage Design Guidelines, set out by the MECP.
- on-site stormwater management facilities may require Environmental Compliance Approval from the MECP. One completed MECP Application form is to be submitted to the Township signed by the Developer and the Developer's Consulting Engineer, in accordance with MECP requirements.

1.20.6 Site Grading Design

The site grading plan shall show, as a minimum, the following information:



- The drainage of the site is to be self-contained.
- Site grading shall be compatible with elevations of adjoining / abutting lands.
- All grassed embankments shall have a maximum slope of 3:1.
- The grade of grassed or other landscaped areas shall have a maximum slope of 7% and a minimum slope of 2%.
- Swales on grassed areas shall have a minimum slope of 2% and a maximum slope such that the flow velocity for contained does not exceed 1.25 m. / second.
- The maximum suggested length for any drainage swale is 75 m.
- The minimum depth for any drainage swale shall be 150 mm. @ 3:1
- The maximum depth for any drainage swale shall be 750 mm @ 5:1
- The maximum side slope on any drainage swale shall be 3:1.
- All driveways shall have positive drainage from the property line to the roadway.
- Centreline grades at 15 m intervals along all existing roads bounding the property and existing grades.
- A legend indicating which are existing and which are to be proposed elevations.
- Contours at maximum 0.5 m intervals to indicate the existing elevations of the site. Contours are to extend to a minimum distance of 15 m beyond the property limits to indicate the grading and drainage patterns of the adjacent lands.
- Cross sections as required to clarify the proposed grading, particularly in relation to adjacent lands.
- Proposed elevations on paved areas, around proposed buildings, along swales, along roadways, parking areas, driveways, catch basin rim elevations, and all other elevations necessary to establish the grading and drainage patterns for the development. Arrows to be used to indicate direction of the surface drainage.
- Road cross sections indicating the pavement and granular base design.
- Roadway dimensions and curb radii.
- Concrete curbs and Curb depressions, with dimensions.



- Embankments, retaining walls, stairs, sidewalks / walkways, and ramps, etc.

1.20.7 Roadway Design

- All roadways, driveways and internal fire routes shall be required to satisfy Fire Access Route Design as per OBC 3.2.5.6 and designed in accordance with the most recent engineering requirements of the Township.
- Minimum pavement design for all roadways, driveways, and internal fire routes (as required) shall be:
 - subgrade compacted to 95% Standard Proctor Density
 - 450 mm. compacted depth of Granular “B”
 - 150 mm. compacted depth of Granular “A”
 - 50 mm. compacted depth of HL4 Asphalt base course
 - 40 mm. compacted depth of HL3 Asphalt surface course
- Minimum width of a roadway for two-way traffic with no on-street parking shall be 9.0 m from E/P to E/P.
- All roadways serving multiple-family projects shall be designed to facilitate passage of emergency and service vehicles. Curb returns having an 8.0 m. radius and inside bends having at least a 12.0 m radius are required. On No Exit roads, provision shall be provided for vehicle turning – turning bulb preferred.
- The grade for any roadway shall be 0.5% min. and 6% max.
- The minimum grade for any driveway shall be 2% within the right-of-way and 2% on private property. The maximum grade shall be 7.0%. The maximum grade shall be used only when necessary due to site conditions.
- The following minimum sight distances maintained (in both directions) for driveway entrances shall be:



<u>Posted Speed Limit</u> <u>km/h</u>	<u>Minimum Sight Distance</u> <u>metres</u>
50	135
60	170
70	200
80	230

1.20.8 Landscaping Requirements

- A Landscaping Plan shall be prepared by a qualified Landscape Architect if required by the Township. The Developer may request jointly obtaining a Landscape Architect with the Township (costs shall be borne by the Developer).
- The Landscape Plan shall show all landscaping details as required by the Site Plan Agreement. A schedule of plant species and sizes is to be identified on the Landscape Plan.
- All maintenance holes, catch basins, hydrants, valves, streetlights, and other servicing features that appear above grade shall also be shown on the Landscape Plan.

1.20.9 Site Lighting

Parking lot and entrance way illuminance shall be L.E.D. and designed as outlined in the American National Standard Practise for Roadway Lighting ANSI/IES and RP-8-14 (2014) or latest edition is to be used as a guideline.

All on-site exterior lighting shall be directed downward and internal to the site and shall in and be in accordance with “Dark Sky Friendly” lighting design. Designs shall show that fixtures have no up-light focus. Fixtures shall be designed in such a way that there is a minimum horizontal and “zero” vertical lighting focus. No light from the site shall cast onto adjoining properties and in no way impinge on adjacent properties unless otherwise approved.



The photometrics of fixtures shall be submitted for review with preliminary design submissions of development plans and lighting poles and fixtures shall appear in a Note on the drawings.

1.20.10 Construction Notice

A minimum of forty-eight (48) hours prior to commencing construction within the municipal right of way, the contractor shall contact the Township.

1.20.11 Driveways and Parking Areas / Lots

If granular surfaces are allowed, the Construction Notes shall include the following:

“The granular parking area shall be maintained with a stable surface, which is treated so as to prevent the raising of dust or loose particles.”

- All driveways and internal fire routes shall be required to satisfy Fire Access Route Design as per OBC 3.2.5.6 and designed in accordance with the most recent engineering requirements of the Township.
- Minimum pavement design for all driveways and internal fire routes (as required) shall be:
 - subgrade compacted to 95% Standard Proctor Density
 - 300 mm. compacted depth of Granular “B”
 - 150 mm. compacted depth of Granular “A”
 - 50 mm. compacted depth of HL8 Asphalt base course
 - 40 mm. compacted depth of HL3 Asphalt surface course

Refer to Dwg. 1.20-01 for Entrance Details

- All Industrial / Commercial / Institutional and Multi-Residential (Apartments) driveway entrances shall have:
 - Minimum Driveway Width of 9.0 m
 - Maximum Driveway Width of 12.0 m
- Driveway entrances shall be designed to accommodate the anticipated vehicular traffic without causing undue interference with the traffic flow on the road. The minimum width



of a driveway depression for commercial, apartment or industrial driveways shall be 12.0 metres for a 9.0m driveway width.

- Where driveway entrances are constructed at / over open ditches, a 450 mm diameter Corrugated Steel Pipe (CSP) culvert with a bearing capacity of a minimum of 320 kpa shall be installed. The culvert shall be of sufficient length to span the entrance width and provide additional length and sufficient cover shall be provided to ensure degradation of the entrance does not occur.
- Driveway entrances shall be situated such that there is a minimum of 3.0 m offset from any side yard property line and a minimum setback of 3.0 m from all utility boxes, utility poles or other 'street furniture'.
- Upon Final Inspection and Approval of the Site Plan works, the owner of the property for which the Site Plan was developed shall be responsible for the maintenance and replacement of the driveway entrance culvert(s).
- All parking areas shall be paved with asphalt or similar hard surface, unless otherwise prescribed by Township staff in writing. No granular parking areas shall be allowed within an Urban Settlement Area.
- Parking Stall Sizing shall be:
 - Standard: 3.0m in width by 6.0m in length
 - Barrier Free: 4.6m in width by 5.5m in length with a 1.75m wide delineated side aisle

1.20.12 Traffic Analysis

Consideration shall be given to the impact a site plan may have on the existing traffic and the introduction of new traffic from the site on the adjacent road system. The Township, MTO or the County of Simcoe may request that a traffic impact study be undertaken.



1.20.13 Erosion and Sediment Control

All erosion and sediment shall be minimised and controlled in accordance with the latest requirements of the Township of Tay and such that no silt shall be permitted to leave the site or into / onto any waterway, wetland or environmentally significant land that crosses or is adjacent to the site. Silt Fence shall be erected, at a minimum unless otherwise Noted or directed, along the property limits. Mud pads shall be required at construction access points to limit the amount of silt and dirt onto the roadway.

1.20.14 Utility Co-ordination

It shall be the responsibility of the Developers Consulting Engineer to follow up with the utility to ensure there is sufficient infrastructure in place to service the site.

The Developer shall also be responsible to undertake utility locates prior to construction. Conflicts with proposed works, damage during construction to utilities or any public infrastructure is the responsibility of the Developer / Applicant and the cost of all repairs shall be borne by the Developer.

1.20.15 Road Occupancy Permit

A Permit for Installation / Relocation of Public Utilities shall be obtained and the Township or County of Simcoe or Ministry of Transportation. The Township is to be notified forty-eight (48) hours in advance of the commencement of any construction within the Township's municipal right of way. These works include, but are not limited to, curb cuts, culvert installation, service connection and utility installation. All works are to be done at the Developer's expense.

The Developer shall apply for a Driveway Entrance Permit (if an existing permitted entrance does not exist) and install the culvert to Township Standards or better.



If it is determined by the Township that the Developer's Contractor is to install an Entrance Culvert, then a Road Occupancy Permit is required by the Developer on behalf of their Contractor.

The Developer shall restore all disturbed areas within the municipal right of way to original or better conditions in accordance with the Road Occupancy Permit or otherwise approved on the Site Plan and to the satisfaction of the Township.

It shall be the responsibility of the Developer to ensure that all street furniture is not damaged during construction and, at the Developer's cost, all such infrastructure is moved (if required) and adjusted to the proposed grade upon completion.

No planting, berming, landscaping shall be permitted within the Right-of-Way unless otherwise approved.

It shall be the Developer's responsibility to ensure that all mud or material, which is tracked onto the road, is removed immediately. Should the roads not be kept free and clear of mud and debris it shall be cleaned, without notice by Township forces at the owner's expense.

NOTE: The I.C.I. Site Servicing and Grading Design Checklist is found at the end of this Section.

1.20.16 As-Constructed Drawings

After all construction is complete, the design drawings shall be amended to incorporate the changes and alterations made during construction in order that the drawings as amended represent the services and conditions As-Constructed. One set of As-Constructed drawings shall be submitted to the Township within one year of final completion and prior to the final reduction or return of securities.



1.20.17 Final Inspection

Upon completion of all construction the Developer shall request the Township to carry out a final inspection of the entire subdivision works. All deficiencies found during this final inspection shall be immediately corrected by the Developer.

This final inspection shall be carried out for the benefit of the Township and shall in no way relieve the Developer of their obligations under the Ontario Building Code Act, Condominium Act and / or the Site Plan Agreement.

1.20.18 Certification

The Developer's Consulting Engineer shall monitor construction of all site grading, drainage, and servicing works.

All sod, landscaping and asphalt works, and rooftop and flow control devices installed shall be inspected by the Engineer for the certificate to be valid.

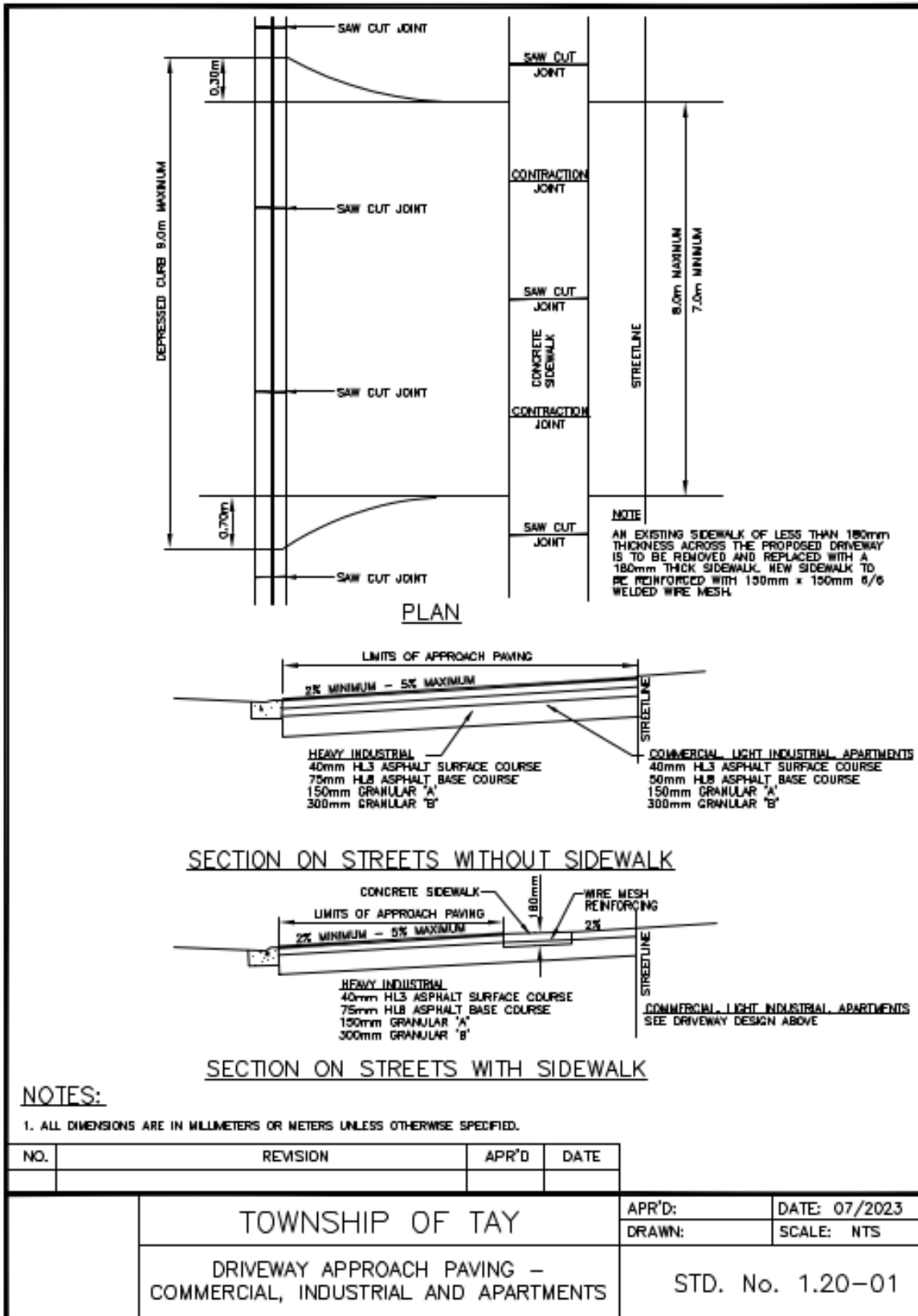
The Developer's Consulting Engineer shall confirm that the stormwater storage volumes and structures are in place and shall function without adverse effect to adjacent structures and lands.

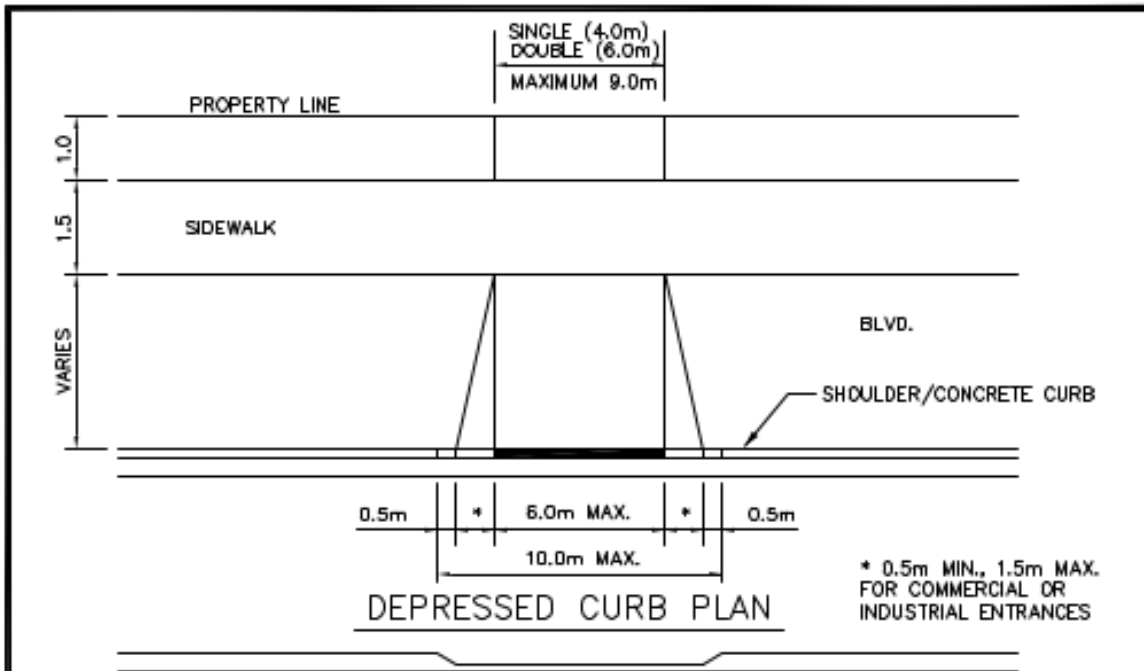
Upon completion of construction and Final Inspection the Developer's Consulting Engineer shall provide written certification to the Township that all works comply with the approved Site Plan, Stormwater Management Report, and the Site Plan Agreement.

The wording is to be followed by the Professional Engineers stamp and signature.

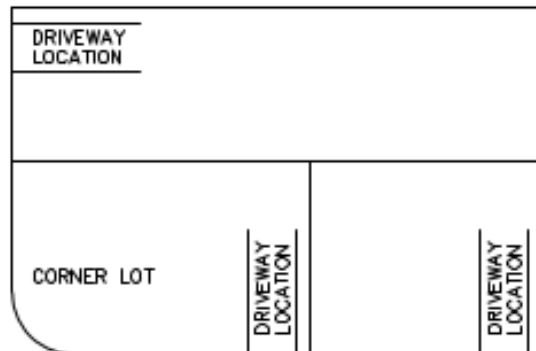


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ELEVATION



CORNER LOT LOCATIONS

NOTES:

1. DRIVEWAY SHALL NOT BE MORE THAN 6.0m or 35% OF INGRESS OR EGRESS
— REFER TO ENTRANCE PERMIT FOR FURTHER DESIGN REQUIREMENTS.
2. CROSSFALL OF SIDEWALK 2.0% UNLESS OTHERWISE APPROVED.
3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

NO.	REVISION	APR'D	DATE

<p>TOWNSHIP OF TAY</p> <p>DRIVEWAY APPROACH PAVING – COMMERCIAL, INDUSTRIAL AND APARTMENTS</p>	APR'D:	DATE: 07/2023
	DRAWN:	SCALE: NTS
STD. No. 1.20-02		



I.C.I DESIGN CHECKLISTS

TOWNSHIP OF TAY			
I.C.I. SITE SERVICING, STORMWATER MANAGEMENT, EROSION & SEDIMENT CONTROL and GRADING PLANS CHECKLIST			
Project / Developer's Name: _____			
Developer's Engineer: _____			
Engineer's Contact Info: _____			
Project Address: _____			
SPA File No: _____ Date: ____/____/____/			
Engineering Contact: _____ Planning Contact: _____			
ALL Site Plan Designs Reviewed by the Subdivision Engineer of Record or Assumed I.C.I. Subdivision / Stand Alone Site Plan submitted by a Professional Engineer			
SITE SERVICING PLAN(S)			
Description	Yes	No	N/A
Site Servicing Plan Stamped and Signed by P.Eng			
Date of Submission / Submission #			
North Arrow and Key Plan			
Legend and Metric Scale			
Geodetic Benchmark Information			
Site Statistics and Property Dimensioning			
Municipal / Utilities Easements and Maintenance Access Locations			
Engineered Fill Location(s) Indicated			
Road and Road Side Detail – Ditch Lines / Centre Line Grades / Required Widening			
Road and Road Allowance Restoration Notes			
Driveway Culvert Lengths and Diameter / Culvert Inverts and Grades			
Driveway Curb Cut Length / Driveway Width / Curb Radii / Setback(s) from All Utilities			
Driveway Locations and Traffic Flow Details Identified			
Fire Routes / Fire Hydrants / Siamese Connections / Stand Pipes and Storage Tanks Located			
Site Signage and Light Standards Located			
Truck and Large Vehicle Delivery Routes, Vehicle Loading, Turning and Parking			
Personal Vehicle Parking / Accessible Parking Stalls Indicated			
Water System – Private Well – Location and 15.0m Offset Radius			
Water Service – Municipal inc.: Pipe size, length, slope, flow direction and material			
Sanitary System – Private – Septic Tank / Pump Chamber / Tile Bed / Loading Area			
Sanitary Service – Pipe size, length, slope, flow direction, material and invert elevations			
Storm Sewers – Pipe size, length, slope, flow direction, material and invert elevations			
Frost Protection on Shallow Services Required			
Building(s) Location inc.: Dimensions / Lot Line Setbacks / Grade Elevations / # of Units			
Storage Areas and Enclosures for Garbage and Waste			
Sidewalks / Walkways / Ramps / Entrance Locations and Elevations (risers as req'd)			



STORMWATER MANAGEMENT, EROSION & SEDIMENT CONTROL and GRADING PLAN(s)			
Description	Yes	No	N/A
Storm Water Management and Grading Plan - Stamped and Signed by P.Eng			
Property Dimensioning			
Existing Property Features - Watercourses / Utility or Municipal Easements			
Sufficient Elevation and Grading Detail on Adjacent Property (3.0m min.)			
Match Existing Grades at Property Line			
Silt and Sediment Control Measures Type i.e. Fence / Entrance Mat / Sediment Basins / etc.			
Silt and Sediment Control Measures Located			
Building(s) Location inc.: Lot Line Setback Distances / Building Corner Grade Elevations			
FFE and TFW elevations (TFW 0.15m above grade) indicated			
Sidewalks / Walkways / Ramps and Entrance Locations and Elevations (risers as req'd)			
Location and Elevation of Retaining Walls (Top of Wall and @ Grade)			
Roof-top Control Data i.e. Flow Rate / Depth / Volume / Drain Location / etc.			
Typical Swale Cross Section Detail - Depth / Minimum / Maximum Sidewall Slopes			
Elevations and % Grades - Sheet Flow Areas and Parking Lots			
Overland Flow Routes and Swale Locations and % Grade Indicated			
Overland Flow Route Sized Properly			
Correct Controlled Discharge Rate			
Internal Stormwater Sewer System Indicated			
Storm Drainage Self-contained (as req'd)			
SWM Controls, Ponding Elevations, Volumes, Limits etc. Indicated			
Level of SWM control (2, 5, 10, year etc.) Indicated			
Allowance for External (In-flowing) Drainage			
Reports Submitted with Site Plan Plans of Design (as required)	Yes	No	N/A
Storm Water Management Report - Stamped and Signed by P.Eng			
Geotechnical Report - Stamped and Signed by P.Eng			
Functional Servicing Report - Stamped and Signed by P.Eng			
Traffic Impact Analysis and Report - Stamped and Signed by P.Eng			
Engineering Cost Estimate - Stamped and Signed by P.Eng			
Photometric Design Plan - Stamped and Signed by P.Eng			
Landscaping Plan			
Landscaping Cost Estimate			
Environmental Impact Study			
Natural Heritage Report			
Archeological Report			
Other:			
Other:			