

## 1.2 Roads

### 1.2.1 General

#### 1.2.1.1 System Type

All roads shall be designed to maximize safe usage. The street system should clearly indicate the characteristics and nature of the road function.

#### 1.2.1.2 Convenience

Roads shall be designed and laid out to:

- conform to the community design objectives
- facilitate public transit and traffic conveyance
- accommodate major storm drainage flows

All roads shall be designed to their functional classification (e.g., local, collector, arterial, etc.).

#### 1.2.1.3 Service Area

All road designs shall consider the location, geometry, configuration, etc. of surrounding existing roads sufficient to verify that the proposed and existing road designs match and meet the City's current criteria. Proposed road construction may include the reconstruction of existing roads to the satisfaction of the City.

### 1.2.2 Geometric Standards

#### 1.2.2.1 Road Classification

The cross-sections referred to in the following discussion are typical for mid-block conditions and therefore represent a minimum for each roadway type. The specific allocation of elements within the right-of-way can be tailored to the specific environment, depending on the composition of transportation users to be accommodated and the need for wider sidewalks, cycling facilities and boulevards, subject to the approval of the City.

##### 1.2.2.1 (a) Minor Arterial Roads

Minor arterial roads are those aligned with the Regional Road grid and, in consideration of possible assumption by the Region of York, shall have a minimum right-of-way width of 36 m. It is expected that, in most cases, the design criteria and standards for such roads will fall under the jurisdiction of the Region of York. In the absence of specific direction from the Region of York in respect of cross-section and other geometric design features, a typical Region of York standard shall be applied. Transit service and related facilities are to be accommodated on Minor Arterial Roads.

##### 1.2.2.1 (b) Major Collector Roads

Major collector roads shall have a minimum right-of-way width of 26 m in accordance with Standard Drawing R-101. Sidewalks are to be provided on both sides and, in cases where a cycle facility is required, the relevant sidewalks widths can either be increased to function as Multi-Use Path (i.e., single path shared by pedestrians and cyclists), and or separated cycling and pedestrian facilities can be provided. Transit service and related facilities are to be accommodated on Major Collector Roads. On-street parking can also be accommodated in place of a travel lane.

## 1.2.2.1 (c) Minor Collector Roads

Minor collector roads shall have a minimum right-of-way width of 24 m in accordance with Standard Drawings R-102 & R-103. Sidewalks and cycling facilities are to be provided on both sides of the road and lay-by parking lanes are to be provided on one side of the road when applying the R-102 standard. Where lay-by parking lanes are not appropriate or feasible, a double row of trees is required. Lay-by parking should be implemented adjacent to schools, parks, open space areas, commercial properties, etc., and at other locations where appropriate and where the spacing between successive driveways is sufficient.

## 1.2.2.1 (d) Local Roads

Local roads shall have a minimum right-of-way width of 17.5 m in order to accommodate 2 lanes of travel and parking on one side of the road, in accordance with Standard Drawing R-104. Local buffer roads or local roads with a single lane in each direction of travel may be designed with a 15.0 m right-of-way in accordance with Standard Drawing R-104 with the reduced boulevard abutting the stormwater management feature, open space, parkland, environmental feature or road allowance. Sidewalks are to be provided on at least one side of all local roads.

## 1.2.2.1 (e) Industrial Roads

Roads in industrial areas shall be classified as either Minor Collectors or Major Collectors and accordingly follow the characteristics discussed above and elsewhere in this document.

## 1.2.2.1 (f) Intensification Areas

The cross-section and other geometric features of roads located in intensification areas are to be developed on a site-specific basis appropriately considering the existing conditions and future intended function of the road in terms of vehicular and pedestrian/bicycle movement, preserving typical City practices to the extent practical, and considering Secondary Plans or Area-Specific Policies as applicable.

Lane widths for intensification areas are recommended based on roadway type, transit requirement, bicycle facilities, desired operating speed and context area. Narrower lanes are generally recommended to avoid excessive pavement width, reduce pedestrian crossing distance and act as a traffic calming measure.

Table 1-1 summarizes the recommended lane widths for intensification areas:

**Table 1-1 Recommended Lane Widths for Intensification Areas**

Lane Type	Minimum Width (m)	Range (m)
Curb Lane	3.5	3.5 – 4.0
Through Lane – Local Road	3.0	3.0 – 3.5
Through Lane – Collector Road	3.3	3.3 – 3.5
Centre Lane	3.5	3.5 – 4.8
On-Street Parking Lane – Local Road	2.0	2.0 – 2.5
On-Street Parking Lane – Collector Road	2.2	2.2 – 2.7
Cycling Facility	1.5	1.5 - 2.1
Multi-Use Path (including bicycle facility)	3.0	3.0 – 4.25

### 1.2.2.2 Greenways

Greenway widths may be added to road cross-sections as determined at the Block Plan approval stage to the satisfaction of the City. In situations where greenways are added to the above noted right-of-way standards, the requirements for sight triangles and reserves shall not be impacted by the additional boulevard widths imposed by the required greenway section. Greenways shall include a row of tree plantings centred across their width (generally 3 m).

### 1.2.2.3 Road Design Criteria

**Table 1-2 Road Design Geometric Features**

	Major Collector	Minor Collector/Industrial	Local
Design Speed (km/h)	60	60	50
Maximum Posted Speed (km/h)	50 (40 in School Zones)		
Minimum Stopping Sight Distance (m) <sup>1</sup>	85	65	65
Minimum Horizontal Curve Radius (m) <sup>2</sup>	180	180	105
K-Crest minimum (m)	15	15	7
K-Sag minimum (m) Comfort Control <sup>4</sup>	10	10	6
Headlight Control	20	20	11
Minimum C/L Grade <sup>5</sup> (%)	0.5	0.5	0.5
Maximum C/L Grade (%)	5	5	5
Length of Vertical Curve (m)	Should not be less than design speed in km/h		

For design speed higher than 60km/h or arterial road, refer to Region of York standards.

**Table 1-3-1 Truck Manoeuvring Template**

	Fire Truck	Garbage Truck
Length (mm)	14000	12000
Width (mm)	2740	2400
Track (mm)	4000	2370
Lock to Lock Time	6.0	6.0
Steering Angle	40	40

<sup>1</sup> Turning and crossing sight distances shall be used instead of minimum stopping sight distances at locations as determined by the City.

<sup>2</sup> Values provided relate to crown roadway sections and the values reflect normal crown. Values may be reduced in consultation with the City by way of applying roadway superelevation or reducing design speed upon approval by the City.

<sup>4</sup> Minimum K-sag values according to comfort control shall only be used at locations where there is sufficient street lighting.

<sup>5</sup> Notwithstanding the minimum grade of 0.5%, a minimum curb line grade of 0.7% shall be maintained on all cul-de-sac and all angle bend road sections.

## 1.2.3 Layout Details

### 1.2.3.1 Bus Bays & Lay-By Lanes

Bus bays shall be provided as required to the satisfaction of the City and transit authority. Exclusive use bus bays or lay-by parking lanes at bus stops on Minor Collector Roads should be considered where normal-to-high dwelling time is expected, in consultation with the transit authority.

### 1.2.3.2 Sidewalk & Walkways

Sidewalks shall generally be required to conform to the City's Sidewalk Policy in effect at the time of development. Sidewalks are required on both sides of collector and arterial roads except in the case of industrial roads (classified as minor or major collectors), in which case, sidewalks are required on one side of the road. Sidewalks are required on one side of local roads (including local buffer roads). Additional sidewalk locations may be required where they form part of a walkway system and where pedestrian routes connect to local amenity areas such as schools, parks, transit routes, retail areas, Multi-Use Path (i.e., single path shared by pedestrians and cyclists), etc. Where only one sidewalk is required, it shall be located on the side of the street that provides the most direct route to local amenities.

Sidewalks should be located as far as practical from the travelled way and usually close to the right-of-way limits, as indicated in the Standard Drawings for standard road cross-sections. The minimum sidewalk widths are as follows:

- 1.5 m for sidewalk (pedestrian use only);
- 3.0 m for a Multi-Use Path (i.e., single path shared by pedestrians and cyclists); or
- 2.0 m in areas of hospitals and nursing homes;
- 2.4 m in commercial areas, schools, bus stops and high pedestrian areas;
- 3.0 m adjacent to bus bays;
- As otherwise determined based on expected pedestrian volumes and the nature of adjacent land uses, subject to a minimum of 1.5 m; and
- For sidewalks located adjacent to curbs, the above minimum widths shall be increased by 0.5 m;
- 2.4 m for development that abuts a service block and/or park and open space that are directly adjacent to a development;
- 2.0 m in areas of Vaughan Metropolitan Centre (VMC)

Where sidewalks do not exist on both sides of the street, sidewalks must be considered during re-development or substantial reconstruction of the right-of-way.

The tactile walking surface indicators will be placed at all depressed curbs at signalized intersections or where pedestrian crossings are present, as well as depressed curbs, within the right-of-way, leading to a pedestrian facility (sidewalk or walkway). Tactile walking surface indicators will be implemented at pedestrian ramps in accordance with the York Region Standards (E-6.07, DS-119, DS-120, DS-121, DS-408, DS-410, DS-411)

### 1.2.3.3 Traffic Calming

Traffic calming measures to be implemented in accordance with the approved Traffic Management Plan or as otherwise required by the City of Vaughan and in accordance with the City's Standard Drawings as well as the Canadian Guide to Neighbourhood Traffic Calming (Transportation Association of Canada, 1998 or latest revision thereof). The following restrictions are to be considered:

- Traffic calming will not be considered on roads with a right-of-way width of 26.0 m or greater (i.e., not on Major Collector roads).

- All vertical measures, such as speed humps/raised crosswalks and the like, are not to be installed on a street designated as an emergency response route or transit route.
- The posted maximum speed limit shall not be greater than 50km/h.

The City's Standard Drawings (Appendix A) detail the traffic calming measures that shall be considered acceptable for installation on City streets. Other measures considered as appropriate for traffic calming purposes include pavement markings and warning signage upon approval of the City. In addition, contrasting materials are acceptable measures subject to their use at stop- or signal-controlled crossings. Their applicability in existing areas and new developments is summarized in Table 1-4.

**Table 1-4 Accepted Traffic Calming Measures and their Applicability**

Traffic Calming Measure	Through Traffic Committee Process (Existing Areas)	Through Traffic Management Plan (New Developments)
Speed Hump	Subject to Warrant 1	No
Raised Crosswalk	Subject to Warrant 1	With Pedestrian Signal Only (if warranted)
Raised Intersection	Where Possible	Yes
Roundabout/Traffic Circle	Yes	Yes
Median	Subject to Warrant 2	Yes
Curb Extension/Road Narrowing	Subject to Warrant 2	Yes
Contrasting Materials	Yes	Yes
Pavement Markings	Yes	Yes
Warning Signage	Yes	Yes

#### 1.2.3.3 (a) Warrants for Installation in Existing Areas

##### 1.2.3.3 (a) (i) Warrant 1 – Speed Humps and Raised Crosswalks

Speed humps and raised crosswalks shall be considered in existing residential areas on local classification roadways, through the Neighbourhood Traffic Committee process, only where three of the four warrants are met:

1. The street is not a primary emergency response route. The determination of whether a street is a primary emergency response route shall be made in consultation with the Infrastructure Delivery Department and Fire & Rescue Services Departments.
2. The speed limit is 50 km/h or less.
3. The 85<sup>th</sup> percentile speed on the street is measured to be 10 km/h greater than the speed limit. (The 85<sup>th</sup> percentile is the speed at which 85% of the drivers are driving at or less.)
4. Traffic volume: local roadways greater than the trip generation rate of 9.57 trips/household/day. (Source: Institute of Transportation Engineers (ITE), Trip Generation Manual – 8<sup>th</sup> Edition.)

Speed humps may not be integrated into streets in new developments through a Transportation Management Plan.

##### 1.2.3.3 (a) (ii) Warrant 2 – Medians, Curb Extensions or Road Narrowings

Medians, curb extensions or road narrowings shall be considered in existing areas, through the Neighbourhood Traffic Committee process, only where the following two warrants are met:

1. The speed limit is 50 km/h or less.
2. The 85<sup>th</sup> percentile speed on the street is measured to be 10 km/h greater than the speed limit. (The 85<sup>th</sup> percentile is the speed at which 85% of the drivers are driving at or less.)

Medians, curb extensions or road narrowings may also be integrated into streets in new developments through a block Transportation Management Plan.

#### 1.2.3.3 (b) Raised Intersections and Roundabouts/Traffic Circles

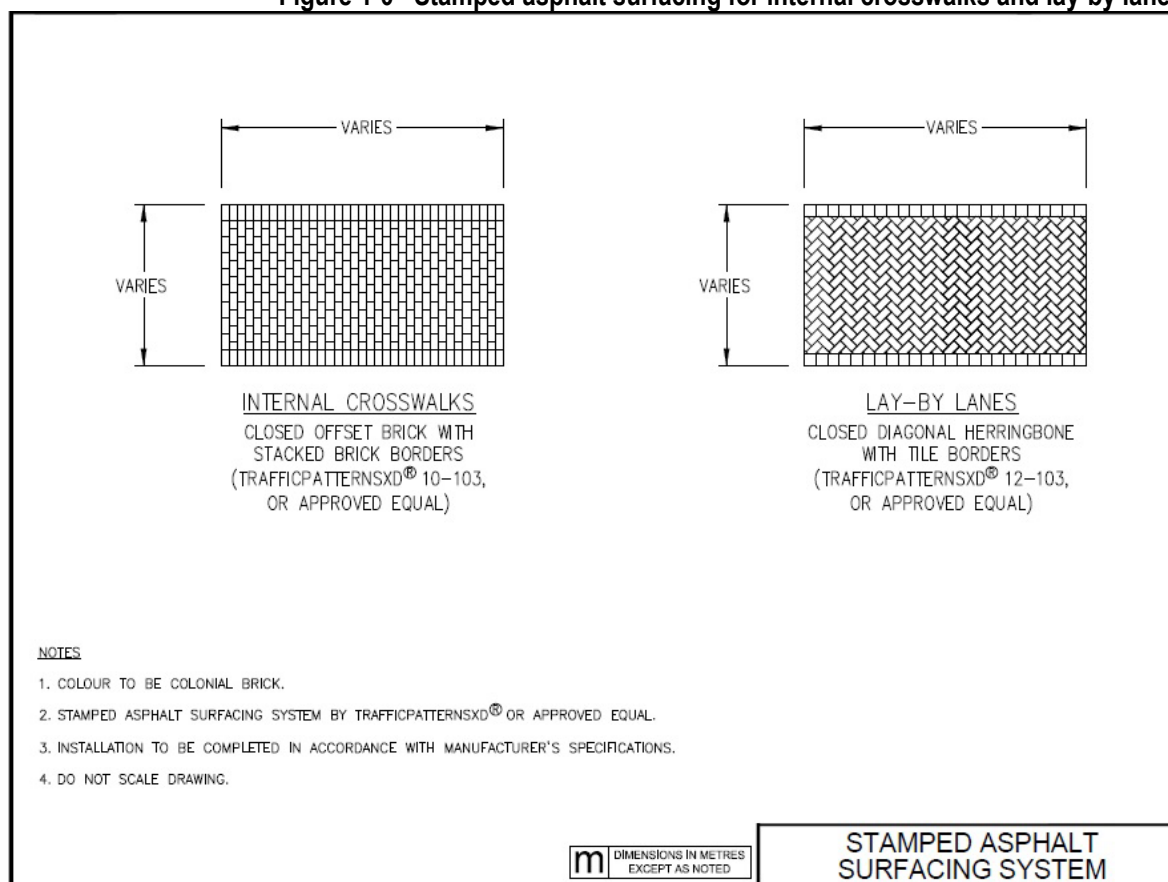
Raised intersections may be integrated into intersections in new developments, as specified in an approved block Transportation Management Plan and subject to hydraulic analysis of drainage function of roadway. They may be retrofitted into existing intersections provided that drainage issues can be satisfactorily resolved.

Roundabouts/traffic circles may be installed at intersections in existing areas through the Neighbourhood Traffic Committee process, and integrated into intersections in new developments as specified in an approved block Transportation Management Plan. In all cases the installation of roundabouts/traffic circles may be subject to right-of-way constraints.

#### 1.2.3.3 (c) Contrasting Materials, Pavement Markings and Warning Signage

Contrasting materials (i.e., unit paver or textured concrete crosswalks, parking lay-bys, etc.) and pavement markings (i.e., painted road narrowings) may be installed through the Neighbourhood Traffic Committee process, and integrated into streets in new developments as specified in an approved block Transportation Management Plan. Warning signs (i.e., Curve Warning, Pedestrian Ahead, Park Area, etc.) may be installed by the City in new or existing areas.

Contrasting materials may only be used at crossings that are stop- or signal-controlled.

**Figure 1-0 Stamped asphalt surfacing for internal crosswalks and lay-by lanes****1.2.3.3 (d) Assumption**

Prior to Assumption, if the implemented traffic calming measures are not reliable and/or are ineffective solution(s) for pedestrian and driver safety (as determined by the City), then any additional traffic calming measures as determined by the City will be the responsibility of the Developer.

### 1.2.3.4 Pavement Markings

Line painting shall be as follows or otherwise directed by the City:

REGULATORY STOP SIGNS			REQUIRED PAVEMENT MARKINGS			
INTERSECTION TYPE ROAD A TO ROAD B	STOP SIGN SIZE	U-CHANNEL POST OR WOODEN POST	ROADWAY TYPE	STOP BARS	CENTRE LINE	LANE LINE
MINOR COLLECTOR (24.0m) TO MINOR COLLECTOR (24.0m)	75 cm	U-CHANNEL POST	LANEWAY (8.0m)	N/A	NO	NO
LOCAL (17.5m) TO MINOR COLLECTOR (24.0m)	75 cm	U-CHANNEL POST	BUFFER (15.0m)	N/A	NO	NO
LOCAL (17.5m) TO LOCAL (17.5m)	60 cm	U-CHANNEL POST	LOCAL (17.5m)	N/A	NO	NO
BUFFER (15.0m) TO LOCAL (17.5m)	60 cm	U-CHANNEL POST	MINOR COLLECTOR (24.0m)	N/A	YES	YES
BUFFER (15.0m) TO MINOR COLLECTOR (24.0m)	75 cm	U-CHANNEL POST	MAJOR COLLECTOR (26.0m)	N/A	YES	YES
LANEWAY (8.0m) TO LOCAL (17.5m)	60 cm	U-CHANNEL POST	INTERSECTION TYPE			
LANEWAY (8.0m) TO MINOR COLLECTOR (24.0m)	75 cm	U-CHANNEL POST	ALL CLASS OF ROADWAYS	YES	N/A	N/A
ANY CLASS ROADWAY TO MAJOR COLLECTOR (26.0m)	75 cm	U-CHANNEL POST				
ANY CLASS ROADWAY TO RURAL ROAD	120 cm	WOODEN POST				
RURAL ROAD TO REGION ROAD	120 cm	WOODEN POST				

**NOTES:**

1. ALL REGULATORY SIGNS MUST BE FABRICATED AS DESCRIBED IN THE DETAILED PATTERNS CONTAINED IN ONTARIO TRAFFIC MANUAL (O.T.M.) BOOK 2.
2. ALL REGULATORY SIGNS MUST BE FABRICATED USING A MINIMUM OF HIGH INTENSITY DIAMOND GRADE (OR EQUIVALENT) RETROREFLECTIVE SHEETING.
3. LOCATION OF SIGNS TO BE IN ACCORDANCE WITH O.T.M. BOOK 1b.
4. THE APPLICATION, LOCATION, GLASS-BEAD REFLECTIVITY, COLORS AND DIMENSIONS FOR PAINT SHALL CONFORM TO O.T.M. BOOK 11. ALKYD PAINTS MAY BE USED ON BASE COURSE ASPHALT AND THERMOPLASTIC MATERIALS MUST BE USED ON TOP COURSE ASPHALT.
5. ALL SIGN POSTS SHALL BE BREAKAWAY-TYPE IN ACCORDANCE WITH RELEVANT MTOD STANDARDS AND SPECIFICATIONS.

DIMENSIONS IN METRES  
EXCEPT AS NOTED

**SIGNAGE AND MARKING  
REQUIREMENTS**

Alkyd paints may be used on base course asphalt and must be maintained (including repainting) prior to the placement of top course asphalt. Durable thermoplastic materials are required on top course asphalt and are to be in good condition prior to assumption by the City.

### 1.2.3.5 Signs

Traffic signs shall be manufactured and installed in accordance with the latest version of the Ontario Traffic Manuals (OTM) and City Standard Drawings R-111, R-113 and R-114.

Abbreviation for street name suffixes shall be as follows:

Avenue	Ave.	North	N.
Boulevard	Blvd.	Parkway	Pkwy.
Circle	Cir.	Place	Pl.
Court	Crt.	Road	Rd.
Crescent	Cres.	South	S.
Drive	Dr.	Square	Sq.
East	E.	Street	St.
Gate	Gate	Trail	Tr.
Lane	Lane	West	W.



### 1.2.3.6 [Traffic Signals](#)

Traffic signalization requirements shall be established in consultation with the City of Vaughan and Region of York and shall generally be in accordance with the City of Vaughan Transportation Impact Study (TIS) Guidelines (April 2018) and York Region Mobility Plan Guidelines (November 2016) for Development Applications. The consideration for traffic signals shall also be based on the results of a signal warrant analysis per OTM Book 12. Signalized intersections can also require additional elements including accommodating daylight triangles, turning lanes, crosswalks and cross rides, and so on.

### 1.2.3.7 [Sodding](#)

All portions of road allowance not covered with asphalt, concrete or other approved hard surface treatments shall be covered with 150 mm of topsoil and No. 1 Nursery Sod.

Boulevard topsoil depth for tree pit areas shall be 450 mm. The tree pit shall be 2500 mm wide and the length shall vary depending on the width of the road's right-of-way in accordance with Vaughan Urban Design Standards (ULA 201, ULA 202 and ULA 203).

All areas outside of the boulevard that are to be sodded, including all lots and blocks not covered by buildings, driveways, sidewalks or other approved hard surface treatments, shall have 150 mm of topsoil and No. 1 Nursery Sod. (This excludes vacant lots, the treatment for which is discussed in 2.1.2.1 (b).) Minimum of 300mm of topsoil will be required for parks and open spaces.

Sod is to be rolled after placement and to be maintained until the sod root system has been established to the satisfaction of the City.

### 1.2.3.8 [Off Road Multiuse Pathways](#)

Off road multiuse pathways shall be provided as required per the Sidewalk Plan, Vaughan Pedestrian and Bicycle Master Plan, and to the satisfaction of the City and shall be a minimum of 3.0 meters wide asphalt with 1.0 meter mow strips.

## 1.2.4 **Structural Requirements**

### 1.2.4.1 [Road Pavement Design Report](#)

The road pavement design shall be prepared by a geotechnical engineer and shall be included in the Geotechnical Report. The report shall include results from soil testing of the existing subgrade and recommend a pavement design in accordance with the Transportation Association of Canada publication, "A Guide to the Structural Design of Flexible and Rigid Pavements in Canada". The design shall include consideration of the effect of proposed underground services and non-ideal conditions.

Pavement design for all urban roads shall be based on the assumption that the top lift of asphalt is a wearing surface only and does not contribute to the structural strength. Base course asphalt must be in place a minimum of two winters or as approved and directed by the City before the top lift asphalt is applied. Perforated subdrains connected to the storm drainage system shall be installed full length under all curbs unless otherwise directed in writing by the City.

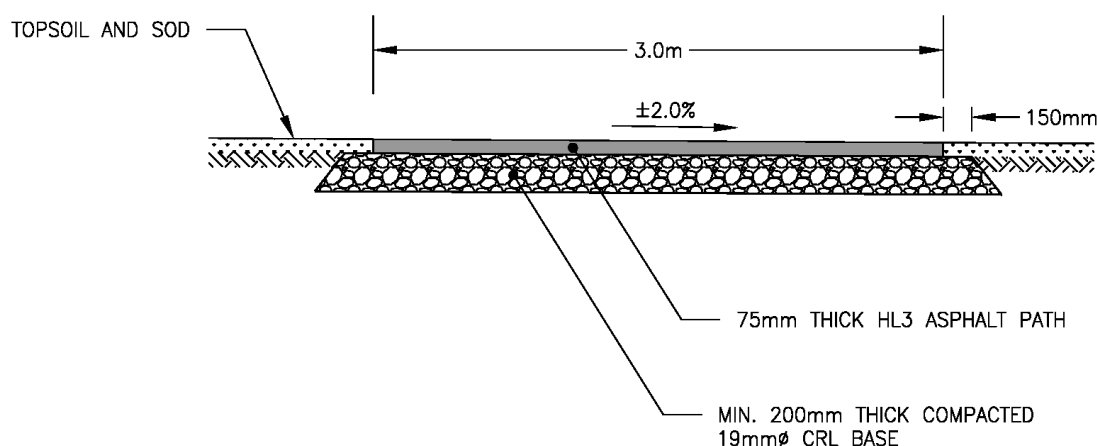
In no case shall the road structural requirements be less than the City's minimum thickness requirements as provided in Table 1-5.

**Table 1-5 Minimum Thickness Requirements <sup>6</sup>**

	Top Course Asphalt <sup>7</sup> HL-3	Base Course Asphalt HL-8	Base 20 mm Crusher-Run Limestone	Sub-Base 50 mm Crusher- Run Limestone
Local/Rural Residential Roads & Laneways	40 mm	50 mm	150 mm	200 mm
Industrial, Collector & Arterial Roads	50 mm	75 mm	125 mm	350 mm
Residential Driveways	25 mm <sup>8</sup>	50 mm	200 mm	n/a
Industrial & Heavy-Duty Driveways <sup>9</sup>	50 mm	75 mm	125 mm	350 mm

#### 1.2.4.2 Multi-Use Path

The composition of the Multi-Use Path shall be in accordance with Figure 1-1.

**Figure 1-1 Composition of Multi-Use Path**

#### 1.2.4.3 Non-Ideal Conditions

Non-ideal conditions for road construction relates to generally wet subgrade, organic and non suitable road building material which may necessitate the excavation of subgrade to a depth specified by a geotechnical engineer and replacement thereof with selected subgrade material or, as recommended by a geotechnical engineer, and the replacement thereof with granular material.

#### 1.2.4.4 Testing & Inspection

The City requires that all roads and selected driveways be core tested shortly after placement and prior to the application of top course asphalt to determine the actual road and driveway base construction and hence order

<sup>6</sup> All values refer to compacted thickness

<sup>7</sup> The maximum asphalt cement content by mass in an asphalt mixture for driveways is 7.0%

<sup>8</sup> HL-3A asphalt to be used. Top course asphalt shall not be placed until the base course asphalt has been in place for one winter season. The entire driveway surface is to be paved from the curb to the garage. Other hard driveway surfaces (i.e. interlocking stone) may be installed as approved by the City.

<sup>9</sup> This standard shall apply to the portion of the industrial driveway between the curb and the street line.

rectification of any detected deficiencies. Core holes shall be filled with base asphalt immediately after coring. The following general minimum guidelines shall be applied when establishing the testing program:

- One sample at every road intersection.
- One sample on every street, excluding intersections.
- Additional samples on road segments every 50 m roughly centered in alternating lanes between intersections.
- One sample for every 25 residential driveways by unit count, rounded to the next highest whole number.

At the discretion of the City, additional testing above these minimum guidelines may be required.

In the event that failed tests occur, additional testing will be required to the satisfaction of the City in order to establish the extent of rectifications required. The density of such additional testing shall be at the discretion of the City.

Ground penetrating radar can be used as an alternative.

In the case where driveways are found to be deficient, the entire driveway from the curb to the garage is to be removed and replaced with appropriate structure.

#### 1.2.4.5 Curb Repairs at Driveways

For curb repairs at driveway locations, the entire driveway apron from the curb to the sidewalk shall be replaced and, in cases where there is no sidewalk, then the driveway apron is to be replaced from the curb to a minimum of 0.5 m past the back of the curb. The entire driveway curb is to be replaced.

### 1.2.5 **Materials**

#### 1.2.5.1 Native Material

The use of native material for backfilling of trenches or for fill sections of roadway is subject to approval of the City. A geotechnical report on the type of soil and method of compaction should be presented for prior approval.

#### 1.2.5.2 Limestone

Where 20 mm or 50 mm diameter limestone is specified, this shall be prewashed crusher run limestone from a source approved by the City.

The 20 mm diameter crusher run limestone shall meet the Ontario Provincial Standard Specification (OPSS) Granular A gradation specification. The 50 mm diameter crusher run limestone shall meet the OPSS Granular B Type II gradation specification.

#### 1.2.5.3 Recycled Aggregates

The City may consider on a selective basis the use of recycled aggregates for road base and sub-base materials subject to conformance with OPSS Granular A and OPSS Granular B Type I specifications, respectively. Further, this material may also be considered for purposes of stabilizing soft subgrade, trench backfill and engineered fill. The use of recycled aggregates must further conform to OPSS 1010.05.01, OPSS 1010.05.02 and OPSS 1010.05.03.02, subject to its acceptance by the City for the purpose considered. For the sake of greater clarity, although this provision is stated herein, it is not to be construed as an approval of any kind for its use.

#### 1.2.5.4 Asphalt

All asphalt shall be homogeneous, free from impurities, and shall comply with the detailed requirements for the specified grades as identified by the OPSS and the City. The composition of base course pavements may be

modified by the recycling up to a maximum 20% by mass of reclaimed asphaltic concrete and in accordance OPSS 310 and/or OPSS.MUN1150 with minimum compaction of 92% to maximum compaction of 95%. Top course asphalt shall contain no reclaimed materials.

#### 1.2.5.5 Concrete

All concrete curbs and gutters, sidewalks and walkways shall be mixed from Portland Cement A5 conforming to Canadian Standards Association Specifications. Coarse and fine aggregates shall conform to City specifications. Concrete must meet exposure Class C-2 specifications in accordance with the latest version of CSA A23.1. Curing by means of burlap, water, curing compounds, moisture barrier, or membrane shall be according to City specifications. Two stage concrete curb and gutter to be installed within the road right of way in accordance with OPSD 600.070 subject to the modification that the portion of base (binder course) asphalt to be removed prior to placement of top stage to be increased from 80 mm to a minimum of 400 mm or width of available compaction equipment in order to ensure proper compaction of asphalt placed in resulting void. Reinforcement is required for base curb in two stage construction. This requirement does not apply to stage one curb construction.

#### 1.2.5.6 Unshrinkable Fill

Unshrinkable fill is required for the restoration of any excavations within existing roadways and shall comply with OPSS 1359 subject to a minimum strength of 0.4 MPa.

#### 1.2.5.7 Sodding

All sod shall be No. 1 Nursery Sod as classified by Nursery Sod Growers Association of Ontario, latest revision.

All sod shall be taken from a good loamy soil. It shall be well permeated with roots; be uniform in texture and free from weeds; be in a good healthy condition with no sign of decay and contain sufficient moisture to maintain its vitality during transportation and placing.

#### 1.2.5.8 Topsoil and Planting Mix

All topsoil shall be obtained from a source known to be free of weeds, chemicals, and hazardous waste. Topsoil and planting mix to meet all City standards and specifications. Testing of samples shall be at the City's discretion.

#### 1.2.5.9 Other Materials

All other materials shall be approved by the City.

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