# ACCESS MANAGEMENT GUIDELINE

**Dated: January 2015**

Halton REGION

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# 1.0 INTRODUCTION

This Access Management Guideline document provides the context for access approval for Halton Regional Roads. Its purpose is to provide direction to developers, planners, and consultants on Halton Region's best practices in access management. It also provides a reference for the review and approval of new and redevelopment access applications.

The purpose of the Access Management Guideline document is to provide a framework for access control that will maintain a high level of service for through-traffic, while providing reasonable access to abutting properties. The overall goals of the Guidelines are to reduce collisions, reduce energy consumption, preserve the long-term integrity of the traffic movement function while balancing the needs of all road users.

The degree of access control is directly related to the functional classification (See Appendix A) of the individual road and is generally comprised of the following:

- Access to land development via the arterial/collector road system
- Physical control of left turn movements at mid-block locations
- Appropriately spaced right-in / right-out accesses

## 1.1 ACCESS MANAGEMENT – BEST PRACTICES

Access Management allows the Region the authority to effectively manage the provision of access to the public road system for new development or redevelopment. The major objective is to provide a safe access which is consistent with the function and operation of the public road system and access needs of the adjacent land uses. In addition, it achieves the necessary balance between traffic movement and land use access by careful control of the location, type and design of driveways and intersections. As indicated in Transportation Association of Canada – 1999 Geometric Design Guide for Canadian Roads (TAC Manual) "access management provides a systematic means of balancing the access and mobility requirements of roads. Access management is the process that manages access to land development while simultaneously preserving the flow of traffic on the surrounding public road system in terms of safety, capacity and speed."

The Traffic Engineering Handbook, 6th Edition indicates that direct access to/from arterials should be discouraged or denied except where no alternative access exists. In addition, access to a property should be obtained from the local road system where possible. Where access must be provided from an arterial road, it should be proven to be safe without affecting the capacity of the roadway and balance the needs of all road users using criteria established within this Guideline

Before permitting an access, generally, a raised centre median should be in place to physically restrict the access and reduce turning conflicts and potential collisions. Auxiliary turning lanes should be incorporated with all types of accesses. As indicated in the, US Department of Transportation - Access Management Guideline for Activity Centres, left turn lane and right turn lanes are essential from both a safety and capacity perspective. It has been noted that the

frequency of and severity of rear end collisions will be reduced when left and right turn lanes are in place.

Sufficient sight distances for vehicles using the access is also essential. Vehicles should be able to enter and exit the access safely with respect to vehicles using the access and vehicles on the adjacent roadway. Sight distances should be met for all access types using the standards indicated from the TAC Manual and current Regional practices.

Notwithstanding the above information, a Transportation Impact Study may also be required prior to determining the location of an access. The goal of a Transportation Impact Study is to assess the potential affects of additional traffic being generated by a proposed development on the surrounding transportation network to determine what provisions are needed for safe and efficient site access and traffic flow and to address other related issues for transit and active transportation.

This Guideline is developed based upon existing state of the practice referencing technical guidelines, including the Region's Right-of-Way Guidelines, Traffic Impact Study Guidelines, 1999 TAC Geometric Design Guide for Canadian Roads, Transportation Engineering Handbook, Access Management Guidelines for Activity Centres (US DOT), MTO design guides, the Highway Capacity Manual, American Association of State Highway & Transportation Officials (AASHTO) and Transportation Research Board (TRB) publications, and other sources.

## 1.2 AUTHORITY FOR ACCESS MANAGEMENT

Halton Region has the authority to regulate access through a number of legislative processes. Access can be controlled under the legislative authority of the Planning Act and the Municipal Act. Halton can use the following planning tools as described in these acts:

- Official Plan Policies
- Site Plan and Subdivision Process
- Entrance Permits
- Proactive Corridor / Access Reviews

### Official Plan

The Regional Official Plan provides a future vision of growth, land use and infrastructure in the Region. It is a policy document that sets out the basic goals, objectives and directions for long-term growth and development in the Region. It guides public and private decisions regarding development patterns, land use servicing, economic matters, and transportation infrastructure investment. The Access Management strategy outlined in this report builds upon the Region's policies contained in its Official Plan.

The Regional Official Plan sets the framework for implementing a policy to manage development. The Official Plan addresses access functions and sets general practice for access approval within the context of sound engineering practice.

## Site Plan and Subdivision Plan Approval

Site Plan and Subdivision approval processes are carried out under the regulations of the Planning Act, which implement the land use policies of the Official Plan and Zoning By-laws. The Site Plan or Subdivision Plan process uses a set of drawings that illustrate the physical arrangements of property improvements, such as driveways, drainages, etc. Site Plan and Subdivision Agreements regulate in detail, items such as parking requirements, layout, access location, and access configuration. The Site Plan and Subdivision Plan approval process often involves items regarding access and access management for Regional roads.

## Entrance Permit

Municipal Act allows municipalities to control the construction of accesses onto a public roadway through the issuance of permits.

An entrance permit is a site-by-site permission for access and a tool to regulate the location of the access prior to construction. Entrance permits allow the Region to protect the interests of both individuals and the community as a whole. By reviewing and approving plans before any work is done, the Region can ensure that the owner of the access comply with:

- The Official Plan which controls the functions and uses of access;
- The Guidelines and Standards, which sets requirements for design and materials; and agreements through site plan or subdivision relating to site configuration or required improvements.

# 1.3 ACCESS RESTRICTIONS

The Region reserves the right to temporarily permit a full movement access onto a Regional road, until such time that the roadway is reconstructed with a centre median at which time the full moves access would be restricted to a right in/out only. In these cases, this condition will be registered on the Title of the property and the Owner shall agree that it shall not initiate any action, suit or any other restrictions of access to and from the site; including, but not limited to any action for injurious affection.

Median breaks to allow for a full movement access connection shall not be permitted at locations where there are existing raised medians or HOV/transit facilities on the roadway. The Region maintains its right to modify and close accesses in order to ensure safe and efficient operation of the Regional road system. The right of municipalities to maintain safety through access management has been recognized in the Ontario courts.

## 1.4 TIMING

It is the intent of Halton Region that there is concurrency between the impacts of a development and the implementation of required infrastructure. Every effort must be made to have all road and traffic improvements are to be in place prior to occupancy of the development. It is recommended that no development occupancy shall be permitted prior to completion of all road infrastructure work and inspection.

# 2.0 ACCESS TYPE

When all options for access to the subject land from local and non-arterial roads are not feasible, the following is a list of types of accesses which may be acceptable, with conditions, on Regional Roads:

- Right in/out – Section 2.1;
- Full Movement – Section 2.3;
- Partial Movement (Left in/out) – Section 2.4;
- Mutually Shared Driveway – Section 2.5;
- Emergency – Section 2.6;
- Construction and Temporary – Section 2.7; and
- Rural Driveway – Section 2.8.

## 2.1 RIGHT IN/OUT ACCESS

Right in/out accesses should be considered where necessary and only when the minimum spacing requirements can be achieved. (See Access - Spacing Section 3.2) Where possible, the developer will be responsible to construct a centre median with a minimum of 45 metres on either side of the curb extension with the objective to provide a continuous centre median. At locations where a centre median can not be constructed due to limited roadway width, adjacent access constraints, the developer will be required to build a directional island to physically restrict the movements at the access point. As a temporary measure, the Region will also consider the installation of flexible delineators when a Roads Capital project is imminent.

At locations where restricting access to a right in/out is not conducive to the surrounding area, due to existing adjacent accesses or other physical constraints, the Region, at its discretion may require the Developer/Owner to enter into an access agreement to restrict an access in the future, in conjunction with a future road widening project or under the direction of Regional Council for public safety and capacity reasons. (See Access Restrictions – Section 1.3)

Due to the current trend in Service Stations, it is necessary to provide specific requirements as it relates to the type and location of access. With the development of new service stations, only one right in/out access shall be considered, on each frontage to a Regional road, at the location furthest from the intersection with preference to achieve access at the furthest limit of the property. At rebuilds of existing service stations, all efforts will be made by staff to incorporate only one right in/out access at the furthest limit of the property frontage.

## 2.2 FULL MOVEMENT ACCESS

Full movement accesses are currently permitted, where necessary, when minimum spacing requirements can be achieved. (See Access Spacing – Section 3.2) A full movement access will only be considered when the safety and capacity of the roadway will not be adversely affected.

In addition to adequate spacing between intersection or full movement access, it is necessary to ensure that proper sight distances are achieved utilizing standards indicated in the TAC Manual for Geometric Design Guide for Canadian Roads and confirmed by field measurements.

The provision of future traffic control signals shall be considered in conjunction with a full movement access. The cost for the installation of traffic control signals shall be 100% paid by the Developer/Owner, unless identified in Halton's Capital Works program.

## 2.3 PARTIAL MOVEMENT ACCESS (LEFT IN, RIGHT IN/OUT)

Partial moves access (left in, right in/out) shall only be considered when an adequate left turn lane can be constructed to accommodate the necessary storage and taper for the proposed turning volume. In addition, the partial movement access shall ensure that satisfactory back to back left turn lanes with the adjacent intersections can be accommodated.

Although typical spacing for partial moves accesses will vary depending on the volume of each roadway and the necessary left turn storage and taper requirement, every effort should be made to maximize the spacing for these proposed accesses. As such a minimum spacing is recommended to be 235 metres obtained given that there are sufficient provisions made to provide for storage for left turning vehicles when considering this type of access. Access spacing is to be measured stop bar to stop bar.

In addition, a centre median shall be designed and built in such a way to physically restrict the left out movement.

## 2.4 MUTUALLY SHARED DRIVEWAY

Mutually shared or joint access requirements are used to connect major developments and to improve driveway spacing, which allows intensive development of a corridor, while maintaining efficient traffic operations, and safe and convenient access to businesses.

For commercial and high density developments, the Region will require the developers to establish shared commercial driveways when there are more than one business development at a given location, or a series of adjacent developments proposed over time. A shared entrance is beneficial and helps preserve the traffic carrying capacity of the arterial.

Halton Region supports and encourages the use of mutually shared driveway arrangements. Shared driveways must be registered on Title of both properties in order to protect the interests of both property owners in the event that either of the properties is sold.

## 2.5 EMERGENCY ACCESS

Emergency access is typically required when a development (particularly a subdivision) has only one connection to the local road network. Unlike typical access driveways, these emergency access driveways are infrequently, if ever, used and can be dealt with quite differently.

For emergency accesses to be effective, the design considerations must be addressed:

- The travel surface must be designed to withstand large truck loads (i.e. Fire trucks),
- The access must be clearly marked as such,
- The access must be controlled (bollards, chains, etc.) to ensure the access does not become a common access,
- The access width should be sufficient to accommodate large trucks (6 metres), and
- The design must make the emergency access serviceable (snow removal).

## 2.6 CONSTRUCTION AND TEMPORARY ACCESS

A construction or temporary access design must be considered like any other access when it comes to safety and design. Even though the access may be temporary, sufficient truck and car volumes may use the access.

There are three aspects to construction and temporary accesses that will be considered:

- Location - Often access from a Regional road is requested for construction purposes for new developments. Every effort will be made to locate the construction or temporary access in the location of the future street or driveway. Locating the access in these areas would ensure that the Access Design Guidelines have been met because the permanent access locations would have been previously reviewed.
- Maintenance. Maintenance must be undertaken to ensure that both road and boulevard are maintained and damages repaired.
- Duration. The access will have an annual renewal permit. A renewal process would ensure that the construction access has been maintained, and that unused construction accesses can be closed.

A construction or temporary access should be designed and installed in conforming to the Entrance Permit conditions. Appropriate mitigation measures must be implemented to prevent mud tracking from the development onto Regional roads. Securities, insurance and conditions will be provided as part of the Entrance Permit.

## 2.7 RURAL DRIVEWAY

An application for a rural driveway to a Regional Road will be evaluated on a site by site basis. In general the following will be required:

- The access will have a minimum platform of 6 metres and 1.5 metres of side slope;
- If a culvert is required, the culvert shall be new, corrugated, 16-gauge galvanized steel spiral, polyethylene or approved equivalent;
- The diameter and length shall be determined on a site by site basis;
- Culverts shall be backfilled with a minimum compacted cover of 300 mm of Granular 'A'. The reminder of the access, within Halton Region's right-of-way, shall have a minimum compacted thickness of 200 mm of Granular 'A'';
- Driveway sideslopes shall be top dressed with a minimum 100 mm of topsoil and sodded and graded to a maximum of 3:1 ratio from the access driveway platform to the ends of the culvert invert; and
- Fencing, gates, curbs, lighting, headwalls, etc. shall not be constructed or installed within Halton Region's right-of-way limits.

Appropriate mitigation measures must be implemented to prevent mud tracking from the development onto Regional roads. Securities, insurance and conditions will be provided as part of the Entrance Permit.

# 3.0 ACCESS CONTROL CONSIDERATIONS

The access management process involves an approval and a design stage. Access approval involves the weighing of the merits and operational implications of an access to determine where access will be permitted and what form of access (i.e. Number of movements) will be allowed.

The following Halton Region documents should be reviewed in the access approval process:

- Guidelines for the Preparation of Transportation Impact Studies
- Right-of-Way Guidelines
- Design Guidelines for Proposed Road and Traffic Signal Works on Region of Halton Roads

Each proposed access must be shown to maintain the safety and efficiency of the arterial roadway. Despite the potential merits of an access, operational implications must be considered when evaluating a proposed access to a Regional road. It is the Region's common practice to request a Transportation Impact Study when evaluating a proposed access location.

## 3.1 DIRECT ACCESS vs INDIRECT ACCESS

The number of direct access points to the Regional Road network must be effectively managed to reduce delay, minimize turning conflicts, and maintain an acceptable level of safety for motorists, pedestrians and cyclists.

Therefore, before direct access to a Regional Road will be permitted, alternate access opportunities must be explored and the need for access to the Regional system must be demonstrated. The following are valid criteria used to consider direct access to a Regional Road:

- Land parcels are otherwise landlocked;
- Environmental and utility considerations/impacts;
- A site possesses unique constraints which negate any other access opportunities, such as the lot depth, the footprint of existing buildings, grades, or minimal frontage onto local streets; and
- Alternate access creates unacceptable traffic operational conditions on, or in close proximity to, the Regional Road.

A Transportation Impact Study is required to support all proposed direct access locations.

## 3.2 ACCESS SPACING

There are various reports and conclusions in the Traffic Engineering field that discuss the spacing recommendations for different types of access. The general spacing guidelines for right in/out access is 115 metres to 140 metres between accesses. Where spacing is not conducive to the land use, physical or economical reasons, a spacing of 30 metres to 60 metres may be considered

Although typical spacing for partial moves access (left in, right in/out) will vary depending on the volume of each roadway and the necessary left turn storage and taper requirement, every effort should be made to maximize the spacing for these proposed accesses. The Access Management Guideline for Activity Centres – US Department of Transportation indicates a minimum spacing of 235 metres should be obtained and with the provision to provide sufficient storage and taper for left turning vehicles when considering this type of access.

The general spacing guidelines for a full movements access is 300 metres to 400 metres. This range of spacing is based on the speed of the roadway, traffic signal coordination and storage requirements for left turning vehicles. Full movement accesses should be located at a point to allow enough spacing to the nearest signalized intersection to avoid any possible interference with intersection queues.

Beyond accommodating traffic movements, the demands on Regional roads are changing in that they also need to address multiple roles related to other users including transit riders, cyclists, and pedestrians. Regional streets are also an integral element in promoting high quality urban design, serving as entryways to communities and encouraging the development of pedestrian-friendly and transit-oriented neighbourhoods.

Halton Region has created Access Spacing guidelines (see Table 1) that correspond to the Region's Right-of-Way Guidelines which group the functional classification of roadways into three categories, Rural/NHS, Corridor and Node. The three categories reinforce an urban structure model that directs growth away from rural and natural heritage areas and towards identified urban growth areas within the Regional Official Plan.

## Rural/Natural Heritage System (R)

Rural lands are designated areas for agriculture and protection of infrastructure that supports farming and Natural Heritage Areas (NHS) are lands designated for natural area conservation. In planning for new urban areas, the Region is seeking to minimize development of prime agricultural lands. Regional Roads in Rural/NHS lands should respect the rural character of the area.

## Corridors (C)

Corridors are urban growth areas identified along major roads, arterials or higher order corridors that have the potential to provide a focus for higher density mixed-use development and employment use consistent with planned transit service levels. The design and physical appearance of corridors contribute directly to livability and economic success and therefore should offer a positive community environment and convenient access for residents and businesses to a variety of goods and services.

Corridors will generally vary in use along their length and their design needs to reflect the change in surroundings. Over time, corridors could include a mix of uses such as: sidewalk-fronting shops or businesses, offices, civic uses appropriately scaled and designed public spaces and a broad mix of residential forms and densities. Corridors that travel through employment lands are to provide for development of quality business environment and include a range of offices, industrial-type buildings and services supporting employment such as business related retail and restaurants located in buildings with doors and windows that front the street.

## Node (N)

Nodes are defined as compact, transit-oriented, pedestrian/cyclist friendly and mixed use/residential neighbourhood centers that are areas of more intensive urban uses within a community. They provide area residents with a hub to meet a variety of daily needs (goods and services) and serve as a social focus for the community and as concentrations of office employment uses. Nodes are generally located at the intersections of major corridors within the identified intensification areas and extend approximately 200-400 metres from the intersection.

Halton Region's access spacing guidelines are further refined by providing spacing for cross-section type as identified in the Region's Right-of-Way guidelines. Please see Appendix B for the individual cross-sections by Rural/NHS (R), Corridor (C) and Node (N).

Table 1 outlines the minimum spacing requirements for access and road connections to Regional roads. As speed limits increase, greater minimum distance is required between access locations. Access spacing can be reduced to a minimum of 250 metres within the intensification areas (Node) identified within the Regional Official Plan that can substantiated through the submission of a comprehensive corridor analysis and Transportation Impact Study analyzing all possible alternatives and taking into consideration land use and community factors. Access spacing is measured stop bar to stop bar.

**Table 1 – Minimum Access Spacing**

| TYPE* | Full Movement Access (m) | Right in/out Access (m) |
|---|---|---|
| R1 | 400 | 115 |
| R2 | 400 | 115 |
| C1 | 400 | 115 |
| C2 | 300 | 115 |
| C3 | 300 | 115 |
| C4 | 300 | 115 |
| C5 | 300 | 115 |
| N1 | 250 | 115 |
| N2 | 250 | 115 |

## 3.4 SIGHT DISTANCE REQUIREMENTS

A safe sight distance is the distance needed by a driver on a Major Arterial, or a driver exiting a driveway or street to verify that the road is clear and to avoid conflicts with other vehicles.

Adequate sight distance must be provided for both movements into and out of an access with a minimum of hazard and disruption to traffic. Sight distance requirements must be considered both for vehicles approaching the access and departing from the stopped position at the access.

The sight distances should be designed to enable existing vehicles:

- Upon turning left or right, to accelerate to the operating speed of the street without causing approaching vehicles to reduce speed by more than 15km/h; and
- Upon turning left, to clear the near half of the street without conflicting with vehicles approaching from the left.

The operating characteristics (driver eye elevation, visibility of the vehicle, and vehicle acceleration characteristics) of both trucks and passenger vehicles should be considered if both vehicle types are anticipated to utilize the access.

## 3.5 DRIVEWAY AND SITE CONFIGURATION

Driveway location and design affects the ability of a driver to safely and easily enter and exit a site. Road classification, right-of-way, design speed, design hour volumes, and land use influence driveway location and design. For driveways to be permitted along major Regional roads, the design of the proposed driveways should be feasible to minimize interference with the mobility of the through traffic by designing the driveway to provide desirable:

- Driveway width – See Section 5.4 -Table 2
- Driveway radii – See Section 5.4 – Table 3
- Clear throat conditions

- Turning characteristics

## 3.6 ACTIVE TRANSPORTATION

In the design of a access, it is also important to integrate the pedestrian and cyclist needs into the vehicular operational requirements of the driveway. Separate accommodation for vehicles, pedestrians and cyclists is required for sites with significant pedestrian/cyclist flows.

Pedestrians and cyclists should be provided the right of way at sidewalk/driveway crossings by way of pedestrian and cycling facilities that should adhere to the standards set out in Ontario Traffic Manual Book 18. Generally, the sidewalk should extend through the driveway to illustrate to the driver that the pedestrian has the right of way. However, at driveways with very high vehicle volumes or vehicle speed and pedestrian safety concerns, consideration may be given to not carrying the sidewalk through the driveway to alert pedestrians to the vehicle/pedestrian conflict.

As development occurs within the Nodes and Corridors, Halton Region will work with the local Municipality to ensure that there is proper integration between pedestrian walkways, cycling paths and transit routes and vehicular access to development. Halton Region will also support any Municipal initiatives to encourage and increase safety for pedestrians and cyclists.

Accesses within Nodes and Corridors of high pedestrian volumes should be designed to maximize visibility of pedestrians and for reducing speeds of entering and exiting vehicles and drivers by using smaller driveway radii. All efforts will be made to consolidate access points within these areas in order to maximize pedestrian and cyclist comfort.

## 3.8 SUMMARY OF OPERATIONAL IMPLICATIONS

The evaluation of access locations will be assessed for the following specific operational criteria to determine whether a full movement or partial movement access is feasible. In most instances a Transportation Impact Study will be required.

- Insufficient gaps in the traffic flow
- Turn movements that conflict or overlap
- Conflicting movements with traffic signal operations
- Sight distance constraints (vertical or horizontal geometry, parking, etc.)
- Traffic flow queues that block the access
- Inadequate on-site traffic conditions (circulation, clear throat, or grades)
- Access impact on trees or other boulevard elements
- Impacts on downstream traffic operations
- Conflicts resulting from lane transitions (i.e. lanes beginning or terminating)
- Undesirable pick-up / drop-off or service vehicle activity

- Contributing to existing safety / operational problems
- Encourages unsafe maneuvers (weaving, U-turns, wrong way, reversing)
- Insufficient right of way for adequate road geometrics (radii, width)
- Impact on pedestrian and cycling environment (excessive width or combination of access)
- Impacts on adjacent properties
- Transit operations and bus stop locations

# 4.0 MITIGATION OF ACCESS IMPACTS

Road and/or traffic signal control improvements are often required to mitigate the traffic demands of a proposed development. Where deemed appropriate by the Region, traffic control signals or other measures may be required to accommodate an access.

## 4.1 ROAD IMPROVEMENTS

Road improvements include any physical changes that must be made to the Regional Road network to mitigate the transportation impacts of a proposed access. These improvements can be modest or extensive, such as making changes to existing pavement markings or physically constructing a turn lane.

All costs associated with the design and construction of the access and roadworks to facilitate the development are 100% paid by the Developer/Owner.

## 4.2 TRAFFIC CONTROL IMPROVEMENTS

Traffic signal control improvements include any physical changes that must be made to the existing traffic control signal network to mitigate the impacts of a proposed development or access. These improvements may require the provision of additional signal hardware at an existing location and/or the installation of traffic control signals at a new location.

Any proposed and approved full movement accesses to a Regional Road will require the proponent to assess the need for traffic control signals by using the technical warrants established by the Ministry of Transportation Ontario (MTO) and Transportation Association of Canada (TAC), as well as engineering judgment. Traffic control signals will be required to be installed if warrants are met through the previous listed evaluation criteria. The traffic signals should be designed in reference with section 3 in the *"*Design Guidelines for Proposed Road and Traffic Signal Works on Region of Halton Roads".

## 4.3 TRAFFIC CONTROL DEVICES

When the construction and alteration of an access takes place, the Region may require traffic control devices to be installed, relocated, or removed on a Regional Road. The traffic control devices include regulatory or warning signs, traffic control signals, delineators, pavement markings, etc. The Region or its designate shall be the only party, which undertakes the installation, relocation, removal, and maintenance of such devices on the Regional road right-of-way. An easement may be required on private property for traffic control devices that are part of the Regional system in order for the Region to undertake ongoing or future maintenance.

The Region may require traffic control devices to be installed, relocated, or removed on private property. All such work including the installation, maintenance, relocation, and removal of such devices shall be the responsibility of the applicant and must be completed to the satisfaction of the Region. Where identified by the Transportation Impact Study, traffic signals shall be designed and installed in accordance with the specifications and requirements detailed in the "Uniform Traffic Signal Specifications for Operating Authorities with the Region of Halton" manual.

All traffic control devices, including pavement markings and traffic signs, are to be designed and installed in accordance with the latest version of the Ontario Traffic Manual

# 5.0 ACCESS DESIGN

Access Design Guidelines identify the design thresholds from which desirable operations can be maintained. Access Design Guidelines are an important part of the access design process. These Guidelines help the slower turning traffic move off the arterial road more quickly and help the traffic leaving the driveway turn and enter the stream of traffic more efficiently.

The traffic activities that occur on a site in the vicinity of the proposed driveway can also affect the traffic operations of the Regional Road. Key objectives for the effective management of traffic operations are: to reduce delay, remove the need for undesirable movements such as backing out onto the Regional Road, minimize turning conflicts, and maintain an acceptable level of safety for pedestrians, cyclists and motorists.

There are a number of site configuration issues that affect the physical design of the driveway and traffic operations into and out of the driveway. The access design should consider the following:

- Sight Distance Requirements – Section 5.1;
- Driveway Design – Section 5.2
- Auxiliary Lanes – Section 5.3;
- Angle of Intersection – Section 5.4;
- Illumination – Section 5.5;
- Drainage – Section 5.6; and
- Drive-Thru – Section 5.7

# 5.1 SIGHT DISTANCE REQUIREMENTS

## Decision Sight Distance

Decision sight distance is the distance required for a driver to detect an unexpected or otherwise difficult to perceive information source or hazard in a roadway environment that may be visually cluttered, recognize the hazard or its potential threat, select an appropriate speed and path, and initiate and complete the movement safely and efficiently. Under some conditions the added complexity of traffic and local conditions and driver expectancy may require longer times and distances to accommodate normal vehicle manouevers of lane changing, speed changes and path changes.

Decision sight distance is applied where pedestrians, vehicles or design features and topographic conditions must be addressed by the driver. Stopping sight distance is applied where only one obstacle must be seen in the roadway and dealt with. The difference between stopping sight distance in the context of decision sight distance is that the vehicle is forced to stop for some traffic condition, such as a queue of vehicles, rather then an object in the roadway.

In view of the complexity and variations in drivers' expectancy regarding situations associated with access management, **decision sight distance is the preferred criteria when reviewing**

**access management.** It allows drivers additional margin for error and affords them sufficient length and time to adjust their vehicle movements at the same or reduced speed of approaching traffic.

## Turning Sight Distance

Turning sight distance is the distance a driver entering a roadway from an access can see such that the vehicle can accelerate to a speed without significantly interfering with the vehicles approaching from the right. According to TAC, it is assumed that the main line vehicle will slow down to a speed 85% of the design speed and there should always be a gap of at least 2.0 seconds between the turning vehicle and the main-line vehicle.

Drivers may require longer sight distances at critical locations, such as intersections where several sources of information compete, where the intersection is on or beyond a crest of a vertical curve, or, where there is substantial horizontal curvature on the approach to the intersection area. Treatments such as landscaping and public art may contribute to the corridor aesthetically and possibly operationally (in terms of speed management). However treatments should not affect sight lines for entering or exiting vehicles or pedestrian/cyclist visibility approaching access points.

The provision of adequate sight distance is required to accommodate a driveway on a Regional Road. Inadequate sight distances will affect traffic flows and contribute to reduce safety. Direct access from a property to a Regional Road will be denied when the turning and/or decision sight distance cannot be attained and when restrictions on turning movements to and from a proposed development would not be practical.

# 5.2 DRIVEWAY DESIGN

Driveway design affects the ability of a driver to safely and easily enter and exit a site. The following criteria should be considered when designing accesses to Regional Roads.

The traffic activities that occur on a site in the vicinity of the proposed driveway can affect the traffic operations of the Regional Road. Key objectives for the effective management of traffic operations are: to reduce delay, remove the need for undesirable movements such as backing out onto the Regional Road, minimize turning conflicts, and maintain an acceptable level of safety for pedestrians and motorists.

There are a number of site configuration issues that affect the physical design of the driveway and traffic operations into and out of the driveway.

## Driveway Dimensions

Appropriate driveway width and radii are important design elements in ensuring safe and efficient flow of traffic to/from the Regional Road. The driveway dimensions should reflect:

- The proposed land use;
- The operational type (1-way or 2-way traffic flow);

- The traffic volume; and
- The design vehicles the driveway will serve.

Generally, larger radii are applied with narrower driveway widths and vice versa.

## Driveway Width

Driveway width should accommodate the appropriate design vehicles, control the location and angle of conflict points, and limit entry/exit to the intended number of lanes of operation. Whether a driveway will operate with one-way or two-way traffic flow should also be considered. **Table 2** illustrates recommended dimensions.

**Table 2 – Driveway Dimensions (Width)**

| Width (m) | Urban | | | Rural | | |
|---|---|---|---|---|---|---|
| | Residential | Commercial | Industrial | Residential | Commercial | Industrial |
| Minimum | 3.5 | 4.5 | 6.0 | 4.9 | 5.5 | 6.0 |
| Maximum | 7.5 | 9.0 | 12.0 | 9.0 | 9.0 | 12.0 |

Source: Transportation Association of Canada – 1999 Geometric Design Guide for Canadian Roads

It should be noted that the minimum width of commercial and industrial driveways is intended to apply to one-way operation. In high pedestrian activity areas such as in urban growth areas as identified within the Regional Official Plan or in the same block with community centre, school or library, the maximum basic width should be 9 m. The width is measured perpendicular to the centreline of the driveway, in most instances, at the inner limit of a curbed radius or between the line of the radius and the near edge of a curbed island at least 4.6 m in area.

## Driveway Radii

The radius of the curb return or amount of flare/taper of the curb connecting the edge of throat of a driveway with the edge of the nearest traveled lane affects the ease and speed of vehicles entering or exiting the roadway. **Table 3** illustrates recommended dimensions.

The following factors should be considered in designing the radius of the curb:

- The vehicle turning path making a right turn to or from the site;
- The width and nature of the driveway; and
- The width of the adjacent traffic lanes.

**Table 3 – Driveway Dimensions (Radii)**

| Right Turn Radius (m) | Urban | | | Rural | | |
|---|---|---|---|---|---|---|
| | Res. | Com. | Ind. | Res. | Com. | Ind. |
| Minimum | 1.5 | 3.0 | 4.5 | 3.0 | 4.5 | 7.5 |
| Maximum | 4.5 | 16.0 | 16.0 | 7.5 | 24.0 | 24.0 |

Source: Transportation Association of Canada – 1999 Geometric Design Guide for Canadian Roads

## Driveway Alignment

The introduction of a new driveway impacts directly on the existing traffic operations to and from the Regional Road. Careful integration of a new driveway into the existing operating character of the Regional Road is required to minimize turning conflicts and disruption to through traffic.
A centreline of a new driveway to the Regional Road should align with the centreline of any opposing existing driveway or roadway.

## Clear Throat Distance

Clear throat distance is the area provided on a driveway to store vehicles waiting to circulate into the site, usually a parking area. Failure to provide an adequate clear throat distance can create congestion and queuing of vehicles onto the Regional Road. This can result in as well as safety concerns for pedestrians/cyclists attempting to cross the driveway and on-road vehicle-vehicle conflicts.

The driveway throat should be designed to enable traffic leaving the site efficiently.

A queuing study may be required to determine that an appropriate amount of storage space is provided.

Adequate parking is required for all new developments. All parking areas should be designed to minimize conflict with traffic on Regional Roads. The amount of storage space required is directly related to the peak hour traffic demands of the parking lot, and should be assessed on a site-by-site basis.

# 5.3 AUXILIARY LANES

Auxiliary lanes can minimize the conflict between turning vehicles and following through traffic by providing storage space, which results in smoother traffic flow, and increased capacity and safety. Turning lanes should be utilized to minimize the difference in speed between turning and through vehicles and used to eliminate encroachment of turning vehicles into adjacent lands. Considerations will be made for transportation infrastructure, environmental and utility conflicts. All auxiliary lane designs must be in accordance with the TAC Manual – 1999 Geometric Design Guide for Canadian Roads.

## Right Turn Lanes

Right turn tapers are required on Regional Roads at accesses that:

- Have sufficient volume of decelerating vehicles;
- Have right turn volume at signalized intersections of 10% of the through traffic volume; or
- Have constrained sight distance approaching the access

The storage length required can be calculated by the following formula

$$S = NL/30$$

Where S = storage length
N = design volume (vph)
L = length of an average vehicle

The recommended taper is a function of design speed as summarized in **Table 4**.

**Table 4 – Right Turn Lane Tapers**

| Design Speed | Design Domain for Taper Ratio | Parallel Lane Length (m) |
|---|---|---|
| 50 | 11:1 – 17:1 | 35 – 75 |
| 60 | 14:1 – 17:1 | 40 – 90 |
| 70 | 17:1 – 20:1 | 50 – 110 |
| 80 | 17:1 – 24:1 | 60 – 130 |

Source: Transportation Association of Canada – 1999 Geometric Design Guide for Canadian Roads

# Left Turn Lanes

When the number of left-turning vehicles entering an access is sufficient to create a hazard, and reduces capacity, consideration should be given to the provision of a separate left-turn lane. Left turn lane requirements are based on:

- Volume warrants;
- Roadway environment conditions such as sight distance constraints (there should be sufficient decision sight distance approaching a turning point);
- Safety considerations.

The minimum design length (parallel) of left turn lanes is 15 metres, however the storage plus the taper should at least equal the deceleration length. The recommended taper is a function of design speed as summarized in **Table 5**. The lower end of the range should only be used in constrained urban conditions.

**Table 5 – Left Turn Lane Tapers**

| Design Speed | Design Domain for Taper Ratio | Horizontal Curve Taper R (m) |
|---|---|---|
| 50 | 8:1 – 30:1 | 500 |
| 60 | 15:1 – 36:1 | 750 |
| 70 | 15:1 – 42:1 | 1000 |
| 80 | 15:1 – 48:1 | 1200 |
| 90 | 27:1 – 54:1 | 1500 |
| 100 | 30:1 – 60:1 | 2000 |

Source: Transportation Association of Canada – 1999 Geometric Design Guide for Canadian Roads

## 5.4 ANGLE OF INTERSECTION

The angle of intersection is the degree at which a driveway or road intersects with the Regional Road. It is desirable that the centerline of the new driveway and the centerline of the Regional Road meet at or nearly at right angles ($90^o$) to ensure safe sight visibility when maneuvering to and from the site.

The angle of intersection at which a new driveway intersects with the Halton Regional Road should be $90^o$. A minimum acute angle of $70^o$, as measured from the driveway curb line, may be acceptable. An angle of intersection less than $70^o$ or greater than $110^o$ will not be permitted. For one-way driveways, a skewed intersection in the range of $45^o$ to $60^o$ may be appropriate in certain situations and should be discussed with staff to confirm.

## 5.5 ILLUMINATION

All roadway illumination design and installation shall be carried out in accordance with the latest version of the following or applicable standards:

- Guide of the Design of Roadway Lighting – Transportation Association of Canada
- Illumination of Isolated Rural Intersection – Transportation Association of Canada
- Design Manual for Traffic Barriers, Energy Attenuators, Light Poles – Ontario Ministry of Transportation

### At-Grade Illumination

Roadway illumination is required for at-grade intersections and entrances to commercial/industrial/institutional/high density development where:

- Separate left-turn or right-turn lanes are provided;
- Traffic is channeled by means of raised median islands on one or more approaches;
- Traffic signal is installed;
- Multi-lane undivided approaches are present and warrants for traffic signals are at least 80 percent met; and
- Multi-lane undivided approaches are present and through traffic volumes is in excess of 6,000 AADT.

Provision for future illumination is required for at-grade intersections where the requirement to illuminate the intersection is not immediately met but increase in traffic and other factors in the future will warrant illumination. The provision of the underground ductwork underneath pavement structures will be required.

### Structures

Roadway illumination is required on all structures where:

- Approaches to the structure are illuminated;
- Traffic travels under a structure for a distance greater than 25 metres and where regular night time pedestrian traffic is expected; and
- All pedestrian tunnels/over passes.

Provisions for future illumination is required for all structures. These requirements shall include duct bank along the structure and concrete plinths for future street light pole installations.

## 5.6 DRAINAGE

Accesses must be constructed so that they do not adversely affect the roadway drainage, drainage on adjacent properties or the drainage or stability of the roadway subgrade. The construction of an access must not cause water to flow across the road pavement, to pond on the shoulders or in the ditch or cause erosion within the highway.

### Existing Gutter

Where drainage is carried along the curb, the access must be sloped to prevent run-off spillage into private property and the flow line of the gutter through the access shall be maintained.

### Existing Ditch

A culvert pipe shall be installed where construction of an access necessitates crossing an open ditch. The culvert shall be installed such that the invert elevation is compatible with the profile of the existing ditch line. No ditch or gutter shall be filled without adequate alternate provision for drainage being made.

Culvert pipes shall be of a size adequate to carry the anticipated flow in the ditch as determined by the Region. In most instances, the size of the culvert pipe shall not be less than 400mm inside diameter.

The structural material and gauge of the culvert pipe shall be adequate to withstand the anticipated vehicular traffic across the access and shall meet the Regional specifications as identified in Halton Region's Geometric Design Guidelines.

## 5.7 DRIVE-THRU

Drive-thru facilities at car washes, banks, service station kiosks, and fast food restaurants can result in significant vehicle queues. Parking and circulation activities on these sites should be accommodated simultaneously without creating internal conflicts that may result in congestion or queuing on the Regional Road.

The provisions of a drive-thru facility should meet the following criteria:

- Drive-thru traffic is separate from other site traffic and parking facilities;
- The drive-thru area and the remaining parking lot circulation is clearly defined and delineated with appropriate pavement markings and signage;
- Adequate vehicle queue storage is provided to meet the peak design traffic demands so as not to interfere with pedestrian and/or vehicular movements and must be maintained within the site to prevent vehicles queuing on the roadway; and
- Discourage drive-thru facilities within the identified urban growth areas.

The amount of stacking space provided on a site with a drive-through must be sufficient to accommodate the range of potential tenants. This demand should be sensitive to the changes in potential uses and current surveys of demand. Sites with access to a Regional Road should provide sufficient storage for vehicles without impeding site circulation or blocking parking or site loading.

A queuing study may be required to determine that an appropriate amount of storage space will be provided.

# 6.0 REFERENCES


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# 7.0 APPENDIX A

. **Region of Halton Transportation Facility Classification**

| Facility Type | Function | General Design Guidelines |
|---|---|---|
| Provincial Freeways | ▪ Serve mainly inter-regional travel demands<br>▪ Accommodate all truck traffic<br>▪ Accommodate higher order transit services and high-occupancy-vehicle lanes<br>▪ Carry high volumes of traffic<br>▪ Connect Urban Areas in different regions | ▪ Full access control<br>▪ Minimum 4 travel lanes<br>▪ Noise-sensitive land uses to be discouraged along right-of-way |
| Provincial Highways | ▪ Serve mainly inter-regional travel demands<br>▪ Accommodate all truck traffic<br>▪ Accommodate higher order transit services and high occupancy vehicle lanes<br>▪ Carry high volumes of traffic<br>▪ Connect Urban Areas in different regions | ▪ High degree of access control<br>▪ Transit-supportive, high density, mixed use development to be encouraged along right-of-way within urban areas<br>▪ Right-of-way requirements vary |
| Major Arterials | ▪ Serve mainly inter-regional and regional travel demands<br>▪ May serve an Intensification Corridor<br>▪ Accommodate all truck traffic<br>▪ Accommodate higher order transit services and high occupancy vehicle lanes<br>▪ Connect Urban Areas or Nodes different municipalities<br>▪ Carry high volumes of traffic<br>▪ Distribute traffic to and from Provincial Freeways and Highways | ▪ High degree of access control<br>▪ Transit-supportive, high density, mixed use development to be encouraged along right-of-way within urban areas<br>▪ Right-of-way requirements up to 50m |
| Multi-Purpose Arterials | ▪ Serve a mix of functions of Major Arterials and Minor Arterials | ▪ Intermediate degree of access control<br>▪ Transit-supportive, high density, mixed use development to be encouraged along right-of-way within urban areas<br>▪ Right-of-way requirements up to 50m |
| Minor Arterials | ▪ Serve mainly local travel demands<br>▪ May serve an Intensification Corridor<br>▪ Accommodate local truck traffic<br>▪ Accommodate local transit services<br>▪ Connect Urban Areas within the same municipalities<br>▪ Carry moderate to high volumes of traffic<br>▪ Distribute traffic to and from Major and Multi-Purpose Arterials | ▪ Intermediate degree of access control<br>▪ Right-of-way requirement generally up to 35m unless specifically identified in a Local Municipal Official Plan |

| | | |
|---|---|---|
| Higher Order Transit Corridors | ▪ Serve inter-municipal and inter-regional travel demands by public transit<br>▪ Serve an Intensification Corridor<br>▪ Accommodate higher order transit services<br>▪ Connect Urban Growth Centres and Mixed Use Nodes | ▪ Exclusive right-of-way for transit vehicles where possible<br>▪ Transit-supportive, high density, mixed use development to be encouraged around stations |
| Major Transit Stations | ▪ Part of high order transit network<br>▪ Serve inter-municipal and inter-regional travel demands by public transit<br>▪ Complements Intensification Areas | ▪ Connecting the higher order transit service with other transportation modes<br>▪ Facilities for mode transfers such as bicycle parking, automobile drop-off/pick up<br>▪ Surrounded by transit-supportive, high density, mixed use development to ensure the viability of high level of transit services |
| Rail Lines | ▪ Serve all types of people and goods movements by rail at the regional or national scale<br>▪ Accommodate commuter rail movement to Urban Growth Centres in the Greater Toronto and Hamilton Area and surrounding region | ▪ Grade separations at intersections with other major transportation facilities where warranted<br>▪ Noise- or vibration-sensitive land uses to be discouraged along right-of-way<br>▪ Transit-supportive, high density, mixed use development encouraged around Major Transit Stations |

Source: Halton Region Official Plan, 2009