4.6 General Guidelines

Design Speed

Design speed, the speed selected as a basis to establish appropriate geometric design elements for a roadway corridor, includes the following cross-sectional design elements:

- Travel lane width
- Cycling lane width
- Curb radii
- Shoulder width
- Clear zone
- Sight triangles
- Sight distance

Objectives

When selecting a design speed for a corridor, respect the roadway typologies to create a safer environment for all corridor users, including motorists, pedestrians, cyclists and transit users. The relationship between posted speed and design speed is key.

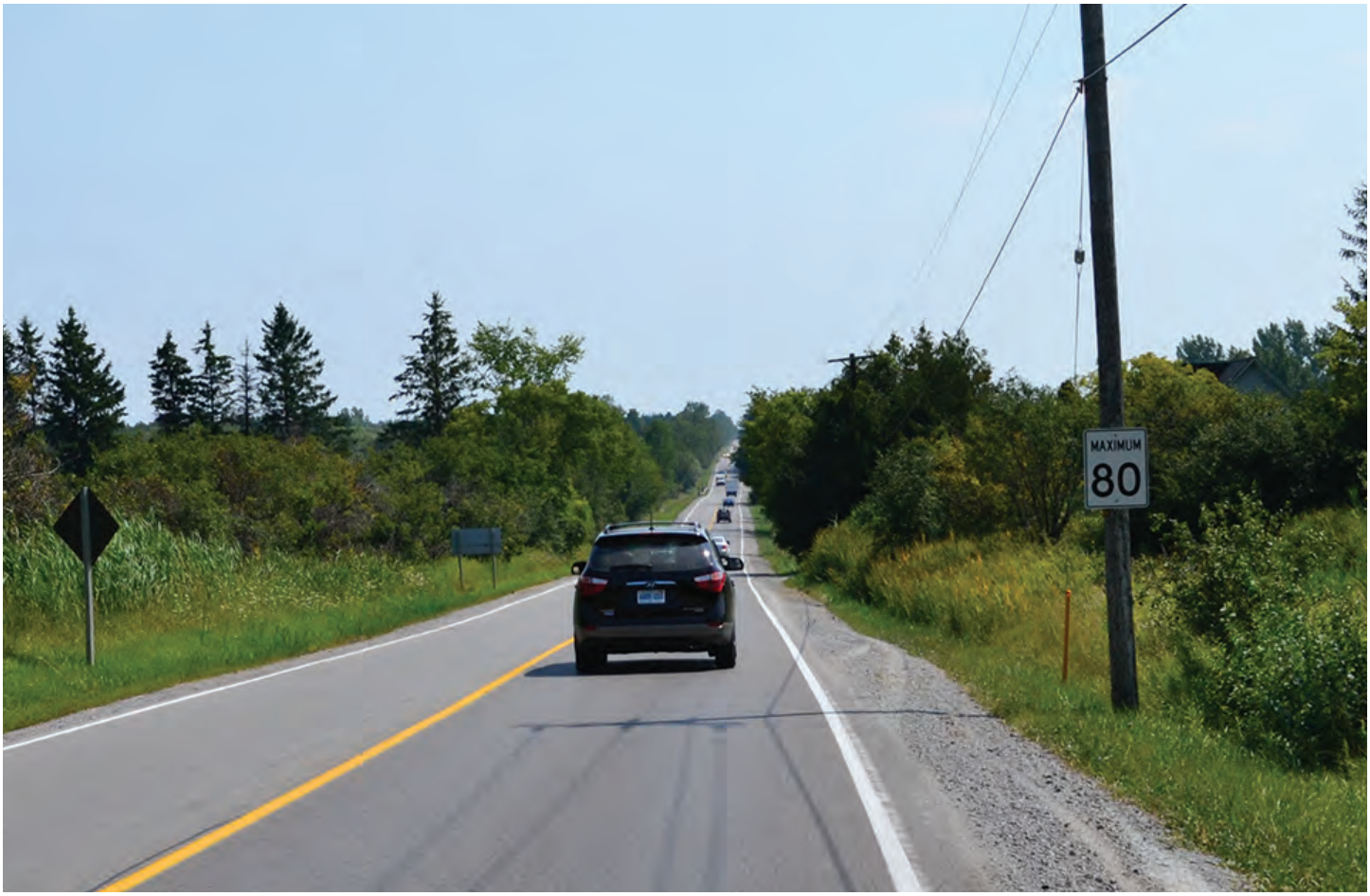
Design speed is a primary factor in selecting the horizontal and vertical alignments for roadways and influences how comfortable motorists feel traveling the corridor and the resulting operating speed. It is important to select geometric design elements that support comfortable travel without encouraging drivers to exceed a roadway's intended operating speed.

Guidelines

- Setting an equivalent roadway design speed and posted speed for lower speed corridors provides a measure of comfort, safety and flexibility in corridor design. This practice is used in several US states including Pennsylvania and Virginia. NCHRP Report 504 also suggests future flexibility within the AASHTO policy to follow these same guidelines
- Additional information regarding this practice can be found in the ITE *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (2010)* and the New Jersey Department of Transportation and Pennsylvania Department of Transportation's *Smart Transportation Guidebook – Planning and Designing Highways and Streets that Support Sustainable and Livable Communities (March 2008)*
- For lower speed corridors (with posted speeds of 60km/h or less), it is recommended that the design speed equal the posted speed
- For roadway corridors with a posted speed of 70km/h or greater, it is recommended that the design speed be 10km/h greater than the posted speed (see Table 1 on the following page). This will allow greater flexibly for the designer in terms of radius, clear zone and other roadway elements/features within the right-of-way, while delivering a safer and more cost-effective roadway
- Table 1 shows Recommended Posted vs Design Speeds for Regional Roads

Further Details

- ITE: Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (2010)
- New Jersey DOT/Pennsylvania DOT: Smart Transportation Guidebook – Planning and Designing Highways and Streets that Support Sustainable and Livable Communities (March 2008)



Consider appropriate design speed and posted speed for the roadway

Table 1 Recommended Posted Speeds and Design Speeds for Regional Roads	
Posted Speed (km/h)	**Design Speed (km/h)**
40	40
50	50
60	60
70	80
80	90
90	100
100	110

Utilities

The provision of utilities by means of designating utility corridors is one of the primary roles of the public road allowance. Underground and above ground utilities have major impacts on the design and function of a roadway.

Most Regional capital works projects have constraints that generally require the designer to develop consensus amongst the owners/operators of the pipework and utilities under the guidance of the Region as the right-of-way manager.

Objectives

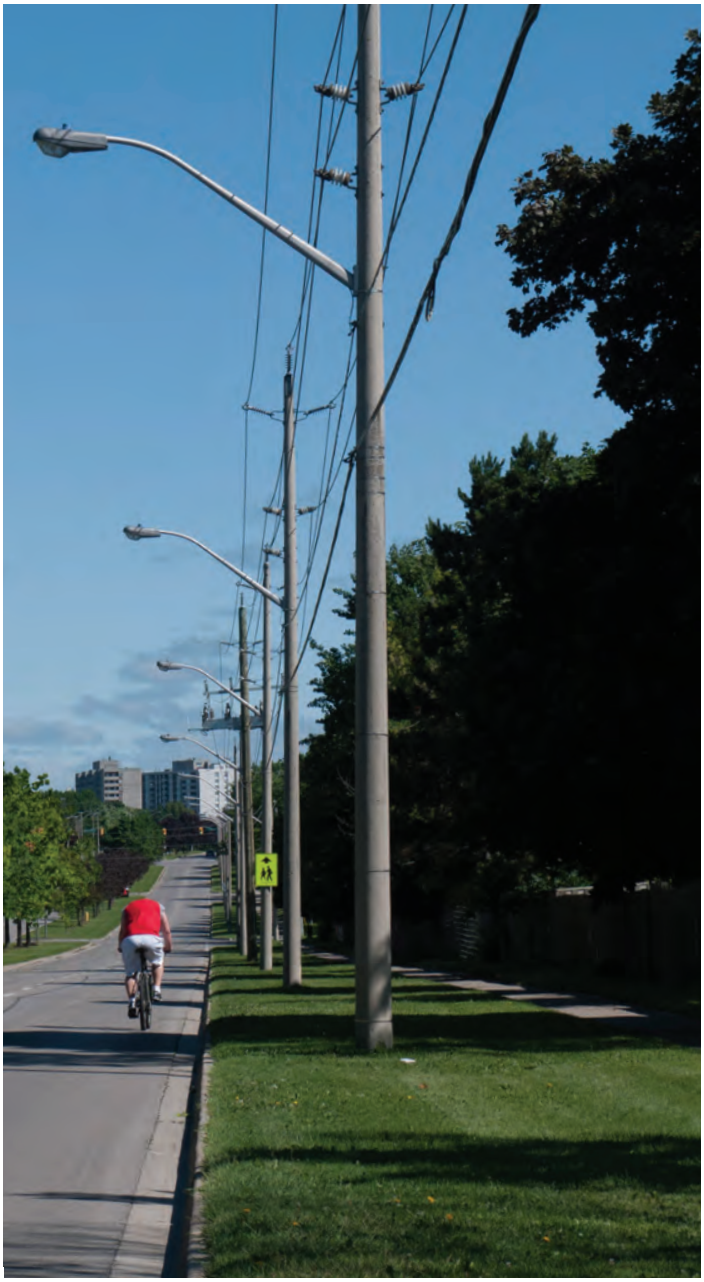
Above and below grade utilities need to be located in a safe and efficient manner. Coordinating utilities and boulevard elements is essential to ensure adequate access for repairs and services, to minimize disruptions to the pedestrian clearway and traffic and to ensure the safety of maintenance personnel. However, strategies should also be adopted to create a relatively compact edge of road condition.

Guidelines

- Consider joint utility trenches to achieve a higher quality pedestrian realm and narrower right-of-way
- Consideration should be given to maximizing the service life of all infrastructure in the right-of-way, as well as minimizing lifecycle costs by means of coordination and the completion of an integrated planning and design process with the right-of-way stakeholders
- Standards for the placement and location of utilities must be observed, however the design of these spaces should proactively consider coordination, impact on the public realm and long-term service life
- Coordinate the scheduling of Regional, public and/or private utility capital works programs
- Implement damage prevention programs
- Document and retain as-built records of all constructed infrastructure
- Bury hydro facilities, services and utilities where practical, in order to minimize visual impact in accordance with the Regional Official Plan policy 7.5.6.
- A 3 metre separation between power lines and any physical development is preferred however, it is understood a 3 metre separation may not always be practical in urban areas. The minimum setback between the back of curbs and the edge of poles is 1 metre.
- Locate utility poles 3-4 metres from the

property line on rural roads and in accordance with existing guidelines for minimum sightline and sight triangle distances
- Overhead clearance requirements are a function of site condition and may vary along an alignment. Ensure the overhead clearance zone is in accordance with CSA Standard C22.3 No.1-15 Overhead Systems
- Minimize the visibility of utility accessories, such as utility boxes, by providing accessories in inconspicuous places and/or by screening them with plantings. Ensure such screening does not interfere with access to the accessories. Utility providers should also consider innovative methods of containing utilities and determining locations for large utility equipment and utility cluster sites
- Coordinate streetscape plans with service/utility plans to minimize long-term conflicts with tree roots and branches
- Maintain a 1 metre clearance between watermain and tree roots
- Consider subsurface or trenchless technology installation rather than tree removal to address conflicts with underground utilities
- Where feasible and to assist with concealing utility infrastructure, consider using paver trays that are clearly identified and easy to remove

Further Details
- York Region Sight Triangle Manual
- CSA Standard C22.3 No.1-15 Overhead Systems



Hydro lines and trees are offset to allow trees to grow to maturity

Noise Attenuation

Traffic on arterial roads adjacent to residential areas can cause disruptive noise to residents. This is especially true on higher speed, higher volume arterial roads. Noise levels must conform to provincial and municipal guidelines and York Region's Traffic Noise Mitigation Policy.

The traditional solution has been to build noise attenuation fences or walls to isolate the arterial road from adjacent neighbourhoods, thereby imposing a continuous barrier to pedestrian traffic. Alternatives that are more context-sensitive exist to design the roadway itself to reduce vehicle noise.

Objectives

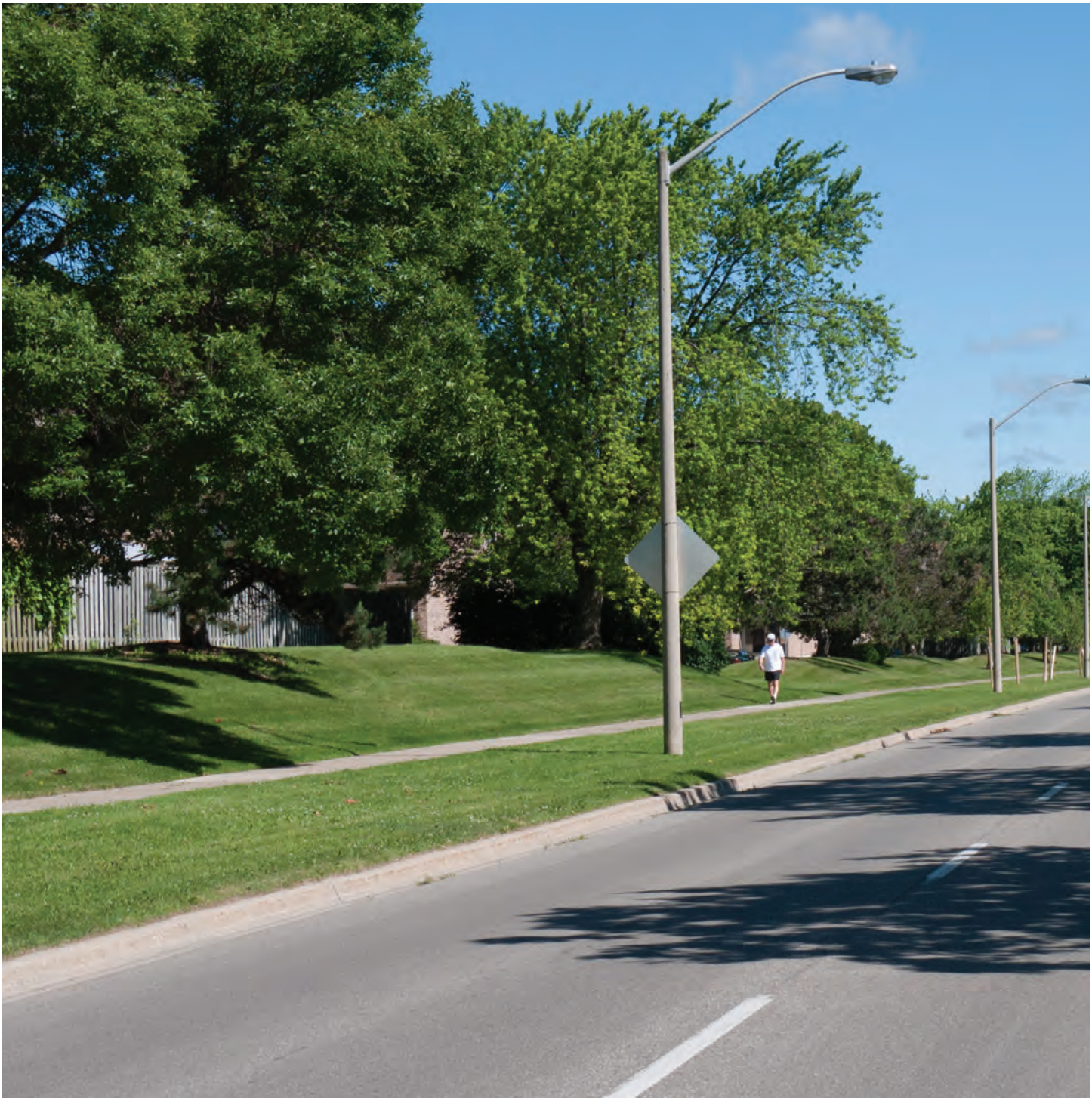
Noise attenuation strategies should begin with the design of the road itself in supporting a posted speed reduction. This can be accomplished through the provision of visual cues to reduce vehicle noise, such as narrowed traffic lanes, paving material changes, on-street parking or vegetation near intersections. Remaining noise should be blocked without the use of fences or walls, to the greatest extent possible. If, as a last resort, noise fences or walls are required, every effort should be made to reduce their visual impact and avoid blocking pedestrian and bike access.

Guidelines

- Promote street oriented development. Where possible, buildings themselves should buffer vehicle noise as opposed to other noise attenuation measures such as walls, fences and berms
- Reduce noise at the source by reducing the speed of vehicles through design consistent with the roadside environment
- Eliminate rattling maintenance hole covers as a source of noise by positioning them where vehicles will be less likely to run over them (e.g. at the centre of traffic lane)
- Necessary land requirements should be determined in the development application process prior to draft approval (e.g. plans of subdivision), including keeping sight lines and sight triangles clear
- Avoid using noise attenuation fences or walls if possible. They should only be used as a last resort and should integrate pedestrian connections to the adjacent communities
- Integrate the design of attenuation fences and walls with their surroundings using a variety of designs, colours and textures, vines and other plantings. If required, attenuation fences or walls should be visually appealing. Select materials based on life span and future maintenance

Further Details

- Standard Operating Procedures (SOPs) for Traffic Noise Mitigation on Regional Roads and York Region Noise Barrier Design Standards (To access the latest version of this document please contact the Program Manager, Portfolio Implementation, Transportation and Infrastructure Planning branch)



Landscaped berm beside a roadway reduces noise for adjacent homes

Special Character Streets/Scenic Roads

Historic downtowns, heritage buildings and natural spaces are some of the most valued assets of any community and provide an important sense of place and identity for the municipality. They are both a link to the past and an anchor for future economic growth. The design of arterial roads through such areas is typically unique, reflecting the specific history and/or visual or natural character of each place. The balance between land use, built form and the transportation characteristics of the road corridor also tend to be very specific and unique.

The term "Scenic Roads" refers to Regional roads characterized by natural, cultural heritage and recreational features that contribute to their scenic value. These features may include traditional main streets, large trees, heritage buildings, rural character, watercourse crossings, views to natural beauty and interesting highway geometry.

Objectives

It is an objective of the York Region Official Plan to encourage and support the conservation of significant landscapes, views and vistas. Defining features of a Scenic Road should be identified during the beginning stages of the Decision Making Process, and where feasible, the scenic value of such features should be protected and/or enhanced along Regional roads. Local municipalities should be encouraged to establish policies in their Official Plans to protect the scenic value of Regional roads.

Guidelines

- Priority should be given to maintaining those features which are special or scenic, provide ecosystem services and intrinsic natural value and preserve the character of the place. This includes heritage or unique built form, heritage planting, scenic road configurations such as bends or valleys and open space connectivity
- On scenic main streets, avoid narrowing sidewalks and removing on-street parking and/or landscaping. The presence of slow moving through-traffic, on-street parking and a quality public realm are all required to preserve and enhance existing retail uses
- Only consider a by-pass of a hamlet or village after completing a market feasibility study, which can be included within the Environmental Assessment process, having regard for the provisions of the York Region Official Plan
- Allow for flexibility in road widths through the Environmental Assessment process to reduce impacts on the natural heritage system, such as watercourse crossings
- Examine unique design initiatives, such as higher order landscaping and streetscaping, for places of historic, cultural or natural importance, in consultation with the public and community
- Integrate the design of the road edge with adjacent open spaces, where arterial roads cross or are adjacent to significant natural areas, watercourses and open spaces

Further Details

- York Region Official Plan

Scenic road over watercourse, St. John's Sideroad

Natural Heritage

The natural heritage system, also called the Greenlands System in York Region, includes terrestrial and aquatic habitats, such as wetlands, watercourses, forests and meadows and landform features such as valleys and linkage areas. Road networks can significantly impact the terrestrial natural heritage system, valley land management and water management. Road crossings of the natural heritage system can also contribute significantly to urban design and sense of place.

Objectives

Road design and construction should avoid key natural heritage and hydrologic features where possible. Road design should improve the resiliency of the natural heritage system to the stressors of climate change and integrate the natural environment into the design process early on and wherever possible.

It is the policy of the Official Plan (2010, Cons. 2016) to enhance natural heritage systems (e.g. Section 2.1.20 and 8.2.4). More efficient and sustainable modes of transportation (including transportation demand management) will reduce the need to expand infrastructure, which helps protect natural heritage features in the Region.

Guidelines

- Integrate natural heritage system into all road design projects in close proximity to, or otherwise impacting, natural heritage features
- Minimize impacts to the natural heritage system, such as reduced road widths over sensitive corridors and implementation of low-impact development measures
- Consider options to maintain natural connectivity of the landscape for ecological purposes, such as the addition of animal or amphibian crossings
- Consider opportunities for naturalized planting as opposed to street tree planting
- Preserve existing vegetation and incorporate reforestation and naturalization along roads
- Consider opportunities for trail connections and the facilitation of safe road crossings for trail users
- Undertake strategic enhancements to the Greenlands System as part of road design wherever possible
- Work with the local Conservation Authority to identify other opportunities, such as sizing and locating crossing structures appropriately
- Consider urban forests along roadways as a tool to manage species diversity, provide soil volume and quality, expand the urban canopy, and manage stormwater, noise pollution and traffic calming
- Consider opportunities for using the natural heritage system and urban forests to moderate micro climate effects and build climate change resilience for road infrastructure and the community
- All applicable environmental acts and regulations must be adhered to

Further Details

- York Region Forest Management Plan (2016)

Major Infrastructure

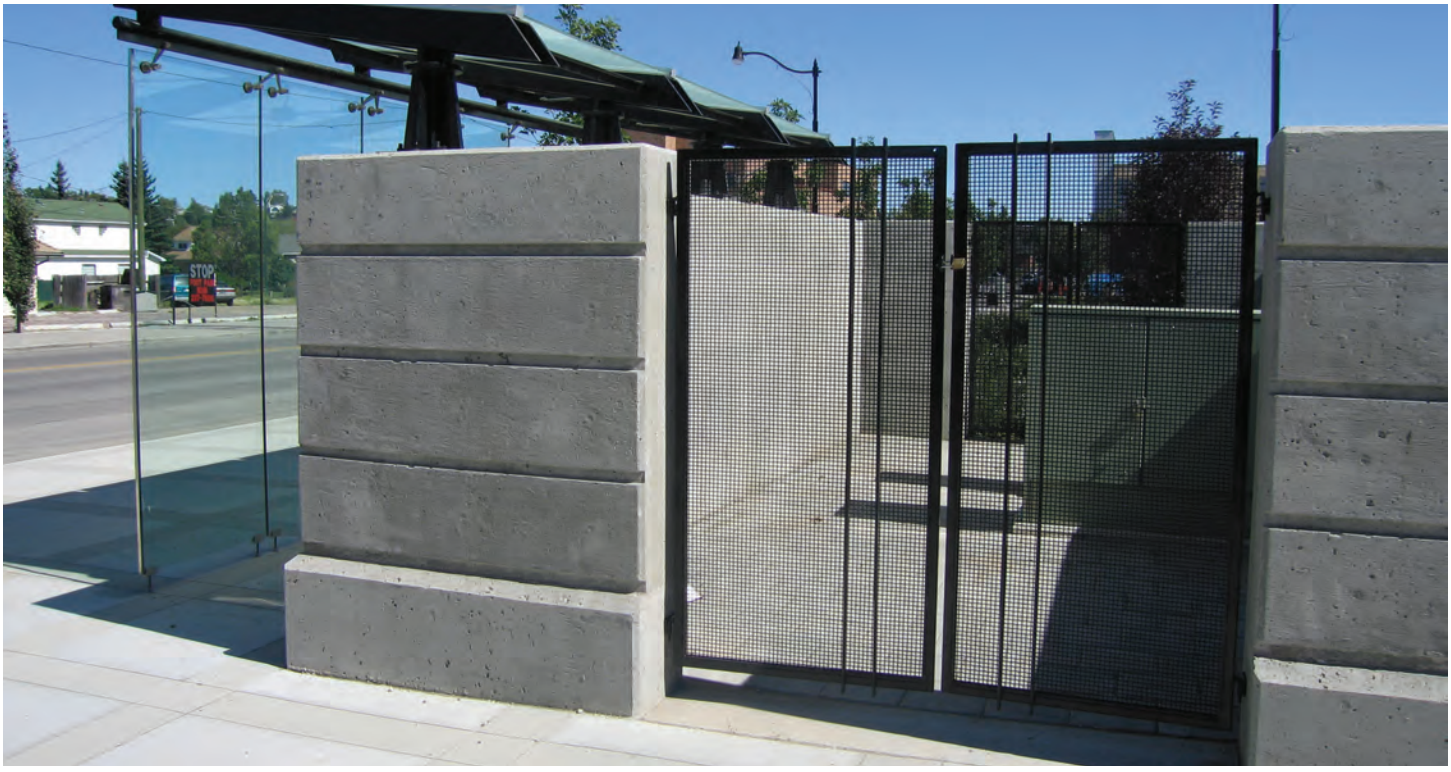
Major infrastructure considered in the road design and construction process includes bridges, overpasses, railway crossings, retaining walls, pumphouses and other utility infrastructure.

Objectives

Infrastructure found within or adjacent to the street should be fully integrated within the road design process. Consider opportunities to enhance the viewscape of the natural heritage system and explore architectural form, finishes and colours that make infrastructure a positive feature or better integrated into a community and context.

Guidelines

- Apply attributes of Regional road typologies to major infrastructure
- Consider integrated design of major pieces of infrastructure so they reflect and are sensitive to the context
- Integrate parapet walls, columns, ornamental lighting, railings, lookouts, public art and environmental features where possible, considering local history, architecture, natural species or special characteristics
- Enhancements should be low maintenance and not obstruct movement or sightlines
- Consider ease of access to utility infrastructure



Screening of utilities infrastructure is integrated into streetscape and bus stop design

Access Control

Access control determines the number, spacing and design of access points to roads, such as intersections, driveways and curb cuts, that are appropriate for the specified road typology.

Objectives

The objectives of access control include:

- Safety: Good access control can reduce vehicular collision rates. Controlling the number and width of driveways reduces areas of exposure for pedestrians and cyclists along a roadway
- Mobility: Spacing traffic signals at appropriate distances permits signals to be coordinated for optimized operation. Optimal signal spacing can reduce the need to increase a roadway's capacity through widening
- Aesthetics: By providing raised medians and reducing the width of driveways, more room can be used for streetscape

Guidelines

- The highest level of access control is desirable for the City Centre Street and Main Street typologies to address safety issues associated with the greater quantity and frequency of interactions between vehicular and active modes of travel
- A high level of access control is desirable for the Avenue typology to support its function as a goods movement corridor with generally uninterrupted flow characteristics
- A moderate degree of access control is desirable for the Connector and Rural Hamlet Road typologies given the reduced frequency of interactions between vehicular and active modes of travel
- Sidewalks, walkways and cycle tracks should be continuous across private entrances and special tiles/grooves should be considered to warn pedestrians when approaching driveways
- Table 2 shows the comparison between the road classification in the Access Guidelines for Regional Roads and the Designing Great Streets typologies. The Access Guidelines should be updated to reflect the Designing Great Streets typologies
- Where intersections are more than 500m apart, pedestrian crossings to access transit stops should be considered.

Further Details

- York Region Access Guidelines for Regional Roads

Table 2: Road Classification

Class	Access Guidelines Description	Designing Great Streets Description
I	Rural - 2 Lane	Rural Road
II	Rural - Multilane	Rural Road
III	Main Street	Main Street/Rural Hamlet Road
IV	Commercial/Commuter	Connector/City Centre Street
V	Commuter	Connector/Avenue
VI	Expressway	N/A

Servicing and Commercial Loading Zones

Servicing and loading are essential functions in urban environments and road design must consider the need for building access for servicing, including garbage, utilities and maintenance. Commercial loading zones are also required for deliveries and pick-ups at commercial, office, institutional and other buildings.

Objectives

Access points for servicing and loading should be located to minimize interruptions for pedestrians, cyclists, transit users and other vehicles on the street. Loading zones should provide convenient access to commercial and office buildings, while not obstructing movement.

Guidelines

- Require formal rear laneways as part of new development
- Access, servicing and loading should be integrated within buildings to minimize visual and physical impacts on the public realm. Where this is not possible, it should be located at the side or rear of buildings and visual impact minimized through careful screening
- Where possible, service, loading and outside storage areas should be coordinated
- Shared access to these facilities is encouraged to minimize curb cuts and the movement of servicing and loading vehicles
- Servicing enclosures and storage areas should be constructed of materials that complement the main building. Chain link fencing is highly discouraged
- Where curbside or dedicated lay-by loading is necessary, adequate space and coordination with on-street parking must be considered
- Reduce loading and unloading times by encouraging efficient use of curbside loading space
- Ensure the allocation of curbside loading space is consistent with the adjacent land use
- Right-size loading zones for the land uses they will service
- Create safe curbside loading zones that do not cross cycle tracks where possible

Further Details

- York Region Access Guidelines for Regional Roads
- Ontario Freight Supportive Guidelines (2016)

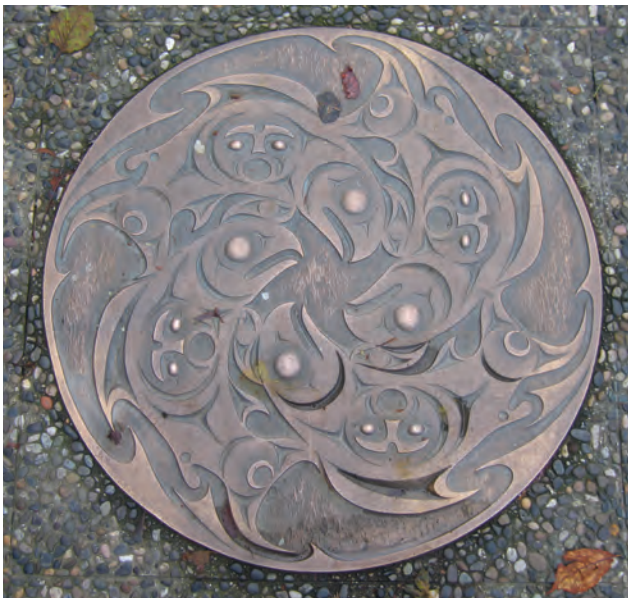
Parking and servicing accessed from a rear lane

Public Art

Public art is art that is temporary or permanent, is accessible to the public and enhances or provides interest to the public realm. It can also educate or bring awareness to a special aspect of the area or community. Some art can be integrated into a planned public works project, such as sidewalk inlays. Other pieces are stand alone and represent an element or character of the place. Public art can be used to bring awareness to unique context and heritage or to highlight landmarks, views and vistas. Public art is supported in York Region's Official Plan (2010) (Policy 3.4.13), and is even encouraged as part of development proposals (Policy 5.4.6(k)).

Objectives

Public art should be used where possible to beautify, improve and provide interest to the public realm. Public art pieces should be located in areas that do not interfere with the pedestrian clearway or vehicular traffic.



Examples of public art integrated into streetscape

Guidelines

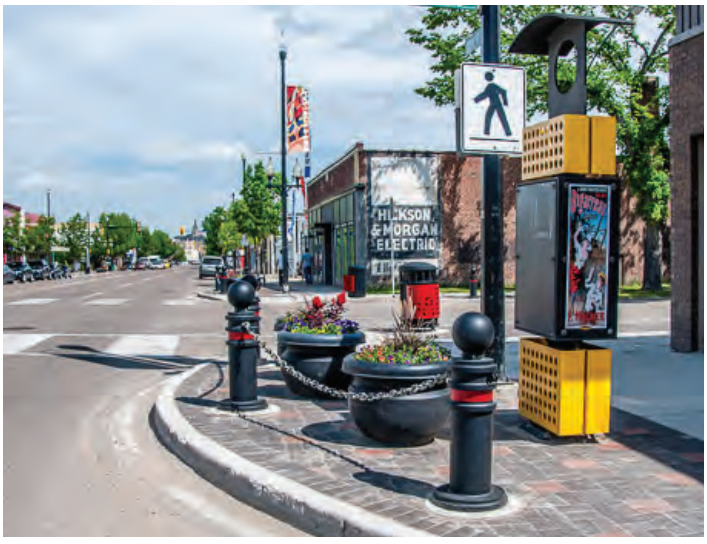
- Recommended public art locations include sites of cultural significance or high-use areas such as public parks, plazas, street intersections, walkways, trails, courtyards, gardens and institutional or public building sites
- The use of public art should be limited near forms of traffic control (e.g. stop signs) in order to minimize driver distractions and sightline obstructions
- Public art should be designed specifically for its location and to add to the identity and profile of the community
- Public art pieces should be durable and easily maintained
- Public art should be physically and visually accessible, barrier-free and incorporate universal design principles. For example, public art is encouraged to incorporate Braille on interpretive materials and include touchable maquettes whenever possible

Traffic Signal and Illumination

Above ground infrastructure such as traffic signals, control boxes and illumination poles are infrastructure that support a safe and efficient traffic movement and must be considered in the road design and construction process.

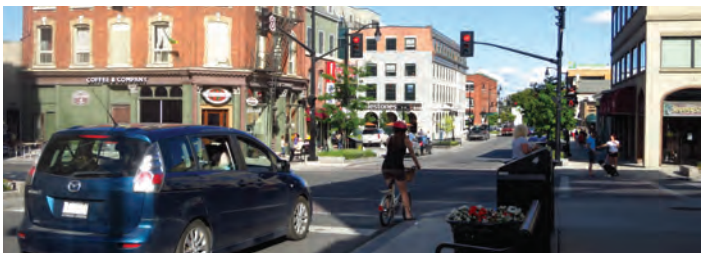
Objectives

The placement of this infrastructure is based on specific guidelines/standards and needs to be fully integrated within the road design process. Consider the context and opportunities to apply a unique design that reduces pole clutter and creates a sense of place. This can be achieved through finishes, colours that make the infrastructure a feature that contributes positively to the community. Colour, texture, coordinate with other elements within the boulevard such as crosswalk ramps, planters, planted areas, site furniture, etc. This is especially important in city centres, urban avenues and connector road typologies.



Strategic placement of illumination poles reduces clutter and creates a sense of place

- Apply an integrated design approach for traffic signals and illumination poles
- Traffic signal and illlumination pole placement at all intersections shall ensure clear and unencumbered access for pedestrians and cyclists
- Consider consolidating poles to reduce pole clutter, improve operations and meet accessibility requirements
- Consider underground and overhead utilities as well as street trees to ensure that proper clearances are maintained
- Consider energy efficient light standards and dark sky compliant luminaires that support and complement municipal streetscaping objectives
- Consider colour coordinating traffic signal and illumination poles where possible
- Colour and textured enhancements to traffic signals and illumination poles should be a high quality architectural finish to reduce maintenance
- Consider integrating traffic signal boxes within the planting and furnishing zone to improve accessibility for pedestrians and minimize potential future relocation costs
- Consider painting or wrapping traffic signal boxes in a manner that is sensitive to the surrounding streetscape. The finish may be featured as an artistic piece of infrastructure



Climate Change Mitigation and Adaptation

Greenhouse gases (GHGs) directly contribute to climate change, which is leading to changes in long-term weather patterns, extreme weather events and natural hazards. From 2009 to 2017, the oil and gas sector and transportation sector saw the largest increases in GHG emissions as compared to other industry sectors. Climate change will have serious human, environmental and economic costs that will impact how the transportation system is designed and how it functions.

The Region is committed to ensuring the environmental health of its residents and is managing emissions and greenhouse gases through sustainable transportation infrastructure planning and implementation.

Objectives

Climate change will affect the way the Region plans, designs, constructs, operates, maintains, and decommissions infrastructure. Designing streets that encourage more sustainable forms of transportation will help communities reach their GHG reduction goals. Designing streets that are resilient to the damaging effects of climate change will minimize costly future investments, disruptions to operations and protect human health and wellbeing.

Guidelines

Designing streets for climate change requires both mitigation measures to reduce GHG emissions and adaptation measures to manage the impacts of climate change. Mitigation measures have the potential to reduce emissions that contribute to climate change in support of Ontario's Climate Change Action Plan goals of reducing GHG emissions and shifting to a low carbon economy. Adaptation methods will be important to consider in the design of streets. Adaptation methods will result in streets that are more resilient to the impacts of climate change and that support a more resilient natural heritage system.

Low-impact developments are cost-effective, with functional and aesthetic benefits

Mitigation Measures:

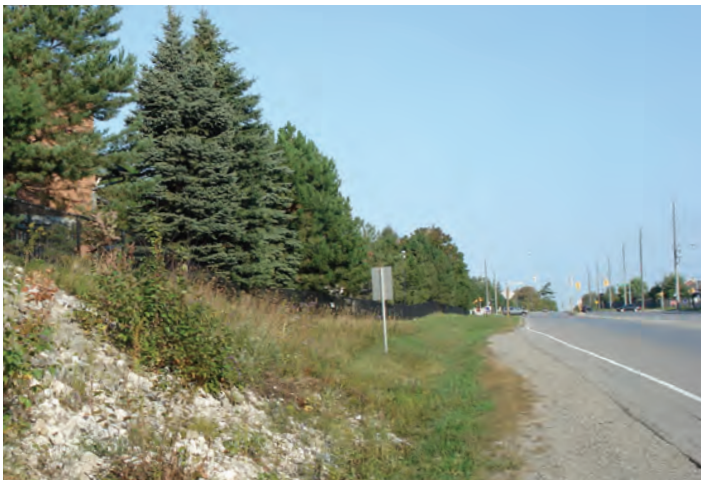
- An environmental assessment can track and document climate considerations such as air, water and natural features including historical climate data for the study area (where available) and representation of data through charts, graphs and tables.
- Through street design, discourage the use of single occupant vehicle vehicles, instead promoting carpooling, transit and active transportation
- Specify in construction contracts the local sourcing of aggregates, a minimum level of overall recycled content, the on-site reuse of fill, the use of materials that are easily at their end of life, and a minimizing of materials sent to the landfill (i.e. silt soxx instead of silt fence)
- Specify in construction contracts materials with lower carbon footprints
- Design construction contracts to encourage sourcing from suppliers with strong sustainability policies and practices
- Explore opportunities to minimize impacts to woody vegetation and to increase woody vegetation, as woody vegetation is a carbon sink

Adaptation Measures:

- Ensure environmental assessments identify relevant climate change risks and vulnerabilities
- Consider materials and measures that can address urban heat islands and increase the solar reflectivity of impervious surfaces, such as light coloured aggregates in asphalt or concrete
- Design crossing structures to minimize the risks to life and property from flooding and erosion
- Ensure sufficient boulevard space is dedicated to LID measures to meet water quantity, water quality and erosion targets
- Design roads and structures to be resilient to more frequent freeze-thaw cycles

Further Details

- Climate Change Strategy (2015) and Five-Year Climate Change Action Plan, 2016-2020 (2016)
- Consideration of Climate Change in Environmental Assessment in Ontario
- York Region Forest Management Plan (2016)



Maintain and encourage naturalization along rural roads

Air Quality

Local sources of vehicle pollution such as major roads and highways can play a role in air quality conditions, particularly on communities situated close to the roads. The highest levels of pollutants tend to occur in close proximity to highways and major roads typically within 150 to 200 metres. Poor air quality can have impacts on health including respiratory and cardiovascular systems and can have adverse effects on the natural environment. There has been more research looking at exposure and emissions related to traffic related air pollutants (TRAPs) and how streets and communities can be designed to reduce these impacts.

Objectives

It is important that road projects consider both mitigation measures to reduce traffic emissions as well as adaptation measures to reduce public exposure to TRAPs. Current Region initiatives can help reduce both emissions (e.g. The Region's use of Intelligent Transportation Systems which helps to maximize the Region's ability to move people and vehicles thereby reducing idling) and exposure to TRAPs (e.g. streetscaping design elements in York Region's Streetscape Program that optimize the utilization of street trees which can act as barriers to capture air pollutants).

The air quality guidelines are intended to reduce the impacts associated with TRAPs by designing streets that include mitigation measures to reduce traffic emissions and measures to reduce the public exposure to pollutants.

Guidelines

- Consider street designs that do not disrupt the flow of traffic (e.g. roundabouts), increase efficiency of transit and carpooling, discourage single occupancy vehicle use, promote cycling and walking trips, improve connectivity, address localized congestion points (e.g. intersections) and promote York Region programs such as Transit Oriented Development
- Where sensitive receptors (e.g. senior residences, schools, daycares, hospitals, parks) are in close proximity to major roads, consider including streetscaping design elements to reduce the impacts of traffic pollutants
- Consider choosing certain types of vegetation and planting the vegetation in way that can help reduce exposure to traffic pollutants
- Environmental assessments should identify and address relevant air quality impacts
- Employ best practices during construction including vehicles/machinery and equipment in good repair, equipped with emission controls, and as applicable, properly maintained and operated within regulatory requirements, and use of dust control measures

Further Details

- York Region Corporate Air Quality Strategy (2008)

Encroachments

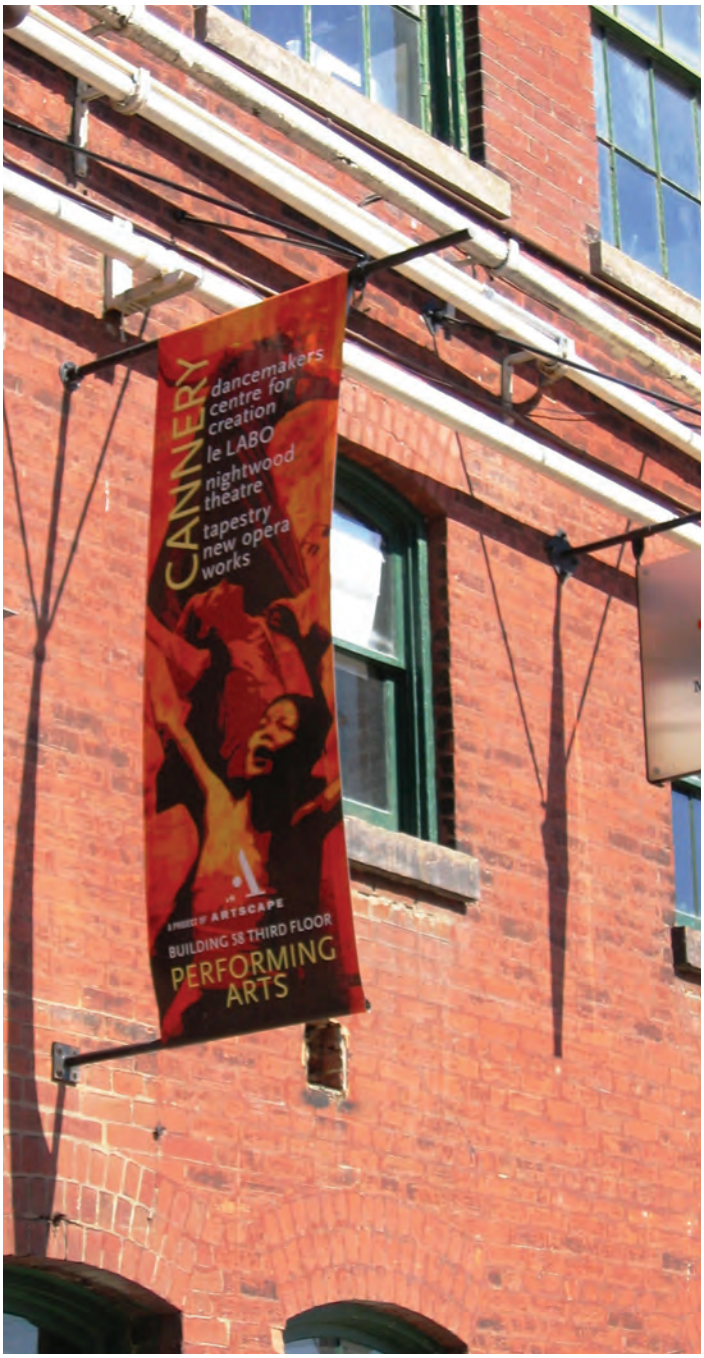
Encroachments are elements that extend into the adjacent streetscape area, such as hanging signage protruding into the pedestrian clearway or street lighting located in the Planting and Furnishing Zone protruding into the roadway.

Objectives

Encroachments create a layering of streetscape elements that, if considered carefully, can help to frame the street and pedestrian realm.

Guidelines

- Typical encroachments include awnings, at-grade signs, overhead signs, planting and public art
- Encroachment of features such as awnings, lighting and planting is acceptable depending on the circumstances
- If adjacent private building elements encroach into the public boulevard (e.g. awnings or signage), they are not permitted to impede the pedestrian clearway
- Buildings should not encroach into the right-of-way
- Encroachments should not conflict with utilities. Encroachment agreements will be required



Hanging signage helps to frame the street