

# TRANSPORTATION MASTER PLAN



## CONSOLIDATION

November 2005





# **DURHAM TRANSPORTATION MASTER PLAN**

**REGION OF DURHAM  
PLANNING AND WORKS DEPARTMENTS**

**WITH THE ASSISTANCE OF TSH ASSOCIATES**

**APPROVED BY REGIONAL COUNCIL  
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# DURHAM TRANSPORTATION MASTER PLAN EXECUTIVE SUMMARY

## Introduction

The Transportation Master Plan (TMP) is a strategic planning document designed to define the policies, programs and infrastructure improvements required to address the Regional Municipality of Durham's transportation needs for the next 20 years and beyond. Developed through the Durham Mobility Study, the TMP reflects the growth and development policies outlined in the Regional Official Plan and will be an important foundation document for the review of the Official Plan now underway. The TMP has regard for the directions of the Region's Community Strategic Plan. The proposed infrastructure plans are consistent with and support the long-range capital plans contained in the 2003 Development Charge Background Study.

Preparation of the TMP followed the master planning process defined in the Municipal Class Environmental Assessment (EA). The work completed in preparing the TMP is consistent with the first two phases of the Class EA planning and design process for the proposed Regional Road projects. Project specific investigations are required to satisfy EA requirements.

In keeping with the principles of environmental assessment, the Durham Mobility Study featured a high degree of public involvement. Public open houses, an opinion survey, website, newsletters and a Community Advisory Committee were all utilized to obtain citizen and business input on transportation priorities and tradeoffs.

## Current and Future Conditions

The Region's existing transportation system consists of an integrated network of roads, railways, public transit routes, airports, marine facilities, and trails which collectively facilitate the movement of people and goods. Several levels of government, as well as private companies, are responsible for the development, operation, and maintenance of the system.

Future demand on the transportation system is expected to increase as the Region grows. Recent forecasts indicate that the Region's population and employment will increase by 55% (from about 550,000 to 850,000 persons) and 83% (from 170,000 to 311,000 jobs) respectively, by 2021. The impact of these increases was assessed using a computer-based model that predicted how future travel demand could change as a result of this anticipated growth. The results of this analysis indicate that the Region will face several challenges in achieving an efficient, safe and reliable transportation system without changes in travel behaviour and the provision of new services and facilities.

During the afternoon peak period in 2001, about 87% of Durham residents travelled by automobile (either as a driver or passenger), compared to 6% by transit and 7% by other modes. If this trend continues, the number of person trips made by residents travelling in automobiles will increase by about 230,000 trips





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during the peak period of an average day in 2021. This forecasted amount of growth in automobile travel is almost double 2001 volumes – a trend that is clearly unsustainable.

## Vision, Goals and Principles

In consultation with the public, it was determined that a continuation of the current trend of an auto-dominated transportation system was not desirable. Citizens felt that the Region should concentrate on a balanced transportation strategy that focussed on investing in both road infrastructure and measures aimed at reducing single-occupant vehicle travel (i.e. transit and transportation demand management). A committed effort to reduce automobile use will be required to achieve this goal.

With this in mind, a Transportation Vision or “desired end state” for Durham Region is proposed for the year 2021, as follows:

*The transportation system for the Region of Durham is integrated and balanced, using a range of transportation strategies to address the mobility and goods movement requirements of the entire community, to sustain investment in industry, agriculture and tourism, to maintain community “wellness”, and to integrate with the environment.*

*The auto continues to be the dominant mode of transportation. However, the community has realized a shift towards greater use of transit, pedestrian and cycling facilities.*

*The changes in modal usage have been accomplished by increased urban densities, mixed use development, policies that encourage reduced auto use, higher order transit facilities linking centres within Durham and other urbanized areas in the Greater Toronto Area and improved integration of the various modes of transportation.*

*The necessary funding available from all levels of government has been put in place and all possible opportunities for private sector funding to achieve the improvements necessary to ensure a liveable community have been investigated.*

The Transportation Vision is supported by goals and principles, which promote: facilitating sustainable economic growth; effective use of the system; safe, reliable and efficient movement of people and goods; choices in services; and responsible development and environmental integrity.

## The Plan

The TMP details three co-ordinated and comprehensive strategies to achieve the Region’s Transportation Vision, being:

- *Providing More Travel Choices*
- *Improving the Road System*
- *Mitigating Environmental and Community Effects*



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These strategies provide a framework for establishing a more sustainable transportation system in keeping with the directions of the Community Strategic Plan and Regional Official Plan. Each strategy is supplemented by a series of recommended actions intended to define specific activities for implementing the strategy. A summary of the actions is attached.

### **Providing More Travel Choices**

Offering a greater variety of choices is a fundamental goal of the TMP. Actions to provide more travel choices focus on:

#### Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is a co-ordinated series of actions aimed at maximizing the people moving capability of the transportation system. Intended to reduce single-occupant auto use, potential TDM measures include: TDM supportive land use; bicycle and pedestrian programs and facilities; public transit improvements; preferential treatments for buses and high occupancy vehicles; ridesharing; and employee incentives. The TMP recommends that the Region take an active role in implementing a TDM program to reduce projected 2021 peak period automobile driver trips to 15% below forecasts based on current mode choice trends. This will be assisted by engaging a TDM Co-ordinator to develop and deliver the program. Education and marketing will be key components.

#### Land Use Management

The form development takes and its location directly affect the amount of travel, the length of trips, and the choice of travel mode. The TMP recommends implementing land use plans and encouraging development forms that help make alternatives to the automobile, especially transit, more attractive and viable. It also recommends supportive land use designations, and the preparation of complimentary implementation guidelines and checklists. These actions will help to detail and promote conformity with the Regional Official Plan, which already establishes a sound framework for land use management.

#### Walking and Cycling

Walking and cycling alternatives should be promoted through supportive urban and road design, provision of appropriate facilities, such as dedicated paths and paved road shoulders, and education about routes and the benefits of active living. The TMP recommends the development of a Regional Bicycle Plan, and consideration of the needs of cyclists and pedestrians in the planning, design, construction, maintenance and operation of the Regional Road network.

#### Transit and Other Public Transportation Services

Public transportation (i.e. specialized and conventional transit services, paratransit, taxis, and intercity public transportation) is an integral and important element of the Region's transportation system. The approved Regional Transit Improvement Plan (TIP) outlines short and long-term actions to integrate and improve inter-municipal transit service within Durham.



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In support of the TIP, the TMP identifies a Transit Priority Network, as shown in **Figure 11**, that will provide the foundation for a Bus Rapid Transit (BRT) system. BRT service is anticipated to evolve in the corridors that comprise the network, from buses in mixed traffic to vehicles operating in dedicated lanes. The TMP also recommends actions to support the Transit Priority Network, including: identifying right-of-way requirements; developing a phased service strategy for BRT; considering transit priority measures; working with GO Transit to expand commuter rail and bus services; and conducting feasibility studies to identify future routes.

Other public transportation recommendations include: considering a Community Transportation Program; and investigating demand responsive services.

## **Improving the Road System**

The TMP places a strong emphasis on actions aimed at protecting, improving and making the best use of the existing road system in Durham Region. However, the TMP recognizes that selective road expansion is needed to support growth. Actions to improve the road system focus on:

### Road System Hierarchy and Design

The major road system designated in the Regional Official Plan is composed of a functional hierarchy of arterial roads and freeways. The TMP recommends that this hierarchical approach be maintained, and design characteristics detailed through the development of Arterial Road Corridor Design Guidelines. The TMP also recommends an updated Freeway and Arterial Road network for the Regional Official Plan that reflects changes to designations identified through the development of the TMP.

### Provincial Highways and Other Road Connections

The Provincial Highway network forms the backbone of the transportation system in Durham. The TMP recommends that the Region petition the Provincial Government to continue to improve the freeway system in Durham, and invest in trade corridors connecting the Region to markets in other parts of Canada and the United States.

### Regional Roads

The Region is responsible for an extensive network of arterial roads and structures (bridges and culverts). The TMP recommends a series of actions aimed at ensuring timely maintenance, safe and efficient operation, and selective expansion of the Regional Road network. The proposed Regional Road expansion projects are shown in **Figure 16**.

### Road Safety

Motor vehicle collisions represent a significant public safety concern. They result in economic loss, personal pain and suffering, and occasionally the loss of life. To lessen the severity or eliminate certain crashes altogether, the TMP recommends addressing road safety in a proactive manner through the development and implementation of a Safety Management Strategy. The TMP also recommends other safety-related



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actions, which include: working with the Durham Regional Police and others to encourage more responsible driving habits; allowing electronic enforcement methods, where suitable; establishing appropriate policies and warrants for various traffic control measures; and using road safety audits in the planning and design of future roads.

### Transportation System Management

Transportation System Management (TSM) solutions can offer substantial, low-cost gains in operational efficiency. The Region will continue to apply a variety of TSM measures, including computerized traffic signal co-ordination and localized roadway modifications. A wide range of emerging technologies, referred to as Intelligent Transportation Systems (ITS), will also be considered. These solutions can make the transportation system safer and more efficient, reliable and environmentally friendly, without the need for costly and intrusive road improvements. Examples of ITS measures include traffic surveillance and emergency vehicle signal pre-emption. The TMP also recommends the development of an ITS Strategy and Incident Management Plans, and the continued upgrade and modernization of the Region's traffic control systems to maximize safe and efficient operation for a variety of modes.

### Goods Movement and Access to Ports and Harbours

The TMP proposes a Strategic Goods Movement Network to ensure reliable and efficient goods movement within Durham Region and to the entire Greater Toronto Area. Implementation of this network will focus on actions to ensure routes are continuous, capable of accommodating heavy vehicles and connected to key destinations and intermodal facilities. Opportunities to use other modes, such as rail, will also be promoted. To gain a better understanding of the challenges faced by industry, a Goods Movement Roundtable will be established to provide an on-going forum for industry and other stakeholders.

### **Mitigating Environmental and Community Effects**

The environmental consequences of providing transportation services need to be considered and mitigated in the development and operation of facilities. Actions to mitigate environmental and community effects focus on:

#### Air Quality and Emissions

Transportation is one of the largest sources of air pollution in Canada. By managing congestion and offering a choice of travel options, the adverse effects on air quality will be lessened. Technological advances to reduce energy consumption, improve engine and vehicle performance, and enhance fuels will also help. The TMP recommends that the Region take a number of actions, including: continuing to participate in initiatives such as the Smog Summit and Greater Toronto Area Clean Air Council; and developing an education and marketing program to inform people of the impact of transportation related air pollution and travel choice decisions.



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## Road Drainage

There is growing concern over environmental issues related to stormwater drainage and its effects on receiving bodies of water and nearby vegetation, soils and wildlife. The TMP recommends the implementation of a Road Drainage Policy to address this concern.

## Traffic in Residential Areas

Speed and volume of traffic travelling through neighbourhoods is an issue for many residents. In addition, the public is becoming increasingly concerned about traffic noise, particularly from major streets. To address these concerns, the TMP recommends the development of a Regional Road Traffic Management Policy, a Hamlet By-pass Policy and a Regional Road Noise Abatement Policy.

## **Implementation**

The process for implementing the TMP and its recommended actions is cyclical and involves the public. The process begins with the development of the TMP and the establishment of *policy* direction. Through various annual *programming* exercises (e.g. Servicing and Financing Studies, the annual current and capital budgets and longer term financial forecasts), investment priorities and timings are established. The *planning* and *design* phase for future infrastructure begins once priorities are set, and follows the Municipal Class EA process. Physical implementation occurs with *construction*, and continues into the *operation* and *maintenance* of the facilities. *Monitoring* is undertaken to gauge the effectiveness of the policies, programs and infrastructure improvements in achieving the TMP goals and objectives. Shifts in underlying assumptions or achievement of objectives signal the need for a review of the basic policy direction, and the process starts again.

A regular review of the TMP is proposed every five years, ideally at the same time the Region carries out the statutory assessment of the need for an update to its Official Plan. The Region may amend the TMP in the intervening period to incorporate substantive changes resulting from the Official Plan review process or other major initiatives, but on-going updates are not contemplated.



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## **SUMMARY OF RECOMMENDED ACTIONS FOR THE TRANSPORTATION MASTER PLAN**

1. Develop a Transportation Demand Management (TDM) Program to reduce projected year 2021 peak period automobile driver trips by 15% below forecasts based on current trends, focussing first on actions to promote:
  - Transit, pedestrian and cycling-oriented development through land use management;
  - Walking, cycling and ridesharing; and
  - Use of transit and other public transportation services.
  
2. Subject to budget approval, engage the services of a TDM Co-ordinator to:
  - Plan and design a TDM Program;
  - Develop and conduct marketing and education initiatives related to TDM;
  - Approach potential businesses to participate in the TDM Program;
  - Assess the potential market for ridesharing and, if promising, introduce a ridematching service with the assistance of other groups and agencies; and
  - Monitor and report on the effectiveness of the TDM Program.
  
3. Pursue funding opportunities with the Provincial and Federal Governments and the private sector for the TDM Program.
  
4. Conduct a Commuter Parking Lot Feasibility Study to determine:
  - The potential location and demand for commuter parking lots;
  - How to integrate the lots into the overall TDM program and to co-ordinate with other Regional and Greater Toronto Area initiatives; and
  - Partnership opportunities.
  
5. Petition the Federal Government to amend taxation laws to enable employers to provide income tax-exempt transit passes to employees.
  
6. Investigate opportunities and, where feasible and subject to budget approval, lead initiatives to encourage intensification and more mixed-use development, and to create incentives for redevelopment and infilling adjacent to transit priority facilities, especially in the Highway 2 corridor.
  
7. Prepare TDM-Supportive Land use Guidelines in consultation with the Local Municipalities that:
  - Define the concept and elements of TDM-supportive land use patterns;
  - Plan for transit services and TDM-supportive facilities in the formative stage of plan development;
  - Determine applicable locations for TDM-supportive development, which will typically be adjacent to Transit Corridors and Transportation Centres;
  - Identify complementary policies and initiatives; and
  - Define implementation and performance measures.



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8. Develop a Development Application Checklist in consultation with the Local Municipalities that requires:
    - Consistency with the approved TDM-Supportive Land Use Guidelines and Arterial Road Corridor Design Guidelines;
    - Encouragement and support for the safe and convenient use of transportation modes other than the automobile;
    - The early input of transit agencies in the review of development applications;
    - The presence of a grid system of arterial roads, and collector roads where necessary; and
    - A plan for implementing transit service and TDM-supportive facilities early in developing areas.
  9. Examine the concept of centres and corridors through the Regional Official Plan review as an approach to promoting transit-supportive development in desired locations.
  10. Develop a Regional Bicycle Plan in consultation with the Local Municipalities, the Ministry of Transportation and other stakeholders, which:
    - Focuses activity on the Local Municipal road and path systems;
    - Connects the Local Municipal bicycle systems together;
    - Integrates with other modes of transportation, especially walking and transit;
    - Considers the need for bicycle facilities within Regional Road corridors;
    - Identifies facilities that may be required on the Provincial Highway network to achieve network continuity, which may be subject to municipal funding; and
    - Defines an implementation strategy, identifying public education and marketing initiatives, costs, financing sources and responsibilities.
  11. Develop guidelines for ensuring the needs of pedestrians and cyclists are considered in the planning, design, construction, operation and maintenance of the Regional Road network.
  12. Designate the Transit Priority Network depicted in Figure 11 as part of the Regional Official Plan and, subject to budget approval, implement this network by:
    - Identifying right-of-way requirements within each transit corridor to permit service evolution, including needs for stations, and incorporating such provisions into the Regional Official Plan;
    - Developing a phased service strategy for evolving towards a Bus Rapid Transit (BRT) system;
    - Considering transit priority measures, such as reserved lanes, queue jump lanes and transit-activated signals, where feasible and warranted;
    - Incorporating policies and designations into the Regional and Local Official Plans to promote transit-supportive land uses abutting corridors and other supportive measures; and
    - Incorporating transit corridor design parameters into the Arterial Road Corridor Design Guidelines and TDM-Supportive Land Use Guidelines.

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13. Recognize Highway 2 as Durham's most significant transit corridor and, subject to budget approval, develop the corridor to its fullest potential by:
    - Continuing to prepare corridor studies to outline the actions necessary to transform the existing road into a "mainstreet";
    - Requiring transit-supportive land uses as development and redevelopment occurs;
    - Enhancing streetscape and urban design;
    - Balancing the need to preserve mobility with the desire to create a more pedestrian-oriented environment in the review of operating conditions and development applications; and
    - Incorporating appropriate supporting policies and designations into the Regional and Local Official Plans.
  14. Request GO Transit to:
    - Expand commuter rail service through the City of Oshawa to the proposed station in the vicinity of Harmony Road and Bloor Street along the CPR Belleville subdivision; and
    - Expand bus services along Highways 401 and 407 and to the northern urban areas in Durham Region, and begin by providing more service on existing routes.
  15. Request the Ministry of Transportation to consider the designation of reserved lanes on Highway 401 for Bus Rapid Transit, and the designation of a transitway on proposed Highway 407 to Highway 35/115, including the two high-speed links with Highway 401.
  16. Subject to budget approval (if necessary), support the protection of corridors for future:
    - Transit service to the future Seaton community in the City of Pickering, in the vicinity of Brock Road and Taunton Road, along the CPR Belleville subdivision;
    - Transit service to the Municipality of Clarington along the CPR Belleville subdivision, with stations in Courtice at Courtice Road and in Bowmanville at Martin Road; and
    - Transportation opportunities in the CPR Havelock and former CNR Uxbridge corridors.
  17. Explore the interest in establishing a Community Transportation Program with potential stakeholders.
  18. Co-operate in the promotion of a Greater Toronto Area-wide inter-regional transit plan, after considering the financial and service implications for Durham.
  19. Request GO Transit, the Toronto Transit Commission and York Region Transit to introduce measures that make public transportation more attractive to longer-distance commuters and examine opportunities to improve inter-regional connections and their compatibility with the Transit Priority Network.



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20. Encourage potential public and private sector service providers to participate more in the delivery of public transportation services in the Region, with a focus on:
    - Working with taxis and other commercial carriers to provide off-peak, low volume and non-traditional services, and to improve their connectivity with other public transportation services;
    - Providing better service to the rural area and passengers with special needs; and
    - Expanding inter-city transportation options, including air, rail and marine modes.
  21. Conduct feasibility studies to examine the use of the following corridors for passenger transportation purposes:
    - The CPR Belleville subdivision between the City of Toronto and the Municipality of Clarington (Bowmanville);
    - Regional Highway 47 between Township of Uxbridge and York Region; and
    - Hydro corridors within Durham Region.
  22. Designate the hierarchical road system comprising Type A, B and C arterial roads and the freeway system shown in the TMP as part of the Regional Official Plan.
  23. Prepare Arterial Road Corridor Design Guidelines in consultation with the Local Municipalities and other stakeholders that:
    - Define the role of the arterial road system and public space principles;
    - Determine an appropriate approach for balancing mobility objectives for vehicular movement and property access with liveability objectives for community design, landscape character, and non-auto modes;
    - Define roadway access management criteria;
    - Provide design criteria for the roadway, boulevard and adjacent lands, such as road allowance widths, cross-section, location of utilities and connections, in advance of development, where possible;
    - Consider the most appropriate placement for pedestrian, cycling and transit facilities within the road allowance, subject to financial considerations;
    - Define implementation measures.
  24. Advise the Local Municipalities of the actions in the TMP regarding the designation and jurisdiction of specific arterial roads.
  25. Petition the Provincial Government to improve the Provincial Highway network in Durham Region through:
    - The extension of Highway 407 to Highway 35/115, including two high-speed freeway connections to Highway 401;
    - The expansion of Highway 401, including the construction of new or improved interchanges;
    - The extension of Highway 404 and the related widening of Highways 48 and 12/48; and
    - The improvement of Highways 7, 7A and 7/12.



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26. Request the Ministry of Transportation to review the location and configuration of future Highway 401 interchanges and grade separations in Durham Region, especially near Liverpool Road (City of Pickering), in the vicinity of Harmony Road and Townline Road (City of Oshawa/Municipality of Clarington) and east of Courtice Road (Municipality of Clarington), and liaise with the Ministry and the Local Municipalities in conducting the review.
  27. Petition the Provincial and Federal Governments to invest in the expansion and on-going improvement of Canada/U.S. trade corridors, especially as it relates to the freeway system.
  28. Request the Ministry of Transportation to investigate strategies, such as dedicated facilities, to improve the flow of truck traffic and the movement of goods.
  29. Request the City of Toronto and/or York Region to proceed with:
    - The continued widening of Steeles Avenue;
    - The improvement of 14th Avenue; and
    - The implementation of the Markham-Scarborough link.
  30. Subject to annual review and approval through the Roads Servicing and Financing Study and appropriate budgets, develop and maintain the Regional Road network in a manner that promotes:
    - Safe and efficient operation for all road users;
    - Sufficient capacity to accommodate travel demands;
    - Cost-effective service delivery;
    - Asset management strategies for timely preventative maintenance and rehabilitation;
    - Investment decisions based on life-cycle cost consideration; and
    - The application of appropriate technologies.
  31. Require that utility cuts and other actions that detrimentally impact the life of a pavement or structure be minimized and restored to a reasonable state.
  32. Benchmark and monitor the effectiveness of infrastructure management programs.
  33. Engage the railway companies proactively to gain their support, including financial, for grade separating railway crossings of Regional Roads where conflict warrants have been established, beginning with:
    - Brock Road at the CPR Belleville (City of Pickering);
    - Bloor Street at the CPR Belleville (City of Oshawa); and
    - Hopkins Street at the CPR Belleville (Town of Whitby).
  34. Determine if there are locations on the Regional Road network where at-grade intersections should be grade-separated to alleviate traffic safety or operational concerns.

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35. Develop a Safety Management Strategy and establish targets to measure its success, which may include:
    - Striving for fewer fatalities and personal injury collisions;
    - Promoting safer walking and bicycling; and
    - Reducing the number of intersection-related collisions.
  36. Work with the Durham Regional Police Service and other stakeholders to reinforce the benefits of safe driving and to encourage more responsible driver behaviour through:
    - Regular educational and promotional programs;
    - Programs like Road Watch, Save A Life and RIDE; and
    - Targeted enforcement initiatives.
  37. Establish and observe appropriate policies and warrants for the implementation of traffic control measures, including traffic signals, speed zones and turn restrictions.
  38. Petition the Provincial Government to allow electronic enforcement methods, such as photo radar, where their introduction is feasible, cost-effective and likely to effect the desired change in driver behaviour.
  39. Examine safety explicitly in the planning and design process for future road projects through initiatives such as Road Safety Audits.
  40. Develop an Intelligent Transportation Systems Strategy to enhance the efficiency and reliability of the regional transportation system.
  41. Develop Incident Management Plans to outline traffic diversion strategies for unforeseen events.
  42. Designate a Strategic Goods Movement Network as part of the Regional Official Plan after consulting with the Local Municipalities and key stakeholders.
  43. Confirm the Strategic Goods Movement Network by:
    - Signing preferred truck routes;
    - Identifying and promoting potential locations for inter-modal transfer facilities to enable more use of rail and other modes;
    - Disseminating information on the network widely;
    - Confirming its suitability for the movement of hazardous goods; and
    - Eliminating by-law restrictions to truck movement on these preferred truck routes, where possible.
  44. Establish a Chairman's Roundtable on Goods Movement to provide a forum for on-going dialogue between industry, affected stakeholders, Local Municipalities, senior governments and the Region.
  45. Conduct or participate in goods movement surveys and other data collection initiatives to improve understanding of the structure and nature of freight activity.



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46. Continue to participate in programs and organizations, like the Smog Summit and the Greater Toronto Area Clean Air Council, aimed at reducing harmful emissions and improving air quality, and carry through with commitments.
  47. Investigate the introduction of an anti-idling by-law.
  48. Conduct education and marketing as part of the recommended TDM Program to inform citizens about the adverse impacts of transportation-related air pollution and on measures to reduce auto travel.
  49. Train employees to be more environmentally responsible when operating vehicles.
  50. Develop a Regional Road Drainage Policy that balances environmental and development objectives and identify state of the art and best management practices for the mitigation of stormwater run-off from both public and private lands.
  51. Develop a Regional Road Traffic Management Policy in consultation with the Local Municipalities, the Durham Regional Police Service, and appropriate stakeholders to address concerns with traffic on Regional Roads in residential areas.
  52. Develop a Hamlet By-Pass Policy in consultation with the Local Municipalities that identifies criteria (including financial) for establishing the need and justification of future arterial road realignments around communities, and review the proposed by-pass locations designated in the Regional Official Plan for conformance with the policy.
  53. Consult with the aggregate industry and other stakeholders to establish preferred haul routes around sensitive residential areas using the Strategic Goods Movement Network as a basis.
  54. Develop a Regional Road Noise Abatement Policy in consultation with the Local Municipalities and the development community to establish noise level thresholds and applicable mitigation measures.
  55. Use the annual Servicing and Financing Study and appropriate budget processes to update costs, refine priorities and present a comprehensive program and financial perspective for the Regional Road network.
  56. Petition the Provincial and Federal Governments to provide municipalities with the tools to obtain sustainable, dedicated funding sources for financing transportation infrastructure and services.
  57. Subject to annual review and approval through the Roads Servicing and Financing Study and appropriate budgets, proceed with Municipal Class Environmental Assessment studies, detailed design, land acquisition and utility relocation for the projects identified in Figure 16 in a timely manner.
  58. Preserve, and if necessary mitigate impacts to, environmentally sensitive and significant natural areas and prime agricultural lands through planning, design, landscaping measures and best management practices when upgrading or expanding transportation facilities.

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59. Inform and involve the public in the planning, design and construction of Regional Road improvements to the greatest extent possible, in keeping with statutory obligations and project constraints.
  60. Plan infrastructure, including modifications, in a manner that recognizes implications for service level standards, operating and maintenance practices and costs for service delivery.
  61. Plan infrastructure to provide adequate snow storage space and adequate green space.
  62. Introduce right-of-way enhancements, such as street furniture and planters, in a manner that maintains safe traffic operations and preserves a clear, unencumbered right-of-way for maintenance services, wherever possible.
  63. Develop, and subject to budget approval, conduct a region-wide Transportation Monitoring Program and report progress to Regional Council on a regular basis.
  64. Subject to budget approval, support new and on-going data collection initiatives critical to monitoring transportation conditions and predicting future needs, including the:
    - Census of Canada;
    - Transportation Tomorrow Survey;
    - Cordon Count Program; and
    - Regional Geographical Information System.
  65. Conduct a comprehensive review of the TMP every five years, ideally in conjunction with a review of the Regional Official Plan.
  66. Consider the policies and recommendations of the TMP in future reviews of the Regional and Local Official Plans.



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## PREFACE AND ACKNOWLEDGEMENTS

This report provides the Transportation Master Plan (TMP) for the Regional Municipality of Durham. The TMP is a strategic planning document designed to identify and address the long-term transportation needs of Durham Region to the year 2021 and beyond. Building on the directions provided in the **Community Strategic Plan** and the **Durham Regional Official Plan**, the Plan establishes the goals and strategies necessary to achieve our future transportation vision.

The TMP was developed through the Durham Mobility Study, which commenced in September 1999. A Steering Committee of Regional Council members and senior Regional staff chaired by Councillor Rick Johnson guided the study.

Preparation of the TMP followed the planning process defined in the Municipal Class Environmental Assessment (EA). The Municipal Class EA process provides a framework for planning municipal infrastructure projects in keeping with the spirit and intent of the Ontario *Environmental Assessment Act*. Master Plans are a specific provision of the Municipal Class EA. They provide a means to examine an infrastructure system comprehensively and outline the framework for planning subsequent projects and development.

In keeping with the principles of environmental assessment, the process of preparing the TMP involved considerable public involvement. The community's views on transportation and growth management played a key role in defining the Plan's strategies. The feedback received through the public involvement process helped to identify and validate the issues, trends, and community preferences related to transportation services in Durham. It was particularly helpful for assessing the trade-offs that the public would be willing to consider in making mobility decisions.

Working papers, newsletters, media releases and an Internet web site kept people informed of study progress and invited their input on an on-going basis. Public meetings held at key points allowed residents, businesses and other interested parties the opportunity to express their views. A Community Advisory Committee formed at the outset of the study provided valuable feedback, and served as a sounding board for reviewing study findings. The results of a March 2000 public opinion survey conducted by the Angus Reid Group (now IPSOS Reid) were also instructive.

The TMP reflects the input of many dedicated and helpful citizens, businesses and organizations from across the Region. We wish to acknowledge the efforts of those individuals who directly contributed to the development of the Plan:

### Steering Committee

The following members of Regional Council and senior Regional staff served on the Steering Committee, providing valuable direction and support for the project:



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### 1999 – 2000

Councillor R. Johnson (Pickering – Chair)  
Councillor K. Gadsden (Scugog – Vice Chair )  
Regional Chair R.M. Anderson  
Mayor M. Brunelle (Whitby)  
Mayor N. Diamond (Oshawa)  
Mayor D. Hamre (Clarington)  
Councillor B. Nicholson (Oshawa)  
Councillor M. Novak (Clarington)  
Councillor S. Para (Uxbridge)  
Mayor S. Parish (Ajax)  
Mayor K. Shier (Brock)  
Commissioner A.L. Georgieff (Planning)  
Commissioner V.A. Silgailis (Works)

### 2001 – 2003

Councillor R. Johnson (Pickering – Chair)  
Councillor K. Carruthers (Scugog – Vice Chair)  
Regional Chair R.M. Anderson  
Mayor M. Brunelle (Whitby)  
Mayor T. Clayton (Brock)  
Councillor S. Crawford (Ajax)  
Mayor N. Diamond (Oshawa)  
Councillor J. McMaster (Ajax)  
Councillor S. Para (Uxbridge)  
Councillor J. Schell (Clarington)  
Commissioner A.L. Georgieff (Planning)  
Commissioner J.R. McCorkell (Works)  
Commissioner C.R. Curtis (Works)

## Community Advisory Committee

The following members of the public and representatives of interested organizations served on the Community Advisory Committee, offering their opinions and displaying considerable patience and enthusiasm in working through the study:

C. Antram	R. Jones	J. Markland	T. Springer
R. Atkinson	P. Kelland	J. McMullen	G. Taylor
B. Danford	B. Kelly	P. Mueller	T. Tonkinson
S. DeRyke	S. Laskowski	D. Read	J. Vincent
E. Fulford	M. Leek	D. Smith	P. White
M. Hartley	R. MacKay	J. Smith	S. Wilson

## Study Consultants

The consultant team led by Mr. D.I. Allingham of TSH Associates worked closely with Regional staff in completing the study. Sub-consultants McCormick Rankin Associates (transit), Cumming and Company (facilitation), Peter Dalton Consulting (demand forecasting) and Angus Reid Group (public opinion) assisted.

## Regional Staff Team

Staff from the Regional Works, Planning and Finance Departments took an active role in the study. The staff Project Management Team, led by Mr. G. Chartier, managed the project, led the public involvement program and prepared the final Plan.

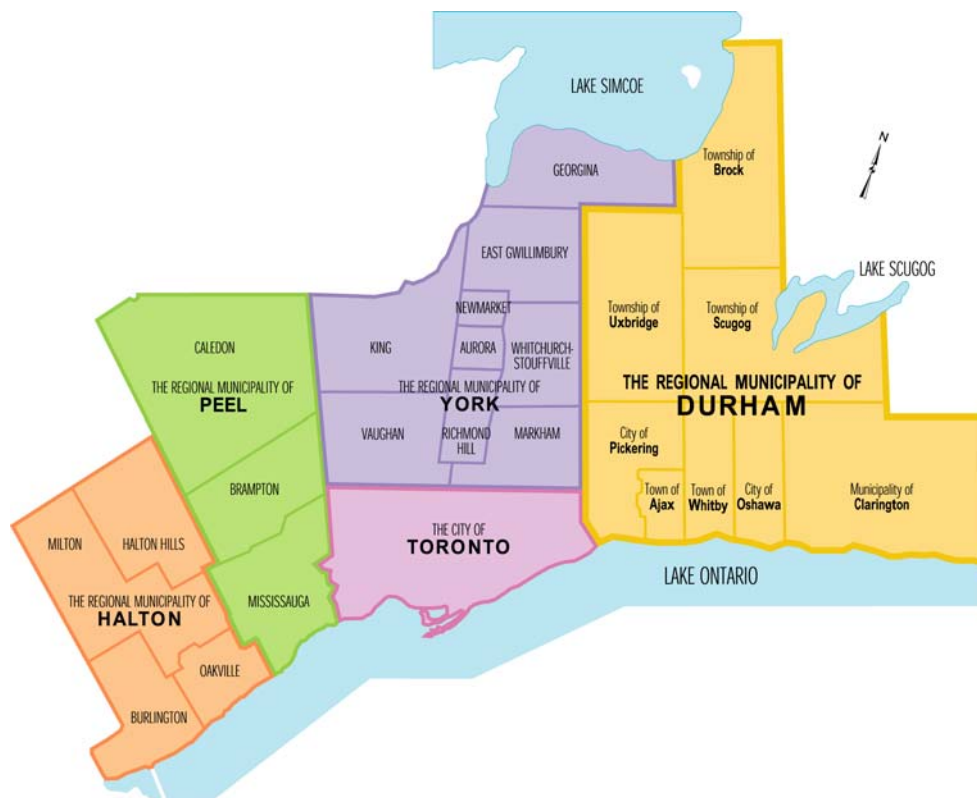


# CHAPTER 1 - INTRODUCTION

## 1.1 PURPOSE AND SCOPE OF THE PLAN

The Regional Municipality of Durham, shown with its constituent municipalities in **Figure 1**, is one of the fastest growing communities in Canada. The Region's population has more than doubled over the past twenty-five years to about 550,000 people today, and is expected to reach 1,055,000 by 2031<sup>1</sup>.

With the Region poised for continued growth, the safe, efficient and reliable movement of people and goods will become increasingly more important and challenging. The provision of an effective transportation system will be key to maintaining the Region's quality of life and creating the type of community and economy envisioned by the **Community Strategic Plan** and the **Durham Regional Official Plan**, Regional Council's principle policy documents.



**FIGURE 1 – Regional Municipality of Durham and its Local Municipalities in the Greater Toronto Area**

<sup>1</sup> Durham Region Planning Department, "Population, Employment and Urban Land" Discussion Paper, June 2003



The **Durham Transportation Master Plan (TMP)** is a strategic planning document designed to identify the transportation facilities and services required to meet these future challenges. The Plan defines the **policies, programs and infrastructure improvements** needed to manage anticipated transportation demands to the year 2021, and to support the development pattern designated in the **Durham Regional Official Plan (ROP)**. Particular emphasis is placed on actions related to the Regional Road network, as it is the only element of the transportation system vested solely with the Regional Corporation.

The TMP serves four primary purposes, being to:

- **Identify the new and improved facilities and services needed to serve planned growth;**
- **Define strategies and programs to encourage the use of travel modes other than the single-occupant automobile;**
- **Outline approaches to improve the movement of goods; and**
- **Recommend ways to preserve and better use existing transportation resources.**

The Plan supports broader policy objectives, including promoting responsible growth, preserving infrastructure, respecting the environment and communities, enhancing safety, and encouraging economic development. Changing community values, emerging demographic and development trends, and the reality of fiscal constraints influenced the Plan's direction.

The actions recommended in the TMP represent the stated intentions of Regional Council, and will guide investment and policy decisions. However, the Plan only provides a “blueprint” for future action and will need to be implemented through several mechanisms further detailed in Chapter 4, including:

- **Development Charge By-laws, Annual Servicing and Financing Studies, Annual Current and Capital Budgets and Longer-term Financial Forecasts** – These financial instruments will identify and provide the necessary resources to implement the recommended programs and infrastructure improvements;
- **Amendments to the Regional Official Plan** – Elements of the TMP will be incorporated into the ROP as planning policy to ensure implementation through local official plans and the review and approval of development applications;
- **Implementation Strategies and Action Plans** – The scope, timeframe and resource requirements for the recommended major initiatives need to be further detailed;
- **Environmental Assessments** – Prior to proceeding with Regional Road improvement projects, the Region must carry out Class Environmental Assessment (EA) studies to complete



the planning and design process initiated through this Plan. This is necessary to satisfy provincial and federal statutory requirements; and

- **Guideline Documents** – Guidelines, such as those setting design standards and recommended operating and maintenance procedures, are needed to provide further implementation detail.

Certain assumptions underlying the TMP may prove imprecise over time due to changing conditions. Although the Plan is flexible enough to accommodate minor deviations, the Region will need to periodically review and update the document. Ideally, this would be linked to the five-year reviews required for the ROP. The Region may amend the TMP in the intervening period to incorporate substantive changes resulting from the Official Plan review process or other major initiatives, but on-going updates are not contemplated.

Successful implementation of the TMP will ultimately depend on the co-operation and active participation of many stakeholders, including the Local Municipalities; the provincial government; local agencies, boards and commissions; the private sector; the business community; and local citizens. The Plan provides a framework for co-operation between these stakeholders, but is not binding upon any party other than the Regional Municipality of Durham. However, the Region will use the Plan to guide its input into the activities of others, and will seek to implement the Plan's provisions through its review of local official plans, development applications and other such initiatives.

## 1.2 PLAN CONTEXT

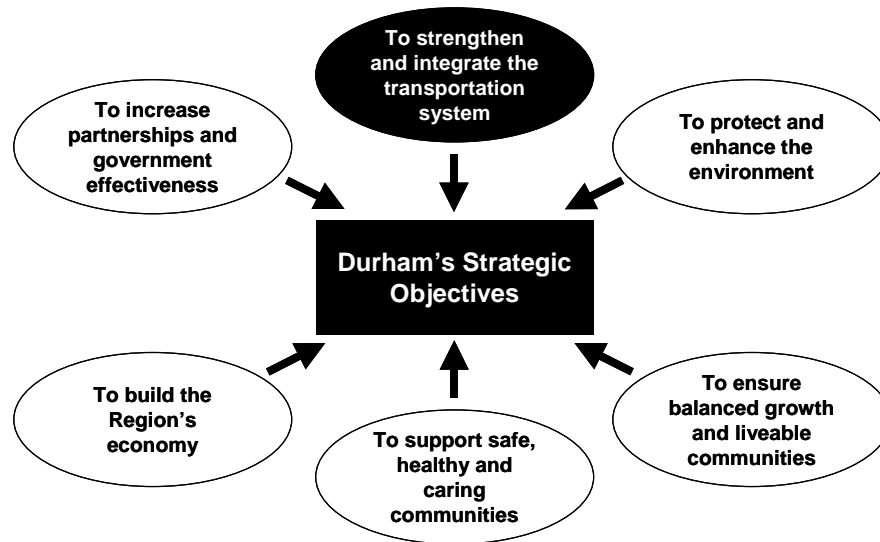
### 1.2.1 Regional Policy Framework

The TMP complements and supports the overarching policy framework provided by:

- ***Growing Together – Durham's Community Strategic Plan*** – The Community Strategic Plan is the “umbrella document” that establishes the framework for other Regional strategies. Developed through extensive public consultation, the Community Strategic Plan defines a vision of the future for the broader community and outlines six objectives (shown in **Figure 2**) and supporting actions for the Region to undertake.

The TMP defines many of the strategies and recommended actions needed to achieve the Community Strategic Plan objective of ***strengthening and integrating the transportation system***. Implementation of the Plan will also help in the attainment of the other five objectives, which are inextricably linked with or are dependent on having an effective transportation system for their success. Alignment of the TMP with the Community Strategic Plan is discussed further in Section 2.1 in the context of developing the Transportation Vision.





**FIGURE 2 – Community Strategic Plan Objectives**

- **Durham Regional Official Plan** – Required by the *Planning Act*, the ROP guides the growth and development of the Region. The TMP builds on the land use and transportation policy framework in the ROP, identifying the facilities and services required to achieve the Official Plan’s development pattern and growth targets. The TMP also provides further detail to the growth management, urban form and transportation system policies contained in the ROP.

Concurrent with the preparation of the TMP, Regional Council initiated a two-phase review of the ROP. The first phase confirmed that the basic elements and directions of the Official Plan remain sound, but identified the need to consider refinements to certain policy areas, including transportation, through Phase 2 of the review. The TMP establishes the direction for such changes to transportation related policies in the ROP.

The TMP is premised on the Region achieving the year 2021 population and employment projections of 850,000 people and 311,000 jobs proposed through the ROP review<sup>2</sup>. The Regional Road expansion projects proposed in the Plan are based on these updated growth projections, which are explained further in Section 2.3.1.

- **Regional Development Charge By-law and Background Study** – The Development Charge By-law enables the Region to capture the growth-related share of capital improvement costs from new development. Development charges are an important source of revenue for the Region, and are fundamental to the timely implementation of the Plan.

The Development Charge By-law was renewed in 2003 based on the growth projections prepared for the ROP review. The proposed Regional Road improvements outlined in

<sup>2</sup> Durham Region Planning Department, “Population, Employment and Urban Land” Discussion Paper, June 2003.

Sections 3.3.3 and 4.1.1 are consistent with the long-range capital program and financial plan developed for the by-law renewal.

### 1.2.2 Federal and Provincial Policies and Initiatives

The TMP also has regard for several overarching federal and provincial policies and initiatives, including:

- **Future Pickering Airport and Seaton Lands** – In the 1970's, the Federal and Provincial governments acquired land in north Pickering to develop an airport and new urban community, respectively. Although timing remains uncertain, development of the Pickering Airport and the Seaton community will significantly impact population and employment growth in Durham. Additional households will generate travel demands requiring new transportation facilities and services. The availability of more local job opportunities will influence travel patterns and help reduce out-commuting, allowing the Region to become more self-contained.

The TMP has assumed the Pickering Airport and the Seaton community will be under development by 2021. Travel demand forecasting for the Plan has assumed population and employment growth of 54,000 people and 20,000 jobs in north Pickering, and airport-oriented traffic commensurate with the development of a typical reliever airport. Although the ROP sets population and employment targets of 90,000 people and 45,000 jobs for Seaton, recent planning efforts suggest the ultimate yield will be less due to environmental constraints.

The Plan does not address the necessity, location or type of airport development, or the configuration of the supporting transportation system. These matters are beyond the scope of this report (and generally the Region's jurisdiction), and subject to further review and planning by the responsible agencies. The importance of integrating the airport with the other elements of the transportation system is discussed in Section 3.3.6.

The TMP also does not fully address the configuration of the road system serving Seaton, except for the major Regional Roads connections. The need and location of other arterial roads, such as the proposed Dixie Road extension, will be determined once more definitive plans for Seaton are known. Until such time, options need to be protected, as discussed in Section 3.3.1.

- **Highway 407 East Extension** – Highway 407 opened as a toll highway to east of Brock Road in 2001. The freeway is proposed to extend easterly through Durham Region to Highway 35/115, with two Highway 401-407 connecting links and a transitway. An individual Environmental Assessment is currently underway for the proposed transportation corridor, but implementation timing is uncertain.

Similar to the future Pickering Airport, the extension of Highway 407 will significantly influence population and employment growth in the Region. The presence of the highway is expected to spur development, especially employment uses, on abutting lands designated for urban growth



in the ROP. As well, the extension will provide a transportation corridor (transitway) for Bus Rapid Transit (BRT) or other higher-order service to serve growing travel demands with York Region and points west. However, construction of Highway 407 will create pressure to expand the Regional Road system serving the facility.

Consistent with the ROP, the TMP recommends the extension of Highway 407, given the anticipated economic and transportation system benefits. However, the Plan acknowledges that other processes will establish the need, justification, and location of the highway. Travel demand forecasting for the Plan has assumed the freeway will be extended to the proposed East Durham freeway link, with two Highway 401 connections, by the year 2021. This may be an aggressive timeframe, but results in a more pragmatic and less extensive Regional Road expansion program. The implications of Highway 407 are discussed further in Sections 2.3.3 and 3.3.2.

- **The Oak Ridges Moraine** – In December 2001, the Province enacted the *Oak Ridges Moraine Conservation Act*, establishing land use planning and resource management direction for protecting the moraine. The Oak Ridges Moraine Conservation Plan (ORMCP), prepared in accordance with the Act, defines policy requirements for infrastructure projects undertaken in this environmentally significant area. The ORMCP permits new transportation, infrastructure, and utility uses on the Oak Ridges Moraine, provided the need for the project has been demonstrated and there is no reasonable alternative.

The TMP respects the provisions of the ORMCP, and does not propose new transportation facilities on the moraine. Any future initiatives related to existing infrastructure in this area will have regard for the ORMCP, as noted in Section 4.2.3.

### 1.3 ENVIRONMENTAL ASSESSMENT STATUS

Preparation of the TMP followed the master planning process defined in the **Municipal Class EA**<sup>3</sup>. This process integrates the planning for infrastructure requirements for existing and future land use with the principles of environmental assessment planning, which include:

- Consulting with affected parties early and often;
- Considering a reasonable range of alternatives;
- Identifying and considering the effects of each alternative on all aspects of the environment;
- Evaluating the alternatives systematically to determine their net environmental effects; and
- Providing clear, complete and traceable documentation of the planning process.

<sup>3</sup> Ontario Municipal Engineers' Association, *Municipal Class Environmental Assessment*, 2000.



The work completed in preparing the Plan is consistent with the first two phases of the Municipal Class EA planning and design process for the proposed Regional Road projects. However, the TMP was not prepared in a manner that would allow the document, on its own, to serve as the problem and opportunity statement (Phase 1), or the assessment of alternative solutions (Phase 2) for the identified projects. More detailed investigations and public involvement are still required to fulfil consultation and documentation requirements. The Plan will be relied upon in completing this future work.

The TMP does not require approval under the *Environmental Assessment Act*, although the projects recommended by the Plan must fulfil all appropriate EA requirements. Requests for an order to comply with Part II of the Act, the portion of the legislation regarding appeals, is possible only for those projects that are subject to the Municipal Class EA, and not the Plan itself. All Regional Road improvements fall into this category.

## 1.4 PLAN ORGANIZATION

The remainder of the TMP is organized into three chapters:

- **The Foundation Elements** – Chapter 2 establishes the policy foundation for the Plan. It presents a vision, goals and objectives for the transportation system, outlines the current transportation context, and describes the process of projecting future transportation demands that the Plan is intended to serve.
- **The Plan Elements** – Chapter 3 details the strategies and recommended actions for meeting future transportation challenges and opportunities, while moving towards the Region's Transportation Vision. It describes three strategies to address the demands of continued growth and other trends affecting transportation in Durham Region.
- **The Implementation Elements** – Chapter 4 outlines how the Plan will be implemented and its expected effects. The approach for monitoring long-term performance and keeping the strategy current is detailed.

The companion *Technical Summary Report* documents the analysis and public consultation carried out in preparing the Plan, and summarizes the proposed Regional Road improvements.



## CHAPTER 2 - THE FOUNDATION ELEMENTS

### 2.1 TRANSPORTATION VISION, GOALS AND PRINCIPLES

The process of strategic planning begins with defining the desired end state, or **vision**, of the future condition. In preparing the TMP, this involved the development of a **Transportation Vision**, and supporting goals and principles. Four distinctly different options for meeting future transportation needs were considered in establishing the vision:

- Do nothing beyond currently programmed improvements. This is referred to as the **Do Nothing** option;
- Continue current transportation investment practices and do nothing to influence travel behaviour. Current levels of automobile, transit, cycling and walking remain unchanged at existing levels (i.e. as a percentage of total travel). This is referred to as the **Trend** option;
- Concentrate primarily on initiatives to promote the use of transit and transportation modes other than the single-occupant automobile at the expense of expanding the road system. This is referred to as the **Non-Road** option; and
- Invest in both road infrastructure improvements and transportation demand management (including transit) initiatives, with the expectation that demand for **single-occupant** auto travel will be moderated or diverted to other travel modes. The resulting transportation system provides for a greater balance between auto and other modes of transportation, and is referred to as the **Balanced** option for this reason.

The public input received through the study indicated that the **Do Nothing** option was unacceptable. Citizens are concerned about the long-term consequences of continued dependence on the automobile for personal travel. During the public involvement process, stakeholders indicated that auto use should be curtailed to preserve the environment and protect communities.

Although the public felt the **Trend** option of an auto-dominated transportation system was not desirable, few people supported more restrictive measures to achieve the **Non-Road** option. Most were of the opinion the **Balanced** option was the preferred approach, as it offered a choice of travel modes, without unduly constraining the ability to travel by automobile. The public opinion compared favourably with the technical evaluation of the four options described in the companion *Technical Summary Report*.



The conclusions reached above are consistent with the experiences of other rapidly growing areas. In those communities, solutions to urban transportation problems are focussing on a combination of actions to improve both roads and other modes of travel, especially transit<sup>4</sup>.

The **Balanced** option meets the needs of a greater number of users. A strategy that relies solely on public transportation will not serve the travel needs of residents unable to use transit, and does not help goods movement by truck. A roads-based strategy, on the other hand, only provides short-term relief from congestion, because the new capacity created is usually consumed by growth. As well, road widening is a finite activity due to property and fiscal constraints, and its adverse impacts on existing neighbourhoods and the environment.

Achieving a more balanced transportation system will require a committed effort to reduce automobile use. Moving away from today's auto-dominated society presents a formidable challenge, given the nature of existing infrastructure, current development trends, prevailing social values, and the flexibility afforded by the automobile. But meeting these challenges will result in a more **sustainable transportation system**. This is a system that safeguards the natural environment, uses less land for roads, and lowers the capital and life cycle costs for services and infrastructure.

A sustainable transportation system is an important component of a sound growth management strategy, as advocated by both the Community Strategic Plan and ROP. It contributes towards:

- Allowing people without automobiles, or not wishing to own one, to gain access to jobs, shopping and community activities;
- Making communities more attractive and liveable, through urban design oriented towards people rather than the automobile;
- Increasing the sustainability of built and natural environments and limiting the potential for climate change by safeguarding environmentally sensitive areas, preserving open space and farmland, and reducing auto-related pollution and energy consumption;
- Reducing land consumed for transportation facilities;
- Lowering capital and life-cycle costs for services and infrastructure;
- Increasing economic activity and employment opportunities in the Region; and
- Bolstering a greater sense of community and civic pride.

Each community has its own impression of what a sustainable transportation system should look like. The *Transportation Vision for Durham Region* presented below embodies the concepts of

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<sup>4</sup> City of Charlotte and Mecklenburg County, NC, *The Charlotte-Mecklenburg Transit/Land Use Plan*, 1997 ([www.ci.charlotte.nc.us/cititransit/virtual\\_centre/transit\\_plans/2025/index.htm](http://www.ci.charlotte.nc.us/cititransit/virtual_centre/transit_plans/2025/index.htm))





sustainable transportation, while representing Durham’s unique character. The vision reflects the community values and principles articulated during the public involvement processes conducted for the Community Strategic Plan and the TMP. It builds on the policies of the ROP, and captures the key thrusts of the Transportation Association of Canada’s *New Vision for Urban Transportation* previously endorsed by Regional Council<sup>5</sup>.

### A TRANSPORTATION VISION FOR DURHAM REGION

#### By the year 2021:

*The transportation system for the Region of Durham is integrated and balanced, using a range of transportation strategies to address the mobility and goods movement requirements of the entire community, to sustain investment in industry, agriculture and tourism, to maintain community “wellness”, and to integrate with the environment.*

*The auto continues to be the dominant mode of transportation; however, the community has realized a shift towards greater use of transit, pedestrian and cycling facilities.*

*The changes in modal usage have been accomplished by increased urban densities, mixed use development, policies that encourage reduced auto use, higher order transit facilities linking centres within Durham and other urbanized areas in the GTA and improved integration of the various modes of transportation.*

*The necessary funding available from all levels of government has been put in place and all possible opportunities for private sector funding to achieve the improvements necessary to ensure a liveable community have been investigated.*

The Transportation Vision is supported by the goals and principles for action presented in **Table 1**. These statements guided development of the policies, programs and infrastructure investments outlined in Chapter 3. The goals and principles are consistent with the strategic actions and desired end results of the transportation objective in the Community Strategic Plan, which are summarized in **Table 2**.

It is important to recognize that achieving the Transportation Vision will be challenging in light of current trends and forecast conditions, which are discussed in the following sections. Even minor changes in travel behaviour will require a cultural shift and likely government influence through investment, regulation and/or pricing. To this end, the TMP sets a framework for “evolutionary” change, building on a series of strategies that, when taken together, will help guide future travel behaviour in a more sustainable manner.

<sup>5</sup> Joint Report No. 1999-J-10, adopted by Regional Council on April 6, 1999.

TABLE 1 – Transportation System Goals and Principles

<p><b>GOAL A</b> Facilitate Sustainable Economic Growth</p>	<p><b>GOAL B</b> Use the System Effectively</p>	<p><b>GOAL C</b> Move People and Goods Safely, Reliably and Efficiently</p>	<p><b>GOAL D</b> Provide Choice in Services</p>	<p><b>GOAL E</b> Promote Responsible Development and Environmental Integrity</p>
<p>Develop and provide a transportation system that supports the retention of existing businesses and attraction of new investment and economic activity in an increasingly competitive market.</p>	<p>Preserve and maximize the use of existing and underutilized facilities as a means of avoiding or deferring the need for new infrastructure.</p>	<p>Provide and maintain a transportation system that is safe, efficient and reliable for all users and modes.</p>	<p>Provide and maintain a transportation system that offers choices for moving people and goods.</p>	<p>Provide and maintain a transportation system that supports sustainable growth and respects the natural, social and cultural environments.</p>
<p><b>Principles for Action:</b></p> <ol style="list-style-type: none"> <li>1. Support the planning, design and delivery of a fully integrated regional transportation system, composed of roads, transit, railways, airports and harbours.</li> <li>2. Develop a transportation system that facilitates the efficient movement of goods by truck and other modes.</li> <li>3. Develop a transportation system that provides service to new and developing areas.</li> <li>4. Identify and protect transportation corridors and supporting facilities.</li> <li>5. Encourage neighbouring municipalities to implement transportation improvements that complement Durham's network.</li> <li>6. Encourage the Provincial government to upgrade and expand their highway network.</li> <li>7. Encourage partnerships between the Region, the private sector and other agencies to improve the transportation system.</li> <li>8. Pursue Provincial and Federal government funding for transportation facilities and services, promoting the economic and social benefits that accrue.</li> <li>9. Identify and promote the benefits that accrue to the Region and its citizens when assessing and developing infrastructure improvements.</li> </ol>	<p><b>Principles for Action:</b></p> <ol style="list-style-type: none"> <li>1. Complete missing connections within the transportation system to minimize the requirements for additional infrastructure.</li> <li>2. Optimize the transportation system to reduce delays and maximize available capacity.</li> <li>3. Encourage and support development that maximizes the use of existing transportation infrastructure.</li> <li>4. Take advantage of public transportation services to manage high levels of demand in congested corridors.</li> <li>5. Apply new and emerging transportation engineering standards, practices and technologies to maximize system utilization.</li> <li>6. Utilize abandoned rail and utility corridors for new transportation facilities.</li> <li>7. Place priority on infrastructure preservation projects and programs that address public safety, structural inadequacy and operational efficiency, in that order, in allocating resources.</li> <li>8. Consider life-cycle cost implications associated with operating, maintaining, rehabilitating and replacing an asset in making infrastructure investment decisions.</li> </ol>	<p><b>Principles for Action:</b></p> <ol style="list-style-type: none"> <li>1. Place priority on infrastructure improvement projects and programs that improve safety and operational efficiency in allocating resources.</li> <li>2. Reduce congestion and improve the efficiency of the transportation system through the use of appropriate management measures.</li> <li>3. Encourage cost-effective operating policies and capital improvements.</li> <li>4. Identify and give priority to improvements aimed at addressing safety concerns.</li> <li>5. Make safety an explicit element and criterion for identifying, evaluating, selecting, and designing transportation projects.</li> <li>6. Consider the personal security needs of users in the planning, design and operation of the transportation system.</li> <li>7. Design, operate and maintain the transportation system in accordance with accepted transportation engineering standards and guidelines.</li> <li>8. Utilize incident management measures to safeguard the public and minimize the consequences of events.</li> <li>9. Improve the level of safety and minimize the risk to the public associated with the transportation of dangerous goods.</li> <li>10. Be prepared to respond in the case of an incident or emergency event.</li> <li>11. Eliminate at-grade crossing conflicts at high activity locations.</li> </ol>	<p><b>Principles for Action:</b></p> <ol style="list-style-type: none"> <li>1. Provide reasonable access to a variety of transportation modes.</li> <li>2. Establish an integrated and co-ordinated public transportation system for trips both within and external to the Region.</li> <li>3. Provide a basic level of service for those who must rely on public transportation services.</li> <li>4. Recognize the unique requirements of rural residents in the provision of transportation services.</li> <li>5. Recognize the unique requirements of the mobility challenged in the design of facilities and provision of services.</li> <li>6. Preserve opportunities for higher-order transit technologies.</li> <li>7. Design facilities and services to provide convenient transfers and maximize integration between transportation modes.</li> <li>8. Develop safe, convenient and well-integrated bicycle and pedestrian facilities that link key activity nodes.</li> <li>9. Encourage urban design and built form that supports greater use of transit, cycling and walking.</li> <li>10. Inform and educate the public on the implications and availability of travel choices.</li> <li>11. Promote the use of air, rail and marine modes for passenger and goods movement.</li> </ol>	<p><b>Principles for Action:</b></p> <ol style="list-style-type: none"> <li>1. Consider natural, social and cultural environmental impacts in the development and delivery of transportation facilities and services.</li> <li>2. Avoid environmentally sensitive and significant natural areas and prime agricultural land where possible in the planning of transportation facilities.</li> <li>3. Support measures that reduce vehicle emissions, minimize energy consumption, and limit natural environmental consequences.</li> <li>4. Ensure that transportation and land use decisions are consistent with ROP and the TMP policies, and are made in a Regional context, recognizing that such decisions have far-reaching implications.</li> <li>5. Ensure that new urban development and redevelopment exhibit characteristics that are transit, pedestrian and bicycle-supportive.</li> <li>6. Apply appropriate mitigation measures to minimize the adverse effects of the transportation system.</li> <li>7. Explore and support new and emerging technologies that help to mitigate the adverse effects of the transportation system.</li> <li>8. Monitor ongoing transportation conditions to ensure Plan objectives are being satisfied and to identify the need for Plan updates.</li> <li>9. Establish a stable, on-going transportation planning cycle covering all modes of surface transportation for passenger and goods movement.</li> </ol>

**TABLE 2 – Transportation System Objective of the Community Strategic Plan**

<b>Objective:</b>	<b>A. To strengthen and integrate the transportation system so that people can move easily around the Region and access other parts of the Greater Toronto Area and beyond.</b>
<b>Strategic Actions:</b>	<p>A1. Developing a viable, affordable and integrated transit plan within the Region and linking with the rest of the GTA and beyond</p> <p>A2. Upgrading and maintaining regional roads to effectively serve and connect communities, and accommodate growing traffic volumes</p> <p>A3. Supporting the development of alternative methods of transportation including waterfront trails and other trail systems</p> <p>A4. Advocating for transportation improvements to address commuter needs and support effective movement of goods and services by all modes</p>
<b>Desired End Results:</b>	<ul style="list-style-type: none"> <li>• People can move with ease by affordable transit between communities in Durham and beyond</li> <li>• Less congestion on roads</li> <li>• People have transportation choices</li> <li>• Completion of Highways 407, 404 and 401</li> <li>• System of regional trails is in place connecting open spaces and natural features</li> <li>• Interconnected regional waterfronts</li> <li>• Durham Region is serviced by enhanced transportation services in all modes</li> </ul>

Achieving the Transportation Vision will also be strongly influenced by the Region’s ability to attract greater levels of employment and by the type of land development that occurs. Providing more job opportunities locally and achieving supportive development will contribute to reduced average trip lengths, making modes other than the automobile more attractive. Even if individuals choose to drive, their shorter trips will diminish the need for road improvements by better distributing traffic and reducing total vehicle-kilometres of travel. The TMP supports the objective of facilitating economic development through transportation investment in its vision, goals, principles and recommended actions, and promotes more compact, pedestrian-oriented urban form.

## 2.2 THE EXISTING SYSTEM

The transportation system serving Durham Region is an integrated network of: roads (freeways, arterials, collectors and locals); transit services (on-road bus, GO rail and park and ride lots); pedestrian and cycling facilities (sidewalks, multi-use pathways and on-road cycling facilities); railways; airports; and harbours. Local citizens and businesses rely extensively on this system to serve about 1.1 million<sup>6</sup> person trips and many freight movements daily.

Several levels of government, as well as the private sector, are responsible for the development, operation, and maintenance of the transportation network. The Region is responsible for 832 kilometres (2,087 lane kilometres) of arterial road and 209 bridge and culvert structures. The eight Local Municipalities own and operate local, collector and some arterial roads that fall within their boundaries, as well as all sidewalks (including those on Regional Roads) and multi-use pathways under their jurisdiction. The Provincial government has responsibility for major highways, including 400 series freeways. Highway 401 forms the backbone of the Region’s transportation system,

<sup>6</sup> Source: Data Management Group, 2001 Transportation Tomorrow Survey.

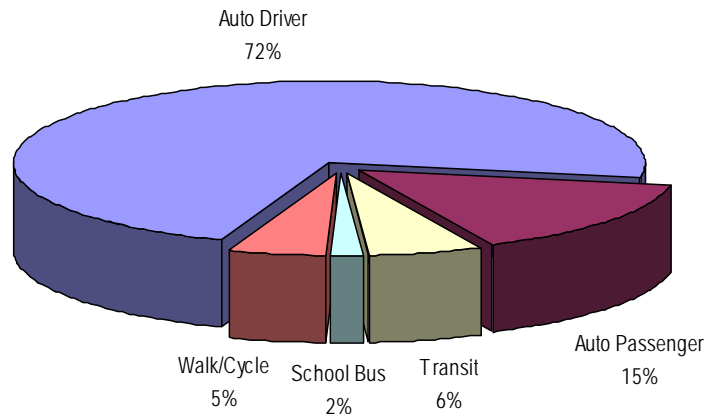


carrying more than 200,000 vehicles per day at the Durham – Toronto boundary<sup>7</sup>. Highway 407 was recently constructed as a toll road to east of Brock Road.

GO Transit provides inter-regional and inter-municipal rail and bus transit service. There are four municipal transit systems in Durham offering service: Ajax-Pickering Transit, Clarington Transit, Oshawa Transit, and Whitby Transit. Ajax-Pickering Transit Authority and Handi-Transit Incorporated, a not-for-profit agency funded by the Local Municipalities, provide specialized transit service. Intercity passenger train service is provided by VIA Rail, connecting the Oshawa VIA station to the Windsor-Quebec City corridor. Several intercity bus companies serve the Region.

The Canadian National Railway (CNR) and Canadian Pacific Railway (CPR) provide freight rail service, on rail lines generally running parallel to Highway 401. The Oshawa Airport provides chartered passenger and cargo services, and accommodates recreational flying. Port Oshawa is a commercial harbour that can accommodate any type of cargo vessel operating on the St. Lawrence Seaway system. Recreational marinas are located at Frenchman’s Bay (Pickering), Whitby Harbour, Port Oshawa, Port Darlington, and Newcastle Village on Lake Ontario. Marinas also exist in Port Perry on Lake Scugog, and in Beaverton on Lake Simcoe.

Figure 3 shows that the **single-occupant** automobile is the primary mode of travel. Travel mode choice has remained relatively consistent over the past fifteen years, with the exception of average automobile occupancy, which has decreased from 1.27 persons per vehicle in 1986 to 1.21 in 2001<sup>8</sup>.



**FIGURE 3 – Afternoon Peak Period Person Trips by Travel Mode**

Source: Data Management Group, 2001 Transportation Tomorrow Survey

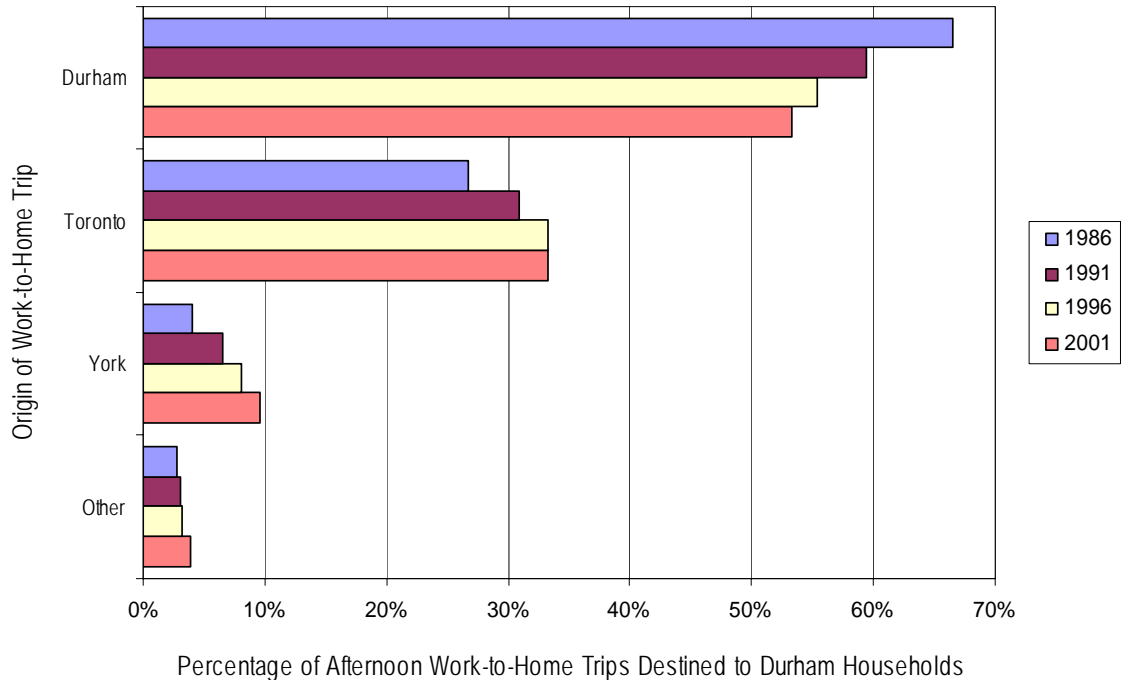
Figure 4 shows the origins of trips made by Durham residents from work to home during the three-hour afternoon peak period. In 1986, 65% of work-to-home trips originated from within the Region.

<sup>7</sup> Source: Durham Region Planning Department, 2001 Cordon Count Program

<sup>8</sup> Source: Data Management Group, 2001 Transportation Tomorrow Survey. Represents average auto occupancy in the afternoon peak period.

The remaining 35% began their journey from outside Durham. Over the last fifteen years, the percentage of Durham residents who commute to employment opportunities outside the Region (also known as out-commuting) has grown steadily. In 2001, the percentage reached 46%, or nearly half of all afternoon work-to-home trips.

For goods movement, trucks are the primary carriers of freight, with rail being the next dominant mode, especially for the local automotive manufacturing industry. Air and marine modes carry relatively small shares of total freight.



**FIGURE 4 – Origins of Afternoon Peak Period Work to Home Trips Destined to Durham Households**

Source: Data Management Group, 2001 Transportation Tomorrow Survey

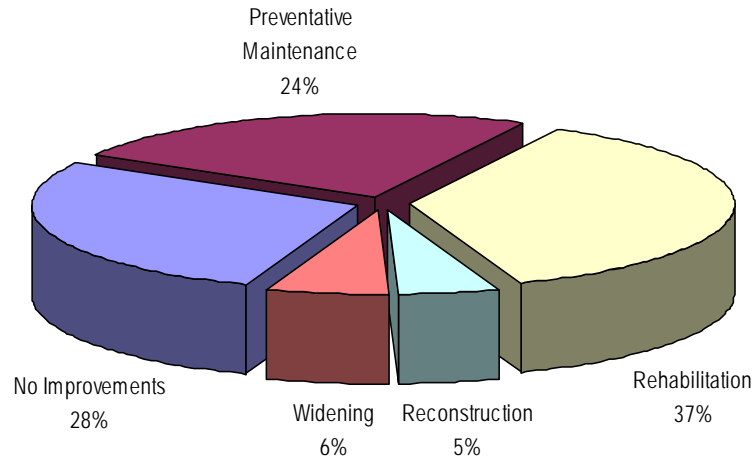
The volume of commercial vehicles on freeways and major arterial roads is considerable, although its share of total vehicular traffic has remained somewhat constant<sup>9</sup>. As an example, trucks account for about 13% of total daytime traffic, or a volume of about 14,300 vehicles<sup>10</sup>, on Highway 401 at Lake Ridge Road. In certain locations along Highway 401, trucks represent almost a quarter of the traffic stream<sup>11</sup>.

<sup>9</sup> Durham Region Planning Department, "2001 Durham Cordon Count Program" Facts Sheet, 2003.

<sup>10</sup> Source: Durham Region Planning Department, 2001 Cordon Count Program. Volumes measured between 6:30 a.m. and 6:30 p.m.

<sup>11</sup> Source: Durham Region Planning Department, 2001 Cordon Count Program. Volumes measured between 6:30 a.m. and 6:30 p.m. at the Clarington east limit station.

Many daily automobile, truck, bus and bicycle trips in Durham are made on the Regional Road network. Given the growing volume of traffic these roads are serving, it is not surprising that the system requires improvement. **Figure 5** indicates that more than two-thirds of the Regional Road network needs some type of improvement, be it preventative maintenance (i.e. crack sealing or overlay), rehabilitation (i.e. grind and overlay), full reconstruction or widening.



**FIGURE 5 – Percentage of Lane-Kilometres Requiring Improvement by Type of Treatment for the Regional Road Network<sup>12</sup>**

Source: Durham Region Works Department

## 2.3 FUTURE TRANSPORTATION DEMAND

Transportation system demand will increase as the Region grows. The magnitude of this increase was assessed using a computer-based model that predicted how travel demand could change as a result of anticipated population and employment growth. The purpose of this forecasting exercise was to identify the facilities and services needed to serve transportation demands to the year 2021.

### 2.3.1 Population and Employment Forecasts

**Table 3** summarizes the population and employment forecasts for Durham Region contained in the ROP review discussion paper on population, employment and urban land<sup>13</sup>. These forecasts are consistent with recent monitoring that suggests the current ROP targets of 970,000 people and 485,000 jobs will not likely be reached by 2021. Using these updated figures ensures consistency between the ROP review and TMP processes, and with the results of the 2003 Regional Development Charge by-law renewal. The long-range capital program and financial plan developed for the by-law renewal are based on these same development forecasts.

<sup>12</sup> Improvement requirements are based on the type of treatment, as determined from the Region's pavement management system. The treatment type is based primarily on the latest Pavement Condition Index, which for this report was estimated through the 2002 Road Needs Study update.

<sup>13</sup> Durham Region Planning Department, "Population, Employment and Urban Land" Discussion Paper, June 2003.

It should be noted that these growth forecasts are being used only for forecasting travel demand, and are not intended for other planning purposes at this time. Approved forecasts will be incorporated into the TMP, if different, at the conclusion of the on-going ROP review process.

**TABLE 3 – Forecast Population and Employment Growth**

	Population				Employment			
	2001 <sup>1</sup>	2011	2021	2031	2001	2011	2021	2031
Ajax	76,655	103,525	141,400	183,535	22,125	31,985	48,095	68,720
Brock	12,595	14,165	16,255	18,545	2,875	3,410	4,240	5,270
Clarington	72,585	96,695	130,155	167,375	14,985	21,495	32,000	45,465
Oshawa	144,615	159,775	183,220	209,955	57,425	67,890	85,700	108,115
Pickering	90,625	122,900	166,580	215,235	28,220	41,145	61,605	87,815
Scugog	20,980	24,005	26,220	26,830	5,410	6,710	7,850	8,520
Uxbridge	18,070	21,980	23,860	24,665	4,745	6,270	7,190	7,860
Whitby	90,930	120,885	162,085	207,925	30,535	43,520	64,315	90,885
<b>DURHAM</b>	527,055	663,930	849,775	1,054,065	166,320	222,425	310,995	422,650
<b>Ten Year Growth</b>		136,875	185,845	204,290		56,105	88,570	111,655
<b>% Growth Over 2001</b>		26%	61%	100%		34%	87%	154%
<b>Jobs/Person</b>					0.32	0.34	0.37	0.40

Source: Durham Region Planning Department

Note: 1. Based on the 2001 Census of Canada estimate of 506,901, factored up by 4% to reflect the expected undercount of population.

**Table 3** shows that population and employment are forecast to grow 61% and 87%, respectively between 2001 and 2021. Although the growth in population is notable, the significant increase in employment requires explanation.

The anticipated growth in employment is premised on Durham's "activity rate", or jobs to population ratio, rising from 0.32 jobs per person in 2001 to 0.37 in 2021. This projected activity rate is consistent with rates experienced in other high-growth municipalities within the GTA. It also reflects trends observed in the 1980's when the Region was more "self-contained" (i.e. a more balanced employment and population ratio and fewer people commuting out of the Region for work). These trends are expected to re-emerge as development patterns in Durham continue to mature and several key economic growth stimulants, such as Highway 407, the Pickering Airport, and the new university, are realized. The outcomes of achieving these forecasts, and consequences of not, were highlighted in Section 2.1.

### 2.3.2 Mode Share Targets

Forecasting travel demand requires assumptions about the relative use of each travel mode in the future. The Transportation Vision described in Section 2.1 is founded on the premise that the Region will exhibit a more balanced transportation system by the year 2021 and use of modes other than the automobile will increase.



The TMP aims to achieve the highest diversion of **single-occupant** automobile travel to other modes that is reasonably practical given current travel habits and the present transportation system focus of serving the automobile. For modelling and analysis purposes, the Plan sets a target of **reducing afternoon peak-period automobile driver trips by 15% compared to forecasts based on current trends**. In achieving this 15% target by the year 2021, it is assumed that most drivers will divert to transit, although walking, cycling, ridesharing and work-at-home are all expected to increase over this period.

A 15% auto reduction target is consistent with the conclusions of other long-range transportation planning exercises undertaken by the Province<sup>14</sup>, and other Canadian municipalities. The goal will be challenging to reach, but can be achieved through implementation of the strategies recommended in the TMP in a comprehensive and co-ordinated fashion.

**Figure 6** summarizes forecasted year 2021 peak period travel demands (in person trips) based on the population and employment forecasts summarized in **Table 3**. Total afternoon peak period travel demand is expected to grow from 285,000 person trips in 2001 to about 552,000 person trips in 2021. This increase of 94% is greater than the population growth of 61% over the same period, and is a reflection of the considerable increase in employment anticipated.

**Figure 6** also compares resulting mode shares for the 15% auto reduction target scenario and the forecast based on the continuance of current mode choice trends. The figure shows that nearly 60,000 peak period automobile driver trips would be diverted to other modes of travel. Achieving this 15% target will more than double the number of transit trips that would have occurred in the year 2021 without this change in travel behaviour, and increase transit ridership by 450% over current levels.

### 2.3.3 Corridor Capacity Analysis

A subsequent detailed analysis was carried out to determine the implications of future automobile demands on the existing road system. Demand forecasting results were compared to existing traffic capacities at key screenlines<sup>15</sup> to identify locations where road capacities would not be sufficient in the year 2021 to provide an acceptable level of service. The traffic forecasts represent typical afternoon peak period conditions<sup>16</sup>.

The TMP establishes the acceptable level of service for a screenline to be 90% of its vehicular capacity, or a volume to capacity (v/c) ratio of 0.9. Traffic flows on roads exceeding this v/c ratio, commonly referred to as level of service "E", tends to be unstable, with longer periods of congestion and reduced travel speeds during peak travel conditions. Planning for a v/c ratio of 0.9

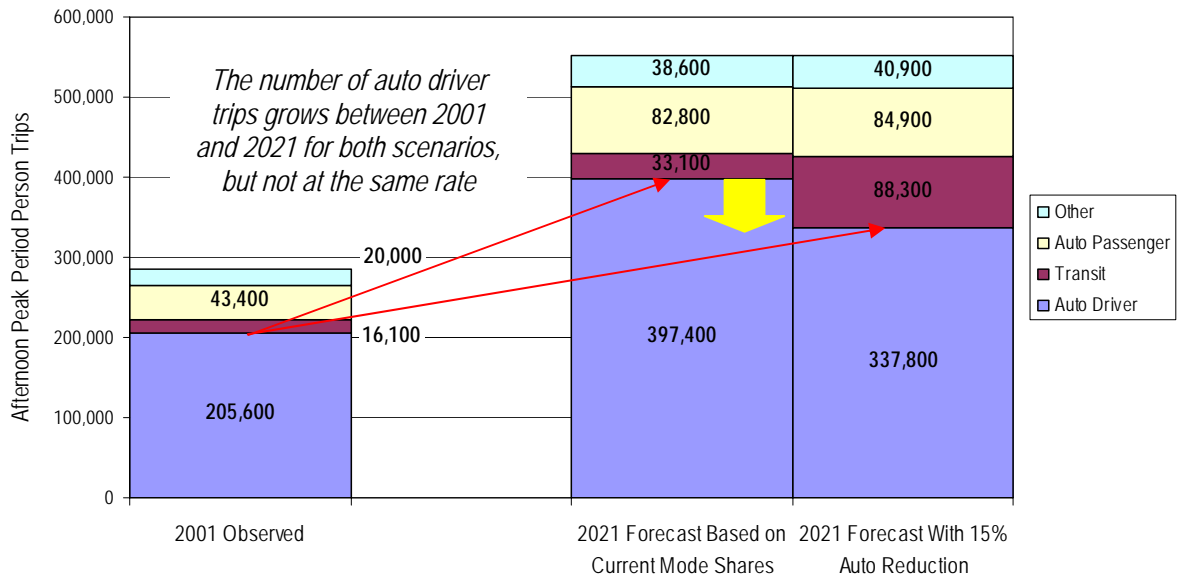
<sup>14</sup> Ministry of Transportation, *Technical Report #5 – Preliminary Review of Transportation Demand Management, Towards a Greater Toronto Transportation Plan*, 1997.

<sup>15</sup> A screenline is an imaginary or actual physical barrier used as a control location to examine major traffic flows.

<sup>16</sup> The three-hour afternoon peak period was selected as it typically represents the highest travel demand condition on the transportation system.



also acknowledges that road expansion is not limitless, and that some congestion will occur during peak periods.



Mode	Mode Share Scenario	Observed 2001 <sup>1</sup>		Forecast 2021		% Change from 2001 to 2021
		Person Trips	%	Person Trips	%	
Auto Driver	Based on Current Mode Share	205,600	72%	397,400	72%	93%
	With 15% Reduction in Auto Driver Trips			337,800	61%	64%
	<b>Increase in Auto Driver Trips</b>			<b>-59,600</b>	<b>-15%</b>	
Auto Passenger	Based on Current Mode Share	43,400	15%	82,800	15%	91%
	With 15% Reduction in Auto Driver Trips			84,900	15%	96%
	<b>Increase in Auto Passenger Trips</b>			<b>2,100</b>	<b>3%</b>	
Transit <sup>2</sup>	Based on Current Mode Share	16,100	6%	33,100	6%	106%
	With 15% Reduction in Auto Driver Trips			88,300	16%	448%
	<b>Increase in Transit Trips</b>			<b>55,200</b>	<b>167%</b>	
Other <sup>3</sup>	Based on Current Mode Share	20,000	7%	38,600	7%	93%
	With 15% Reduction in Auto Driver Trips			40,900	7%	105%
	<b>Increase in Other Trips</b>			<b>2,300</b>	<b>6%</b>	
<b>TOTAL</b>		<b>285,100</b>		<b>551,900</b>		<b>94%</b>

- Notes: 1. Source: Data Management Group, 2001 Transportation Tomorrow Survey  
 2. "Transit" includes GO rail, GO bus and local bus modes  
 3. "Other" includes walk, cycle, school bus, motorcycle and taxi modes

**FIGURE 6 – Forecasted Peak Period Travel Demands and Mode Shares**



As with the 2003 Development Charge by-law renewal, the traffic forecasts prepared for the TMP assumed that Highways 401 and 407 would be expanded to the proposed East Durham link by the year 2021, with two high-speed connections between the two freeways.

**Figures 7 and 8** illustrate the results of the screenline analysis for the scenarios based on the continuation of current mode choice trends and the 15% auto reduction target, respectively. The following two observations were noted:

- Traffic demands grow over time at every screenline, and reach over-capacity conditions in most areas. Road expansion will be required to rectify capacity constraints.
- The continuation of current mode choice trends poses a greater impact on the road system, and requires a more comprehensive road expansion program to address future travel demands.

## 2.4 THE OUTLOOK FOR TRANSPORTATION IN DURHAM REGION


The foregoing sections have illustrated that the Region faces considerable challenges in achieving its Transportation Vision. Growth pressures, lagging employment rates, entrenched travel behaviour, deteriorating infrastructure conditions, and a rising rate of out commuting will need to be overcome. Other challenges and emerging trends include:

- Changing demographics and users needs. The Region has an aging population, but continues to experience an influx of new families. Both out of necessity and because of different values, transportation needs will change over time;
- Managing congestion for the continually increasing volume of trucks moving goods. Travel time reliability is key for businesses dependent on just-in-time delivery and who have time sensitive markets;
- Limiting negative environmental impacts related to automobile and truck use, including greenhouse gas emissions, air pollution, noise, speeding traffic, and community separation; and
- Responding to the changing relationship between transportation and society resulting from fundamental shifts in technology, market structure and regulatory frameworks.

The Region's ability to finance transportation system maintenance and improvement is also a key concern. Senior governments have systematically withdrawn their financial assistance for municipal transportation services and have downloaded responsibility for road and transit systems onto the property tax bill. Without additional, sustainable financing sources, such as dedicated fuel taxes, vehicle registration fees or tolls, current funding levels are insufficient to meet future needs.



# FORECAST 2021 AFTERNOON PEAK HOUR TRAFFIC CONDITIONS AT MAJOR SCREENLINES WITH CURRENT MODE CHOICE TRENDS

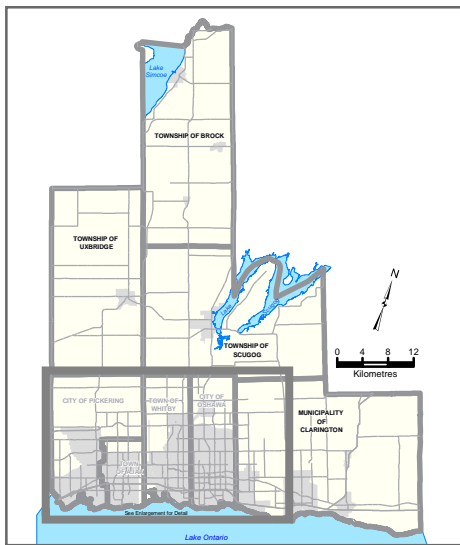


**Level of Service**

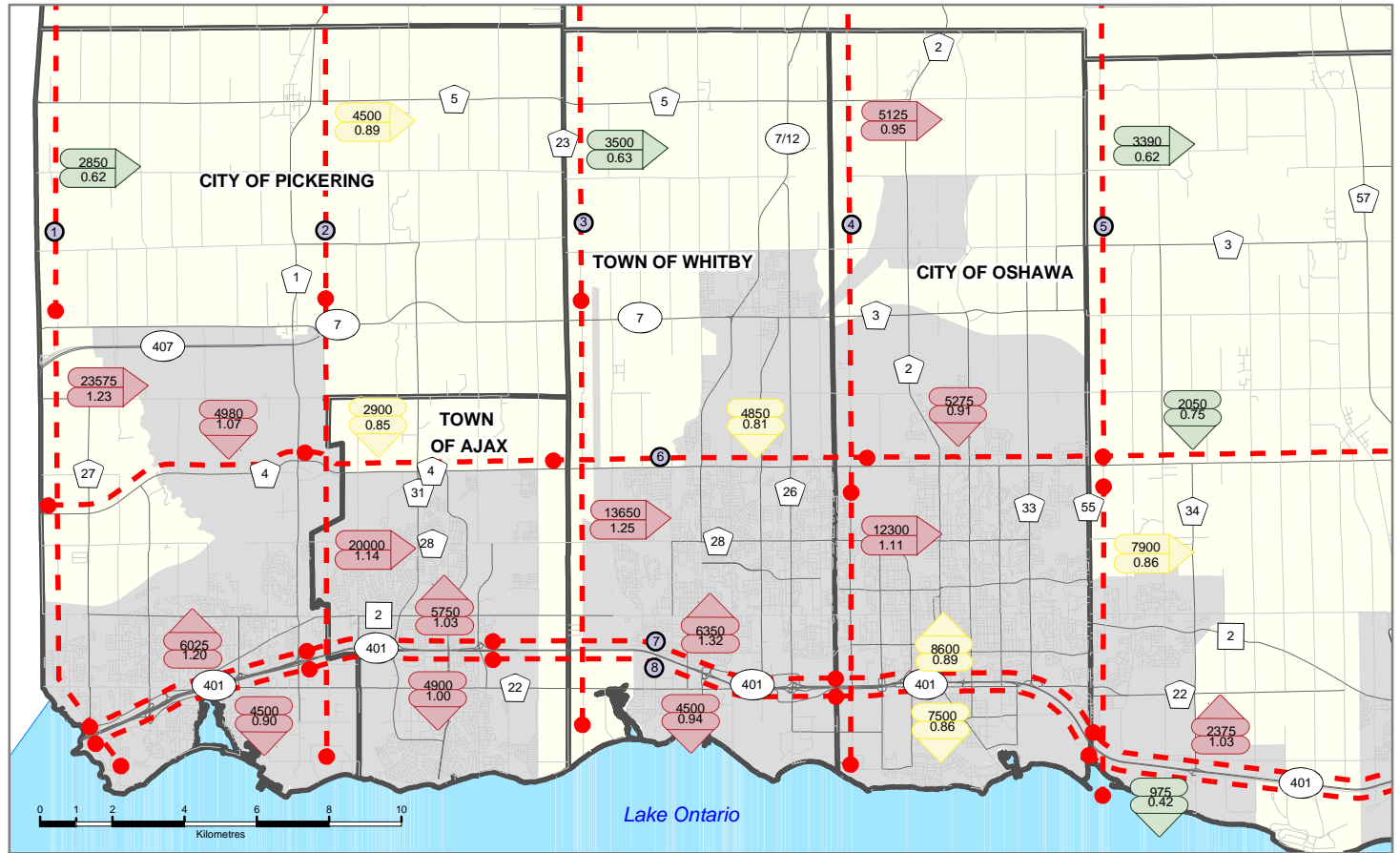
- Good (v/c < 0.8)
- Unstable (0.8 < v/c < 0.9)
- Congested (v/c > 0.9)

**Urban Area**

**Volume V/C** Note: V/C refers to Volume to Capacity Ratio



## Enlargement Detail



### Screenline Location

- ① East of York-Durham Townline
- ② East of Brock Rd.
- ③ East of Lake Ridge Rd.
- ④ East of Thornton Rd.
- ⑤ East of Townline Rd.
- ⑥ North of Taunton Rd.
- ⑦ North of Highway 401
- ⑧ South of Highway 401

### NOTES:

Urban area based on Regional Official Plan.

This figure forms part of the Durham Transportation Master Plan and must be read in conjunction with the text.

# FORECAST (2021) AFTERNOON PEAK HOUR TRAFFIC CONDITIONS AT MAJOR SCREENLINES WITH 15% REDUCTION IN AUTO TRIPS

**Level of Service**

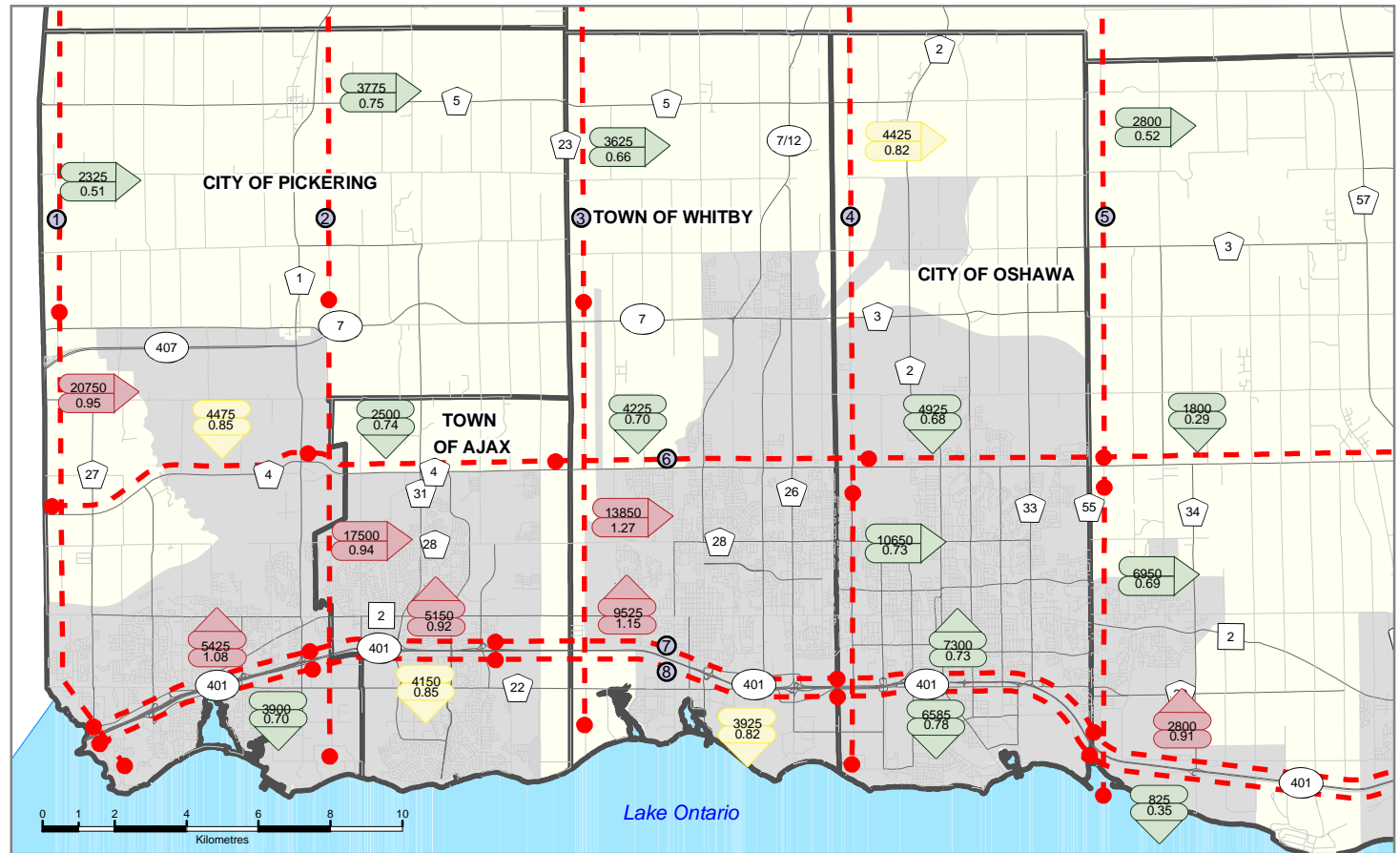
- Good ( $v/c < 0.8$ )
- Unstable ( $0.8 < v/c < 0.9$ )
- Congested ( $v/c > 0.9$ )

**Urban Area**

**Volume V/C**

Note: V/C refers to Volume to Capacity Ratio

## Enlargement Detail



### Screenline Location

- ① East of York-Durham Townline
- ② East of Brock Rd.
- ③ East of Lake Ridge Rd.
- ④ East of Thornton Rd.
- ⑤ East of Townline Rd.
- ⑥ North of Taunton Rd.
- ⑦ North of Highway 401
- ⑧ South of Highway 401

### NOTES:

Urban area based on Regional Official Plan.

This figure forms part of the Durham Transportation Master Plan and must be read in conjunction with the text.

Meeting growing and changing user expectations is another challenge. Through the public involvement process, citizens shared their future outlook for the transportation system, which included:

- Public transit services with better connections, better service and greater coverage;
- Equitable travel options for those without cars or unable to drive;
- Protection for the natural environment and neighbourhoods;
- Reduced auto use through the use of incentives; and
- Improvements to the road system, given the continued importance of the automobile as the prime mode of transportation for most people.

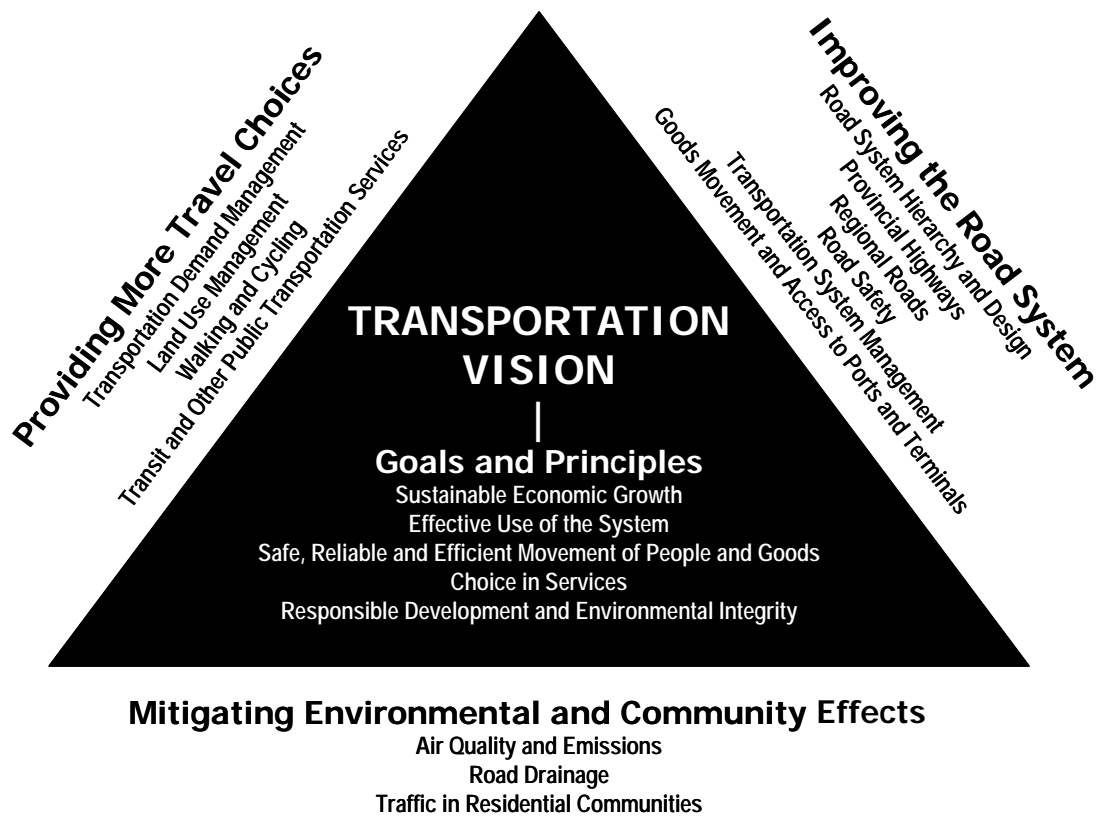




## CHAPTER 3 - THE PLAN ELEMENTS

### 3.1 THE STRATEGIES

The previous chapter illustrated that a long-term plan is required to address the diverse transportation needs of a growing and changing community. The TMP responds to these future challenges and opportunities with three co-ordinated and comprehensive **strategies** that reconcile the many aspirations, goals, values, and priorities for the transportation system, as **Figure 9** shows:



**FIGURE 9 – Transportation Master Plan Strategies**

These strategies provide a framework for establishing a more sustainable transportation system, in keeping with the directions of the Community Strategic Plan, the ROP and the Transportation Vision, goals and principles. The main themes and thrusts of the strategies are to:

- Manage travel demand and traffic congestion;
- Offer a wider range of travel options and equitable access to transportation services;

- Keep the transportation system in a state of good repair;
- Enhance safety for users;
- Optimize the use of previous and future investments in transportation infrastructure;
- Improve the efficiency and reliability of moving goods within and through Durham;
- Limit, and where necessary mitigate, the social, environmental and community-related effects of transportation;
- Minimize the cost of providing transportation services; and
- Monitor and adapt to changing conditions.

Each strategy is supplemented by a series of **recommended actions** that define specific implementation activities. These recommended actions address the differing requirements of the Region’s urban and rural communities, and provide guidance on how to manage both the supply and demand of transportation service.

Accommodating the transportation demands of planned growth is the fundamental purpose of the TMP. The challenges presented by future growth are addressed through the combined effects of the various actions, which will moderate the extent to which congestion would otherwise occur.

## 3.2 PROVIDING MORE TRAVEL CHOICES

Offering more choices to travellers is one of the fundamental goals of the TMP. Providing a range of travel options:

- Enables more equitable access to transportation services for all individuals;
- Offers viable and competitive alternatives to the automobile throughout the day;
- Allows communities to become more compact, which enhances their attractiveness and liveability; and
- Encourages a healthier lifestyle that promotes physical activity and reduces harmful natural environmental consequences.

Actions to provide more travel choices outlined in the TMP focus on four themes:

- **Transportation Demand Management**
- **Land Use Management**
- **Walking and Cycling**
- **Transit and Other Public Transportation Services**





### 3.2.1 Transportation Demand Management

The Transportation Vision developed for the TMP emphasizes the importance of providing a more balanced transportation system. In support of this goal, the Plan sets a year 2021 target to reduce peak period automobile driver trips by 15% below forecasts based on current trends, as discussed in Section 2.3.2.

One way to reduce auto travel is through the introduction of a **Transportation Demand Management (TDM) Program**. TDM is a co-ordinated series of actions aimed at maximizing the people moving capability of the transportation system. The objectives of TDM are to encourage individuals to make fewer trips, to travel less by **single-occupant** auto, to travel outside the peak periods, and to reduce the distance of their trips. Similar to the Region's existing waste reduction and water efficiency programs, TDM has the goal of reducing consumption and dependency by influencing the conditions affecting demand, not the supply of services. By using the existing system more effectively and efficiently, TDM promotes environmental sustainability and fiscal responsibility.

**Table 4** presents a list of potential TDM measures for use in Durham Region. Disincentive measures tend to be the most effective and may generate revenue to fund other infrastructure improvements. However, disincentives also tend to have the least public and political support because they are typically more intrusive and generally require supporting legislation and enforcement.

**TABLE 4 – Possible TDM Measures for Durham Region**

Possible TDM Measure	Measure Currently Used in the Region	Public Acceptance	Potential to Affect Change in Travel Behaviour		RECOMMENDED FOR FURTHER CONSIDERATION
			High	Low	
<b>Incentive Measures</b>					
TDM-Supportive Land Use	✓		✓		✓
Bicycle/Pedestrian Programs and Facilities	✓	✓	✓		✓
Public Transit Service Improvements	✓	✓	✓		✓
Priority Measures (i.e. HOV or Bus Lanes)		✓	✓		✓
Ridesharing (i.e. Car/Vanpooling)	✓	✓	✓		✓
Employee Incentives (i.e. Subsidized Transit Passes, Preferential Parking)	✓	✓	✓		✓
Alternative Work Hours	✓	✓		✓	
Telecommuting	✓	✓		✓	
<b>Disincentive Measures</b>					
Parking Supply Management and Pricing				✓	
Auto Usage Charges				✓	
Tolls				✓	

A TDM program in Durham could begin with the incentive measures noted in **Table 4**, building on existing initiatives already underway. Their combined influence will help to reduce the growth in peak period automobile travel. Even a small reduction or shift in trips can reduce traffic congestion and limit the need for infrastructure expansion. Actions related to land use management, walking and cycling, and transit are discussed in greater detail in the following sections.

Ridesharing is another TDM initiative recommended for further consideration in the TMP. Complementary facilities, such as carpool lots and matching services, would be required. Employee incentives, like employer subsidized transit passes and preferred parking for carpools, are also recommended.

Success of the TDM Program will depend on marketing and public education. Even minor changes in travel behaviour will require a cultural shift, given current reliance on the automobile. Educating the public about the environmental, social, health and economic benefits associated with TDM is key. Potential marketing and education initiatives include:

- Providing promotional and educational materials, targeted initially towards urban area employers, rural residents, school children and community groups, that outline the benefits and opportunities presented by TDM and the need to change personal travel behaviour;
- Holding regular forums to enable stakeholders to share information and promote programs;
- Approaching potential businesses to pursue the benefits associated with TDM; and
- Placing material on the Region's Internet site.

There is a role for all levels of governments and the private sector to play in developing, funding and implementing the TDM Program, but the program needs to be integrated and co-ordinated at a region-wide level to promote accessibility, service and equity across jurisdictional boundaries. Many of the actions will require intervention and leadership to happen.

The Region has recently taken a more active role in promoting actions to encourage TDM, such as developing a Transit Improvement Plan, which is discussed further in Section 3.2.4. The Region is also working with other GTA Regions and the Cities of Toronto and Hamilton to establish a network of Transportation Management Associations (TMAs). With matching municipal and private sector financing, the TMAs will deliver a host of TDM-related initiatives.

The appointment of a TDM Co-ordinator by the Region is recommended to initiate and manage the program, and to forge co-operative relationships with stakeholders. This approach has been successful in promoting waste reduction and water efficiency measures in Durham, having reduced or deferred the need for infrastructure related to these services. Other municipalities, such as the Region of Waterloo, the City of Ottawa, and the Town of Markham, have engaged co-ordinators to manage similar programs. These jurisdictions are showing that dedicating resources to better managing transportation demands can have a positive effect.



## Recommended Actions:

1. *Develop a Transportation Demand Management (TDM) Program to reduce projected year 2021 peak period automobile driver trips by 15% below forecasts based on current trends, focussing first on actions to promote:*
  - *Transit, pedestrian and cycling-oriented development through land use management;*
  - *Walking, cycling and ridesharing; and*
  - *Use of transit and other public transportation services.*
2. *Subject to budget approval, engage the services of a TDM Co-ordinator to:*
  - *Plan and design a TDM Program;*
  - *Develop and conduct marketing and education initiatives related to TDM;*
  - *Approach potential businesses to participate in the TDM Program;*
  - *Assess the potential market for ridesharing and, if promising, introduce a ridematching service with the assistance of other groups and agencies; and*
  - *Monitor and report on the effectiveness of the TDM Program.*
3. *Pursue funding opportunities with the Provincial and Federal Governments and the private sector for the TDM Program.*
4. *Conduct a Commuter Parking Lot Feasibility Study to determine:*
  - *The potential location and demand for commuter parking lots;*
  - *How to integrate the lots into the overall TDM program and to co-ordinate with other Regional and Greater Toronto Area initiatives; and*
  - *Partnership opportunities.*
5. *Petition the Federal Government to amend taxation laws to enable employers to provide income tax-exempt transit passes to employees.*

### 3.2.2 Land Use Management

The integration of transportation and land use is a fundamental premise of the TMP. By intensifying densities and increasing mixed-use development along designated corridors and within specified nodes, TDM-supportive land use plans can make alternatives to the automobile, especially transit, more attractive and viable as **Figure 10** shows. Concentrating employment, especially office and service jobs, in locations supported by high quality transit service help to promote ridership. Placing higher density residential developments near potential transit stops creates common destinations for transit riders. The Plan does not, though, encourage higher



densities and more mixed-use development in stable residential neighbourhoods away from major transportation corridors.



**FIGURE 10 – A Comparison of Auto-Oriented and TDM-Supportive Development Patterns**

*Sources:*  
 Canadian Institute of Planners (top)  
 Public Streets for Public Use, Portland's Arterial Street Classification, Dottemer, 1987 (bottom)

Creating compact urban form that utilizes land efficiently helps to minimize the need for costly infrastructure expansion and service extensions. This form of development makes better use of existing facilities and services, and poses less impact on the environment. Travel by modes other than the automobile is also easier when land uses are closer together.

The land use and growth management framework embodied in the ROP is consistent with and supportive of the above directions. The Official Plan already promotes:

- Intensification, higher densities and more compact urban form;
- Focusing higher intensity and mixed use development in nodes (such as Central Areas) and along arterial road corridors, in conjunction with transit facilities;
- Linkages for pedestrians and cyclists within and external to communities, and to public transit;
- A grid system of arterial, and collector roads where necessary, to provide for a transit-supportive road pattern;
- Greater self-containment of employment to reduce out-commuting;
- Protection of existing residential neighbourhoods; and
- Enhanced protection for urban boundaries to restrain land absorption, to preserve the natural environment, to maximize transportation opportunities, and to limit servicing requirements.

While the ROP policies are supportive of these directions, more detailed **TDM-Supportive Land Use Guidelines** are needed to define the implementation aspects. A **Development Application Checklist** is also recommended to ensure proposed plans have regard for the guidelines, the ROP and the TMP. Development of these tools should be done co-operatively with the Local Municipalities, given their important role in land use planning and granting development approvals.

Consideration should also be given to promoting centres and corridors as supporting land use measures for the Transit Priority Network introduced in Section 3.2.4. These areas would be characterized by mixed-use and higher density development, and parking provisions that reflect higher levels of transit service. The on-going ROP review has identified the commercial benefits of this type of urban form and intends to examine the merits further<sup>17</sup>.

<sup>17</sup> Durham Region Planning Department, "Commercial Policy Review" Discussion Paper, June 2003.



## Recommended Actions:

6. *Investigate opportunities and, where feasible and subject to budget approval, lead initiatives to encourage intensification and more mixed-use development, and to create incentives for redevelopment and infilling adjacent to transit priority facilities, especially in the Highway 2 corridor.*
7. *Prepare TDM-Supportive Land use Guidelines in consultation with the Local Municipalities that:*
  - *Define the concept and elements of TDM-supportive land use patterns;*
  - *Plan for transit services and TDM-supportive facilities in the formative stage of plan development;*
  - *Determine applicable locations for TDM-supportive development, which will typically be adjacent to Transit Corridors and Transportation Centres;*
  - *Identify complementary policies and initiatives; and*
  - *Define implementation and performance measures.*
8. *Develop a Development Application Checklist in consultation with the Local Municipalities that requires:*
  - *Consistency with the approved TDM-Supportive Land Use Guidelines and Arterial Road Corridor Design Guidelines;*
  - *Encouragement and support for the safe and convenient use of transportation modes other than the automobile;*
  - *The early input of transit agencies in the review of development applications;*
  - *The presence of a grid system of arterial roads, and collector roads where necessary; and*
  - *A plan for implementing transit service and TDM-supportive facilities early in developing areas.*
9. *Examine the concept of centres and corridors through the Regional Official Plan review as an approach to promoting TDM-supportive development in desired locations.*

### 3.2.3 Walking and Cycling

Walking and cycling are environmentally friendly and sustainable modes of transportation that require less infrastructure than the automobile to serve travel demand. They provide an excellent alternative for short distance trips, support and complement the use of transit, reduce vehicle



emissions and consumption of non-renewable energy resources, and promote a more active, healthier lifestyle.

The Local Municipalities are currently responsible for providing pedestrian and cycling facilities and services in Durham Region, including sidewalks in Regional Road allowances<sup>18</sup>. Some municipalities have extensive recreational path systems for walking and cycling to complement their sidewalk inventory. A few have designated on-street bicycle lanes.

There are locations where expansion of the local cycle/pathway system into the Regional Road allowance could help to increase the level of walking and cycling. Urban Regional Road corridors in close proximity to major pedestrian and bicycle trip generators, such as Durham College/UOIT, or those connecting Local Municipal routes together should be considered. Facilities should be located within the boulevard if possible, given cost<sup>19</sup> and the conflicts with vehicular traffic. In cases where the Regional Road forms a barrier to connecting Local Municipal routes together, means of conveyance, such as traffic signals or structures, could be considered where warranted.

In the rural area, cyclists are often forced to the gravel shoulders of what are typically roads with fast moving traffic and considerable volumes of trucks. Although not for cycling purposes, the Region has been partially paving shoulders during rehabilitation projects over the past ten years to address pavement deterioration concerns. Continuing this practice on all rural Regional Roads could help to provide safer cycling conditions and would offer other benefits. In some instances, paving the shoulder will not be feasible due to right-of-way, terrain or financial reasons. Cyclists would need to be warned in advance of changing conditions.

With several Local Municipalities having completed or considering trail and bike route plans, it is important to provide for region-wide system connectivity and consistency where possible. This helps to promote cycling as a viable option for more trips. Development of a **Regional Bicycle Plan** is recommended to better co-ordinate these initiatives, and to consider appropriate treatment for bicycles within the Regional Road allowance. The Bicycle Plan, to be developed in consultation with the Local Municipalities and other stakeholders, would also define implementation costs and responsibilities. Regional financing for any recommended initiative would need to be reallocated from and/or added to existing budgets, and would be subject to further review and approval.

The Plan also recommends developing guidelines to ensure the needs of pedestrians and cyclists are considered in the planning, design, construction, operation and maintenance of the Regional Road network. Specific guidance could include:

- Providing better sightlines to increase the visibility of pedestrians and cyclists;

<sup>18</sup> *Municipal Act, 2001*, S.O. 2001, c. 25, s. 55

<sup>19</sup> The estimated cost to provide bicycle lanes on an urban Regional Road is about \$200,000 per km and about \$60,000 per km on rural roads (2003 dollars).



- Using appropriate and warranted traffic controls, such as Intersection Pedestrian Signals, to minimize hazardous conflicts;
- Ensuring catchbasins are oriented in a manner that does not impede or cause harm to on-road cyclists;
- Limiting sidewalk/pathway/bikeway grades consistent with terrain constraints;
- Separating pedestrian and vehicular paths, where possible;
- Including medians, islands or other pedestrian refuges on streets more than four lanes wide to provide safer pedestrian crossings;
- Using curb extensions to reduce intersection crossing distances in locations with limited heavy vehicle traffic;
- Ensuring that crossings are adequately designed and clearly delineated; and
- Installing detection at signalized intersections to ensure signal timing is sufficient to cross safely.

### Recommended Actions:

10. *Develop a Regional Bicycle Plan in consultation with the Local Municipalities, the Ministry of Transportation and other stakeholders, which:*
  - *Focuses activity on the Local Municipal road and path systems;*
  - *Connects the Local Municipal bicycle systems together;*
  - *Integrates with other modes of transportation, especially walking and transit;*
  - *Considers the need for bicycle facilities within Regional Road corridors;*
  - *Identifies facilities that may be required on the Provincial Highway network to achieve network continuity, which may be subject to municipal funding; and*
  - *Defines an implementation strategy, identifying public education and marketing initiatives, costs, financing sources and responsibilities.*
11. *Develop guidelines for ensuring the needs of pedestrians and cyclists are considered in the planning, design, construction, operation and maintenance of the Regional Road network.*





### 3.2.4 Transit and Other Public Transportation Services

An efficient and effective public transportation system is critical to the long-term economic, environmental and community sustainability of the Region. While transit and other public transportation services cannot offer benefits universally, at all times of the day for all trips, services should be expected to:

- Meet the basic mobility needs of people who have no other travel alternatives through a base level of service at a reasonable cost;
- Offer a viable and competitive alternative to the automobile during peak periods of travel in high demand corridors; and
- Expand the carrying capacity of the transportation system.

Greater use of transit for peak period travel will be key to achieving the TMP's 15% auto reduction target and accommodating growing travel demands. Increased transit ridership during off-peak times is another important objective. Also key is improving the capacity of public transportation to serve individuals without access to automobiles or residing in areas more difficult to service.

#### 3.2.4.1 Integration of Inter-Municipal Transit Services – Durham Region Transit Improvement Plan

With the level of growth experienced in Durham over the last few decades and the emergence of activity centres across the Region, there has been greater pressure for more integrated inter-municipal transit service. Residents attending public open houses and forwarding comments during the study expressed a strong desire for more transit connections between municipalities. Less than half (46%) of the public opinion survey respondents were satisfied with bus service between municipalities, and about 85% felt that better inter-municipal transit was either essential or fairly important<sup>20</sup>. Throughout the study, the Community Advisory Committee strongly advocated for better transit service integration.

The potential market for cross-boundary service is growing. Between 1986 and 2001, the number of trips between the municipalities in Durham Region increased by about 65%<sup>21</sup>. These travel demands can be expected to climb with the growth anticipated to occur over the coming years.

The continued evolution of transit service to a fully integrated system in the southern portion of Durham is needed to serve growing travel demands. Similar to water supply and sanitary sewerage services, the planning, co-ordination and delivery of transit service should be considered in a larger geographical context to ensure service is efficient, integrated and equitable. This will help to promote the use of public transportation services on a region-wide basis.

<sup>20</sup> Angus Reid Group, *Durham Mobility Study Public Opinion Survey, 2000*

<sup>21</sup> Data Management Group, *1986 and 2001 Transportation Tomorrow Surveys*



In recognition of the growing pressure to integrate transit services, Regional Council struck a Task Force to “develop a plan to consider a regional transit system” in October 2001. Following an extensive study process, Regional Council approved a Transit Improvement Plan (TIP) for the Region in October 2003.

The TIP outlines a short-term (5 years) action plan and long-term implementation strategy for: service delivery; fleet and infrastructure requirements; financial matters; transportation demand management directions; and exclusive transit facilities. While the TIP did not advocate a single-tier transit system, it lays the framework for more integrated inter-municipal services.

### 3.2.4.2 Transit Priority and Bus Rapid Transit

The TMP identifies a **Transit Priority Network** to help support implementation of the TIP. The network combines the key elements of the GO Transit rail system, with priority measures on arterial roads and freeways, and separate facilities where required. Its purpose is to give priority in key transportation corridors to make transit a more competitive and attractive alternative to the automobile.

Current and anticipated transit use trends, future travel demands, and the ROP land use plans and policies were assessed in developing the network. Consideration was also given to the location of existing GO Transit routes and stations, existing transit designations in the Official Plan, and other inter-regional transit plans.

The Transit Priority Network shown in **Figure 11** comprises several elements:

- **Major Transit Corridors** facilitate inter-regional and inter-municipal service, and intersect with Minor Transit Corridors and local transit services. They link to Transportation Centres, commuter and inter-city passenger rail stations, and connect the Central Areas designated in the ROP with other major employment and population nodes. Land use along these corridors should be designed to support transit consistent with their designations in the ROP and local official plans. Major Transit Corridors will be considered for reserved lanes first, assuming service levels necessitate priority treatment (potentially 20 or more buses per hour in the peak direction).

Highway 2 is the Region’s “mainstreet” and most significant inter-municipal transit corridor. This Major Transit Corridor connects the populated urban centres along the Lake Ontario shore and will feature the highest levels of service, provide enhanced connections with other Transit Corridors, and be the target of the highest density, most mixed use development in the Region. Corridor guidelines identifying the actions necessary to transform Highway 2 to a mainstreet have been developed in the City of Pickering and in the Municipality of Clarington. Similar strategies for other portions of the corridor should be pursued.

- **Minor Transit Corridors** facilitate inter-municipal and local municipal transit service, and intersect with local transit services and Major Transit Corridors. They also link with commuter

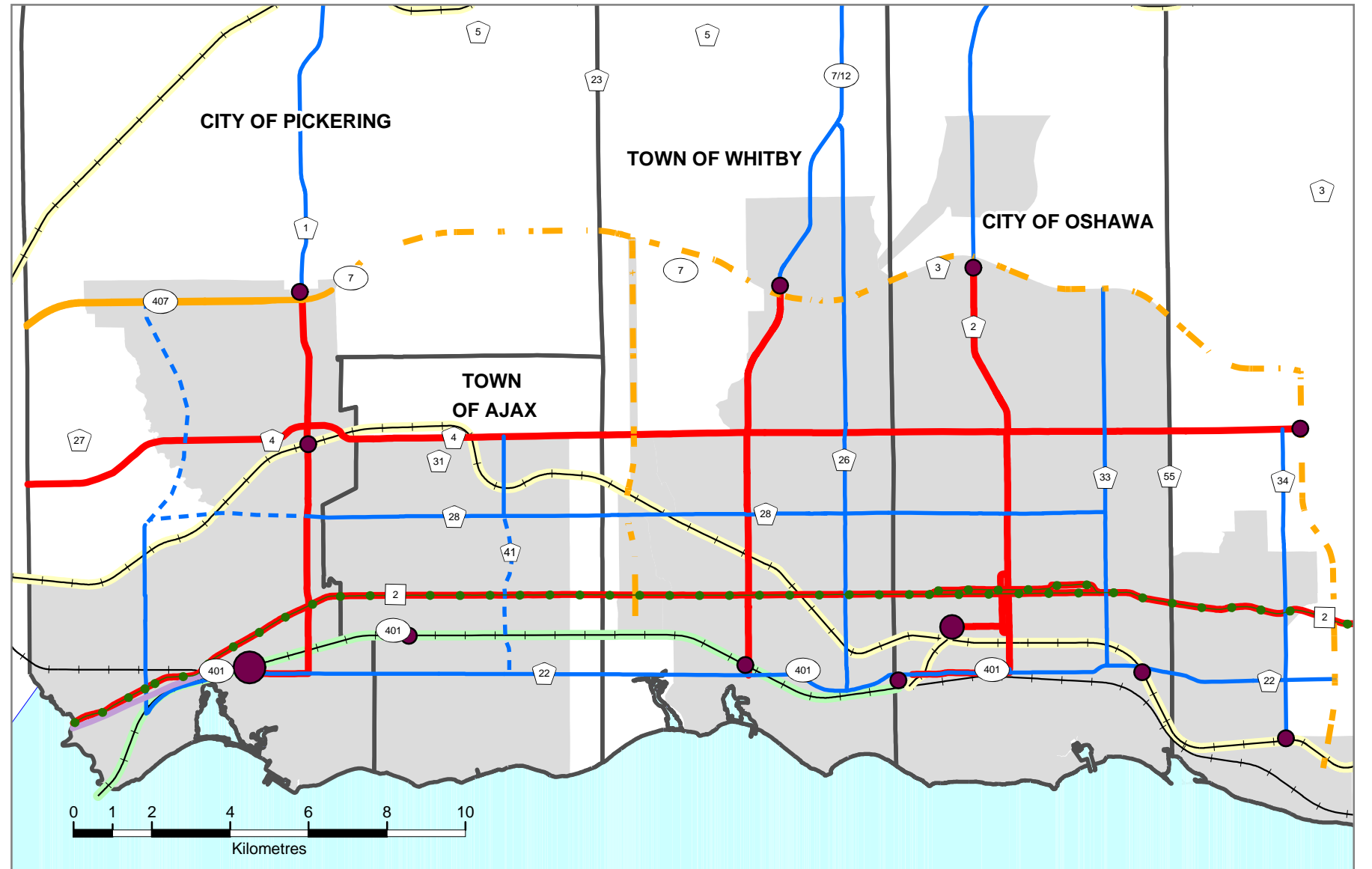
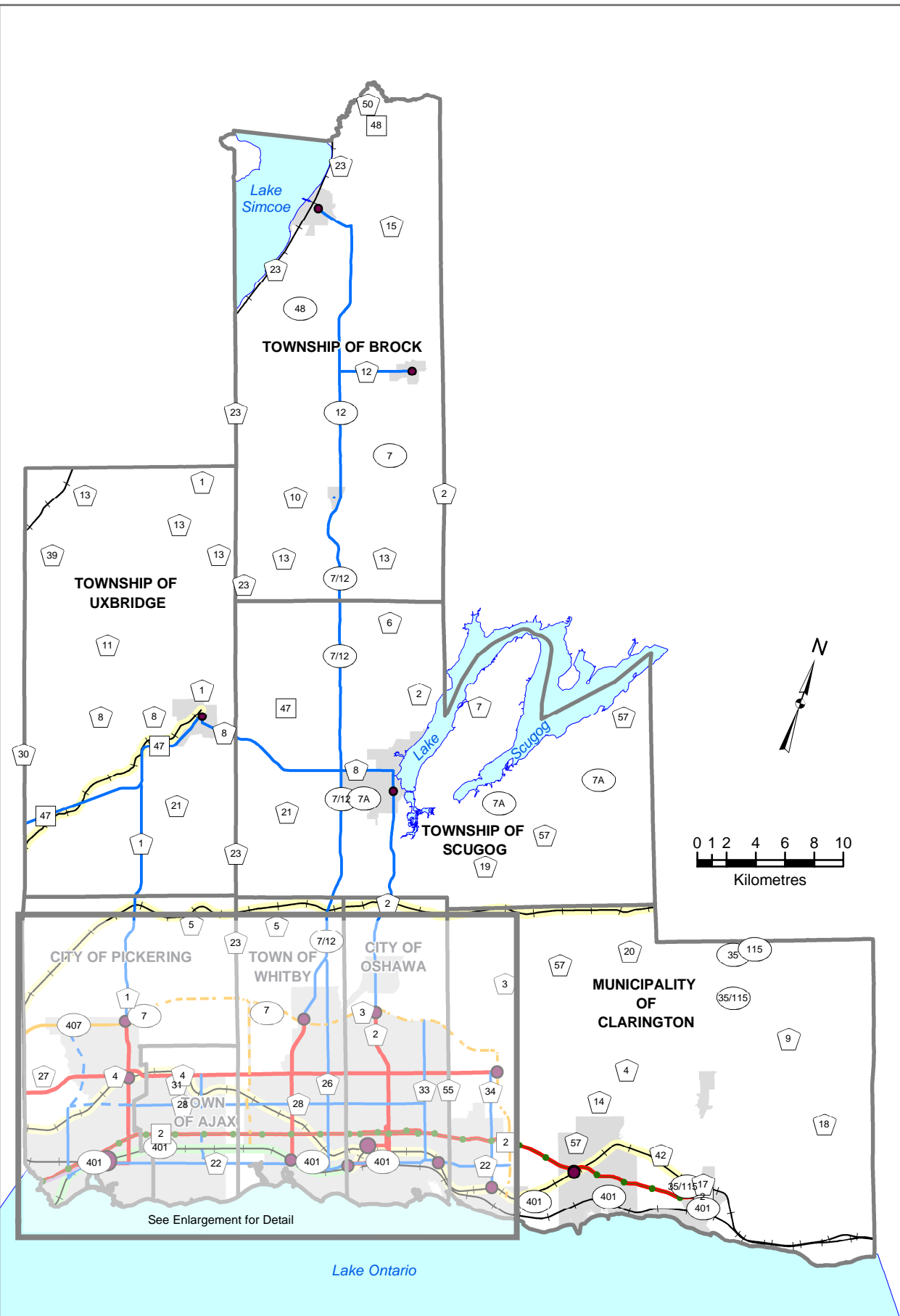
# TRANSIT PRIORITY NETWORK



- Major Transit Corridors
  - Minor Transit Corridors
  - "Mainstreet" Highway 2
  - Highway 407 Transit Corridor
  - Highway 401 Bus Rapid Transit
  - Commuter Rail
  - - - Future Transportation Corridor
  - Transportation Centres
  - Municipal Boundaries
  - Urban Area
- Note: Dashed lines represent Transit Priority corridors on future roads.

NOTES:  
 Urban area based on Regional Official Plan.  
 This figure forms part of the Durham Transportation Master Plan and must be read in conjunction with the text.  
 This map is intended as a framework for planning and design. All projects are subject to further detailed study in accordance with the Environmental Assessment Act.

## Enlargement Detail



and inter-city passenger rail stations where appropriate. Service levels and vehicle priority are expected to be lower than for Major Transit Corridors.

- **Commuter Rail** service is provided by GO Transit. This inter-regional transit service is intended to carry passengers over longer distances, typically between downtown Toronto and the surrounding urban areas. Stations are spaced at intervals that enable high-speed operation and minimize the number of stops, partially due to the heavy rail vehicles used.
- **Transportation Centres** facilitate transfers between different modes of travel or between transit services. They will feature passenger amenity areas and facilities, sufficient parking, efficient transfer provisions, and real-time traveller information. The scale and form of the nodes will evolve over time, and be designed to match demand. Through their evolution, the centres may progress from park and ride facilities to major intermodal terminals. Several centres are located on or near lands that are designated for high-density commercial, retail or mixed-use development. A hierarchy of Transportation Centres is proposed, with the highest order nodes being the Pickering GO Station and the Oshawa Centre/GO Transit locations. Both centres will serve a range of travel modes, are strategically located in Main Central Areas at the confluence of key transportation routes, and abut higher intensity land uses.
- **Highway 401 Bus Rapid Transit (BRT)** facilitates longer-distance inter-regional and inter-municipal transit trips. A study by GO Transit recommended that Kingston Road (Highway 2) and Bayly Street initially provide access to the Pickering GO Station from the proposed Highway 401 BRT route. Implementation and further system expansion would be subject to the approval of the Ministry of Transportation.
- **Highway 407 Transit Corridor** accommodates inter-regional transit service between Durham Region and the Regions of York, Peel and Halton. The corridor connects to Pearson International Airport, York University and other employment areas. Stations along the Transitway and linkages to adjacent routes will be needed to effectively reach a range of destinations. Station locations and a preferred corridor configuration were established within Durham in the *Highway 407 Transitway System Plan and Station Site Plan Study*<sup>22</sup>. Implementation will be subject to the approval of the Ministry of Transportation and the authority responsible for operating the highway if it becomes a toll road.

The Transit Priority Network provides the foundation for a future **Bus Rapid Transit (BRT)** system in Durham Region. BRT combines the routing flexibility and service adaptability of conventional buses, with the travel time advantages offered by segregated fixed rail facilities. BRT, in many respects, is rubber-tired Light-Rail Transit (LRT), but with greater operating flexibility and potentially lower capital and operating costs. Often, a relatively small investment in dedicated facilities for BRT can provide regional rapid transit. **Figure 12** summarizes the seven components of BRT.

<sup>22</sup> Entra Consultants, *Highway 407 Transitway System Plan and Station Site Plan Study*, August 1997



Evolution of the BRT system will occur over time as demand and service levels grow. Initially, the system will feature buses operating in mixed traffic. Dedicated facilities, like high occupancy vehicle (HOV) lanes, reserved bus lanes or a separate busway, will be developed as demand and policy objectives dictate. Future opportunities for Light Rail Transit (LRT) will be preserved in some corridors.

**Table 5** lists other potential transit opportunities, including several railway and hydro corridors within and through the Region. Some of these corridors may not warrant service in the near term, but should still be protected for future public transportation, or possibly cycling or walking purposes.

For transit to capture a greater share of the inter-regional travel market, service between Durham Region and the City of Toronto and Region of York will need to be more efficient. Continuous, direct connections to destinations in north Scarborough and the Highway 404/Highway 407 area would serve emerging travel destinations for Durham citizens not well serviced by transit today. Several potential linkages are identified in **Table 5**.

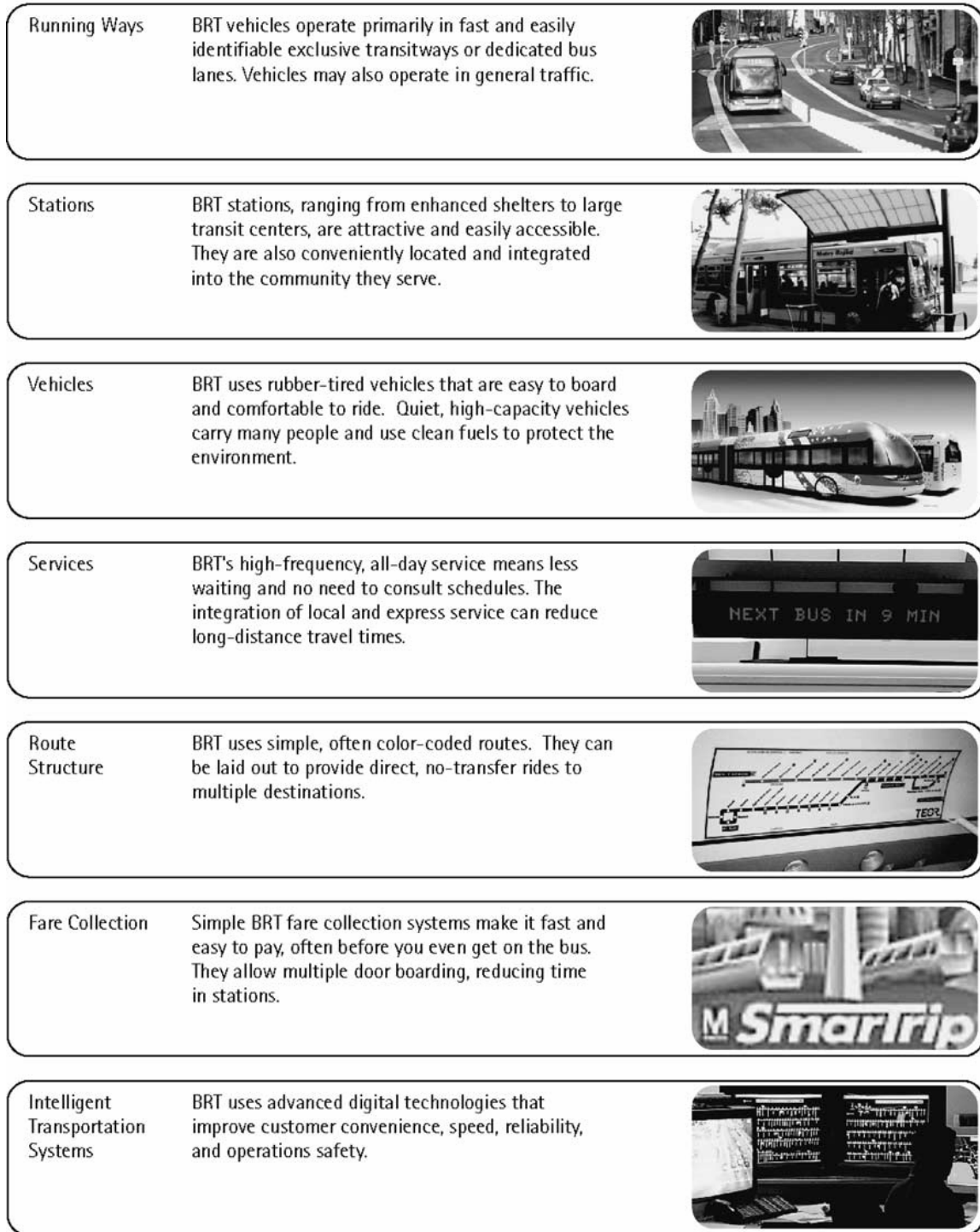
#### 3.2.4.3 Rural Public Transportation

Public transportation options for residents of the Region's smaller urban areas and rural communities are currently limited. Some areas have access to peak period and weekend GO Transit bus services and specialized transit for qualifying riders.

Providing higher levels of traditional transit services would be difficult to justify financially because of the limited number of potential riders and the spatial separation between locations. For this reason, the needs of residents in these areas are likely best met through demand-responsive **paratransit** services and strategically located Transportation Centres. Paratransit encompasses diverse forms of public transportation that fill the niche between private transportation and transit. It includes such services as subscription transportation (e.g. van pools, school buses), for-hire transportation (e.g. taxis, rental cars), and public paratransit (e.g. jitneys, dial-a-ride). The handi-transit services operated within the Region would be classified as public paratransit.

In April 2003, the Townships of Scugog, Uxbridge and Brock released the *North Durham Transit Study* that examined the feasibility of providing transit services to these municipalities. Although the study concluded that new services for the most part are not viable at this time, the Region, in co-operation with the northern area municipalities, should continue to monitor for opportunities.





**FIGURE 12 – Components of Bus Rapid Transit (BRT)**

Source: “Bus Rapid Transit – Volume 1: Case Studies in Bus Rapid Transit”, Levinson, H., Zimmerman, S., Clinger, J. Rutherford, S., Smith, R.L., Cracknell, J., and Soberman, R., Transportation Research Board, Washington, D.C., 2003

### 3.2.4.4 Services for the Transportation Disadvantaged

Access to reliable and efficient transportation services poses a challenge for some residents of Durham who are unable to drive or do not have access to an automobile because of age, income and/or physical disability. If they are unable to arrange their own private trip, these individuals must rely on conventional or specialized (para) transit, or transportation provided by a health or social service agency. The number of people in Durham dependent on these services is rising as a result of the Region's growing and ageing population. The increased demand places additional pressure on specialized transit services that are already "at capacity".

The TIP identified opportunities to enhance specialized transit services within the Region. It recommended that:

- Specialized transit services be integrated within the region under the sole operation of Handi-Transit Incorporated;
- Prior to this transfer of responsibility to Handi-Transit Incorporated, the two specialized transit providers work towards: harmonizing fares; instituting a common fare rate structure; improving communications for cross boundary trips; and, establishing a centralized call centre and/or website; and
- The use of accessible taxis and a taxi scrip program be expanded to supplement specialized transit services within the Region.

Other options for improving service for people dependent on community transportation may exist, including:

- Community shuttles, which blend the responsiveness of specialized services with the efficiency of conventional operations;
- Low-floor buses, which enable conventional transit operators to offer accessible service to a wider range of users;
- Fixed-route deviation; and
- Van and taxi programs, which could be offered in the evenings by area transit operators.

The TMP recommends consulting with potential stakeholders to determine the interest in establishing an on-going **Community Transportation Program** to explore and act upon these and other opportunities. The program could initially be facilitated by the Region and directed by an advisory committee, comprised of representatives of the various sectors involved in community transportation. One of the advisory committee's first tasks would be to consider the merit of establishing a "lead agency" to manage mobility responsibilities, such as information dissemination, scheduling and dispatching, and brokering service arrangements. Collaboration, co-operation and finding a long-term "champion" will be the key to sustained success of such a program.



**TABLE 5 – Future Transit Opportunities**

Corridor/Facility	Opportunities and Challenges	Recommended Action
<b>CPR Belleville Subdivision</b>		
<ul style="list-style-type: none"> <li>• Rapid transit connection from Bowmanville to future North Pickering/Seaton Transportation Centre</li> </ul>	<ul style="list-style-type: none"> <li>• Crosses most Transit Corridors and connects with commuter rail at Oshawa GO Station/Oshawa Centre Transportation Centre</li> <li>• Traverses residential and employment areas, including Bowmanville West, Oshawa downtown, Whitby downtown and future Seaton Main Central Areas</li> <li>• May require consolidation of freight rail traffic on CN Kingston, which would eliminate rail movements through the predominately residential areas in Durham abutting the CPR Belleville</li> <li>• Could alleviate the need for future Regional Road grade separations</li> <li>• May be possible to use upgraded Rossland Road as western connection or interim routing</li> </ul>	<p><b>Conduct feasibility study</b> to examine potential ridership, station locations, technology options, and property protection requirements</p>
<ul style="list-style-type: none"> <li>• Commuter rail connections from future North Pickering/Seaton Transportation Centre to downtown (Union Station) and mid-town (Eglinton Avenue/St. Clair Avenue) in Toronto</li> <li>• Rapid transit connection from future North Pickering/Seaton Transportation Centre to Finch Hydro Corridor in Toronto</li> </ul>	<ul style="list-style-type: none"> <li>• Crosses Scarborough-Markham link and connects into GO Transit rail system</li> <li>• Provides additional service into downtown Toronto, and possibly along the highly developed Finch area, into Pearson International Airport</li> <li>• Provides transit connection to Seaton and the Federal Airport Lands in Pickering</li> <li>• Could use Steeles Avenue/Taunton Road as an interim facility until the rail corridor can be acquired and developed</li> <li>• May be concerns about traversing the Rouge Park area</li> </ul>	<p><b>Conduct feasibility study</b> to examine potential ridership, station locations, technology options, and corridor protection requirements</p>
<b>CPR Havelock Subdivision</b>		
<ul style="list-style-type: none"> <li>• Passenger rail connection from Toronto to Peterborough, traversing Durham</li> </ul>	<ul style="list-style-type: none"> <li>• Provides transit connection to the Federal Airport Lands in Pickering</li> <li>• Traverses primarily rural area, including portions of the Oak Ridges Moraine, which is unlikely to experience urban development</li> <li>• Limited ridership potential in Durham, given orientation of travel and small population base in close proximity</li> </ul>	<p><b>Protect corridor</b> to preserve future options</p>
<b>Former CN Uxbridge Subdivision</b>		
<ul style="list-style-type: none"> <li>• Commuter rail extension from Stouffville to Uxbridge</li> </ul>	<ul style="list-style-type: none"> <li>• Traverses primarily rural area, including portions of the Oak Ridges Moraine, which is unlikely to experience urban development</li> <li>• Limited ridership potential in Durham, given orientation of travel and small population base in close proximity</li> </ul>	<p><b>Protect corridor</b> to preserve future options</p>



**TABLE 5 – Future Transit Opportunities**

Corridor/Facility	Opportunities and Challenges	Recommended Action
<b>Highway 407</b>		
<ul style="list-style-type: none"> <li>• Interregional transit service from future North Pickering/Seaton Transportation Centre to Pearson International Airport, possibly in dedicated transitway</li> </ul>	<ul style="list-style-type: none"> <li>• Connects with major destinations in Markham at the Beaver Creek Business Park and in the area of 14<sup>th</sup> Avenue/Woodbine Avenue</li> <li>• Provides service to Burlington, Oakville, Mississauga, Brampton, Vaughan, Richmond Hill and Markham, and to Pearson International Airport</li> <li>• Provides a transit link between the Federal Airport Lands in Pickering and Pearson Airport</li> <li>• Could use Steeles Avenue/Taunton Road as an interim facility until the service is implemented</li> </ul>	<p><b>Request GO Transit to monitor for future implementation</b></p>
<b>Regional Road Highway 47</b>		
<ul style="list-style-type: none"> <li>• Possible interregional transit service from Uxbridge to Stouffville GO Station and into York Region</li> </ul>	<ul style="list-style-type: none"> <li>• Connects to Stouffville, Newmarket, Aurora, Markham and Richmond Hill, travelling along Bloomington Side Road or other east-west route in York Region to Highway 404</li> <li>• Connects to commuter (GO) rail system at Stouffville GO Station</li> <li>• Complements commuter (GO) rail system and may be replacement for proposed rail service in this corridor, since more flexible service options exist</li> <li>• Serves longer-distance, inter-regional travel</li> <li>• May be limited interest in ridesharing or it may divert transit use</li> </ul>	<p><b>Conduct feasibility study with GO Transit and York Region to investigate potential</b></p>
<b>Hydro Corridors in Durham</b>		
<ul style="list-style-type: none"> <li>• Potential transit, cycling and/or hiking routes</li> </ul>	<ul style="list-style-type: none"> <li>• Traverse the Region</li> <li>• Right-of-way may be available, but encumbered by towers and restrictions</li> <li>• Uncertain as to merit at this time for transit due to possible right-of-way constraints, obstructions and orientation of lines</li> <li>• Province's recent assumption of hydro corridor lands and the Region and local municipalities participation in a two-year planning exercise for declaration of interests for secondary uses on these lands</li> </ul>	<p><b>Conduct feasibility study to determine merit</b></p>

### 3.2.4.5 Taxis

“Taxicabs are a vital public service. They complement the smooth operation of public transit services, whether urban or inter-urban, and for some groups of people are the only available means of transportation (disabled, rural dwellers, etc.). Taxis are also a back-up service for unplanned travel (business, visitors, emergencies, etc.). As a result, authorities bear a responsibility in ensuring the availability and proper operation of this transportation service.”<sup>23</sup> In Durham Region, the Local Municipalities regulate taxi services.

The taxi industry can help achieve the Plan’s objectives by offering a travel option for some users. Taxis have the potential to link rural and urban areas, integrate with other travel modes, and support tourism and commercial business, but their rates may be prohibitive for some individuals. Implementation of the Transit Priority Network and supporting guidelines identified in the Plan will take taxis into consideration.

### 3.2.4.6 Intercity Public Transportation

Durham is connected to its neighbours and the rest of world through intercity public transportation linkages that support the Region’s economic well-being and the travel needs of its citizens. The Region can help facilitate the movement of people between cities by ensuring its policies are compatible with the current and planned operation of intercity transportation facilities and services, and by providing linkages to the regional transportation system. These linkages typically occur at stations or other transfer facilities.

## Recommended Actions:

12. *Designate the Transit Priority Network depicted in Figure 11 as part of the Regional Official Plan and, subject to budget approval, implement this network by:*
  - *Identifying right-of-way requirements within each transit corridor to permit service evolution, including needs for stations, and incorporating such provisions into the Regional Official Plan;*
  - *Developing a phased service strategy for evolving towards a Bus Rapid Transit (BRT) system;*
  - *Considering transit priority measures, such as reserved lanes, queue jump lanes and transit-activated signals, where feasible and warranted;*
  - *Incorporating policies and designations into the Regional and Local Official Plans to promote transit-supportive land uses abutting corridors, and other supportive measures; and*
  - *Incorporating transit corridor design parameters into the Arterial Road Corridor Design Guidelines and TDM-Supportive Land Use Guidelines.*

<sup>23</sup> Quebec Department of Transportation, Taxi Services, “The Fundamentals of Taxi Regulation and The Quebec Experience”, February 1995.



13. *Recognize Highway 2 as Durham’s most significant transit corridor, and, subject to budget approval, develop the corridor to its fullest potential by:*
- *Continuing to prepare corridor studies to outline the actions necessary to transform the existing road into a “mainstreet”;*
  - *Requiring transit-supportive land uses as development and redevelopment occurs;*
  - *Enhancing streetscape and urban design;*
  - *Balancing the need to preserve mobility with the desire to create a more pedestrian-oriented environment in the review of operating conditions and development applications; and*
  - *Incorporating appropriate supporting policies and designations into the Regional and Local Official Plans.*
14. *Request GO Transit to:*
- *Expand commuter rail service through the City of Oshawa, to the proposed station in the vicinity of Harmony Road and Bloor Street along the CPR Belleville subdivision; and*
  - *Expand bus services along Highways 401 and 407 and to northern urban areas in Durham Region, and begin by providing more service on existing routes.*
15. *Request the Ministry of Transportation to consider the designation of reserved lanes on Highway 401 for Bus Rapid Transit, and the designation of a transitway on proposed Highway 407 to Highway 35/115, including the two high-speed links with Highway 401.*
16. *Subject to budget approval (if necessary), support the protection of corridors for future:*
- *Transit service to the future Seaton community in the City of Pickering, in the vicinity of Brock Road and Taunton Road, along the CPR Belleville subdivision;*
  - *Transit service to the Municipality of Clarington along the CPR Belleville subdivision, with stations in Courtice at Courtice Road and in Bowmanville at Martin Road; and*
  - *Transportation opportunities in the CPR Havelock and former CNR Uxbridge corridors.*
17. *Explore the interest in establishing a Community Transportation Program with potential stakeholders.*
18. *Co-operate in the promotion of a GTA-wide inter-regional transit plan, after considering the financial and service implications for Durham.*



19. *Request GO Transit, the Toronto Transit Commission and York Region Transit to:*
- *Introduce measures that make public transportation more attractive to longer-distance commuters; and*
  - *Examine opportunities to improve inter-regional connections and their compatibility with the Transit Priority Network.*
20. *Encourage potential public and private sector service providers to participate more in the delivery of public transportation services in the Region, with a focus on:*
- *Working with taxis and other commercial carriers to provide off-peak, low volume and non-traditional services, and to improve their connectivity with other public transportation services;*
  - *Providing better service to the rural area and passengers with special needs; and*
  - *Expanding inter-city transportation options, including air, rail and marine modes.*
21. *Conduct feasibility studies to examine the use of the following corridors for passenger transportation purposes:*
- *The CPR Belleville subdivision between the City of Toronto and the Municipality of Clarington (Bowmanville);*
  - *Regional Highway 47 between Township of Uxbridge and York Region; and*
  - *Hydro corridors within Durham Region.*

### 3.3 IMPROVING THE ROAD SYSTEM

The TMP lays the framework for a transportation system that is less dependent on the automobile. However, the auto will continue to be the predominant mode of travel for the foreseeable future. Because much of the road infrastructure required to serve future needs is in place today, the Plan places a strong emphasis on actions aimed at preserving, improving and better using the existing system. Selective expansion of the Regional Road and Provincial freeway networks will also be needed to support anticipated growth, as discussed in Section 2.3.3.

Actions to improve the road system described in the TMP focus on six themes:

- Road System Hierarchy and Design
- Provincial Highways and Other Road Connections
- Regional Roads
- Road Safety
- Transportation System Management
- Goods Movement and Access to Ports and Terminals



### 3.3.1 Road System Hierarchy and Design

Road systems are typically classified according to a hierarchy that recognizes different types of roads serve different purposes. A roadway hierarchy will typically reflect variations in design standards, flow characteristics, traffic volumes, traffic control, access control, vehicle type and abutting land uses.

The ROP designates a hierarchy of major roads, without regard for jurisdiction, comprising three categories of arterial roads (Type A, B and C) and freeways. Each of these roads is intended to perform a specific function, ranging from local distribution and collection (Type C arterials) to the provision of mobility over longer distances (Type A arterials and Freeways).

The Official Plan designations of certain arterial roads were reviewed at the request of Regional Council, the Local Municipalities and other stakeholders. Each road was examined to assess its role in serving network traffic needs, in providing future transit and emergency services connections, and in facilitating access to underutilized land. The review recommended some changes in designation or jurisdiction to better reflect the intended purpose of the facility.

**Appendix 1** summarizes the results of this review. The resulting Freeway and Arterial Road Network is shown in **Figure 13**.

Over time, design and jurisdiction should more closely reflect classification. This will ensure similar class roads are designed, maintained and operated consistently. Although the ROP details the design characteristics of arterial roads, **Arterial Road Corridor Design Guidelines** are needed to provide more detailed direction for implementation. The guidelines will consider compatibility of adjacent land uses and all modes of travel. Specific attention will be given to the role, function and design of Type C arterial roads.

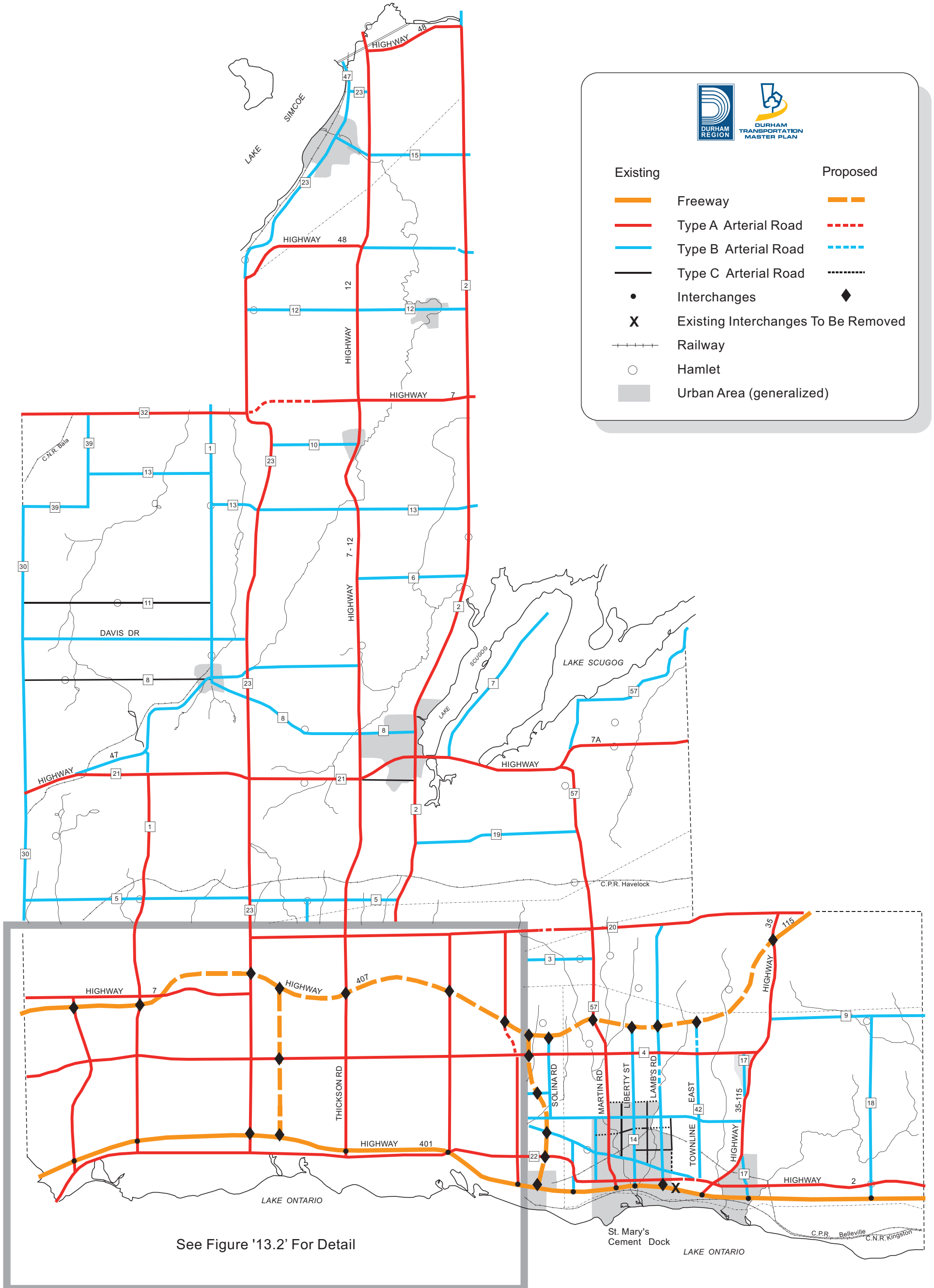
Efforts to rationalize the arterial road system are underway, following Regional Council direction related to the Public Works Officials “Who Does What” initiative in June 2002.

#### Recommended Actions:

22. *Designate the hierarchical road system comprising Type A, B and C arterial roads and the freeway system shown in Figure 13 as part of the Regional Official Plan.*
23. *Prepare Arterial Road Corridor Design Guidelines in consultation with the Local Municipalities and other stakeholders that:*
  - *Define the role of the arterial road system and public space principles;*
  - *Determine an appropriate approach for balancing mobility objectives for vehicular movement and property access with liveability objectives for community design, landscape character, and non-auto modes;*
  - *Define roadway access management criteria;*



# FREEWAY AND ARTERIAL ROAD NETWORK



NOTES:  
 Urban Area based on Regional Official Plan.  
 This figure forms part of the Durham Transportation Master Plan and must be read in conjunction with the text.  
 This map is intended as a framework for planning and design. All projects are subject to further detailed study in accordance with the Environmental Assessment Act.

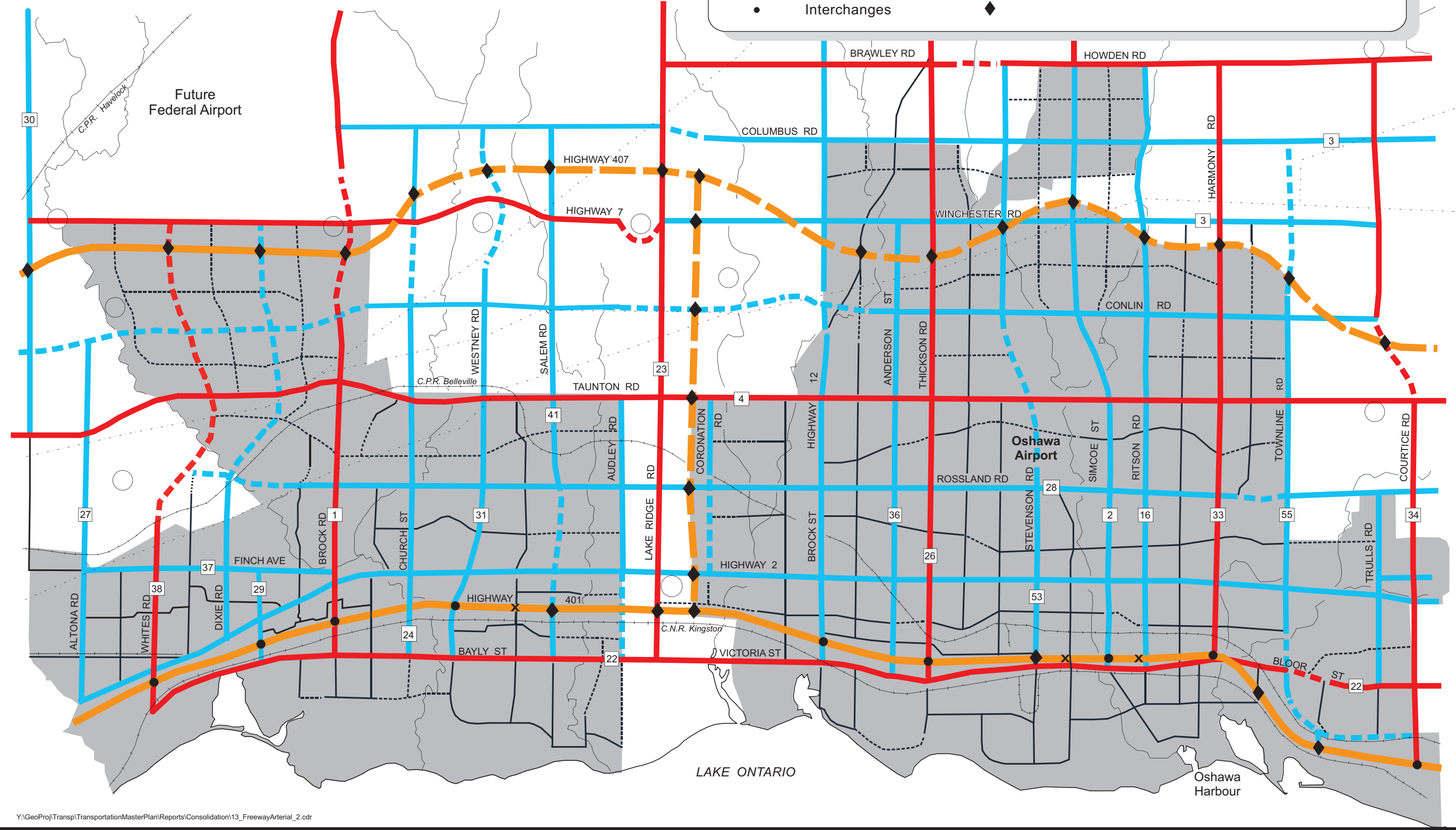
# FREEWAY AND ARTERIAL ROAD NETWORK

**NOTES:**

- The designation of Dixie Road (Pickering), the proposed roads in Columbus (Oshawa) and the location of the proposed West Durham link between Highway 401 and Highway 407 (Whitby) are all deferred in the current Regional Official Plan.
- Urban Area based on Regional Official Plan.
- This figure forms part of the Durham Transportation Master Plan and must be read in conjunction with the text.
- This map is intended as a framework for planning and design. All projects are subject to further detailed study in accordance with the Environmental Assessment Act.



Existing		Proposed			
	Freeway				Existing Interchanges To Be Removed
	Type A Arterial Road				Railway
	Type B Arterial Road				Hamlet
	Type C Arterial Road				Urban Area (generalized)
	Interchanges				



- *Provide design criteria for the roadway, boulevard and adjacent lands, such as road allowance widths, cross-section, location of utilities and connections, in advance of development, where possible;*
  - *Consider the most appropriate placement for pedestrian, cycling and transit facilities within the road allowance, subject to financial considerations; and*
  - *Define implementation measures.*
24. *Advise the Local Municipalities of the actions in Appendix 1 to the TMP regarding the designation and jurisdiction of specific arterial roads.*

### 3.3.2 Provincial Highways and Other Road Connections

Continued investment in Provincial highway improvements within the Region is fundamental to preserving and enhancing Durham's economic competitiveness and to facilitating planned growth. Improvements to Highway 401 and the extension of Highway 407 are key parts of this strategy.

The travel demand forecasts prepared for the TMP illustrated the need to expand Highway 401 and extend Highway 407 within the Region. The growing volume of traffic travelling through Durham and the access benefits to the Region's businesses further reinforces the need for these improvements. The need for improvements to outdated Highway 401 interchanges at Brock Street, Simcoe Street, Harmony Road, Waverly Road and Liberty Street is also becoming more apparent as the Region continues to grow. Consistent with the ROP, consideration should be given to extending Highway 407 to Highway 35/115, with two high-speed freeway connections to Highway 401. Technical studies by the Province will confirm need and justification and the scope of improvements if warranted.

The extension of Highway 404 into Durham and related improvements to Highways 48 and 12/48 would provide economic and social benefits for the Region's northern areas. It would offer better access to York Region and the rest of the GTA, and would help to relieve truck traffic pressures on Regional Roads within the rural communities. Further improvements to Highways 7, 7A and 7/12 are required as well to meet growing truck and recreational demands, and should be a priority of the Province. This may include the proposed Highway 7 – York Regional Road 32 (Ravenshoe Road) interconnection discussed further in **Appendix 1**.

Improvements to Provincial highways and the road systems of other jurisdictions beyond Durham's boundaries are equally critical. With most export activity to and from the Region oriented west, trucks must negotiate the often-congested highway system through the City of Toronto and the Regions of Peel and Halton as part of their trips. The Plan encourages efforts to alleviate this gridlock, which is reportedly costing the GTA economy as much as \$2 billion a day.

Road improvements by the City of Toronto and York Region on roads connecting at the boundary and in close proximity will also be required. These works are paramount to making the most of Durham's investment in improving the Taunton Road corridor and accommodating the Region's planned growth.



## Recommended Actions:

25. *Petition the Provincial Government to improve the Provincial Highway network in Durham Region through:*
  - *The extension of Highway 407 to Highway 35/115, including two high-speed freeway connections to Highway 401;*
  - *The expansion of Highway 401, including the construction of new or improved interchanges;*
  - *The extension of Highway 404 and the related widening of Highways 48 and 12/48; and*
  - *The improvement of Highways 7, 7A and 7/12.*
26. *Request the Ministry of Transportation to review the location and configuration of future Highway 401 interchanges and grade separations in Durham Region, especially near Liverpool Road (City of Pickering), in the vicinity of Harmony Road and Townline Road (City of Oshawa/Municipality of Clarington) and east of Courtice Road (Municipality of Clarington), and liaise with the Ministry and the Local Municipalities in conducting the review.*
27. *Petition the Provincial and Federal Governments to invest in the expansion and on-going improvement of Canada/U.S. trade corridors, especially as it relates to the freeway system.*
28. *Request the Ministry of Transportation to investigate strategies, such as dedicated facilities, to improve the flow of truck traffic and the movement of goods.*
29. *Request the City of Toronto and/or York Region to proceed with:*
  - *The continued widening of Steeles Avenue;*
  - *The improvement of 14<sup>th</sup> Avenue; and*
  - *The implementation of the Markham-Scarborough link.*

### 3.3.3 Regional Roads

The TMP recommends a series of actions for Durham's entire transportation system. However, the Region only has direct responsibility for the Regional Road network. The following actions recommended in regard to timely maintenance, safe and efficient operation, and selective expansion of the Regional Road network relate to this direct responsibility. These works constitute the vast majority of proposed Regional expenditures over the life of the Plan.

### 3.3.3.1 Preventative Maintenance and Rehabilitation

A comprehensive, co-ordinated program of on-going preventative maintenance and timely rehabilitation is key to preserving the Region's road network. Preventative maintenance treatments, such as crack sealing, resurfacing and joint replacements, and rehabilitation activities like deck replacements and in-place asphalt recycling, extend the life of existing facilities and reduce the overall life-cycle cost<sup>24</sup> of providing infrastructure. Without these planned activities, the Region will need to reconstruct or replace expired infrastructure elements earlier than necessary, and at a substantially higher cost and disruption than the deferred works. Studies have shown that a dollar spent on rehabilitation can prevent up to five dollars in reconstruction costs<sup>25</sup>.

In recent years, needed preventative maintenance and rehabilitation work has been deferred due to a lack of funding. Until recently, the budget allocated to rehabilitation and resurfacing has only allowed the Region to address about 1% of its road network annually. Although Regional Council has dedicated more funding in recent years, the unsatisfied backlog of road needs continues to mount as the system ages and traffic volumes increase due to growth.

At present, the backlog of unmet preventative maintenance and rehabilitation needs for pavements and structures (bridges and culverts) is estimated at \$87.4 million and \$13.3 million, respectively<sup>26</sup>. An additional \$51.8 million is required to reconstruct and replace existing facilities. When added together, the Region is facing total capital maintenance needs of over \$150 million.

Continued deferral will only exacerbate the situation. The road system is approaching a critical juncture for two reasons:

- **Aging bridges** – Without preventative maintenance or rehabilitation treatments, a bridge typically lasts 40 to 45 years from initial construction. The average age of Durham's bridges is 32 years, with over 58% of the structures built in a 20-year period between 1960 and 1979.
- **Deteriorating pavement condition** – Preventative maintenance treatments are suitable for roads with a Pavement Condition Index (PCI)<sup>27</sup> between 65 and 90 (on a scale of 100). More costly rehabilitation is required below a PCI of 65, with 30 being the threshold for full reconstruction. The average PCI for the Regional Road system today is 67, suggesting several roads are moving from being candidates for preventative maintenance to requiring more expensive rehabilitation treatments. Approximately 24% of the Region's roads currently fall into this preventative maintenance category. Similarly, about 37% of the inventory has reached the need for rehabilitation. Without timely investment, these roads will progress to reconstruction status.

<sup>24</sup> Life-cycle costing is an economic analysis procedure used to compare alternative infrastructure management strategies over an extended period of time, taking into account the total cost incurred (for initial construction and all subsequent maintenance and rehabilitation).

<sup>25</sup> City of Edmonton, *Transportation Master Plan*, April 1999.

<sup>26</sup> TSH Associates, *2002 Regional Road and Structure Appraisals Summary Report*, 2003.

<sup>27</sup> The Pavement Condition Index (PCI) is a measure of the condition of the road surface and underlying structure based on field assessments.

The Region needs to establish a cost-effective preventative maintenance and rehabilitation strategy to preserve its aging bridge inventory and repair the deteriorating road system. Development of this program is evolving through on-going work on the Region's **Asset Management Strategy**. The Asset Management Strategy will provide a systematic approach for operating, maintaining and upgrading the Regional Road infrastructure in a cost-effective manner. This strategy could prevent millions of dollars in reconstruction costs over the life of the Plan.

Implementing the Road Asset Management Strategy will require long-term commitment to additional financing. It is estimated that an annual investment of at least \$12 million per year in pavement rehabilitation is required to maintain the PCI at its current level. A more desirable PCI target of 70 would require only slightly more funding annually, in the vicinity of \$13 to 14 million. This level of funding is about double the current investment.

To succeed, a preventive maintenance program requires long-term commitment, on-going improvements, and documented and reported program benefits. Life-cycle cost analysis plays a pivotal role in selecting pavement preservation treatments and in evaluating any trade-off between the initial pavement structure and the subsequent need for maintenance and rehabilitation. Many agencies have found that applying a series of low-cost preventive treatments extends the service life of pavements. This translates into a better investment, better ride quality and increased customer satisfaction and support.<sup>28</sup>

Over the next five years, a number of pavement and structure rehabilitative treatments are planned, as shown in **Figure 14**. This list of proposed rehabilitation, reconstruction and replacement projects, as summarized in **Appendix 2** of the Plan, is based on current financing levels. Implementation of these projects will be subject to annual review and approval through the Roads Servicing and Financing Study and the Roads Capital Budget.

### 3.3.3.2 Safety and Operational Improvements

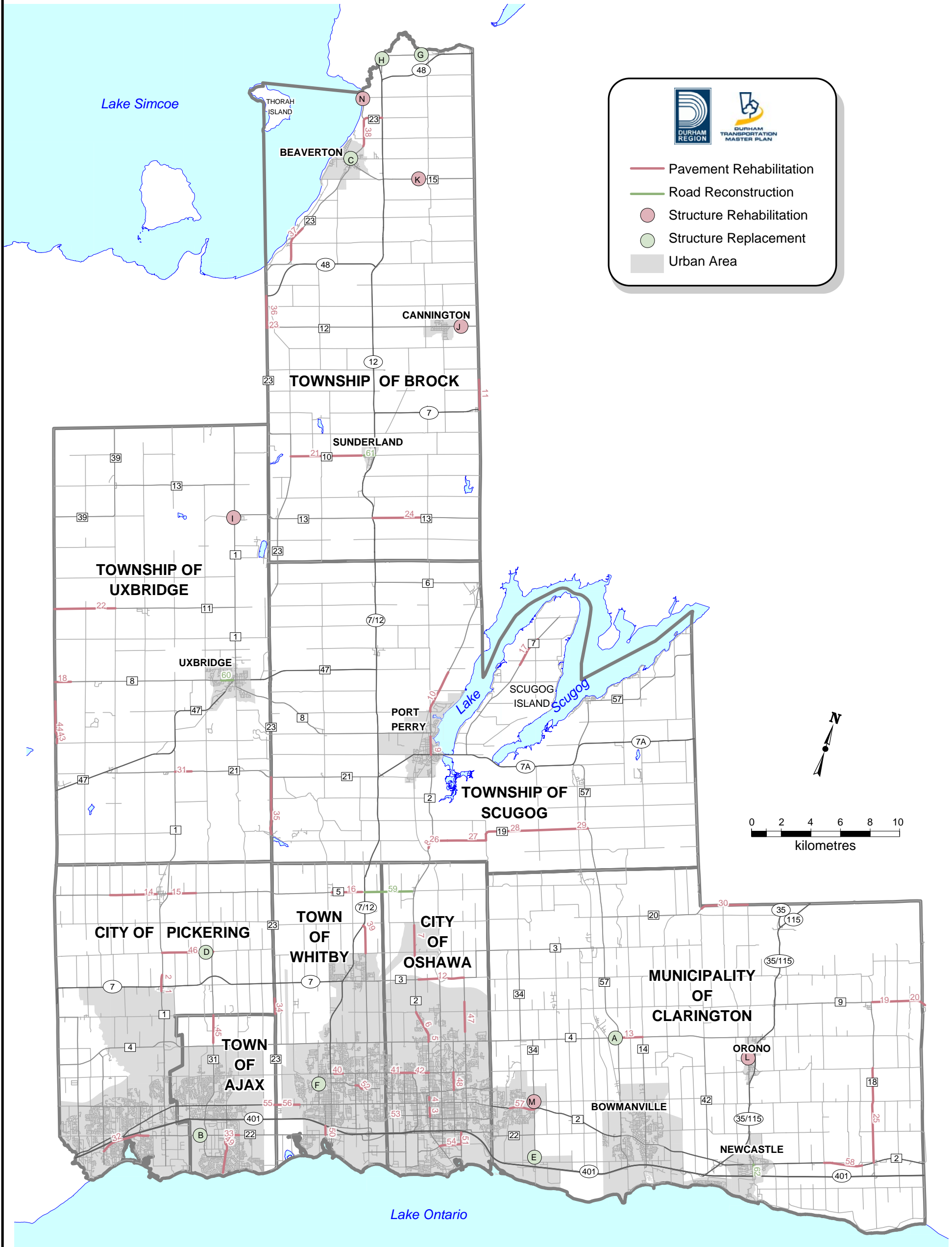
Recent collision statistics suggest efforts to make the Regional Road system safer have helped. The number of collisions has remained relatively constant over the past ten years, despite increased traffic volumes and more registered vehicles.

Part of this success can be attributed to the Region's on-going program of intersection and corridor improvements. Targeted at improving roadway geometry and eliminating traffic conflicts, projects in this category include:

- Improving intersection geometry and road alignment to eliminate sight line deficiencies and insufficient stopping sight distances;
- Building turn and auxiliary lanes to separate through traffic movements from slower moving and turning vehicles;

<sup>28</sup> National Guide to Sustainable Municipal Infrastructure, *Timely Preventative Maintenance for Municipal Roads – A Primer*, Ottawa, September 2002.

# PROPOSED REGIONAL ROAD REHABILITATION, RECONSTRUCTION AND REPLACEMENT PROJECTS (2004 - 2008)



NOTES:

- Urban Area based on Regional Official Plan.
- This figure forms part of the Durham Transportation Master Plan and must be read in conjunction with the text.
- See Appendix 2 for further details about the proposed projects.
- This map is intended as a framework for planning and design. All projects are subject to further detailed study in accordance with the Environmental Assessment Act and budget approval by Regional Council.

- Placing guide rail, or better, removing fixed obstructions to mitigate roadside hazards;
- Upgrading shoulders through grading and paving to provide safe refuge for disabled vehicles and for cyclists;
- Installing and upgrading traffic control devices, including traffic signals where warranted, to improve the flow of traffic;
- Introducing barriers and restrictions such as raised median islands to control access and to separate directions of travel; and
- Providing additional illumination where needed.

The TMP recommends continuing this important and effective program of road safety and operational improvements. **Figure 15** shows the location and suggested timing of proposed intersection and corridor improvements over the life of the Plan. The list of locations is summarized in **Appendix 3**. Implementation of these projects will be subject to annual review and approval through the Roads Servicing and Financing Study and the Roads Capital Budget.

Efforts to eliminate level rail crossings and at-grade road intersections at locations with high traffic volumes and collision histories should also be pursued where warranted. Several critical railway grade separation projects will be addressed through the proposed Regional Road expansion projects outlined in Section 3.3.3.3.

### 3.3.3.3 Expansion

Expansion of the Regional Road network will be required to accommodate the projected automobile traffic demands summarized in Section 2.3.3. **Figure 16** illustrates the program of road widening and new connections proposed to meet anticipated demands. The description, rationale, anticipated timing and estimated cost for these proposed projects are provided in **Appendix 4**. The scope, timing and cost of the projects noted in the appendix will be re-evaluated over time, during updates to the plan and when other circumstances warrant. Implementation will be subject to annual review and approval through the Roads Servicing and Financing Study and the Roads Capital Budget.

The proposed Regional Road expansion projects are required to serve the year 2021 travel demand forecasts described in Section 2.3.3 for the scenario reflecting the **continuation of current mode choice trends (Exhibit 7)**. The program **does not reflect the targeted 15% reduction in afternoon peak period automobile driver trips**. **Widening of Highway 401 and extension of Highway 407 to the East Durham link, with the two connecting links** were assumed in preparing the demand forecasts, as noted in Section 2.3.3.

This capital forecasting approach is consistent with the process used to prepare the 2003 Development Charges By-law Background Study and is the preferred method for prudent financial planning. The recommended program in **Figure 16** matches the long-range capital forecast approved by Regional Council in July 2003 as part of Development Charge by-law renewal, since

both programs are based on similar growth and travel behaviour assumptions. The TMP process provided an opportunity to confirm the Development Charge study road program through a more rigorous evaluation of alternatives in keeping with the Municipal Class EA process.

The pace and location of development, and resulting growth in traffic volumes, will dictate the need for and timing of future Regional Road expansions. The implementation of further freeway expansions and improvements by the Province will also have a bearing on the priority and staging of Regional works. It is anticipated that the recommended TDM Program will reduce single-occupant automobile travel, thereby moderating the need for road expansion. Financing considerations play a major role in programming construction projects. On-going monitoring and regular reviews will confirm the ultimate timing, phasing and need for the recommended Regional Road expansions, and may necessitate refinements to the proposed scope and scheduling of projects.

Development of the recommended Regional Road expansion program assumed improvements to two roads currently under the jurisdiction of the Local Municipalities, being:

- The upgrading and expansion of the 3<sup>rd</sup> Concession Road/Rossland Road connection through the City of Pickering, Town of Ajax and Town of Whitby; and
- The widening and extension of Salem Road from Kingston Road to Taunton Road in the Town of Ajax.

The demand forecasting showed expansions of both roads would be needed to serve expected traffic demands. Section 3.3.1 discusses the future role, function and jurisdiction of these roads.

Several Highway 401 interchange and grade separation projects are also listed in the program to address projected crossing and access needs. Works at Salem Road/Harwood Avenue, Stevenson Road/Park Road and Lake Ridge Road are currently in the construction, design and planning stages, respectively, as joint initiatives with the Province and the Local Municipalities.

The analysis completed for the Plan reiterated the need for improvements to the existing Harmony Road interchange, as well as an additional interchange east of Harmony Road, to alleviate Highway 401 crossing and accessing constraints in east Oshawa. The location for this additional interchange, potentially Colonel Sam Drive, needs to be confirmed and pursued.

### Recommended Actions:

30. *Subject to annual review and approval through the Roads Servicing and Financing Study and appropriate budgets, develop and maintain the Regional Road network in a manner that promotes:*
  - *Safe and efficient operation for all road users;*
  - *Sufficient capacity to accommodate travel demands;*

# PROPOSED REGIONAL ROAD INTERSECTION AND CORRIDOR IMPROVEMENT PROJECTS (2004 - 2021)

**Intersection Improvements**

- 2004-2007
- 2008-2012
- 2013-2021

**Corridor Improvements**

— Urban Area

— provincial; regional

— municipal; other

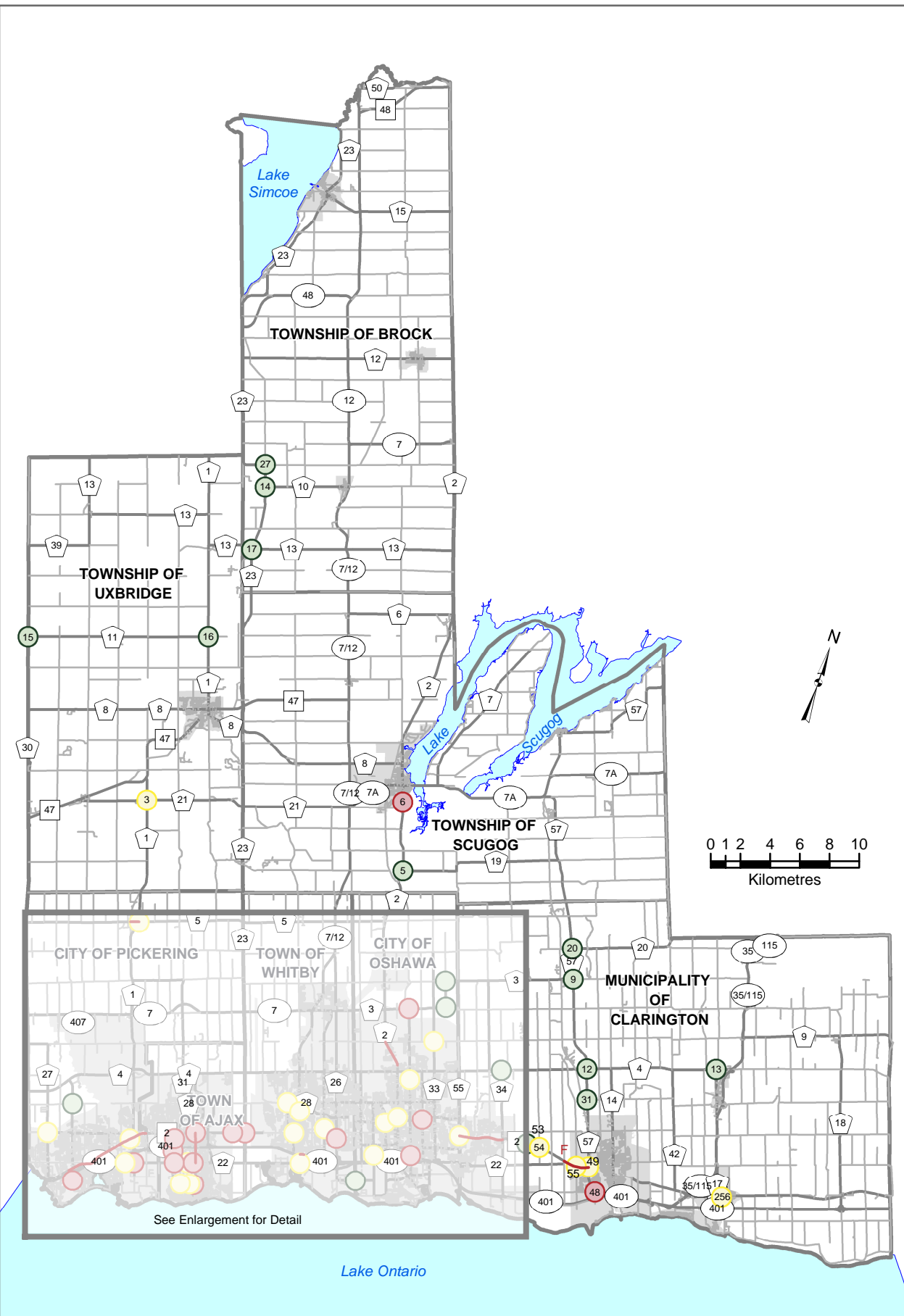
NOTES:

Urban area based on Regional Official Plan.

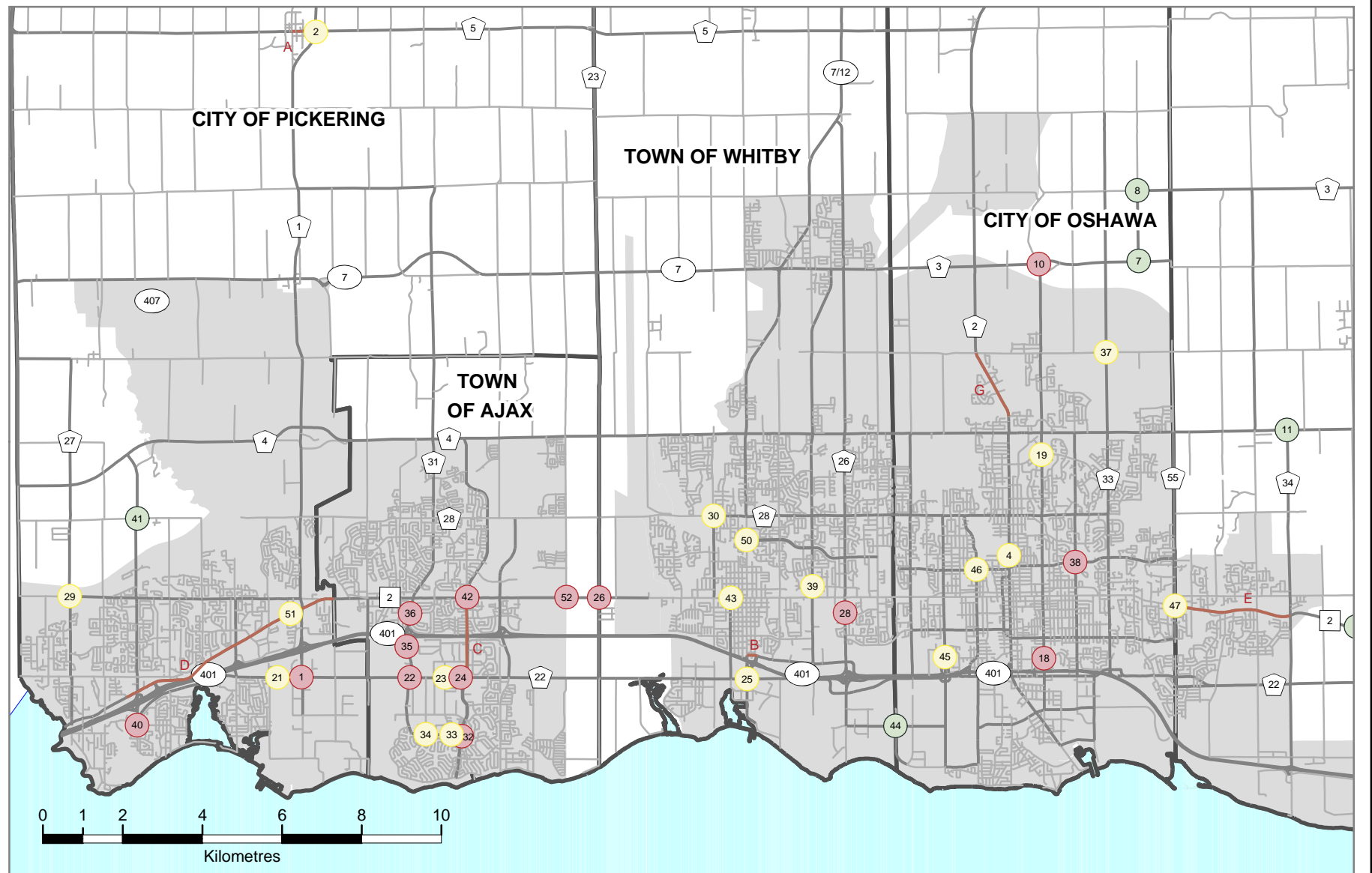
This figure forms part of the Durham Transportation Master Plan and must be read in conjunction with the text. See Appendix 3 for further details about the proposed projects.

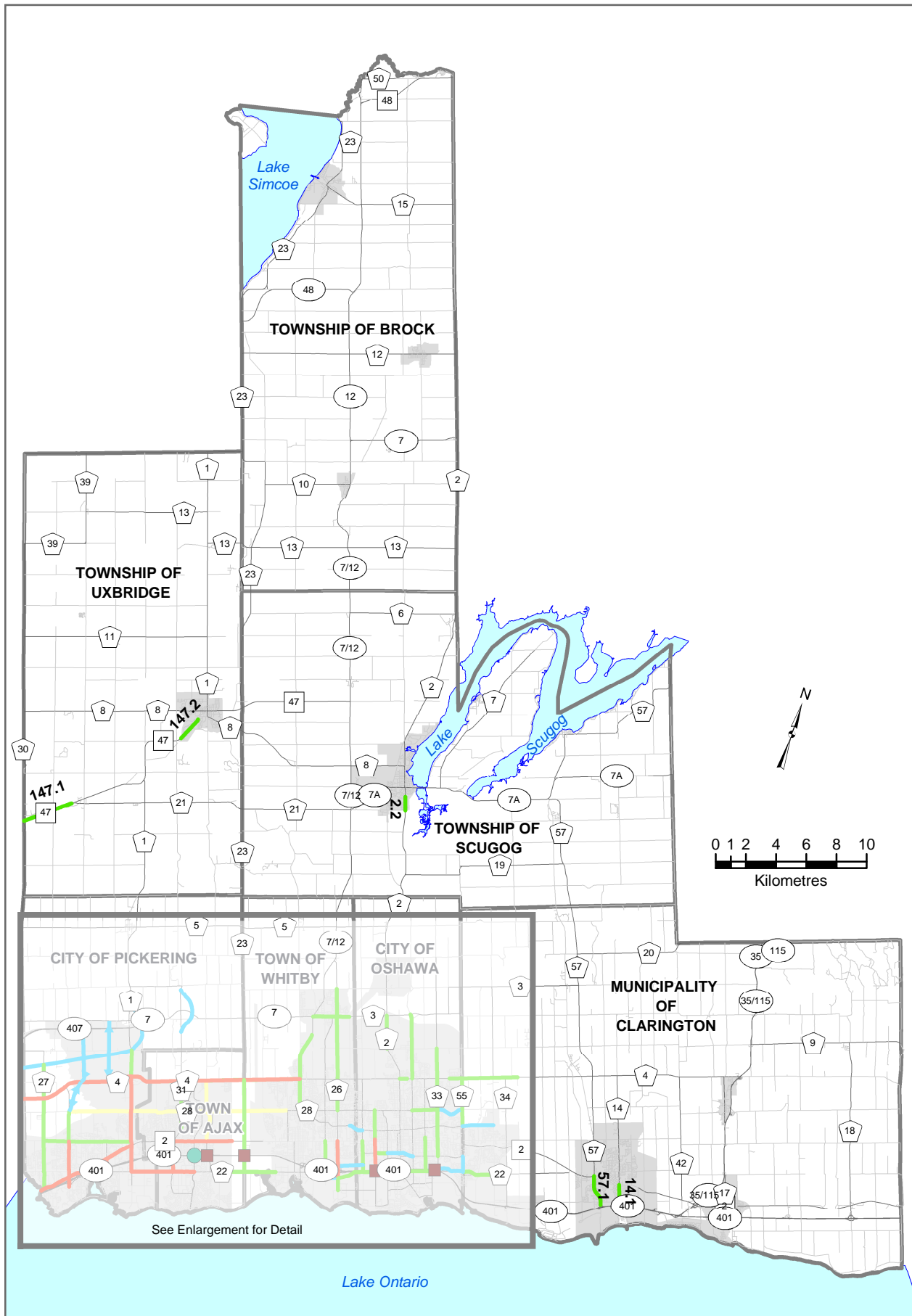
This map is intended as a framework for planning and design. All projects are subject to further detailed study in accordance with the Environmental Assessment Act and budget approval by Regional Council.

See Appendix 3 for further details about the proposed projects.



## Enlargement Detail





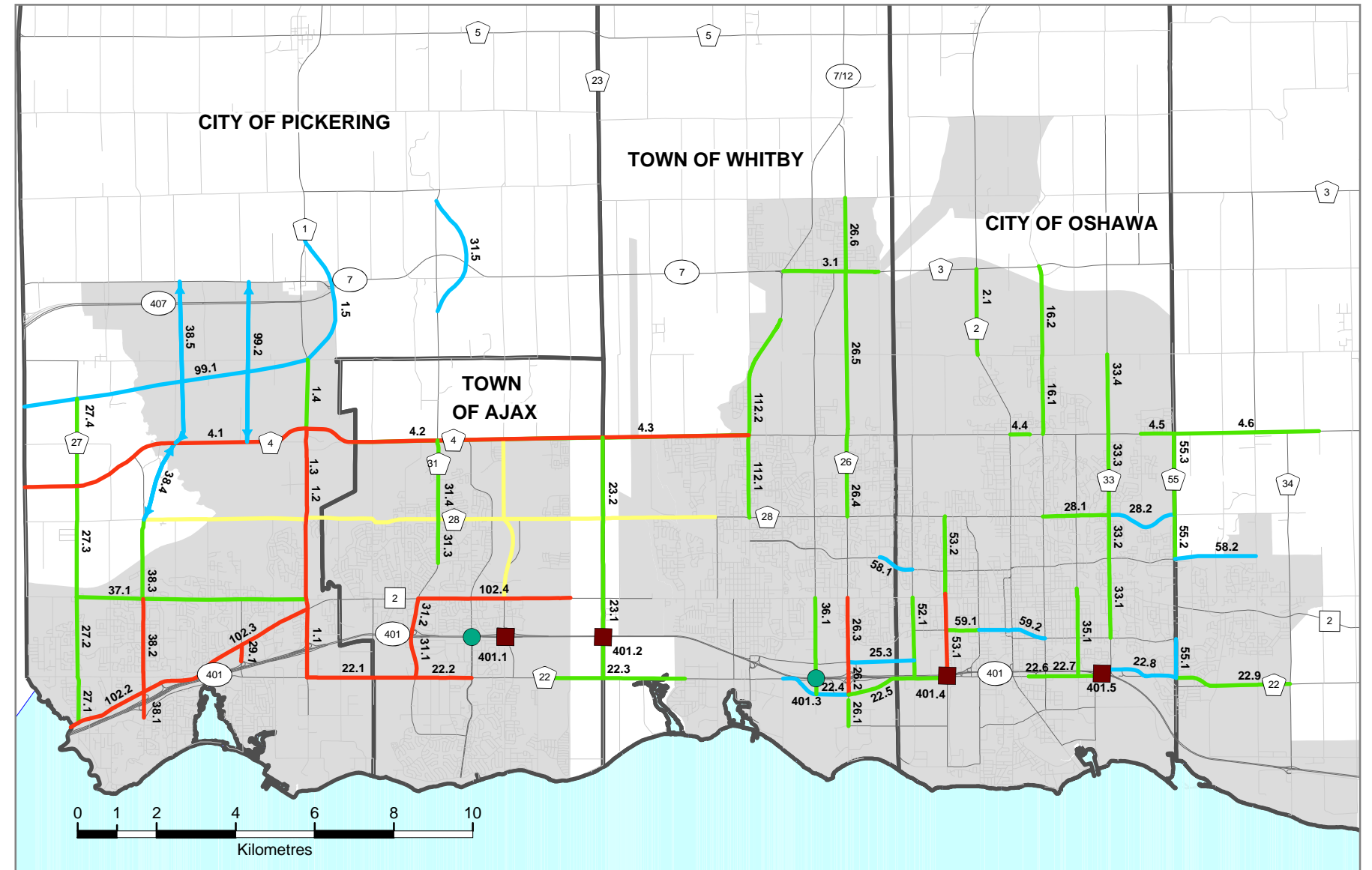
# PROPOSED REGIONAL ROAD EXPANSION PROJECTS (2004 - 2021)



- New Connection
- Widen to 3 - 5 Lanes
- Widen to Ultimate 6 Lanes
- Local Municipal Road Projects
- New Highway 401 Interchange/Ramp
- New Highway 401 Grade Separation
- Urban Area
- 22.1 Project Number

NOTES:  
 Urban area based on Regional Official Plan.  
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 See Appendix 4 for further details about the proposed projects.

## Enlargement Detail





- *Cost-effective service delivery;*
  - *Asset management strategies for timely preventative maintenance and rehabilitation;*
  - *Investment decisions based on life-cycle cost consideration; and*
  - *The application of appropriate technologies.*
31. *Require that utility cuts and other actions that detrimentally impact the life of a pavement or structure be minimized and restored to a reasonable state.*
32. *Benchmark and monitor the effectiveness of infrastructure management programs.*
33. *Engage the railway companies proactively to gain their support, including financial, for grade separating railway crossings of Regional Roads where conflict warrants have been established, beginning with:*
- *Brock Road at the CPR Belleville (City of Pickering);*
  - *Bloor Street at the CPR Belleville (City of Oshawa); and*
  - *Hopkins Street at the CPR Belleville (Town of Whitby).*
34. *Determine if there are locations on the Regional Road network where at-grade intersections should be grade-separated to alleviate traffic safety or operational concerns.*

### 3.3.4 Road Safety

Road safety is a fundamental objective of all road authorities. Motor vehicle collisions result in financial loss, pain and suffering, and sometimes loss of life. They are also a major cause of traffic congestion and economic impacts for the broader community.

The approach of targeting known road safety concerns with reactive counter-measures has proven successful. However, more effort is still needed to address driver behaviour. Developing new initiatives and continuing existing programs like Road Watch, Save a Life and RIDE co-operatively with the Durham Regional Police Service and other stakeholders will help to make drivers more aware of their actions.

The observance and application of appropriate warrants and criteria for the installation of traffic control devices can also help to promote a safer operating environment for all road users. Inappropriate or poorly placed measures like traffic control signals, speed zones and turn restrictions contribute to driver frustration and violation of the devices, in addition to gridlock. New and emerging techniques, including electronic enforcement, have a role to play in improving road safety. Again, recognized warrants and criteria should be considered prior to implementation.

It may be possible to lessen the severity or eliminate certain collisions altogether by addressing safety in a proactive manner. The TMP recommends development of a more formal **Safety**



**Management Strategy** that combines the 3 Es (engineering, education and enforcement) and builds on existing programs. Consistent with a safety-conscious planning philosophy, the strategy will feature actions to:

- Co-ordinate and integrate broad-based safety programs;
- Develop processes to ensure that major safety problems are identified and addressed;
- Consider safety early and explicitly for all transportation programs and projects, through processes like Road Safety Audits;
- Identify safety needs of special and vulnerable user groups;
- Ensure routine maintenance and operation of the safety measures and other infrastructure elements; and
- Market the program to the community and stakeholders to encourage their involvement from the start.<sup>29</sup>

### Recommended Actions:

35. *Develop a Safety Management Strategy and establish targets to measure its success, which may include:*
  - *Striving for fewer fatalities and personal injury collisions;*
  - *Promoting safer walking and bicycling; and*
  - *Reducing the number of intersection-related collisions.*
36. *Work with the Durham Regional Police Service and other stakeholders to reinforce the benefits of safe driving and to encourage more responsible driver behaviour through:*
  - *Regular educational and promotional programs;*
  - *Programs like Road Watch, Save A Life and RIDE; and*
  - *Targeted enforcement initiatives.*
37. *Establish and observe appropriate policies and warrants for the implementation of traffic control measures, including traffic signals, speed zones, and turn restrictions.*
38. *Petition the Provincial Government to allow electronic enforcement methods, such as photo radar, where their introduction is feasible, cost-effective and likely to effect the desired change in driver behaviour.*
39. *Examine safety explicitly in the planning and design process for future transportation projects through initiatives such as Road Safety Audits.*

<sup>29</sup> Institute of Transportation Engineers, *Traffic Engineering Handbook*, Washington, D.C., 1999



### 3.3.5 Transportation System Management

Transportation system management solutions can offer substantial, low-cost benefits and gains in operational efficiency, such as:

- Smoother traffic flow and reduced congestion;
- Reduced fuel consumption and vehicle emissions;
- Reduced user costs for fuel and vehicle maintenance;
- Potential for fewer accidents and lower related costs; and
- Delay to the need for costly road expansion.

The transportation system management initiatives identified in the TMP can be described as **Intelligent Transportation Systems (ITS)** solutions. ITS is the name given to a broad range of diverse and emerging technologies. These measures can make the transportation system safer and more efficient, reliable and environmentally friendly, without the need for physical changes to existing infrastructure. ITS solutions are typically considered to:

- Better manage available capacity within the transportation system;
- Disseminate information to users before and during their trips;
- Improve the safety and effectiveness of commercial and transit vehicles, and reduce cost of operation and regulatory compliance; and
- Make vehicles safer and more efficient, through driving assistance and vehicle control intervention systems.

The Region has already implemented a number of ITS initiatives, such as traffic surveillance, responsive traffic control systems, and emergency vehicle signal pre-emption. Future activities will be identified and co-ordinated through an **ITS Strategy**. Initiatives to be considered for the strategy include:

- Adaptive signal control, in which signal timing is continually adjusted to meet changing, real time conditions;
- Advance traveller information, through the use of changeable message signs, the Internet, and other communications solutions; and
- Incident management plans to outline the preferred approach for managing the traffic implications of unforeseen events.

The process of preparing and implementing ITS strategies typically involves a number of public and private sector partners. This helps to ensure initiatives are delivered to travellers in a co-ordinated and seamless manner.

### Recommended Actions:

40. *Develop an Intelligent Transportation Systems Strategy to enhance the efficiency and reliability of the regional transportation system.*
41. *Develop Incident Management Plans to outline traffic diversion strategies for unforeseen events.*

### 3.3.6 Goods Movement and Access to Ports and Harbours

The TMP highlights the importance of ensuring reliable and efficient goods movement, both within the Region and the entire GTA. In Durham, most freight is carried by truck. Because trucking relies heavily upon major roads for access to industrial and commercial centres, a high-quality freeway and arterial road network is necessary.

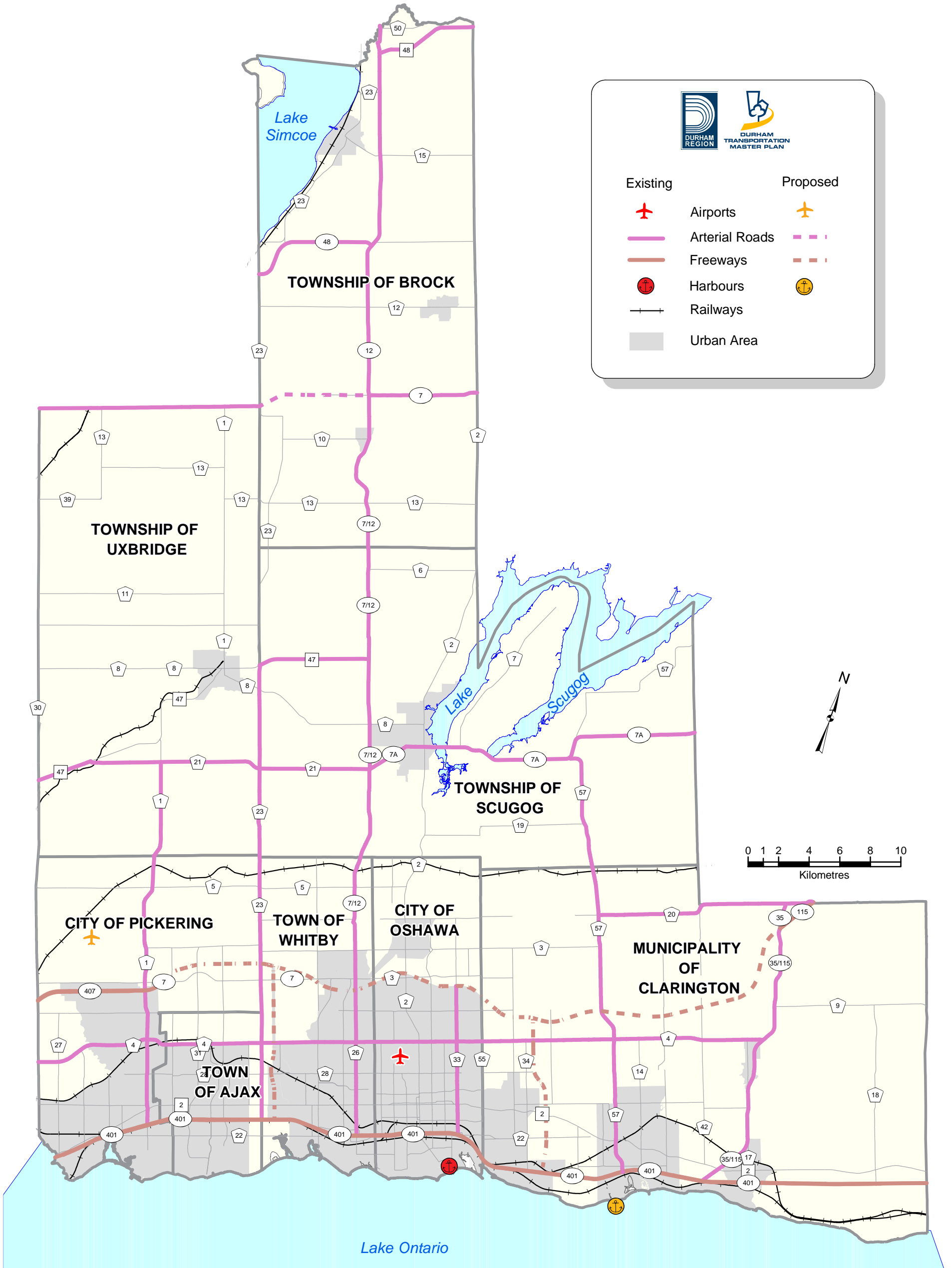
Figure 17 shows a **Strategic Goods Movement Network** proposed to better facilitate the movement of heavy vehicles within and through the Region. Existing haul routes, the location of major generators of truck traffic, and ROP road designations were considered in developing the network. Routing of truck traffic around residential areas was also a priority. Complementary actions to mitigate the community impacts of heavy vehicle traffic on communities are provided in Section 3.4.3.

Implementation of the network should focus on actions to ensure the routes are continuous, without truck bans or restrictions; serve typical truck weights and dimensions; and are clearly marked. Road improvements will be required in certain locations to eliminate impediments to truck travel, such as seasonal and permanent load restrictions, insufficient turning radii, and narrow lanes. Implementation of these works will be subject to annual review and approval through the Roads Servicing and Financing Study and Roads Capital Budget. Further consultation with the Local Municipalities and affected stakeholders, including the trucking industry, is needed to confirm the network and establish implementation priorities.

Connection of the road system to freight terminals, airports and harbours is another important consideration in establishing the Strategic Goods Movement Network. Intermodal facilities are encouraged as a means to better co-ordinate the movement of freight between modes. Emerging opportunities to use rail to carry conventional truck trailers should also be promoted. Diverting some heavy vehicle traffic could reduce truck volumes on major roads, while still enabling flexible delivery options.

Unlike passenger travel, information on goods movement is limited and municipal governments are not as familiar with the challenges facing the industry. Better goods movement information and on-going dialogue with stakeholders are needed. To this end, the Plan recommends establishing a

# STRATEGIC GOODS MOVEMENT NETWORK



NOTES:

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**Chairman’s Roundtable on Goods Movement** to provide a forum for on-going dialogue between industry, affected stakeholders, Local Municipalities, Senior Governments, and the Region. Enhanced data collection efforts are also recommended.

### Recommended Actions:

42. *Designate a Strategic Goods Movement Network as part of the Regional Official Plan after consulting with the Local Municipalities and key stakeholders on the plan shown in Figure 17.*
43. *Confirm the Strategic Goods Movement Network by:*
  - *Signing preferred truck routes;*
  - *Identifying and promoting potential locations for inter-modal transfer facilities to enable more use of rail and other modes;*
  - *Disseminating information on the network widely;*
  - *Confirming its suitability for the movement of hazardous goods;*
  - *Considering roadway geometric standards that better accommodate trucks in design; and*
  - *Eliminating by-law restrictions to truck movement on these preferred routes, where possible.*
44. *Establish a Chairman’s Roundtable on Goods Movement to provide a forum for on-going dialogue between industry, affected stakeholders, Local Municipalities, senior governments and the Region.*
45. *Conduct or participate in goods movement surveys and other data collection initiatives to improve understanding of the structure and nature of freight activity.*

## 3.4 MITIGATING ENVIRONMENTAL AND COMMUNITY EFFECTS

While transportation plays an important role in enhancing quality of life and economic prosperity, expansion and increased use of the system has environmental and community consequences. These effects need to be considered in overall system planning and the design of transportation facilities.

Actions to mitigate environmental and community effects as presented in the TMP focus on three themes:

- **Air Quality and Emissions**
- **Road Drainage**
- **Traffic in Residential Communities**



### 3.4.1 Air Quality and Emissions

Transportation is one of the largest sources of air pollution in Canada. Implementing the actions outlined in Sections 3.2 and 3.3 will help to limit the amount of auto travel and to keep operating speeds at levels that help minimize emissions.

Technology offers one of the most promising solutions to air quality and emissions concerns. Substantial technological advancements over the last twenty years have reduced energy consumption, improved engine and vehicle performance and enhanced fuels. Further developments on the horizon will help to reduce air pollution and emissions even further.

Over the past few years, there has been a number of international, national, and provincial initiatives aimed at reducing vehicle-related emissions and air pollution. The most significant of these is the **Kyoto Protocol**, which was ratified by the Federal government in December 2002. Through the protocol, Canada is committed to reducing carbon dioxide (CO<sub>2</sub>) emissions and five other greenhouse gases to 6% below 1990 levels sometime between 2008 and 2012. In November 2002, the Federal government released the **Climate Change Plan for Canada**, which sets out a three-step approach for achieving this emission reduction objective.

Municipalities have an important role to play in achieving the objectives of the Kyoto Protocol, and other Federal and Provincial government air quality and emissions initiatives, such as the Ozone Annex to the Canada-United States Air Quality Agreement and Ontario's Anti-Smog Action Plan. Local governments are charged with managing land development and transportation infrastructure, two of the prime determinants in vehicular traffic demands. By integrating transportation and land use in a manner that reduces per capita automobile travel and encourages travel by non-motorized modes, municipalities can help achieve the broader air quality and greenhouse gas reduction objectives. Related actions are discussed in Sections 3.2.

The Region has taken several steps to respond to air quality and emissions concerns:

- The Region joined the Greater Toronto Area Clean Air Council (GTA-CAC) in March 2002. The GTA-CAC is an inter-governmental working group formed to enhance the co-ordination of air quality initiatives across the GTA and highlight concerns about air pollution. The GTA-CAC hosts an annual **Smog Summit**, at which time an Inter-Governmental Declaration on Clean-Air is signed. The 2003 declaration committed GTA municipalities to support the development of strategies to reduce emissions of air pollutants and greenhouse gases. This included an investigation into the purchase of low sulphur fuel fleet vehicles and participation in an anti-idling education campaign.
- The Region has introduced a **Corporate Model for Clean Air** as part of its commitment to the GTA-CAC. The Plan defines actions that Regional employees can take throughout the year, and especially during smog alerts, to reduce their impact on air quality. Recommended actions include encouraging staff to keep their vehicles well maintained, minimize vehicle idling time, encouraging staff to use transit or rideshare, and on smog days, refuel vehicles after sundown or before sunrise.

- The Region continues to mitigate the impacts of its operations through the application of environmentally friendly **Green Fleet** measures wherever possible. These initiatives attempt to influence not only the type and number of vehicles purchased, but also how the vehicles are operated and how the corporation conducts its business.
- The Region looks for opportunities to procure materials and services that create fewer greenhouse gas emissions and consume less energy. Studies conducted by other agencies have demonstrated both financial and environmental benefits to their purchase of energy efficient equipment, such as lower glare fixtures as an example.

The Plan recommends that the Region continue its involvement in initiatives supporting energy and emissions reductions, and conduct education and marketing as part of the TDM Program.

### Recommended Actions:

46. *Continue to participate in programs and organizations, like the Smog Summit and the Greater Toronto Area Clean Air Council, aimed at reducing harmful emissions and improving air quality, and carry through with commitments.*
47. *Investigate the introduction of an anti-idling by-law.*
48. *Conduct education and marketing as part of the recommended TDM Program to inform citizens about the adverse impacts of transportation-related air pollution and on measures to reduce auto travel.*
49. *Train employees to be more environmentally responsible when operating vehicles.*

### 3.4.2 Road Drainage

There is growing concern over the environmental issues related to road drainage and its impacts on receiving bodies of water, vegetation, soils and wildlife. Environment Canada has identified potentially harmful environmental effects related to road salt run-off. Other substances contained in road drainage and the erosion effects of unchecked water volumes also pose significant concerns.

Roads with ditches, known as rural cross-sections, deal with stormwater in the most environmentally friendly manner. However, reconstruction to urban standards with curb, gutter and stormwater sewerage systems is often required as development occurs to:

- Control the quantity and quality of drainage;
- Delineate a pavement edge or pedestrian path to improve safety;
- Eliminate open ditch drainage to reduce right-of-way width;
- Reduce maintenance operations;



- Control access; and/or
- Improve aesthetics.<sup>30</sup>

Existing Regional policy regarding road drainage relates primarily to guidance in the design and construction of storm sewer systems. A **Regional Road Drainage Policy** is needed to address new and evolving drainage-related challenges and opportunities, including:

- Identifying “state-of-the-art” and “best management” practices that the Region can use to mitigate the impacts of stormwater run-off; and
- Defining the role and responsibility of the Regional Road storm drainage system in accommodating flows from adjacent development, and identifying opportunities for integrating systems.

### Recommended Actions:

50. *Develop a Regional Road Drainage Policy that balances environmental and development objectives and identifies state of the art and best management practices for the mitigation of stormwater run-off from both public and private lands.*

### 3.4.3 Traffic in Residential Communities

Residents in Durham are becoming increasingly concerned about the speed and volume of traffic travelling through their neighbourhoods. Traditional regulatory efforts to alleviate these concerns, such as reduced speed limits, stop signs, and vehicle prohibitions, have become less effective because of limitations on enforcement and driver disregard for the measures.

Public frustration in this regard has led to the popularity of traffic calming in some communities. Traffic calming attempts to restore streets to their intended function through physical changes to the road. Electronic enforcement methods, like photo radar and red light cameras, are also being considered in some jurisdictions amid public debate.

The TMP recommends the development of a **Regional Road Traffic Management Policy** to outline suitable approaches for managing traffic on Regional Roads in residential areas. The policy will attempt to balance potentially conflicting community objectives with overall network considerations, recognizing that arterial roads are intended to carry larger volumes of traffic at higher speeds. If their ability to serve this function is restricted, traffic will divert to the local road system to escape congestion, causing additional problems.

The need for specific direction related to school areas, hamlets and community facilities would be assessed in developing the policy. For good reason, vehicle speeds and the safety of crossing locations tend to be concerns in these areas. The application of sound traffic engineering practices

<sup>30</sup> Transportation Association of Canada, *Urban Supplement to the Geometric Design Guide for Canadian Roads*, Ottawa, ON, 1995

coupled with invaluable community input is key to ensuring the safest environment for vulnerable pedestrians and cyclists.

In some situations, congestion on the major road system is causing traffic infiltration problems in adjacent neighbourhoods. Improving system operation, as discussed in Section 3.3.5, can help to limit adverse community impacts by keeping vehicles on the roads intended to carry the heavier traffic. Complementary land use planning actions are also needed to ensure the development occurring adjacent to the transportation facility is appropriate and designed to minimize possible effects. Previous sections of the Plan discussed these concepts in further detail.

Rural communities have become increasingly concerned about truck traffic, especially vehicles hauling aggregate resource material. The boom in the economy has increased the demand for building materials, and consequently the number of gravel trucks travelling on roads in Durham's rural areas. Although these roads were designed from an engineering perspective to accommodate trucks, the noise, dust, odour and emissions emanating from the heavy vehicles using the road affects the liveability of adjacent homes.

Offering attractive alternate routes is the preferred solution. However, this approach may prove challenging since the roads being used today present the shortest distance, and hence time and cost, options available. The ROP identifies several future by-pass locations that could help to divert truck traffic. Some of these by-passes would be costly to implement, be difficult to achieve due to property or other constraints, or pose adverse economic impacts on the local business community. A **Hamlet By-Pass Policy** is proposed to identify criteria for establishing the need and justification of future arterial road realignments around communities.

There are also situations where upgrading a parallel route or providing better signing could alleviate a concern about truck traffic. These opportunities will be discussed with Local Municipalities and other stakeholders, such as the aggregate industry, in the review of the Strategic Goods Movement Network, per Section 3.3.6.

Citizens are growing more concerned about traffic noise. A **Regional Road Noise Abatement Policy** is proposed to outline the Region's approach to mitigating road-related noise.

### Recommended Actions:

51. *Develop a Regional Road Traffic Management Policy in consultation with the Local Municipalities, the Durham Regional Police Service, and appropriate stakeholders to address concerns with traffic on Regional Roads in residential areas.*
52. *Develop a Hamlet By-Pass Policy in consultation with the Local Municipalities that identifies criteria (including financial) for establishing the need and justification of future arterial road realignments around communities, and review the proposed by-pass locations designated in the Regional Official Plan for conformity with the policy.*

53. *Consult with the aggregate industry and other stakeholders to establish preferred haul routes around sensitive residential areas using the Strategic Goods Movement Network as a basis.*
54. *Develop a Regional Road Noise Abatement Policy in consultation with the Local Municipalities and the development community to establish noise level thresholds and applicable mitigation measures.*



## CHAPTER 4 - THE IMPLEMENTATION ELEMENTS

### 4.1 THE IMPLEMENTATION PROCESS

The cyclical process of implementing the TMP is shown in Figure 18.

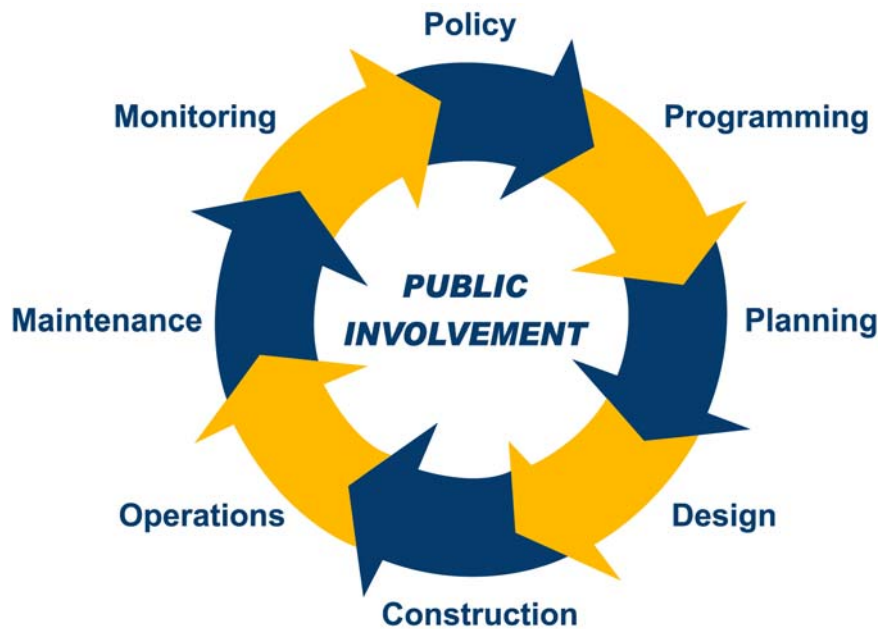


FIGURE 18 – The Implementation Process

The process begins with establishing **policy** direction through the preparation of the TMP document, which is founded on the policy framework of the Community Strategic Plan and the ROP. The **programming** phase follows, where investment priorities and timing are established based on the Plan recommendations, tempered by monitoring results and fiscal realities. The **planning and design** of future facilities begins once priorities are set, and follows the Municipal Class Environmental Assessment process.

Physical implementation occurs with the **construction** stage, and continues into the **operations and maintenance** phases. The Plan will guide the development of the annual capital and operating programs for these purposes, and serve as a basis for day-to-day practices. **Monitoring** is done to gauge the effectiveness of the policies, programs and infrastructure improvements in achieving the Transportation Vision, goals and principles defined in Section 2.1. Shifts in underlying assumptions and/or attainment of Plan goals signal the need for a review of the basic policy direction, and the process starts over again. **Public involvement** permeates the entire process to ensure stakeholder needs are addressed throughout.

The following sections detail how the phases will be carried out to support implementation of the TMP.

### 4.1.1 Programming – Establishing Priorities and Financing Requirements

Implementation of the TMP strategy will involve progressive improvements to infrastructure, as well as to services and programs, based on need and financial capability. The timing for these investments will be better defined through on-going monitoring of transportation system performance and land development, as discussed in Section 4.1.4.

Table 6 summarizes the potential capital and operating expenditures to the year 2021 for the Regional Road network based on the cost estimates prepared for the 2003 Development Charges By-law Background Study.

**TABLE 6 – Estimated Capital and Operating Costs to the Year 2021 for the Regional Road Network (Thousands of 2003 dollars)**

	2003 – 2007	2008 – 2012	2013 – 2021	2003 – 2021
<b>CAPITAL COSTS</b>				
<b>REHABILITATION PROJECTS (Figure 14)</b>				
Road and Storm Sewer Reconstruction Projects	\$10,850	\$3,500	\$7,200	\$21,550
Road Resurfacing and Rehabilitation Program	\$24,450	\$40,000	\$96,000	\$160,450
Structure Replacement Projects	\$1,435	\$4,500	\$8,000	\$13,935
Structure Rehabilitation Program	\$4,480	\$2,500	\$5,600	\$12,580
<b>OPERATIONAL AND SAFETY PROJECTS (Figure 15)</b>				
Intersection Improvements and Signal Installations	\$14,025	\$19,050	\$29,000	\$62,075
Corridor Improvements	\$1,785	\$3,000	\$0	\$4,785
<b>EXPANSION PROJECTS (Figure 16)</b>				
Regional Road Widening and New Connections	\$78,855	\$143,830	\$280,100	\$502,785
Highway 401 Interchanges and Grade Separations	\$30,565	\$6,200	\$0	\$36,765
<b>OTHER PROJECTS</b>				
Transportation System Management Projects	\$3,350	\$6,175	\$10,400	\$19,925
Potential Noise Wall Retrofit and Bicycle Facility Programs	\$750	\$2,500	\$4,000	\$7,250
Engineering and Other Activities	\$6,750	\$7,020	\$13,465	\$27,235
<b>TOTAL ESTIMATED CAPITAL COSTS</b>	<b>\$177,295</b>	<b>\$238,275</b>	<b>\$453,765</b>	<b>\$869,335</b>
<b>OPERATING COSTS</b>				
Roads and Streets Maintenance Operations	\$47,400	\$49,000	\$81,900	\$178,300
Traffic Operations	\$20,500	\$21,700	\$37,300	\$79,500
<b>TOTAL ESTIMATED OPERATING COSTS</b>	<b>\$67,900</b>	<b>\$70,700</b>	<b>\$119,200</b>	<b>\$257,800</b>

**NOTES:**

1. These cost estimates represent the Region of Durham's share only. Costs for other jurisdictions have not been included.
2. Costs are based on the estimates included in Appendix C (Capital) and G (Operating) of the 2003 Region of Durham Development Charges Background Study, approved by Regional Council on July 9, 2003.
3. "Engineering and Other Activities" includes provisions for a share of land acquisition, landscaping, engineering studies, and other, undefined capital expenses.



According to **Table 6**, the total capital cost for the proposed Regional Road projects in the Plan is estimated at **\$869.3 million** (in 2003 dollars). This figure reflects the recommended (higher) expenditure levels for rehabilitation, reconstruction and replacement projects proposed in Section 3.3.3.3 in future years. Another \$257.8 million in on-going operating and maintenance costs is expected to be incurred to 2021.

The proposed road improvements identified in **Figures 14, 15, and 16** and **Appendices 2, 3 and 4** will be used as the basis for preparing annual Servicing and Financing Studies and the yearly Capital Budget and Four-Year Forecast. These processes will be used to update cost estimates and priorities annually. Further elaboration on priorities and financing will be provided through future reviews of the Development Charge By-law and updates to this plan.

Regardless of the priorities and timing established, funding will continue to be an issue. The potential capital costs identified in the TMP will require a greater financial commitment. The Roads Rehabilitation Levy introduced in the 2001 Roads Capital Budget was an initial step, but further investment will be needed to preserve and expand the Region's infrastructure.

Given limitations on current revenue streams, provision of a dedicated, sustainable financing source is a prerequisite to ensuring the long-term viability of the transportation system in Durham and achieving the Transportation Vision. The need for such revenue sources is becoming an even greater concern given the Region's requirement to partially fund the capital requirements of GO Transit.

Other sources of funding beyond property taxes and development charges must be made available. Jurisdictions in other parts of Canada and the United States have access to a wider range of sustainable and reliable revenue sources, such as:

- Fuel taxes;
- Registration and user fees; and
- Trust funds and toll revenue.

In Ontario, the Provincial and Federal governments collect billions of dollars in fuel taxes and vehicle fees, but unlike other jurisdictions, do not share the revenue with operating authorities. Their involvement in the funding of municipal transportation, especially public transportation, is crucial.

### Recommended Action:

55. *Use the annual Servicing and Financing Study and Operating and Capital Budget processes to update costs, refine priorities, and present a comprehensive program and financial perspective for the Regional Road network.*
56. *Petition the Provincial and Federal Governments to provide municipalities with the tools to obtain sustainable, dedicated funding sources for financing transportation infrastructure and services.*



### 4.1.2 Facility Planning, Design and Construction – Implementing the Projects

For the proposed Regional Road expansion projects shown in **Figure 16**, the work completed in preparing the TMP is consistent with Phases 1 (identify the problem) and 2 (identify alternative solutions to the problem) of the five-phase Municipal Class EA planning and design process. In the future, the Plan will be relied upon in completing the Municipal Class EA studies for these projects.

As part of the EA study, functional plans will be completed to assess costs and impacts in greater detail. In cases where alignments are not well established, the EA studies will examine and compare routing options as to their impacts, feasibility, cost and effectiveness. It is assumed that these studies will not result in a complete re-think of the underlying basis for the project, but focus on implementation.

There may be opportunities to alleviate adverse environmental impacts of a proposed project by relocating the facility, altering the design or choosing not to proceed with its implementation. However, in many instances the infrastructure already exists or the options for new or improved alignments are limited. In these situations, mitigation measures are needed to minimize negative impacts.

Once functional planning is complete, detailed designs and contracts documents are prepared and the project is tendered for construction. The construction process is the most intrusive of all implementation stages, impacting many citizens and businesses. Every effort is made to ensure the work is carried out in a safe and efficient manner, with suitable public notice prior to events occurring.

The time required to complete facility planning, design and construction is dependent on a number of factors, some which are beyond the Region's control. For Regional Road widening projects, a three-year timeframe is typically required to complete planning and design, acquire land, relocate utilities, negotiate access rights, prepare contract documents, and complete construction.

#### Recommended Actions:

57. *Subject to annual review and approval through the Roads Servicing and Financing Study and Roads Capital Budget, proceed with Municipal Class Environmental Assessment studies, detailed design, land acquisition and utility relocation for the projects identified in Figure 16 in a timely manner.*
58. *Preserve, and if necessary mitigate impacts to, environmentally sensitive and significant natural areas, and prime agricultural lands through planning, design, landscaping measures and best management practices when upgrading or expanding transportation facilities.*
59. *Inform and involve the public in the planning, design and construction of Regional Road improvements to the greatest extent possible, in keeping with statutory obligations and project constraints.*



### 4.1.3 Operations and Maintenance – Managing the System

The Region operates and maintains the roads, bridges, culverts, storm drainage systems, and traffic control measures under its jurisdiction. Typical maintenance activities include asphalt and concrete repairs, sign repairs, pre-emptive traffic signal bulb repairs, and street sweeping. The Region is also responsible for operating traffic control signals and systems, and for carrying out winter snow and ice control.

Operational and maintenance services play an essential role in infrastructure management, helping to reduce life-cycle costs, while improving safety, sustaining desired levels of service, and protecting the natural environment. The effective and efficient delivery of operational and maintenance services depends on the manner in which the transportation system is constructed, and can be aided or hindered by infrastructure design, traffic management measures and landscaping features. Maintenance service level standards, which define the extent and timing of related activities, are regulated by the *Municipal Act* and are approved by Regional Council.

#### Recommended Actions:

60. *Plan infrastructure, including modifications, in a manner that recognizes implications for service level standards, operating and maintenance practices and costs for service delivery.*
61. *Plan infrastructure to provide adequate snow storage space and adequate green space.*
62. *Introduce right-of-way enhancements, such as street furniture and planters, in a manner that maintains safe traffic operations and preserves a clear, unencumbered right-of-way for maintenance services, wherever possible.*

### 4.1.4 Monitoring – Dealing with Uncertainty and Tracking Change

It is important to gather pertinent information about the Region's transportation system and its use on a regular basis. A clear understanding of changing conditions and progress enables more informed implementation decisions and priority setting. It also assists in assessing how well the Region is progressing towards its Transportation Vision and supports reviews of the Regional and Local Municipal Official Plans.

A comprehensive **Transportation Monitoring Program** is proposed to measure and report on system performance. The program would feature Region-wide monitoring to track changes in land use patterns, demographic characteristics, and system performance and mode choice over time. It is anticipated that the elements of this program will be monitored every five to ten years, depending on the availability of data sources.

Corridor and area-specific monitoring may be considered in the future to measure development and transportation system performance in key corridors. This will help to proactively identify areas of concern and timely responsive measures. It is anticipated that the elements of this program may





be monitored more frequently, perhaps every one to five years given the nature of the data and their collection methods.

**Table 7** offers a range of indicators that could be used to monitor the effectiveness of the Plan in achieving both system goals and progress towards a more transit-supportive urban form. Care should be exercised not to duplicate, but rather to build upon, other performance measurement exercises already underway.

**TABLE 7 – Potential Monitoring Program Indicators**

Indicator Group	Indicators	Study Area	Program or Source
<b>GOAL A – Facilitate Sustainable Economic Growth</b>			
General Land Use Characteristics	<ul style="list-style-type: none"> <li>Population</li> <li>Employment</li> <li>Population to Employment Ratio</li> <li>Land Area</li> </ul>	<ul style="list-style-type: none"> <li>Durham Region, Oshawa CMA, Toronto CMA, EUA, Main Central Areas, Central Area, CBD</li> </ul>	<ul style="list-style-type: none"> <li>TAC</li> </ul>
Transportation - Land Use Interaction	<ul style="list-style-type: none"> <li>Employment Self-containment (% of Employed Labour Force working Durham Region)</li> <li>Employed Labour Force to Jobs Ratio</li> </ul>	<ul style="list-style-type: none"> <li>Durham Region, Area Municipalities</li> <li>Durham Region, Area Municipalities</li> </ul>	<ul style="list-style-type: none"> <li>Durham</li> <li>Durham</li> </ul>
<b>GOAL B – Use the System Effectively</b>			
Transportation Infrastructure	<ul style="list-style-type: none"> <li>Arterial Lane-km per 1,000 capita</li> <li>Expressway Lane-km per 1,000 capita</li> <li>HOV Lane-km per 1,000 capita</li> <li>Automobiles per Capita</li> <li>AM Transit Seat-km per Capita</li> <li>24-hour Transit Seat-km per Capita</li> <li>Off-Street Parking Spaces</li> </ul>	<ul style="list-style-type: none"> <li>Durham Region, OP Urban Area, EUA</li> <li>Durham Region, OP Urban Area, EUA</li> <li>Durham Region, OP Urban Area, EUA</li> <li>Durham Region</li> <li>OP Urban Area, EUA</li> <li>OP Urban Area, EUA</li> <li>Central Areas, CBD</li> </ul>	<ul style="list-style-type: none"> <li>TAC</li> <li>TAC</li> <li>TAC</li> <li>TAC</li> <li>TAC</li> <li>TAC</li> <li>TAC</li> </ul>
Transportation Utilization	<ul style="list-style-type: none"> <li>AM Peak Period Auto Occupancy</li> <li>AM Peak Period Transit Mode Share</li> <li>AM Peak Period Auto Mode Share (Towards 15% Auto Reduction Target by 2021)</li> <li>AM Peak Period Person-Trips per Capita</li> <li>24-hour Person-Trips per Capita</li> <li>Annual Transit Rides per Capita</li> <li>24-hour Arterial Auto Vehicle-km per Capita</li> </ul>	<ul style="list-style-type: none"> <li>Durham Region, OP Urban Area, EUA</li> <li>OP Urban Area, EUA, Main Central Areas, CBD</li> <li>OP Urban Area, EUA, Main Central Areas, CBD</li> <li>Durham Region, OP Urban Area, EUA</li> <li>Durham Region, OP Urban Area, EUA</li> <li>Durham Region, OP Urban Area, EUA</li> <li>Durham Region, OP Urban Area, EUA</li> </ul>	<ul style="list-style-type: none"> <li>TAC</li> <li>TAC</li> <li>TAC</li> <li>TAC</li> <li>TAC</li> <li>TAC</li> <li>TAC</li> </ul>



TABLE 7 – Potential Monitoring Program Indicators

Indicator Group	Indicators	Study Area	Program or Source
Transportation Network Performance	<ul style="list-style-type: none"> <li>Arterial and Expressway Road Utilization Index (Vehicle-km/Lane-km)</li> <li>AM Peak Period Traffic Growth Relative to Population Growth at Screenlines</li> <li>Percentage of 24-hour Auto Person-Trips in AM Peak Period at Screenlines</li> <li>Percentage of 24-hour Transit Person-Trips in AM Peak Period at Screenlines</li> </ul>	<ul style="list-style-type: none"> <li>Durham Region, EUA</li> <li>Durham Region</li> <li>Durham Region</li> <li>Durham Region</li> </ul>	<ul style="list-style-type: none"> <li>TAC</li> <li>TAC</li> <li>TAC</li> <li>Durham</li> </ul>
<b>GOAL C – Move People and Goods Safely, Reliably and Efficiently</b>			
Transportation Infrastructure	<ul style="list-style-type: none"> <li>Operating Costs for Regional Roads per Lane-km</li> <li>Operating Costs for Winter Control Maintenance of Regional Roads per Lane-km</li> <li>% of Lane-km Rated as Good to Very Good</li> <li>% of Winter Event Responses that Met or Exceeded Municipal Standards</li> </ul>	<ul style="list-style-type: none"> <li>Durham Region</li> <li>Durham Region</li> <li>Durham Region</li> <li>Durham Region</li> </ul>	<ul style="list-style-type: none"> <li>MPMP</li> <li>MPMP</li> <li>MPMP</li> <li>MPMP</li> </ul>
Transportation Network Performance	<ul style="list-style-type: none"> <li>Annual Injuries/Fatalities per 1,000</li> <li>Average Home-Work Trip Distance</li> <li>AM Public Transit Travel Times between Main Central Areas and Regional Nodes</li> </ul>	<ul style="list-style-type: none"> <li>Durham Region, EUA</li> <li>Durham Region, Area Municipalities, EUA</li> <li>Durham Region</li> </ul>	<ul style="list-style-type: none"> <li>TAC</li> <li>TAC</li> <li>Durham</li> </ul>
Road and Transit Expenditures	<ul style="list-style-type: none"> <li>Road Expenditures per Capita</li> <li>Transit Expenditures per Capita</li> <li>Farebox as % of Budget</li> <li>Operating Costs for Conventional Transit per Regular Passenger-trip</li> <li>Number of Conventional Transit Passenger-trips per Person in Service Area</li> </ul>	<ul style="list-style-type: none"> <li>Durham Region, Oshawa and Toronto CMAs</li> <li>Durham Region, Oshawa and Toronto CMAs</li> <li>Durham Region, Oshawa and Toronto CMAs</li> <li>Durham Region</li> <li>Durham Region</li> </ul>	<ul style="list-style-type: none"> <li>TAC</li> <li>TAC</li> <li>TAC</li> <li>MPMP</li> <li>MPMP</li> </ul>
<b>GOAL D – Provide Choice in Services</b>			
Transportation - Land Use Interaction	<ul style="list-style-type: none"> <li>Households Within 400 m of Transit Routes</li> <li>Major Employment Within 400 m of Transit Routes</li> <li>Pedestrian Volumes on Arterials and Collector Roads</li> <li>Bicycle Volumes on Arterial and Collector Roads</li> </ul>	<ul style="list-style-type: none"> <li>OP Urban Area</li> <li>OP Urban Area</li> <li>Main Central Areas</li> <li>OP Urban Area</li> </ul>	<ul style="list-style-type: none"> <li>Durham</li> <li>Durham</li> <li>Durham</li> <li>Durham</li> </ul>

TABLE 7 – Potential Monitoring Program Indicators

Indicator Group	Indicators	Study Area	Program or Source
<b>GOAL E – Promote Responsible Development and Environmental Integrity</b>			
Air Quality and Automobile Travel	<ul style="list-style-type: none"> <li>• CO<sub>2</sub> Emissions per Capita</li> <li>• CO<sub>2</sub> Emissions per Person-trip</li> <li>• Other Emissions per Capita (CO, SO<sub>2</sub>, NO<sub>x</sub>, VOCs)</li> <li>• Other Emissions per Person-trip (CO, SO<sub>2</sub>, NO<sub>x</sub>, VOCs)</li> </ul>	<ul style="list-style-type: none"> <li>• Durham Region, EUA</li> <li>• Durham Region, EUA</li> <li>• Durham Region</li> <li>• Durham Region</li> </ul>	<ul style="list-style-type: none"> <li>• TAC</li> <li>• TAC</li> <li>• STPI, TMA</li> <li>• STPI, TMA</li> </ul>
Transportation - Land Use Interaction	<ul style="list-style-type: none"> <li>• % of Occupied Urban Land by Infrastructure Type</li> </ul>	<ul style="list-style-type: none"> <li>• OP Urban Area</li> </ul>	<ul style="list-style-type: none"> <li>• Durham</li> </ul>
NOTES:			
MPMP	Municipal Performance Monitoring Program, Ministry of Municipal Affairs and Housing		
STPI	Sustainable Transportation Performance Indicators program, Centre for Sustainable Transportation/Transport Canada/Environment Canada		
TAC	Transportation of Canada, Urban Transportation Indicators program		
TMA	GTA Transportation Management Association monitoring potential		

### Recommended Actions:

63. *Develop, and subject to budget approval, conduct a region-wide Transportation Monitoring Program, and report progress to Regional Council on a regular basis.*
64. *Subject to budget approval, support new and on-going data collection initiatives critical to monitoring transportation conditions and predicting future needs, including the:*
- *Census of Canada;*
  - *Transportation Tomorrow Survey;*
  - *Cordon Count Program; and*
  - *Regional Geographical Information System.*

## 4.2 EFFECTS OF THE PLAN

### 4.2.1 Mobility

Implementation of the policies, programs and infrastructure improvements identified in the TMP will have an impact on mobility by the year 2021. Table 8 summarizes the effects on mobility of implementing the proposed Regional Road expansion projects. As the table shows, achieving the 15% auto reduction target by the year 2021 will have a positive impact on all system performance characteristics.



**TABLE 8 – Effects on Mobility of Recommended Road Improvement Program**

	2003 Base	2021	
		Based on Current Mode Shares	With 15% Reduction in Auto Driver Trips
System Travel (million vehicle-km)	1.24	1.94	1.70
Average System Speed (km/h)	64	62.2	66.2
Auto Mode Split	87%	87%	76%
Transit Mode Split	6%	6%	16%
Other Mode Split	7%	7%	8%
Population	552,000	850,000	850,000
Vehicle-km/Capita	2.25	2.28	2.00

Implementation of the TMP will help to manage growth in congestion. The Plan provides a framework for increasing transit use and for optimizing and expanding the road network. These actions will reduce congestion relative to what would occur without the improvements.

The Plan offers other mobility benefits beyond congestion relief. The public transportation and TDM initiatives will provide more choice for users and will improve the relative competitiveness of non-auto modes. This will help to attract people who have a choice of travel methods and to provide more options for the transportation disadvantaged. Initiatives aimed at improving non-motorized travel will also be more viable for shorter trips.

The proposed improvements will also benefit the movement of goods by reducing congestion on the road network.

#### 4.2.2 Safety

Specific and indirect actions identified in the TMP are intended to reduce the frequency and severity of collisions. These actions will be systematically pursued, regardless of the current level of safety, and will:

- Minimize exposure to collisions through reduced automobile travel. The Plan's objective of increased TDM and public transportation use will reduce vehicle travel and the potential for collisions. The land use strategies aimed at creating more transit-oriented, mixed-use development will help to limit travel distances and demands, and to promote non-motorized modes of travel;
- Minimize the risk of collisions occurring for travel that does take place by promoting road design compatible with function. Maintaining a hierarchy of roads, with different design characteristics, assists in making the driving task more predictable and provides more consistent operating conditions. The proposed safety and operational improvements identified in Section 3.3.3.2 will address deficiencies and traffic conflicts through changes in geometric design and operating conditions. Managing access, optimizing traffic operations, and

implementing information systems through ITS will all contribute towards a safer road environment; and

- Minimize the risk of collisions occurring by promoting roadside treatments, reducing speed, protecting vulnerable road users and establishing emergency response plans.

The TMP should also enhance personal safety. The land use recommendations of the Plan promote more compact, transit-oriented development consistent with the principles of Crime Prevention Through Environmental Design (CPTED). The premise of CPTED is that proper placement and design of facilities and routes can improve safety. These principles apply equally to the design of pedestrian and cyclist facilities.

### 4.2.3 Natural Environment

#### 4.2.3.1 Vehicle Emissions and Air Quality

Achieving the TMP objective of reducing auto use by 15% will benefit air quality. On a per capita basis, emissions are expected to decline over the next twenty years as a result of improvements in vehicle technology and fuels. Further evolution of vehicle emission standards will continue to help. Greenhouse gas emissions are likely to be higher than current levels given the increase in vehicle-kilometres of travel predicted. Vehicle technologies or travel behaviour changes would be needed to significantly reduce fuel consumption and vehicle emissions.

#### 4.2.3.2 Natural Features and Agricultural Lands

The TMP recognizes the importance of protecting and conserving the Region's natural features and agricultural lands in delivering transportation services. To this end, the Plan:

- Encourages optimization of the existing system and reduced reliance on the automobile to minimize the need for expansion;
- Plans for a lower level of vehicle service on the road system;
- Recommends expanding existing facilities only when additional capacity is required, and mitigating any adverse impacts;
- Avoids new road crossings and expansions through the Rouge Park south of Steeles Avenue and along the Oak Ridges Moraine. Previous plans for the Bayly Street/Lawrence Avenue and Rossland Road/Finch Avenue interconnections are not being pursued; and
- Requires Regional Council to eliminate, minimize or mitigate the negative effects of existing and future transportation facilities through design, landscaping measures and best management practices.

The Plan recommends the following new creek crossings:

- Adelaide Avenue/Manning Road interconnection (Corbett);
- Townline Road extension (Farewell);
- Bloor Street realignment (Farewell);
- 14<sup>th</sup> Avenue extension (West Duffins);
- Whites Road realignment (West Duffins); and
- 3<sup>rd</sup> Concession Road/Rossland Road connection (West Duffins, Duffins, and Harmony).

These crossings will all require the completion of EA studies prior to implementation. Other road expansion projects identified in the Plan may also have localized environmental impacts resulting from the need to manage stormwater, natural habitat or agricultural land loss, changes in stream conditions, and/or construction techniques. The EA studies undertaken for these projects will identify impacts and make appropriate recommendations for addressing the effects.

#### **4.2.4 Community**

##### **4.2.4.1 Neighbourhood and Rural Hamlet Traffic Impacts**

Reductions in congestion, as expected through this Plan, will help to minimize short cutting pressures through neighbourhoods. Completing missing links will improve connectivity and eliminate the need to use local routes as alternates. When developed and implemented, the Regional Traffic Management Policy and Strategic Goods Movement Network will help to address concerns related to speeding vehicles and trucks on Regional Roads.

##### **4.2.4.2 Traffic Noise**

In some locations, proposed road improvements may result in traffic noise becoming more of an issue. Corridors where there is a potential for change in the composition of traffic flow, specifically in the number of heavy vehicles, may require mitigation through abatement measures. The proposed Regional Road Noise Abatement Policy will provide a reasonable set of criteria and standards for noise mitigation.

##### **4.2.4.3 Community Severance Effects**

Community severance effects can generally be characterized as conditions that may inhibit or significantly reduce the interactions of people within a neighbourhood or community. By keeping system expansion primarily to existing corridors and rights of way, impacts have been minimized. Where new connections are proposed, implementation is generally through the land development process, so existing residents are not affected.

The introduction of Highway 407 may introduce some severance effects. The Province will be considering these impacts through its EA study for the facility.

All attempts will be made to maintain pedestrian and vehicular connectivity when planning infrastructure improvements. Aesthetic measures and techniques will also be applied to diminish any visual aspects of community severance. The specific treatments will vary by facility and likely by community, as community preferences tend to differ.

#### 4.2.4.4 Property Acquisition

Some of the recommendations of the Plan will result in the need to acquire property to implement the proposals. Precise estimates of the number and location of affected properties cannot be provided since detailed functional plans have not yet been prepared.

The acquisition of property to implement transportation improvements will invariably affect abutting properties. It is the Region's practice to acquire needed properties in a reasonable and fair-minded manner, based on fair market value of the properties in question. Expropriation will only be considered in situations where mutual agreement cannot be reached.

#### 4.2.4.5 Economic

Implementation of the TMP is anticipated to provide economic benefits to a range of users and society as a whole. The benefits will be in the form of reductions in the operating, time and air pollution costs associated with automobile and transit travel. Indirect economic benefits in the form of increased development and enhanced business competitiveness may also occur as a result of the Plan's implementation.

### 4.3 PLAN REVIEW AND UPDATE

Regular reviews and updates of the TMP will allow for the on-going assessment of its effectiveness and relevance. Establishing a stable transportation planning cycle ensures the Plan strategies remain flexible to respond to unforeseen developments and imprecise assumptions. The performance of the Plan in achieving the Transportation Vision can also be reviewed, and necessary adjustments in strategy made. The Municipal Class EA also recommends that master plans be reviewed every five years to determine the need for a detailed formal review and/or updating.

The *Planning Act* requires the Region to assess the need for an update to its Official Plan every five years. That review process provides a timely opportunity to revisit the assumptions of the TMP and consider the need for an update. The monitoring program discussed in Section 4.1.4 will also provide an indication of the need for a review. The Municipal Class EA also recommends that



master plans be reviewed every five years to determine the need for a formal review and/or update.<sup>31</sup>

Over the time period preceding the formal review, Regional Council decisions on transportation issues will have the inevitable effect of amending, deleting, replacing or complementing some of the policies in the TMP. For this reason, individuals must consider this plan in conjunction with the record of subsequent Council decisions to obtain a complete understanding of current policy and plans. The Region may amend the TMP in the intervening period to incorporate substantive changes or major initiatives, but on-going updates are not contemplated.

### **Recommended Action:**

65. *Conduct a comprehensive review of the Transportation Master Plan every five years, ideally in conjunction with a review of the Regional Official Plan.*
66. *Consider the policies and recommendations of the Transportation Master Plan in future reviews of the Regional and Local Official Plans.*

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<sup>31</sup> Ontario Municipal Engineers' Association, *Municipal Class Environmental Assessment*, 2000.







## APPENDIX 1 – Analysis of Specific Road Segments

Segment and Request	Municipality	Response and Rationale
Deletion of the Clements Road extension between Westney Road (Regional Road 31) and Church Street	Ajax	<p>The extension of Clements Road is not required for network capacity purposes by 2021 if Bayly Street (Regional Road 22) and Highway 401 are widened. As well, the crossing of the West Duffins Creek could pose negative environmental impacts. However, the connection would provide access to the employment lands in south Ajax and Pickering, and would complete the road system for emergency evacuation and transit service purposes. It would also provide a needed connection in the event Bayly Street and Highway 401 are not widened.</p> <p><b>Retain the future Type C arterial road designation for the Clements Road extension between Westney Road and Church Street in the ROP until such time as an Environmental Assessment is completed.</b></p>
Designation of Lake Driveway between Pickering Beach Road and Harwood Avenue (Regional Road 44) and Harwood Avenue (Regional Road 44) between Westney Road (Regional Road 31) and Lake Driveway	Ajax	<p>Lake Driveway is not expected to serve an arterial road function in the future, given its location, connectivity and adjacent land uses. The Type C arterial road designation for Harwood Avenue south of Westney Road should also be deleted if Lake Driveway is redesignated since it will not connect to another arterial road. The roads should remain at least collector designations in the Ajax Official Plan to reflect their role in providing access to the waterfront area.</p> <p>If Harwood Avenue is redesignated, its jurisdiction should be examined further in keeping with its more local function.</p> <p><b>Delete Type C arterial road designation for Lake Driveway between Pickering Beach Road and Harwood Avenue, and for Harwood Avenue between Westney Road and Lake Driveway in the ROP. Examine the jurisdiction of Harwood Avenue.</b></p>
Designation of Pickering Beach Road from Bayly Street to Emperor Street	Ajax	<p>Through the Ajax Official Plan Review, the Town proposed changing Pickering Beach Road from Bayly Street to Emperor Street, from a Type C arterial to a Type B arterial. This proposal was deferred for further consideration in 2000, pending the results of the TMP. Upon further review, the TMP analysis illustrates that the re-designation of this segment of road is not warranted from a network capacity perspective.</p> <p><b>Retain Type C arterial road designation.</b></p>
Extension of Kerrison Drive between Salem Road and Audley Road	Ajax	<p>The extension of Kerrison Drive to Audley Road would improve the distribution of traffic in this area and provide traffic relief to the heavily traveled and congested Kingston Road (Regional Highway 2) corridor. This will help distribute traffic away for the intersection of Salem Road and Kingston Road, which is expected to be highly traveled once the interchange is completed and Salem Road is extended further north. It will also provide an important mid-block connection through this developing area of Ajax, the location of considerable commercial land use.</p> <p><b>Extend the Type C arterial road designation for Kerrison Drive between Salem Road and Audley Road in the ROP.</b></p>



Segment and Request	Municipality	Response and Rationale
Extension of new Type C arterial road in the A8 community between Salem Road and Audley Road	Ajax	<p>The extension of the new Type C arterial road to the Audley Road would improve the distribution of traffic in this area and provide relief to Kingston Road (Regional Highway 2), Rossland Road and Taunton Road (Regional Road 4). The travel demand forecasting illustrated the importance of this continuous connection, from Taunton Road to Audley Road, in serving future traffic.</p> <p><b>Extend the designation of the proposed Type C arterial road designation from Salem Road to Audley Road in the ROP.</b></p>
Interconnection of Conlin Road and 5th Concession Road	Ajax-Pickering - Whitby	<p>The extension of Conlin Road/5th Concession Road could pose an environmental impact on the Provincially significant Heber Downs wetland. However, the connection could assist in addressing existing and projected capacity deficiencies in Ajax and Whitby.</p> <p><b>Retain the Type B arterial road designation for Conlin Road – 5th Concession Road in the ROP until such time as an Environmental Assessment is completed.</b></p>
Interconnection of Highway 7 and Ravenshoe Road (York Road 32)	Brock	<p>The connection of Highway 7 east of Highway 12 to Ravenshoe Road west of Lake Ridge Road (Regional Road 23) is not required for network capacity purposes by 2021, given the availability of other adjacent routes. There would be impacts to existing residents living on Ravenshoe Road, which were raised through a recent Class EA study completed by the Region of York. The connection would provide a more direct route between York Region and the City of Kawartha Lakes, especially for recreational and commercial vehicle traffic. It may also help to divert automobile and truck traffic away from other Regional Roads, such as River Street (Regional Road 10 – Sunderland) and Regional Road 13 (Leaskdale), which may benefit area residents. The Township of East Gwillimbury and the City of Kawartha Lakes have both requested the Region to consider constructing the road. At present, the project is not a high priority compared to other Regional needs, but the opportunity to implement the connection should be retained and considered in the context of the future Highway 404 extension.</p> <p><b>Retain the future Type A arterial road designation for the proposed interconnection of Highway 7 and Ravenshoe Road.</b></p>
Designation of Concession Street between Scugog Street and Liberty Street (Regional Road 14)	Clarington	<p>This portion of Concession Street is not expected to serve an arterial road function in the future, given its location, connectivity and adjacent land uses. The road should remain at least a collector designation in the Clarington Official Plan to reflect its role in providing access to the downtown area and in distributing traffic to the adjacent arterial road system.</p> <p><b>Delete the Type C arterial road designation for Concession Street between Scugog Street and Liberty Street in the ROP.</b></p>

Segment and Request	Municipality	Response and Rationale
Deletion of Adelaide Avenue extension between Courtice Road (Regional Road 34) and Townline Road (Regional Road 55)	Clarington	<p>The extension of Adelaide Avenue (Regional Road 58) east of Townline Road is not required for network capacity purposes by 2021 if the Rossland Road extension is constructed, Townline Road is widened between Adelaide Avenue and Rossland Road, and the Bloor Street/Townline Road south area is improved. A crossing of the Provincially significant Black-Farewell wetland complex, generally located to the east of Trulls Road, could pose significant environmental impacts. However, the road network in this area is discontinuous and incomplete, which has led to significant traffic and safety concerns in the King Street (Regional Highway 2) corridor at Townline Road. As well, the extension would address a screenline capacity deficiency under the ROP scenario.</p> <p>A shorter extension of Adelaide Avenue to Trulls Road could help address operational difficulties, while minimizing impacts on the natural environment. A link would also benefit emergency and future transit services. The option for constructing the road should continue to be protected until a Class Environmental Assessment (Schedule C) study is completed.</p> <p><b>Delete the Type C arterial road designation for the Adelaide Avenue extension, from Trulls Road to Courtice Road. Retain the Type C arterial road designation between Townline Road and Trulls Road until an Environmental Assessment study is completed.</b></p>
Interconnection of Gibb Street and Olive Avenue (Regional Road 59)	Oshawa	<p>The analysis illustrated that the Gibb-Olive connection is a less desirable option for serving future travel demands than other alternatives. However, the interconnection would improve access to this area of the City of Oshawa and would eliminate the discontinuity of the road system and the operational difficulties that presents. The option for constructing the road should continue to be protected until a Class Environmental Assessment (Schedule C) study is completed.</p> <p><b>Retain the Type C arterial road designation for the Gibb Street – Olive Avenue interconnection until an Environmental Assessment study is completed. Examine the need to widen Gibb Street-Olive Avenue from 2 to 4 lanes between Park Road South and Ritson Road South as part of the Class EA study.</b></p>
Designation of Finch Avenue between Altona Road (Regional Road 27) and Pickering Townline Road between Finch Avenue and Pickering Townline Road and Taunton Road (Regional Road 4)	Pickering	<p>Given the discontinuity of the area road network, the Rouge Park policy prohibiting new roads south of Steeles Avenue, and the presence of the Agricultural Preserve, it is unlikely that either road will serve a significant arterial road function in the future. Designating these roads as Type C arterials is consistent with their expected roles and function.</p> <p><b>Redesignate Finch Avenue, between Altona Road and Pickering Townline Road, and Pickering Townline Road, between Finch Avenue and Taunton Road, from Type B arterial roads to Type C arterial roads in the ROP.</b></p>

Segment and Request	Municipality	Response and Rationale
Designation of Fairport Road between Kingston Road (Regional Highway 2) and 3 <sup>rd</sup> Concession Road	Pickering	<p>The analysis illustrated the need to maintain the Type C arterial road designation for Fairport Road in order to serve future travel demands. Changing the designation to a collector or local road would reduce its capacity, thereby forcing traffic that would be using Fairport Road onto other continuous adjacent arterial roads, including Whites Road (Regional Road 38), Dixie Road, Valley Farm Road and Brock Road (Regional Road 1). However, insufficient capacity exists in the preferred arterial routes, Whites Road and Brock Road, to accommodate additional traffic.</p> <p>For the road to change its function, physical geometric changes, likely in the form of traffic calming measures, would need to be implemented to have any effect on volumes or speeds. This would conceivably divert traffic to adjacent roads. If physical measures were not implemented, it is unlikely the road would change character just by modifying its designation, given its design and connectivity. Significant levels of enforcement would be needed to reinforce traditional solutions of speed limit reductions and additional all-way stop controls.</p> <p><b>Retain the Type C arterial road designation for Fairport Road between Kingston Road and its proposed extension to 3<sup>rd</sup> Concession Road.</b></p>
Designation of a Highway 7 by-pass around the community Brougham	Pickering	<p>Through the Pickering Official Plan, the City proposed a future east-west by-pass of Brougham for traffic travelling on Highway 7. The proposal was deferred for further consideration when the Pickering Official Plan was approved in 1997, given unresolved technical concerns.</p> <p>Upon further review, the technical and financial feasibility of the project is questionable. The by-pass would involve a significant diversion of existing Highway 7 north, because the close proximity of Highway 407 and a cemetery severely limit options to the south. The presence of watercourses and woodlots further complicate viability to the north. As well, the project would be very costly given the extent of work required. For these reasons, it is recommended that the by-pass not be identified in the City of Pickering and Durham Regional Official Plans.</p> <p><b>Delete the Highway 7 by-pass of Brougham from the Pickering Official Plan to resolve outstanding deferrals D24 and D42 through the ROP Review.</b></p>

Segment and Request	Municipality	Response and Rationale
<p>Designation and extension of Dixie Road between Kingston Road (Regional Highway 2) and the future Seaton community</p>	<p>Pickering</p>	<p>The analysis illustrated the need to maintain the Type B arterial road designation for Dixie Road in order to serve future travel demands. Changing the designation to a Type C arterial road would reduce its capacity, thereby forcing traffic that would be using Dixie Road onto other continuous adjacent arterial roads, including Whites Road (Regional Road 38), Fairport Road, Valley Farm Road and Brock Road (Regional Road 1). However, insufficient capacity exists in the preferred arterial routes, Whites Road and Brock Road, to accommodate additional traffic. Even with minimal development of the Seaton community, Dixie Road, when taken in conjunction with the proposed 3<sup>rd</sup> Concession Road extension westerly, provides an important connection in a somewhat discontinuous arterial road network in the Pickering area.</p> <p>Further extension of Dixie Road north should be considered in future development plans for the Seaton community to provide connections with the south Pickering area for local traffic and transit service. The connection would also provide needed relief to Brock Road and Whites Road, which will be carrying larger volumes of inter-municipal and inter-regional traffic. However, a separate crossing of the West Duffins Creek is not recommended for Dixie Road, as operational solutions may be feasible to make use of the proposed crossing for 3<sup>rd</sup> Concession Road. The ultimate fate of the Dixie Road connection will be decided once development plans for the proposed Seaton community become more definitive.</p> <p><b>Retain the Type B arterial road designation for Dixie Road between Kingston Road and 3<sup>rd</sup> Concession Road and the future Type B arterial road designation for Dixie Road north of the 3<sup>rd</sup> Concession Road. Determine the ultimate alignment of the Dixie Road extension through future planning studies for the north Pickering area.</b></p>
<p>Designations and alignment of roads in the Seaton and East Duffins areas</p>	<p>Pickering</p>	<p>Matters related to the area specific designations and alignments of future roads in the proposed Seaton and East Duffins communities should continue to be addressed through the specific planning studies being conducted for those respective areas, with the exception of those roads addressed in this table.</p> <p><b>Continue to address matters related to the road patterns in the proposed Seaton and East Duffins communities through on-going planning studies. Continue to defer in the ROP.</b></p>



Segment and Request	Municipality	Response and Rationale
<p>Extension of 14<sup>th</sup> Avenue, proposed Altona Road (Regional Road 27) by-pass of Whitevale and designation of Altona Road north of the proposed 14<sup>th</sup> Avenue extension</p>	<p>Pickering</p>	<p>The analysis illustrated that the 14<sup>th</sup> Avenue extension is required for network capacity purposes. While further expansion of Highway 407 beyond its current four-lane configuration may help to alleviate this capacity deficiency, additional connections to York Region are needed to provide network connectivity and travel options for a variety of users, including emergency and future transit vehicles. It would also serve as a by-pass of Whitevale, helping to resolve long standing through traffic concerns in that community. For these reasons, the proposed Regional Road expansion project is illustrated on Figure 16 and in Appendix 4 for 14<sup>th</sup> Avenue extension. There may be further justification for the connection, depending on the outcome of the long-standing matters surrounding the Federal Airport Lands and the proposed Seaton community.</p> <p>However, the interconnection would require another crossing of the West Duffins Creek, which could pose environmental impacts. As well, the project could impact the Whitevale Golf Course and its future expansion plans. The extension could also affect residents in the Box Grove community in Markham who reside adjacent to 14<sup>th</sup> Avenue. The design of existing 14<sup>th</sup> Avenue and adjacent land uses may not be consistent with the characteristics of a higher-order arterial road as envisioned.</p> <p>Given the discontinuity of the area road network, the absence of alternative connection opportunities, and the expected traffic capacity deficiency at the west Durham boundary, the option for constructing the road should continue to be protected until a Class Environmental Assessment (Schedule C) study is completed. Until the Class EA study is completed, the proposed Altona Road by-pass designation contained in the Pickering Official Plan should remain deferred. The proposed by-pass would form part of the 14<sup>th</sup> Avenue extension if it were warranted, or would need to be assessed on its own merits if the connection is not justified. The designation of Altona Road, north of the proposed 14<sup>th</sup> Avenue extension should be deferred for the same reason.</p> <p><b>Retain the future Type B arterial road for the 14<sup>th</sup> Avenue Extension until an Environmental Assessment study is completed. Continue to defer the Pickering Official Plan designation related to the proposed Altona Road by-pass and Altona Road north of the proposed 14<sup>th</sup> Avenue extension until the study is completed.</b></p>

Segment and Request	Municipality	Response and Rationale
Jurisdiction of 3 <sup>rd</sup> Concession Road/Rossland Road between Valley Farm Road and Cochrane Street (Regional Road 43)	Pickering, Ajax and Whitby	<p>The travel demand forecasting illustrated the importance of extending 3<sup>rd</sup> Concession Road westerly across the West Duffins Creek to complete the arterial connection to Whites Road (Regional Road 38). The analysis also illustrated the need for widening and improving the road between Valley Farm Road and Cochrane Street to accommodate future demands.</p> <p>Rossland Road will serve an important inter-municipal function for both auto and transit service in the future and should be considered for inclusion in the Regional Road network. As the other east-west arterial roads in the vicinity, Taunton Road (Regional Road 4) and Kingston Road (Regional Highway 2), reach capacity, Rossland Road will assume a greater role, especially if future expansion of Highways 401 and 407 is further deferred. Rossland Road is also proposed to be a Minor Transit Corridor, providing an important higher-order public transportation connection. In this role, Rossland Road could become one of the most significant transit corridors, given its proximity to residential land uses and its westerly termination location, ultimately near the Toronto/Durham boundary.</p> <p>The Public Works Officials Who Does What initiative examined the issue of road jurisdictions and related implementation matters, including financing. Further consideration should be given to assuming Rossland Road into the Regional Road system based on its expected roles and function.</p> <p><b>Consider the assumption of Rossland Road into the Regional Road system, after addressing implementation and financial issues.</b></p>
Designation of new road on Scugog Island	Scugog	<p>An additional road is not required on Scugog Island for network capacity purposes, given the low volume of traffic and minimal development. There would be impacts to existing residents living on the island from new road construction.</p> <p>The road would provide an emergency, relief route in case of an incident on Island Road (Regional Road 7). It would help to divert automobile and truck traffic away from Island Road by providing additional capacity to serve the Great Blue Heron casino. But the cost to implement the facility would be high, in the range of \$8 to 12 million, depending on land availability.</p> <p><b>No action.</b></p>
Designation of Brock Street (Regional Road 8) and Sanford Road (Regional Road 11), west of Brock Road (Regional Road 1)	Uxbridge	<p>Davis Drive provides the most viable connection with York Region in this vicinity and should remain the Type B arterial road. Consideration should be given to designating Brock Street and Sanford Road as Type C arterial roads in the ROP, in recognition of their arterial road functions.</p> <p><b>Designate Brock Street and Sanford Road, west of Brock Road, as Type C Arterial roads in the ROP.</b></p>



Segment and Request	Municipality	Response and Rationale
<p>Extension of Water Street between Thickson Road (Regional Road 26) and South Blair Street</p>	<p>Whitby</p>	<p>The extension of Water Street is not required for network capacity purposes by 2021, but would provide excellent access to the vacant industrial lands along the lakeshore. It would also complete the road system for emergency evacuation, transit service and bicycle routing, would help to distribute traffic and would provide an alternative routing in the vicinity of the heavily used Thickson Road/Victoria Street (Regional Road 22) intersection.</p> <p><b>Retain the future Type C arterial road designation for Water Street between Thickson Road and South Blair Street.</b></p>



# APPENDIX 2 – Proposed Regional Road Rehabilitation, Reconstruction and Replacement Projects (2004 – 2008)

## Pavement Rehabilitation and Road Reconstruction Projects

Project Number	Project Description		Length (km)
<b>Rehabilitation Projects</b>			
1	Brock Rd #1	From 0.3 km S. of Hwy 7 to Hwy 7	0.3
2	Brock Rd #1	From Hwy 7 to Brougham Rd	0.8
3	Simcoe St #2	From S. of Gibb St #59 to Metcalfe St	0.6
4	Simcoe St #2	From 0.1 km S. of William St to 0.1 km N. of William St	0.2
5	Simcoe St #2	From Taunton Rd #4 to Oshawa Creek	0.8
6	Simcoe St #2	From Oshawa Creek to Conlin Rd	1.7
7	Simcoe St #2	From Steepleview Ct to 2.2 km N. of Steepleview Ct	2.2
8	Simcoe St #2	From 0.6 km S. of Shirley Rd #19 to 0.2 km N. of Shirley Rd #19	0.8
9	Simcoe St #2	From Hwy 7A to Beech St	1.3
10	Simcoe St #2	From 1.6 km N. of Reach St #8 to 4.6 km N. of Reach St #8	3.0
11	Durham/Victoria Bdry Rd #2	From Hwy 7 to 2.0 km N. of Hwy 7	2.0
12	Winchester Rd #3	From 0.3 km E. of Simcoe St #2 to Harmony Rd #33	3.0
13	Taunton Rd #4	From Regional Road 57 #57 to Liberty St #14	1.6
14	9th Concession Rd #5	From 2.9 km W. of West limit of Claremont to West limit of Claremont	2.9
15	9th Concession Rd #5	From Brock Rd #1 to Sideline 12	1.9
16	Myrtle Rd #5	From East limit of Ashburn to 0.2 km W. of Hwy 7/12	2.0
17	Island Rd #7	From 0.4 km S. of Chandler Dr to 1.6 km N. of Chandler Dr	2.0
18	Brock St #8	From York/Durham Line #30 to 1.1 km E. of York/Durham Line #30	1.1
19	Ganaraska Rd #9	From Newtonville Rd #18 to 1.5 km E. of Newtonville Rd #18	1.5
20	Ganaraska Rd #9	From 1.5 km E. of Newtonville Rd #18 to Durham/Northumberland Boundary	2.0
21	Sunderland Rd #10	From Lake Ridge Rd #23 to 4.4 km E. of Lake Ridge Rd #23	4.4
22	Sandford Rd #11	From York/Durham Line #30 to Concession 3	4.1
23	12th Concession Rd #12	From Lake Ridge Rd #23 to East limit of Wilfred	0.8
24	3rd Concession Rd #13	From Hwy 12 to 3.4 km E. of Hwy 12	3.4
25	Newtonville Rd #18	From King St #Hwy 2 to 5th Concession Rd	6.4
26	Shirley Rd #19	From Simcoe St #2 to 1.0 km E. of Simcoe St #2	1.0
27	Shirley Rd #19	From 1.0 km E. of Simcoe St #2 to Russell Rd	3.0
28	Shirley Rd #19	From Russell Rd to Old Scugog Rd	6.4
29	Shirley Rd #19	From Old Scugog Rd to Scugog Rd #57	0.7



<b>Project Number</b>	<b>Project Description</b>		<b>Length (km)</b>
30	Boundary Rd #20	From 0.9 km W. of Mosport Rd #20 to 1.9 km W. of Hwy 35	3.2
31	Goodwood Rd #21	From Brock Rd #1 to 1.1 km E. of Brock Rd #1	1.1
32	Bayly St #22	From Whites Rd #38 to Krosno Bl	3.5
33	Bayly St #22	From Harwood Av #44 to Pickering Beach Rd	0.8
34	Lake Ridge Rd #23	From 1.0 km N. of Ajax/Pickering T/L to 2.0 km N. of Ajax/Pickering T/L	1.0
35	Lake Ridge Rd #23	From 0.1 km N. of Chalk Lake Rd to Goodwood Rd #21	3.8
36	Lake Ridge Rd #23	From Cameron St #12 to Hwy 48	2.1
37	Lake Ridge Rd #23	From 0.3 km N. of Concession 1 to 0.9 km S. of Concession 3	2.4
38	Mara Rd #23	From Whites Creek Bridge to Hwy 12	2.2
39	Thickson Rd #26	From Columbus Rd to Hwy 7/12	1.8
40	Rossland Rd #28	From 0.3 km E. of Brock St to Garden St	0.5
41	Rossland Rd #28	From E. of Thornton Rd #52 to W. of Stevenson Rd #53	0.8
42	Rossland Rd #28	From Stevenson Rd #53 to Simcoe St #2	1.7
43	York/Durham Line #30	From Wagg Rd to York Reg. Rd. 15	0.8
44	York/Durham Line #30	From York Reg. Rd. 15 to 2.1 km N. of York Reg. Rd. 15	2.1
45	Westney Rd #31	From 0.2 km N. of Taunton Rd #4 to Concession 5	1.8
46	7th Concession Rd #31	From Brock Rd #1 to 3.4 km E. of Brock Rd #1	3.4
47	Harmony Rd #33	From 0.4 km N. of Taunton Rd #4 to 0.5 km N. of Conlin Rd	2.1
48	Wilson Rd #35	From Adelaide Av #58 to Rossland Rd #28	1.2
49	Harwood Av #44	From Lake Driveway to Bayly St #22	1.5
50	Brock St #46	From Victoria St #22 to Hwy 401	0.4
51	Farewell St #56	From Wentworth St #60 to Bloor St #22	0.8
52	Manning Rd #58	From Anderson St #36 to Thickson Rd #26	0.9
53	Gibb St #59	From Thornton Rd #52 to Waverly St S	0.8
54	Wentworth St #60	From Simcoe St #2 to Farewell St #56	1.5
55	Kingston Rd #Hwy 2	From 1.1 km W. of Lake Ridge Rd #23 to 0.4 km W. of Lake Ridge Rd #23	0.7
56	Dundas St #Hwy 2	From Lake Ridge Rd #23 to 1.7 km E. of Lake Ridge Rd #23	1.7
57	King St #Hwy 2	From Prestonvale Rd to Courtice Rd #34	1.7
58	King St #Hwy 2	From Morgans Rd to Ovens Rd	2.5
<b>Reconstruction Projects</b>			
59	Myrtle Rd/Raglan Rd #5	From Hwy 7/12 to West limit of Raglan	3.2
60	Brock St #8	From Railway St to Toronto St #Hwy 47	0.8
61	River St #10	From West limit of Sunderland to Hwy 12	0.8
62	Mill St #17	From Hwy 401 to King St #Hwy 2	0.8

**Bridge and Culvert Rehabilitation and Replacement Projects**

Project Number	Structure Name	Location
<b>Rehabilitation Projects</b>		
A	Bowmanville Creek Bridge	Taunton Rd #4 - 0.1 km W. of Blackstock Rd #57
B	John Mills Bridge	Bayly St #22 - 0.4 km W. of Westney Rd #31
C	Beaverton Bridge	Mara Rd #23 - 0.1 km N. of Simcoe St
D	Bayles Bridge	Westney Rd #31 - 2.8 km E. of Brock Rd #1
E	Courtice Road – CPR Overpass	Courtice Rd #34 - 3.1 km S. of King St #Hwy 2
F	Cochrane Street – CPR Overpass	Cochrane St #43 - 0.7 km S. of Rossland Rd #28
G	Morgan Bridge	Portage Rd #50 - 3.1 km E. of Reg Rd #51
H	Gamebridge Bridge	Sideroad 10/11 #51 - 0.2 km N. of Portage Rd #50
<b>Replacement Projects</b>		
I	Leaskdale Bridge	Brock Rd #1 - 0.1 km S. of Zephyr Rd #13 E
J	Unnamed Bridge	Cameron St #12 - 0.9 km E. of McRae St
K	Cameron Bridge	5th Concession Rd #15 - 0.1 km W. of Thorah Sideroad
L	Main Street Culvert	Mill St #17 - 1.4 km S. of Taunton Rd #4
M	Unnamed Bridge	Courtice Rd #34 - 0.1 km N. of King St #Hwy 2
N	Champlain Bridge (Talbot River)	Shoreline Rd #47 - 0.6 km N. of Concession IX





## APPENDIX 3 – Proposed Regional Road Intersection and Corridor Improvement Projects (2004 – 2021)

### Intersection Improvement Projects

Project Number	Location	Anticipated Timing
1	Brock Rd #1 and Bayly St #22	2004 – 2007
2	Brock Rd #1 and 9th Concession Rd #5	2008 – 2012
3	Brock Rd #1 and Goodwood Rd #21	2008 – 2012
4	Simcoe St #2 and Hospital Ct	2008 – 2012
5	Simcoe St #2 and Shirley Rd #19	2013 – 2021
6	Simcoe St #2 and Vanedward Dr	2004 – 2007
7	Winchester Rd #3 and Concession 7/Grandview St	2013 – 2021
8	Winchester Rd #3 and Columbus Rd	2013 – 2021
9	Enniskillen Rd #3 and Regional Road 57 #57	2013 – 2021
10	Winchester Rd #3 and Ritson Rd #16	2004 – 2007
11	Taunton Rd #4 and Courtice Rd #34	2013 – 2021
12	Taunton Rd #4 and Regional Road 57 #57	2013 – 2021
13	Taunton Rd #4 and Main St #17	2013 – 2021
14	6th Concession Rd #10 and Lake Ridge Rd #23	2013 – 2021
15	Sandford Rd #11 and York/Durham Townline #30	2013 – 2021
16	Sandford Rd #11 and Main St	2013 – 2021
17	3rd Concession Rd #13 and Lake Ridge Rd #23	2013 – 2021
18	Ritson Rd #16 and Dean St	2004 – 2007
19	Ritson Rd #16 and Beatrice St	2008 – 2012
20	Mosport Rd #20 and Scugog Rd #57	2013 – 2021
21	Bayly St #22 and Alliance Rd	2008 – 2012
22	Bayly St #22 and Westney Rd #31	2004 – 2007
23	Bayly St #22 and Monarch Av	2008 – 2012
24	Bayly St #22 and Kitney Rd	2004 – 2007
25	Victoria St #22 and Brock St #46	2008 – 2012
26	Lake Ridge Rd #23 and Dundas St #Hwy 2	2004 – 2007
27	Lake Ridge Rd #23 and 7th Concession Rd	2013 – 2021
28	Thickson Rd #26 and Nichol Av	2004 – 2007
29	Altona Rd #27 and Finch Av #37	2008 – 2012
30	Rossland Rd #28 and Cochrane St #43	2008 – 2012
31	Rossland Rd #28 and Waverly St	2013 – 2021



<b>Project Number</b>	<b>Location</b>	<b>Anticipated Timing</b>
32	Westney Rd #31 and Harwood Av #44	2004 – 2007
33	Westney Rd #31 and Rands Rd/Monarch Av	2008 – 2012
34	Westney Rd #31 and Finley Av	2008 – 2012
35	Westney Rd #31 and Fairall St/GO Station	2004 – 2007
36	Westney Rd #31 and Bramwell Dr/Ritchie Av	2004 – 2007
37	Harmony Rd #33 and Conlin Rd	2008 – 2012
38	Wilson Rd #35 and Adelaide Av #58	2004 – 2007
39	Anderson St #36 and Crawforth St	2008 – 2012
40	Whites Rd #38 and Granite Ct	2004 – 2007
41	Whites Rd #38 and 3rd Concession Rd	2013 – 2021
42	Harwood Av #44 and Kingston Rd #Hwy 2	2004 – 2007
43	Henry St #45 and Dundas St #(Hwy 2)	2008 – 2012
44	Boundary Rd #52 and Wentworth St #60	2013 – 2021
45	Stevenson Rd #53 and Laval Dr	2008 – 2012
46	Park Rd #54 and Adelaide Av #58	2008 – 2012
47	Townline Rd #55 and King St #Hwy 2	2008 – 2012
48	Waverly Rd #57 and Baseline Rd	2004 – 2007
49	Martin Rd #57 and King St #Hwy 2	2008 – 2012
50	Manning Rd #58 and Brock St #(Hwy 12)	2008 – 2012
51	Kingston Rd #Hwy 2 and Denmar Rd/Guild Rd	2008 – 2012
52	Kingston Rd #Hwy 2 and Audley Rd	2004 – 2007
53	King St #Hwy 2 and Solina Rd	2013 – 2021
54	King St #Hwy 2 and Rundle Rd	2008 – 2012
55	King St #Hwy 2 and Green Rd	2008 – 2012
56	King St #Hwy 2 and Arthur St	2008 – 2012

**Corridor Improvement Projects**

<b>Project Number</b>	<b>Project Description</b>	<b>Anticipated Timing</b>
A	Central St #5 From West of Canso Dr to Brock Rd #1	2004 – 2007
B	Consumers Dr #25 From Brock St to Highway 401 Ramps	2004 – 2007
C	Harwood Av #44 From Bayly St #22 to Kingston Rd #Hwy 2	2008 – 2012
D	Kingston Rd #Hwy 2 From Steeple Hill to Delta Blvd, from Walnut Lane to Glenanna Rd, and from Brock Rd #1 to Notion Rd	2004 – 2008
E	King St #Hwy 2 From Townline Rd #55 to Courtice Rd #34	2008 – 2012
F	King St #Hwy 2 From Maple Grove Rd to Martin Rd #57	2008 – 2012
G	Simcoe St #2 From Oshawa Creek to Conlin Road	2004 - 2007

## APPENDIX 4 – Proposed Regional Road Expansion Projects (2004 – 2021)

Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**	
Brock Rd #1	1.1	Widen from 5 to 7 lanes from Bayly St #22 to Finch Av #37 (2.0 km)	2004 – 2007 \$4,200	Addresses existing and projected capacity deficiencies in Pickering North-South sub-area resulting from growth in the Region, especially north Pickering, and the limited number of Highway 401 interchanges and crossings. Supports development of and improves access to adjacent retail/commercial land uses. Supports provision of higher-order transit service in designated Major Transit Corridor. Accommodates demand for vehicle access to and across Highway 401. Provides continuity to the widening of Kingston Rd #Hwy 2 and Bayly St #22.	Schedule C, Phase 5
	1.2	Widen from 2 to 4 lanes, with new CPR grade separation from Dellbrook Av to Taunton Rd #4 (3.3 km)	2004 – 2007 \$16,160	Addresses existing and projected capacity deficiencies in Pickering North-South sub-area resulting from growth in the Region. Supports development of the north urban areas of Pickering and Ajax, and the future Pickering airport. Addresses road safety concern with at-grade railway crossing. Supports provision of higher-order transit service in designated Major Transit Corridor. Accommodates demand for vehicle access to Highway 407.	Schedule C, Phase 5
	1.3	Widen from 4 to 6 lanes from Finch Av #37 to Taunton Rd #4 (4.3 km)	2013 – 2021 \$9,540		Schedule C, Phase 5
	1.4	Widen from 2 to 4 lanes from Taunton Rd #4 to 5th Concession Rd (1.7 km)	2008 – 2012 \$3,010		Schedule C, Phase 5
	1.5	Construct new Brougham by-pass to 2/4 lanes from 5th Concession Rd to N. limit of Brougham (3.2 km)	2008 – 2012 \$9,270	Addresses projected capacity deficiency in Pickering North-South sub-area resulting from growth in the Region. Supports development of the north urban areas of Pickering and Ajax, and the future Pickering airport. Supports provision of higher-order transit service in designated Major Transit Corridor. Accommodates demand for vehicle access to Highway 407. Mitigates societal impacts associated with increased vehicle traffic on the community of Brougham.	Schedule C, Phase 5
Simcoe St #2	2.1	Widen from 2 to 5 lanes from Conlin Rd to Winchester Rd #3 (2.0 km)	2008 – 2012 \$4,980	Addresses projected capacity deficiency in Oshawa North-South sub-area resulting from growth in the Region, especially north Oshawa, and development of the university. Supports provision of higher-order transit service in designated Major Transit Corridor. Accommodates demand for vehicle access to future Highway 407.	Schedule C (Not Started)





Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**
	2.2 Widen from 2 to 3 lanes from King St to Vanedward Dr (0.9 km)	2008 – 2012 \$2,650	Accommodates growth in auto demands resulting from residential development in Port Perry and beyond, existing and planned retail/commercial development adjacent to Simcoe St #2 and growth in recreational traffic. Provides opportunity to create a more urban character at the entry to Port Perry that encourages motorists to reduce speeds and helps to enhance the appearance. Improves road safety through provision of dedicated left-turn lane and raised median, where required. Maximizes through lane capacity.	Schedule B, Phase 5
Winchester Rd #3	3.1 Widen from 2 to 3 lanes from Baldwin St #Hwy 12 to Garrard Rd (2.4 km)	2008 – 2012 \$4,150	Accommodates growth in auto demands resulting from development in Brooklin. Improves road safety through provision of dedicated left-turn lane and raised median, where required. Maximizes through lane capacity.	Schedule C (Not Started)
Taunton Rd #4	4.1 Widen from 4 to 6 lanes from Pickering Townline Rd to Brock Rd #1 (7.5 km)	2013 – 2021 \$22,970	Addresses existing and projected capacity deficiencies in Pickering/Ajax East-West sub-area resulting from growth in the Region. Supports development in the north urban areas of Pickering, Ajax and Whitby. Provides needed inter-regional transportation capacity. Supports provision of higher-order transit service in designated Major Transit Corridor. Eliminates bottleneck between existing widened sections. Provides continuity to the widening of Westney Rd #31 and Lake Ridge Rd#23.	Schedule C (Not Started)
	4.2 Widen from 2 to 5 lanes from W. of Church St to Brock St #Hwy 12 (8.5 km)	2004 – 2007 \$22,900		Schedule C, Phase 5
	4.3 Widen from 5 to 7 lanes from Brock Rd #1 to Brock St #Hwy 12 (11.3 km)	2013 – 2021 \$31,000		Schedule C (Not Started)
	4.4 Widen from 4 to 5 lanes from Simcoe St #2 to Mary St (0.5 km)	2004 – 2007 \$700	Addresses concerns with safety and efficiency of access to adjacent lands through provision of dedicated left-turn lane and raised median, where required. Maximizes through lane capacity. Supports provision of higher-order transit service in designated Major Transit Corridor.	Schedule C, Phase 5
	4.5 Widen from 2 to 5 lanes from E. of Harmony Rd #33 to Townline Rd #55 (1.2 km)	2004 – 2007 \$4,270	Addresses existing and projected capacity deficiencies in Oshawa East-West sub-area resulting from growth in the Region, especially north Oshawa and Clarington. Supports provision of higher-order transit service in designated Major Transit Corridor.	Schedule C, Phase 5
	4.6 Widen from 2 to 4 lanes from Townline Rd #55 to E. of Courtice Rd #34 (3.3 km)	2013 – 2021 \$6,600		Schedule C (Not Started)

Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**
Liberty St #14	14.1 Widen from 2 to 3/4 lanes from Baseline Rd to King St (Hwy 2) (1.1 km)	2004 – 2007 \$1,100	Addresses concerns with safety and efficiency of access to adjacent lands through provision of dedicated left-turn lane and raised median, where required. Maximizes through lane capacity. Requires further study to determine final lane configuration.	Schedule B (Not Started)
Ritson Rd #16	16.1 Widen from 2/3 to 5 lanes from Taunton Rd #4 to Conlin Rd (1.9 km)	2008 – 2012 \$5,100	Addresses projected capacity deficiency in Oshawa North-South sub-area resulting from growth in the Region, especially north Oshawa. Accommodates demand for vehicle access to future Highway 407.	Schedule C (Not Started)
	16.2 Widen from 2 to 4 lanes from Conlin Rd to Winchester Rd #3 (2.3 km)	2013 – 2021 \$4,450		Schedule C (Not Started)
Bayly St/ Victoria St/ Bloor St #22	22.1 Widen from 5 to 7 lanes from Brock Rd #1 to Westney Rd #31 (2.7 km)	2013 – 2021 \$7,400	Addresses existing and projected capacity deficiencies in the Pickering/Ajax East-West sub-area resulting from growth in the Region. Supports development in the south urban areas of Ajax and Whitby for both residential and employment uses. Eliminates bottleneck between existing widened sections. Provides continuity to the widening of several north-south roads, including Brock Rd #1, Westney Rd #31, Salem Rd #41 and Lake Ridge Rd#23.	Schedule C (Not Started)
	22.2 Widen from 5 to 7 lanes from Westney Rd #31 to Harwood Av #44 (1.4 km)	2013 – 2021 \$3,280		Schedule C (Not Started)
	22.3 Widen from 2 to 4/5 lanes from Shoal Point Rd to Seaboard Gt (3.4 km)	2004 – 2007 \$4,150		Schedule C (Not Started)
	22.4 Construct new alignment and widen from 2 to 5 lanes from South Blair St to E. of Thickson Rd #26 (2.2 km)	2004 – 2007 \$2,900	Addresses existing and projected capacity deficiencies in the Whitby East-West sub-area resulting from growth in the Region. Supports development in the south urban area of Whitby for both residential and employment uses. Improves road safety by eliminating geometric deficiencies associated with tight curves. Eliminates bottleneck between existing widened sections. Provides continuity to the widening of several north-south roads, including the future Hopkins St #36 grade separation of Highway 401 and Thickson Rd #26. Requires further study to determine final project limits. Anticipated cost is for widening from E. of Thickson Rd #26 and Thornton Rd.	Schedule C, Phase 5
	22.5 Widen from 2/3 to 5 lanes from E. of Thickson Rd #26 to W. of Stevenson Rd #53 (1.8 km)	2008 – 2012 \$3,670		Schedule C (Not Started)
	22.6 Widen from 4 to 5 lanes from Merritt St to Ritson Rd #16 (0.4 km)	2004 – 2007 \$1,230	Addresses projected capacity deficiency in Oshawa East-West sub-area resulting from growth in the Region, especially east Oshawa. Improves safety and efficiency of access to adjacent retail/commercial land uses	Schedule A, Phase 5



Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**
	22.7 Widen from 3 to 5 lanes from Ritson Rd #16 to Farewell St #56 (1.0 km)	2013 – 2021 \$2,510	through provision of dedicated left-turn lane and raised medians, where required. Eliminates bottleneck between existing widened sections.	Schedule C (Not Started)
	22.8 Construct new alignment to 4 lanes, with new CPR grade separation and bridge crossing of Farewell Creek from Harmony Rd #33 to Townline Rd (1.4 km)	2008 – 2012 \$10,380	Addresses existing and projected capacity deficiencies in Oshawa East-West sub-area resulting from growth in the Region, especially east Oshawa and south Clarington (Courtice). Addresses road safety concern with at-grade railway crossing. Improves road safety by eliminating geometric deficiencies associated with tight curves and jog in alignment. Provides continuity to the widening/extension of Townline Rd #55. Supports development of future GO Transit station.	Schedule C (Not Started)
	22.9 Widen from 2 to 3 lanes and improve profile from Townline Rd to Courtice Rd #34 (2.9 km)	2008 – 2012 \$4,890		Schedule C (Not Started)
Lake Ridge Rd #23	23.1 Widen from 2 to 5 lanes from Bayly St #22 to Kingston Rd #Hwy 2 (2.0 km)	2013 – 2021 \$4,240	Addresses projected capacity deficiency in Whitby North-South sub-area resulting from growth in the Region, especially east Ajax and west Whitby. Accommodates demand for vehicle access to new Highway 401 interchange and across the freeway. Provides important connection to northern areas of the Region. Offers alternate route to Brock Street (former Highway 12) for heavy vehicle traffic. Provides continuity to the widening of Kingston Rd #Hwy 2.	Schedule C (Not Started)
	23.2 Widen from 2 to 5 lanes from Kingston Rd #Hwy 2 to Taunton Rd #4 (3.8 km)	2008 – 2012 \$8,030		Schedule C (Not Started)
Consumers Dr #25	25.3 Widen from 2 to 5 lanes and construct new connection to 2 lanes from W. of Thickson Rd #26 to Thornton Rd #52 (1.7 km)	2004 – 2007 \$3,660	Addresses projected capacity deficiency in Oshawa East-West sub-area resulting from growth in the Region. Supports development of and improves access to employment lands and retail/commercial uses in south urban areas of Whitby and Oshawa. Improves road safety by eliminating geometric deficiencies associated with the tight curves. Provides continuity to the widening of Thornton Rd #52 and potentially a connection to Stevenson Rd #53 and the new Highway 401 interchange.	Schedule C, Phase 4
Thickson Rd #26	26.1 Widen from 2 to 4 lanes from Wentworth St #60 to CNR Kingston (0.6 km)	2008 – 2012 \$1,080	Addresses existing and projected capacity deficiencies in Whitby North-South sub-area resulting from growth in the Region and the limited number of Highway 401 interchanges and crossings. Supports development of the south and north urban areas of Whitby and Oshawa	Schedule B (Not Started)



Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**	
26.2	Widen from 5 to 7 lanes from Victoria St #22 to Consumers Dr #25 (0.8 km)	2004 – 2007 \$1,300	and improves access to adjacent retail/commercial land uses. Accommodates demand for vehicle access to and across Highway 401 and to future Highway 407.	Schedule C, Phase 4	
26.3	Widen from 5 to 7 lanes from Consumers Dr #25 to Dundas St (Hwy 2) (1.6 km)	2013 – 2021 \$11,590		Schedule C (Not Started)	
26.4	Widen from 3 to 5 lanes from Rossland Rd #28 to Taunton Rd #4 (1.9 km)	2008 – 2012 \$4,210		Schedule C (Not Started)	
26.5	Widen from 2 to 5 lanes from Taunton Rd #4 to Winchester Rd #3 (4.2 km)	2013 – 2021 \$9,320		Schedule C (Not Started)	
26.6	Widen from 2 to 5 lanes from Winchester Rd #3 to Columbus Rd (1.9 km)	2013 – 2021 \$4,460		Schedule C (Not Started)	
Altona Rd #27	27.1	Widen from 2 to 4 lanes from Kingston Rd #Hwy 2 to Sheppard Av (1.2 km)	Addresses existing and projected capacity deficiencies in Pickering North-South sub-area resulting from growth in the Region, especially west and north Pickering, and road network discontinuity at the west Durham boundary. Improves road safety with elimination of at-grade railway crossing.	Schedule C, Phase 4	
	27.2	Widen from 2 to 4 lanes from Sheppard Av to Finch Av #37 (2.0 km)		2008 – 2012 \$5,630	Schedule C, Phase 4
	27.3	Widen from 2 to 4 lanes from Finch Av #37 to Taunton Rd #4 (2.8 km), with new CPR grade separation		2013 – 2021 \$8,460	Schedule C (Not Started)
	27.4	Widen from 2 to 4 lanes from Taunton Rd #4 to 14th Av Extension (2.0 km)		2013 – 2021 \$3,330	Schedule C (Not Started)



Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**
Rossland Rd #28	28.1 Widen from 3 to 5 lanes from Ritson Rd #16 to Harmony Rd #33 (1.7 km)	2008 – 2012 \$4,830	Addresses projected capacity deficiency in Oshawa East-West sub-area resulting from growth in the Region, especially north Oshawa. Improves network operations and road safety by alleviating unnecessary turning movements caused by road network discontinuity in the east Oshawa/west Clarington area. Provides road connection through developing area. Provides opportunities for emergency service, transit service, cycling and pedestrian movements across creek.	Schedule C (Not Started)
	28.2 Construct new bridge crossing of Harmony Creek tributary and widen from 2 to 3 lanes from Harmony Rd #33 to Townline Rd #55 (1.8 km)	2008 – 2012 \$7,210		Schedule C, Phase 4
Liverpool Rd #29	29.1 Widen from 5 to 6 lanes from Hwy 401 to Kingston Rd #Hwy 2 (0.4 km)	2013 – 2021 \$1,300	Addresses projected capacity deficiency in Pickering North-South sub-area resulting from growth in the Region, especially north Pickering, and the limited number of Highway 401 interchanges and crossings. Supports development of and improves access to adjacent retail/commercial land uses. Accommodates demand for vehicle access to Highway 401.	Schedule B (Not Started)
Westney Rd #31	31.1 Widen from 5 to 6 lanes from Bayly St #22 to Hwy 401 (1.1 km)	2013 – 2021 \$1,620	Addresses projected capacity deficiency in Ajax North-South sub-area resulting from growth in the Region and the limited number of Highway 401 interchanges and crossings. Supports development of the north urban area of Ajax. Accommodates demand for vehicle access to and across Highway 401.	Schedule C (Not Started)
	31.2 Widen from 4 to 6 lanes from Hwy 401 to Kingston Rd #Hwy 2 (0.9 km)	2013 – 2021 \$2,680		Schedule C (Not Started)
	31.3 Widen from 3 to 4 lanes from Delaney Dr to Rossland Rd (0.9 km)	2008 – 2012 \$1,190		Schedule B (Not Started)
	31.4 Widen from 2 to 4 lanes from Rossland Rd to Taunton Rd #4 (2.0 km)	2008 – 2012 \$2,350		Schedule C (Not Started)
	31.5 Construct new Greenwood bypass to 2 lanes from S. of Greenwood to N. of Greenwood (2.4 km)	2008 – 2012 \$4,610		Supports development of the north urban areas of Pickering and Ajax. Accommodates demand for vehicle access to Highway 407. Mitigates societal impacts associated with increased vehicle traffic on the community of Greenwood.

Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**	
Harmony Rd #33	33.1	Widen from 3 to 4/5 lanes from Olive Av #59 to Adelaide Av #58 (1.8 km)	2004 – 2007 \$3,140	Addresses existing and projected capacity deficiencies in Oshawa North-South sub-area resulting from growth in the Region, especially north Oshawa, and the limited number of Highway 401 interchanges and crossings. Supports development of north urban area of Oshawa and improves access to adjacent retail/commercial land uses. Accommodates demand for vehicle access to Highway 401 and future Highway 407. Requires further study to determine final lane configuration. Anticipated cost is for widening from 3 to 4 lanes.	Schedule C, Phase 5
	33.2	Widen from 3 to 5 lanes from Adelaide Av #58 to Rossland Rd #28 (1.1 km)	2004 – 2007 \$1,750		Schedule C, Phase 5
	33.3	Widen from 3 to 5 lanes from Rossland Rd #28 to Taunton Rd #4 (2.1 km)	2008 – 2012 \$4,540		Schedule C (Not Started)
	33.4	Widen from 2 to 4 lanes from Taunton Rd #4 to Conlin Rd (2.0 km)	2008 – 2012 \$3,650		Schedule C (Not Started)
Wilson Rd #35	35.1	Widen from 3 to 4 lanes from Bloor St #22 to Bond St (Hwy 2) (2.2 km)	2013 – 2021 \$5,230	Addresses capacity deficiency in Oshawa North-South sub-area resulting from growth in the Region, especially north Oshawa, and the limited number of Highway 401 interchanges and crossings. Improves access to adjacent retail/commercial land uses. Accommodates demand for vehicle access across Highway 401.	Schedule C (Not Started)
Hopkins St #36	36.1	Widen from 2 to 5 lanes, with new CPR grade separation from Consumers Dr #25 to Dundas St (Hwy 2) (1.6 km)	2008 – 2012 \$9,370	Addresses projected capacity deficiency in Whitby North-South sub-area resulting from growth in the Region, especially north Whitby, and the limited number of Highway 401 interchanges and crossings. Supports development of and improves access to adjacent retail/commercial land uses. Addresses road safety concern with at-grade railway crossing. Accommodates demand for vehicle access across Highway 401.	Schedule C (Not Started)
Finch Av #37	37.1	Widen from 2 to 3 lanes from Altona Rd #27 to Brock Rd #1 (5.8 km)	2008 – 2012 \$9,470	Accommodates growth in auto demands resulting from development in north Pickering. Improves road safety and access to adjacent lands through provision of dedicated left-turn lane and raised median, where required. Maximizes through lane capacity. Connects recent intersection improvements designed to support widening.	Schedule C (Not Started)
Whites Rd #38	38.1	Widen from 4 to 6 lanes from Bayly St #22 to Kingston Rd #Hwy 2 (0.7 km)	2013 – 2021 \$4,750	Addresses projected capacity deficiency in Pickering North-South sub-area resulting from growth in the Region, the limited number of Highway 401 interchanges and crossings, and the road network discontinuity at the west Durham boundary. Supports	Schedule C (Not Started)

Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**
	38.2 Widen from 5 to 6 lanes from Kingston Rd #Hwy 2 to Finch Av #37 (2.4 km)	2013 – 2021 \$4,790	development of the north urban area of Pickering and the future Pickering airport, and improves access to adjacent retail/commercial land uses. Improves road safety by eliminating at-grade railway crossing. Supports provision of higher-order transit service in designated Major Transit Corridor. Provides continuity to Bayly Street #22. Accommodates demand for vehicle access to and across Highway 401 and to Highway 407 once an interchange is constructed. Requires further study to confirm alignment north of 3 <sup>rd</sup> Concession Rd.	Schedule C (Not Started)
	38.3 Widen from 2 to 5 lanes, with new CPR grade separation from Finch Av #37 to 3rd Concession Rd (2.0 km)	2013 – 2021 \$11,050		Schedule C (Not Started)
	38.4 Provide 4 lanes of additional capacity across West Duffins Creek	2013 – 2021 \$30,640 for new crossing		Schedule C (Not Started)
	38.5 Construct new connection from Taunton Rd #4 to Hwy 7	Undefined		
Thornton Rd #52	52.1 Widen from 2 to 3 lanes from Champlain Av #25 to King St (Hwy 2) (1.8 km)	2008 – 2012 \$2,990	Supports development of and improves access to employment lands and retail/commercial uses in south urban areas of Whitby and Oshawa. Improves road safety through provision of dedicated left-turn lane and raised median, where required. Maximizes through lane capacity. Provides continuity to the extension of Consumers Dr #25. Consider reconstructing a new CPR grade separation as part of project during the Class EA study.	Schedule C (Not Started)
Stevenson Rd #53	53.1 Widen from 4 to 6 lanes from Hwy 401 to Bond St (Hwy 2) (1.8 km)	2008 – 2012 \$2,200	Addresses projected capacity deficiency in Oshawa North-South sub-area resulting from growth in the Region, especially in north Oshawa and north Whitby, and the limited number of Highway 401 interchanges and crossings. Supports development and improves access to adjacent retail/commercial land uses. Improves road safety through provision of dedicated left-turn lane and raised median, where required. Maximizes through lane capacity. Accommodates demand for vehicle access to Highway 401. Supports future development/re-development of the Oshawa airport and ultimate extension of road through the airport lands. Requires further study to determine final lane configuration and project limits. Anticipated cost is for widening from 4 to 5 lanes between Gibb St #59 and Bond St (Hwy 2).	Schedule C (Not Started)
	53.2 Widen from 3/4 to 5 lanes from Bond St (Hwy 2) to Rossland Rd #28 (2.0 km)	2008 – 2012 \$4,370		Schedule C (Not Started)

Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**
Townline Rd #55	55.1 Construct new bridge crossing of Farewell Creek, with widening of approach roads from 2 to 3 lanes from Bloor St #22 to Olive Av #59 (1.0 km)	2013 – 2021 \$15,900	Addresses projected capacity deficiency in Oshawa North-South sub-area resulting from growth in the Region, especially northeast Oshawa and west Clarington. Addresses neighbourhood traffic concerns, relieves adjacent routes and reduces circuitous travel due to road network discontinuity in the east Oshawa/west Clarington area. Provides opportunities for transit service, cycling and pedestrian movements across creek. Improves road safety through provision of dedicated left-turn lane and raised median, where required. Maximizes through lane capacity. Accommodates demand for vehicle access to Highway 401. Provides continuity to the widening of Bloor St #22.	Schedule C (Not Started)
	55.2 Widen from 2 to 4 lanes from Adelaide Ave #58 to Pebblestone Rd (1.1 km)	2008 – 2012 \$2,200	Addresses projected capacity deficiency in Oshawa North-South sub-area resulting from growth in the Region, especially north Oshawa. Supports development of the north urban area of Oshawa and Courtice urban area of Clarington. Accommodates demand for vehicle access to future Highway 407. Provides continuity to the extension of Rossland Rd #28.	Schedule C (Not Started)
	55.3 Widen from 2 to 4 lanes from Pebblestone Rd to Taunton Rd #4 (2.1 km)	2013 – 2021 \$3,290		Schedule C (Not Started)
Waverly Rd/ Martin Rd #57	57.1 Widen from 2 to 4 lanes from Hwy 401 to King St #Hwy 2 (2.0 km)	2008 – 2012 \$3,720	Addresses projected capacity deficiency resulting from growth in central Clarington and the limited number of Highway 401 interchanges and crossings. Supports development of the Bowmanville urban area and improves access to adjacent retail/commercial land uses. Accommodates demand for vehicle access to Highway 401.	Schedule C (Not Started)
Manning Rd/ Adelaide Av #58	58.1 Construct new connection to 3 lanes, with new crossing of Corbett Creek from Garrard Rd to Thornton Rd #52 (0.9 km)	2004 – 2007 \$3,140	Addresses projected capacity deficiency in Oshawa East-West sub-area resulting from growth in the Region, especially northeast Whitby and northwest Oshawa. Improves network operations and road safety by alleviating unnecessary turning movements caused by road network discontinuity in the east Whitby/west Oshawa area. Improves access to Oshawa General Hospital. Provides opportunities for emergency service, transit service, cycling and pedestrian movements across creek.	Schedule C, Phase 4
	58.2 Widen from 2 to 3 lanes from Townline Rd #55 to Trulls Rd, after road is constructed (2.0 km)	2008 – 2012 \$1,270	Accommodates projected growth in auto demands resulting from development in Courtice. Provides options and relieves adjacent routes in the east Oshawa/west Clarington area. Improves road safety and access to adjacent lands through provision of dedicated left-turn lane and raised median, where required. Maximizes through lane capacity.	Schedule C, Phase 4



Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**
Gibb St/ Olive Av #59	59.1 Widen from 3 to 4 lanes from E. of Stevenson Rd #53 to Park Rd #54 (0.3 km)	2008 – 2012 \$700	Accommodates projected growth in auto demands resulting from development in the Oshawa area. Supports development and improves access to nearby retail/commercial land uses in the Oshawa Centre area and the evolving Stevenson Rd #53/Highway 401 district. Eliminates bottleneck between existing widened sections.	Schedule B (Not Started)
	59.2 Construct new connection and widen from 2/3 lanes to 3/4 lanes from Park Rd #54 to Ritson Rd #16 (1.4 km)	2008 – 2012 \$2,840	Accommodates projected growth in auto demands resulting from development in the Oshawa area. Addresses neighbourhood traffic concerns, relieves adjacent routes and reduces circuitous travel caused by road network discontinuity and improves network operations and road safety by alleviating unnecessary turning movements. Provides opportunity for redevelopment of affected lands. Requires further study to determine final lane configuration and project limits. Anticipated cost is for constructing new connection to 3 lanes between Simcoe St #2 and Ritson Rd #16.	Schedule C (Not Started)
14 <sup>th</sup> Av Extension	99.1 Construct new connection to 4 lanes, with new bridge crossing of West Duffins Creek from York/Durham Line to Brock Rd #1 (7.2 km)	2013 – 2021 \$32,030	Addresses projected capacity deficiencies in Pickering/Ajax East-West sub-area resulting from growth in the Region and road network discontinuity at the west Durham boundary. Supports development in the north urban areas of Pickering and Ajax. Provides needed inter-regional transportation capacity.	Schedule C (Not Started)
In the Vicinity of Sideline 22	99.2 Construct new connection from Taunton Rd #4 to Hwy 7	Undefined		
Kingston Rd/ King St #Hwy 2	102.2 Widen from 4 to 6 lanes from Pickering/Toronto Boundary to Whites Rd #38 (2.1 km)	2013 – 2021 \$8,630	Addresses projected capacity deficiencies in the Pickering/Ajax East-West sub-area resulting from growth in the Region. Supports development in the south urban areas of Pickering, Ajax and Whitby for both residential and employment uses, and improves access to nearby retail/commercial land uses. Supports provision of higher-order transit service in designated Major Transit Corridor. Eliminates bottleneck between existing widened sections in Ajax and the widening of several north-south roads, including Altona Rd #27, Whites Rd #38, Liverpool Rd #29, Brock Rd #1, Westney Rd #31 and Salem Rd #41. Provides needed inter-municipal transportation connection.	Schedule C (Not Started)
	102.3 Widen from 5 to 7 lanes from Whites Rd #38 to Brock Rd #1 (4.7 km)	2013 – 2021 \$17,990		Schedule C, (Not Started)
	102.4 Widen from 5 to 7 lanes from Westney Rd #31 to Audley Rd (3.9 km)	2008 – 2012 \$7,030		Schedule C (Not Started)

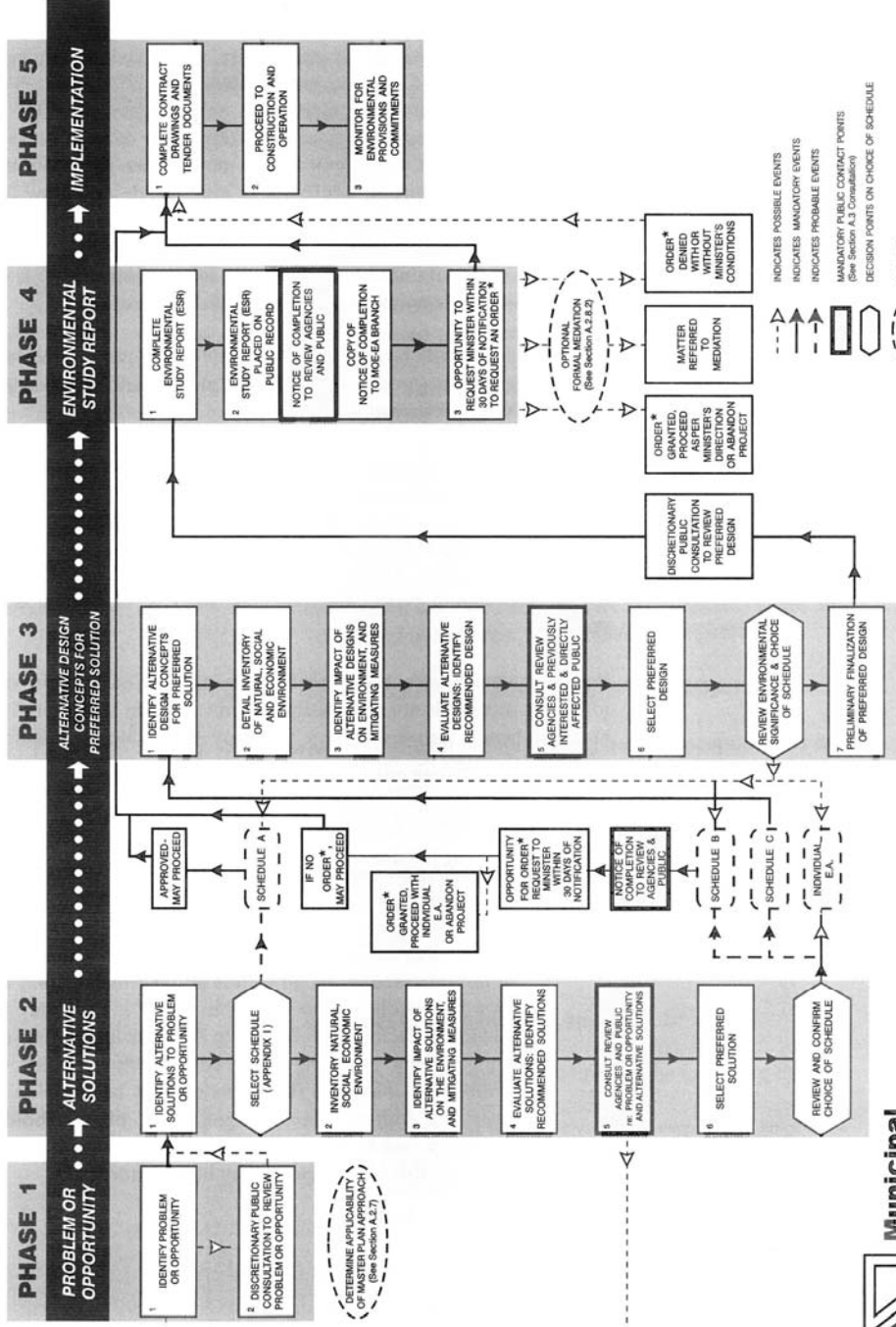
Project Description		Anticipated Timing and Cost (000's)*	Rationale	EA Status**
Brock St/ Baldwin St #Hwy 12	112.1 Widen from 3 to 5 lanes from Rossland Rd #28 to Taunton Rd #4 (1.7 km)	2008 – 2012 \$3,900	Addresses projected capacity deficiencies in Whitby North-South sub-area resulting from growth in the Region and the limited number of Highway 401 interchanges and crossings. Supports development of the northern urban areas of Whitby and improves access to adjacent retail/commercial land uses. Supports provision of higher-order transit service in designated Major Transit Corridor. Accommodates demand for vehicle access to future Highway 407. Eliminates bottleneck between existing widened sections.	Schedule C (Not Started)
	112.2 Widen from 2 to 4 lanes from Taunton Rd #4 to Garden St (3.1 km)	2013 – 2021 \$5,070		Schedule C (Not Started)
Toronto St #Hwy 47	147.1 Widen from 2 to 4 lanes, with re-alignment at Goodwood, from York/Durham Line #30 to Goodwood Rd #21 (3.4 km)	2013 – 2021 \$5,980	Accommodates projected growth in auto demands resulting from development in the northern part of the Region, primarily Uxbridge and Port Perry. Addresses impact of two streams traffic, from Highway 47 to the northeast and from Goodwood Rd #21 to the east, converging into one facility. With re-alignment at Goodwood, achieves ROP objective of creating a continuous Type A arterial road. Improves access to adjacent employment lands and enhances goods movement, especially for aggregate resource material.	Schedule C (Not Started)
	147.2 Widen from 2 to 3 lanes from Wellwood Dr to Campbell Dr (1.3 km)	2008 – 2012 \$1,360		

\* 2003 estimate.

\*\* Current or anticipated schedules and phases are correct to the date of consolidation and as per the Municipal Class Environmental Assessment (EA) Planning and Design Process (Attachment 1 of Appendix 4) of the Environmental Class Assessment, June 2000.

# MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA



## APPENDIX 5 – Glossary of Terms

**Activity Centres:** Compact, transit-oriented, pedestrian-friendly areas where the highest concentrations of residential, employment retail and other uses in the urban area are located.

**Ajax-Pickering Transit Authority (APTA):** The identity of the public transit system operated in the City of Pickering and the Town of Ajax through a joint effort of the two municipalities. APTA also provides specialized door-to-door transit service for persons with disabilities in Ajax and Pickering.

**Arterial Roads:** Roads designated in the *Durham Regional Official Plan* to accommodate the efficient movement of large and moderate volumes of vehicular traffic, including transit service, and providing continuous routes.

**Asset Management Strategy:** Measures to preserve the physical integrity of infrastructure by managing its condition and determining optimal reinvestment and renewal schedules.

**Bus Lane:** A roadway lane dedicated for use by public transit vehicles that may be open to mixed traffic during some hours of the day or days of the week.

**Bus Rapid Transit (BRT):** Fast, frequent, limited-stop bus service that operates within an exclusive right-of-way or with priority measures over mixed traffic in shared corridors.

**Carpool:** A vehicle with two or more occupants who are ridesharing.

**Central Areas:** Areas designated in the *Durham Regional Official Plan* to be developed as the main concentration of activities within urban areas, offering a broad mix of higher intensity land uses (i.e., employment, retail, housing, recreation, cultural, and entertainment uses).

**Collector Roads:** Roads designed to carry lower volumes of vehicular traffic, providing continuous access across neighbourhoods.

**Community Advisory Committee (CAC):** A group of individuals comprising members of the public and representatives of interested organizations formed to provide input and feedback into the Durham Mobility Study.

**Community Strategic Plan:** A broad plan, developed through extensive public consultation and adopted by Durham Regional Council, which lays out a vision for the future of Durham Region through the development of objectives and related actions to be undertaken over the next 3 to 5 years.

**Community Transportation:** Transportation services typically developed and provided by non-profit organizations through partnerships with public, private, non-profit, and volunteer resources and services, that respond to the unmet needs of persons who have a transportation disadvantage.



**Commuter Parking Lot:** A location for carpool participants to park their cars and consolidate into one vehicle, usually located at or beyond the edge of the urban area.

**Commuter Rail:** Inter-regional transit service, typically heavy rail, that operates between suburban communities and the Central Business District (CBD) with fewer stops and a more express type service.

**Cordon:** An imaginary line composed of one or more *screenlines*, usually enclosing a geographic area.

**Corridor Improvement:** Road construction project involving the addition of turn lanes, medians urbanization, streetscaping and/or traffic control measures to address road safety and/or operational need. May involve rehabilitation and reconstruction, but these activities are typically not the primary focus.

**Conventional Transit:** The provision of public transit services designed for most transit users.

**Development Charges:** Charges levied by the Regional Municipality of Durham and its local municipalities on new development to help pay for the planning and construction of growth-related infrastructure in accordance with the Development Charges Act.

**Durham Mobility Study:** The process of developing working papers, involving the public and conducting background research that led to the development of the Transportation Master Plan.

**Durham Regional Official Plan:** Defines the intent of Regional Council in the guidance of growth and development in the Regional Municipality of Durham, as mandated by the Planning Act.

**Environmental Assessment:** A planning process that is mandated by provincial and federal legislation, and that requires the systematic identification and mitigation of the effects of infrastructure projects on all aspects of the environment.

**Freeways:** Divided multi-lane highways, operating at high speeds, which permit vehicular access only through the use of entrance and exit ramps and are under the jurisdiction of the Province of Ontario.

**GO Transit:** The identity of the public transit system provided by the Province of Ontario for interregional transit services across the Greater Toronto Area (GTA).

**Green Fleet:** Used to describe vehicles that are more energy efficient and less polluting than conventional vehicles.

**Greater Toronto Area (GTA):** The Greater Toronto Area consists of the Regions of Durham, Halton, Peel and York and their local municipalities, and the City of Toronto.

**Handi-Trans:** Identity of the specialized door-to-door *paratransit* service provided for mobility-impaired persons in Oshawa, Whitby, Clarington, Scugog and Uxbridge.



**High Occupancy Vehicle (HOV) lane:** A roadway lane dedicated for use by *carpools* meeting minimum occupancy criteria (usually two or three persons) and buses, that may be open to mixed traffic at some hours of the day or days of the week, and that may also be open to other vehicles such as taxis or bicycles.

**Highways:** Roads under the jurisdiction of the Province of Ontario, managed by the Ministry of Transportation, which serve an *arterial road* function.

**Intelligent Transportation Systems (ITS):** A broad range of diverse and emerging technologies that are applied to make the transportation system safer and more efficient (e.g., adaptive traffic signals and changeable electronic message signs).

**Level of Service:** An indicator of the quality of operating conditions that may be applied to cycling or walking facilities (to reflect connectivity, convenience and comfort), transit service (to reflect speed, reliability and frequency) or roadways (to reflect the ratio of vehicle demand to roadway capacity, and resultant delay).

**Life-cycle Cost Analysis:** An economic analysis procedure used to compare alternative infrastructure management strategies over an extended period of time, taking into account the total cost incurred for initial construction and all subsequent maintenance and rehabilitation.

**Light Rail Transit (LRT):** Rail transit technology capable of operating in a variety of physical environments, ranging from exclusive right-of-way to mixed traffic environments on public streets, as single vehicles or multiple-vehicles.

**Local or Area Municipality:** An incorporated city, town, township, or municipality within Durham Region.

**Local Roads:** Roads designed to carry low traffic volumes, at low speeds, which are intended primarily to provide access to abutting land uses.

**Mainstreet:** *Arterial roads* found in denser urban or village areas, typically featuring *mixed-use development* in a continuous edge of more closely set low and mid-rise buildings and supporting several modes of transportation, especially transit. In Durham, the former Highway 2 is the most significant *mainstreet* and *Major Transit Corridor*, as it connects the populated urban centers along the lakeshore together.

**Major Transit Corridor:** *Arterial roads* that facilitate the highest levels of inter-regional and inter-municipal transit service, linking *Transportation Centres* and *Main Central Areas*, and intersecting with *Minor Transit Corridors*.

**Minor Transit Corridor:** *Arterial roads* which facilitate moderate to high levels of inter-municipal and local municipal transit service, intersecting with *Major Transit Corridors*.

**Mixed-use Development:** Areas characterized by a wide variety of shopping, employment, entertainment, light industrial, and residential uses.

**Modal Share:** The percentage of person-trips made by one travel mode, relative to the total number of person-trips made by all modes.

**Modal Split:** The percentage of person-trips made by either transit or automobile, relative to the total number of person-trips made by motorized modes (i.e., transit and automobile combined).

**Pathway System:** Off-road facilities for travel by walking, cycling and other modes such as in-line skating, that serve both recreational and utilitarian travel needs.

**Oshawa Transit Commission (OTC):** The identity of the City of Oshawa’s public transit system.

**Paratransit:** The provision of transit services through diverse means, either private or public, such as vanpools, school buses, taxis, rental cars, dial-a-ride, and special needs vehicles.

**Pavement Condition Index (PCI):** A measure of the condition of the road surface and underlying structure based on field assessments.

**Peak Hour:** The hour of greatest person-trip demand within a given morning or afternoon *peak period*.

**Peak Period:** A period, typically three hours in length, of high person-trip demand on weekday mornings and afternoons.

**Performance Measurement:** Monitoring of indicators that enable an understanding of conditions, actions and impacts that help to determine progress towards the *Transportation Vision*.

**Person-trip:** A trip made by one person using any mode of travel.

**Rapid Transit:** Fast, frequent, high-capacity transit service provided using either bus or rail technology, operating in an exclusive right-of-way or otherwise undelayed by mixed traffic in shared corridors.

**Reconstruction:** Road construction project involving the removal of all surface layer materials and possible substantial changes to base and subbase layer materials.

**Rehabilitation:** Actions taken to restore initial pavement serviceability, such as pavement overlay or insitu recycling. Pavements may receive several rehabilitation treatments (or undergo several rehabilitation cycles) before they are reconstructed.

**Regional Roads:** Roads under the jurisdiction of the Regional Municipality of Durham, the majority of which serve an *arterial road* function.



**Regional Transit Task Force (RTTF):** An advisory committee comprised of members of Durham Regional Council appointed to direct the development of the *Transit Improvement Plan*.

**Ridesharing:** Shared use of a motor vehicle by two or more persons to make a trip when they would otherwise travel separately.

**Safety Management Strategy:** A co-ordinated series of measures and actions designed to improve road safety that combine engineering, education, and enforcement initiatives.

**Screenline:** An imaginary or actual physical barrier used as a control location to examine major traffic flows.

**Specialized Transit:** The provision of transit services designed specifically for elderly or mobility-impaired users.

**Steering Committee:** An advisory committee comprised of members of Durham Regional Council and senior Regional staff appointed to direct the *Durham Mobility Study*.

**Strategic Goods Movement Network:** A network of designated roadways that have been identified as the primary routes for heavy vehicle and designed and constructed to permit and withstand their use at all times of the year.

**Traffic Management:** A series of enforcement and physical measures used to mitigate the undesirable effects of vehicle travel through communities, which include excessive volumes and speeds, aggressive driver behaviour, and unfavourable conditions for walking and cycling.

**Transit Corridor Districts:** Areas of street-oriented uses that incorporate a mix of retail, employment and residential uses, developed at medium densities, located along *arterial roads* serving as major transit routes.

**Transit Improvement Plan (TIP):** A short-term action plan and a long-term strategic plan to increase transit ridership and usage in Durham Region over the next 20 years, addressing *conventional* and *specialized transit* services on a region-wide basis.

**Transit Priority Measures:** Strategies that increase transit operating speeds and transit travel time reliability in mixed traffic, such as traffic signal priority or queue jumps.

**Transit Priority Network:** A co-ordinated and integrated inter-municipal and inter-regional transit system comprised of *Major* and *Minor Transit Corridors*, *commuter (GO) rail* links, Transportation Centres future Highway 407 Transitway, and future Highway 401 Bus Rapid Transit (BRT) system through a series of transportation centers

**Transitway:** A *rapid transit* facility designed for the exclusive use of buses and other authorized vehicles.



**Transportation Centre:** An area that may be on or near lands that are designated for high-density commercial, retail, or mixed-use development defined to facilitate transfers between different modes of travel or between transit services, which provide for sufficient parking and passenger facilities.

**Transportation Demand Management (TDM):** A co-ordinated series of actions aimed at maximizing the people-moving capability of the transportation system, through means such as encouraging individuals to reduce the number of trips they make, travel more often by non-driving alternatives, travel outside peak periods, and shorten the length of their trips.

**Transportation Disadvantaged:** Individuals who are unable to drive due to physical and/or financial reasons, and must rely on *conventional transit*, *specialized transit*, or other transportation services.

**Transportation System Management (TSM):** A range of strategies that maximize the efficient operation of the road system through operational measures and localized infrastructure modifications for the benefit of all modes of travel.

**Transportation Vision:** An expression of what a desirable future transportation system might look like, and how it can benefit the community.

**(Designated) Urban Area:** The area defined in the Durham Regional Official Plan that is situated within the urban area boundary.

**Volume to Capacity (V/C) Ratio:** The measured or estimated volume of traffic for a given period of time (e.g., vehicles per hour) and road facility, divided by the capacity of that road facility based on design criteria such as the number of lanes and operational speeds.

