GO Train Lakeshore East Extension through Central Oshawa to Bowmanville

Economic Impact Analysis

Independent Real Estate Intelligence

April 2016

Altus Group

ARUP

GO Train Lakeshore East Extension through Central Oshawa to Bowmanville Economic Impact Analysis

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1 INTRODUCTION

Arup and Altus Group Economic Consulting were retained by dLAB (a partnership of Durham College, the University of Ontario Institute of Technology, Trent University Durham, River Oaks Group and Halloway Developments), the City of Oshawa, and the Municipality of Clarington, to assess the economic challenges and benefits to local municipalities, the Region of Durham, and Canada as a whole, associated with investing in the extension of GO train services through Central Oshawa to Bowmanville.

Our clients wish to acknowledge and thank Halminen Homes, the County of Northumberland, the Municipality of Port Hope and the Town of Cobourg who each also contributed to financing this study.

The scope of this Economic Impact Analysis report is to identify potential impacts of the project on economic activity in the Region of Durham and surrounding area. This report is a precursor to an eventual Business Case study, which will provide a more robust and rigorous study of the benefits and costs of the project.

1.1 BACKGROUND

1.1.1 Description of Project

The GO Lakeshore East extension project, according to the February 2011 Environmental Assessment Study prepared by AECOM, would expand GO rail services, with GO service at the existing Oshawa GO Station (on Bloor Street West, between Thickson Road and Stevenson Road South) shifted to a new station north of Highway 401 (Thornton's Corners GO).

There would also be a new station in Central Oshawa located immediately south of Downtown Oshawa and two new stations in Clarington: the Courtice GO Station, which is surrounded by

emerging employment lands and business parks and Bowmanville GO Station, which would be the new eastern terminus of the GO Lakeshore East line.

The extension of GO service to Bowmanville would use the CP Rail corridor north of Highway 401, via a new connection from the existing GO tracks west of the existing Oshawa GO Station over Highway 401.

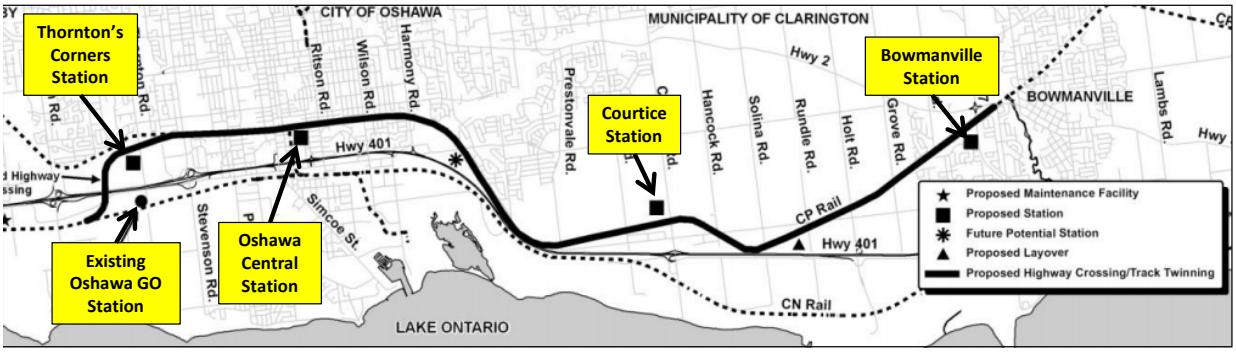
The general location of each of the four proposed GO station sites are as follows (going from west to east):

- Thornton's Corners (west of Thornton Road South, between Burns Street East and Highway 401, south of the CP Rail line);
- Oshawa Central Station (located between Simcoe Street South and Ritson Road South, and between Olive Avenue East and First Avenue, north of Highway 401);
- Courtice (located west of Courtice Road, just north of Baseline Road West and Highway 401); and
- Bowmanville (located southwest of the intersection of Regional Road 57 and King Street West/Highway 2).

Figure 1 shows a map of the proposed GO Lakeshore East extension project, along with the location of the existing Oshawa GO Station and the four proposed stations. The Environmental Assessment for the project was approved in March 2011.

Figure 1

Map of GO Lakeshore East Extension Project



Source: AECOM, Oshawa to Bowmanville Rail Service Expansion, Transit Project Assessment Process Environmental Assessment Study, February 2011

1.1.2 Current Service Levels

Currently, service along the Lakeshore East GO line terminates at the existing Oshawa GO Station. There are 41 weekday trips from Oshawa to Union Station (including six during morning peak hours), and 39 weekday trips from Union to Oshawa (including eight during evening peak hours). The service to the existing Oshawa GO Station is all-day, two-way service.

Figure 2 **Current Weekday GO Train Service to/from Oshawa GO Station, as of January 2016**

	Before AM Peak (before 6:30am)	AM Peak (6:30am to 8:30am)	Inter-Peak (8:30am to 4:00pm)	PM Peak (4:00pm to 6:30pm)	Evening (after 6:30pm)	Total
			Number of Trips			
from Oshawa to Union	4	6	15	6	10	41
from Union to Oshawa	1	4	15	8	11	39

Source: GO Transit Schedules, Effective January 2, 2016

1.1.3 Future Service Level Scenarios

The study team has developed ridership assumptions based on two possible service levels:

- Scenario 1: High frequency (four trains per hour) GO-RER service runs to new Oshawa Thornton's Corners GO Station

with lower frequency (one train per hour) running to Oshawa Central, Courtice and Bowmanville GO stations.

- Scenario 2: Introduction of high frequency service (four trains per hour) through Central Oshawa to Bowmanville GO.

For the purposes of impacts modelling, it is conservatively assumed that service would begin operation in the year 2026, based on the project being funded over the next five years and constructed in the period thereafter. However, the actual timing of the project and provision of service could be earlier than assumed if funding was provided sooner rather than later.

Ridership assumptions in this report are informed by a mathematical exercise based on changes in journey times, and population and employment growth. A more refined set of ridership projections can be expected in the eventual Business Case study.

1.2 APPROACH

This report analyses economic benefits of improving transit availability and access in Durham Region and the surrounding area. The economic benefits are analysed through three broad categories:

1. **The economic impacts of the initial investment, development and construction of the GO Lakeshore East extension**: The planning, design, site development and construction of the project contribute directly to the local and regional economy and generate substantial "spinoff" benefits;
2. **The economic impacts of the on-going operations**: Having the GO Lakeshore East extension in service will generate economic impacts in two ways:

- Through the on-going operation of the GO train service, which will create jobs, and generate economic efficiencies and benefits to prospective new riders and businesses in Durham Region;
- The expanded service can also be expected to stimulate development activity around the proposed stations, and help offset recent declines in economic health and diversity of Durham Region.

3. **The community economic impacts** on Durham Region, local municipalities, and the emerging employment sectors

To quantify the economic impacts of the project, this report focuses on several economic parameters, including:

- **Economic activity**: The volume of goods and services consumed in the economy related to the construction and ongoing operation of the GO Lakeshore East line;
- **Contribution to GDP**: The value-added component of the economic activities, a measure of the contribution of the activities to Ontario's Gross Domestic Product (GDP);
- **Jobs**: The number of jobs generated from activities of the project, including direct and spinoff jobs;
- **Income**: The volume of income generated through these various economic activities, including wages, other labour earnings, mixed income, and profits; and
- **Government tax revenues**: Federal and provincial tax revenues, primarily personal and corporate income taxes, and other payroll deductions.

There are generally said to be three "rounds" of economic impact (Figure 3)

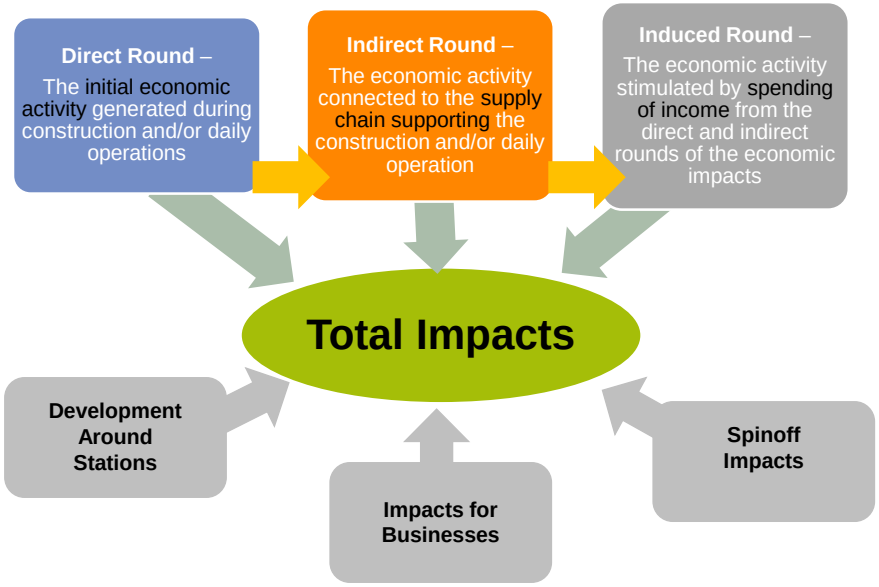
- **Direct Round** – jobs and economic activity directly related to the capital investment and construction of the project (such

as construction of buildings, terminals, station and parking lots etc.) and their daily operation once complete, including drivers, maintenance, administrative staff, etc.;

- **Indirect Round** – jobs and economic activity connected to the supply chain supporting the construction and daily operation of service, including construction material suppliers, etc.; and
- **Induced Round** – jobs and economic activity stimulated as a result of the re-spending of all the incomes earned under the first and additional rounds of expenditures (e.g. the wages of construction workers and transportation operation workers as well as businesses that provide supplies and services).

Figure 3

Three Rounds of Economic Impacts



Source: Altus Group Economic Consulting

The study also looks at benefits to Durham Region residents and businesses, and how the project can help build on the economic development initiatives and opportunities present in eastern Durham Region.

The Economic Impacts Analysis study represents a high-level scoping of issues and ideas related to the project that would be refined and analyzed in more detail in an eventual Business Case study.

2 ECONOMIC OVERVIEW

This section of the report looks at the progress Durham Region has been making towards meeting the population and employment forecasts in the *Growth Plan for the Greater Golden Horseshoe* ("*Growth Plan*"), and the nature of the growth it has received over the past ten years.

The *Growth Plan* is a framework for managing growth in the Greater Golden Horseshoe, and provides for a system of Urban Growth Centres, intensification targets for development in existing built-up areas, density targets for greenfield areas, and overall population and employment forecasts for single- and upper-tier municipalities to 2031 and 2041. As per the Introduction section of the *Growth Plan*, the Plan will:

> …guide decisions on a wide range of issues – transportation, infrastructure planning, land-use planning, urban form, housing … - in the interest of promoting economic prosperity. It will create a clearer environment for investment decisions and will help secure the future prosperity of the GGH. (page 6)

The GO Lakeshore East extension project will help Durham Region and its local municipalities fulfill the policies of the *Growth Plan* and contribute to the economic well-being of the Greater Golden Horseshoe and the Province as a whole. To date, Durham Region has not met the population and employment forecasts in the *Growth Plan*. The GO Lakeshore East project can provide some stimulus to the Region to help fulfill the projections and objectives of the *Growth Plan*.

2.1 EMPLOYMENT GROWTH

2.1.1 Actual vs. Forecasted Employment Growth

Over the 2001-2011 period, Durham Region was forecast to receive 72,000 new jobs, growing from 188,000 jobs in 2001 to 260,000 jobs in 2011. Based on 2001 and 2011 Census data, the Region saw job growth of only 35,000 net new jobs over the ten-year period, or approximately 49% of the forecasted amount. This is equal to growth of 3,500 net new jobs per year. The potential reasons for this shortfall are numerous, including the significant job losses in the manufacturing sector, the need for improved transportation linkages in Durham, and the effects of the 2008/2009 recession.

The *Growth Plan* forecasts for Durham Region to 2041 require the Region to achieve employment of 430,000 persons, which would mean annual employment growth between 2011 and 2041 of more than 6,900 jobs. This rate of growth would require the Region to generate new jobs at an annual rate 197% higher than that experienced over the 2001-2011 period. The Region is going to need to see the pace of job growth significantly quicken in the coming years, in order to help fulfill the objectives of the *Growth Plan* in creating a prosperous economy for residents of Ontario.

Figure 4 **Actual and Forecast Employment, Durham Region and GTHA, 2001-2041**

	Historical		Forecast				Avg. Annual Growth 01-11	Avg. Annual Growth 11-41
	2001	2011	2011	2021	2031	2041		
	Persons							
Durham	188,000	223,000	260,000	300,000	360,000	430 000	3,500	6,900
Remaining GTHA								
Halton	189,000	233,000	280,000	330,000	390,000	470 000	4,400	7,900
Toronto	1,435,000	1,519,000	1,540,000	1,618,000	1,660,000	1,720 000	8,400	6,700
Peel	534,000	646,000	730,000	801 000	880,000	970 000	11,200	10,800
York	385,000	487,000	590,000	687 000	790,000	900 000	10,200	13,767
Hamilton	205,000	219,000	230,000	274,000	310,000	350 000	1,400	4,367
Subtotal Remaining GTAH	2,748,000	3,104,000	3,370,000	3,710,000	4,030,000	4,410 000	35,600	43,533
GTHA	2,936,000	3,327,000	3,630,000	4,010,000	4,380,000	4,820 000	39,100	49,767

Note: 2031 forecasts shown are the "2031B" forecasts from the Growth Plan
Source: Altus Economic Consulting based on Statistics Canada 2011 National Household Survey, Hemson Ltd. 2013

All Greater Toronto Area & Hamilton (GTHA) regions and municipalities other than Halton Region achieved a greater proportion of their employment growth than Durham Region did (48.6%):

- Halton Region – 44,000 actual job growth vs. 91,000 forecasted or 48.4% of forecast;
- Toronto – 84,000 actual job growth vs. 105,000 forecasted jobs, or 80.0% of forecast;
- Peel Region – 112,000 actual job growth vs. 196,000 forecasted, or 57.1% of forecast;
- York Region – 102,000 actual job growth vs. 205,000 forecasted, or 49.8% of forecast; and
- Hamilton – 14,000 actual job growth vs. 25,000 forecasted, or 56.0% of forecast.

According to the *Durham Regional Official Plan* ("*Regional Official Plan*"), the City of Oshawa is forecast to achieve employment growth of 22,520 new jobs over the 2011-2031 period, and the Municipality of Clarington is to add 15,845 new jobs. The new employment growth forecast for Oshawa and Clarington combined account for nearly 31% of all job growth in the Region – if the Region is to meet its employment forecasts in the *Growth Plan*, it will need the City of Oshawa and the Municipality of Clarington to be strong economic contributors and employment generators.

Figure 5 **Employment Forecasts for Local Municipalities, Durham Region Official Plan, 2011-2031**

Municipality	2011	2031	Growth 2011-2031	Share of Growth 2011-2031
		Jobs		*Percent*
Ajax	34,810	49,290	14,480	11.6%
Brock	4,025	5,005	980	0.8%
Clarington	22,575	38,420	15,845	12.7%
Oshawa	68,270	90,790	22,520	18.1%
Pickering	41,000	76,720	35,720	28.7%
Scugog	7,955	9,480	1,525	1.2%
Uxbridge	6,060	8,970	2,910	2.3%
Whitby	40,650	71,310	30,660	24.6%
Total	225,345	349,985	124,640	100.0%

Source: Altus Group Economic Consulting based on Durham Regional Official Plan

2.1.2 Imbalance between Available Jobs and Available Workforce in Durham Region

According to Statistics Canada data, there are 255,535 employed Durham Region residents that commute to work.[1] However, there are only 170,170 jobs at workplaces in Durham Region[2], meaning that there is a significant imbalance between the jobs required by Durham Region residents and the jobs available locally. There are approximately 67 jobs available in Durham Region for every 100 employed residents, the lowest such ratio among major municipalities in the GTHA.

Within Durham Region, the City of Oshawa has the strongest balance between jobs and working residents, with 51,505 jobs in the City for 58,720 employed residents, or 88 jobs in the City for every 100 employed residents. The Municipality of Clarington has just 47 jobs for every 100 employed residents and will need local job creation to shift from a 'bedroom community' to a community that

[1] In Statistics Canada terminology, this is based on persons with a "usual place of work", which excludes workers who work at home or those with "no fixed place of work".

[2] Similarly, the 170,170 jobs 'at workplaces' in Durham Region are at "usual places of work" in the parlance of Statistics Canada, and so this also excludes those who work at home and a no fixed place of work.

provides a fuller range of employment opportunities to its residents, allowing more residents to stay in the community for work.

Figure 6 **Comparison of Commuting Residents to Jobs Available in Municipalities, 2011**

	Employed Residents with Usual Places of Work	Usual Places of Work in Municipality	Net Outflow / (Inflow) of Residents for Usual Places of Work	Jobs in Municipality as % of Workers in Municipality
		Jobs		*Percent*
Pickering	38,370	29,670	8,700	77.3%
Ajax	48,625	24,045	24,580	49.4%
Whitby	52,490	33,945	18,545	64.7%
Oshawa	58,720	51,505	7,215	87.7%
Clarington	36,200	16,965	19,235	46.9%
Scugog	8,540	5,900	2,640	69.1%
Uxbridge	8,430	5,390	3,040	63.9%
Brock	4,160	2,750	1,410	66.1%
Total Durham Region	255,535	170,170	85,365	66.6%
Halton Region	218,470	188,225	30,245	86.2%
Peel Region	541,585	542,890	(1,305)	100.2%
York Region	426,640	388,170	38,470	91.0%
Toronto	1,034,130	1,291,050	(256,920)	124.8%
Hamilton	201,850	178,810	23,040	88.6%

Source: Altus Group Economic Consulting based on Statistics Canada, 2011 National Household Survey

2.1.3 Factors Influencing Durham Region's Economic Development

2.1.3.1 Shift from Goods-Producing to Services-Producing Employment

Figure 7 shows the change in employment in various sectors in Durham Region between 2001 and 2011.[3] There has been an on-going shift in the nature of employment in the Region – from goods-producing sectors such as manufacturing, and primary industries to service sectors such as finance, insurance and real estate (F.I.R.E.), professional and scientific services, public services and information and culture sectors.

[3] The estimate of employment excludes employment for persons with "no fixed place of work", such as plumbers, construction workers, truck drivers, etc., who do not have a permanent place where they do their day-to-day work.

Figure 7 **Place of Work by Industry, Durham Region, 2001-2011, Excluding No Fixed Place of Work**

Industry	2001	2006	2011	Avg. Annual Growth 2001-2011
Goods-producing sector		*Jobs*		*Percent*
Primary[1]	3,355	1,565	2,465	-3.0%
Utilities	7,910	8,890	9,825	2.2%
Construction	5,660	5,165	6,150	0.8%
Manufacturing	34,725	29,660	19,930	-5.4%
Total	51,650	45,280	38,370	-2.9%
Services-producing sector				
Trade	32,030	33,850	37,280	1.5%
Transportation and warehousing	5,855	6,160	5,975	0.2%
F.I.R.E.	8,060	7,265	10,255	2.4%
Professional, scientific and technical services	7,750	6,180	10,445	3.0%
Business, building and other support services	5,375	6,615	7,135	2.9%
Broad Public Services[2]	36,995	39,625	49,675	3.0%
Information, culture and recreation	5,715	6,205	8,810	4.4%
Accommodation and food services	12,345	12,625	13,070	0.6%
Other services	7,685	7,835	8,550	1.1%
Total	121,810	126,360	151,195	2.2%
Total Employment	173,460	171,640	189,565	0.9%

[1] Includes agricultre, forestry, fishing, mining, and oil & gas extraction
[2] Includes health care, social assistance, educational services, and public adminstration
Source: Altus Group Economic Consulting based on data from the 2001 and 2006 Census of Canada and the 2011 National Household Survey

The average annual decline in goods-producing sectors (-2.9%) has been slightly outweighed by the average annual growth in service-producing sectors (+2.2%).

The extension of the GO Lakeshore East line, and increased transit availability and service throughout Durham Region, would likely stimulate growth in service-producing sectors, which tend to be located in office or commercial retail space. Office and retail users benefit from having employees able to commute via transit, and having improved access to clients and customers. The office and retail buildings that generate service sector employment also generate more jobs per square foot than traditional goods-producing sectors. Therefore, investing in expanded transit service, and helping to stimulate office and retail development around the

proposed transit stations can result in a more significant impact on reducing traffic congestion.

Figure 8 shows the number of jobs in Durham Region, by industry, compared to the industries that Durham Region residents are employed in, to indicate sectors that, if the Region experienced growth, could tap into readily available local talent and address the imbalance between jobs available in Durham and the number of employed Durham residents. For example:

- There are 23,830 Durham Region residents employed in the Finance, Insurance and Real Estate industry, but only 7,735 jobs are available in this industry within Durham Region, or 32.5 jobs for every 100 employed residents in this sector; and
- There are only 44.2 jobs per 100 residents in the Professional, Scientific and Technical services industry.

These service-producing sectors have helped drive employment growth in the Region. Offering improved transportation access and development opportunities around prospective transit stations to attract businesses in these sectors can help accelerate employment growth in the Region by focusing investment where growth is more likely to occur.

On the other hand, the Region currently has more jobs in the Utilities industry than there are employed Durham Region residents in that sector, meaning that it is necessary to import talent from surrounding municipalities to fill those positions. Improved transportation options, such as improved and expanded service on the GO Lakeshore East line, may be required to continue to attract skilled workers in that industry to places of work in Durham Region.

Figure 8 **Comparison of Employed Residents in Durham to Jobs Available in Durham, 2011, by Industry**

	Employed Residents by Industry	Jobs in Durham by Industry	Net Outflow / (Inflow) of Residents for Usual Places of Work	Jobs in Municipality as % of Workers in Durham by Industry
Goods Producing Sectors		*Jobs*		*Percent*
Primary	1,800	1,430	370	79.4%
Utilities	8,115	9,740	(1,625)	120.0%
Construction	8,220	4,995	3,225	60.8%
Manufacturing	26,550	19,100	7,450	71.9%
Subtotal Goods Producing	44,685	35,265	9,420	78.9%
Service Producing Sectors				
Trade	46,025	34,435	11,590	74.8%
Transportation and Warehousing	10,495	5,655	4,840	53.9%
Finance, Insurance and Real Estate	23,830	7,735	16,095	32.5%
Professional, Scientific and Technical Services	15,375	6,800	8,575	44.2%
Business, Building and other Support Services	9,550	5,900	3,650	61.8%
Broad Public Services	67,455	47,075	20,380	69.8%
Information, Culture and Recreation	13,385	7,235	6,150	54.1%
Accommodation and Food Services	14,865	12,930	1,935	87.0%
Other Services	9,855	7,460	2,395	75.7%
Subtotal Service Producing	210,835	135,225	75,610	64.1%
Total	255,520	170,490	85,030	66.7%

Note: Broad Public Services includes employment in education and health sectors
Source: Altus Group Economic Consulting based on Statistics Canada 2011 National Household Survey

2.2 POPULATION GROWTH

2.2.1 Actual Population Growth Has Fallen Short of Growth Plan Forecasts

Figure 9 shows population growth in Durham Region over the 2001-2011 period, and compares actual population growth to the forecasts from the *Growth Plan for the Greater Golden Horseshoe* for 2011.

Durham Region fell 29,000 persons short of the forecasted growth between 2001 and 2011 of 132,000 persons - accommodating 78% of the growth forecasted over the ten-year period, the lowest such ratio among the six major GTHA municipalities.

Figure 9 also compares the average annual growth over the 2001-2011 period with the required annual growth to meet the 2041 population forecasts. Durham Region's annual average growth of 10,300 persons over the 2001-2011 period is well below the 18,633

persons of annual population growth required over the 2011-2041 period to be able to achieve the population targets in the *Growth Plan*. Essentially, population growth in Durham Region needs to double the current pace to meet the 2041 growth forecasts. It is important for Durham Region to be able to meet the *Growth Plan* population forecast targets (and the targets for density in greenfield lands and Urban Growth Centres, and the intensification target for development in the built boundary), in that it will help the Region optimize available infrastructure, inject activity into the local economy, and allow the GTHA to grow in a balanced manner.

Figure 9

Actual and Forecast Population, Durham Region and GTHA, 2001-2041

	Historical		Forecast				Avg. Annual Grow h	Avg. Annual Grow th
	2001	2011	2011	2021	2031	2041	01-11	11-41
				Persons				
Durham	528,000	631,000	660,000	770,000	970,000	1,190 000	10,300	18,633
Remaining GTHA								
Halton	391,000	520,000	520,000	645,000	820,000	1,000 000	12,900	16,000
Toronto	2,584,000	2,725,000	2,760,000	2,965,000	3,190,000	3,400 000	14,100	22,500
Peel	1,032,000	1,350,000	1,320,000	1,559,000	1,770 000	1,970 000	31,800	20,667
York	763,000	1,072,000	1,060,000	1,330,000	1,590 000	1,790 000	30,900	23,933
Hamilton	510,000	540,000	540,000	601,000	680,000	780,000	3,000	8,000
Subtotal Remaining GTHA	5,280,000	6,207,000	6,200,000	7,100,000	8,050,000	8,940 000	92,700	91,100
GTHA	5,808,000	6,838,000	6,860,000	7,870,000	9,010,000	10,130 000	103,000	109,733

Note: 2031 forecasts show n are the "2031B" forecasts from he Grow th Plan
Source: Altus Economic Consulting based on Hemson Ltd. 2013

According to the *Regional Official Plan*, the City of Oshawa is forecast to achieve population growth of 43,415 persons over the 2011-2031 period, and the Municipality of Clarington is to add 52,360 persons. Combined, the population growth forecast for Oshawa and Clarington accounts for over 30% of all forecast population growth in the Region.

Figure 10

Population Forecasts for Local Municipalities, Durham Region Official Plan, 2011-2031

Municipality	2011	2031	Growth 2011-2031	Share of Growth 2011-2031
		Persons		*Percent*
Ajax	111,355	137,670	26,315	8.3%
Brock	12,385	14,015	1,630	0.5%
Clarington	87,980	140,340	52,360	16.6%
Oshawa	153,585	197,000	43,415	13.7%
Pickering	110,085	225,670	115,585	36.6%
Scugog	22,585	25,390	2,805	0.9%
Uxbridge	20,940	26,965	6,025	1.9%
Whitby	124,990	192,860	67,870	21.5%
Total	643,905	959,910	316,005	100.0%

Source: Altus Group Economic Consulting based on Durham Regional Official Plan

2.2.2 Durham Region and Local Municipality Intensification Targets

Figure 11 shows the minimum intensification allocations for each lower-tier municipality in Durham Region. Oshawa is required to accommodate at least 39.2% of its 2015-2031 unit growth inside the built boundary, or 7,934 units, equating to approximately 500 units per year.

Figure 11

Minimum Intensification Allocations 2015-2031, Durham Region

Municipality	Intensification Units	Total Unit Growth	% of Municipal Total
Ajax	4,343	7,987	54.4%
Brock	306	1,321	23.2%
Clarington	6,181	19,616	31.5%
Oshawa	7,934	20,229	39.2%
Pickering	14,354	36,163	39.7%
Scugog	576	1,908	30.2%
Uxbridge	1,042	2,870	36.3%
Whitby	11,963	26,316	45.5%
Total	46,699	116,410	40.1%

Source: Schedule E, Table E9, Durham Region Official Plan

The Municipality of Clarington must meet a minimum intensification rate of 31.5% over the 2015-2031 period, or 6,181 units, which would require roughly 390 units per year. Clarington's proposed Official Plan sets a higher target than set out in the

Regional Official Plan, and would require that the Municipality plan for 40% of residential units from 2022-2031 within the built boundary – this amounts to a total of 7,132 units from 2015-2031, equivalent to 446 units per year.

Ensuring that Oshawa and Clarington (and the other lower-tier municipalities in the Region of Durham) meet their respective intensification allocation targets is critical to allowing the Region to meet its overall intensification requirement of 40% as mandated by the *Growth Plan*. Meeting these intensification targets allows communities such as Oshawa and Clarington to make more efficient use of land, and also of existing and planned infrastructure. Intensification allows communities to provide a mix of jobs and housing in close proximity to areas with established public services (including transportation options), allowing people to work closer to where they live.

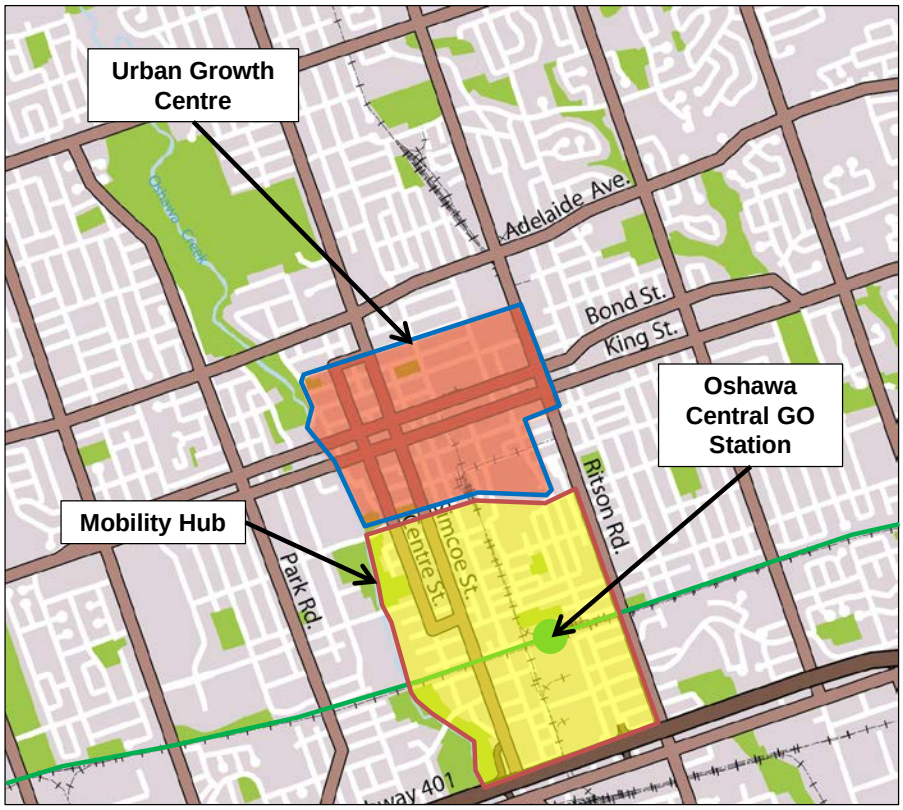
2.2.3 Density in Downtown Oshawa Needs to Double to Meet Growth Plan Targets

Downtown Oshawa is identified as an Urban Growth Centre (UGC) in the *Growth Plan*. Figure 12 shows the boundaries of the Downtown Oshawa UGC and its proximity to the proposed Oshawa Central GO Station. The map also shows the boundaries of the Oshawa Mobility Hub (as per Schedule B-1 of the *City of Oshawa Official Plan*).

The *Growth Plan* requires the Downtown Oshawa UGC to achieve a density target of 200 persons and jobs per hectare (p&j/ha.) by the year 2031. According to the *Technical Report on Preliminary Performance Indicators for the Growth Plan*, as of 2011, Downtown Oshawa had a density of 103 p&j/ha., up only slightly from 101 p+j/ha. in 2006.

Figure 12

Downtown Oshawa Urban Growth Centre



Source: Altus Group Economic Consulting based on Ministry of Municipal Affairs and Housing map

The Downtown Oshawa UGC is 106 hectares in size. In order to achieve the 200 p&j/ha. density by 2031, the area would need to accommodate 10,255 additional persons and/or jobs. Figure 13 summarizes the existing density and required density to be achieved by 2031 in the Downtown Oshawa UGC.

Figure 13 **Existing and Required Population and Job Density, Oshawa Urban Growth Centre, 2006, 2011 and 2031**

	Population	Jobs	Total People & Jobs	Hectares	People & Jobs / Hectare
2006	3,165	7,525	10,690	106	101
2011	3,250	7,695	10,945	106	103
2031	Exact mix of persons & jobs TBD		21,200	106	200
Required Growth 2011-2031			10,255		

Source: Altus Group Economic Consulting based on Technical Report on Preliminary Performance Indicators for the Growth Plan for the Greater Golden Horseshoe

According to the *Oshawa Official Plan*, the Mobility Hub area is to attract a mix of major office, retail, business, personal and administrative services, residential, institutional, recreational, cultural and entertainment uses. The long-term density target for the Mobility Hub lands is at least 75 residential units per gross hectare. The City's plans for the Mobility Hub area means that they have integrated land use and transportation plans for the area around the proposed Oshawa Central GO Station. Having the plans and transportation structure in place around the GO station will enable the area to capitalize on the investment in the GO Lakeshore East extension project.

The arrival and operation of the GO train and other transit services at a new Oshawa Central station would stimulate significant development activity in both the Downtown Oshawa UGC and the Oshawa Mobility Hub area.

2.2.4 Bowmanville Town Centre

The Bowmanville Town Centre is the east gateway into the Region of Durham, as well as the GTA at large. It is already a hub for economic activity, with a mix of residential, offices, retail, entertainment and recreational uses. It is also planned to be the primary location for higher density residential developments in the

Municipality. The *Regional Official Plan* requires that Clarington plan for a density of 75 units per hectare in the Bowmanville Town Centre and a floor space index (FSI) of 2.5.

Currently, according to Municipal staff, the density in the Town Centre is 40 units per hectare and has a FSI of 0.7 (or about 110-130 persons and jobs per hectare).

If the planned developments for Bowmanville Centre are realized, and the future proposals on vacant sites meet the densities envisioned by the Province, Region and Municipality, Bowmanville Centre has the potential to almost double the current density with a combined 205 persons and jobs per hectare in the Centre.

The GO train service to Bowmanville, which would have linkages to local public transit, cycling routes, and pedestrian trails, will be a key influence on the ability of the Municipality to plan a well-designed, pedestrian-oriented area connected to a centrally located GO station.

2.2.5 dLAB

A potential major source of intensification related to the GO Lakeshore East extension project is the area around the proposed Thornton's Corners GO Station, known as the Durham Learning and Business District ("dLAB").

The dLAB project would see the creation of a new urban employment and education hub, containing mixed-use spaces for both business and learning.

Three academic institutions (UOIT, Durham College and Trent University Durham) are involved in the project and would have space to further their reach in helping stimulate the Region's business community. The project would weave the three post-secondary campuses into a district that also contains office, retail uses, to foster collaboration, and to allow prospective employers to

have easy access to a base of available talent. The access to the site from the proposed Thorton's Corners GO Station, once the GO train service is up and running, would only improve the prospects for success of the dLAB project, ensuring that a greater number of persons are able to access their jobs or campuses via transit.

2.3 CONCLUSIONS

The growth seen in the Region of Durham between 2001 and 2011 is well below forecasted growth in the *Growth Plan*, both in terms of employment and population growth. Employment and population growth over the 2011-2041 period are each going to need to double from the levels between 2001 and 2011 for the Region to meet its 2041 *Growth Plan* forecasts.

There is a significant imbalance between the number of jobs in the Region and the number of employed Durham Region residents – there are only 67 jobs available in the Region for every 100 employed residents, with the ratio even lower for the growing service-oriented sectors, suggesting that the Region needs to focus on attracting growth in service-producing sectors to begin to address the imbalance.

The Region has long depended on good-producing sectors, particularly manufacturing, to provide job opportunities and for a strong economy. However, with the continuing decline of traditional manufacturing jobs, the introduction of GO train service to Central Oshawa and Clarington can help provide stimulus for firms in other growing sectors to help accelerate growth in the Region.

For sectors where the Region is a net importer of jobs, such as the Utilities sector, providing additional transportation options could help more easily attract and retain talent from within the Region and surrounding municipalities.

The City of Oshawa and the Municipality of Clarington are key to helping the Region meet its *Growth Plan* forecasts – they are responsible for a combined 30% of all job and population growth forecast in the Region over the 2011-2031 period.

The *Growth Plan* requires that the City of Oshawa plan for a density of 200 persons & jobs per hectare in its Downtown Oshawa UGC. Currently, the density in Downtown Oshawa is just 103 persons and jobs per hectare, up only marginally over the 2006-2011 period (up from 101 persons and jobs per hectare).

The *Regional Official Plan* contains a requirement for the Bowmanville Town Centre (which includes the proposed GO station) to meet a density of 75 units per hectare, which would be roughly double the current density of 40 units per hectare.

The introduction of GO train service to Central Oshawa and Bowmanville will be a key influence in the ability of the City of Oshawa and Municipality of Clarington to meet the density targets for Downtown Oshawa and Bowmanville Town Centre, respectively.

3 COMMUNITY ECONOMIC IMPACT OF GO LAKESHORE EAST EXTENSION

This section looks at the prospects for additional urban development in the areas around the proposed GO stations, by analysing the development potential of vacant and underutilized sites, and the impact that transit accessibility would have on the attractiveness of lands around transit stations.

The modelling summarized in this section (and shown in more detail in Appendix A) is based on the development potential of sites that are vacant and/or underutilized today. However, this analysis does not take into account many existing developed properties (such as single-family houses and commercial developments) that could be intensified over the long-term should demand warrant it. Therefore, the development potential identified here may be conservative. The improvements that the project would bring for the ability of businesses in the Region to access labour markets, and for persons in the Region to more easily access GO train services means that there may be significant amounts of development potential beyond what is estimated in this report.

3.1 IMPROVED ACCESS TO LABOUR, MARKETS AND CLIENTS

According to a study by the City of Hamilton ("Community Impact and Economic Analysis of Light Rail Transit"), business and commercial interests benefit from increased access to employees and customers due to accessible transit nodes.

Weisbrod (2009) found that business productivity is improved with greater access to broader labour markets, where a greater range of skills can be found. Improved transportation access and options

provides employers with an improved ability to find and attract workers with the desired skills.[4]

According to modelling from Arup, the project would mean that, under the Scenario 1, over 19,900 more people aged 20-64 could reach Downtown Oshawa, and 80,100 more could reach the Bowmanville GO Station area within 60 minutes or less than are able to reach it today within that amount of time. These incremental increases are based on future population estimates for the GTHA.

Scenario 2, with all-day two-way service, would mean that nearly 73,700 more people aged 20-64 could reach Downtown Oshawa in under an hour. Over 169,500 more could reach the Bowmanville GO Station area in less than an hour. This would therefore mean that 2 to 3.5-times the number of people could access Downtown Oshawa and Bowmanville under Scenario 2 than under Scenario 1.

Figure 14

Estimated Increase in Persons Aged 20-64 Within 60 Minutes Commute of Downtown Oshawa and Bowmanville due to GO Lakeshore East Extension Project

	Downtown Oshawa	Bowmanville GO Station
Scenario 1 - Peak Service Only	19,900	80,100
Scenario 2 - Two-Way, All-Day Service	73,700	169,500

Source: Altus Group Economic Consulting based on modelling and data from Arup

The ability for substantial numbers of additional people being able to more easily access the eastern Durham Region could have implications on the ability of existing and prospective businesses to attract talent to their organizations and to access broader markets.

[4] Glen Weisbrod & Arlee Reno, Economic Impact of Public Transportation Investment, prepared for American Public Transportation Association, (October 2009)

3.2 BENEFITS TO POST SECONDARY INSTITUTIONS

Figure 15 shows the enrolment trends at Durham College, University of Ontario Institute of Technology (UOIT) and Trent University Durham. Combined, enrolment at the post-secondary institutions have increased by 22% over the past five years, including 28% at Durham College and 18% growth at UOIT. In total, there are over 3,900 additional post-secondary students at schools in Durham Region, compared to five years ago.

Figure 15

Growth in Enrolment, Post-Secondary Institutions, Durham Region, 2011-2015

	Durham College	UOIT	Trent University Durham	Total
2011-12	8,332	8,423	799	17,554
2015-16 (estimated)	10,694	9,930	834	21,458
% Growth	28%	18%	4%	22%

Source Altus Group Economic Consulting based on data from Durham College and UOIT, and Trent University Durham

Improved transportation access to Durham College's Whitby Campus (located near the proposed Thornton's Corners GO Station) would help Durham College continue to grow by allowing for more prospective students to be able to reach the campus in a reasonable amount of time. Trent University Durham is a roughly 10 minute walk north of the proposed Thornton's Corners station and would also benefit from improved transit access.

The increasing student population at UOIT would also benefit from access to GO Transit. The University's Strategic Plan anticipates that the enrolment will double to 20,000 students by 2030. Improved transportation access can help provide access to a larger number of prospective students and help UOIT and the other post-secondary institutions continue to grow.

Further, the recent announcement by the Provincial government pledge to make post-secondary education more affordable through

the Ontario Student Grant (OSG). According to the Ministry of Finance:

> The OSG will make average college or university tuition free for students with financial need from families with incomes of $50,000 or less, and will make tuition more affordable for middle-class families.

This new program is likely to generate increased enrolment at Ontario universities and colleges, which will put additional emphasis on ensuring that as many post-secondary institutions as possible are connected to the rapid transportation systems, such as the GO Lakeshore East train. The proposed GO Lakeshore East project will significantly increase access to Durham College, UOIT and Trent University Durham.

3.3 PAST STUDIES ON URBAN DEVELOPMENT IMPACTS OF IMPROVED PUBLIC TRANSPORTATION

Investment in transportation in Durham Region can be a catalyst for new economic, commercial and residential developments along the transportation corridor, specifically on lands around the stations themselves.

Commercial and residential developments that occur near the transit nodes can benefit municipalities by generating property taxes, development charges, land transfer taxes, and HST revenues.

The value created by the project can be captured by the Region and local municipalities through increased property tax assessment value and tax revenues. Revenues generated from the development of lands around the subject sites could help to offset the capital and operating costs of constructing the project.

There have been numerous studies relating to increased or extended GO train services estimating the potential impacts those infrastructure investments can have on stimulating development around the transit stations:

- The Midtown Oakville Mobility Hub Study estimated that development potential around the Oakville GO Station amounted to 5,400 residential units, 450,000 ft^2 of civic facilities, 160,000 ft^2 of retail space, and between 1.77 and 1.87 million ft^2 of office space.
- A report on the impacts of providing all-day two-way service to Guelph and Kitchener-Waterloo found that the development potential around the station areas (and other areas connected to GO stations) would amount to:
    - In Downtown Brampton, 1.5 million ft^2 of redevelopment within the next 10 years;
    - There was a total of 6.9 million ft^2 of development potential for residential and office uses in Downtown Guelph and the City's University Research Park and Guelph Innovation District;
    - David Johnston Research & Technology Park in Waterloo had potential for 1 million ft^2 of development through vacant properties and intensifying occupied sites;
    - Waterloo Corporate Campus had potential for 700,000 ft^2 of office space;
    - Kitchener's Innovation District had identified potential of 5 million ft^2 of residential and office development; and
    - The City of Guelph saw GO train service return to Downtown Guelph in 2011, and adopted the Downtown Guelph Secondary Plan in 2012 that sought to see intensification of the City's historic core. Since 2011, there has been a surge in development in the Downtown, with 464 new units recently completed or under construction, and 37,700 ft^2 of new commercial retail space added as well.

- In the City of Vaughan, an application has been submitted for a mid-rise mixed-use plan adjacent to the Maple GO Station, on lands that were previously designated as Commercial Mixed-Use, and had a permitted density of 1.5 FSI. The proposed plan would see density increase to 2.03 FSI, and would include 1,018 new residential units (with heights up to 10-storeys) and over 25,000 ft^2 of new retail floor space;
- In March 2010, the Town of Halton Hills passed a Georgetown GO Station Secondary Plan to encourage intensification around the major transit station area. The Secondary Plan set a population target for the area of 2,800 persons to the year 2031, with approximately 2,200 persons included in a high-density/mixed-use precinct. The employment target for the Secondary Plan area is 300 jobs to the year 2031. Within the Secondary Plan Area, since the adoption of the Secondary Plan, the Town has since seen an application for 118 residential units and 9,700 ft^2 of commercial space. There are three other residential applications on the border of the Secondary Plan Area, and within the 1-km radius of the GO station, with a combined 156 residential units either approved or under application. All three applications just outside the Secondary Plan Area, plus the one application in the Secondary Plan Area have been submitted since the adoption of the Secondary Plan.

Several other studies have been prepared regarding the impacts of commuter rail service expansion on development in American cities:

- A study focused on a rail expansion project in Ohio forecast that the proposed 28 new stations would generate nearly $3 billion in development, with major stations generating between $200

and $250 million each, and smaller stations generating between $50 and $100 million each.[5]

- A study on commuter rail in the Boston area found that between 1971 and 1999, more medium-density and commercial buildings were built in areas that gained commuter rail service than other areas, and that commuter rail is most likely to impact land use patterns when it is explicitly linked to local and regional policies for land use and development.[6]
- A study of a commuter rail project in the Milwaukee area found that there was a total potential of 23,000 new residential units, and 12.3 million ft^2 of new retail and office space within a half-mile of the nine proposed stations. The study concluded that 20% to 50% of this potential development was unlikely to occur without the introduction of the commuter rail project.[7]

3.4 THERE IS SIGNIFICANT EXISTING DEVELOPMENT CAPACITY AROUND THE PROPOSED GO STATIONS

Figure 16 shows the cumulative development potential around each of the proposed GO stations, as broken down by local municipality.

In total, there are 63 identified vacant and/or underutilized sites in the immediate vicinity of the four GO stations where development could occur to support the introduction of GO train service. The sites identified in the maps in this section of the report are described in more detail in Appendix A.

[5] Transportation Economics & Management Systems, Inc., Ohio Hub Passenger Rail Economic Impact Study, (May 2007)

[6] Eric Beaton, Rappaport Institute Policy Briefs, The Impacts of Commuter Rail in Greater Boston, (September 2006)

[7] University of Wisconsin-Milwaukee, Institute for Survey and Policy Research, Community Economic Impact Study of the Proposed Kenosha-Racine-Milwaukee (KRM) Commuter Rail, (January 18, 2007)

In total, these sites represent potential for 5,992 residential units (mostly around the Oshawa Central and Bowmanville stations), and nearly 5.6 million ft² of non-residential floor space (mostly around the proposed Thornton's Corners and Courtice stations). When Clarington Energy Business Park is included, the potential for non-residential floor space amounts to 7.8 million ft².

Figure 16 **Development Potential Around Proposed GO Stations, by Municipality**

	Residential				Non-Residential			
	Single / Semi	Town	Apartments	Total	Office / Institutional	Retail	Industrial	Total
Whitby	*Units*				*Square Feet*			
Thornton's Corners (part)	-	-	-	-	576,000	144 000	-	720,000
Subtotal Whitby	-	-	-	-	576,000	144 000	-	720,000
Oshawa								
Thornton's Corners (part)	-	-	110	110	502,000	506 215	543,456	1 551,671
Oshawa Central	-	165	2,447	2,612	10,388	558 040	-	568,428
Subtotal Oshawa	-	165	2,557	2,722	512,388	1,064 255	543,456	2,120,098
Clarington								
Courtice	-	-	-	-	763,581	-	1,677,965	2,441,546
Clarington Energy Business Park			-	-	1 840,629	-	361,667	2 202,296
Bowmanville	18	1 026	2,226	3,270	150,695	121 040	-	271,735
Subtotal Clarington	18	1 026	2,226	3,270	2,754,905	121 040	2,039,632	4 915,577
Total	18	1,191	4,783	5,992	3 843,293	1,329 295	2,583,088	7,755,675

Source: Altus Group Economic Consulting

The large number of vacant and/or underutilized sites around the four proposed GO stations represents a significant opportunity for the Region to see each station area develop with transit supportive densities, helping ensure the operational success of the service, and allowing the Region and local municipalities to capitalize on the potential transit investments.

There is also likely to be (re)development potential in the areas beyond the study areas, further broadening the scope of development impacts of the GO Lakeshore East extension project.

This study primarily identifies the capacity for new development around proposed GO station sites. A Business Case Study, to be completed at a later date, would present a more refined approach that would investigate the likelihood of the identified sites to develop in the short- or long-term.

Having the ability to build a significant amount of residential and non-residential development in close proximity to each of the four proposed GO stations helps solve the "first- and last-mile problem", in that these developments can help to minimize the amount of time and effort commuters face when taking a trip via public transportation. Developments in close proximity to stations make it as easy as possible to travel to or from the station. The easier it is for commuters to access the transit system, the more likely they are to use it.[8]

Durham Region and local municipalities are engaged in optimizing the benefits of the potential GO train extension, through plans for integration of the proposed GO stations with local transit routes. The Region and local municipalities have the necessary planning designations and policies in place to capitalize on the transit investment, and to maximize the impact of the investment on the economy.

Later in this section of the report, we have estimated the economic and fiscal benefits that these developments would bring, upon full build-out.

3.4.1 Thornton's Corners

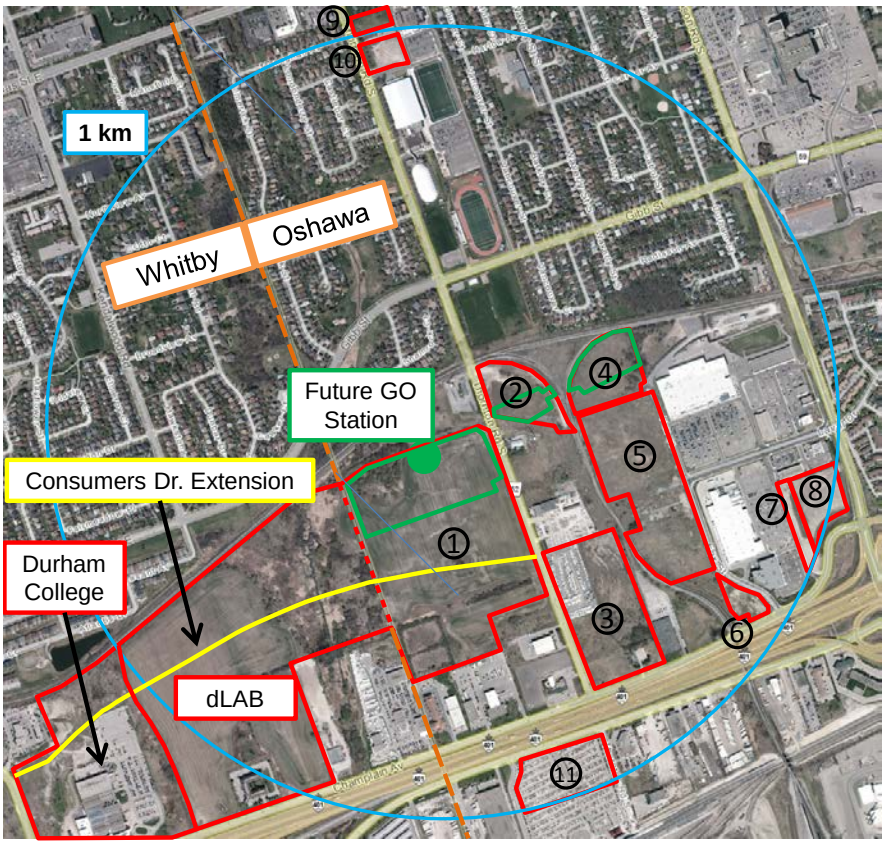
Figure 17 shows the sites around the proposed Thornton's Corners GO Station that are currently vacant and/or underutilized within one kilometre of the station site. The Whitby/Oshawa border bisects the study area. The station area also includes the dLAB lands, which is located in the area between the proposed Thornton's Corners GO Station and Durham College's Whitby campus, and a site owned by Metrolinx (site #3 on Figure 17).

[8] Los Angeles County Metropolitan Transportation Authority, First Last Mile Strategic Plan, Draft, (November 2013)

We have also shown the extension of Consumers Drive that is planned for construction by the Region in 2016, which will provide access to the interior of the dLAB site. The area around the Thornton's Corners GO Station, with the development of dLAB will have a strong office/institutional component, with a mix of retail and industrial uses scattered throughout the study area.

In total, the 11 identified sites in the station area have a development potential of 2.2 million ft² of non-residential uses, and 110 residential units.

Figure 17 **Vacant and Underutilized Sites – Thornton's Corners GO**



Total (Re)Development Potential (11 sites)

- 110 residential units
- 1,078,000 ft² of office
- 650,200 ft² of retail & commercial
- 543,500 ft² of industrial

Source: Altus Group Economic Consulting based on Durham Interactive Map and Oshawa 2014 Land Inventory

In total, the dLAB has a development potential of over 1.3 million ft². Three academic institutions (UOIT, Durham College and Trent University Durham) are involved in the project and would have

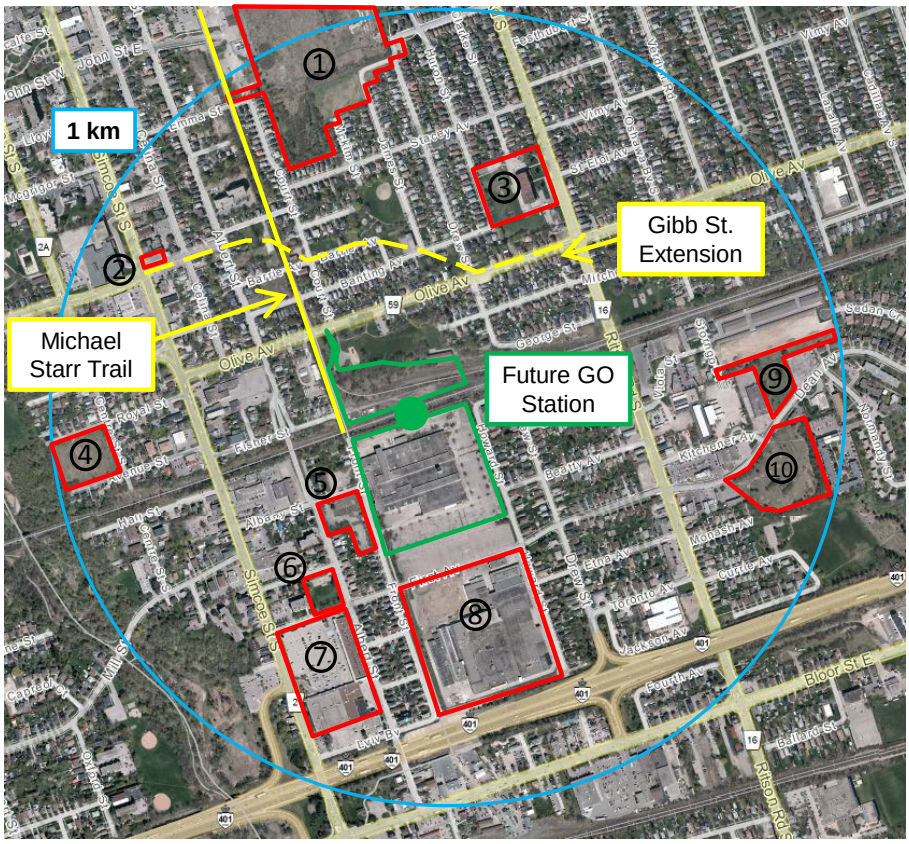
space so as to further their reach in helping stimulate the Region's business community.

According to conversations with the developer behind the project, the dLAB concept came about as a direct result of the 2011 AECOM Environmental Assessment Study. The dLAB site could also have longer-term potential for residential uses.

3.4.2 Oshawa Central

Figure 18 shows the development potential around the proposed Oshawa Central GO Station. The map also shows the Rail Trail link between the GO station and Downtown Oshawa, and the planned Gibb Street Extension project to improve circulation within the study area.

Figure 18 **Vacant and Underutilized Sites - Oshawa Central GO**



Total (Re)Development Potential (10 sites)

- 2,600 residential units
- 10,000 ft^2 of office
- 558,000 ft^2 of retail

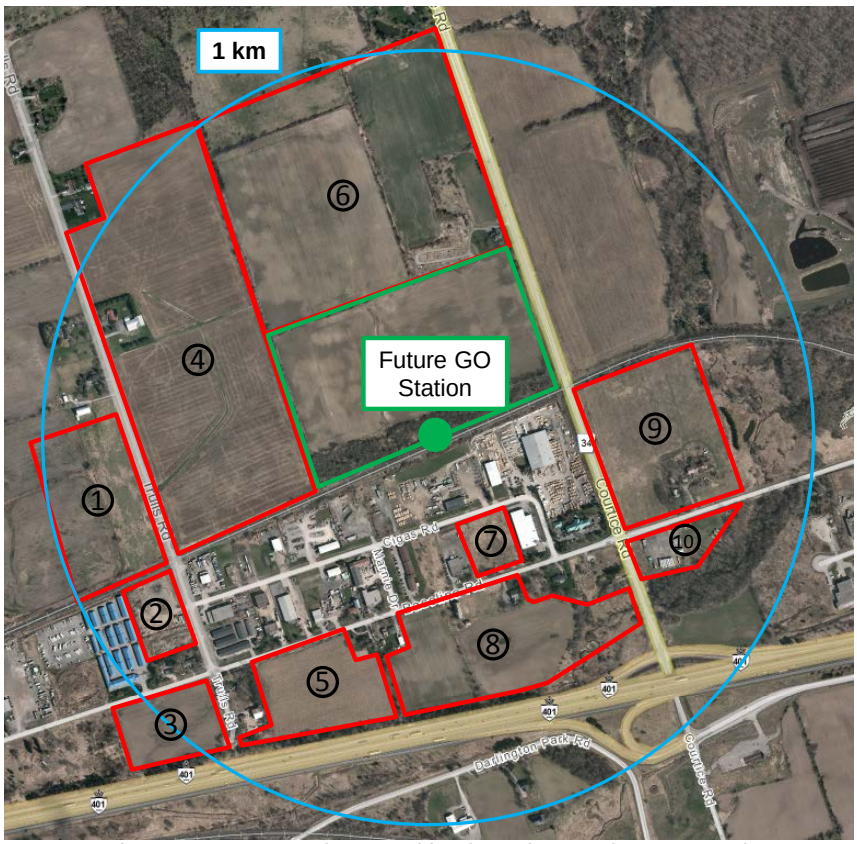
Source: Altus Group Economic Consulting based on Durham Interactive Map

The area around the Oshawa Central GO Station is likely to see significant residential and commercial retail development, helping the City meet its intensification target for the UGC, and the density target for the planned Mobility Hub. In total, there is potential for 2,600 residential units and nearly 600,000 ft² of office and retail uses.

3.4.3 Courtice

Figure 19 shows the development sites around the proposed Courtice GO Station. The area immediately around the GO station is planned for a mix of non-residential uses, and would be a major employment hub for the Municipality of Clarington. In total, the 10 sites identified would have a development potential of over 2.4 million ft² of non-residential space.

Figure 19 **Vacant and Underutilized Sites - Courtice GO, Clarington**



Total (Re)Development Potential (10 sites):

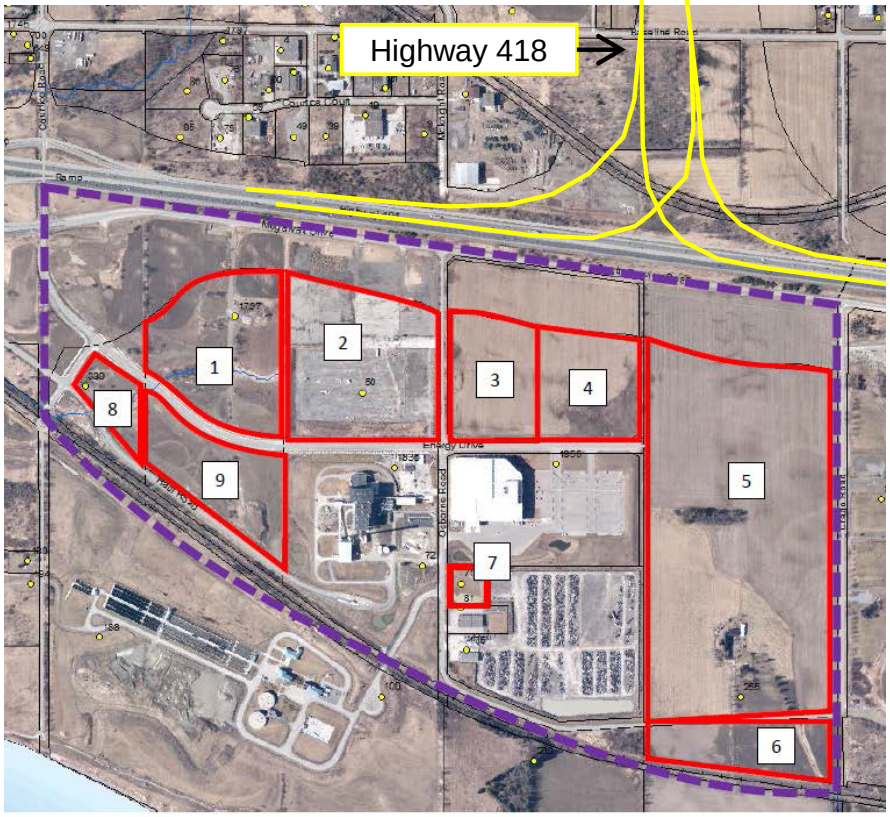
- 763,600 ft² of office
- 1,677,900 ft² of industrial

Source: Altus Group Economic Consulting based on Durham Interactive Map and input from Clarington staff

Immediately south of the proposed Courtice GO Station is the Clarington Energy Business Park. These lands are serviced and are within 5 kilometres of the proposed GO station, are accessible from Highway 401, and are close to interchanges with Highway 35/115 and the future Highway 418 (East Durham Link).

The vacant and underutilized lands in the Clarington Energy Business Park has the potential for 2.2 million ft² of non-residential development in the vicinity of the proposed GO station. Figure 20 shows the vacant and underutilized sites in the Clarington Energy Business Park.

Figure 20 Vacant and Underutilized Sites - Clarington Energy Business Park



Total (Re)Development Potential (9 sites):

- 1,840,600 ft² of office
- 361,700 ft² of industrial

Source: Planning Services Department, Municipality of Clarington

The Business Park is home to OPG's Durham Energy Centre modern office complex that houses 2,500 staff. In 2014, the Municipality of Clarington adopted the Clarington Energy Business

Park Secondary Plan, to plan for "prestige employment uses that can benefit from close proximity to Darlington Nuclear Power Plant, the University of Ontario Institute of Technology and/or other major employers within the energy and environment sectors of the regional economy." The goals of the Secondary Plan include the following:

> 2.1 To develop a focal point for research and development and related industrial activity and facilitate cooperation among businesses within the Durham Region energy cluster.
>
> 2.2 To distinguish the Clarington Energy Business Park as a unique and innovative employment area within the Greater Toronto Area.
>
> 2.3 To enhance the economic competitiveness and global profile of Clarington
>
> 2.4 To broaden and diversify employment opportunities within Clarington
>
> 2.5 To facilitate the incubation and commercialization of new energy innovations
>
> 2.6 To both support and capitalize on the research and academic mission of the University of Ontario Institute of Technology
>
> 2.7 To establish a real-world laboratory where new energy innovations are tested and applied in functioning industrial and commercial buildings. …

The GO Lakeshore East extension project could help the Municipality achieve the goals for the Business Park as set out in the Secondary Plan.

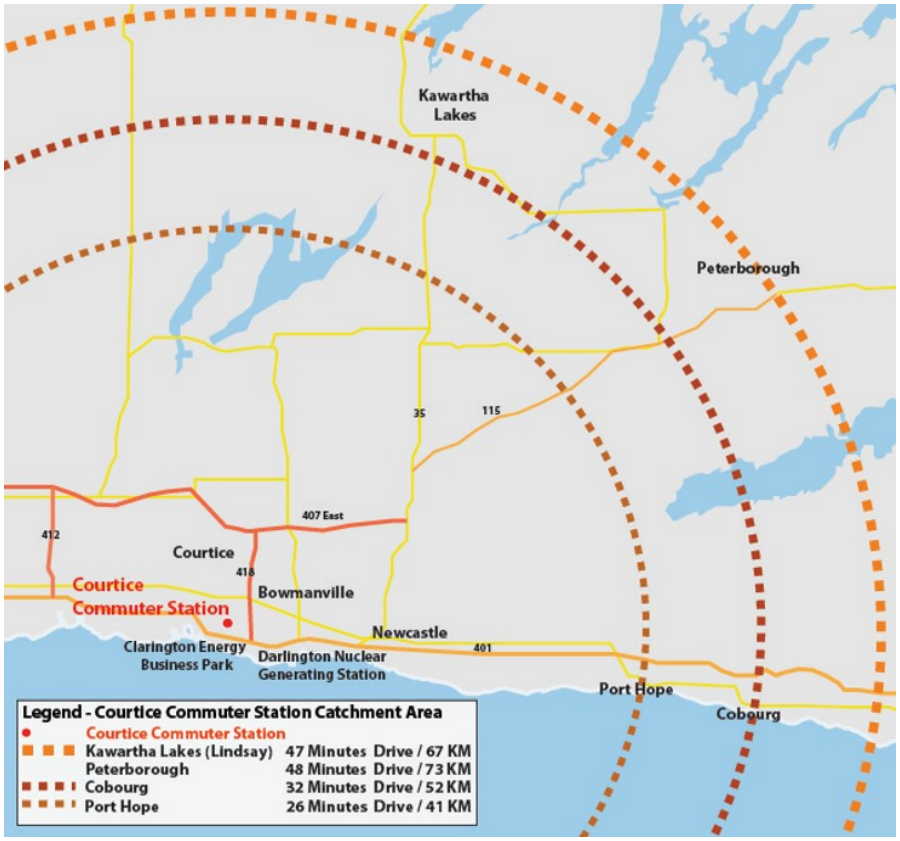
3.4.3.1 Increased Accessibility for Northumberland County, the City of Kawartha Lakes and Peterborough

Figure 21 shows the accessibility of the proposed Courtice GO Station and the business park surrounding the station and the

Clarington Energy Business Park from the municipalities to the north and east of Durham Region, specifically Northumberland County (including the communities of Port Hope and Cobourg), Kawartha Lakes and Peterborough.

Figure 21

Courtice GO Station and Business Parks Accessible from Northumberland County, Peterborough and Kawartha Lakes



Source: Municipality of Clarington

Fostering the development of the business parks around Courtice GO Station can provide employment opportunities for not only residents in Durham Region, but also the residents of these surrounding municipalities. The proposed Courtice GO Station would also provide additional transportation options for residents within a 30-45 minutes' drive.

3.4.4 Bowmanville

Figure 22 shows the vacant and/or underutilized sites around the proposed Bowmanville GO Station. The station can be expected to have a mix of uses, including a significant amount of residential development (nearly 3,300 units), and over 270,000 ft² of combined office and retail space – there are 23 sites with development capacity.

Figure 22 Vacant and Underutilized Sites - Bowmanville GO, Clarington

Total (Re)Development Potential (23 sites):

- 3,270 residential units
- 150,700 ft² of office
- 121,000 ft² of retail & commercial

3.5 ECONOMIC IMPACT OF DEVELOPMENT AROUND PROPOSED GO STATIONS

3.5.1 Development Charges

Based on the development potential of vacant and/or underutilized sites within one kilometre of the proposed GO stations,

development could generate approximately $232 million in development charge revenues for the Region, local municipalities and school boards, based on today's DC rates.

Figure 23 shows the breakdown of development charge revenues by residential suite type and non-residential asset class as well as the breakdown of revenues by jurisdiction. In total, the breakdown of DC revenues would be as follows:

- Town of Whitby: $2.1 million;
- City of Oshawa: $27.6 million;
- Municipality of Clarington: $32.7 million;
- Durham Region: $154.3 million; and
- School Boards: $15.1 million.

Whitby, Oshawa, Clarington and Durham Region can use these DC revenues to fund growth-related capital projects across their respective jurisdictions.

Figure 23 **Potential Development Charge Revenues, Build-Out of Development Capacity Around Proposed GO Stations**

Total by Jurisdiction	Singles / Semis	Towns	Apartments	Office	Retail	Industrial	Total
				Dollars			
Town of Whitby	-	-	-	1,653,120	413,280	-	2,066,400
City of Oshawa	-	1,457,610	17,271,001	2,891,370	6,005,515	-	27,625,496
Municipality of Clarington	287,730	12,673,129	9,933,453	5,614,474	743,296	3,398,471	32,650,552
Region of Durham	473,346	25,218,362	62,958,629	25,596,329	17,706,209	22,381,818	154,334,692
School Boards	31,284	2,233,594	10,862,183	1,100,538	48,354	814,798	15,090,751
							231,767,891

Source: Altus Group Economic Consulting based on Town of Whitby 2016 Development Charges Pamphlet , Municipality of Clarington 2016 Development Charges Pamphlet and City of Oshawa 2016 Development Charges Pamphlet

3.5.2 Annual Property Tax Revenues

If each of the vacant and/or underutilized sites were to be developed, they would generate roughly $24.8 million in annual property tax revenues for the Region and local municipalities (including the education portion of the tax levy).

We estimated assessment value based on recent assessment data from Altus Group databases and historic home price data in each of Whitby, Oshawa and Clarington. For non-residential assessment values, we averaged current assessment values for comparable office, retail and industrial properties in the areas surrounding the proposed GO stations.

In total, the breakdown of annual property tax revenues, assuming full build-out would be as follows:

- Town of Whitby: $240,000[9];
- City of Oshawa: $4.2 million;
- Municipality of Clarington: $4.4 million;
- Durham Region: $11.7 million; and
- Education: $4.4 million.

Durham Region and the local municipalities can use these annual property tax revenues to support local service priorities.

In addition to the property tax revenues generated from new developments around the proposed GO stations, there have been numerous studies about the impacts that commuter rail can have on existing properties surrounding transit stations:

- Cervero/Duncan (2002) found that properties within 0.5 miles of new commuter rail stations saw property values increase by 17% for the Coaster system in San Diego, California. For commercial properties around stations, values for properties in the Downtown area increased by 91%;
- Gruen & Associates (1997) found that properties within 1,000 feet of the Chicago Metra system increased by 20%;

[9] The estimates of tax revenues for local municipalities only include the Town/City/Municipal portions of the estimated tax revenues. For example, the sites within the Town of Whitby would also pay Regional taxes and education taxes, which are excluded from the amount shown for the Town, but included in the Regional an d Education totals.

- A Voith study (1991) found that properties in Camden County, New Jersey increased on average by 10% due to the PATCO service; and
- Landis et al (1995) found that commercial properties within 0.25 miles of the CalTrain in Santa Clara County, California had a value premium of 120%.

We have not undertaken an analysis of how much an increase in property values around the proposed GO station sites would mean for each municipality's tax base. However, any increase in assessment values can help generate additional tax revenues for Durham Region and the local municipalities and either help fund expanded municipal services, or help alleviate pressure on increasing tax rates to provide existing service levels.

3.5.3 Federal and Provincial Tax Revenues

Based on the build-out of the development capacity around each of the four proposed GO stations, the following would be generated in federal and provincial tax revenues under the Land Transfer Tax and Harmonized Sales Tax (net of rebates):

- Land Transfer Tax: a total of $14.6 million would be generated for the Province; and
- HST: a total of $59.6 million would be generated from home purchases (after rebates), including $22.9 million for the provincial government and $36.7 million for the federal government.

3.5.4 Jobs in Non-Residential Developments

Figure 24 shows the estimated number of jobs from the build-out of the vacant and/or underutilized non-residential development sites around the four proposed GO stations.

In total, the 7.8 million ft^2 of potential development equates to approximately $1.1 billion in construction value, and could

accommodate approximately 21,300 jobs.[10] These jobs would see estimated annual wages or income of approximately $1.25 billion, with $270.7 million per year accruing to the provincial and federal governments in income tax revenues.

Figure 24 Jobs, Income and Income Tax Revenue from Potential Non-Residential Developments Around GO Stations on Lakeshore East Extension through Central Oshawa to Bowmanville

	Area of New Development	Construction Value of Development	Employment	Total Annual Income	Total Annual Personal Income Tax
	Square Feet	*Dollars*	*Jobs*	*Dollars*	*Dollars*
Office / Institutional	3,843,293	672,576,208	15,373	1,011,810,734	211,721,378
Retail	1,329,295	199,394,247	3,323	93,095,313	29,357,563
Industrial	2,583,088	206,647,020	2,583	146,777,452	29,627,047
Total	7,755,675	1,078,617,475	21,279	1,251,683,499	270,705,989

Source: Altus Group Economic Consulting based on Altus Group Cost Guide 2016

These jobs will also have an effect on Gross Domestic Product (GDP), but the extent of the impact will depend on the types of industries that these persons are employed in, and the types of positions these persons will hold.

3.6 SPENDING FROM RESIDENTS AND EMPLOYEES IN DEVELOPMENTS AROUND GO STATIONS CAN HELP SUPPORT LOCAL BUSINESSES

The residents in developments around the proposed GO stations can be expected to support local retail stores and businesses. In total, there is identified potential for nearly 6,000 residential units around the four proposed GO stations, which would have a combined annual spending on goods and services of $266 million. These annual expenditures include spending on food, household operations, furnishing and equipment, clothing, transportation, clothing, personal care, recreation, reading materials, education and many other goods and services. It can be expected that a portion of these expenditures would be made at businesses and

[10] These jobs include a mix of full-time and part-time positions

service providers in eastern Durham Region, and in the non-residential developments built around the station areas.

Based on third-party research, it is estimated that the average urban office worker in the US spends approximately $115 per week in the vicinity of their office[11], which includes spending on food, goods and services (and excludes transportation costs and purchases made online). The development potential on vacant and underutilized sites around the four proposed GO stations could generate roughly 15,400 office workers, which would mean that they would combined spend $1.8 million per week at local stores and businesses, or $92 million per year.

3.7 CONCLUSIONS

The improved transportation service and connection of Downtown Oshawa and Clarington to the GTA by a fixed rail link means that, under Scenario 2:

- 73,700 more people can get to Downtown Oshawa via transit in under an hour; and
- 169,500 more people can get to the Bowmanville GO Station area via transit in under an hour.

The project is also connecting people to the areas around the Thornton's Corners and Courtice GO stations.

Analysis of the vacant and underutilized sites around each of the four proposed GO stations shows that there is significant development capacity to see the areas developed (as quickly as the market can deliver the developments) with transit-supportive densities. This analysis did not consider the development potential of sites beyond a 1-km radius around stations, or the long-term development potential of sites currently occupied or built-upon. If

[11] Michael P. Niemira and John Connolly, International Council of Shopping Centres, "Office-Worker Retail Spending in a Digital Age, (2012)

this was done, the development potential would be even higher than estimated in this study.

We have found a total of 63 vacant and/or underutilized sites around the four stations (including the sites in the Clarington Energy Business Park southeast of the Courtice GO Station). Combined, these sites could generate, at build-out:

- Nearly 6,000 residential units; and
- 7.8 million ft^2 of non-residential development, including 3.8 million ft^2 of office/institutional space, 1.3 million ft^2 of retail space and 2.6 million ft^2 of industrial development.

Based on the experience of municipalities such as Guelph, Vaughan, Halton Hills and others, there can be expected to be steady interest in developing the lands around the four proposed GO stations. The lands around the four proposed GO stations are more likely to be developed if transit service is provided.

At build-out of the vacant and/or underutilized sites, the developments would generate the following revenues for the Region, local municipalities and upper levels of government:

- $232 million in development charge revenues (based on today's DC rates);
- Nearly $25 million in annual property tax revenues;
- Almost $15 million in Provincial Land Transfer Tax revenues; and
- Nearly $60 million in HST revenues, including approximately $23 million for the Province and $37 million for the federal government.

The potential non-residential developments on vacant and/or underutilized sites around the proposed GO stations, once built-out and occupied by businesses, could accommodate over 21,000 jobs, which would equate to annual income for these persons of

approximately $1.3 billion, generating roughly $270 million in annual income tax revenues for the provincial and federal governments.

These are significant increases in the accessibility to the GTAH's labour force, which would help skilled workers find jobs in Durham Region, help businesses attract skilled labour, and allow the Region's post-secondary institutions to continue to grow by providing improved access to prospective students.

The service can also help provide improved accessibility to/from points east of the proposed new eastern terminus station in Bowmanville. The project would mean that places such as Kawartha Lakes, Peterborough and Northumberland County would be within a 30-45 minute drive of GO train services, better connecting them to the rest of the Greater Golden Horseshoe.

4 ECONOMIC DEVELOPMENT OPPORTUNITIES IN EASTERN DURHAM REGION

This section reviews several economic development initiatives in eastern Durham Region, including several major infrastructure projects that will generate significant economic activity and will require improved accessibility for the thousands of skilled workers required for the projects to access the Region on a daily basis.

There are also numerous emerging employment sectors that will require transportation infrastructure, such as the GO Lakeshore East extension, to continue to grow and tap into the labour market within Durham Region and the GTHA as a whole.

4.1 MAJOR INFRASTRUCTURE PROJECTS IN DURHAM REGION

4.1.1 407 Extension

Phase 1 of the Highway 407 East extension is scheduled to open to traffic in spring 2016, connecting Brock Road in Pickering to Harmony Road in Oshawa. Highway 412 is also scheduled to open at the same time, connecting Highway 407 to Highway 401.

The Highway 407 East extension was considered one of the key drivers in the employment analysis in the Region's *Growing Durham* reports.[12] Approximately 50% of the Region's potentially developable employment lands are located along the proposed Highway 407 corridor.

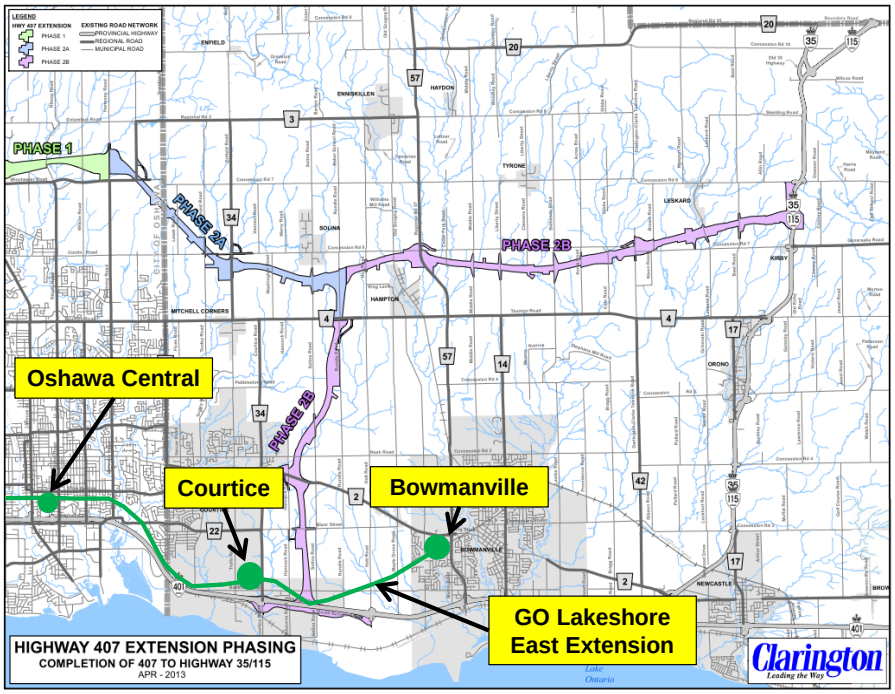
Phase 2 of the 407 East extension will see the highway extended from Harmony Road to the East Durham Link (EDL) by 2017, and to Highway 35/115 by 2020. The cost of the works amounts to $1.15 billion. The East Durham Link (also known as the future Highway 418) will connect Highway 401 to Phase 2 of the Highway 407, and

[12] Urban Strategies & Watson & Associates, Growing Durham – Recommended Growth Scenario and Policy Directions, Final Report, (November 18, 2008)

will be located immediately to the east of the proposed Courtice GO Station, in close proximity to the employment lands surrounding the GO station and the Darlington Energy Park lands.

Figure 25

Map of Phase 2 Highway 407 Extension and East Durham Link



Source: Municipality of Clarington Engineering Services Department

4.1.2 Port Granby Waste Project

The Port Granby project will clean up approximately 450,000 cubic metres of low-level radioactive waste at an existing facility in southeast Clarington, which will be relocated to a new long-term waste management facility to be built about a kilometre north of the current site. The project is part of the larger Port Hope Area Initiative, which will also see a similar project in the nearby Port Hope community.

The project is expected to cost approximately $270 million, and last at least five years, and require hundreds of workers at the various firms contracted to do the work.[13]

4.1.3 Darlington Expansion / Refurbishment

Currently, the Darlington Nuclear Generating Station has four nuclear reactors, and refurbishment is required to replace the core reactor components to enable the plant to operate through 2055. The $12.7 billion project is expected to take 15 years (the refurbishment of each reactor taking three years each), generating roughly 3,000 new jobs during the planning and construction process, requiring skilled tradespeople, project managers, and engineers.[14]

The Darlington facility is also seeking to be the home to Ontario's next two nuclear units, which would generate 3,500 new jobs during site preparation and construction and another 1,500 jobs during operation and maintenance.

4.2 EMERGING EMPLOYMENT SECTORS

4.2.1 Health and Biosciences

There are several developments in the expanding health and biosciences sector in eastern Durham Region:

- Lakeridge Health is currently seeking public support and funding for a $180 million expansion and refurbishment of the Bowmanville hospital. The plans include the demolition of the existing north wing and the construction of a new tower attached to the remainder of the existing building via a walkway. The facility, upon completion of the project, would

[13] Based on http://www.phai.ca/en/home/port-granby-project/default.aspx

[14] Jennifer O'Meara, "Darlington nuclear refurbishment's expected economic boost welcome in Clarington", (January 14, 2016), http://www.durhamregion.com/news-story/6230997-darlington-nuclear-refurbishment-s-expected-economic-boost-welcome-in-clarington/

include new surgical suites, expanded day surgery options and additional services incorporated into the hospital. There would also be a new emergency department.[15] An expanded hospital can better attract talent to fill any vacant doctor or nursing positions through improved access to the GTA's labour market.

- The Municipality of Clarington is home to the first private commercial genetics lab in Ontario to be awarded a contract by the Ministry of Health to provide non-invasive prenatal testing.[16] Gamma Dynacare's Impact Genetics is a world-wide leader in genetic testing, and in particular testing for retinoblastoma – a rare eye cancer that strikes during childhood. The lab is planning to grow with new tests being added to determine the best treatments of lung tumours, melanoma and colon cancer.
- The Lakeridge Health Education and Research Network (LHEARN) is a hub for cutting edge training, education and research. Lakeridge Health has partnered with more than 80 post-secondary institutions and each year welcomes more than 1,600 students to pursue studies at the LHEARN Centre. The Centre has an auditorium for lectures, a health sciences library, and simulation labs equipped with patient simulators to create realistic medical scenarios for students.[17]

4.2.2 Arts & Culture

The area has recently attracted a number of entrepreneurs in the arts and cultural sector, building on the strong institutions in place, including Parkwood Estate, the Regent Theatre, the Robert McLaughlin Gallery, the Visual Arts Centre in Clarington, the

[15] Presentation by Kevin Empey, Chief Executive Officer, Lakeridge Health, Regarding and Update on the Hospital Building Plans – delegation to Municipality of Clarington General Government Committee at November 9, 2015 meeting

[16] Clarington Board of Trade, Economic Development Update, Summer 2015

[17] Source: Lakeridge Health

Ontario Symphony, the Peony Festival the Oshawa Jazz Festival, Bowmanville's Applefest and Maplefest, the Gift of Art, the General Motors Centre (which hosts several high profile concerts), and Canadian Tire Motorsport Park. These events and attractions are a key component to attracting tourism to the Region, providing quality of life for residents, and generating significant employment and economic activity.

4.2.3 Advanced Manufacturing

General Motors, with its headquarters in the City of Oshawa, is continually investing resources in the research, design, engineering and creation of innovative product lines such as electric and hydrogen fuel cell powered vehicles. In July 2012, a $850 million investment in research and development was announced.[18]

While the motor vehicle parts manufacturing sector is a major source of employment for Durham Region, according to Millier Dickinson Blais' *Sector Analysis and Cluster Development Strategy Report*:

> …a number of other advanced manufacturing subsectors have emerged to offer additional opportunities outside of automotive. Capabilities in medical devices, machinery manufacturing, electrical equipment, and fabricated metals suggest opportunities for the advanced manufacturing sector to support growth in other areas of the City's economy, such as energy generation, health and biosciences and multimodal transportation.[19]

4.2.4 Energy Generation

The Region has a strong Energy Generation employment sector, through the existing (and potentially expanding) Darlington Nuclear plant, and the programs offered by UOIT and its Energy

[18] Source: City of Oshawa, Economic Development Services

[19] Millier Dickinson Blais, City of Oshawa Sector Analysis + Cluster Development Strategy, (December 2, 2013)

Systems and Nuclear Science Research Centre, which operates a number of programs related to alternative energies such as wind, solar, hydrogen, hydraulic, nuclear and geothermal. The energy sector in Clarington consists of a highly educated and skilled workforce – the Clarington Board of Trade showcases this sector through its annual Clarington Energy Summit.

4.2.5 Multimodal Transportation and Logistics

With the coming completion of Highway 407 to Highway 35/115, the Oshawa Executive Airport, the Port of Oshawa and access to both CN and CP railways, eastern Durham Region has existing and growing access to a multi-modal transportation network, helping foster growth in the Region's Transportation and Logistics Sector.

According to the City's Sector Analysis and Cluster Development Strategy:

> Opportunities for growth in this industry exist in Oshawa due to local export oriented industries, and current and emerging major infrastructure facilities such as the Oshawa Municipal Airport, Port of Oshawa, Highway 401 and Highway 407 East. …
>
> In order to encourage growth in these subsectors, investment will be needed in the City's infrastructure and major transportation assets to improve goods movement prospects.[20]

4.2.6 Information Technology

The Information Technology sector is a key focus of Durham Region's post-secondary institutions, particularly through programs offered by UOIT in Information Technology Security, which is one of only a few specialized IT security programs in the world. UOIT also offers bachelor's degrees in Game Development & Entrepreneurship, and a "Hacker Research Lab" where students

[20] Ibid, pages 56 & 59

in the Information Technology program learn and develop anti-hacking strategies. Durham College also offers programs in Animation, Web Design, Computer Systems Technology, and many others. Emerging IT companies in Oshawa include Mojility (using technology to create compliance and efficiency solutions) and Cimetrix (providing clients with products and prototypes using 3D printing technology).[21]

4.3 ENABLERS OF ECONOMIC GROWTH IN DURHAM REGION

Eastern Durham Region has the economic infrastructure in place to foster growth for area businesses and economic sectors:

- **Post-Secondary Institutions**: The three post-secondary institutions in Durham Region (Durham College, UOIT and Trent University Durham) have education and training programs that are responsive to local economic needs by placing emphasis on training for local industries such as nuclear, mechanical engineering, food sciences and business administration.
- **Oshawa Executive Airport**: The Oshawa Executive Airport is located southwest of the intersection of Thornton Road North and Taunton Road West. The facility has a modern terminal building capable of facilitating corporate business travel and general aviation, dual runways able to service a broad range of aircraft, and over 300,000 ft^2 of hangar space. The airport provides services such as flight training, air ambulance, passenger charter services, and freight services.
- **The Port of Oshawa:** The Port of Oshawa is a deep-sea port that handles roughly $23 million in cargo annually, from salt and steel products to asphalt and grain. The Port is located just 2 kilometres from Highway 401 and is connected to the rail system, with the completion of a new rail spur, allowing the

[21] Source: City of Oshawa, Economic Development Services

Port to respond to growing demands of current and prospective clients. There are expansion plans, through the East Wharf Consolidation Project, which will provide additional berths for ships and more cargo handling space. Recently, Triad Metals, a wholesale distributor of structural steel products, chose to build its first Canadian warehousing operation at the Port to serve its customers in Ontario and eastern Canada more efficiently.[22]

- **Business Incubation**: In mid-2015, the City of Oshawa partnered with the Spark Commercialization and Innovation Centre to open The Loft, a 90-seat start-up incubation space in Downtown Oshawa. The Loft allows start-up businesses to network with local entrepreneurs and businesses. Spark Centre provides free advisory services to young innovation and technology companies (those less than 3 years old and with total revenue less than $1 million), and offers services such as executive coaches, functional advisory and day-to-day operational support.[23]

4.4 CONCLUSIONS

There are several major economic opportunities in eastern Durham Region, including:

- The continued extension of Highway 407 and the link highways connecting Highway 407 to Highway 401 (Highway 412 in western Durham Region and Highway 418 in eastern Durham Region);
- The Port Granby Waste Project, which has a cost of $270 million and is expected to last several years and require hundreds of workers; and

[22] Source: www.portofoshawa.ca

[23] News Release, "Spark Innovation Centre and City of Oshawa Announce The Loft", (May 22, 2015), http://www.sparkcentre.org/news/spark-innovation-centre-and-city-of-oshawa-announce-the-loft/

- The Darlington Refurbishment and potential expansion, the former of which has a cost of $12.7 billion, and is expected to take up to 15 years, and generate roughly 3,000 jobs. The expansion project would generate an additional 3,500 jobs during construction and 1,500 jobs once operational.

These projects will require numerous skilled tradespeople, engineers, project managers, among other workers to complete the jobs on budget and on schedule.

Improving transportation infrastructure will allow prospective workers more options to commute to job sites in eastern Durham Region, and make it easier for contracted firms to attract those workers. The easier it is for contracting firms to have access to a skilled labour supply, the more likely it will be able to maintain appropriate staffing levels, and retain existing workers. These are all essential elements to delivering the projects on-time and on-budget.

There are also several other emerging economic sectors in the Region, particularly in Oshawa and Clarington, including a modernizing and increasingly research and training oriented Health and Biosciences sector, and the continued focus and investment of the Region in the Advanced Manufacturing sector.

The introduction of GO train service to eastern Durham Region can also complement the existing economic infrastructure in place, which already includes the Oshawa Executive Airport, the Port of Oshawa, Durham College, University of Ontario Institute of Technology and the Trent University Durham campus.

5 ECONOMIC AND FINANCIAL IMPACT FROM GO LAKESHORE EAST EXTENSION

This section of the report looks at the economic impact generated from both the construction and on-going operations of the proposed GO Lakeshore East extension project.

5.1 ECONOMIC IMPACT FROM CONSTRUCTION

5.1.1 Capital Costs

According to the June 2010 Metrolinx *GO Rail Options Benefits Case Assessment* report, the capital costs associated with the Lakeshore East Line extension would be approximately $330 million (in 2009 dollars, as of the published date of the study). This includes costs for trackwork, signals, structures (including the crossing of Highway 401), road crossings, stations, engineering and project management costs, and contingencies.[24] The capital cost is based on all-day, two-way service to Bowmanville, so the capital cost is assumed to be the same for Scenario 1 and Scenario 2.

In arriving at the $330 million cost estimate, the Benefits Case Assessment report uses contingencies amounting to $107 million over and above the $177 million in base construction costs, or a contingency factor of 60% of base costs. This cost estimate represents our "High" cost scenario.

For the purposes of this analysis, we have also estimated the costs if the contingencies were reduced to a more reasonable 15%, which will be our "Low" cost scenario. Based on a 15% contingency (which is over and above a 26% engineering factor still applied to the costs), the costs presented in the Benefits Case Assessment would be $257 million.

[24] The above cost estimate excludes costs associated with the maintenance and layover facilities.

According to Arup, costs for transportation infrastructure have experienced inflation of approximately 10% since 2009, so the $257-$330 million cost range would be more in the range of $284-$366 million in 2015 dollars. These costs do not include any land or property acquisition costs.

According to the Benefits Case Assessment, the extension would also require additional rolling stock – three new trains to 2021 and an additional four between 2021 and 2031. The cost of each train set was estimated in the study at $32 million. Therefore, capital costs (inflated by 10% to bring to 2015 dollars) for rolling stock, would ultimately amount to $247 million, bringing the total capital costs to between $532-$614 million.

5.1.2 Economic Output from Construction

The construction of, and rolling stock required for, the extension of the GO Lakeshore East line to Bowmanville, based on the costs presented in the Benefits Case Assessment report and the modified costs based on a reduced contingency factor, would have a total cost between $532 and $614 million.

Based on an Input-Output model used to measure the impacts of various types of economic activities (described in more detail in Appendix C to this report), the construction of the infrastructure and capital required for the eventual operation of the line would therefore generate between 5,456 and 6,289 person-years of employment, including between 2,681 and 3,091 person-years directly in industries relating to the construction of the stations, track, structures, and signals. The works would generate between another 1,583 and 1,825 person-years in industries indirectly related to the construction.

These person-years of employment can be expected to generate between $369 and $426 million in income for those employed in the construction of the project (both directly and indirectly).

The total gross economic output related to the construction of the extension would amount to between $1.1 and $1.3 billion. This includes the $532 to $614 million in direct output (related to the costs of the works themselves), between $346 and $399 million in indirect output generated, and between $247 and $285 million in induced economic output.

Figure 26 **Estimated Economic Benefits of the GO Lakeshore East Extension: Total Initial Construction Investment**

	Direct		Indirect		Induced		Total	
	Low	High	Low	High	Low	High	Low	High
Economic Activity ($millions)	532 to 614		346 to 399		247 to 285		1,125 to 1,297	
Gross Domestic Product ($millions)	251 to 290		179 to 206		143 to 165		573 to 661	
Number of Jobs*	2,681 to 3,091		1,583 to 1,825		1,192 to 1,374		5,456 to 6,289	
Wages ($millions)	185.2 to 213.5		115.1 to 132.7		69.1 to 79.6		369.4 to 425.8	
Business Earnings ($millions)	70.0 to 80.7		64.7 to 74.6		67.7 to 78.1		202.4 to 233.4	
Provincial & Federal Taxes ($millions)								
Personal							85.6 to 98.6	
Business							34.0 to 39.2	
Total Provincial & Federal Taxes ($millions)							**119.6**	**137.8**

* person years of employment

Source: Altus Group Economic Consulting based on Statistics Canada Input-Output model and other sources

The total impact on GDP is estimated to be between $573 and $661 million, which includes direct, indirect and induced GDP effects.

The project can be expected to generate between $120 and $138 million in income tax revenues for the federal and provincial governments, including between $55 and $63 million directly, and between $65 and $75 million through indirect and induced rounds of economic output.

5.2 ECONOMIC AND FINANCIAL IMPACT OF HAVING GO LAKESHORE EAST EXTENSION SERVICE AVAILABLE

5.2.1 Assumed New Riders

Based on a high-level analysis undertaken by Arup, ridership for each Scenario of the GO Lakeshore East extension, both in and out of Durham Region, is assumed to be as follows:

- Scenario 1, peak service westbound in the morning peak and eastbound in the afternoon peak: 2,000 riders in the morning

peak. Assuming each passenger makes two trips per day, equals a total of 4,000 trips.

- Scenario 2, two-way, all-day service with a minimum of one trip per hour: 5,000 riders in the morning peak, combined eastbound and westbound. If each of these passengers makes two trips per day, this would equate to 10,000 trips per day. There would likely be additional trips for persons making off-peak trips, and trips taken on weekends that are not accounted for in this assumption.

The above assumptions, which are informed by a high-level analysis, are deemed to be fit for the purposes of this study. However, a more detailed modelling exercise should be undertaken as part of the development of a Business Case Study to establish more robust ridership estimates.

5.2.2 Economic Output from On-Going Operations

5.2.2.1 Incremental Operating Costs

According to the *GO Rail Options Benefits Case Assessment*, the annual incremental operating costs in 2031 for the extension of the GO Lakeshore East line would be $79 million, based on a Scenario 1 service level.[25] This cost estimate is shown in 2031 dollars, and was inflated based on a 5% annual rate. Therefore, in 2015 dollars, the annual incremental operating costs for Scenario 1 would be $34.8 million. To estimate the operating costs for Scenario 2, the operating costs of Scenario 1 have been adjusted under the basic assumption that the increase in costs is proportionate to the increase in service, as based on the number of trains run in each Scenario.

In the peak hour, under Scenario 2, there would be two additional trains per hour and trains would run in both directions, resulting in

[25] Metrolinx, GO Rail Benefits Case Assessment, (June 2010), Table 1, Phase II

four-times the number of train trips, and in the off-peak, trains would run every 15 minutes, as opposed to once an hour, also resulting in four times the number of train trips. Consequently, the operating costs for Scenario 2 have been calculated as being four-times those of Scenario 1, or $139.2 million ($39.4 million x 4). Note that although this calculation should provide a reasonable initial estimate, a more detailed operating cost estimate would be prepared as part of a Business Case analysis. [26]

Based on Statistics Canada Input-Output multipliers for rail transportation, this annual expenditure of operating costs would result in the following annual economic impacts:

- For Scenario 1, a $43 million impact on GDP, including $26 million directly through the daily operation of train services. For Scenario 2, a $172 million impact on GDP, including $105 million directly;
- Total gross output of $146 million for Scenario 1, and $584 million for Scenario 2;
- Permanent employment of approximately 333 jobs for Scenario 1 and 1,334 jobs in Scenario 2. These employment estimates represents persons both directly in the day-to-day operation of the service, and indirectly via service providers, suppliers, etc.;
- Annual wages and salaries for those employed of over $22 million under Scenario 1, and $90 million in Scenario 2; and
- Annual provincial and federal tax revenues of $6 million for Scenario 1 and $23 million for Scenario 2.

[26] In reality, there would be some economies of scale from each additional trip offered through Scenario 2, the degree to which is unknown at this time. The Business Case study would provide a more rigorous modelling of the incremental costs between Scenario 1 and Scenario 2.

Figure 27 **Estimated Economic Benefits of the GO Lakeshore East Extension: On-Going Operation (Single Year), Scenario 1 and Scenario 2**

	Direct	Indirect	Induced	Total
Scenario 1				
Economic Activity ($millions)	34.8	15.9	95.2	145.9
Gross Domestic Product ($millions)	26.3	8.1	8.5	42.9
Number of Jobs	171	79	83	333
Wages ($millions)	13.4	4.8	4.2	22.4
Business Profit ($millions)	0.0	0.6	0.4	1.0
Provincial and Federal Taxes ($millions)				
Personal				5.8
Business				0.2
Total Provincial & Federal Taxes ($millions)				**5.9**
Scenario 2				
Economic Activity ($millions)	139.1	63.5	381.0	583.5
Gross Domestic Product ($millions)	105.3	32.3	33.9	171.6
Number of Jobs	685	315	334	1,334
Wages ($millions)	53.8	19.2	16.6	89.6
Business Profit ($millions)	0.0	2.3	1.5	3.9
Provincial and Federal Taxes ($millions)				
Personal				23.2
Business				0.2
Total Provincial & Federal Taxes ($millions)				**23.3**

Source: Altus Group Economic Consulting based on Statistics Canada Input-Output model and other sources.

Over a 10-year period, these annual impacts would cumulatively be as follows:

- For Scenario 1, a $429 million boost to GDP. For Scenario 2, an increase of $1.7 billion in GDP;
- Total gross output of $1.5 billion for Scenario 1, and $5.8 billion for Scenario 2; and
- Wages and salaries for those employed would be over $224 million under Scenario 1, and $896 million in Scenario 2.

5.2.3 Expected Fare Revenues

If we assume that the average fare for the new riders at the proposed new GO stations is $10.00 per trip, this would mean annual incremental revenues of $9.3 million per year for Scenario 1, and $23.2 million per year for Scenario 2. The Net Present Value of the estimated incremental revenues through 30 years, assuming

operations begin in 2026, are $77 million for Scenario 1 service and $191 million for Scenario 2 service.

5.2.4 Other Quantifiable Benefits from On-Going Operation of Lakeshore East Extension

5.2.4.1 Savings in Time

Figure 28 shows the anticipated time savings for new riders accommodated by the extended GO Lakeshore East line. Based on modelling by Arup, the riders on a Scenario 1 service will save a combined 510,000 minutes per day (or nearly 8,500 hours) spent commuting from a few different sources:

- The improved access to GO trains (less distance to travel to GO stations);
- The more rapid commute for those who opt for train over personal vehicles; and
- The reduced congestion on area roads (for those who continue to drive).

Over the course of a year, the potential time savings amounts to more than three million hours saved per year, which has a value of $40 million per year. For Scenario 2 service, nearly 10,500 hours per day would be saved from the ridership generated, would have a value of nearly $50 million per year.

Figure 28

Estimated Value of Time Saved from GO Lakeshore East Extension

	Scenario 1	Scenario 2
Riders (trips per day)	4,000	10,000
Time Savings per Day (minutes / day)	510,000	629,000
Time Savings per Day (hours / day)	8,500	10,483
Working Days (days / year)	231	231
Total Hours Saved per Year	3,102,500	3,826,417
Value of Time Saved per Year ($ / year)	$40,394,550	$49,819,945

Source: Altus Group Economic Consulting based on data from Arup, CANSIM Table 281-0048

5.2.4.2 Savings in Vehicle Operating and Ownership Costs

The decision to take transit can give a substantial boost to a family's disposable income, both for their reduced use of vehicles and for the option of foregoing ownership of vehicles due to available public transportation options. According to a study by the Canadian Urban Transit Association, commuting by transit is one-third to one-half as expensive as commuting by car in major Canadian cities, which would have the effect of increasing a family's disposable income.[27]

Benefits for those opting to travel by public transit may also include savings on insurance, fuel and parking costs for those formerly traveling by automobile.

Increased transit usage would also generate cost and time savings for those who remain as automobile travellers as there would be less congestion on roads, resulting in faster travel times.

[27] Canadian Urban Transit Association. Measuring Success: The Economic Impact of Transit investment in Canada. 2010

According to a 2013 Study by the Canadian Automobile Association (CAA), the costs of operating a vehicle (including fuel, maintenance and tires) is roughly $0.15 per kilometre driven.[28]

Based on Arup estimates of vehicle kilometres saved due to the introduction of GO train service on the extended Lakeshore East line, there would be a substantial savings from reduced automobile usage generated from the two scenarios:

- The operation of service under Scenario 1 would generate 66,000 kilometres per day in vehicle-kilometres saved for all commuters, generating $4.4 million in cost savings per year in reduced operating costs.
- The Scenario 2 level of service would save commuters 212,000 kilometres per day, generating $14.2 million in cost savings per year in operating costs.

According to the 2013 study by CAA, there are also fixed costs of automobile ownership, amounting to approximately $6,500 per year (including insurance, license and registration, depreciation and interest on car loans). If 5% of new transit riders that use the GO train extension are able to eliminate their need for a car (or avoid purchasing a car in the first place), this translates to $1.3 million in annual car ownership savings for Scenario 1, and $3.2 million per year for Scenario 2. Reducing car ownership, and the associated cost savings for households that are able to reduce or avoid car ownership improves the ability to afford the costs of home ownership, and improves the desirability of living and/or working in Durham Region.

[28] Canadian Automobile Association, Driving Costs, 2013 Edition

Figure 29

Estimated Savings in Vehicle Operation and Car Ownership from Lakeshore GO East Extension Project

	Scenario 1	Scenario 2
Cost Savings from Reduction in Vehicle Operation		
Riders (trips per day)	4,000	10,000
Vehicle Kilometres Saved per Day (km / day)	66,000	212,000
Working Days (days / year)	231	231
Vehicle Kilometres Saved per Year (km / year)	15,246,000	48,972,000
Cost of Operating Vehicle ($ / km)	$0.15	$0.15
Subtotal Cost Savings for Driving Avoided ($ / year)	$ 4,430,488	$ 14,231,263
Cost Savings from Reduction in Car Ownership		
Share of Riders Who Reduce Car Ownership	5%	5%
Reduction in Car Ownership (# of vehicles)	200	500
Annual Cost of Owning a Vehicle ($ / year)	$6,482	$6,482
Subtotal Car Ownership Savings	$ 1,296,432	$ 3,241,080
Total Savings in Vehicle Operation and Ownership ($ / year)	$ 5,726,920	$ 17,472,343

Source: Altus Group Economic Consulting, Study on Driving Costs by Canadian Automobile Association, and data from Arup

Combined, the savings in vehicular operation and ownership amount to $5.8 million per year for Scenario 1 and $17.5 million per year for Scenario 2.

5.2.4.3 Improved Road Safety

According to the American Public Transportation Association[29], increased public transportation usage results in a reduction in accidents, even for those still traveling by automobile, due to reduced congestion and vehicle kilometres travelled.

Fewer vehicles on the road means fewer automobile collisions. According to a study by the University of Ottawa, there are over 2,000 automobile collisions per billion kilometres driven. According to Statistics Canada data, for every billion kilometres driven, there

[29] Glen Weisbrod & Arlee Reno, Economic Impact of Public Transportation Investment, Prepared for: American Public Transportation Association, (October 2009)

are five collisions with fatalities (where at least one person is killed) and 498 collisions with injuries (where at least one person is injured).[30]

Based on modelling from Arup that estimates the number of vehicle kilometres avoided by new transit riders on the GO Lakeshore East extension, this would mean that there would be just over 30 collisions avoided per year under the Scenario 1, and nearly 100 collisions avoided per year under Scenario 2.

The March 2010 *Collision Cost Study* prepared for the Capital Region Intersection Safety Partnership, classified collisions into three categories and estimated the costs[31] of each type of collision:

- Fatal Collisions: $181,335 per collision;
- Collisions Involving Injury: $39,524 per collision; and
- Property Damage Only Collisions: $10,902 per collision.[32]

Cost estimates are based on costs to repair vehicles, insurance costs, out of pocket expenses, towing and storage costs, police, fire and ambulance costs, medical and hospital costs.

[30] Statistics Canada, Catalogue No. 91-215-X

[31] Costs are categorized as direct costs (costs to persons involved in collisions, insurance companies, employers and taxpayers), indirect costs (borne by people close to person involved or by society as a whole)

[32] Capital Region Intersection Safety Partnership, Collision Cost Study, (February 2010)

Figure 30

Estimated Savings in Collisions from Transit Riders of Lakeshore GO East Extension

	Scenario 1	Scenario 2
Riders (trips per day)	4,000	10,000
Vehicle Kilometres Saved per Day (km / day)	66,000	212,000
Working Days (days / year)	231	231
Total Kilometres Saved (km / year)	15,246,000	48,972,000
Collisions Involving Fatalities per billion km	5	5
Collisions Involving Injury per billion km	498	498
Property Damage Only Collisions per billion km	1,497	1,497
Total Collisions per billion km	2,000	2,000
Collisions Involving Fatalities Avoided per Year	0.07	0.22
Collisions Involving Injuries Avoided per Year	7.60	24.40
Property Damage Only Collisions Avoided per Year	22.83	73.32
Total Collisions Avoided per Year	30.49	97.94
Total Cost for Each Collision Type ($ / collision)		
Fatal	$ 3,981,335	$ 3,981,335
Injury	$ 39,524	$ 39,524
Other	$ 10,902	$ 10,902
Cost Savings for Collisions (dollars)		
Fatal	$ 273,147	$ 877,383
Injury	$ 300,267	$ 964,494
Other	$ 248,852	$ 799,344
Total ($ / year)	$ 822,267	$ 2,641,221

Note Cost for fatal collisions includes $181,335 from Collision Cost Study and $2.8 million USD ($3,783,000 based on exchange rate of $0.74 USD / $1 CAD)

Source: Altus Group Economic Consulting based on data from Arup, Statistics Canada, Catalogue No. 91-215-X, Collision Cost Study Report, (March 2010), and data from University of Ottawa

The Collision Cost Study did not consider the value of a statistical life (VSL) in their study, but a recent study by the OECD on evaluating the norms for the use of VSLs has found the median VSLs across 900 separate policy measures was $2.8 million USD (or $3.8 million CAD). We have added this cost to the $181,335 per fatal collision taken from the Collision Cost Study report.

Based on the cost estimates, the collisions avoided from Scenario 1 of the GO Lakeshore East extension project would save approximately $822,300 in costs per year. The cost savings

associated with collisions avoided through Scenario 2 of the project would be $2,641,200 per year.

5.2.4.4 Improved Environmental and Personal Health

Todd Litman (2010) states that where residents tend to drive less and rely more on alternative modes (such as public transportation), there are fewer health problems than more automobile-dependent communities.[33] The availability of integrated public transportation systems has many positive benefits:

- Reduces emissions from motor vehicle travel, helping to mitigate the impacts of poor air quality on the health of individual Canadians and the costs of providing health care services; and
- According to MacKeown (2007), a reduction in car traffic by 30–50 % can help lower emission rates, saves 20 lives and $900 million annually.[34]

Based on the Business Case for Two-Way Commuter Rail report (April 20, 2015)[35], each automobile kilometre travelled generates 0.23kg of CO^2 emissions, and the cost of CO^2 for each kilometre driven is $0.01. Modelling from Arup shows that, based on assumed ridership levels:

- Scenario 1 is estimated to result in a total savings of 66,000 vehicle kilometres per day, or 15 million kilometres per year. This results in CO^2 savings of 3.5 million kilograms, which has an associated cost savings of $152,500 per year.
- Scenario 2 is estimated to result in a total savings of 212,000 vehicle kilometres per day, or 49 million kilometres per year.

[33] Todd Litman, Evaluating Public Transportation Health Benefits, (June 14, 2010)

[34] Topalovic, P., Carte, J., Topalovic, M., & Krantzberg, G. (2012). Light Rail Transit in Hamilton: Health, Environmental and Economic Impact Analysis. Hamilton: Springer Science and Business.

[35] Region of Waterloo, City of Kitchener et al, Innovative Regional Economies and Strategic Infrastructure, (April 20, 2015)

This results in CO^2 savings of 11 million kilograms, which has an associated cost savings of $489,700 per year.

Figure 31 **Estimated Savings in CO2 Emissions from Transit Riders of Lakeshore GO East Extension**

	Scenario 1	Scenario 2
Vehicle Kilometres Saved per Day (km / day)	66,000	212,000
Working Days (days / year)	231	231
Vehicle Kilometres Saved per Year	15,246,000	48,972,000
CO2 Emissions per Km Travelled (kg / km)	0.23	0.23
CO2 Emissions Saved per Year (kg)	3,506,580	11,263,560
Cost of CO2 per Km Driven ($ / km)	$ 0.01	$ 0.01
Annual Savings ($ / year)	$ 152,460	$ 489,720

Source: Altus Group Economic Consulting based on data from Arup, and Innovative Regional Economies and Strategic Infrastructure: Business Case for Two-Way Commuter Rail on the CN North Mainline, (April 20, 2015)

5.2.4.5 Net Present Value of Other Benefits from On-Going Operation

Figure 32 shows the total benefits generated from the implementation of Scenario 1 and Scenario 2 of the GO Lakeshore East extension project. It presents the savings on an annual basis, and estimates the value of these annual benefits over a 30-year period, assuming that service for each Scenario begins in year 2026.

In total, by year 2046, with operations starting in 2026, the Net Present Value of benefits related to time savings, reduced costs of accidents, vehicle operating cost and avoided CO2 emissions equals $389 million for Scenario 1, or $582 million for Scenario 2.

Figure 32

Estimated Impacts from Increased Transit Ridership, Time Savings and Reduction in Driving Distance

	Scenario 1	Scenario 2
	Dollars per Year	
Value of Time	$ 40,394,550	$ 49,819,945
Cost of Accidents and Collisions	$ 822,267	$ 2,641,221
Vehicle Operating Costs	$ 5,726,920	$ 17,472,343
CO2 Emissions	$ 152,460	$ 489,720
Total Savings per Year	$ 47,096,197	$ 70,423,229
NPV over 30 Years	$ 389,232,608	$ 582,021,888

Note: Savings per year discounted at 6% per year, assuming Phase 1 begins operation in year 2026, and Phase 2 begins operation in 2036
Source: Altus Group Economic Consulting

5.3 CONCLUSIONS

The construction of the GO Lakeshore East extension can be expected to have the following economic impacts:

- Increase to Gross Economic Output of $1.1-$1.3 billion;
- Generate 5,500-6,300 person-years of employment, and $369-$426 million in employment income for these workers;
- Add $573-$661 million to GDP; and
- Generate $120-$138 million in tax revenues for the provincial and federal governments.

Based on assumed ridership for each modelled service level (Scenario 1 and Scenario 2), the on-going operation of the GO Lakeshore East extension would have the following economic impacts:

- Produce significant time savings for commuters, with a value of between $40.4 million for Scenario 1 service and $49.8 million for Scenario 2, per year;
- Save commuters money in the avoidance of vehicle ownership, operating and maintenance costs, ranging from $5.7 million per year for Scenario 1 service and $17.5 million per year for Scenario 2 service, per year;

- The project, by enticing commuters to take public transportation would also reduce congestion and help improve road safety, resulting in many fewer collisions, with an anticipated savings associated with this reduction in collisions of between $822,300 for Scenario 1 service and $2.6 million for Scenario 2 service, per year;
- The increased usage of public transit can help reduce CO2 emissions, generating cost savings of $152,500 for Scenario 1 and $489,700 for Scenario 2, per year; and
- When we calculate the Net Present Value of each of these annual cost savings, it results in a 30-year NPV of $389 million for Scenario 1 service and $582 million for Scenario 2 service.

6 SUMMARY AND CONCLUSIONS

This Economic Impact Analysis report identified potential impacts of the project on economic activity in the Region of Durham and surrounding area. This report is meant to be a high-level analysis, as a precursor to an eventual Business Case study, which will provide a more robust and rigorous study of the benefits and costs of the project.

The GO Lakeshore East extension project can help stimulate growth in the Region and to help it meet its employment and population forecasts as set out in the *Growth Plan*. The Region will need to accelerate its pace of growth if it is going to meet these targets. The Region also has an imbalance in the jobs available in the Region and needs economic stimulus to foster economic growth and leverage the strengths of the Region and the opportunities available. In light of the continued decline of traditional manufacturing sector, which Durham Region has relied upon for so long, the GO Lakeshore East extension project is vital to enabling the Region to diversify its economy and having a prosperous future.

Notes on Ridership Estimates

The ridership assumptions used in the report are informed by a high-level analysis, and are deemed fit for the purposes of this study. A more detailed modelling exercise would need to be undertaken as part of the development of a Business Case Study to establish more robust ridership estimates.

Improved Access to Vast GTA Labour Market

The improved transportation service and connection of Downtown Oshawa and Clarington to the GTA by a fixed rail link means that:

- 73,700 more people can get to Downtown Oshawa via transit in under an hour; and
- 169,500 more people can get to the Bowmanville GO Station area via transit in under an hour.

These are significant increases in the access to the GTA's labour force, which can help skilled workers find jobs in Durham Region, help businesses attract labour, and allow the Region's post-secondary institutions to continue to grow by providing improved access to prospective students.

Significant Development Opportunities around Proposed GO Stations

The project would see four new GO stations, all of which have a significant amount of vacant and/or underutilized land surrounding the stations. The number of vacant and/or underutilized sites around the GO stations present an opportunity to have the station areas developed with transit-supportive densities. Based on detailed analysis of 63 identified sites around the stations, we have determined the development capacity of each, based on existing permissions in local Official Plans.

The Region has land-use plans in place to allow the development industry and business sector to capitalize on these lands and their proximity to GO train stations as soon as the demand warrants.

In total, there is potential for nearly 6,000 residential units and 7.8 million ft^2 of non-residential development in the immediate vicinity around the four proposed GO stations. The non-residential buildings would have an approximate construction value of $1.1 billion, and the jobs generated in the buildings would generate $271 million in annual income tax revenues for the federal and provincial governments.

These developments would generate substantial fiscal benefits for the Region and local municipalities, and the provincial and federal governments, including:

- $232 million in development charge revenues;
- $25 million per year in property tax revenues;
- $15 million in Provincial Land Transfer Tax revenues;
- $60 million in HST revenues, including approximately $23 million for the provincial government and $37 million for the federal government; and
- The non-residential development potential means that there is potential for 21,000 jobs in the immediate vicinity of the proposed GO station areas.

The residents and employees that live and work around each station could help support local businesses. The residents of the potential 6,000 housing units around the GO stations would spend roughly $266 million per year on goods and services, while office workers in buildings developed around the GO stations could be expected to spend approximately $92 million per year at stores and restaurants in the area immediately surrounding their office building.

Figure 33

Impact of Development Potential on Community	
Jobs	21,300 jobs
Wages/Income from Jobs	$1.2 billion / year
Municipal Benefits of Development Potential	
Development Charges	$232 million
Annual Property Tax Revenues	$20.4 million / year
Provincial Benefits of Development Potential	
Land Transfer Tax Revenues	$15 million

Impact of Development Potential on Community	
HST Revenues	$23 million
Annual Income Taxes	$100 million / year
Annual Property Tax Revenues	$4.4 million / year
Federal Benefits of Development Potential	
HST Revenues	$36.7 million
Annual Income Taxes	$171 million / year

The Project Can Leverage Several Large-Scale and Long-Term Infrastructure Projects and Emerging Economic Sectors

The three major projects (Highway 407 Extension, Port Granby Waste Project and Darlington Refurbishment) are all multi-year projects that will employ thousands of workers. These projects require significant injections of labour into Durham Region, and the introduction of GO train service through Central Oshawa and to Bowmanville can help provide the talent and skilled workers required for these projects through improved access to/from Durham Region each day.

There are also several other emerging economic sectors in the Region, particularly in Oshawa and Clarington, including a modernizing and increasingly research and training oriented Health and Biosciences sector, and the continued focus and investment in the Region in the Advanced Manufacturing sector.

The GO Lakeshore East extension project can help stimulate economic development in eastern Durham Region, including helping to attract businesses to the Clarington Energy Business Park, and dLAB project around the existing Durham College Whitby campus.

Other Benefits for Residents and Businesses

The on-going operation of the GO Lakeshore East extension would also generate time savings for commuters, reduce congestion and increased road safety, reduce vehicle operating costs and reduce CO2 emissions. Combined, these cost savings have a Net Present Value of between $387 million and $575 million.

Economic Impact of Construction

The construction of the GO Lakeshore East extension can be expected to have the following economic impacts:

- Increase in Gross Economic Output of $1.1-$1.3 billion;
- Generation of 5,500-6,300 person-years of employment, and $369-$426 million in employment income for these workers;
- An additional $573-$661 million of GDP; and
- Generation of $120-$138 million in income tax revenues for the provincial and federal governments.

Economic Impacts of On-Going Operations

The on-going operations of the GO train service through Central Oshawa to Bowmanville would result in incremental operating costs, and would also generate jobs and economic activity for the economy. Over a 10-year period, the operation of the train service would generate the following economic activity, depending on the Scenario:

- An impact on GDP of between $429 million (for Scenario 1) and $1.7 billion (for Scenario 2);
- Gross output of $1.5 billion for Scenario 1 and $5.8 billion for Scenario 2;
- Employment (directly and indirectly) for 330 jobs in Scenario 1 and 1,330 jobs in Scenario 2; and

- Wages and salaries for those employed directly or indirectly from $220 million in Scenario 1 to $896 million in Scenario 2; and
- Annual provincial and federal income tax revenues of $59 million for Scenario 1 and $233 million for Scenario 2.

Cumulative Economic Impacts from Construction and Operations

In total, the project, including construction and ten years of operation, would generate the economic and fiscal impacts summarized in Figure 34.

The total economic and fiscal impacts summarized in the table below does not include the impacts of the development potential around each station site, and the revenues each development would generate for Durham Region and the local municipalities. It also does not include the income tax revenues that would be generated for the provincial and federal governments through the jobs created in the businesses that locate in the non-residential developments in the station areas.

Figure 34

	Scenario 1	Scenario 2
Gross Output	$2.5-$2.7 billion	$6.9-$7.1 billion
GDP	$1.0-$1.1 billion	$2.3-$2.4 billion
Jobs	8,800-9,600 person-years	18,800-19,600 person-years
Wages	$593-$650 million	$1.26-$1.32 billion
Provincial and Federal Income Tax Revenues	$179-$197 million	$353-$371 million

Appendix A
Detailed Analysis of Development Potential around Proposed Stations

ESTIMATED DEVELOPMENT POTENTIAL AROUND EACH STATION

Vacant and/or Underutilized Lands around Sites

We have undertaken a detailed analysis of vacant and/or underutilized sites around each of the four proposed GO stations. We have reviewed sites within a 1-kilometre radius around each station, however we acknowledge that the development stimulated by the introduction of GO train service to Central Oshawa and Clarington may extend beyond the study area presented in this report.

Our analysis is based on:

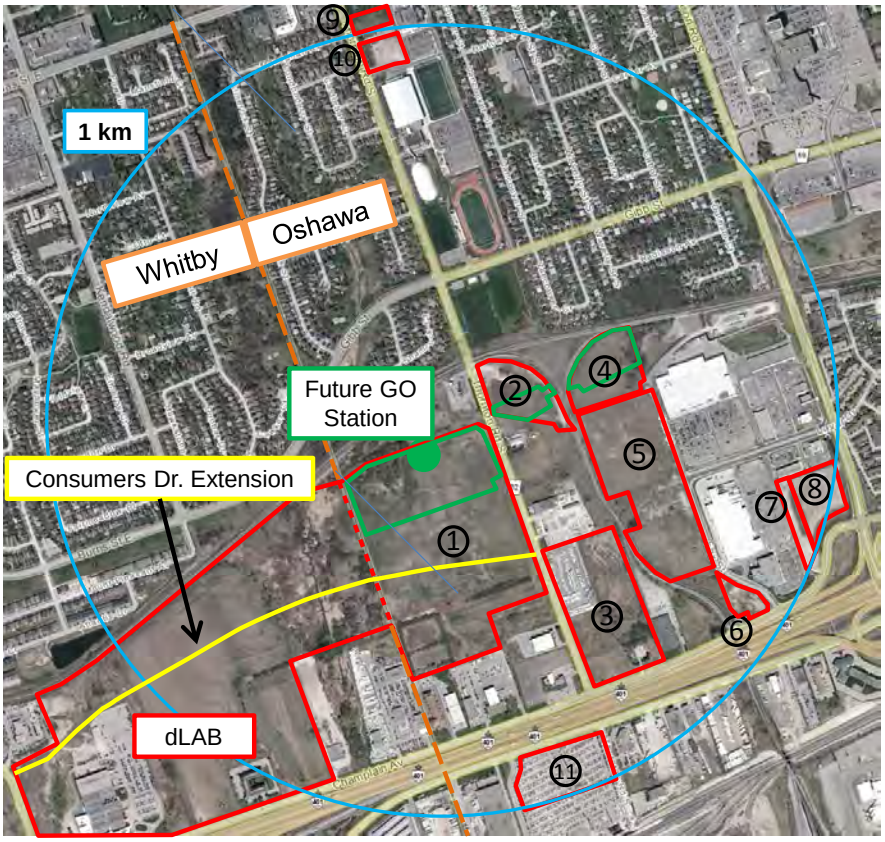
- Site visits to each of the station areas;
- Review of existing development applications in the areas around the stations;
- Review of Oshawa and Clarington Official Plans to ascertain current land use designations and permitted densities; and
- Comments from City of Oshawa and Municipality of Clarington planning staff.

Thornton's Corners GO Station Area

Figure A-1 shows the study area around the Thornton's Corners GO Station. All of the areas within a 1-km radius of the proposed Thornton's Corners GO Station are within the built boundary under the *Growth Plan*.

The area north of CPR is mostly built-up as established residential area and includes Trent University Durham campus and Oshawa Civic Recreation Complex. The area south of CPR is designated as Employment Area under the *Regional Official Plan* and has considerable development potential for industrial and commercial uses:

Figure A- 1 **Vacant and Underutilized Sites – Thornton's Corners GO**



Total (Re)Development Potential (11 sites)

- 110 residential units
- 1,078,000 ft² of office
- 650,200 ft² of retail & commercial
- 543,500 ft² of industrial

Source: Altus Group Economic Consulting based on Durham Interactive Map and Oshawa 2014 Land Inventory

- Southwest of the proposed GO station is proposed development known as dLAB (See Site 1 in Figure A- 1). Consisting of approximately 61 hectares of land, the eastern portion of the lands (located in Oshawa) are where the GO station and GO parking facilities would be located. South of the GO station, there are future phases of lands in the dLAB plan, which will contain a mix of office, retail and hotel uses. The western part of dLAB (located on the Whitby portion of the site) includes plans for 12 commercial / institutional buildings, each of which will be approximately 60,000 ft² in size. In total, assuming the buildings will be 80% office uses, and 20% retail uses, would generate 1,008,000 ft² of office space, 252,000 ft² of retail space and 60,000 ft² of hotel space for a total build-out potential of 1,320,000 ft². There is also the potential in the longer-term for residential uses

to be incorporated onto the site, but those have been excluded from this analysis.

- Site 2 is located east of Thornton Road South across the future GO station, is currently a vacant site. The site is designated Industrial under the *City of Oshawa Official Plan*. After deducting the land reserved for a GO tunnel and applying the 25% coverage assumption, the site would be able to accommodate approximately 45,000 ft^2 of industrial space.
- Site 3 is located east of Thornton Road South and north of Highway 401. The site is owned by Metrolinx, and is designated Industrial under the *City of Oshawa Official Plan*. Based on a 35% coverage assumption, the site would be able to accommodate approximately 292,700 ft^2 of industrial space.
- Site 4, located east of Thornton Road South across the future GO station, is currently a vacant site. The site is designated Special Purpose Commercial under the *City of Oshawa Official Plan*. Based on the 35% coverage assumption applied to the remaining developable land after the GO tunnel construction, the site would be able to accommodate approximately 49,000 ft^2 of retail space.
- Site 5 is located west of Fox Street. Currently vacant, the site is designated Special Purpose Commercial under the *City of Oshawa Official Plan*. According to the current preliminary proposal (2016), the site would accommodate approximately 198,000 ft^2 of retail and 96,000 ft^2 of self-serve storage space permitted in the Special Purpose Commercial designation.
- Site 6 is located north of Highway 401 and is currently vacant. The preliminary site plan shows that the site is proposed to accommodate approximately 11,000 ft^2 of retail space.
- Site 7 has a development proposal consisting of two commercial buildings, each of which is approximately 5,000 ft^2 in size.

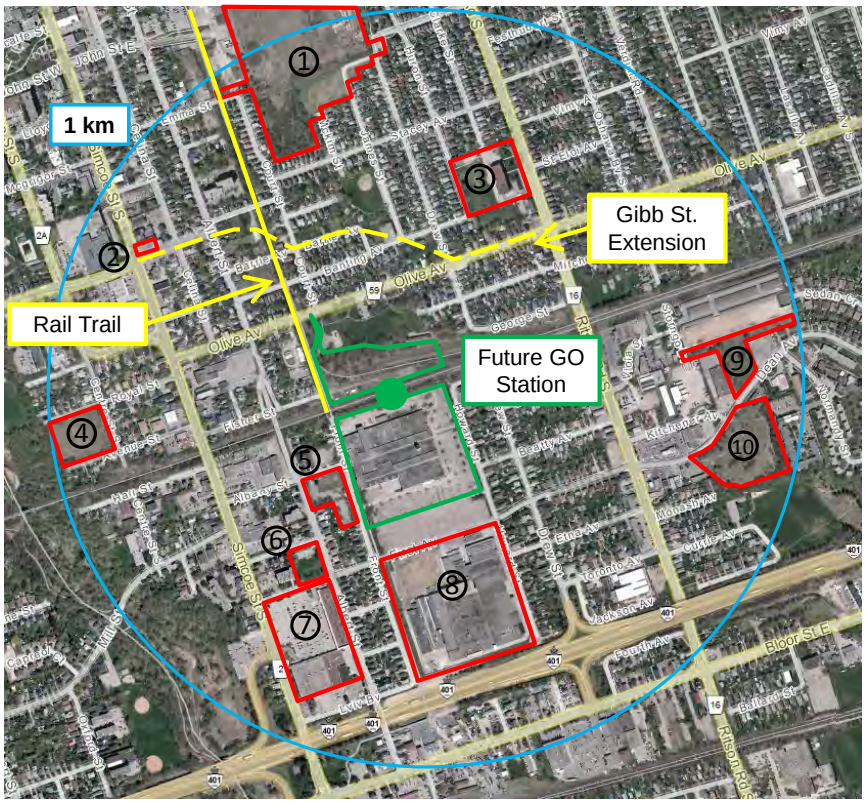
- Site 8, located northwest of Highway 401 and Stevenson Road South, currently has no proposal but would be able to accommodate 70,000 ft² of retail space based on the 35% coverage assumption.
- Site 9 is located north of Trent University Durham campus and has potential to accommodate approximately 60 units of student housing in the form of apartment units.
- Site 10 is located west of Trent University Durham campus and is currently used for parking. According to the Trent University master plan, the site would be able to accommodate 50 residential apartment units and 70,000 ft² of office space.
- Site 11 is the existing GO parking lot. Part of the site may not be needed should the GO service be relocated, and would be available for development. The site is designated Industrial under the *City of Oshawa Official Plan* and will be able to accommodate 161,000 ft² of industrial space, based on 35% coverage.

Oshawa Central GO Station Area

All of the areas within a 1-km radius of the proposed Oshawa Central GO Station is within the built boundary of the Growth Plan. There are numerous vacant and underutilized sites around the proposed Oshawa Central GO Station, shown in Figure A- 2.

Figure A- 2

Vacant and Underutilized Sites - Oshawa Central GO



Total (Re)Development Potential (10 sites)

- 2,600 residential units
- 10,000 ft² of office
- 558,000 ft² of retail

Source: Altus Group Economic Consulting based on Durham Interactive Map

- Site 1 is approximately 1 km north of the proposed GO station – the site has a proposal for development that will accommodate 1,977 residential units and 3,250 ft² of retail space.
- Site 2, 303 Simcoe Street South, is 0.1 hectares in size and has a site plan application under review. The proposed development will accommodate 5 apartment units and 1,680 ft² of retail space.
- Site 3, 300 Ritson Road South, was previously the site for Ritson Public School and is now available for development. The site would be able to accommodate 47 townhouse units and 76 apartment units.
- Site 4 is owned by Habitat for Humanity and is currently under construction for 24 townhouse units.
- Site 5, 63 Albany Street, has an application approved for 65 apartment units.

- Site 6 is the eastern portion of the existing senior's housing site and is currently vacant. A land division application was submitted for this site to accommodate 16 apartment units.
- Site 7 is a partially vacant commercial plaza that is currently for sale and designated as a Planned Commercial Centre under the *City of Oshawa Official Plan*. Based on the 50% coverage assumption, the site will be able to accommodate approximately 156,000 ft^2 of retail space.
- Site 8, south of the proposed GO station is 5.9-hectare parcel that is currently used for industrial uses and parking. There is a short-term user occupying the building for a flea market and offices. In the long-term, given the proximity of the site to the proposed GO station, the lands may accommodate a more compact and efficient mixed-use form of development with access to GO Transit. However, as the site is occupied and would require an Official Plan Amendment and rezoning to accommodate a mixed-use development, no specifically detailed development potential on this site are assumed for this site for the time being.
- Site 9, 0 Dean Avenue, is at the preconsultation stage for residential development that will accommodate 123 apartment units.
- Site 10, 299 Dean Avenue, is 2.1 hectares in size and is currently vacant. The current zoning permits 85 units per hectare, allowing the site to accommodate 185 residential units.

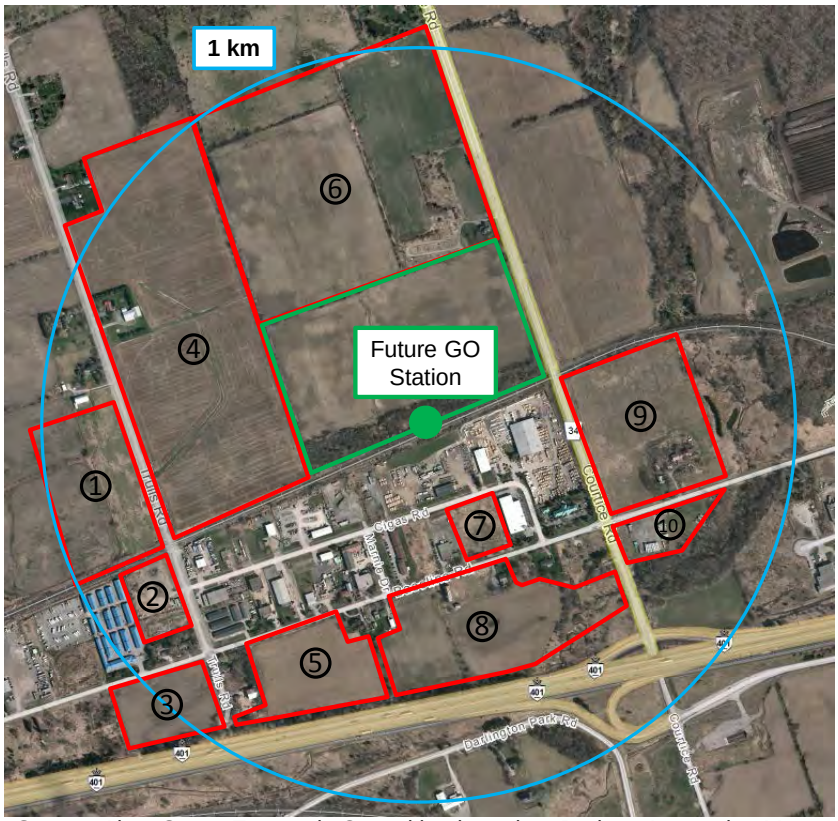
Courtice GO Station Area

Lands immediately south of the proposed GO station are located within the built boundary of the Growth Plan. The GO station itself and the vacant lands to the north of the rail corridor are located in the greenfield area. All of the lands within the 1-km radius and west of Courtice Road are designated Employment Area in the

Regional Official Plan and are designated as either Prestige Employment Area, General Industrial Area or Light Industrial Area under the *Clarington Official Plan*.

There are several vacant and underutilized parcels in the vicinity of the proposed Courtice GO Station, as depicted in Figure A- 3.

Figure A- 3 **Vacant and Underutilized Sites - Courtice GO, Clarington**



Total (Re)Development Potential (10 sites):

- 763,600 ft² of office
- 1,677,900 ft² of industrial

Source: Altus Group Economic Consulting based on Durham Interactive Map and input from Clarington staff

- Site 1 is approximately 6.8 hectares in size, is located north of CPR and west of Trulls Road and is currently vacant. The site is General Industrial Area under the *Clarington Official Plan*. Based on an assumed coverage of 35%, the site would be able to accommodate approximately 256,000 ft² of industrial uses.
- Site 2 is approximately 1.6 hectares in size, is located south of CPR and west of Trulls Road and is currently vacant. The site is a relocation site for a Bobcat dealer, with construction scheduled to commence in 2016. Compared to the existing site on 45 Cigas

Road, approximately 1,800 ft² of additional industrial uses are expected.

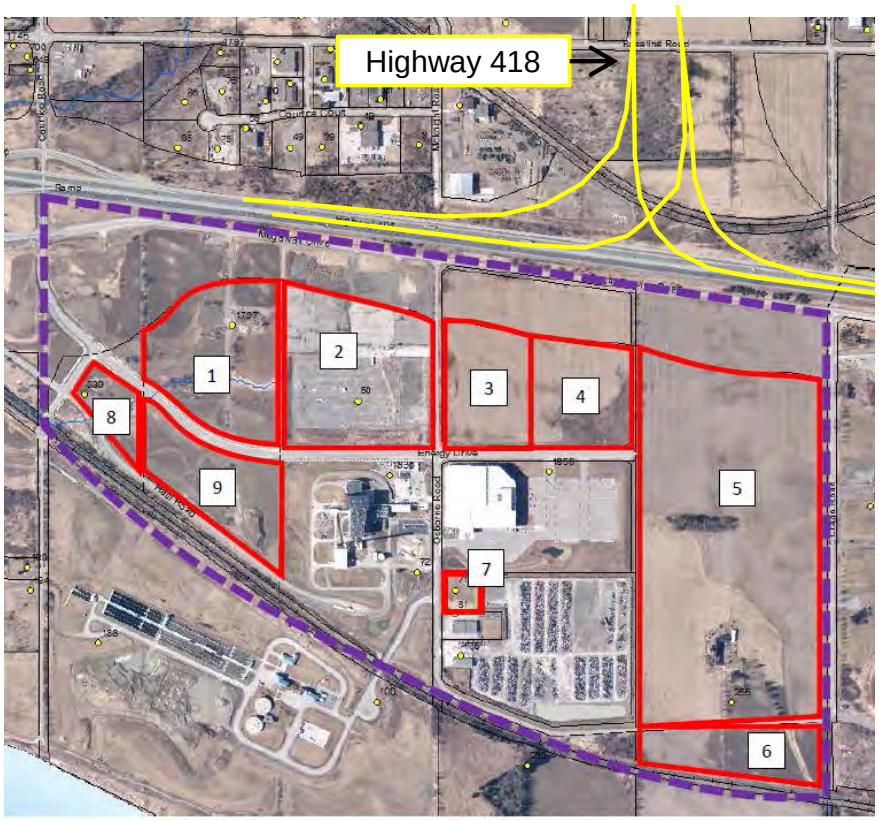
- Site 3 is approximately 2.7 hectares in size, is located south of Baseline Road and west of Trulls Road, and is currently vacant. The site is Light Industrial Area under the *Clarington Official Plan*. Based on an assumed coverage of 35%, the site could be intensified and accommodate approximately 102,000 ft² of industrial uses.
- Site 4 is approximately 21.6 hectares in size, is located west of the proposed GO station, and currently has residential and agricultural uses with one dwelling unit. The site is General Industrial Area under the *Clarington Official Plan*. Based on an assumed coverage of 35%, the site would be able to accommodate approximately 814,000 ft² of industrial uses.
- Site 5 is approximately 3.9 hectares in size, is located south of Baseline Road close to Trulls Road, and is currently vacant. The site is Light Industrial Area under the *Clarington Official Plan*. Based on the current proposal for a contractor's yard with office, indoor and outdoor storage, the site would accommodate 5,600 ft² of office uses and 6,000 ft² of industrial uses.
- Site 6 is approximately 23.4 hectares in size, is located north of the proposed GO station and currently is occupied by one residential dwelling unit. The site is General Industrial Area / Prestige Employment Area under the *Clarington Official Plan*. Based on an assumed coverage of 35%, the site would be able to accommodate approximately 705,000 ft² of office uses and 176,000 ft² of industrial uses.
- Site 7 is located north of Baseline Road west of Courtice Road, and is approximately 1.1 hectares in size. The temporary use for outdoor storage has expired, and the site is available for development. The site is Light Industrial Area under the *Clarington Official Plan*. Based on an assumed coverage of 35%,

the site could be intensified and accommodate approximately 124,000 ft² of industrial uses.

- Site 8 is approximately 7.2 hectares in size located south of Baseline Road west of Courtice Road and currently improved with an industrial building. The site is Light Industrial Area under the *Clarington Official Plan*. Based on an assumed coverage of 35%, the site could be intensified and accommodate approximately 271,000 ft² of industrial uses.
- Site 9 is approximately 7.6 hectares in size located north of Baseline Road and east of Courtice Road and currently is occupied by a residential dwelling unit. The site is Prestige Employment Area under the *Clarington Official Plan*. Based on an assumed coverage of 35%, the site would be able to accommodate approximately 286,000 ft² of industrial uses.
- Site 10 is approximately 1.4 hectares in size located south of Baseline Road and east of Courtice Road. The site is currently vacant and being used for storage. The site is Prestige Employment Area under the *Clarington Official Plan*. Based on an assumed coverage of 35%, the site would be able to accommodate approximately 53,000 ft² of office uses.

Immediately south of the proposed Courtice GO Station (and just outside of the 1-km radius) is the Clarington Energy Business Park. According to Municipality of Clarington, *Economic Base and Employment Lands Discussion Paper*, 2010, the Business Park will be designed to attract manufacturing uses focused on new energy and environmental technologies, where related offices, research facilities, a hotel and commercial uses could also be located. It is envisioned that the Business Park would be a campus-style setting. Recently constructed projects include an Energy from Waste Plant, and the Ontario Power Generation office and visitor centre. The Discussion Paper estimated that the Business Park could support nearly 2,000 jobs.

Figure A- 4 **Vacant and Underutilized Sites - Clarington Energy Business Park**



Total (Re)Development Potential (9 sites):

- 1,840,600 ft^2 of office
- 361,700 ft^2 of industrial

Source: Planning Services Department, Municipality of Clarington

Bowmanville GO Station Area

Most of the areas within a 1-km radius of the proposed Bowmanville GO Station are within the built boundary under the Growth Plan, except for areas on the northwest edge and southwest edge of the Station area.

Most areas north of CPR in the Station Area are under *Bowmanville West Town Centre Secondary Plan*. According to the Secondary Plan, the Bowmanville West Town Centre "will serve as a focal point of activity, interest and identity for residents of the Municipality of Clarington." The Muncipality's *Official Plan* calls for a total of 1,900 units to be built in the West Town Centre area, including 400 townhouses and 1,500 high-density apartment units. The 1,500 high-density apartment units in the West Town Centre area is by

far the largest amount of any neighbourhood in the Municipality, so is planned to be a major activity node.

The area south of the rail corridor is the Westvale community, which calls for another 1,900 units, including a mix of low-density, medium-density and high-density units.

There are many vacant and/or underutilized sites within the Station Area that, under the *Bowmanville West Town Centre Secondary Plan*, exhibit development potential for future residential or commercial uses, as shown in Figure A- 5.

Figure A- 5

Vacant and Underutilized Sites - Bowmanville GO, Clarington

Total (Re)Development Potential (23 sites):

- 3,270 residential units
- 150,700 ft^2 of office
- 121,000 ft^2 of retail & commercial

- Site 1 is 0.4-hectares and is currently vacant and designated for Street Related Commercial in the *Clarington Official Plan*, with three proposed commercial buildings on the site. Based on the

proposal, the site would accommodate 20,000 ft² of commercial retail space.

- Site 2 is 0.65 hectares in size and designated High Density Residential, without a development proposal. The *Clarington Official Plan* calls for high-density development to be within a density of 61-100 units per net hectare. At a density of 100 units per net hectare, this would equate to 65 units.
- Site 3 has 18 single family units under construction.
- Site 4 is 0.35 hectares in size and currently vacant. The site is designated for Street Related Commercial in the *Clarington Official Plan*, with 3-storey mixed-use buildings that will have commercial uses on the ground floor.
- Site 5 is 1.2 hectares in size and is partially vacant. The site has Street Related Commercial and General Commercial designations, with six proposed commercial units on the site. Based on the proposal, the site would accommodate 56,800 ft² of commercial retail space.
- Site 6 is vacant and is 0.4 hectares in size, with no development proposal. Designated for General Commercial in the *Clarington Official Plan*, the site would be able to accommodate approximately 21,500 ft² of space in the form of a grocery store or another commercial use.
- Site 7 is vacant and is 0.4 hectares in size, with no development proposal. Designated for General Commercial in the *Clarington Official Plan*, the site would be able to accommodate approximately 21,500 ft² of office use.
- Site 8 is 5.4 hectares, and is designated Medium Density Residential, currently with a proposal for 3-storey townhouse units. The proposed development would accommodate 198 units.

- Site 9 is a 1-hectare vacant site designated as a Neighbourhood Park.
- Site 10 is a 1.6-hectare vacant site designated as Mid-Rise High Density. The site has a proposal for a 6-storey apartment building that would accommodate 240 apartment units.
- Site 11 is a 0.9-hectare site designated as Community Facility and is currently vacant. The site has no development proposal, but there has been some discussion for residential development. Based on the density assumption of 45 units per hectare, the site would be able to accommodate 41 townhouse units.
- Site 12 is 1.9-hectares in size and is designated as Medium Density Residential and is vacant. The site currently has no development proposal, but there is a discussion for medium density residential development. Based on the density assumption of 45 units per hectare, the site would be able to accommodate 41 townhouse units.
- Site 13 is a 0.13-hectare site that currently has no development proposal. The site is designated Street Related Commercial under the *Clarington Official Plan*. The site would accommodate approximately 7,000 ft^2 of retail space.
- Site 14 is a 0.9-hectare site that is designated Mid Rise High Density Residential, without an application on the site. The *Clarington Official Plan* calls for high-density development to be within a density of 61-100 units per net hectare. The site would be able to accommodate 600 apartment units.
- Site 15 is a vacant site is designated as a Neighbourhood Park.
- Site 16 is a 1.5-hectare site that is currently vacant and designated as Office Commercial. The site has a proposal for commercial and office uses that will accommodate 129,000 ft^2 of office space.

- Site 17 is a 1.8 hectare site without a development application and is designated Mid Rise High Density Residential. The site would be able to accommodate 600 apartment units.
- Site 18 is a 2.6-hectare site that is under construction for a 4-storey condominium apartment that will accommodate 223 units.
- Site 19, which is a 1-hectare site, has a development application for a car wash, a gas station, a convenience store and a drive-through Tim Hortons. The site is Designated Residential, but drive-through restaurant is also permitted under the *Clarington Official Plan* section 23.17.13. According to the development application, the site would accommodate approximately 6,800 ft^2 of retail space.
- Site 20 has a proposal for 414 residential units in three 6-storey condominium apartments.
- Site 21 is 2.0 hectares in size and is developed with existing residential uses. While there is currently no development proposal, the site still presents future development opportunities. According to a block design plan for 3-storey stacked townhouse buildings, the site may be able to accommodate 400 units.
- Site 22 is a 2.8-hectare site that is currently vacant, but is zoned for a maximum of 75 residential units, and has a proposal for 71 units in a 4-storey condominium apartment on Martin Road.
- Site 23 is a 6.7-hectare site that is designated Medium Density Residential, currently with a single residence and no development proposal. The *Clarington Official Plan* calls for medium-density development to be within 31-60 units per net hectare. At a density of 45 units per net hectare, this would mean that this site could accommodate 302 units, likely to be in the form of townhouses.

In total, the above 23 sites could accommodate a total of 3,157 housing units (18 singles/semis, 1,026 townhouses, and 2,113 apartments), plus 150,700 ft^2 of office space, and 121,000 ft^2 of commercial retail space.

Appendix B
Transportation Assessment

TRANSPORTATION ASSESSMENT

ASSESSMENT METHODOLOGY

The transportation assessment undertaken in support of the Economic Impact Analysis is concerned with the changes in transit journey time and mode share that may occur as a result of the implementation of rail services running on the proposed extension of the Lakeshore East GO Train line to Bowmanville.

Reductions in transit journey times would positively impact the connectivity of Durham Region, both internally and externally, with the rest of the GTHA. Reductions in transit journey time have the potential to drive an increase in transit mode share, thus reducing the number of car trips, with all the benefits that this brings to the environment, quality of life, the economy and society in general.

The generic steps followed in the transportation assessment are as follows:

1) Estimate the auto and transit journey times with and without the Lakeshore East GO Line extension;
2) Estimate changes in transit catchment;
3) Establish the relationship between journey times, by mode, and travelers' mode preferences, and develop a forecasting framework; and
4) Estimate the changes in mode share resulting from implementing the Lakeshore East Line extension.

Each of these steps are described in more detail in the subsections below, including a summary of the results obtained.

ESTIMATION OF TRANSIT AND AUTO JOURNEY TIMES

Transit

Transit journey times have been estimated with the aid of GIS and transportation modelling tools, including a Strategic Accessibility Toolkit developed by Arup in conjunction with Metrolinx. The toolkit includes all transit services in the GTHA as well as a very detailed road network that enables an accurate calculation of walk times.

The toolkit allows us to estimate transit journey times between pairs of origin and destination points, taking into account access time (walk or drive), wait time, transfer time, in-vehicle time and egress walk time.

To assess the impact of the project, transit times have been estimated for trips within the whole of the GTHA. Given the size of the area, the centroids of the traffic analysis zones used by the MTO's Greater Golden Horseshoe Model have been used as the unit for analysis.

Journey times have been estimated for transit trips with park and ride access and for transit 'exclusive' trips.

The transit network used for this is based on the 2015 transit network, with additional transit interventions, including all committed future GTHA transit schemes.

The Lakeshore East GO Line extension has been included as two separate scenarios, each of which will involve the relocation of GO train service to the proposed Thornton's Corners GO Station, located on the north side of Highway 401 (accessed via a constructed overpass of the Highway):

- Scenario 1: High frequency (four trains per hour) GO-RER service runs to new Oshawa Thornton's Corners GO Station

with lower frequency (one train per hour) running to Oshawa Central, Courtice and Bowmanville GO stations.

- Scenario 2: Introduction of high frequency service (four trains per hour) through Central Oshawa to Bowmanville GO.

The in-vehicle time between the new Thornton's Corners GO Station and Bowmanville GO Station is assumed to be of approximately 19 minutes.

For this exercise, no changes have been made to the local bus transit network. However, in reality it would be expected that once a GO service is implemented, the local transit networks would be optimized to maximize the connectivity benefit and therefore this should be considered a conservative assumption.

Auto

In addition to the estimation of transit journey times, the analysis process involves the estimation of auto journey times. This analysis is based on a publicly available dataset produced by the MTO, which includes auto speeds that have been collected from two-way GPS devices. It should be noted that this dataset does not have 100% coverage (i.e. it includes only a subset of roads in the GTHA). However, all provincial and regional roads are included; and these are, generally, the most congested. For roads for which observed speed information was not available, posted speed limits have been used to derive the travel times.

Speeds are assumed to remain fixed between scenarios. This assumption is based on the premise that road investments would be sufficient to maintain current road speeds. Given budget and time constraints at this time, this has been considered a reasonable, albeit conservative assumption which, however, should be revised in future studies if more resources are available.

TRANSIT CATCHMENT

Once the transit journey time information is available it is possible to estimate the transit catchments for each scenario. This allows us to estimate the changes in the numbers of jobs and the size of the potential workforce within a given time of selected locations. These impacts are key inputs to the economic evaluation.

The maps shown in Figures B-5 through B-12 of this report illustrate the number of jobs and population in the areas around Oshawa and Bowmanville as well as the approximate journey times to/from these two locations. The zone centroid point nearest to Downtown Oshawa is located at the corner of Mary Street and William Street, and the point representing Downtown Bowmanville was chosen as the centroid closest to the station, with a short additional walk access time required to reach the station.

The tables below summarize the change in jobs and workforce by time and comparing a 'business as usual' scenario with Scenarios 1 and 2 of the project for access to Downtown Oshawa and Bowmanville.

Figure B- 1 **Change in Jobs and Workforce by Time, Downtown Oshawa**

	Jobs			Workforce		
Time	Base 2026	Scenario 1	Scenario 2	Base 2026	Scenario 1	Scenario 2
0 - 15 Minutes	6,200	6,200	6,200	2,400	2,400	2,400
15 - 30 Minutes	29,800	30,500	30,500	26,600	27,200	27,200
30 - 45 Minutes	94,300	93,600	94,600	166,200	165,900	167,900
45 - 60 Minutes	68,000	73,100	95,300	139,100	158,700	210,500
Total	198,300	203,400	226,600	334,300	354,200	408,000
Change vs. Base		5,100	28,300		19,900	73,700

Source: ARUP

Figure B- 2 **Change in Jobs and Workforce by Time, Bowmanville**

	Jobs			Workforce		
	Base 2026	Scenario 1	Scenario 2	Base 2026	Scenario 1	Scenario 2
Time						
0 - 15 Minutes	2,400	2,400	2,400	6,000	7,300	7,300
15 - 30 Minutes	-	-	-	-	-	-
30 - 45 Minutes	2,400	2,500	11,300	5,300	5,300	34,000
45 - 60 Minutes	4,900	82,700	120,500	12,600	91,400	152,100
Total	9,700	87,600	134,200	23,900	104,000	193,400
Change vs. Base		77,900	124,500		80,100	169,500

Source: ARUP

RELATIONSHIP BETWEEN JOURNEY TIMES AND TRAVELERS' MODE PREFERENCES

A key input to the Economic Impact Analysis is the change in transit demand resulting from the implementation of the project. The scope of this study does not include undertaking a detailed modelling exercise, but a high-level exercise has been carried out to establish reasonable assumptions to be used in the analysis.

This high-level exercise involved the development of an analytical framework that enabled us to forecast mode shares, based on information obtained from previous steps in the analysis.

A tool generally used by transportation planners to estimate and forecast mode choice is the 'logit model'. These models can include multiple explanatory variables, calibrated to produce accurate results. This study is based on a simple logit model that includes journey time as its only variable, plus a 'mode constant' that is used to represent additional costs – be they real or perceived – for one or more of the modes being assessed.

The model was calibrated to mode shares by origin zone with data obtained from the Travel Tomorrow Survey. This means that, for current services and journey times, the mode shares obtained from the model yield results similar to the observed mode shares in

Durham, when aggregated by the Traffic Analysis Zone of the trip origins.

The output of the mode share model is a set of Origin-Destination matrices with percentage mode share for each mode.

The change in transit mode share by zone of origin is shown in Figure B-13 and B-14, for Scenarios 1 and 2, respectively.

MODE SHARE IMPACTS

The change in mode share is used to estimate the total number of trips by each mode and, therefore, to estimate the changes in overall transit usage and in the number of car vehicle-kilometers.

Current overall demand has been extracted from the Travel Tomorrow Survey in the form of Origin-Destination trip matrices for the GTHA. This current year matrix is projected into the future by applying growth factors based on the changes in population and employment estimated by Altus Group for scenarios with and without the Lakeshore East GO Line extension.

Since the mode share forecasts are estimated at the origin-destination level, a simple cell-by-cell multiplication is carried out to estimate the number of trips between every pair of origin and destination zones.

Change in Transit Demand

Given that the only change being made to the transit network is the extension of the GO Lakeshore East train line, it is assumed that all additional transit trips would be new GO passengers. These represent an approximately 14% (Scenario 1) and 34% (Scenario 2) GO ridership increase compared to the estimated future base case.

Based on the above, we have established the changes in transit demand presented in the table below are reasonable assumptions to use in the Economic Impact Analysis.

Figure B- 3

Change in Transit Demand, During Morning Peak Period

Scenario	Change in Transit Demand (Morning Peak Period*) *Trips*
Scenario 1 vs Base	2,000
Scenario 2 vs Base	5,000

* Morning Peak Period: 6:00am to 9:00am
Source: ARUP

Change in Auto Vehicle-Kilometres Travelled

The change in auto vehicle-kilometres includes an additional calculation: for every origin-destination pair, the road distance of the shortest path between the two zone centroids has been estimated through the use of GIS tools.

This distance is multiplied by the change in auto trips between each scenario and the base case, with the result being the change in vehicle-kilometres between each origin-destination for each scenario.

The table below summarizes the change in total vehicle-kilometres between all pairs of zones.

Figure B- 4

Change in Auto Vehicle-Kilometres Travelled

Scenario	Change in Vehicle Kms Travelled *Vehicle Kilometres*
Scenario 1 vs Base	(66,000)
Scenario 2 vs Base	(212,000)

Source: ARUP

Figure B-5 – Jobs by Zone (2036 Forecast)

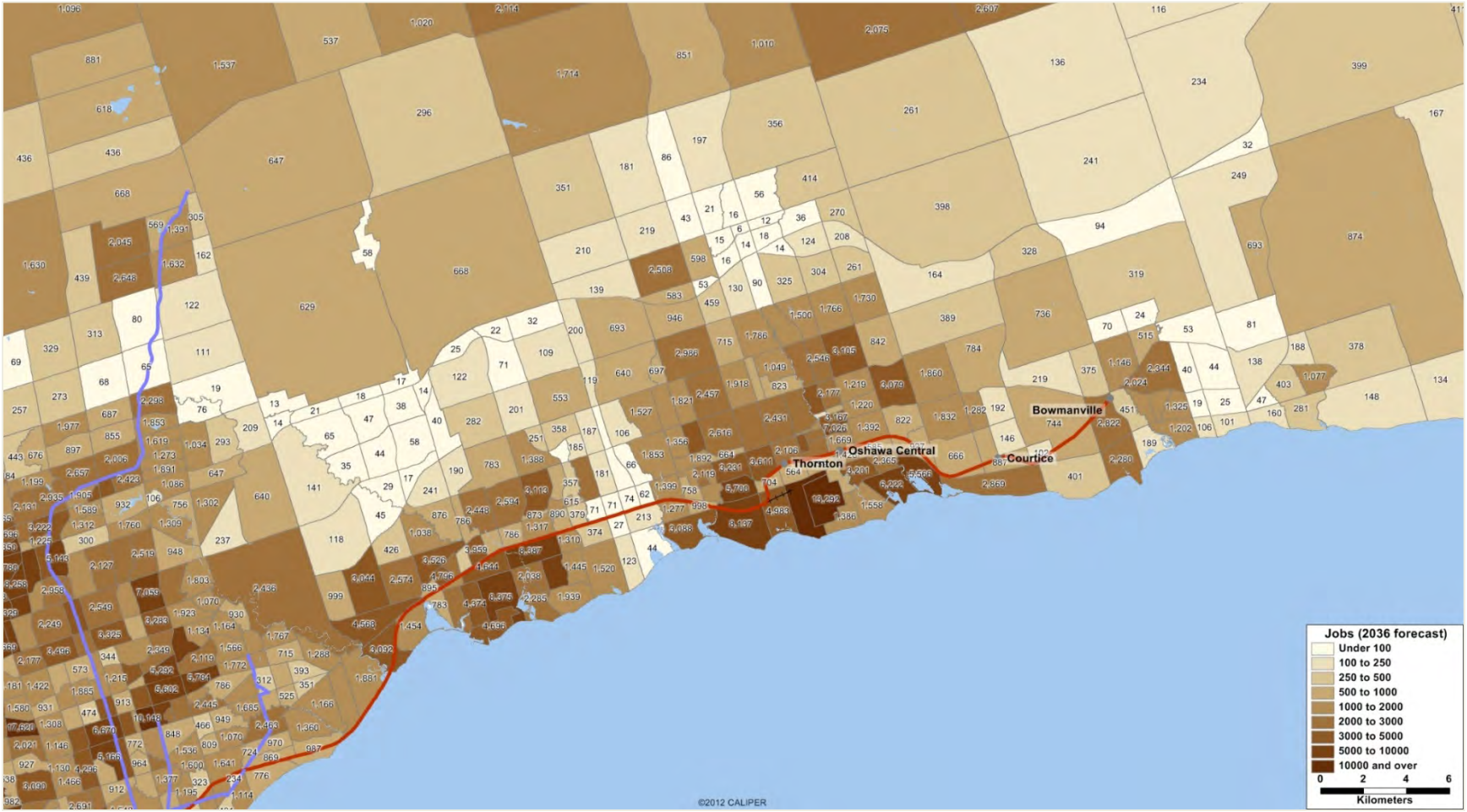


Figure B-6, Population Aged 20-64 (2036 Forecast)

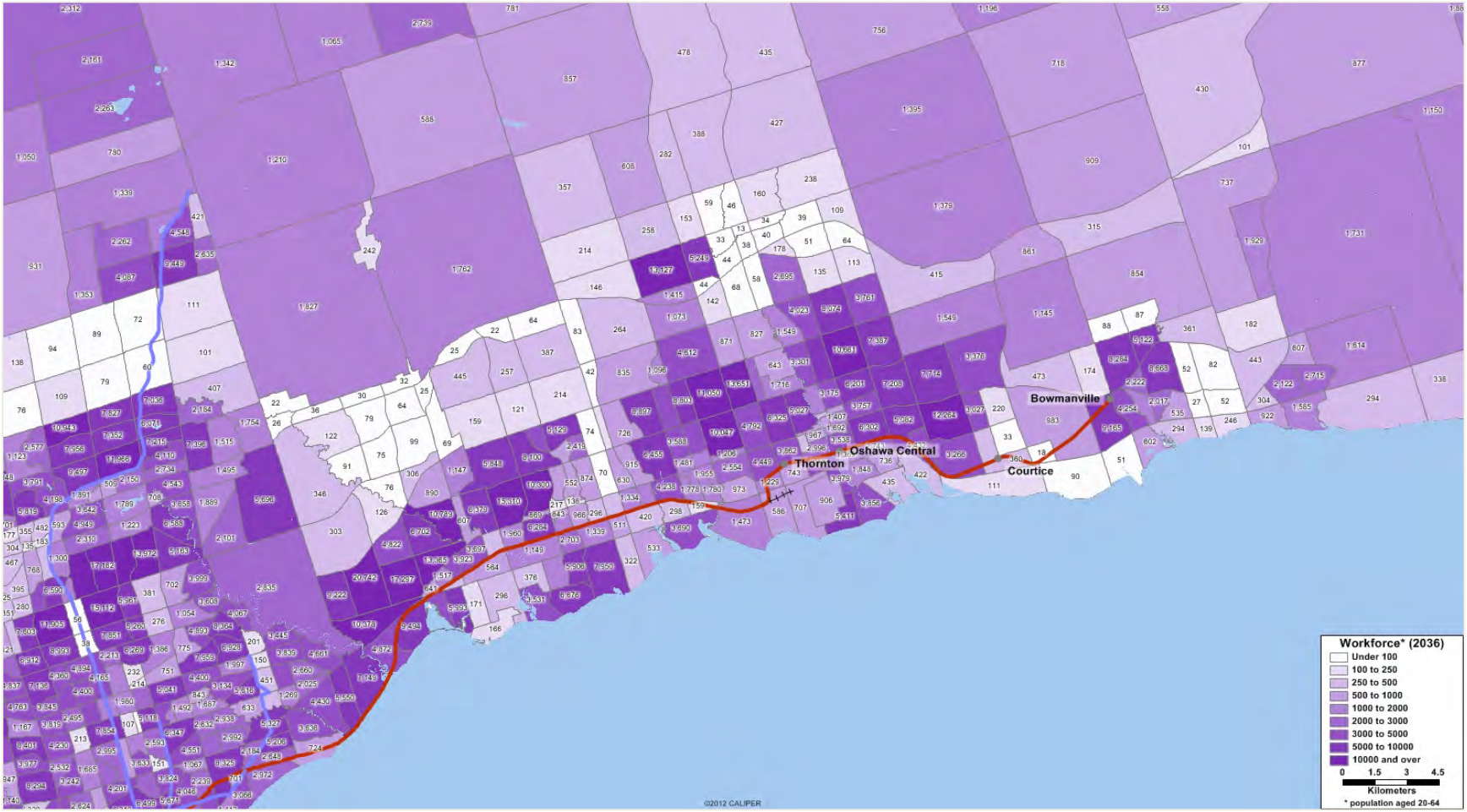


Figure B-7, Transit Time to Downtown Oshawa (base)

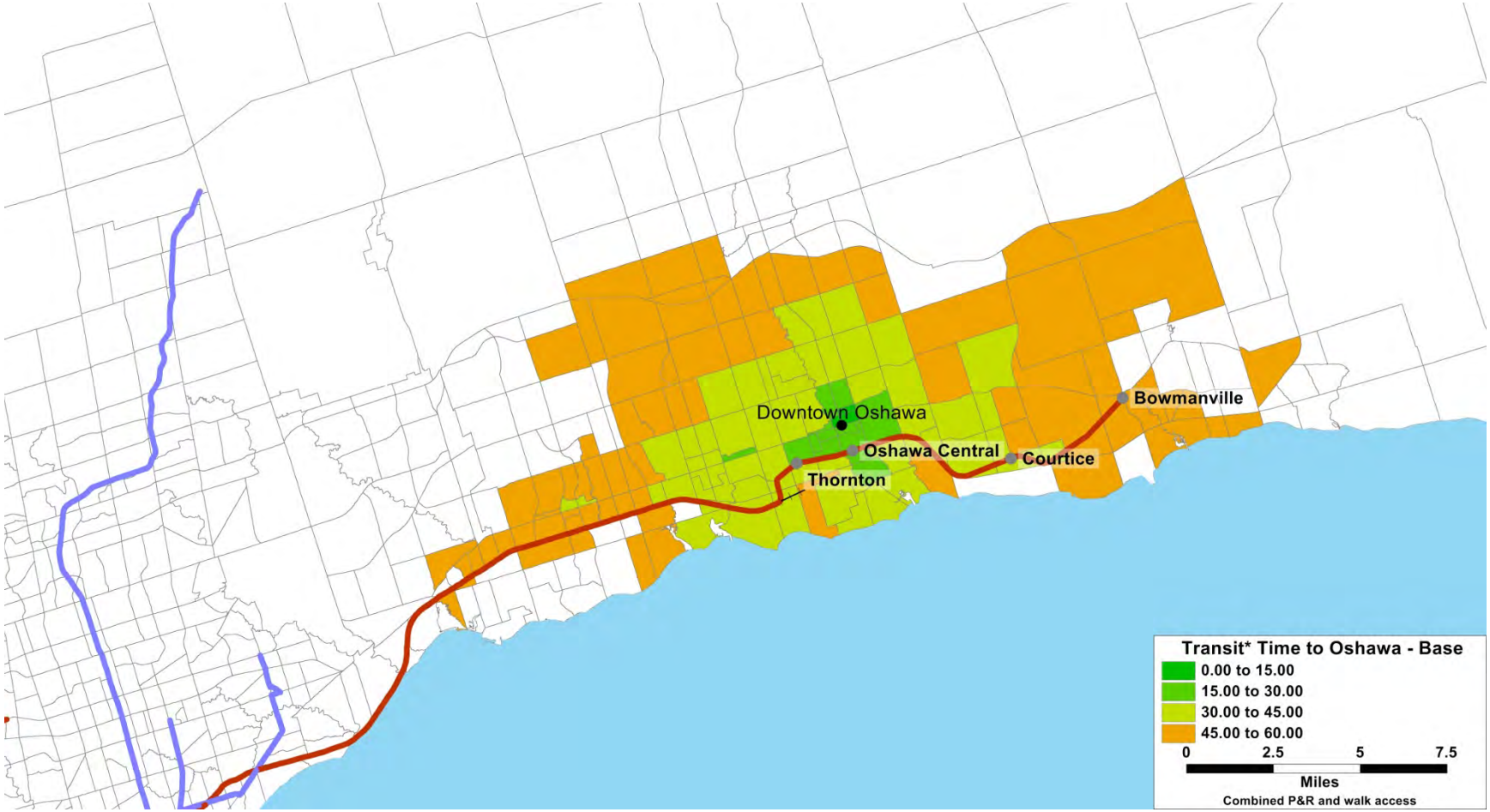


Figure B-8, Transit Time to Downtown Oshawa (Scenario 1)

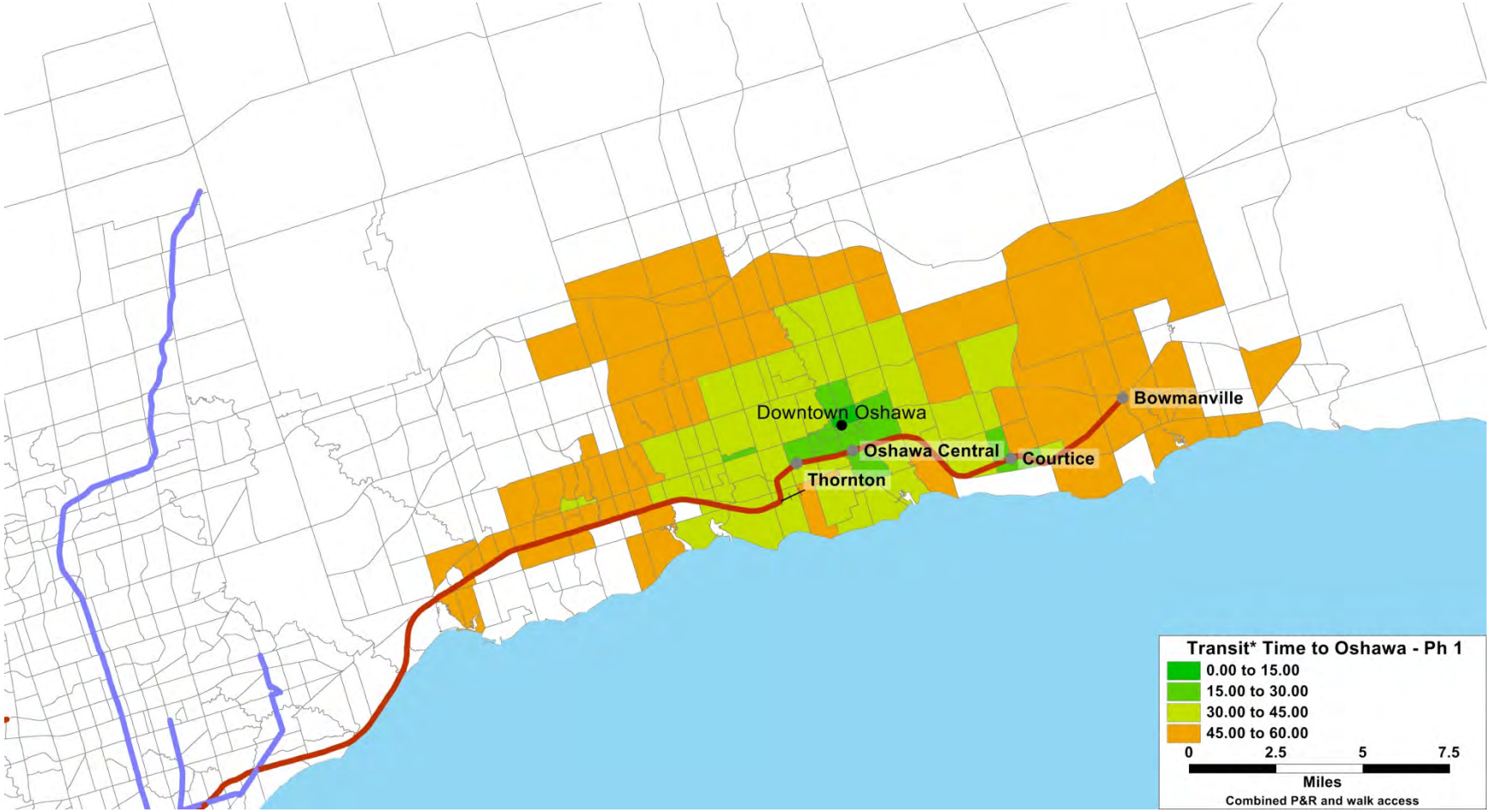


Figure B-9, Transit Time to Downtown Oshawa, (Scenario 2)

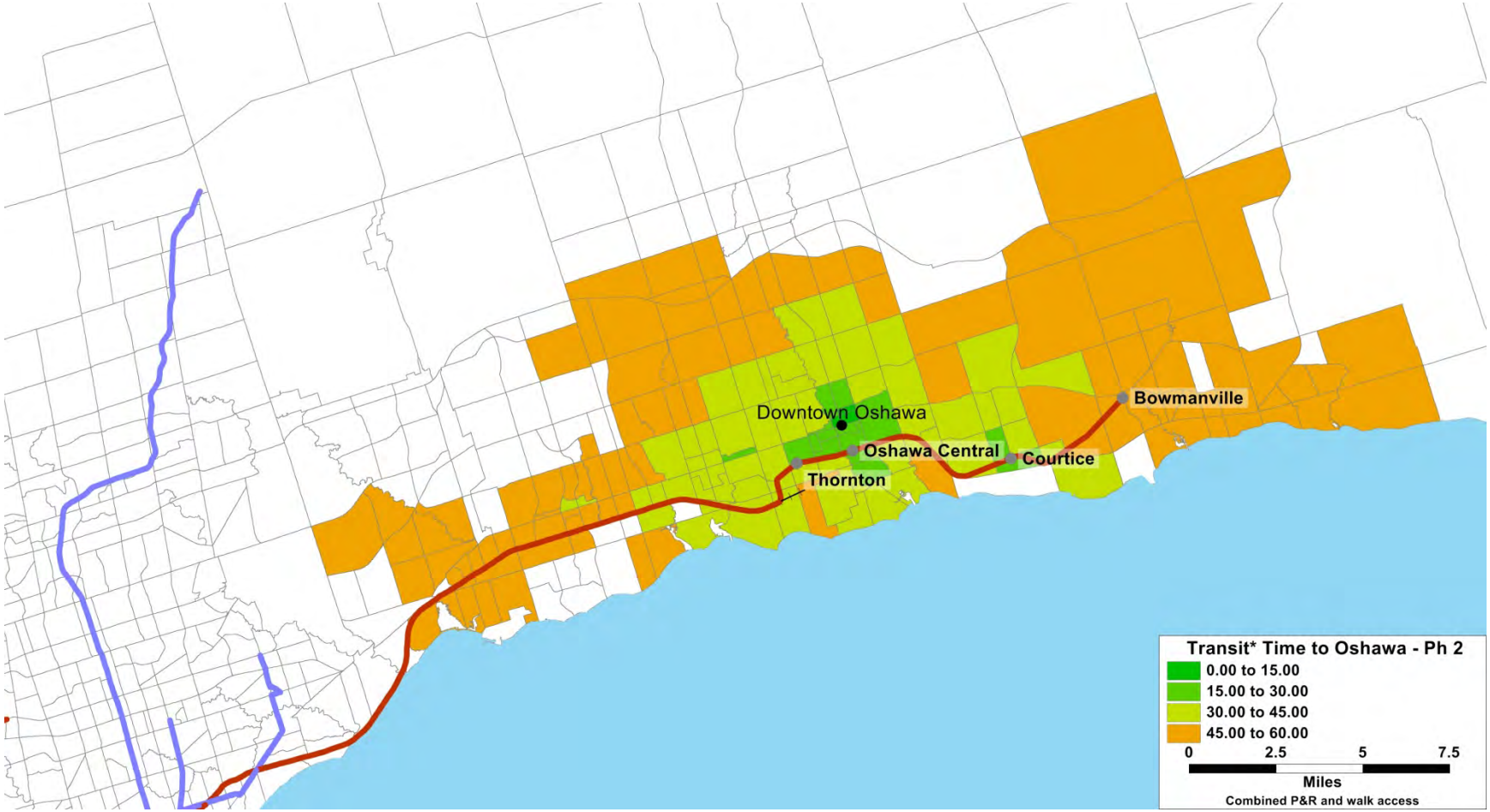


Figure B-10, Transit Time to Downtown Bowmanville (base)

Figure B-11, Transit Time to Downtown Bowmanville (Scenario 1)

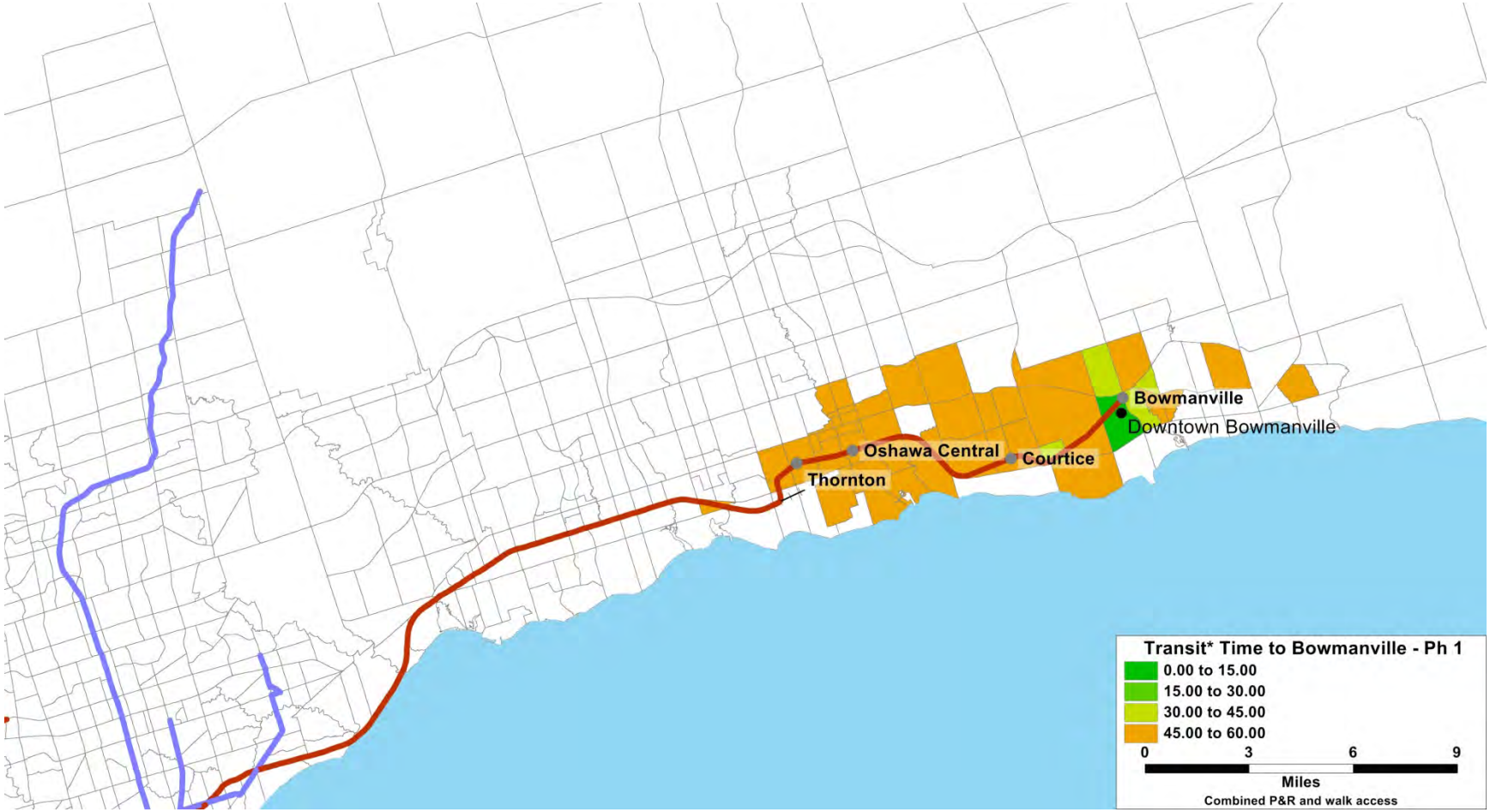


Figure B-12, Transit Time to Downtown Bowmanville (Scenario 2)

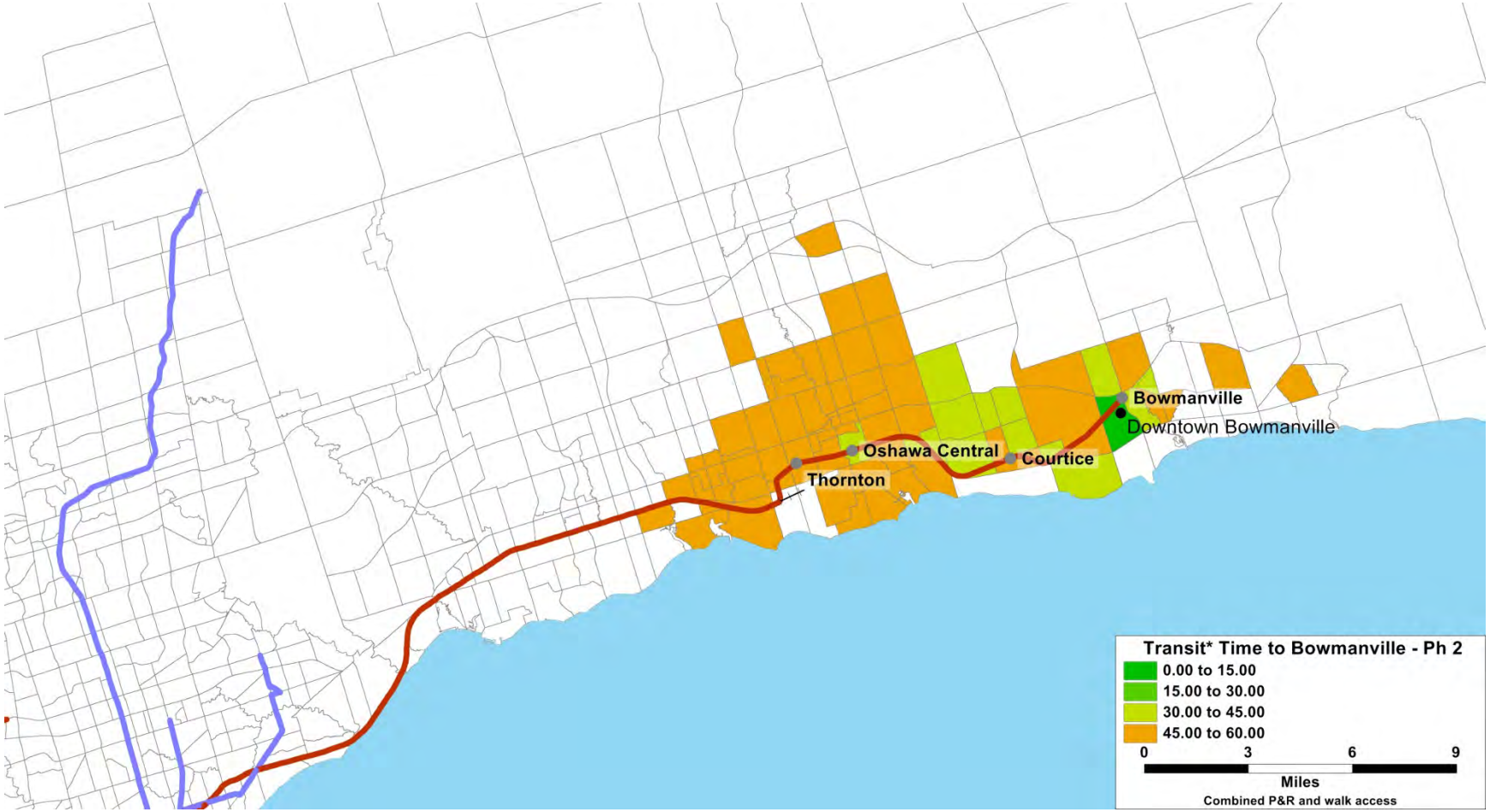


Figure B-13, Mode Share Change (Scenario 1 vs. Base, in percentage points)

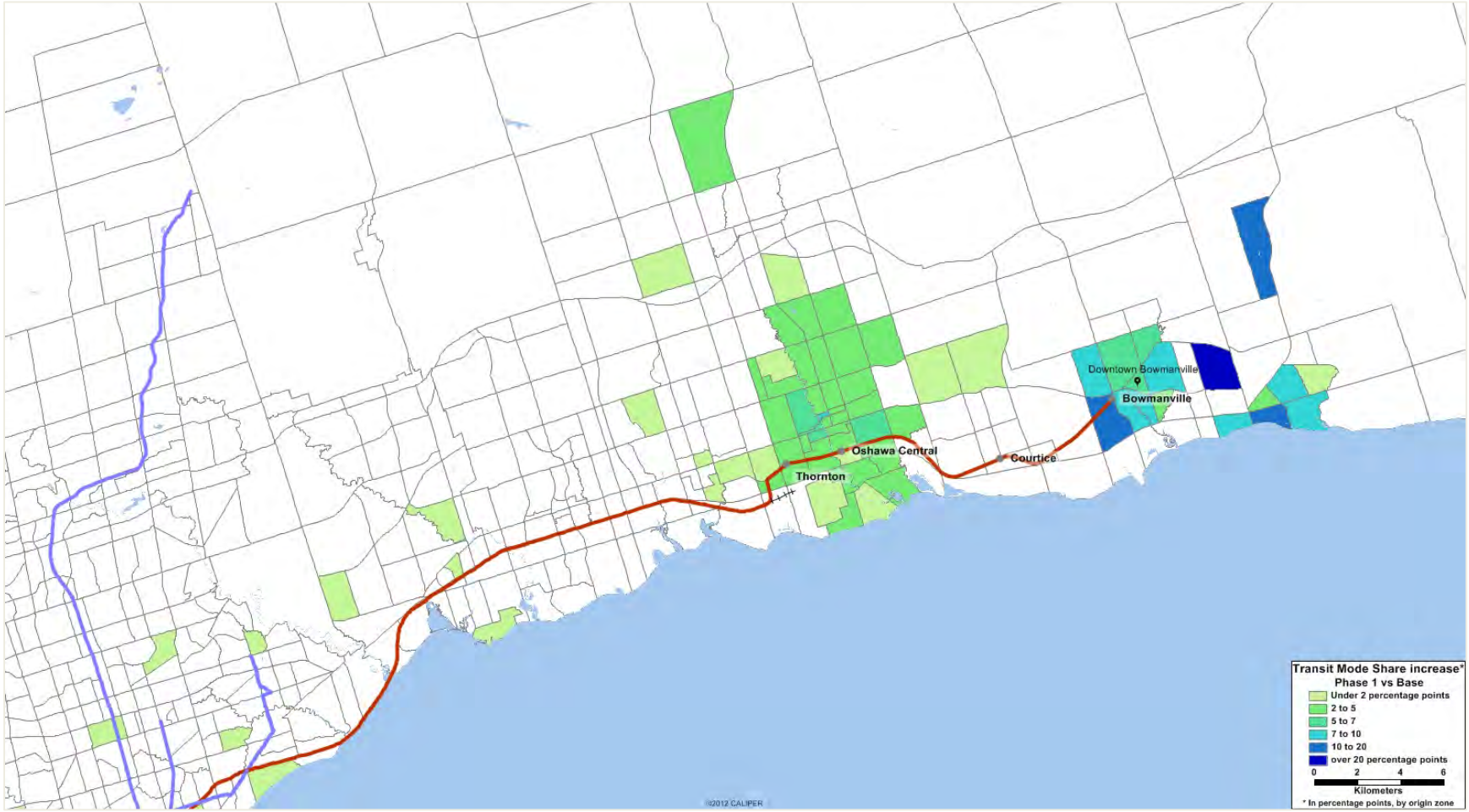
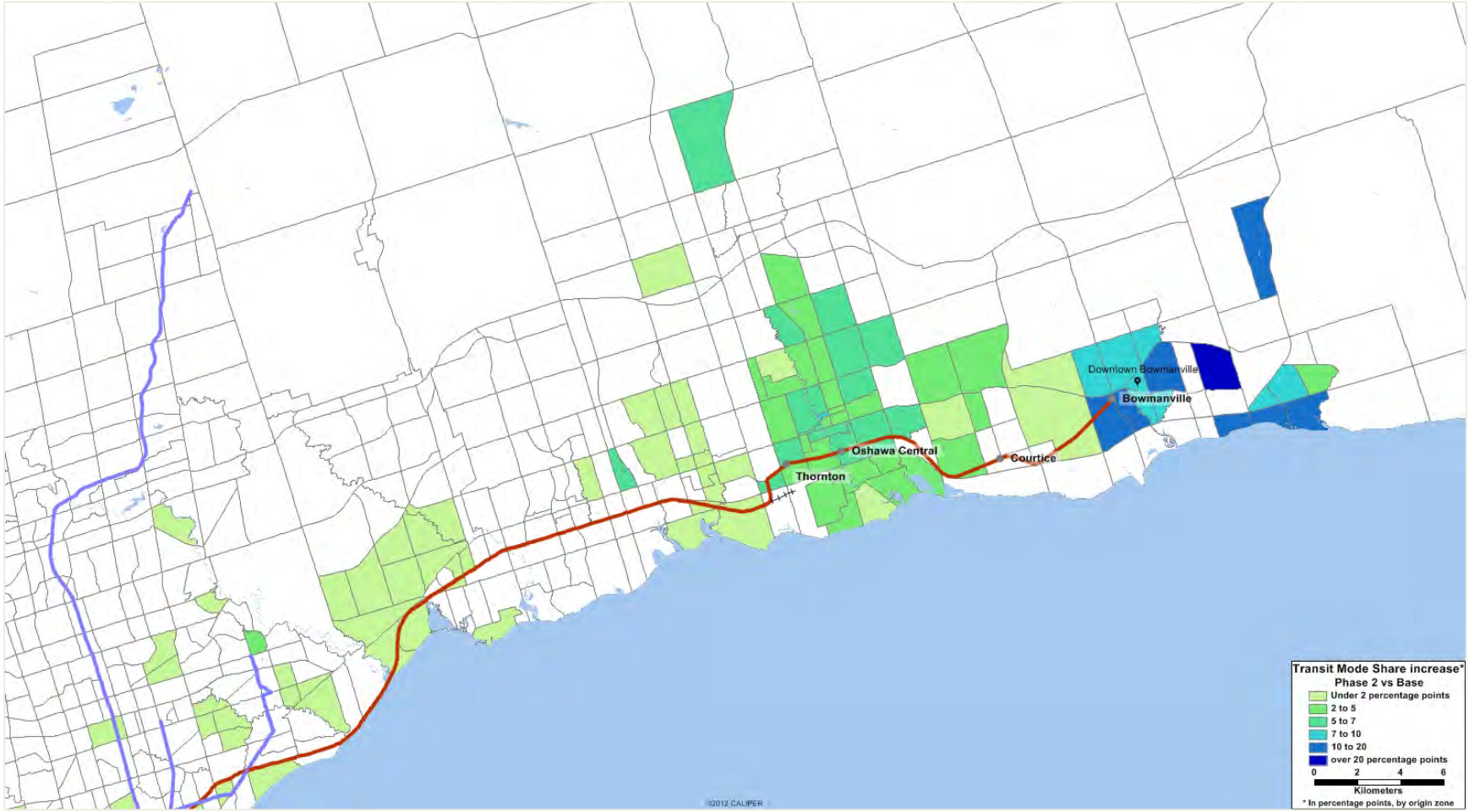


Figure B-14, Mode Share Change (Scenario 2 vs. Base, in percentage points)



Appendix C
Economic Impact Methodology

ESTIMATING ECONOMIC BENEFITS GENERATED BY MLS® HOME SALES AND PURCHASES

This appendix reviews the methodology used to generate estimates of the economic benefits resulting from the construction and on-going operation of the GO Lakeshore East extension project.

The methodology can be broadly divided into two sections:

- Estimating the expenditures resulting from the construction of the project and on-going operations of the GO train service; and
- Estimating the economic impacts of these expenditures.

A summary of the methodology used by Altus Group Economic Consulting to generate each of these estimates is provided below.

ESTIMATING THE ECONOMIC IMPACTS RESULTING FROM THE GO LAKESHORE EAST PROJECT

Estimates for the economic impact of additional expenditures generated by the construction of the project, and on-going operation of the GO train service were derived through the use of Statistics Canada's Interprovincial Input-Output Model. The current model relates to the year 2010. The 2010 results were indexed to the year 2015 based on Statistics Canada's price index. An input-output model is used to estimate the impacts of various types of economic activities. It is an accounting framework of an economy's production system. It shows the interconnections that exist between the various sectors of the economy when goods and services are produced. Using an input-output model, it is possible to determine which goods and services are required to achieve a certain production level in a particular industry – or the economy as whole.

The model can take an estimate of expenditures on a given economic activity (in this case, construction of an infrastructure project and the operation of a rail transportation system) and translate it into the impacts on various industries – and ultimately, the amount of income and jobs created.

A key component of an input-output model is the set of "input structures" for each economic activity covered by the model. An input structure literally splits the original expenditure among all the different inputs that are used in that economic activity. For example, in constructing a rail expansion project, expenditures are incurred in a variety of industries – construction, engineering, administration, etc. Each of these industries has an input structure of its own that involves inputs from a variety of other industries plus labour and owners of firms in that industry.

An input-output model includes a full array of input structures that have been estimated for all industries in the economy. Use of the model in this analysis involves estimating the cost of constructing the project, and the incremental operating costs associated with the extension project. To formulate this input structure, the estimated expenditures were converted into the input categories used by the Statistics Canada Interprovincial Input-Output model.

Findings are presented in terms of "jobs" generated. This is the term used by the Input-Output Division of Statistics Canada in its estimates of employment generated. The term "jobs" is close to but not the same as "person-years of employment". The estimate of jobs provides the number of workers that would be employed for a full-year; however, the estimate includes both full and permanent part-time jobs at the ratios appropriate for each of the industries involved.