DRAFT

HIGHWAY 413 PRELIMINARY DESIGN AND ASSESSMENT OF ENVIRONMENTAL IMPACTS

Community Wellbeing Report

April 2026

Ontario

WSP

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AECOM: 2024-12-21

Table of Contents

page

Community Wellbeing.....1

1. Part A: Socio-Economic Conditions 3

2. Part B: Human Health……..83

Community Wellbeing

The Canadian Index of Well-being defines well-being as “the presence of the highest possible quality of life in its full breadth of expression focused on but not necessarily exclusive to: good living standards, robust health, a sustainable environment, vital communities, an educated populace, balanced time use, high levels of democratic participation, and access to and participation in leisure and culture” (Canadian Index of Wellbeing, 2016). As such, community well-being is a function of several factors that work together to improve wellness within a community. These factors are related to health, social, economic, cultural and environmental conditions, such as social cohesion, economic vitality, cultural preservation, environmental sustainability, access to services, mental health and wellness, and the integrity and accessibility of physical spaces. Community wellbeing can be achieved through a collection of non-clinical approaches for improving health, preventing disease and reducing health disparities by addressing social, behavioural, cultural, environmental, economic determinants of health and wellbeing in a community (Murphy, 2010).

Indigenous Services Canada also developed a Community Wellbeing Index, which provides a measure of the quality of life of communities across Canada, using the data and information collected via the census of the population (Indigenous Services Canada, n.d.). The scores from this Community Wellbeing Index, which consider information such as education, income, housing, and labour force activity, provide a systematic and reliable way to track the socio-economic well-being of communities over time and can also illustrate gaps in well-being between Indigenous and non-Indigenous communities (Indigenous Services Canada, n.d.).

Government agencies, health authorities and community organizations work to promote socio-economic wellbeing, healthy choices and provide health services to foster both individual and community health and well-being. Physical infrastructure can also contribute to determining a community’s health and well-being. Infrastructure development projects can have large impacts on the livelihood, lifestyle, culture and identity of those living in nearby communities.

Changes in air quality, noise effects, accidents and injuries, urban sprawl, access to traditional country foods, food security, social cohesion, employment growth, and public safety, can be infrastructure development-related effects that are intertwined and either directly or indirectly, impact the community’s overall health and well-being. Hence,

community health and well-being depends on a number of factors, including both the social and environmental factors.

By using community wellbeing as a guiding framework, decision-makers can evaluate impacts to meaningful indicators to measure both the benefits and drawbacks of proposed developments, using the planning process to further enhance the benefits and mitigate the drawbacks.

For the Highway 413 Project, community wellbeing was addressed by means of two main studies:

1. Socio-Economics Technical Report (AECOM, 2026); and
2. Human Health Implications (HHI) Study of Highway 413 Preliminary Design and Assessment of Environmental Impacts (HHI Study) (Intrinsik, 2026), in accordance with MTO's Environmental Guide for Assessing Human Health Implications of Provincial Transportation Projects (MTO, 2022).

Both of these studies are provided in this Report under Part A and Part B below.

A

Socio-Economic Conditions

Socio-Economics Technical Report

Highway 413 Preliminary Design and Assessment of Environmental Impacts

March 2026

Ontario

WSP

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AECOM: 2024-12-21

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Table of Contents

page

Executive Summary 1

1. Introduction 3

1.1 Project Overview 3
1.2 Socio-Economic Study Area 5
1.3 Context Setting 6

2. Study Methodology 8

3. Baseline Conditions 9

3.1 Population and Employment Growth Projections 9
3.1.1 Provincial Population Growth Projections 9
3.1.2 Dramatic Population Growth in the GTA is a Reality 11
3.1.3 Population Growth Projection in the Study Area 11
3.1.4 Education Characteristics Within Study Area 12
3.1.5 Community Health & Well-Being 13
3.2 Multiple Land Uses in the Study Area 15
3.3 Approved Urban Growth 17
3.4 Housing and Household Income in the GTA 20
3.4.1 Homelessness in the GTA 22
3.5 Economy 24
3.5.1 Labour Force Availability Within the GGH 24
3.5.2 Travel and Commuting Characteristics Within the Study Area 28
3.5.3 Projected Employment Growth in Study Area Communities 32
3.5.4 Employment Opportunity Associated with Highway 413 Construction 33
3.6 Urban Indigenous Population in the Project Area 34
3.6.1 Traditional Activities 38
3.7 Baseline Summary 38

4. Socio-Economic Impact of Highway 413 40

4.1 Urban Sprawl 41

4.1.1 Baseline Conditions 41
4.1.2 Potential Effects 44
4.1.3 Potential Mitigation 44
4.1.4 Conclusion 44
4.2 Farmland 44
4.2.1 Baseline Conditions 45
4.2.2 Potential Effects 46
4.2.3 Potential Mitigation 46
4.2.4 Conclusion 47
4.3 Natural Heritage Features 47
4.3.1 Baseline Conditions 47
4.3.2 Potential Effects 49
4.3.3 Potential Mitigation 49
4.3.4 Conclusion 52
4.4 Recreation 52
4.4.1 Baseline Conditions 52
4.4.2 Potential Effects 53
4.4.3 Potential Mitigation 53
4.4.4 Conclusion 54
4.5 Social Cohesion 54
4.5.1 Baseline Conditions 54
4.5.2 Potential Effects 55
4.5.3 Potential Mitigation 56
4.5.4 Conclusion 56
4.6 Business and Employment 56
4.6.1 Baseline Conditions 56
4.6.2 Potential Effects 56
4.6.3 Potential Mitigation 57
4.6.4 Conclusion 57
4.7 Travel Times 57
4.7.1 Baseline Conditions 58
4.7.2 Potential Effects 58
4.7.3 Potential Mitigation 59
4.7.4 Conclusion 59
4.8 Indigenous Cultural Practices 59
4.8.1 Baseline Condition 59
4.8.2 Potential Effects 60
4.8.3 Mitigation 60
4.8.4 Conclusion 60

5. Conclusion 61

6. References 64

List of Figures

Figure 1: Highway 413 Route 4
Figure 2: The Socio-economic Study Area 6
Figure 3: GTA Population Forecasts, 1986 to 2046 10
Figure 4: Caledon Population Growth 18
Figure 5: Current and Approved Land Development Boundary in Relation to Highway 413 19
Figure 6: Number of Households in Unaffordable Dwellings in the GTA in 2024 21
Figure 7: Projected Percent Increase in Employment in Halton, Peel, and York Regions, 2021 to 2051 32
Figure 8: Projected Percent Increase in Municipal Employment, 2021 to 2051 33
Figure 9: Population Growth across York, Peel, and Halton Regions (Statistics Canada, 2016, 2021) with Projected Population Growth from the Approved Municipal Plans (Halton, 2022; Peel, 2022; York, 2022) 42
Figure 10: Percent Population Growth in Area Municipalities, 2016 Compared to Projected 2051 Growth (Stats Canada, 2016; Approved Municipal Plans) 43

List of Tables

Table 1: Regional Population Projections, 2016-2051 11
Table 2: Lower Tier Municipalities Population Projections, 2016-2051 12
Table 3: Education Attainment for Population of Ages 25-64, 2021 13
Table 4: Perceived Health & Well-Being by Regional Health Unit, 2019-2020 14
Table 5: Number, and Median Income of Households, 2016-2021 20
Table 6: Comparison of Unaffordability Between GTA, Ontario and Canada (2024) 21
Table 7: Housing Tenure within the Socio-Economic Study Area Municipalities, 2021 22
Table 8: Total Number of Individuals Experiencing Homelessness in Study Area Regions (2021) (Homeless Hub , n.d.) 22
Table 9: Total Labour Force by Industry for Ontario and GGH, 2021 24

Table 10: Total Place of Work Employment by Industry for Ontario and the GGH, 2021 25
Table 11: Total Construction Place of Work Employment in Ontario and GGH, 2021 26
Table 12: Construction Labour Force in Ontario and GGH by Heavy and Civil Engineering, 2021 27
Table 13: Top Five Industry Sectors by Sex in Halton, Peel, and York Regions (2021) 27
Table 14: Mode of Transportation Within the Study Area 28
Table 15: Work Commuting Times in the Study Area (2021) 30
Table 16: Estimated Employment Impact of Constructing Highway 413 34
Table 17: Current Indigenous Population in Study Area Municipalities and Regions 36
Table 18: Summary of Socio-Economics Effects Assessment by Social Value Component 62

Acronyms

CAGR..... Compounded Annual Growth Rate
CMA ..... Census Metropolitan Area
CMHA..... Canadian Mental Health Association
EA ..... Environmental Assessment
ELC ..... Ecological Land Classification
ESA..... Environmentally Significant Area
GGH..... Greater Golden Horseshoe
GTA..... Greater Toronto Area
GTHA ..... Greater Toronto-Hamilton Area
IAAC..... Impact Assessment Agency Canada
LSA ..... Local Study Area
MTO ..... Ministry of Transportation of Ontario
POW..... Place of Work
PSW..... Provincially Significant Wetland
QEW..... Queen Elizabeth Way
SAR..... Species at Risk
SVC..... Social Value Component
SWH..... Significant Wildlife Habita

Executive Summary

As one of the fastest growing regions in North America, the Greater Golden Horseshoe (GGH) is forecast to grow to approximately 15 million people (an increase of 50%) by 2051. Given the expected population and employment growth in major urban centres, and associated travel demands for both personal and commercial transportation in the Greater Toronto Area (GTA), Highway 413 has been identified by the Government of Ontario as an important undertaking aimed at establishing the necessary transportation infrastructure to accommodate this future growth. The Highway 413 Project is expected to foster economic vitality in the region, as it will facilitate better transportation of goods and people, improve connectivity and enable growth in various economic sectors.

Socio-economics is the study of how economic activity (such as the construction and operation of Highway 413) affects and is shaped by social considerations and values. This study gathers data and information to help understand social conditions of affected communities (including economic status, health status, and other social indicators such as education). Examples of wider social impacts include the following. This study incorporates some of these.

What are social impacts?

Example social impacts include the following (derived from Vanclay, 2003):

- ***Way of life*** – that is, how people live, work, play and interact with one another on a day-to-day basis
- ***Culture*** – such as shared beliefs, customs, values and language or dialect
- ***Community*** – cohesion, stability, character, services and facilities
- ***Environment*** – the quality of the air and water people use; the availability and quality of the food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation, their physical safety, and their access to and control over resources
- ***Health and well-being*** – health is a state of complete physical, mental, social and spiritual well-being in addition to the absence of disease or infirmity
- ***Personal and property rights*** – particularly whether people are economically affected, or experience personal disadvantage which may include a violation of their civil liberties
- ***Fears and aspirations*** – community and individual perceptions about their safety, their fears about the future of their community, and their aspirations for their future and the future of their children

The Ontario Ministry of Transportation has retained WSP Canada Inc. and AECOM Canada ULC in collaboration with various sub-consultant and technical firms to undertake the Highway 413 Preliminary Design and Assessment of Environmental Impacts, hereinafter referred to as “the Project”.

The Project is following the requirements of the Highway 413 Act, 2024.

This study begins with understanding the baseline social condition of the communities in proximity to the Project, including the following:

- Population, family size, and other demographics
- Approved urban growth and area expansion
- Employment, education and income
- Industry concentrations
- Housing
- Health and well-being services

Social Value Components (SVCs) were identified that represent public concerns and aspirations in relation to the project[1]. For each SVC, the baseline condition is discussed, and a subsequent effects assessment (defined in Methods section) was undertaken for each SVC is relative to the baseline condition.

In general, the Highway 413 Project (hereafter referred to as the “Project”) is anticipated to generate a mix of potential positive, neutral/negligible, and potential negative effects relative to the baseline conditions discussed in this report. A discussion of the effects on each SVC is provided in this report.

1. See Study Methodology (Section 2.0) for detail on how public input was gathered and elaboration on Social Value Components (SVCs).

1. Introduction

AECOM has been retained to conduct a socio-economic assessment of the Highway 413 Project that explores the potential impacts on the key Social Value Components (SVCs). This Project involves the creation of a new 400-series highway and protection for a future transitway running through the Halton, Peel, and York Regions. The new highway aims to alleviate traffic congestion in the Greater Toronto Area (GTA), which has worsened in recent years and is expected to reduce travel times for those travelling between York, Peel and Halton Regions by up to 30 minutes on one-way trips.

The Project acknowledges both opportunities and challenges to the affected regions and adjacent communities. While it promises improved connectivity and potential economic benefits, it also raises some concerns about environmental impacts of future development. This socio-economic assessment summarizes potential impacts on eight SVCs which are: urban sprawl, farmland, natural heritage features, recreation, social cohesion, business and employment, travel times, and Indigenous cultural practices. These SVCs were selected based upon public input and feedback received during project engagement and consultation activities.

1.1 Project Overview

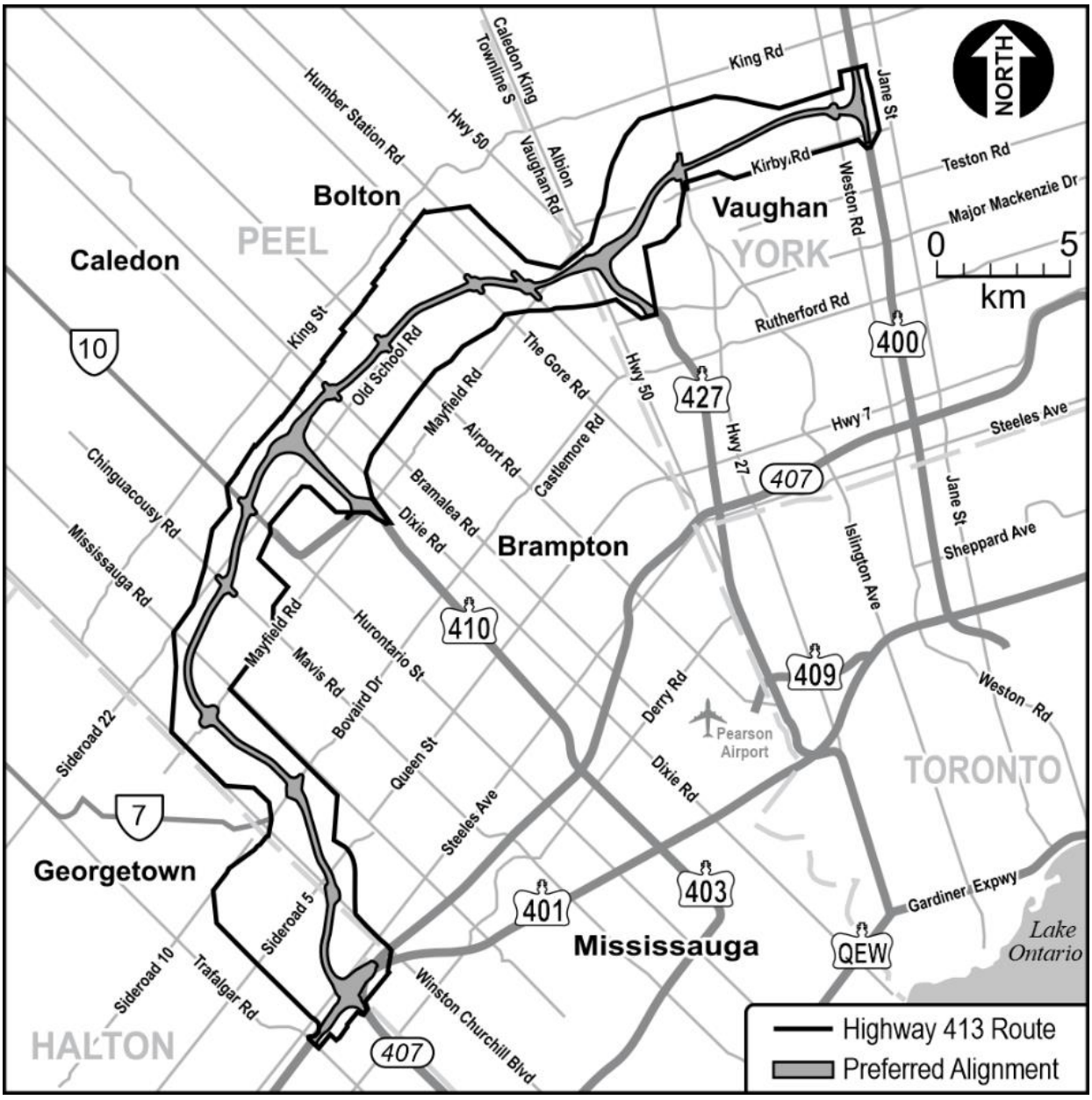
The Ontario Ministry of Transportation has retained WSP Canada Inc. and AECOM Canada ULC in collaboration with various sub-consultant and technical firms to undertake the Highway 413 Preliminary Design and Assessment of Environmental Impacts, hereinafter referred to as “the Project”.

The Project is following the requirements of the Highway 413 Act, 2024.

The Project includes the 52-kilometre Highway 413 Corridor, a 4-kilometre extension to Highway 410, and a 3-kilometre extension to Highway 427 (both facilitating connections to the Highway 413 Corridor), for a total of 59 kilometres of new infrastructure (**Figure 1**). The highway will have 11 interchanges at municipal roads. Features such as stormwater management ponds, carpool lots, Commercial Vehicle Inspection Facilities, maintenance facilities and the potential for electric vehicle charging stations have been explored as part of Preliminary Design.

Highway 413 will connect Highway 401 and Highway 407 Express Toll Route in the Regional Municipality of Halton and the Regional Municipality of Peel with Highway 400 in the Regional Municipality of York.

Figure 1: Highway 413 Route



Source: (Ontario Ministry of Transproation, n.d.)

The typical right-of-way will be 170 metres which includes 110 metres for the typical mainline highway and 60 metres for a proposed transitway. A multi-use trail parallel to Highway 413 may be accommodated within the proposed transitway right-of-way. The right-of-way is expanded at interchanges and high fills areas to accommodate ramps to and from the crossing roads, as well as in locations with ancillary highway facilities as mentioned above. The Preliminary Design consists of a typical six-lane cross section (three lanes in each direction) with a grassed median. The right-of-way has been designed to accommodate up to ten-lanes (five lanes in each direction) should future traffic conditions warrant additional capacity. These additional lanes would be provided by widening the highway towards the median.

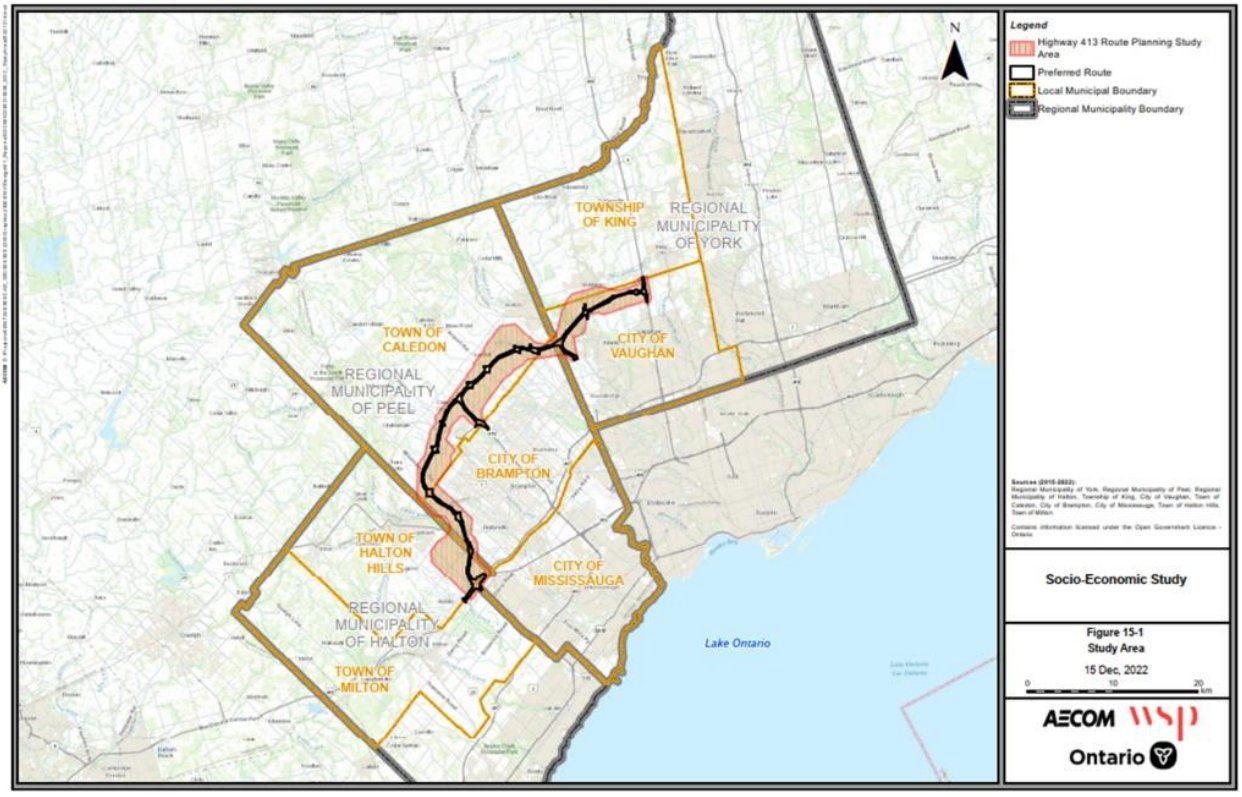
The proposed transitway will be a separate corridor running alongside the highway, dedicated for public transit, including stations to facilitate passenger access at key locations. The proposed transitway and stations will be subject to a separate future assessment of environmental impacts.

Highway 413 is a 400-series highway, which is a network of controlled-access highways throughout the Province of Ontario. Their primary function is to accommodate through traffic and provide links between urban centres. 400-series highways feature full grade separations (such as bridges) at most intersecting roads and railway lines. Interchanges are provided along the 400-series highways to connect to other highways and municipal roads. These highways have design standards to accommodate high speeds and various collision avoidance and traffic management systems. Highway 413 is proposed to have a posted speed limit of 110 kilometres per hour.

1.2 Socio-Economic Study Area

The socio-economic study area is diverse and is defined by the surrounding regional municipalities within which the Highway 413 route will be constructed. This includes the regional municipalities of Halton, Peel, and York, and the cities of Mississauga, Brampton and Vaughan; the towns of Milton, Halton Hills and Caledon; and the township of King. **Figure 2** illustrates the Highway 413 Route within the context of the regional and local municipalities which form the Socio-Economic Study Area.

Figure 2: The Socio-economic Study Area[2]



1.3 Context Setting

For context, it is important to note that this socio-economic assessment adhered to the following guiding parameters:

1. The baseline condition considers a time horizon from 2025 and looks forward to 2051, which coincides with municipal and regional planning time frames.
2. The purpose of the socio-economic study is to assess potential impacts that can be attributed specifically to Highway 413 within the defined study area.

2 . Figure 2 was generated by WSP and AECOM, 2023.

3. The information for this assessment is derived from the following sources:
    a. Research and data collection from municipal and regional government reports, and federal and provincial statistics.
    b. Research, analysis, and conclusions from other technical studies.
    c. Public input and comments provided over the course of this study.
    d. This report was prepared without direct engagement with Indigenous communities and relies on information supplied by MTO from MTO's consultation and engagement with Indigenous communities.
4. The nature of this assessment is qualitative and relies on secondary source data.

Assumptions:

Once lands are utilized for urban development (i.e., housing and commercial/industrial uses) and associated infrastructures, the future option to utilize these same lands for other uses is restricted.

Land utilization has changed over a long period of time. The historical changes to land utilization are outside the scope of this specific assessment.

2. Study Methodology

This socio-economic analysis summarizes the existing conditions within the socio-economic study area and examines potential consequences on SVCs within that study area. SVCs are defined as components within the study area that have social, cultural, spiritual, economic, or aesthetic importance to the surrounding communities.

Eight (8) SVCs were identified as the most significant to local communities, based on findings from public sources and consultation and engagement activities. Sources for the background review included: Statistics Canada, regional approved plans for the Halton, Peel, and York Regions (Halton Region, 2022; Peel Region, 2022; York Region, 2022) news and media, and community records.

This assessment relied on evidence from the following Highway 413 Preliminary Design and Assessment of Environmental Impacts studies:

- Agriculture Impact Assessment
- Consultation Record (will be available in the EIAR)
- Land Use
- Terrestrial Ecosystems Impact Assessment
- Fish and Fish Habitat Impact Assessment
- Human Health Implications Report

Sources of information regarding public issues and aspirations were derived from written comments submitted to the MTO, input from workshops and public meetings, news and media sources, and community records such as Council meeting notes. Sources of information also included the results of engagement and consultation undertaken by MTO.

Based on a review of this information, eight SVCs were identified:

1. Urban Sprawl
2. Farmland
3. Natural Heritage Features
4. Recreation
5. Social Cohesion
6. Business and Employment
7. Travel Times
8. Indigenous Cultural Practices.

3. Baseline Conditions

3.1 Population and Employment Growth Projections

3.1.1 Provincial Population Growth Projections

Population growth within the GTA and GGHA are illustrated in this section. The data presented in this section support two key long-term demographics trends:

1. Planned population growth, with immigration and migration are key drivers; and,
2. Proportional increase in an aging population, particularly the 65+ age group.

The following data and information support these observations.

1. Continued Increase in Provincial Population

Between 2011 and 2021, Ontario's population experienced an average annual growth rate of 1.1%. This growth has accelerated in recent years, reaching 2.0% between 2021-22 and 3.1% between 2022-23. Going forward, the pace of increase within the provincial population is expected to sustain itself, partially due to immigration[3], while long term growth is expected to decline marginally to 1.3% by 2045-46. Between 2023 and 2046, the Ontario Ministry of Finance estimates a reference scenario of growth to be an average annual rate of 1.44%.

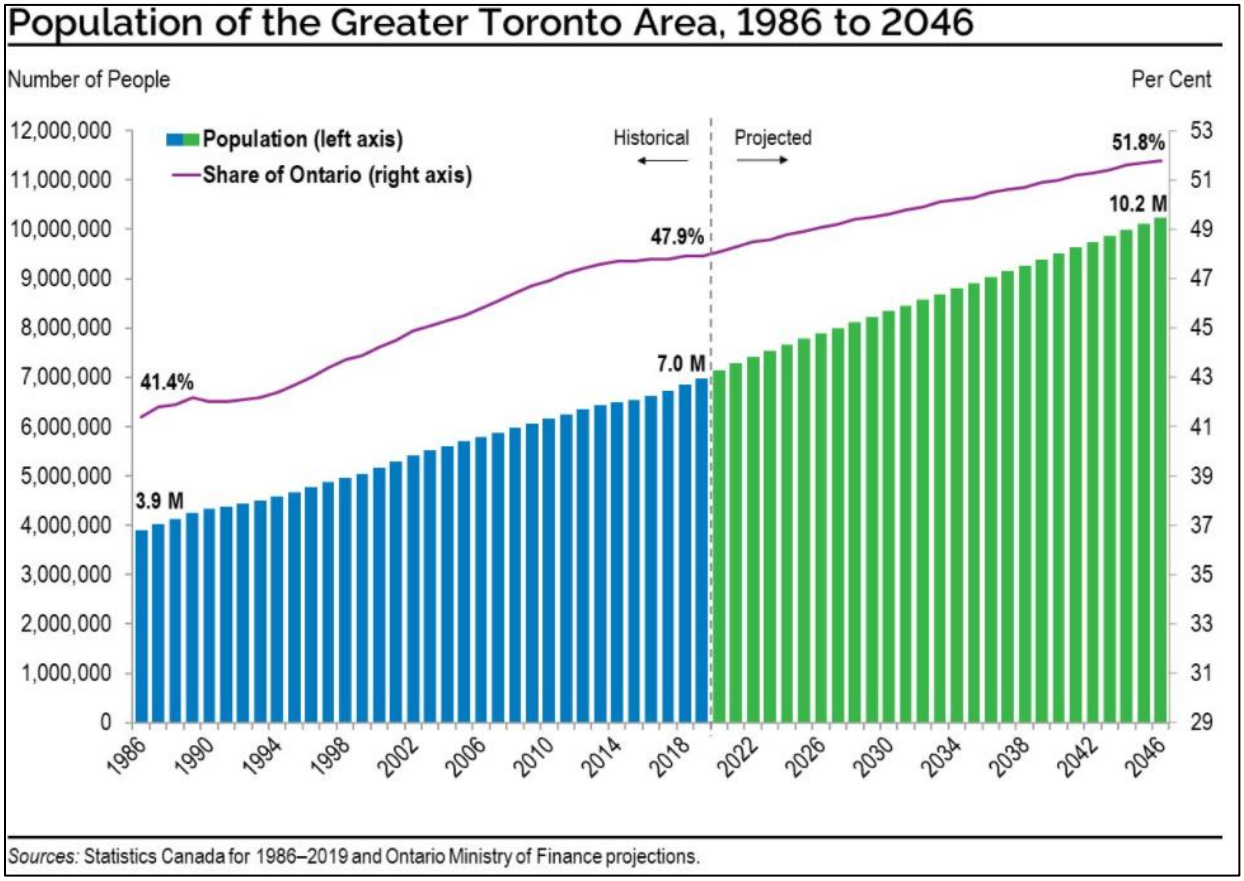
2. Population Growth Driven by Immigration

The share of annual population growth attributed to natural increase has been declining over the last 50-years. This trend is largely driven by lower fertility rates and an aging population. While the impact of declining natural increase has been largely offset by a significant rise in net immigration to Ontario, this demographic shift is expected to persist over the long-term. Fertility rates are projected to remain low and the continued aging of the population, making net migration the

3. Important to note that immigration levels depend on federal policy and programs which recently indicate a slowing of immigration.

primary driver of future population growth. Population growth within the GTA is expected to grow more rapidly compared to the rest of the province, because this is where most immigrants settle (**Figure 3**).

Figure 3: GTA Population Forecasts, 1986 to 2046



3. Concentration of Population Growth in the GTA

Provincial population growth has been fueled in part by an increase in immigration, with immigrants generally choosing to settle in the GTA. Between 2002 and 2022, the population in the 16 major census metropolitan areas (CMAs) within Ontario added 2.8 million residents, growing by 29% over this period. Of the major CMAs in Ontario, the GTA is expected to experience the highest population growth, with a forecast increase of 41% between 2023 and 2046, increasing by an additional 3.1 million people reaching 10.2 million residents by 2046. The growth within the GTA is expected to be faster than that of the provincial rate, indicating that this region is driving growth in the province, with just under half of the provincial population expected to live in the GTA by 2046.

4. Increase in the Number of Seniors and Aging within the 65+ Age Group

Resulting from the lower fertility rates, the population of Ontario is aging, albeit the pace is slower than many comparable jurisdictions as the strong international migration has contributed to an offsetting factor. Over the next decade, the increase in seniors is set to continue to increase, as well as the aging of the baby boomers will result in an increasing proportion of the population in the 65+ age group.

3.1.2 Dramatic Population Growth in the GTA is a Reality

Southern Ontario, and the GTA specifically, has one of the highest population concentrations in Canada. The GTA region is home to some 7 million people and is expected to grow to over 10 million residents by 2046. The anticipated growth underscores the pressing need for continued infrastructure investment to support an expanding population, including the provision of housing, transportation networks and employment lands.

3.1.3 Population Growth Projection in the Study Area

The study area for the project, includes three upper tier municipalities[4] that are projected to experience continued rapid growth in population. These include Halton Region, Peel Region and York Region. At the regional level, Halton and Peel are expected to experience annual growth rates of 1.7% between 2021 and 2051, surpassing the average annual rate forecast at the provincial level. While slightly lower, York Region is forecast to achieve a growth rate of 1.2% between 2021 and 2051, lagging that of the provincial level (**Table 1**).

Table 1: Regional Population Projections, 2016-2051

Municipality	2016 Census Population	2021 Census Population	2031 Population Target	2041 Population Target	2051 Population Target	2021-2051 CAGR
Halton Region	548,000	596,637	735,376	853,108	980,338	1.7%
Peel Region	1,400,000	1,451,022	1,778,552	2,087,402	2,423,150	1.7%
York Region	1,100,000	1,173,334	1,369,958	1,524,063	1,695,866	1.2%

Source: Compiled from Government of Ontario 2020; Government of Ontario 2022b; Halton Region 2022b; Region of Peel 2022b; York Region 2022b.

4. Upper tier municipalities are the Regions of Halton, Peel, and York.

Within these three Regions, seven lower tier municipalities[5] lie within, or are adjacent to, the Highway 413 preferred alignment (**Table 2**). All are designated[6] for major population growth by 2051. The most notable of these is the Town of Caledon, which is projected to grow nearly at an average annual rate of 4.7% between 2021 and 2051 (**Table 2**). Within this subset of the study area, all lower tier municipalities are expected to surpass provincial level growth rates except for the City of Mississauga.

Table 2: Lower Tier Municipalities Population Projections, 2016-2051

Municipality	2016 Census Population	2021 Census Population	2031 Population Target	2041 Population Target	2051 Population Target	2021-2051 CAGR
Milton	110,000	132,979	238,000	277,000	351,000	3.3%
Halton Hills	61,000	62,951	94,000	98,890	132,000	2.5%
Brampton	600,000	656,480	727,000	930,000	985,000	1.4%
Caledon	67,000	76,581	108,000	200,000	300,000	4.7%
Mississauga	722,000	717,961	805,000	920,000	995,000	1.1%
Vaughan	306,000	323,103	418,800	478,900	576,000	1.9%
King City	25,000	27,333	35,100	43,500	51,000	2.1%

Source: Compiled from Government of Ontario 2020; Government of Ontario 2022b; Halton Region 2022b; Region of Peel 2022b; York Region 2022b.

3.1.4 Education Characteristics Within Study Area

The three regions within the study area exceed the provincial average for university level educational attainment. Attainment levels for colleges and apprenticeships are generally consistent with the provincial average. Notably, Halton and York Regions have fewer adults without an education certificate compared to the provincial average. These findings suggest that residents in the regional study area are, overall, well educated. This may be associated with the higher median household income in the study area regions compared to the provincial average discussed in a later section (**Table 5**). Higher incomes tend to be correlated with higher education attainment[7].

5. Lower Tier Municipalities are within the jurisdiction of Upper Tier Municipalities and these two levels of government share responsibilities and governance.
6. The regions of Halton, Peel and York published Master Pans with growth targets to 2051.
7. According to the 2024 Pan-Canadian Education Indicators Program by Statistics Canada, individuals aged 25 to 64 with higher levels of education consistently earn more on average than those with lower levels of education: https://www150.statcan.gc.ca/n1/daily-quotidien/250501/dq250501c-eng.htm

Table 3: Education Attainment for Population of Ages 25-64, 2021

Region/Municipality	Education	Total%	Male%	Female%
Halton Region	No certificate (Diploma or degree)	4.1	4.8	3.5
Halton Region	High school certificate or equivalent	17.7	19.0	16.6
Halton Region	Apprenticeship or trades certificate or diploma	3.7	5.5	2.0
Halton Region	College or other non-university certificate or diploma	21.3	20.2	22.4
Halton Region	University certificate diploma or degree	53.2	50.6	55.6
Peel Region	No certificate (Diploma or degree)	8.7	9.3	8.1
Peel Region	High school certificate or equivalent	22.4	23.7	21.1
Peel Region	Apprenticeship or trades certificate or diploma	3.9	5.5	2.4
Peel Region	College or other non-university certificate or diploma	19.3	17.9	20.7
Peel Region	University certificate diploma or degree	45.7	43.6	47.6
York Region	No certificate (Diploma or degree)	7.1	7.7	6.5
York Region	High school certificate or equivalent	19.9	20.7	19.1
York Region	Apprenticeship or trades certificate or diploma	3.8	5.4	2.3
York Region	College or other non-university certificate or diploma	19.2	18.2	20.1
York Region	University certificate diploma or degree	50.1	48.1	51.9
York Region	University certificate diploma or degree	43.5	38.5	48.3
Province of Ontario	No certificate (Diploma or degree)	8.8	9.9	7.7
Province of Ontario	High school certificate or equivalent	23.3	25.3	21.4
Province of Ontario	Apprenticeship or trades certificate or diploma	5.1	7.5	2.8
Province of Ontario	College or other non-university certificate or diploma	23.6	21.2	25.8
Province of Ontario	University certificate diploma or degree	39.2	36.0	42.2

Source: Statistics Canada 2022b.

3.1.5 Community Health & Well-Being

In a 2022 Statistics Canada survey, residents of Halton, Peel, and York regions reported they were satisfied or very satisfied with their health, life stress, and sense of belonging scoring close to 95% across all three regions in 2019-2020 (**Table 4**). Around 18% to 24% of survey respondents across the regions indicated life stress most days.

Table 4: Perceived Health & Well-Being by Regional Health Unit, 2019-2020

Perceived Health & Well-Being	Halton Regional Health Unit %	Peel Regional Health Unit %	York Regional Health Unit %
Perceived health, very good or excellent[1]	66.6	62.1	65.1
Perceived health fair or poor	8.9	8.4	8.7
Perceived mental health, very good or excellent[2]	69.0	66.2	65.9
Perceived mental health fair or poor	6.8	8.0	8.5
Perceived life stress, most days quite a bit or extremely stressful[3]	23.9	18.1	22.3
Sense of belonging to local community, somewhat strong or very strong[4]	74.5	74.1	69.6
Life satisfaction, satisfied or very satisfied[5]	93.5	94.5	94.6

Source: Statistics Canada 2022j.

Note: 1. Population aged 12 and over who reported perceiving their own health status as being either excellent or very good or fair or poor, depending on the indicator. Perceived health refers to the perception of a person's health in general, either by the person himself or herself, or, in the case of proxy response, by the person responding. Health means not only the absence of disease or injury but also physical, mental and social well-being.

2. Population aged 12 and over who reported perceiving their own mental health status as being excellent or very good or fair or poor, depending on the indicator. Perceived mental health refers to the perception of a person's mental health in general. Perceived mental health provides a general indication of the population suffering from some form of mental disorder, mental or emotional problems, or distress, not necessarily reflected in perceived health.
3. Population aged 12 and over who reported perceiving that most days in their life were quite a bit or extremely stressful. Perceived life stress refers to the amount of stress in the person's life, on most days, as perceived by the person or, in the case of proxy response, by the person responding.
4. Population aged 12 and over who reported their sense of belonging to their local community as being very strong or somewhat strong. Research shows a high correlation of sense of community-belonging with physical and mental health.
5. Population aged 12 and over who reported being satisfied or very satisfied with their life in general. Life satisfaction is based on a self-reported score from 0 to 10 for how respondents feel about their life as a whole at the moment. Satisfied or very satisfied represents those who indicated a value of 6 or more out of 10.

These health and well-being statistics provide a point in time snapshot of the study region, suggesting generally good health and satisfaction with life despite some stresses. Community cohesion and sense of belonging is positive for about 70-75% of the region survey respondents. Scattered throughout the study regions are a variety of health services and facilities that are expected to change and adjust to changing population dynamics over the coming decades.

3.2 Multiple Land Uses in the Study Area

The lands within the study area are home to a variety of uses and values, including but not limited to the following:

- Housing & Business
- Transportation
- Agriculture
- Recreation, particularly access to trails along river corridors and river uses (e.g., canoeing)
- Natural features (e.g., wetlands, terrestrial, aquatic and avian habitats)
- Indigenous cultural practices

Land uses can be active or non-active; both of which are of socio-economic value. Active uses involve use of the land for recreation, housing, agriculture, roads, etc., while non-active uses are valued for their mere existence such as, keeping options open for future alternative land uses, maintaining and preserving wildlife habitats, and/or just knowing the land in its natural state it is there.

The Project's Land Use Report and Environmental Impact Assessment Report identify many active land uses and their baseline condition. The information from these studies includes the following:

- There is a network of roads throughout the study area that are experiencing increasing traffic volumes and congestion. As urban expansion proceeds as planned, more roads will be constructed. Some roads will be upgraded to address a higher volume.
- There are numerous recreational facilities and amenities throughout the study area that support activities such as trail hiking/biking, river canoeing, horseback riding, birding, etc.
- Housing and business establishments are common in the study area. Some are in small subdivisions while others are in large acre lots. Some developments approved in regional master plans have begun.
- Agriculture has long been a predominant fixture in the study area. Much of the land is classified as "*Prime Agricultural Land*". Agriculture within the study area includes a variety of crops, vegetables, and fruit production. An

Agricultural Impact Assessment has been completed for the Project under separate cover. Within the study regions productive agricultural land is as follows:

- Halton Region: 72,920 acres
- Peel Region: 95,583 acres
- York Region: 134,414 acres

- The study area contains many natural features as detailed in the Project's Terrestrial Ecosystems Impact Assessment report and Environmental Impact Assessment Report including (but not limited to):
  - ***Halton Region:*** The region is characterized by its woodlands and wetlands, including the Levi Creek PSW. There is also the presence of East Sixteen Mile Creek, Mullet Creek and Levi Creek, which are important water bodies in the region. The parks and natural areas in Halton support recreational activities for a rapidly expanding population base.
  - ***Peel Region:*** The region features diverse natural areas, including significant woodlands and wetlands such as the Levi's Creek Wetland Complex, Churchville-Norval Wetland Complex, Huttonville Creek & Area Wetland Complex, Etobicoke Creek Headwater Wetland Complex, Heart Lake Wetland Complex and Campbell's Cross Wetland Complex. These natural areas and water bodies enable a variety of recreational activities, including hiking, bird watching, and nature walks, which are highly valued by the community.
  - ***York Region:*** The region also boasts a variety of significant woodlands and wetlands, including the East Humber River PSW Complex. The region's major water bodies, such as the Main and East Humber Rivers, Purpleville Creek, and Robinson Creek play a crucial role in supporting the local ecosystem. Parks and recreational areas in York Region provide ample opportunities for hiking, bird watching, and nature walks, supporting outdoor recreation and community well-being.

There are no First Nation reserves located in the vicinity of the Project; however, the Project is located on lands that remain subject to treaties signed between the Crown and Indigenous communities and in areas where Indigenous communities credibly assert rights. MTO has been consulting with the following Indigenous communities to gain a better understanding of potential impacts of the project on Indigenous

communities' Aboriginal and/or treaty rights as well as to continue to build and strengthen their relationships with these communities. The Indigenous communities are:

- Alderville First Nation
- Beausoleil First Nation
- Chippewas of Rama First Nation
- Chippewas of Georgina Island First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Council of Wendat Nation
- Kawartha Nishnawbe
- Mississaugas of the Credit First Nation
- Mississaugas of Scugog Island First Nation
- Oneida Nation of the Thames
- Six Nations of the Grand River

The Métis Nation of Ontario is also being engaged on an interest-basis during this assessment process.

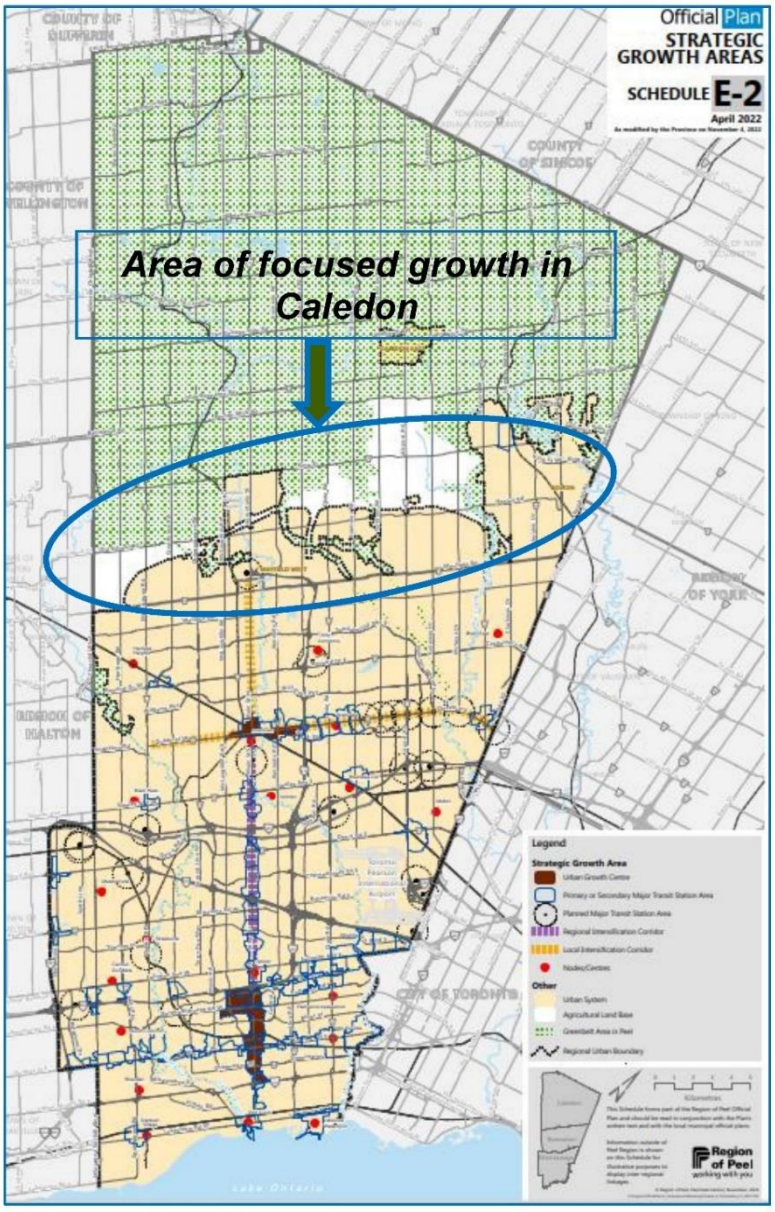
3.3 Approved Urban Growth

The regions of Halton, Peel, and York have approved plans that designate lands for development as per their respective Official Plans (Halton Region, 2022; Peel Region , 2022; York Region , 2022). Essentially, the regions have identified lands for development, either as residential or employment for the next few decades. A consolidated illustration depicting the outer boundary of this approved urban expansion is provided in **Figure 5**.

- Much of the land surrounding the Project is planned for urban growth (represented in yellow), irrespective of the Project.
- The Project tends to form an outer boundary for most of the approved growth plans across all three regions as visualized in Figure 5.
- The land area (net of what is approved for urban growth) consumed by the Project is relatively small.

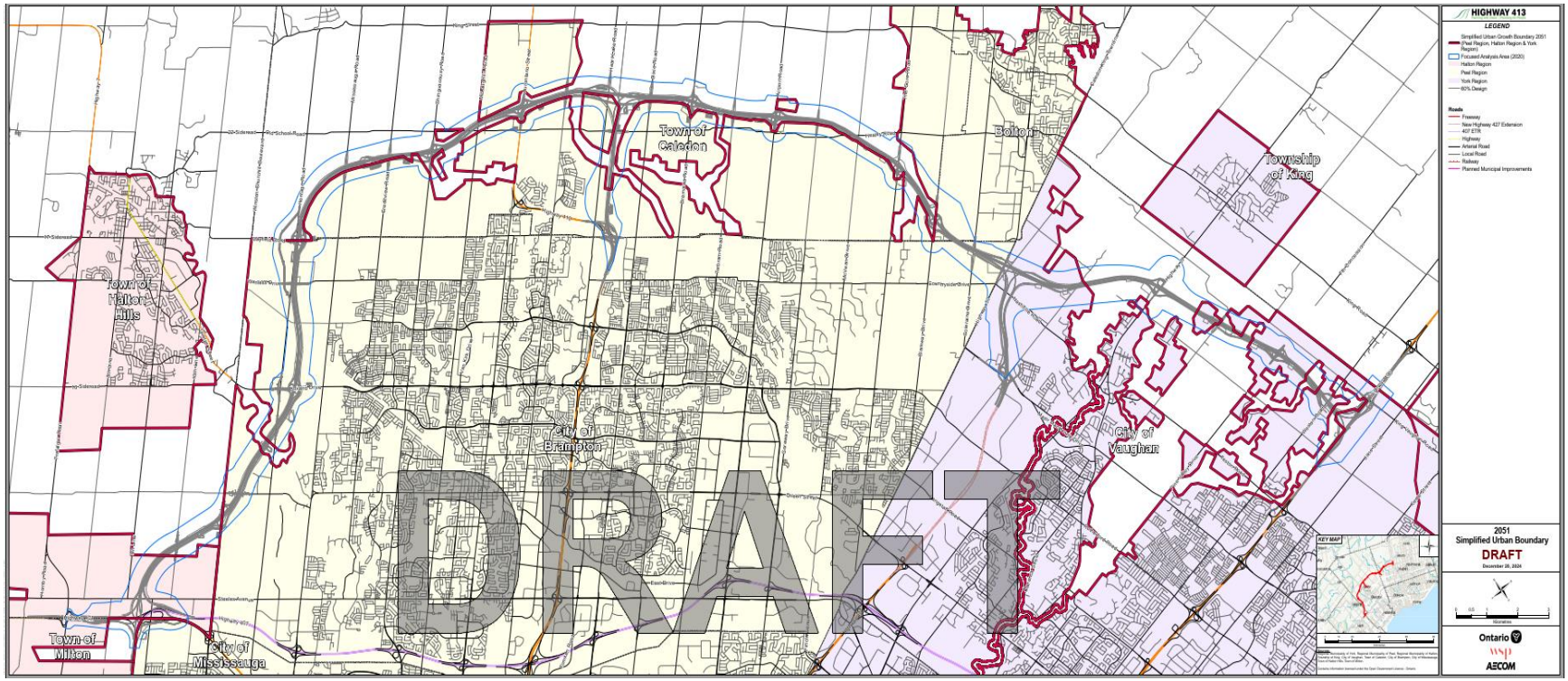
As stated in the previous section, the Town of Caledon's growth is expected to increase about 300% but this growth is concentrated in its southern boundary with Brampton (**Figure 4**[8]). Most of this growth falls within the approved urban expansion represented in **Figure 5**.

Figure 4: Caledon Population Growth



8. Peel 2051, Regional Official Plan Review and Municipal Comprehensive Review, October 2021.

Figure 5: Current and Approved Land Development Boundary in Relation to Highway 413



3.4 Housing and Household Income in the GTA

Recent changes in the number of households and changes to household income (**Table 5**) are important considerations. The growth in the number of households from 2016 to 2021 exceeded the provincial average in Halton and York regions. The Town of Milton experienced the highest growth rate in housing at nearly 17%, more than double the provincial average.

Table 5: Number, and Median Income of Households, 2016-2021

Municipality	Number of Households 2016	Number of Households 2021	Number of Households Change 2016-2021	Median Household Income 2016	Median Household Income 2021	Median Household Income Change 2016-2021
Halton Region	**192,980**	**208,605**	**8.1%**	**103,009**	**121,000**	**17.5%**
Town of Milton	34,255	40,035	16.9%	104,730	126,000	20.3%
Town of Halton Hills	21,075	21,825	3.6%	106,349	127,000	19.4%
Peel Region	**430,180**	**450,745**	**4.8%**	**86,233**	**107,000**	**24.1%**
City of Mississauga	240,910	244,575	1.5%	83,018	102,000	22.9%
City of Brampton	168,010	182,470	8.6%	87,290	111,000	27.2%
Town of Caledon	21,255	23,700	11.5%	113,651	133,000	17.0%
York Region	**357,080**	**391,035**	**9.5%**	**95,776**	**112,000**	**16.9%**
City of Vaughan	94,255	103,915	10.2%	105,351	124,000	17.7%
Township of King	8,140	8,965	10.1%	118,309	141,000	19.2%
Province of Ontario	**5,169,170**	**5,491,205**	**6.2%**	**74,287**	**91,000**	**22.5%**

Sources: Statistics Canada 2017a-j; Statistics Canada 2022b.

Median household incomes across the study area regions and municipalities were higher than the provincial average in 2016 and 2021. The biggest change for this period was in the City of Brampton at 27% compared to the provincial average of just under 23%.

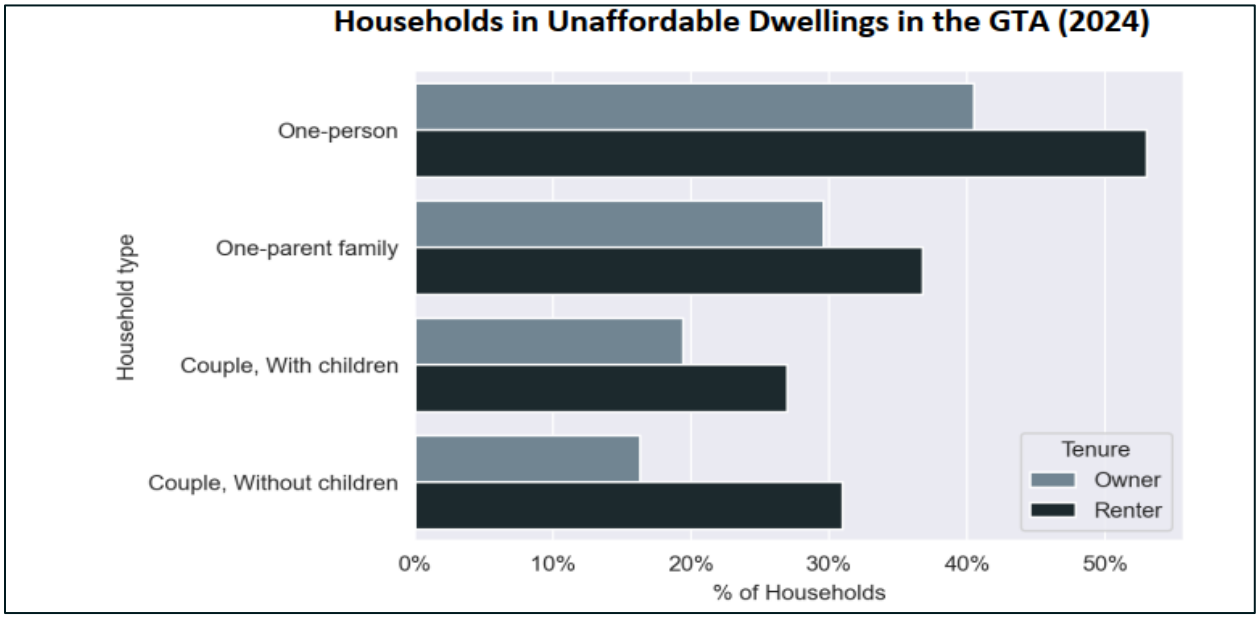
The data indicates that housing availability is increasing (but not keeping up with demand) along with rising household incomes. However, population growth projections (see **Table 2**), particularly in Caledon and Milton, highlight an increased demand for new housing in both these areas and in the broader study area.

Housing affordability is the relationship between household income and housing prices. Housing is considered “affordable” when it costs less that 30% of gross household income. **Figure 6**[9] provides a recent snapshot of the percent of GTA households spending greater than 30% of gross household income on housing. This data indicates

9. Extracted from Canadian Centre for Economic Analysis (2024): Locked Out: Social Value Cost of GTA’s Housing Crisis, page 10.

that on average, renter occupied households tend to reside in more “unaffordable” dwellings compared to ownership, and single person households find themselves in unaffordable dwellings more compared to other categories.

Figure 6: Number of Households in Unaffordable Dwellings in the GTA in 2024



Compared to the rest of Ontario and Canada, the GTA tends to experience higher unaffordability (**Table 6**).

Table 6: Comparison of Unaffordability Between GTA, Ontario and Canada (2024)

Unaffordability by Household Type in the GTA, Ontario, and Canada (2024)

Household Type	GTA	Ontario	Canada
Owners			
One-person	40.5%	32.3%	27.6%
One-parent family	29.6%	23.6%	20.6%
Couple, With children	19.4%	14.0%	10.9%
Couple, Without children	16.3%	10.9%	8.8%
Renters			
One-person	53.0%	50.9%	44.8%
One-parent family	36.8%	35.2%	30.2%
Couple, With children	27.0%	24.0%	17.9%
Couple, Without children	30.9%	27.7%	21.1%

Housing ownership in the study area regions and municipalities outpaces renting compared to the provincial average of about 68% (**Table 7**), particularly in the Town of Caledon with ownership at almost 90%.

Table 7: Housing Tenure within the Socio-Economic Study Area Municipalities, 2021

Regions / Municipalities	Owner%	Renter%
Regional Municipality of Halton	**78.5**	**21.5**
Town of Milton	82.6	17.4
Town of Halton Hills	85.3	14.8
Regional Municipality of Peel	**74.5**	**25.5**
City of Mississauga	70.4	29.6
City of Brampton	78.1	21.9
Town of Caledon	89.4	10.7
Regional Municipality of York	**82.2**	**17.8**
City of Vaughan	85.9	14.1
Township of King	88.2	11.8
Province of Ontario	**68.4**	**31.4**

Note: Percentages may not sum to 100% due to rounding.
Source: Statistics Canada 2022b.

3.4.1 Homelessness in the GTA

Although home ownership is relatively high in the study area, it is expected that housing affordability and homelessness will remain as top concerns. The number of individuals experiencing homelessness is difficult to capture but one estimate using 2021 data indicates it is relatively low compared to the overall population for Halton, Peel, and York regions (**Table 8**).

Table 8: Total Number of Individuals Experiencing Homelessness in Study Area Regions (2021) (Homeless Hub , n.d.)

Region	Total Population	Number of Individuals Experiencing Homelessness	% of Individuals Experiencing Homelessness
Halton	596,637	293	0.05 %
Peel	1,451,022	866	0.06 %
York	1,173,334	329	0.03 %

According to the Homeless Hub (Homeless Hub , n.d.), a large segment of homeless individuals in urban centres across Canada identify as being Indigenous, LGBTQ+, senior citizens, or disabled.

The Town of Halton Hills has a number of programs to support individuals at risk of being homeless, such as Access to Community Housing, Rent Supplement Program, Housing Stability Fund, and Halton Housing Help (Halton Hills 2020). The town does not currently have a homeless shelter, and interim solutions such as churches are used (C. McLeod and B. King, pers. comm., November 9, 2022).

Programs and services are in place in Halton, Peel and York regions to address homelessness.

The York Region Community Health Department offers a number of programs to help people who are homeless and those at risk of becoming homeless, including outreach, emergency housing, housing with support, integrated support social workers, and housing stability programs, however these programs are operating at capacity with waitlists (C. Ciappa and K. Farahani, pers. comm., February 9, 2023).

Given housing prices and the general cost of living, more York residents are struggling with housing affordability (C. Ciappa and K. Farahani, pers. comm., February 9, 2023). York Region offers emergency financial aid to those who are at risk of becoming homeless; this aid is in addition to funding from Ontario Works. Offering support at this stage is considered more effective and efficient than waiting until after a person becomes homeless (C. Ciappa and K. Farahani, pers. comm., February 9, 2023). York Region also implements the Short-Term Assistance for Renters Program, which helps renters stay housed when face with financial difficulty due to temporary job loss.

Over the last few years, a noticeable trend has been the increasing number of homeless encampments being constructed along major roadways (P. Shouldice, C. M. Collins, N. Randall, and A. Phelps, pers. comm., October 27, 2022). York Region Outreach Services includes a team dedicated to assisting individuals living in these encampments. Outreach personnel work with York bylaw officers and the OPP to provide support; the Community Paramedicine Outreach Response Team is also called in to assist with cases of mental health or addictions issues (C. Ciappa and K. Farahani, pers. comm., February 9, 2023).

The Region of Peel Housing Services plans, manages and delivers housing and homelessness programs in Peel. Services offered include one-time financial help for avoiding eviction, emergency and transitional shelters, street outreach, support services and help to find permanent housing, and drop-in and support programs (J. Katz, pers. comm., December 9, 2022). Peel Region has also provided funding to the BlackNorth

Initiative Home Ownership Bridge Program, which helps make home ownership more accessible for Black families (Richa Dave, pers. comm., March 16, 2023).

Peel Housing Corporation provides living environments for tenants in Peel Living and Region of Peel owned properties including: 71 residential properties, two transitional housing residences and three emergency shelters (J. Katz, pers. comm., December 9, 2022). Road maintenance crews in Mississauga notice small homeless shelters under bridges and against noise barriers; however, large scale encampments along major roadways have not been observed (C. Trombino and K. Lauppe, pers. comm., February 6, 2023).

3.5 Economy

This section highlights background information about the overall economy within the study area, providing an important backdrop for the socio-economic assessment.

3.5.1 Labour Force Availability Within the GGH

To assess the spatial concentration of the labour force within Ontario, labour force data as well as place of work employment data has been summarized to identify the percentage provincial employment that is located in the GGH area. This analysis specifically focuses on employment related to the construction of the Highway 413, such as heavy and civil engineering. This area, which is larger than the GTA, is considered the catchment area from which construction labour typically commutes to highway construction sites in the GTA. **Table 9** shows the total labour force for the GGH area compared to the Ontario provincial total. In Ontario, there was a total labour force of approximately 7,200,000 in 2021, of which 67% are in the GGH. Given the scale of Project construction, it us useful to note that the GGH accounts for 63% of total provincial labour force or 340,000 workers.

Table 9: Total Labour Force by Industry for Ontario and GGH, 2021

Industry Sector	Ontario	Greater Golden Horseshoe	GGH Percentage of Ontario
Agriculture, forestry, fishing and hunting	104,895	32,130	31%
Mining, quarrying, and oil and gas extraction	34,365	7,495	22%
Utilities	55,230	31,870	58%
Construction	538,345	338,740	63%
Manufacturing	655,935	442,525	67%
Wholesale trade	244,910	185,135	76%
Retail trade	798,090	527,755	66%
Transportation and warehousing	379,485	275,710	73%

Industry Sector	Ontario	Greater Golden Horseshoe	GGH Percentage of Ontario
Information and cultural industries	169,120	134,380	79%
Finance and insurance	399,030	327,455	82%
Real estate and rental and leasing	152,055	116,690	77%
Professional, scientific and technical services	681,235	521,245	77%
Management of companies and enterprises	26,240	23,285	89%
Waste management & remediation services	324,285	224,870	69%
Educational services	531,260	352,525	66%
Health care and social assistance	859,910	532,015	62%
Arts, entertainment and recreation	130,490	88,970	68%
Accommodation and food services	390,675	257,950	66%
Other services (except public administration)	283,115	186,030	66%
Public administration	428,030	193,020	45%
Total	**7,186,700**	**4,799,795**	**67%**

Source: Statistics Canda table 98-10-0448-01

Table 10 shows the place of work (POW) employment for the GGH area compared to Ontario provincial total. In Ontario, there was a POW employment figure of approximately 6,500,000 in 2021, of which 66% or approximately 4,300,000 workers are in the GGH. Within the construction sector, the GGH accounts for 63% of total provincial labour force or 300,000 workers.

Table 10: Total Place of Work Employment by Industry for Ontario and the GGH, 2021

Industry Sector	Ontario	Greater Golden Horseshoe	GGH percentage of Ontario
Agriculture, forestry, fishing and hunting	99,050	29,420	30%
Mining, quarrying, and oil and gas extraction	32,660	6,980	21%
Utilities	53,760	30,965	58%
Construction	487,400	305,275	63%
Manufacturing	601,730	409,065	68%
Wholesale trade	230,270	173,580	75%
Retail trade	683,150	446,770	65%
Transportation and warehousing	341,020	247,225	72%
Information and cultural industries	156,055	123,990	79%
Finance and insurance	386,245	316,795	82%
Real estate and rental and leasing	143,030	109,650	77%
Professional, scientific and technical services	642,650	490,665	76%
Management of companies and enterprises	25,260	22,390	89%
Waste management & remediation services	281,855	194,235	69%
Educational services	487,935	321,355	66%

Industry Sector	Ontario	Greater Golden Horseshoe	GGH percentage of Ontario
Health care and social assistance	817,410	503,575	62%
Arts, entertainment and recreation	85,955	57,985	67%
Accommodation and food services	293,015	189,660	65%
Other services (except public administration)	228,520	148,365	65%
Public administration	415,925	186,260	45%
Total	**6,492,895**	**4,314,205**	**66%**

Source: Adapted from Statistics Canada table 98-10-0455-01

While labour force data provides information regarding the provincial and regional workforce capacity, place of work (POW) data shows the economic strength of the local economy, identifying where jobs are located and what industries are driving employment. Combining both datasets together provides a complete picture of the regional economy, identifying the total labour force relative to POW employment as well as providing insight into commuting patterns.

Heavy and Civil Engineering Construction account for approximately 50,000 workers throughout the Province of Ontario. Of which, approximately 30,000 or 57% of these workers are located within the GGH (**Table 11**). In addition, Specialty Trade Contractors account for approximately 282,500 workers throughout the Province of Ontario, of which, approximately 176,320 or 62% are located within the GGH.

Table 11: Total Construction Place of Work Employment in Ontario and GGH, 2021

Employment	Ontario	Greater Golden Horseshoe	GGH percentage of Ontario
Construction of buildings	154,695	100,215	65%
Heavy and civil engineering construction	50,210	28,755	57%
Specialty trade contractors	282,500	176,320	62%
Total	**487,405**	**305,290**	**63%**

Source: Adapted from Statistics Canada table 98-10-0455-01

Of the labour force employed within the Heavy and Civil Engineering Construction sector, 60% of the provincial labour force is employed within the Highway, Street and Bridge Construction subsection with approximately 34,000 workers (**Table 12**). Of the labour force employed within the sector, 53% or approximately 18,000 workers are employed within this sector within the GGH.

Table 12: Construction Labour Force in Ontario and GGH by Heavy and Civil Engineering, 2021

Heavy & Civil Engineering Construction Labour Force	Ontario	Greater Golden Horseshoe	GGH Percentage of Ontario
Utility system construction	13,680	7,980	58%
Land subdivision	3,070	2,510	82%
Highway, street and bridge construction	33,855	17,845	53%
Other heavy and civil engineering constructions	5,405	3,460	64%
Total	**56,010**	**31,795**	**57%**

Source: Adapted from Statistics Canada Table 98-10-0448-01

The immediate study area (GGH) is home to a mix of industry sectors. The top five industry sectors in these regions (Table 13) include professional services, construction, manufacturing and retails services that likely contain the majority of resources required to construct and operate the Project. Of interest is that females occupy a large percent of the healthcare and social assistance, and education sectors. Males tend to occupy large percentages of the manufacturing and construction industry sectors.

It is important to note that some statistics in this report are presented for male and female members of the population, reflective of the source data. However, it is acknowledged that gender identity and expression can be fluid and diverse and may not be fully represented by binary categories.

Table 13: Top Five Industry Sectors by Sex in Halton, Peel, and York Regions (2021)

Region	Top Five Industry Sectors Participation Males	Top Five Industry Sectors Participation Females
Halton Region	■ Professional, scientific, and technical services (13.8%) ■ Manufacturing (11.0%) ■ Retail Trade (10.7%) ■ Construction (9.6%) ■ Finance and Insurance (8.1%)	■ Health care and social assistance (16.0%) ■ Educational services & Retail trade (equally 11.7%) ■ Professional, scientific, and technical services (10.7%) ■ Finance and Insurance (8.0%)
Peel Region	■ Transportation and warehousing (15.2%) ■ Manufacturing (12.8%) ■ Professional, scientific, and technical services (11.0%) ■ Retail trade (10.2%) ■ Construction (9.8%)	■ Health care and social assistance (15.5%) ■ Retail trade (12.3%) ■ Professional, scientific, and technical services (8.7%) ■ Educational services (8.4%) ■ Manufacturing (7.6%)

Region	Top Five Industry Sectors Participation Males	Top Five Industry Sectors Participation Females
York Region	■ Professional, scientific, and technical services (13.5%) ■ Construction (12.4%) ■ Retail trade (10.3%) ■ Manufacturing (10.0%) ■ Finance and insurance (7.7%)	■ Health care and social assistance (15.2%) ■ Retail trade (11.3%) ■ Educational services (10.7) ■ Professional, scientific, and technical services (10.6%) ■ Finance and insurance (9.1%)

Source: Statistics Canada 2022b.

3.5.2 Travel and Commuting Characteristics Within the Study Area

The primary mode of transportation in Halton, Peel and York regions, and area municipalities adjacent to the Project is depicted **Table 14**.

Table 14: Mode of Transportation Within the Study Area

Mode of Transportation	Total (%)	Male (%)	Female (%)
Halton Region	-	-	-
Car, truck, van	88.8	90.4	86.9
Public Transit	4.7	4.0	5.5
Walked /Cycled	3.9	3.4	4.3
Other	2.7	2.2	3.3
Town of Milton	-	-	-
Car, truck, van	91.2	92.5	89.6
Public Transit	3.7	3.3	4.3
Walked /Cycled	2.6	3.3	3.0
Other	2.4	1.9	3.1
Town of Halton Hills	-	-	-
Car, truck, van	92.9	94.5	90.9
Public Transit	1.4	1.0	1.8
Walked /Cycled	3.7	3.1	4.3
Other	2.1	1.4	3.0
Peel Region	-	-	-
Car, truck, van	85.0	88.9	79.8
Public Transit	10.3	7.5	13.9
Walked /Cycled	2.3	1.8	3.0
Other	2.4	1.8	3.2
City of Mississauga	-	-	-
Car, truck, van	82.7	86.9	77.3
Public Transit	11.4	8.5	15.1

Mode of Transportation	Total (%)	Male (%)	Female (%)
Walked /Cycled	3.2	2.5	4.2
Other	2.7	2.1	3.5
City of Brampton	-	-	-
Car, truck, van	85.9	89.9	80.6
Public Transit	10.3	7.4	14.3
Walked /Cycled	1.5	1.1	2.1
Other	2.2	1.6	3.0
Town of Caledon	-	-	-
Car, truck, van	95.2	96.3	93.7
Public Transit	1.2	1.1	1.6
Walked /Cycled	1.8	1.5	2.3
Other	1.7	1.1	2.5
York Region	-	-	-
Car, truck, van	88.8	91.5	85.5
Public Transit	6.1	4.5	8.1
Walked /Cycled	2.8	2.2	3.3
Other	2.3	1.7	3.1
City of Vaughan	-	-	-
Car, truck, van	88.8	92.0	84.6
Public Transit	6.5	4.4	9.2
Walked /Cycled	2.3	1.8	2.9
Other	2.4	1.7	3.3
Township of King	-	-	-
Car, truck, van	93.9	95.6	91.7
Public Transit	1.4	0.8	2.1
Walked /Cycled	2.9	2.2	3.5
Other	1.8	1.5	2.4
Province of Ontario	-	-	-
Car, truck, van	83.6	86.7	79.8
Public Transit	8.6	6.6	11.1
Walked /Cycled	5.4	4.9	6.2
Other	2.4	1.9	2.9

Source: Statistics Canada 2022b.

Caledon and King reported the highest rates of personal vehicles for work-related travel at approximately 95.2% and 93.9% respectively, which was significantly higher than the Province of Ontario rate of 83.6%. Males had a higher number than females for use of personal vehicle for work-related travel in the Highway 413 municipalities.

Reliance on public transit was greatest in Mississauga (11.4%), and the lowest in Caledon (1.2%). The province of Ontario average is 8.6%. Females used public transit more than males to travel to work in the Highway 413 municipalities.

The percentage of study area residents who walked or cycled to work was lower than the provincial rate of approximately 5.4%, ranging from 1.5% in Brampton, and peaking at 3.2% in Mississauga and 3.9% in Halton Region. The number of workers that walked or cycled to work was almost split between males and females in the Town of Milton. Females walked to work more than males in all other Highway 413 municipalities.

The commuting duration is the total time workers spent traveling to their place of employment. The reported commuting time as of 2021 by the Highway 413 municipalities is represented in **Table 15**.

Table 15: Work Commuting Times in the Study Area (2021)

Travel Time	Total %	Male %	Female %
Halton Region	-	-	-
Under 15 minutes	28.2	24.0	33.4
15-29 minutes	30.5	28.6	32.8
30-44 minutes	22.5	25.5	18.9
More than 45 minutes	18.8	21.8	15.0
Town of Milton	-	-	-
Under 15 minutes	23.8	18.9	30.0
15-29 minutes	26.2	24.6	28.1
30-44 minutes	27.6	30.6	23.9
More than 45 minutes	22.5	26.0	18.0
Town of Halton Hills	-	-	-
Under 15 minutes	27.3	21.5	34.8
15-29 minutes	24.7	23.1	26.7
30-44 minutes	26.2	29.3	22.3
More than 45 minutes	21.8	16.1	16.3
Peel Region	-	-	-
Under 15 minutes	16.7	14.2	20.0
15-29 minutes	37.0	36.4	37.7
30-44 minutes	26.7	28.8	23.9
More than 45 minutes	19.6	20.6	18.4
City of Mississauga	-	-	-
Under 15 minutes	19.2	16.2	22.9
15-29 minutes	38.5	37.6	39.5
30-44 minutes	24.3	26.8	21.2
More than 45 minutes	18.0	19.4	16.4
City of Brampton	-	-	-
Under 15 minutes	14.4	12.4	17.1
15-29 minutes	36.9	36.9	37.0
30-44 minutes	28.3	30.0	25.9
More than 45 minutes	20.4	20.6	20.1
Town of Caledon	-	-	-
Under 15 minutes	17.6	14.4	21.9

Travel Time	Total %	Male %	Female %
15-29 minutes	25.3	23.3	28.2
30-44 minutes	31.8	33.5	29.4
More than 45 minutes	25.2	18.7	20.5
York Region	-	-	-
Under 15 minutes	19.8	16.3	24.0
15-29 minutes	31.7	30.3	33.5
30-44 minutes	26.6	28.7	24.2
More than 45 minutes	21.9	24.8	18.3
City of Vaughan	-	-	-
Under 15 minutes	20.2	17.2	23.9
15-29 minutes	35.1	34.7	35.4
30-44 minutes	26.6	28.8	23.7
More than 45 minutes	18.2	19.3	17.0
Township of King	-	-	-
Under 15 minutes	15.2	12.9	18.5
15-29 minutes	31.2	29.1	34.3
30-44 minutes	29.5	30.4	28.4
More than 45 minutes	24.1	17.7	19.1
Province of Ontario	-	-	-
Under 15 minutes	28.3	24.9	32.4
15-29 minutes	33.7	33.1	34.5
30-44 minutes	20.6	22.3	18.6
More than 45 minutes	17.4	19.7	14.6

Source: Statistics Canada 2022b.

The average commuting time reported in most Highway 413 municipalities (and the Province) was 15 to 29 minutes. Females had a higher percentage commuting time than males in this group. The highest average reported commuting time is in Towns of Milton and Caledon was ranging from 30 to 44 minutes. Male commuters had higher commuting times compared to females in this group. The most reported average commuting time in Halton Hills was under 15 minutes. Females had a higher percentage than males (Statistics Canada 2022b).

The most common timeframe for commuting to work for all municipalities was from 7:00 am to 7:59 am (Statistics Canada 2022b).

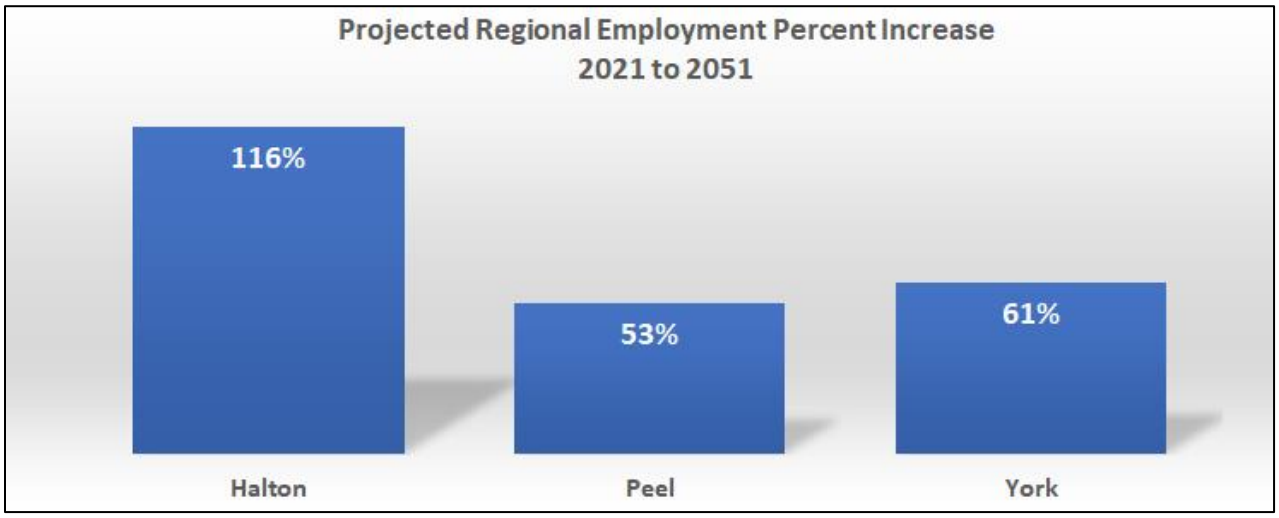
It is possible as population growth extends into the approved development areas within the study area, that traffic congestion and travel times to work will increase.

3.5.3 Projected Employment Growth in Study Area Communities

Manufacturing and construction are dominant industry sectors throughout the GTA including the study area communities. This means robust and growing labour trades and supply chain industry services exist within the area to serve both the construction and servicing of new urban developments, as well as the highway.

Like population growth expectations, projected employment in Halton, Peel and York regions is also anticipated to increase, (**Figure 7**). Halton Region employment is planned to increase at nearly double compared to Peel and York regions.

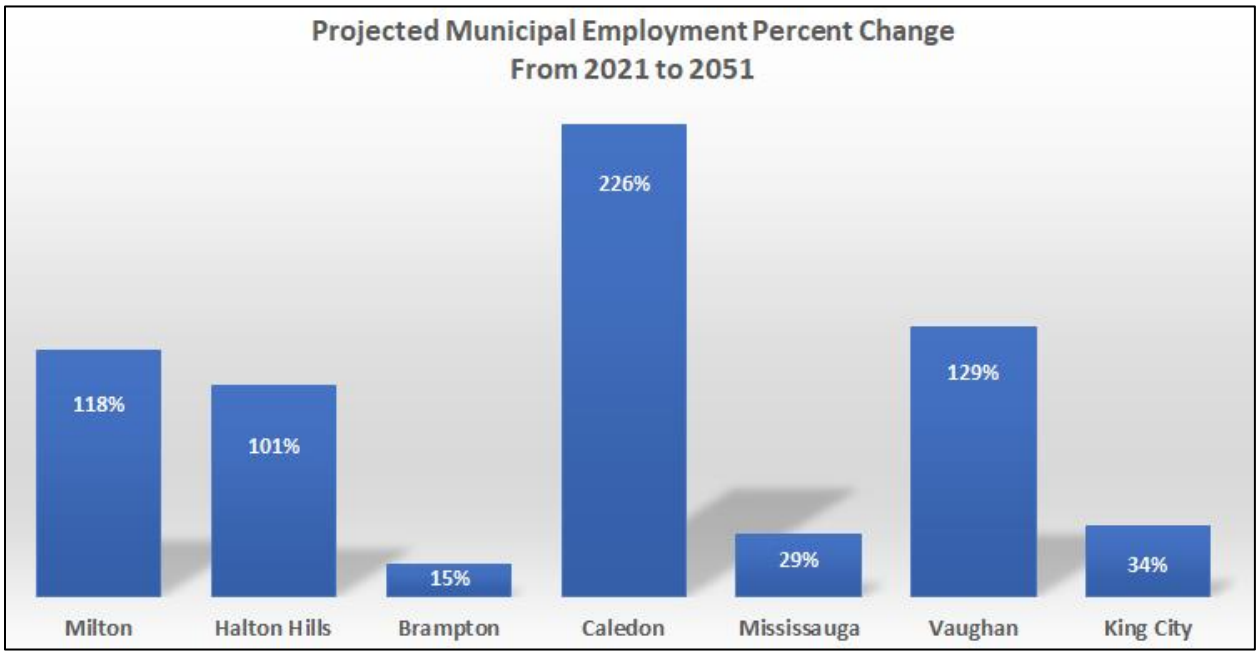
Figure 7: Projected Percent Increase in Employment in Halton, Peel, and York Regions, 2021 to 2051



Source: Statistics Canada: Census of Population, 2022, and the Regional Official Plans

Yet, the Town of Caledon is projected to experience employment increase by about 225% from 2021 to 2051, followed by Vaughan, Milton, and Halton Hills at about half the rate of increase.

Figure 8: Projected Percent Increase in Municipal Employment, 2021 to 2051



Source: 2024 York Region Official Plan https://www.york.ca/york-region/regional-official-plan
2022 Region of Peel Official Plan https://peelregion.ca/sites/default/files/2024-07/official-plan-review-consolidation-clean%20%281%29.pdf
2024 Halton Region Official Plan https://www.halton.ca/Repository/ROP-Office-Consolidation-Text
2024 Ministry of Finance Population Projections https://data.ontario.ca/dataset/population-projections/resource/03abe0d5-0995-4ce2-ad9d-e904d50106a5

3.5.4 Employment Opportunity Associated with Highway 413 Construction

Preliminary estimates of the Highway 413 construction indicate that between 2,600 to 3,300 direct jobs (onsite labour) may be supported from construction over the course of five years (Prism Economics and Analysis, 2021). It is further estimated that an additional 2,300 to 2,900 indirect jobs (labour employed by material suppliers to the Project) could be supported in the construction phase of this Project (**Table 16**).

It is expected that a portion of these direct and indirect jobs will be new hires depending on the dynamics of the overall current skilled labour force. Specifically, if Highway, Street and Bridge Construction labour force (about 17,800 employed in 2021) is fully engaged in other similar projects, then the need to hire additional labour increases.

At best the employment impact from construction of Highway 413 will sustain currently employed construction labour as well as result in hiring new labour.

Table 16: Estimated Employment Impact of Constructing Highway 413

Estimated Employment Impact of Constructing the GTA West Corridor				
	Total No. of Person-Years of Employment		No. of Jobs (Five-year Construction Period)	
	Low Estimate	High Estimate	Low Estimate	High Estimate
Construction Industry Jobs (Direct Employment)	13,200	16,500	2,600	3,300
Supply Chain Effects (Indirect Employment)	11,700	14,700	2,300	2,900
Recycled Spending Effects (Induced Employment)	7,000	8,800	1,400	1,800
Total Employment	**31,900**	**40,000**	**6,300**	**8,000**

Source: Prism Economics and Analysis

Source: Prism Economics and Analysis, 2021

3.6 Urban Indigenous Population in the Project Area

While there are no reserves in the vicinity of the Project, Indigenous individuals may be affected by the Project, including Indigenous community members living off-reserve. It is challenging to find accurate population data specific to urban Indigenous populations. A study conducted by the Seventh Generations Midwives Toronto and the Centre of Urban Health Solutions (St. Michael's Hospital) acknowledges that typical census data collection is flawed due to low response rates from urban Indigenous respondents because of poverty, mistrust of colonial systems, and a high rate of mobility (Rotondi et al. 2017). The study used respondent driven sampling to survey Indigenous individuals who had used services at either Queen West Central Toronto Community Health Centre, Seventh Generations Midwives Toronto, or the Native Canadian Centre of Toronto. Of the 908 respondents, 81.1% reported that they had not completed the Census and would thus not be accounted for in official population figures. While the study by Rotondi et al. (2017) focuses on the urban Indigenous population in the City of Toronto, it can provide insight on urban Indigenous populations and potential study constraints within the broader context of the GTA including the Socio-Economic Study Area. The results of the year-long study indicated that most of the urban Indigenous population in the Toronto area are under the age of 65 (the largest age cohort for those age 15-65+ was those aged 45-54), female, and over half of study respondents indicated that household incomes were $20,000 or less (Rotondi et al. 2017).

The provincial Urban Indigenous Action Plan from the Government of Ontario (2018) notes that during the first round of engagements, priority issues affecting urban Indigenous persons in Ontario included:

- Experiences of racism resulting from lack of cultural competency in service delivery;
- Homelessness and lack of affordable housing;
- Inadequate public transportation;
- Need for education, training and employment;
- Limited support for youth members;
- Poor access to health and mental health services;
- Violence against Indigenous women and girls;
- Food insecurity; and,
- Involvement in the criminal justice system (Government of Ontario, 2018).

These engagement sessions also highlighted what works for urban Indigenous populations and service providers including access to culturally appropriate services, Indigenous culture and diversity, community gatherings, meaningful engagement in planning, policy and program development, development and support of safe spaces, building of local and regional relationships, local services, and integrated service planning. This report also highlighted barriers that urban Indigenous populations and service providers face including lack of supports for youth and seniors, cultural conflict and systemic racism, competition for, or lack of, resources, lack of Indigenous representation and control, a need to support service provider capacity, and a funding administration burden (Government of Ontario, 2018).

With the above in mind, the socio-economic study area communities appear to contain a low percentage of Indigenous residents relative the overall in population in 2021 (**Table 17**).

Table 17: Current Indigenous Population in Study Area Municipalities and Regions

Municipality	Total Population	Indigenous Population (percent of Total Population)
Regional Municipality of Halton	589,770	5,890 (1%)
Town of Milton	131,430	945 (0.7%)
Town of Halton Hills	62,325	1,145 (1.8%)
Regional Municipality of Peel	1,439,075	7,430 (0.5%)
City of Mississauga	712,825	3,555 (0.5%)
City of Brampton	650,165	3,255 (0.5%)
Town of Caledon	76,085	620 (0.8%)
Regional Municipality of York	1,165,615	5,875 (0.5%)
City of Vaughan	321,315	675 (0.2%)
Township of King	27,210	240 (0.9%)
Province of Ontario	14,031,750	406,585 (2.9%)

Source: Statistics Canada 2022b

Efforts from Halton Region to build meaningful relationships with Indigenous people and communities to advance reconciliation are ongoing. The work emphasizes the importance of building and fostering reciprocal relationships with First Nations, Métis and Inuit Peoples. On June 16, 2021, Halton Regional Council endorsed:

- The Truth and Reconciliation Commission Report and Calls to Action;
- The United Nations Declaration of the Rights of Indigenous Peoples;
- An Indigenous Land Acknowledgement statement and its uses;
- Permanently flying the flag of the Mississaugas of the Credit First Nation at the Halton Regional Centre; and
- A working partnership with Indigenous Peoples and local First Nations, Inuit and Métis Communities to establish a Halton Indigenous Advisory Group, modelled after the Halton COVID-19 Indigenous Elder Advisory Group (Halton Region 2022c).

Within Peel Region, an Indigenous Friendship Centre in Mississauga (The Indigenous Network) works to address the needs of the urban Indigenous population of Mississauga and surrounding regions by providing various programs and services (The Indigenous Network, 2023). These programs may address spiritual, mental, emotional, or physical needs of Indigenous peoples and work to improve the sense of community

among the population by fostering a supportive social network. friendship centre offers eight core program sectors to community members including:

- **Wasa-Nabin**, a program for urban Indigenous at-risk teenagers focusing on self-development. The program aims to promote self-esteem, cultural identity, better health choices, education values and career goals for Indigenous and non-Indigenous youth.
- **Journey Together: Indigenous Child & Family Outreach**, a program that operates in conjunction with EarlyON (a free, high-quality program for families and children from birth to six years old across Ontario) and other childcare programs in the region to deliver culturally-specific experiences including smudging, drumming, and storytelling.
- **Cultural Resource Coordinator Program**, caters towards Indigenous youth and their families to provide increased access to culturally based programs and services that foster a strong sense of well-being and positive Indigenous identity;
- **Urban Aboriginal Healthy Living Program**, assists Indigenous individuals in improving their physical and mental health by providing opportunities to learn, participate, and find enjoyment in active living and healthy lifestyles in a safe space.
- **Indigenous Wholistic Mental Wellness Program**, utilizes an integrated model of Western and Traditional Indigenous mental health practices to provide catered mental health counselling and case management to the Indigenous individuals.
- **Kizhaay Anishinaabe Niin**, a program focused on restoring healthy relationships between men and women by encouraging men to speak out and end violence towards Indigenous women.
- **Indigenous Court Worker Program**, helps Indigenous individuals navigate the judicial system by increasing awareness of their legal rights and responsibilities, and providing supports and liaison services. The program also works with members of the judicial system to increase understanding of the unique challenges faced Indigenous individuals within the system.
- **The Gladue Writer Program**, provides services to Indigenous individuals by writing and submitting Gladue reports for those who are deemed to have committed an offence to provide information regarding life circumstances to the court for consideration during sentencing (The Indigenous Network 2022).

The Métis Nation of Ontario offers the Métis Family Wellbeing Program with the objective of preventing violence in Métis families by offering supports and educational activities for children, youth (up to 18 years old), and their families (Métis Nation of Ontario, 2023).

The Indigenous Diabetes Health Circle (IDHC)[10] provides programs focusing on diabetes education, prevention, and management in Indigenous communities in Ontario. Their Southern Region office located in the City of Hamilton and offers services to Indigenous individuals living in the Peel Region (IDHC, 2023).

Within York Region, the Nin Os Kom Tin Native Cultural Friendship Centre, located in the Town of Newmarket, offers social services assistance.

The Toronto Carrying Place, which crosses the highway corridor at the Humber River, was a trail historically used by Indigenous peoples that led from the mouth of the Humber River on Lake Ontario to the Holland River near Lake Simcoe. The trail was 45 kilometers long and followed the valley of the Humber, keeping to the high ground to the east of the river. Indigenous communities have identified that the trail was used as a portage and crosses the corridor (The Toronto Carrying Place, 2023). This is a site of historical significance.

3.6.1 Traditional Activities

Access to traditional country foods enables Indigenous people the opportunity to obtain, prepare and consume foods and medicines valued within their culture. Harvesting and consuming traditional foods promotes both spiritual and physical well-being, making such foods and medicines essential to overall health within Indigenous communities (Intrinsik, 2025). It is noted that traditional gathering, fishing, and/or hunting fosters a sense of community cohesion as it brings people together while promoting traditional knowledge transfer and spiritual awareness.

3.7 Baseline Summary

Findings from the baseline assessment include:

- There is an abundant and diverse labour force within the study area and the GGH. Specifically, in the large highway and bridge construction industry, and

10. See: https://idhc.life/ for more information regarding the Indigenous Diabetes Health Circle.

the labour force is highly concentrated in the GTA. This means the companies and skilled trades needed to construct the Project are relatively local and could potentially be drawn upon for Project construction.

- Construction of Highway 413 is expected to sustain many existing and new employment opportunities. Although it is not currently discernible how many new jobs (hires) will be created because of the Project, it is very likely that many of the estimated 2,900 to 6,200 direct and indirect jobs sustained by the project may be new hires.
- Approved Master Plans in Halton, Peel and York regions, and municipalities adjacent to the Project are projecting significant population and employment growth, all precipitating the need for extensive urban development expansion in the study area. Expansion of housing and employment areas is for the most part located within the Project area. It is important to note that approved urban growth will occur regardless of the Project.
- Housing affordability and homelessness are of concern, like with the rest of Ontario and pose a challenge for regions and municipalities as housing and the projected population growth proceed as planned.
- The self-identified Indigenous population within the study area municipalities represent a small portion of the overall population yet are disproportionally represented in the homeless population.
- The Project is located on lands that remain subject to treaties signed between the Crown and Indigenous communities and in areas where Indigenous communities credibly assert rights. Some Indigenous communities have indicated that their members harvest in, or near, the location of the Project.

4. Socio-Economic Impact of Highway 413

This section defines the SVCs used to conduct the socio-economic The eight SVCs are:

1. Urban Sprawl
2. Farmland
3. Natural Heritage Features
4. Recreation
5. Social Cohesion
6. Business and Employment
7. Travel Times
8. Indigenous Cultural Practices

For each of the eight social value components, the assessment of potential effects begins with a synopsis of the baseline condition followed by a qualitative assessment of possible effects. Mitigation options for negative effects are then discussed, followed by concluding remarks and an evaluation of whether net effects are positive, negative, or neutral/negligible. A summary of these effects is presented in this section.

The determination of net effect conclusions is based on a qualitative assessment and is summarized in Table 18 in the next section (Conclusions). For example, the extent of urban expansion/development and loss of productive farmland is predetermined, as per the baseline discussion, so the assessment for this study is to determine the degree to which the Project changes the baseline condition. In all cases this requires qualitative assessment with the following rubric:

Project Impact	Description	Example
Positive Effect	The Project has potential to generate measurable positive change to the baseline condition that would be evident to many people in the region	Reduction in travel times or reduction in traffic congestion that is noticeable by most people in the region
Neutral / Negligible Effect	The project has no or very small measurable impact relative to the baseline condition (within the bounds of normal/accepted variation)	The loss of farmland due to the Project is very small relative to the total amount of farmland.
Negative Effect	The Project has potential to generate measurable negative change to the baseline condition that would be evident to many people in the region	The loss of natural heritage features attributed to the Project is noticeable to most people in the region

4.1 Urban Sprawl

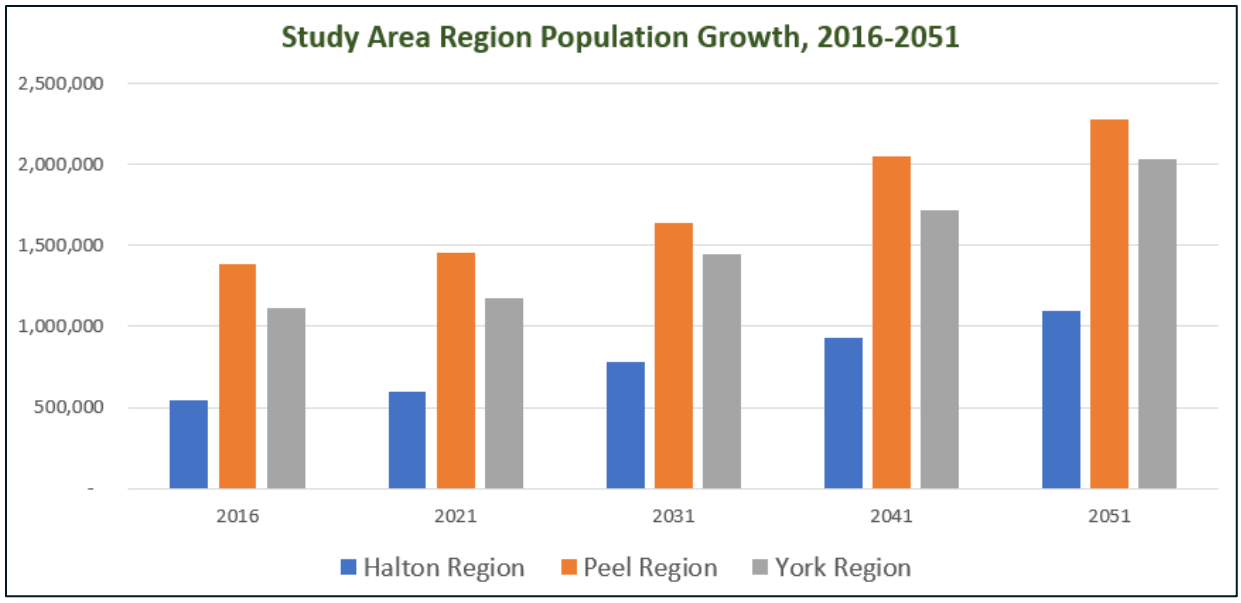
Public consultations identified urban sprawl[11] as a common concern for residents in the study area. Limiting urban sprawl involves managing growth in a way that preserves existing green spaces (including agriculture and recreational spaces), supports sustainable development, and maintains the character of existing communities. Approved regional and lower-tier municipal development plans, aligned with provincial legislation and policies, aim to promote controlled and sustainable residential and commercial growth while minimizing negative impacts on farmland, natural habitats, and community cohesion. This approach to municipal development is designed to support environmental sustainability and can enhance the quality of life for residents by promoting well-planned, vibrant, and resilient communities.

4.1.1 Baseline Conditions

The regions within the boundary of the Highway 413 study area are experiencing rapid population growth that is projected to continue into 2050 (**Figure 9**). Based on current projections, the Region of Halton is projected to grow by 100% from 2016 to 2051, while the Region of Peel and the Region of York are expected to grow by 65% and 83%, respectively.

11. Urban sprawl is the expansion of urban areas into the surrounding rural land. It typically involves low-density, car-dependent development with residential, commercial, and industrial buildings spreading out over large areas.

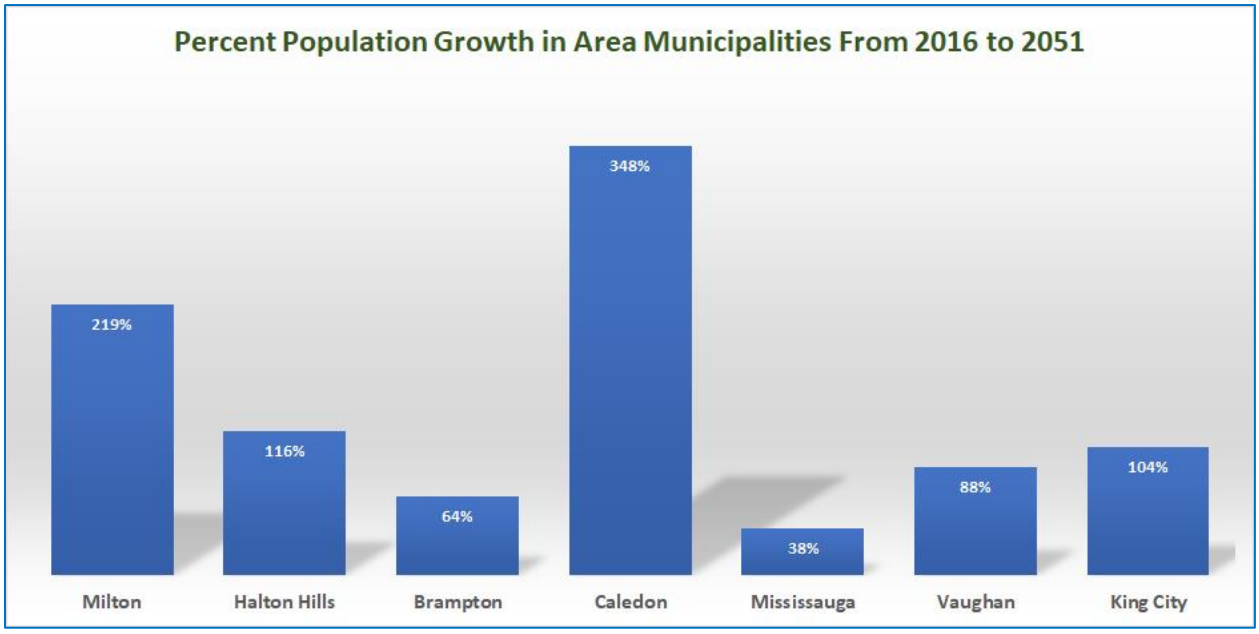
Figure 9: Population Growth across York, Peel, and Halton Regions (Statistics Canada, 2016, 2021) with Projected Population Growth from the Approved Municipal Plans (Halton, 2022; Peel, 2022; York, 2022)



Sources: 2024 York Region Official Plan https://www.york.ca/york-region/regional-official-plan
2022 Region of Peel Official Plan https://peelregion.ca/sites/default/files/2024-07/official-plan-review-consolidation-clean%20%281%29.pdf
2024 Halton Region Official Plan https://www.halton.ca/Repository/ROP-Office-Consolidation-Text
2024 Ministry of Finance Population Projections https://data.ontario.ca/dataset/population-projections/resource/03abe0d5-0995-4ce2-ad9d-e904d50106a5

Within these regions, specific municipalities are also experiencing significant growth (Figure 10). Notably, in the Region of Peel, the Town of Caledon is expected to grow by about 350%. While Milton, situated within the Region of Halton, is projected to grow by 219% from 2016 to 2051. Other municipalities such as Halton Hills, Brampton, Vaughan, and King Township are also projected to see substantial growth during this period.

Figure 10: Percent Population Growth in Area Municipalities, 2016 Compared to Projected 2051 Growth (Stats Canada, 2016; Approved Municipal Plans)



Sources: 2024 York Region Official Plan *https://www.york.ca/york-region/regional-official-plan*
2022 Region of Peel Official Plan *https://peelregion.ca/sites/default/files/2024-07/official-plan-review-consolidation-clean%20%281%29.pdf*
2024 Halton Region Official Plan *https://www.halton.ca/Repository/ROP-Office-Consolidation-Text*
2024 Ministry of Finance Population Projections *https://data.ontario.ca/dataset/population-projections/resource/03abe0d5-0995-4ce2-ad9d-e904d50106a5*

The approved regional plans indicate extensive urban growth in the study area, with significant developments in residential and employment lands proposed for the agricultural lands adjacent to or contiguous with already developed areas (Halton, 2022; Peel, 2022; York, 2022). The expansion of residential and employment lands largely mirrors the Preferred Alignment, as seen in **Figure 5**.

Growth and development are expected to consume much of the undeveloped lands surrounding and/or adjacent to the Project. For more information on urban sprawl in the region, refer to the Highway 413 Land Use Report, 2024. It is important to note that these growth projections are planned regardless of Highway 413.

4.1.2 Potential Effects

Within the study area, including the Regions of Halton, Peel, and York, Highway 413 is expected to form an urban boundary for planned development up to 2051, as designated by regional plans (Halton, 2022; Peel, 2022; York, 2022). The planned residential and employment lands largely follow the Preferred Alignment, indicating a structured approach to growth.

One area of concern regarding urban sprawl is through the Town of Caledon, where the classification of lands as urban or rural is less clear. The lands impacted by the highway are, for the most part, designated as urban, though the development is planned into 2051 (Peel, 2022). When comparing the Preferred Alignment and the approved Regional Plans for up to 2051, there are some pockets of the alignment in the Town of Caledon that are not currently planned for development that will be consumed for the Project. There are, however, pockets planned for long-term development on either side of the Preferred Alignment (as seen in Figure 5).

While the highway is adjacent to rural lands, those are mostly north of the highway. The current planned urban development generally extends up to the Highway 413 Route. However, it is expected that some land not already slated for urban development will be required for the highway itself (see Section 3.2 for further details).

4.1.3 Potential Mitigation

To mitigate the impact of the Project on green spaces and urban sprawl, Municipalities and Regions have considered the amount of "green space" in the GGH area over the next 25 years which is included in municipal Master Plans, all of which is beyond the scope of this study.

4.1.4 Conclusion

It is likely the Project constitutes a negligible impact on potential urban sprawl, beyond that already approved under regional plans to 2051. Efforts to preserve green spaces near the highway may mitigate some potential negative effects of urban sprawl.

4.2 Farmland

The Project raised awareness and some concern about the protection of southern Ontario's agricultural land, including that located in the study area. Public input has

emphasized the importance of limiting farmland loss (Consultation Record will be available in the Environmental Impact Assessment Report) recognizing it as a vital resource for local food production and an important aspect of the region's heritage and economy. This makes limiting overall farmland loss a key SVC, which is highly correlated with the prior SVC (limiting of urban sprawl).

4.2.1 Baseline Conditions

Southern Ontario is known for its fertile and productive farmland and contains some of the most productive lands in Canada. The Preferred Alignment will navigate through three GTA regions - Peel, York, and Halton. There is divergence of public opinion with some opposing the repurposing of farmland for any non-agricultural use, while others desire the land be repurposed to accommodate housing and new businesses to support the increasing population across the GTA. Approved regional plans have designated significant growth in areas that are adjacent to the Project, which will very likely result in the conversion of some farmland to accommodate this urban expansion (Halton, 2022; Peel, 2022; York, 2022). This section provides a high-level overview of the farmland conditions in these regions. For more detailed information, refer to the Agriculture Impact Assessment Report (DBH, 2024). The baseline conditions of farmland in Halton, Peel, and York regions in Ontario, as per Census 2021 data from Statistics Canada, reveal distinct agricultural profiles:

- **Halton Region:** The total farm area is 72,920 acres, with 57,116 acres dedicated to crops. Key field crops include soybeans, hay, wheat, and grains. Fruit crops such as apples, peaches, and strawberries, along with vegetable crops like sweet corn, tomatoes, green peas, and green beans, are also cultivated.
- **Peel Region:** The total farm area is 95,583 acres, with 80,409 acres dedicated to crops. Primary field crops include soybeans, corn for grain, hay, and wheat. Significant fruit crops are apples, grapes, and strawberries, while vegetable crops include sweet corn, tomatoes, green peas, and green beans.
- **York Region:** The total farm area is 134,414 acres, with 109,180 acres used for crops. Main field crops are soybeans, corn for grain, hay, and wheat. The region also produces fruit crops like grapes, apples, and strawberries, and vegetable crops including sweet corn, tomatoes, green peas, and green beans.

4.2.2 Potential Effects

The Project has the potential to reduce small areas of agricultural land across the three regions it traverses, reducing the total farmland area as follows:

- **Halton Region:** With a total farm area of 72,920 acres, the net loss 225.5 acres represents approximately 0.31% of the total farmland.
  - Impact Concentration: The losses are concentrated in Milton (123.92 acres) and Halton Hills (101.54 acres).
- **Peel Region:** Out of 95,583 acres of farmland, the net loss of 1,318 acres accounts for about 1.38% of the total farmland.
  - Impact Concentration: The losses are concentrated in the Town of Caledon (1,317.87 acres).
- **York Region:** With a total farm area of 134,414 acres, the net loss of 388.7 acres constitutes roughly 0.29% of the total farmland.
  - Impact Concentration: Most of the impact will be in the city of Vaughan (385.8 acres), with a smaller portion in King City (3.21 acres).

The net loss of total farmland across the three regions is considered negligible (very small), at approximately 0.36% of the total agricultural lands, or approximately 1,932 acres, currently within the study regions. This does not imply no effect for some farmers in the right of way of the Project. These few farmers will be compensated for the purchase of their property thereby offsetting impacts.

4.2.3 Potential Mitigation

In Preliminary Design, efforts were made to minimize impacts by locating the proposed route along lot lines or property lines to lessen parcel severances and fragmentation. The corridor was also designed to minimize the facility footprint to lessen potential impacts to the agricultural land base, agricultural operations, and the overall agricultural system.

Measures will be further developed during the Detail Design phase of the Project to mitigate impacts on agricultural lands and may include the creation of berms or vegetated buffers, consideration lighting requirements in respect of impacts of livestock or crops, traffic management plans in consideration of agricultural operations, etc. The draft Environmental Impact Assessment Report includes additional information regarding Preliminary Design commitments that will be further developed during Detail Design.

4.2.4 Conclusion

The Project is expected to have a negligible impact on the loss of total agricultural land compared to the loss planned for in regional master plans. The farmland loss represents approximately 0.4% of the total agricultural land across the three regions that it passes through: Halton Region, Peel Region, and York Region.

4.3 Natural Heritage Features

Public frequently express concern about the protection of natural heritage features in the study area, as it relates to preservation for future use and enjoyment for current and future generations. Natural heritage features include rivers, streams, drainage features, wildlife habitats, rare vegetation communities, wetlands, and woodlots within the study area. The public recognizes that protection measures, including Greenbelt designations, conservation areas, Provincially Significant Wetlands (PSWs)[12], and Significant Woodland conservation efforts, are important for safeguarding these critical areas from potential impacts, ensuring their conservation for future generations.

4.3.1 Baseline Conditions

The study area includes a variety of sensitive habitats such as aquatic features, cultural meadows, wetlands, thickets, and various forest types. These habitats include areas of the Greenbelt, PSWs, and Significant Wildlife Habitats (SWHs). These habitats are valued by Indigenous communities. Specifically, Indigenous communities have emphasized the importance of protecting wildlife habitats and natural heritage features, noting that these features as integral to the ability to exercise Aboriginal and treaty rights in the area. The preservation of these features is deeply connected to the stewardship responsibilities, and the enduring relationship Indigenous peoples have with the land.

The following summary is reflective of the Terrestrial Ecosystems Impact Assessment Report (AECOM WSP, 2025):

- **Halton Region:** Region includes aquatic features, cultural meadows, wetlands, thickets, and woodlands. Important sites in this region include East

12. Provincially Significant Wetlands are those wetlands identified by the province under the Ontario Wetland Evaluation System as significant. This includes factors such as frequency of recreational activity, and the presence of sensitive and rare or endangered and threatened species in the area (Wetland Evaluation, 2023).

Sixteen Mile Creek, Mullet Creek and Levi Creek and various smaller order watercourses and drainage features. These areas support diverse flora and fauna, contributing to the ecological health of the region. Notable wildlife concerns include the presence of Species at Risk (SAR), candidate and confirmed SWH, and the need to maintain habitat connectivity for various species. Potential protections identified include the Greenbelt Plan's Natural Heritage System, which provides a framework for conserving these areas. The Study Area also includes Greenbelt designated Protected Countryside and Urban River Valley, which help safeguard these critical areas from development and other impacts.

- **Peel Region:** Region includes aquatic features, cultural meadows, wetlands, thickets, and woodlands. Key sensitive sites in this region include the Credit River, West Humber River, Etobicoke Creek and various smaller order watercourses and drainage features. The region also features six PSWs including the Churchville-Norval Wetland Complex and the Huttonville Creek and Area Wetland Complex. Wildlife concerns in Peel Region include maintaining habitats for SAR, protecting and preserving candidate and confirmed SWH, and ensuring the ecological integrity of wetlands and woodlands. Identified protections include the Greenbelt Plan's Natural Heritage System, Protected Countryside and Urban River Valley as well as updates to significant woodland designations increasing the number from 13 in 2022 to 21 in 2023.
- **York Region:** Region includes aquatic features, cultural meadows, wetlands, thickets, and woodlands. Important named sensitive sites include the Main and East Humber Rivers, Purpleville Creek, Robinson Creek and various smaller order watercourses and drainage features. These areas are crucial for supporting diverse wildlife and maintaining ecological balance. Wildlife concerns in York Region focus on protecting habitats for SAR, maintaining candidate and confirmed SWH and preserving the integrity of wetland and woodland ecosystems. Potential protections identified include Significant Valleylands, the East Humber River Environmentally Sensitive Area (ESA) as well as designations under the Greenbelt Plan and the Oak Ridges Moraine Conservation Plan, which help protect significant woodlands and wetlands from development and other threats.

All three regions potentially impacted by the Project include diverse and numerous natural heritage features, including the Greenbelt, PSWs, and SWHs, some of which already have a high level of protection due to provincial legislation or policies. These

regions are also characterized by rapid population growth and development, which has been accounted for in the approved Regional Plans (Halton, 2022; Peel, 2022; York, 2022). Approved Region Master Plans encroach on these natural heritage features to some extent.

4.3.2 Potential Effects

The protection of natural heritage features is an important factor in the socio-economic environment, as Indigenous communities and local stakeholders have emphasized the desire to maintain these areas despite planned urban development. The Project will potentially impose negative impacts to many natural heritage features. The findings presented in this section are primarily drawn from the Terrestrial Ecosystems Impact Assessment report (AECOM WSP, 2025):

- Habitat fragmentation, which may disrupt the connectivity between different ecological areas and affect wildlife movement and breeding patterns, particularly for SAR.
- Watercourse alterations, such as the installation of culverts and bridges, may impede fish movement and affect aquatic habitats.
- Wetland disturbances may lead to the loss of critical habitats and affect the hydrological functions of these ecosystems.
- Vegetation removal for the highway right-of-way may result in the loss of significant and non-significant woodlands and other sensitive habitats, reducing biodiversity and disrupting the ecological balance.
- Construction activities may also result in the incidental injury or mortality of wildlife and may lead to increased erosion and sedimentation in nearby watercourses and wetlands, potentially degrading water quality and harming aquatic habitats.

4.3.3 Potential Mitigation

Terrestrial

To protect, mitigate and compensate for the impacts of the Project, measures intended to avoid, reduce and/or eliminate impacts to terrestrial features are recommended. Measures may consider the use of standard provincial construction specifications as

well as the development of design considerations and/or plans not limited to the following:

- Additional surveys including field coverage of previously uninvestigated areas, targeted Species at Risk surveys and surveys to confirm the presence and distribution of Significant Wildlife Habitat (including habitat for Species of Conservation Concern);
- Hydrological maintenance of sensitive aquatic features, including wetlands;
- Landscape plans to manage vegetation removal and re-vegetation;
- Invasive species management and the application of clean equipment protocols;
- Right-of-Way footprint refinements;
- Design considerations (e.g., eco-passages) for maintaining habitat connectivity throughout the highway corridor;
- Temporary and permanent exclusion fencing;
- Pre-clearance sweeps, wildlife relocation and on-site training to address wildlife encounters during construction;
- Light and noise pollution reduction;
- General construction protection measures including the development of plans to manage spills, road salt, vegetation clearing, dewatering, emissions; material stockpiles and erosion and sediment control;
- Application of construction timing windows for wildlife including Species at Risk and Species of Conservation Concern;
- Monitoring and oversight of construction activities in sensitive habitats;
- Species-specific Species at Risk mitigation and compensation strategies;
- Authorization and/or permitting from agencies (subject to evaluation by the Bilateral Federal-Provincial Working Group for Highway 413);
- General offsetting / compensation plans for vegetation, wetlands and wildlife; and
- Continued consultation with Indigenous communities during the Detailed Design phase in regards to potential impacts on their harvesting activities.

Aquatic

Upon identification of the potential impacts to fish and fish habitat, mitigation measures were considered that aimed at minimizing those impacts throughout the six major watersheds overlapped by the Project. Measures may include the use of standard provincial construction specifications as well as the development of design considerations and/or plans not limited to the following:

- Minimizing vegetation removal and site alteration in the vicinity of watercourses and drainage areas;
- Management of erosion and sediment both during and following construction through the implementation of Best Management Practices to prevent sediment release into watercourses;
- Establishment of erosion and sediment control plans for all in and near water works;
- Recommendations for the use of energy dissipation methods/materials to deal with sediment laden waters during construction;
- Application of construction timing windows to minimize impacts on the critical life stages for resident fish species;
- Implementation of in-water work isolation measures and fish salvage practices to remove and relocate fish from the active work area;
- Design considerations for maintaining and improving fish habitat (e.g., installing culverts to prevent creation of fish passage barriers, designing realigned channel sections using natural channel design principles);
- Right-of-way refinements to minimize impacts to fish bearing watercourses (e.g., major river crossing spans, structures that span bankfull channel width, open-bottom structures);
- Site-specific mitigation measures for watercourses containing aquatic Species at Risk;
- Authorization and/or permitting from agencies (subject to evaluation by the Bilateral Federal-Provincial Working Group for Highway 413);
- General offsetting / compensation plans for fish habitat;
- Environmental effects monitoring before, during and after construction to document compliance as dictated by relevant permits and approvals; and
- Consideration of feedback from Indigenous communities with respect to aquatic resources.

4.3.4 Conclusion

The regions of Halton, Peel, and York are experiencing rapid growth and development resulting in projected losses in natural heritage features. The Project is expected to generate additional negative consequences for these natural heritage features. While some of these impacts may be reduced through suggested ecological mitigation measures, including off-setting and establishing natural heritage compensation areas, some tangible negative effects will likely persist and may require monitoring and adaptive management throughout the life of the project.

4.4 Recreation

Public input over the course of past 10 years highlights the value placed on use of green spaces for recreational activities, particularly along river corridors that transect the highway route and alignment. Recreational activities such as hiking, bird watching, and nature walks are important for residents and visitors. These activities are closely tied to the availability and accessibility of natural spaces, which face potential disruption from urban expansion and infrastructure projects like Highway 413, particularly those adjacent to waterways and rivers. This section discusses possible impacts to access to recreational spaces along river corridors.

4.4.1 Baseline Conditions

The Highway 413 Route spans diverse natural spaces including wetlands, woodlands, and parks that are adjacent to rivers or water courses. These areas provide recreational opportunities for residents and visitors. The presence of wetlands, such as the Churchville-Norval PSW Complex and the East Humber River PSW Complex, alongside extensive woodlands and river corridors enables recreational enjoyment. These natural spaces support a variety of activities such as hiking, bird watching, and nature walks, making them valuable assets for community well-being and outdoor recreation. Each region is unique:

- **Halton Region:** The region is characterized by its woodlands and wetlands, including the Levi Creek PSW. There is also the presence of East Sixteen Mile Creek, Mullet Creek and Levi Creek, which are important water bodies in the region. The parks and natural areas in Halton support recreational activities to a rapidly expanding population base.
- **Peel Region:** The region features diverse natural areas, including significant woodlands and wetlands such as the Levi's Creek Wetland Complex,

Churchville-Norval Wetland Complex, Huttonville Creek & Area Wetland Complex, Etobicoke Creek Headwater Wetland Complex, Heart Lake Wetland Complex and Campbell's Cross Wetland Complex. These natural areas and water bodies enable a variety of recreational activities, including hiking, bird watching, and nature walks, which are highly valued by the community.

- **York Region:** The region also boasts a variety of significant woodlands and wetlands, including the East Humber River PSW Complex. The region's major water bodies, such as the Main and East Humber Rivers, Purpleville Creek, and Robinson Creek play a crucial role in supporting the local ecosystem. Parks and recreational areas in York Region provide ample opportunities for hiking, bird watching, and nature walks, supporting outdoor recreation and community well-being.

4.4.2 Potential Effects

While the Project is unlikely to impact the long-term accessibility to recreational activities along river corridors, there are many water crossings and associated trails that will be transected by the Project. Construction activities may temporarily limit some access to these recreational areas. However, post construction, the Project may return the accessibility of some trail systems back to pervious conditions. Thus, the overall net effect regarding accessibility may be negligible.

Though the long-term accessibility of recreational activities may be maintained, the quality of recreational activities may be impacted due to the combination of approved growth and development, and additional noise/interruption from the Project.

4.4.3 Potential Mitigation

To address these potential impacts on recreational access and uses along river corridors, several mitigation measures are proposed. Design efforts may support the continuation of activities such as hiking, bird watching, and nature walks with minimal disruption. Habitat restoration or off-set initiatives may help maintain the natural landscape and support local wildlife, while the establishment of new conservation areas may protect critical habitats and provide additional recreational spaces and uses particularly for wildlife viewing (AECOM WSP, 2025).

MTO is reviewing opportunities to support the provision of multi-use trails in coordination with municipal partners. Please refer to Section 4.2.3 Active Transportation of the draft EIAR for additional information.

4.4.4 Conclusion

It is expected that the Project may have a negligible impact on long-term accessibility to recreational spaces along river corridors in the Peel, Halton, and York Regions. By implementing feasible mitigation measures such as spanning the river crossings and associated recreational trails, where warranted. Some habitat restoration will be considered where appropriate to maintain highly used recreational activities.

4.5 Social Cohesion

Managing effects on physical and mental health focuses on understanding and mitigating the stress triggers linked to approved urban growth, as per regional Master Plans, and development of the Highway 413 Project. Health outcomes are closely tied to environmental stability and community cohesion, both of which may face possible disruption (Intrinsik, 2025).

4.5.1 Baseline Conditions

The State of Mental Health in Canada (2024), a report by the Canadian Mental Health Association (CMHA), provides insight into mental health conditions across the country. It highlights that mental health issues have worsened since the COVID-19 pandemic, with increased rates of anxiety, depression, and other mental health disorders (Lowe et al., 2024). Studies have shown that people are generally experiencing more stress due to various factors, including economic uncertainty and a lack of access to mental health resources. Chronic stress has been linked to a range of health problems, including high blood pressure, heart disease, and mental health disorders.

Current physical and mental health conditions in the regions potentially impacted by the Project are already under strain. News articles highlight that residents are experiencing heightened stress levels due to the potential disruptions from ongoing development, including effects on housing/living affordability and job security.

According to the CMHA Halton Region Annual Report (2022), there has been a significant increase in the demand for mental health services, with wait times for counselling services extending up to 12 months.

4.5.2 Potential Effects

The Project has created division within study area communities which may cause added stress among residents. Public opposition has been noted, with some residents voicing concerns about losing recreational, natural heritage or agricultural use spaces and the rapid changes to their environment (Morgan, 2024; DeClerg, 2024). The loss of farmland and the transformation of the landscape from rural to urban can be particularly distressing for some individuals who have strong connections to their land and community in its current state.

- **Community Division and Stress:** The Project has led to some division within communities, with strong opinions on both sides. Supporters argue that the highway will bring economic benefits and improved connectivity between regions, improved travel times and reduction of trucks on local roads, while opponents are concerned about environmental degradation and the loss of prime agricultural land. This division has created stressful incidents for some residents, as they navigate the uncertainties and potential disruptions associated with the Project.
- **Landscape Changes:** The transformation of the landscape from the construction of the Project is a potential source of stress for residents. The Project will encroach on the Greenbelt, and the potential loss of these natural areas can be distressing for those who value the environmental and recreational benefits they provide. Additionally, the rapid nature of the changes to the environment and the loss of familiar landscapes can lead to a sense of overwhelm, displacement and loss among residents.
- **Environmental and Lifestyle Changes:** Changes resulting from the Project may affect nature-based recreational activities, such as hiking trails and bird watching, potentially leading to a decline in their quality of life. Factors like increased noise and other disturbances in the Project area may diminish recreational experience, which may contribute to additional mental stress for users.
- **Impact on Farmland and Heritage:** The loss of farmland is a concern to residents, particularly in regions like Caledon, where agriculture is a vital part of the community's heritage and economy. The Project is expected to result in the loss of prime agricultural land (approx. 1,932 acres), which is irreplaceable and important for local food production.

4.5.3 Potential Mitigation

Potential mitigation measures include enhancing community engagement to ensure residents are informed and involved in decision-making processes, implementing noise and dust control measures where feasible during construction to minimize environmental stressors, and initiatives that preserve natural heritage spaces and provide areas for relaxation and recreation.

4.5.4 Conclusion

Some people who live in the local study area are experiencing stress because of the Project. Others support the Project, and this difference can negatively impact community cohesion. Construction may be a focal point needing mitigation plans to offset events that are sources of mental stress. Further community engagement would be helpful in assisting in developing mitigation measures to offset Project impacts. Overall, the net effect on social cohesion can potentially be negligible with advanced planning and mitigation measures.

4.6 Business and Employment

4.6.1 Baseline Conditions

The GTA and GGH areas are growing in both population and economic activity. The region contains a wide diversity of economic activity including for example, construction, manufacturing, retail, social and health services, government services, and agriculture. Currently, there are many highway construction projects underway in the GGH[13] that draws upon an extensive existing supply chain of labour and materials.

4.6.2 Potential Effects

The Project is a major investment in transportation infrastructure. Preliminary estimates of the Highway 413 construction indicate that between 2,600 to 3,300 ***direct jobs*** (on-site labour) may be supported from construction over the course of five years (Prism Economics and Analysis, 2021) (Table 17). It is further estimated that an additional 2,300 to 2,900 indirect jobs (e.g., labour employed by material suppliers to the Project)

13. Ontario Ministry of Transportation, 2022. Connecting the GGH: A Transportation Plan for the Greater Golden Horseshoe, February 2022. https://www.ontario.ca/page/connecting-ggh-transportation-plan-greater-golden-horseshoe

could be supported in the construction phase of this Project. These employment opportunities are in addition to the potential job creation associated with housing and commercial developments approved in regional master plans to 2051.

4.6.3 Potential Mitigation

To ensure local and regional municipalities can leverage the Highway 413 Project to enhance their own economic development objectives some suggestions include the following:

- MTO to encourage contractors and their supply chain companies to seek opportunities to hire/buy local
- Procurement and contract evaluations to award “points” for local hiring & procurement within the region
- Make trades schools and other educational institutions aware of job opportunities associated with road/highway construction

4.6.4 Conclusion

It is evident that the Project will likely foster some degree of business and employment growth during the construction period and possibly throughout operations in the form of routine ongoing maintenance.

4.7 Travel Times

Business growth in the GTA is constrained by congestion. The Canadian Centre for Economic Analysis (CanCEA) published a study in December 2024 that assesses the cost of traffic congestion at approximately $45 billion annually within the Greater Toronto-Hamilton Area (GTHA) (Canadian Centre for Economic Analysis, 2024). The study asserts that congestion is more than a transportation issue, as it claims it is a social issue where congestion reduces life satisfaction considerably with associated attendant business costs.

Efficient transportation networks are important for supporting the rapid growth within the GTA and surrounding GGH area. By addressing traffic congestion fueled by urban growth, the Project aims to enhance connectivity and ease travel for residents and commuters. The following outlines the baseline conditions and potential effects of the Project.

4.7.1 Baseline Conditions

The GTA is one of the fastest-growing regions in North America, leading to greater traffic congestion and longer travel times. Toronto is ranked highest for congestion across Canada (INRIX, 2023). Urban growth has increased the number of vehicles on the road, exacerbating congestion on major highways and local roads. For instance, as of 2019, the MTO has identified that approximately 386,850 vehicles travelled the Highway 401 through the Etobicoke stretch, daily (Hocking, 2023). Current travel times during peak hours are often extended due to heavy traffic, particularly on key routes such as Highway 401, Highway 400, and the Queen Elizabeth Way (QEW).

Experiences when travelling between regions within the GTA can vary greatly, with congestion differing based on the time of day. A recent study which polled 1,000 people across Toronto, Hamilton, Durham, Halton, and Peel revealed that 86% of people who participated believe that the GTA has a congestion crisis (IPSOS, 2024). The study further found that respondents had considered moving away from Toronto due to congestion (Harrison, 2024). These findings highlight the impact of traffic and congestion in the GTA.

A 2018 study found that weekday traffic congestion in the GTA had a negative impact on human health and the economy, with the worst impacts occurring during morning peak traffic between 7:00 am and 8:00 am. The findings displayed that the impacts during peak congestion were nearly 59 times worse than the least congested period at 2:00 am (Requia et al., 2018). This study highlights the human implications of congestion in the GTA.

Approved official plans for municipalities adjacent to the Highway 413 route indicate there is a potential for further congestion as these areas continue to grow (Halton, 2022; Peel, 2022; York 2022). The increasing population and urban development in regions like Peel, Halton, and York are expected to add more vehicles to the already congested road network, further slowing travel times and increasing traffic-related delays.

4.7.2 Potential Effects

The Project is expected to reduce travel times for commuters in the GTA as modelled by MTO relative to a scenario where the highway is not built. The Project is anticipated to alleviate congestion on existing major routes such as Highway 401 and Highway 400, improving overall traffic flow and connectivity within the region relative to a scenario where the highway is not built.

Opponents of the Project argue that the projected travel time savings are overstated and unlikely to materialize. Critics suggest that the new highway could save drivers only a minimal amount of time They argue that the highway will not effectively address congestion issues and may instead lead to induced demand, where increased road capacity encourages more driving, ultimately worsening traffic conditions.

The Project may provide relief for future congestion, offering travel time savings for drivers using the future highway. It may also provide broader secondary benefits by reducing congestion on local roads in the wider region, resulting in potential travel time savings for drivers even if they do not use the highway.

4.7.3 Potential Mitigation

To maximize the benefits of the Project and address potential challenges, several mitigation measures can be implemented. For instance, completing construction during off-peak hours when feasible to minimize congestion on local roads. Additionally, enhancing public transit options, such as bus rapid transit and commuter rail services, and active transportation networks (e.g. cycling and walking) may complement the new highway and further alleviate congestion by providing alternative transportation modes. Ongoing community engagement is essential to address local concerns and incorporate feedback into the project planning and implementation.

4.7.4 Conclusion

The Project is anticipated to reduce traffic congestion in and around the GTA and consequently reduce travel times for some. Enhancing public transit and integrated transportation networks could sustain traffic congestion relief.

4.8 Indigenous Cultural Practices

4.8.1 Baseline Condition

Several Indigenous communities exercise Aboriginal and/or treaty rights in the project area. Consultation with Indigenous communities is ongoing and will help MTO to understand the potential impacts of the Project on Indigenous communities with established or credibly asserted Aboriginal and/or treaty rights in the project area. It will also help MTO consider developing appropriate mitigation and/or accommodation where warranted.

This section drew evidence from two primary sources: (1) the summary record of consultation and engagement activities (replicated in EIAR Table 7-5) over the course of many years, and (2) communications with MTO, which led all consultation and engagement with Indigenous communities for the broader project.

4.8.2 Potential Effects

Indigenous communities have told MTO that as approved growth and development plans unfold over the next 25 years, the ability for Indigenous communities to exercise Aboriginal and/or treaty rights will become further constrained in developed areas within the GGH area and in this Project area.

As discussed in the urban sprawl (Section 4.1) and agriculture lands (Section 4.2) discussions, the amount of net land loss associated directly attributable to the Project is very small compared to the baseline condition. This small loss relative to the baseline condition is considered a negative impact.

4.8.3 Mitigation

Through the ongoing consultation process, an increased understanding of potential impacts to Indigenous communities' established or credibly asserted Aboriginal and/or treaty rights will be developed, including the development of mitigation and accommodation where warranted. MTO will continue to consult Indigenous communities as the project continues into Detail Design by discussing potential impacts to their rights in the project area, and where appropriate, identifying any proposed mitigation or accommodation measures. See Section 3.2 for the list of communities consulted and engaged on this Project. The insights, knowledge, and perspectives of Indigenous communities will be carefully considered.

4.8.4 Conclusion

Based on discussions with Indigenous communities with established or credibly asserted Aboriginal and/or treaty rights in the Project area, the project has the potential to impact the exercise of their Aboriginal or treaty rights. Through the consultation and engagement process, Indigenous communities have told MTO that the Project will impact rights. MTO will continue consultation with Indigenous communities in Detail Design to better understand potential impacts to Aboriginal and/or treaty rights, and where appropriate identify mitigation or accommodation measures,

5. Conclusion

Of the eight identified SVCs highlighted in this report, the Project is expected to impose potential negligible (small) effects on four, namely, Urban Sprawl, Farmland, Social Cohesion, and Access to Recreation particularly use of trails along river corridors (Table 18).

The potential exists for two other SVCs to experience negative effects, namely Natural Heritage Features, and Indigenous Cultural Practices. However, it is possible that some of these effects may be mitigated to some degree with appropriate off-setting actions and/or mitigation measures where feasible. Details of such mitigation measures will be discussed in Detail Design.

On the positive side, the Project is expected to reduce traffic congestion and travel time within the GTA as well as foster business and employment growth. Employment growth may result in new direct on-site jobs during construction as well as stimulating indirect employment throughout the supply chain for materials. Reduced traffic congestion and travel times will likely enhance business performance (e.g., increased labour productivity in transportation of goods).

An important consideration that drives this assessment is the approved growth and development plans at the regional and lower-tier municipalities that essentially earmark considerable agricultural and other green spaces for housing and employment developments. It is against this baseline condition that the highway is considered in this study.

Based on discussions with Indigenous communities with established or credibly asserted Aboriginal and/or treaty rights in the Project area, the project has the potential to impact the exercise of their Aboriginal or treaty rights. Through the consultation and engagement process, Indigenous communities have told MTO that the Project will impact rights. MTO will continue consultation with Indigenous communities in Detail Design to better understand potential impacts to Aboriginal and/or treaty rights, and where appropriate identify mitigation or accommodation measures.

impact established or credibly asserted Aboriginal and/or treaty rights and MTO will continue to consult Indigenous communities to better understand potential impacts to their Aboriginal or treaty rights and, where appropriate, identify proposed mitigation or accommodation measures.

Relative to this baseline condition, the Project has the potential to generate multiple benefits, such as reduced congestion, improved regional connectivity, and maintain access to recreational spaces, while also potentially negatively impacting some areas of the natural environment and posing challenges to community physical and mental health, and may adversely impact Indigenous cultural practices. Effective mitigation strategies, ongoing community engagement, and sustainable planning will be critical to maximizing the positive outcomes and addressing the concerns identified, especially through the anticipated multi-year construction phase. By implementing mitigations, the Project may contribute to the preservation and enhancement of the key SVCs for residents of Halton, Peel, and York regions.

Table 18: Summary of Socio-Economics Effects Assessment by Social Value Component

Social Value Components	Baseline Condition	Possible Project Effect	Evidence – Notes
■ **Urban Sprawl**	■ Urban expansion is underway in each of the regions within the study area as per approved Master Plans. ■ Greenfield Lands are transitioning to residential and employment uses.	■ ***Negligible Effect on Urban Sprawl***	■ Long term growth and development (planned to 2051) are proceeding regardless of whether the Project is completed. ■ Considering the current approved growth and development plans, the Project does not significantly contribute to urban sprawl or the associated loss of green spaces.
■ **Farmland**	■ The loss of agricultural lands within the study area, to accommodate approved development for housing and employment lands, is underway.	■ ***Negligible Effect on Farmland Loss***	■ The Project results in less than 2% net loss of agricultural land across the three regions that it passes through which is relatively limited when compared to long term farmland loss under the approved Regional Plans.
■ **Natural Heritage Features**	■ Loss of natural heritage features is occurring now in the regions within the LSA.	■ ***Negative Effect on Lost Features***	■ This loss is expected to continue further with the Project. However, proposed mitigations are expected to limit negative effects to some extent.

Social Value Components	Baseline Condition	Possible Project Effect	Evidence – Notes
■ **Recreation**	■ Preservation of access to recreational uses along river corridors is planned,.	■ ***Negligible Effect on Recreational Access***	■ The access and frequency of activities may not change. ■ The long-term quality of experiences may be negatively affected in some cases with the presence of the Project, and approved urban expansion into the area.
■ **Social Cohesion**	■ Many public comments express concerns about loss of farmland, natural heritage features, and reduced enjoyment of recreational experiences with urban growth.	■ ***Negligible Effect on Social Cohesion***	■ Mental and physical stresses are present now and may increase temporarily because of the inconveniences borne from construction; however, the Project is expected to provide relief to congestion and greater connectivity to the provincial network and associated opportunities which may result in positive mental health experiences, balancing out the overall net effect.
■ **Business and Employment**	■ Many highway upgrades and expansions are underway in the GTA.	■ ***Positive Effect on Business & Jobs***	■ This Project has been estimated to sustain between 2,900 to 6,200 jobs, that are mostly offered in the GGH. ■ New business investment may be stimulated.
■ **Travel Times**	■ Traffic congestion in the GTA is increasing and is expected to become exacerbated because of growth.	■ ***Positive Effect on Congestion & Travel Time***	■ Highway 413 traffic modelling indicates a reduction in congestion and reduced travel times relative to a scenario where the highway is not built.
■ **Indigenous Cultural Practices**	■ The project has the potential to impact the established or credibly asserted Aboriginal or treaty rights of Indigenous communities.	■ ***Negative Effect on Indigenous Cultural Practices***	■ MTO will continue to consult Indigenous communities to better understand potential impacts to their established or credibly asserted Aboriginal or treaty rights, and where appropriate identify potential mitigation or accommodation measures, as the design process continues.

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Ontario

WSP

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B

Human Health

Human Health Implications (HHI) Study of Highway 413 Preliminary Design and Assessment of Environmental Impacts

HUMAN HEALTH IMPLICATIONS STUDY REPORT

INTRINSIK PROJECT # 401669

Ministry of Transportation of Ontario
159 Sir William Hearst Avenue, 4th Floor, Downsview, ON M3M 1J8

March 19, 2026

SCIENCE INTEGRITY KNOWLEDGE

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CONTENTS

1. Introduction 7
1.1. Project Overview 7
1.2. Background 8
2. Approach and Methodology 9
2.1. Human Health Implications (HHI) Study 10
2.2. Gender-Based Analysis (GBA) Plus 11
2.2.1. GBA Plus context for the HHI Study 12
3. HHI Study Scoping Phase 12
3.1. Engagement with Indigenous Communities and Stakeholder Consultation and Input into the HHI Study 13
3.1.1. Engagement with Indigenous Communities 13
3.1.2. Engagement with Stakeholders – the HHI Study Scoping Workshop 13
3.2. Preliminary Traffic and Background Air Quality Information 13
3.2.1. Traffic Volumes and Commercial Vehicle Percentage on the Highway 413 13
3.2.2. Background Air Quality in Study Area 14
3.2.2.1. Gross Estimate of Impact of Alternatives 15
3.3. Baseline Health Profile 15
3.3.1. Data Sources 16
3.3.2. Population Groups Considered in the GBA Plus 17
3.3.3. Socio-demographic Profile 18
3.3.4. Education, Income and Employment 25
3.3.5. Affordable Housing 32
3.3.6. Burden of Disease and Mental Health 33
3.3.7. Walkability Score & Transit Score 37
3.3.8. Transportation and Commuting 39
3.4. Sensitive Receptors 42
3.4.1. Impacts to Population Sub-Groups 43
3.5. Conclusions from the HHI Scoping Phase 44
3.6. Determinants of Health to be Assessed in the HHI Study 46
4. HHI Study Assessment Phase 47
4.1. Levels of Physical Activity and Addition of Active Transportation Elements 47
4.1.1. Health Context / Linkages– Why is it Important to Consider the Health Impacts of Physical Activity and Active Transportation 47
4.1.2. Current Conditions 48
4.1.3. Project Impact 49
4.1.4. Mitigation / Enhancement Measures 49
4.2. Noise Levels 49

4.2.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Noise 49
4.2.2. Project Impact 50
4.2.3. Mitigation / Enhancement Measures 51
4.3. Climate Change 52
4.3.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Climate Change 52
4.3.2. Project Impact 52
4.3.3. Mitigation / Enhancement Measures 53
4.4. Social Cohesion 54
4.4.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Social Cohesion 54
4.4.2. Current Conditions 54
4.4.3. Project Impact 54
4.4.4. Mitigation / Enhancement Measures 55
4.5. Traffic Congestion and Delay 55
4.5.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Traffic Congestion 55
4.5.2. Current Conditions 56
4.5.3. Project Impact 56
4.5.4. Mitigation / Enhancement Measures 58
4.6. Traffic-related Safety 59
4.6.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Traffic-related Safety 59
4.6.2. Current Conditions 59
4.6.3. Project Impact 59
4.6.4. Mitigation / Enhancement Measures 60
4.7. Access to Neighbourhood Resources, Including Access to Emergency Response Services 60
4.7.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Access to Neighbourhood Resources 60
4.7.2. Current Conditions 61
4.7.3. Project Impact 62
4.7.4. Mitigation / Enhancement Measures 62
4.8. Food Security, Including Access to Local Healthy Food Sources 63
4.8.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Access to Local Healthy Food Sources 63
4.8.2. Current Conditions 63
4.8.3. Project Impact 63
4.8.4. Mitigation / Enhancement Measures 64
4.9. Access to Traditional Foods and Lands and Ability to Harvest Traditional Foods 64

4.9.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Access to Traditional Foods and Lands 64
4.9.2. Current Conditions 65
4.9.3. Project Impact 65
4.9.4. Mitigation / Enhancement Measures 66
4.10. Mental Health and Wellness 66
4.10.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Mental Health and Wellness 66
4.10.2. Current Conditions 67
4.10.3. Project Impact 67
4.10.4. Mitigation / Enhancement Measures 68
4.11. Human Trafficking 68
4.11.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Human Trafficking 68
4.11.2. Current Conditions 69
4.11.3. Project Impact 70
4.11.4. Mitigation / Enhancement Measures 70
4.12. Potential Impacts to Indigenous Cultural Practices 70
4.12.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts in the context of Indigenous Cultural Practices 70
4.12.2. Current Conditions 71
4.12.3. Project Impact 71
4.12.4. Mitigation / Enhancement Measures 72
5. References 72

LIST OF TABLES

Table 2-1: Human Health Implications Study Tasks and Approach for Highway 413 11
Table 3-1: Average Traffic Volumes for Three Main Segments of the Project 13
Table 3-2: Summary of Background Air Concentrations in the Local Study Area 14
Table 3-3: Percent Change in Annual Tailpipe Emissions Between 2041 No-Build and 2041 Build Scenarios 15
Table 3-4: Population Demographics 18
Table 3-5: Indigenous Communities Population Demographics 18
Table 3-6: Indigenous Population Demographics On and Off Reserves, 2022 (%) 19
Table 3-7: Population Demographics – Visible Minority Populations 20
Table 3-8: Highest Level of Education in Private Household (25 – 64 yrs), 25% of Sample Data[1] 26
Table 3-9: Education Characteristics of Indigenous Communities, 2016 Census of Population 27
Table 3-10: Income Statistics of Households[1] 28
Table 3-11: Indigenous Community Average (Individual) Income, 2016 Census of Population 28
Table 3-12: Labour Force Status, 25% Sample Data[1] 29
Table 3-13: Indigenous Labour Force Status 30
Table 3-13: Labour Force by Occupation (> 15 years old) National Occupational Classification, 25% of Sample Data[1] 31
Table 3-15: Housing Status, 25% of Sample Data[1] 32
Table 3-16: Affordable Housing, 25% of Sample Data[1] 33
Table 3-17: Burden of Disease (Percent of the Population) 34
Table 3-18: Childhood and Adult Obesity (Percent of the Population) 35
Table 3-19: Perceived Health and Mental Health (Percent of the Population) 36
Table 3-20: Perceived Mental Health (Percent of the Population) 37
Table 3-21: Sense of Belonging to the Community (Percent of the Population) 37
Table 3-22: Walk Score Rating System 38
Table 3-23: Transit Score Rating System 38
Table 3-24: Bike Score Rating System 38
Table 3-25: Walkability, Transit, and Bike Scores (Scores out of 100) 38
Table 3-25: Main Mode of Transportation Used to Commute by the Employed Labour Force (Ages 15 Years or Greater), 25% of Sample Data[1] 39
Table 3-26: Commuting Duration for Employed Labour Force (Ages 15 Years or Greater), 25% of Sample Data[1] 40
Table 3-27: Time Leaving for Work for the Employed Labour Force (Ages 15 Years or Greater), 25% of Sample Data[1] 40

Table 3-28: Commuting Destination for the Employed Labour Force (Ages 15 Years or Greater), 25% of Sample Data[1] 41
Table 3-29: Place of Work for the Employed Labour Force (Ages 15 Years or Greater), 25% of Sample Data[1] 42
Table 4-1: Construction Sound Level Criteria (from RWDI, 2025b) 51

LIST OF FIGURES

Figure 1-1: Highway 413 Route 8
Figure 1-2: Some of the potential positive and negative human health implications of transportation. 9
Figure 2-1: Structure of Human Health Implications (HHI) Study Process 10
Figure 3-1: Region of Peel – Population by Age and Sex 21
Figure 3-2: Region of Halton – Population by Age and Sex 21
Figure 3-3: Region of York – Population by Age and Sex 22
Figure 3-4: Alderville First Nation – Population by Age and Sex 22
Figure 3-5: Beausoleil First Nation – Population by Age and Sex 23
Figure 3-6: Curve Lake First Nation – Population by Age and Sex 23
Figure 3-7: Chippewas of Georgina Island First Nation – Population by Age and Sex 24
Figure 3-8: Hiawatha First Nation – Population by Age and Sex 24
Figure 3-9: Chippewas of Rama First Nation – Population by Age and Sex 25
Figure 3-10: Mississaugas of Scugog Island First Nation – Population by Age and Sex 25
Figure 4-1: The Potential Mental Health Consequences of Noise and Noise-related Stress (Adapted from Hahad et al. (2025) 50
Figure 4-2: Changes in Traffic Volume With Highway 413 – AM 57
Figure 4-3: Changes in Traffic Volume With Highway 413 – PM 58

1. Introduction

1.1. Project Overview

The Ontario Ministry of Transportation (MTO) has retained WSP Canada Inc. (WSP) and AECOM Canada ULC (AECOM) in collaboration with various sub-consultant and technical firms to undertake the Highway 413 Preliminary Design and Assessment of Environmental Impacts, hereinafter referred to as "the Project".

The Project is following the requirements of the *Highway 413 Act, 2024*.

The Project includes the 52-kilometre (km) Highway 413 Corridor, a 4 km extension to Highway 410, and a 3 km extension to Highway 427 (both facilitating connections to the Highway 413 Corridor), for a total of 59 km of new infrastructure (Figure 1-1). The highway will have 11 interchanges at municipal roads. Features such as stormwater management ponds, carpool lots, Commercial Vehicle Inspection Facilities, maintenance facilities, and the potential for electric vehicle charging stations, have been explored as part of Preliminary Design.

The Highway 413 will connect to Highway 401 and Highway 407 Express Toll Route (or, 407 ETR) in the Regional Municipality of Halton and the Regional Municipality of Peel with Highway 400 in the Regional Municipality of York.

The typical Right-of-Way (ROW) will be 170 metres (m) which includes 110 m for the typical mainline highway and 60 m for a proposed transitway. A multi-use trail parallel to Highway 413 may be accommodated within the proposed transitway ROW. The ROW is expanded at interchanges and high fills areas to accommodate ramps to and from the crossing roads, as well as in locations with ancillary highway facilities as mentioned above. The Preliminary Design consists of a typical 6-lane cross-section (3 lanes in each direction) with a grassed median. The ROW has been designed to accommodate up to 10-lanes (5 lanes in each direction) should future traffic conditions warrant additional capacity. These additional lanes would be provided by widening the highway towards the median.

The proposed transitway will be a separate corridor running alongside the highway, dedicated for public transit, including stations to facilitate passenger access at key locations. The proposed transitway and stations will be subject to a separate future assessment of environmental impacts.

Highway 413 is a 400-series highway, which is a network of controlled-access highways throughout the Province of Ontario. Their primary function is to accommodate through traffic and provide links between urban centres. 400-series highways feature full grade separations (such as bridges) at most intersecting roads and railway lines. Interchanges are provided along the 400-series highways to connect to other highways and municipal roads. These highways have design standards to accommodate high speeds and various collision avoidance and traffic management systems. Highway 413 is proposed to have a posted speed limit of 110 km/h.

Figure 1-1: Highway 413 Route

The future Highway 413 is expected to:

- Relieve traffic on local roads and parallel highways;
- Help accommodate travel demand;
- Reduce travel times for commuters and goods movement;
- Reduce the social, environmental, and economic costs of congestion;
- Provide greater connectivity between urban growth centres;
- Provide better connections to residential and employment lands; and
- Provide an alternate route in the event of an incident or road closure on local and regional roads.

1.2. Background

The Greater Golden Horseshoe area is expected to attract approximately one million new people every five years, resulting in the population reaching nearly 15 million people by 2051 (Government of Ontario, 2020). A population increase combined with associated economic development activities, Ontario faces many land use and transportation planning challenges in how future growth and development in the Province is carried out. As such, a multi-pronged approach to address these challenges is warranted. One approach being proposed by the Ministry is to develop the Project, a new

400-series highway. According to the Ministry, the Project would not only provide better highway connections to the local communities but is vital transportation infrastructure that can help meet the projected growth in both population and employment that has been identified in the Growth Plan for the Greater Golden Horseshoe.

The design, build, and operation of transportation infrastructure has potential impacts on the overall health and well-being of residents who live in proximity to, or access, these various modes of transportation. Transportation has enormous positive health impacts, but motorized modes of transport can also have potential negative health impacts, mainly due to impacts to air quality and increased traffic congestion (Figure 1-2). As such, transportation planning plays a crucial role in influencing health behaviours, especially those related to levels of physical activity. Day-to-day health behaviours, in turn, impact health outcomes and rates of morbidity and mortality.

To assess the potential human health impacts of the proposed Project, Intrinsik has conducted this Human Health Implications (HHI) Study on behalf of the Ministry. An HHI Study is an adapted method for a broad assessment of positive and negative health-related impacts of transportation projects.

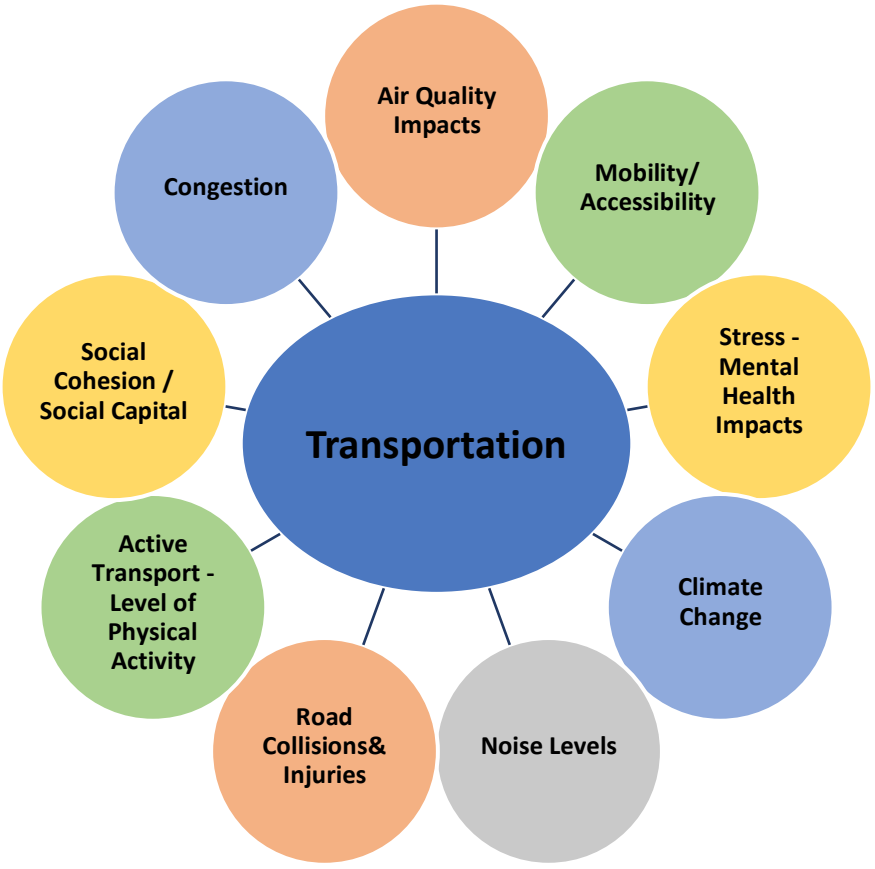

Figure 1-2: Some of the potential positive and negative human health implications of transportation.

2. Approach and Methodology

The World Health Organization (WHO) defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948). This definition identifies

the holistic nature of health and can be expanded to include social, economic, cultural and spiritual factors. The approach and methodology for the HHI Study is based on this definition.

2.1. Human Health Implications (HHI) Study

MTO's Environmental Guide for Assessing Human Health Implications of Provincial Transportation Projects (MTO, 2022a) aims to adapt and utilize the human health risk assessment framework (HHRA) (to assess air quality impacts), as well as an adapted health impact assessment framework (to assess broader health impacts) to holistically assess and understand the potential health impacts, both positive and negative, of a transportation project or policy. An advantage of using such a holistic approach is that it allows project proponents, the public, Indigenous communities and other stakeholders to gain a balanced overview of the potential overall impacts of a given project.

The HHI Study of the proposed Highway 413 Project provides input from a human health standpoint on the potential positive and negative health impacts of the proposed Project as well as the distribution of impacts. The HHI Study for the Project is the first pilot of MTO's Draft HHI Guide (MTO, 2022a). The Draft HHI Guide (MTO, 2022a) aims to adapt and utilize the human health risk assessment framework as well as elements of the health impact assessment framework to holistically assess and understand the potential health impacts, both positive and negative, of a transportation project or policy. An advantage of using such a holistic approach is that it allows project proponents, the public, Indigenous communities and other stakeholders to gain a balanced overview of the potential overall impacts of a given project.

The key steps in the decision-making process during an HHI Study and integration with the environmental assessment process are detailed in Figure 2-1, below.

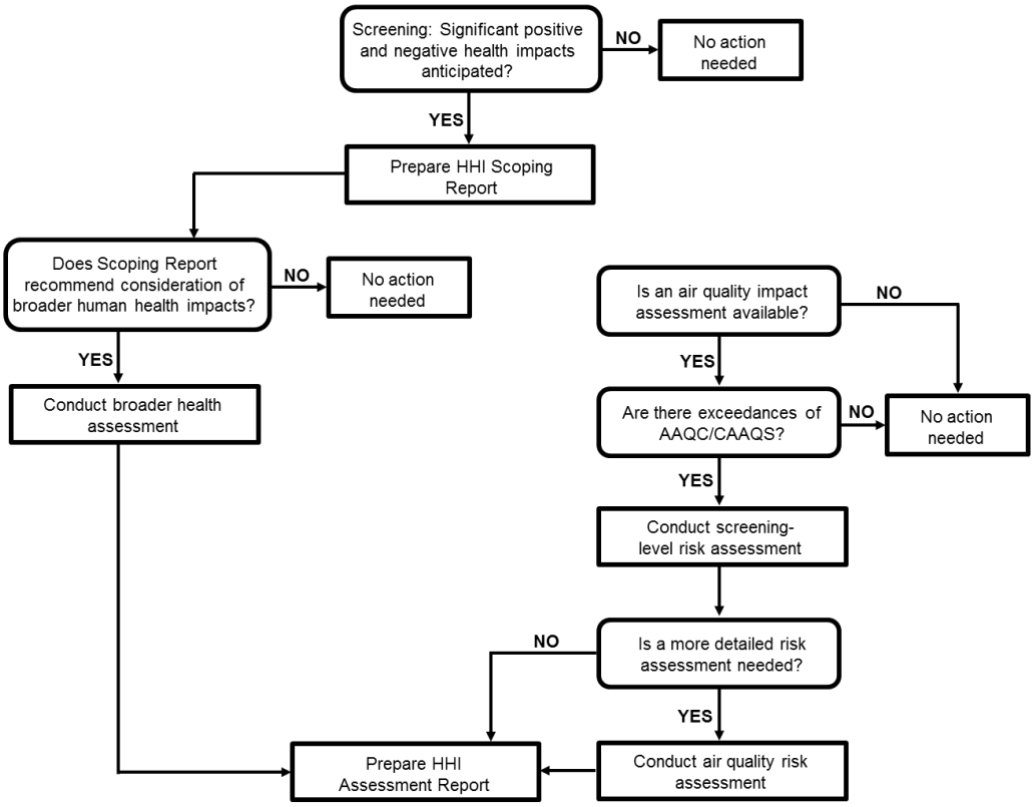

Figure 2-1: Structure of Human Health Implications (HHI) Study Process

The HHI Study consists of four main phases – screening, scoping, broader health assessment, and air quality risk assessment. The screening phase is to determine if a project should undertake an HHI Study depending on the scope and scale of the project. Following screening, should the need for an HHI Study be determined, the scoping phase of an HHI Study identifies the scope of the study, provides a baseline health profile of the study area, and a high-level description of human health implications. The findings of the scoping phase are documented in an HHI Scoping Report, which informs the need for a broader health assessment that is conducted during the Assessment Phase of an HHI Study. The need for a screening-level HHRA (SLHHRA) of potential air quality impacts is contingent upon the completion and findings of an air quality impact assessment during Preliminary Design. The results of the air quality impact assessment inform the need for further screening-level and detailed air quality risk assessments. The findings of the broader health assessment and the SLHHRA, are documented in the overall HHI Study Report.

The two main phases of an HHI Study are highlighted in Table 2-1. The overall aim of the Scoping Phase is to identify the potential health impacts due to the project (related to both air quality and the broader social determinants of health), identify and engage with the Indigenous communities and stakeholders to determine the scope of the HHI Study, provide health-based input during the project specific assessment of environmental impacts, and record all activities undertaken in an HHI Scoping Report.

The Assessment Phase involves preparation of a SLHHRA of air quality impacts, as well as the assessment of the potential broader health impacts initially identified in the HHI Scoping Phase. Recommendations to enhance potential positive impacts and mitigate potential negative ones are also made during the Assessment Phase.

Table 2-1: Human Health Implications Study Tasks and Approach for Highway 413

Scoping Phase	Assessment Phase
• Identify existing sensitive populations • Identify relevant stakeholders and Indigenous communities • Using a human health lens, identify broad human health implications (beneficial and non-beneficial) • Identify need for the Assessment Phase and the health concerns to be addressed • Document in the HHI Scoping Report	• Conduct the risk assessment for air quality impacts; utilize information obtained from the Air Quality & Greenhouse Gas Study • Conduct a qualitative human health assessment of the study area as needed: air quality, climate change, noise levels, level of congestion, active transport options, mental health, social cohesion, etc. • Provide recommendations, if needed, to enhance positive impacts, and on monitoring and mitigation measures required to limit potential adverse impacts • Document in the HHI Study Report

2.2. Gender-Based Analysis (GBA) Plus

Women and Gender Equality Canada (WAGE), formerly known as Status of Women Canada, defines GBA Plus as “an analytical process that provides a rigorous method for the assessment of systemic inequalities, as well as a means to assess how diverse groups of women, men, and gender diverse people may experience policies, programs and initiatives.” (WAGE, 2022). Where readily available, disaggregated data is included in the HHI Study. A GBA Plus was conducted as part of the HHI Study to ensure that:

1. Diverse groups are considered in the assessment of potential health impacts; and

2. Recommendations are made to mitigate disproportionate distribution of potential health impacts.

2.2.1. GBA Plus context for the HHI Study

The HHI Study is designed to assess potential health impacts due to a project on the most sensitive members of the population, such as children, the elderly, and those with compromised or sensitive health conditions (e.g., asthmatics, pregnant women, those with Chronic Obstructive Pulmonary Disease, immunodeficient individuals, etc.). Many of these sensitive members of the population would also be considered in a GBA Plus, as being disproportionately impacted due to project-related activities. The SLHHRA uses regulatory benchmarks which in many cases are protective of the most sensitive endpoint, and also incorporate uncertainty factors to ensure potential health risks are not underestimated. Assumptions made in establishing these regulatory benchmarks are also designed to protect those individuals or population groups who may have higher than normal exposures. Hence, through these approaches, and in combination with a GBA Plus, the HHI Study ensures its assessment provides a broad evaluation of potential health benefits and impacts arising from the proposed Project for all.

3. HHI Study Scoping Phase

The steps in the HHI Study Scoping Phase, as per the Ministry's Draft HHI Guide (MTO, 2022a), are as follows:

1. Identifying the project-specific and other local sources of air pollution likely to impact the health of the affected local population.
2. Providing a Baseline Health Profile of the study area.
3. Identifying the main social and environmental determinants of health of concern due to the Project.
4. Identifying and engaging with Indigenous communities and stakeholders to provide human health-based input to the scope of the HHI Study.
5. Identifying sensitive populations or facilities particularly sensitive to changes in air quality.
6. Characterizing, as well as possible, the amount of time these sensitive population groups are likely to spend over a year/month/day in the study area, the life-stage of the sensitive population groups (child, adult, elderly), and the general health status of each sensitive population group.
7. Identifying the primary list of contaminants of concern to be included in the air quality assessment.
8. Preliminary identification of the potential health impacts, based on the list of the most relevant pollutants and exposure pathways, particularly, the exposure analysis during the Assessment Phase, and developing the preliminary Human Health Conceptual Model using guidance published by the Ministry of the Environment, Conservation and Parks (MECP).
9. Using a social determinants of health approach, identifying the potential broader human health implications (positive and negative) and their significance.

This HHI Scoping Report relied on a high-level review of the peer-reviewed and reputable grey literatures. Where readily available, the HHI Scoping Report utilized feedback pertaining to human health from Indigenous communities, stakeholders, and the general public gathered as part of the Indigenous community engagement process and the public consultation process during the course of the Project. The HHI Scoping Report, and the HHI Study, overall, primarily focus on potential health impacts to residential receptors within the study area, considering both the construction and

operational phases of the Project. The HHI Study has also relied on and utilized all relevant and available data from existing technical study reports conducted for the Highway 413 Project's Environmental Impact Assessment Report (EIAR), including those related to air quality, noise, land use, traffic, impacts to Indigenous peoples, and social and economic impacts where available. This allowed the assessment and recommendations in the HHI Study to be made with using current data specific to the Project.

3.1. Engagement with Indigenous Communities and Stakeholder Consultation and Input into the HHI Study

3.1.1. Engagement with Indigenous Communities

Engagement with Indigenous communities was an integral part of the HHI Study. Consultation with Indigenous communities on potential impacts to their established or credibly asserted Aboriginal or treaty rights is not covered under this report. Although the HHI Study team did not attend all meetings with Indigenous communities, any feedback related to human health was passed on to the HHI Study Team and included in the scope and study. Detailed feedback/comments/input from Indigenous communities is included in the Project's EIAR.

3.1.2. Engagement with Stakeholders – the HHI Study Scoping Workshop

A half-day Scoping Workshop was held on January 9, 2023, to gather feedback and input from stakeholders within the three regional municipalities (Halton, Peel, York), as well as the seven local municipalities (Milton, Hills, Brampton, Caledon, Mississauga, Vaughan, King City) that are within the Local Study Area (LSA), on the scope of the HHI Study, and to identify the human health impacts which are of most concern to stakeholders (see Section 3.5). The purpose of the Scoping Workshop was to encourage discussion and gain relevant and useful input on the HHI Study scope, process, methods, data sources, and outcomes. A Scoping Tool[1] was used during the Scoping Workshop to ask questions related to the HHI Study and receive relevant feedback. Approximately 30 representative stakeholders from regional and local municipalities within the Study Area who have experience and knowledge in several areas, including community and public health, impacts to vulnerable populations, transportation and land use planning, built environment and health, and climate change, participated in the Scoping Workshop.

3.2. Preliminary Traffic and Background Air Quality Information

3.2.1. Traffic Volumes and Commercial Vehicle Percentage on the Highway 413

The table below provides peak hour average traffic volumes for the three main segments (i.e., HWY 401 to HWY 410, HWY 410 to HWY 427, and HWY 427 to HWY 400) of the Project for the year 2041.

Table 3-1: Average Traffic Volumes for Three Main Segments of the Project

Section	HWY 401 to HWY 410 Northbound	HWY 401 to HWY 410 Southbound	HWY 410 to HWY 427 Eastbound	HWY 410 to HWY 427 Westbound	HWY 427 to HWY 400 Eastbound	HWY 427 to HWY 400 Westbound
# of Total Vehicles (AM)	4344	4773	5009	4529	4030	4542

[1] The Scoping Tool was prepared using MTO's Draft Environmental Guide for Assessing Human Health Implications of Provincial Transportation Projects ("MTO's Draft HHI Guide") (MTO, 2022a).

Section	HWY 401 to HWY 410 Northbound	HWY 401 to HWY 410 Southbound	HWY 410 to HWY 427 Eastbound	HWY 410 to HWY 427 Westbound	HWY 427 to HWY 400 Eastbound	HWY 427 to HWY 400 Westbound
# of Total Vehicles (PM)	4335	4188	4345	4726	4380	4031
SOVs (%) (AM)	68	72	67	65	59	71
SOVs (%) (PM)	72	68	67	65	68	57
HOVs (%) (AM)	0.5	0.4	0.1	0.2	0.1	0.1
HOVs (%) (PM)	0.1	0.3	0.0	0.0	0.0	0.0
Light Trucks (%) (AM)	11	9	11	12	15	10
Light Trucks (%) (PM)	7	9	9	10	8	10
Medium + Heavy Trucks (%) (AM)	21	19	21	22	26	19
Medium + Heavy Trucks (%) (PM)	21	23	24	25	25	33

Notes: SOV: Single-Occupancy Vehicle, HOV: High-Occupancy Vehicle.

3.2.2. Background Air Quality in Study Area

Background Air Quality

Ambient background air concentrations were taken from air quality monitoring stations that were considered representative from the Environment and Climate Change Canada (ECCC) National Air Pollution Surveillance (NAPS) Program and MECP ambient air monitoring station network (RWDI, 2025a). The following stations were selected (RWDI, 2025a):

- Brampton monitoring station;
- Newmarket station;
- Etobicoke South monitoring station;
- Toronto monitoring stations (Gage Institute, Roadside – Wallberg (University of Toronto), and Toronto West-125 Resources Rd;
- Toronto North Downsview station; and

Simcoe Experimental Farm station. A summary of the 90th percentile background ambient air concentrations in the LSA are shown in Table 3-2. Although not included in this table, diesel particulate matter (DPM) and ground-level ozone will be included as Contaminants of Concern (COCs). Impacts due to ground-level ozone will be evaluated qualitatively.

Table 3-2: Summary of Background Air Concentrations in the Local Study Area

Contaminant	Averaging Period	Background Concentration (µg/m^3)
CO	1-hour	349
CO	8-hour	362
NO_2	1-hour	35.0
NO_2	24-hour	29.4
NO_2	Annual	14.7
TSP[1]	24-hour	40.7
TSP[1]	Annual	23.3
PM_{10}[1]	24-hour	22.6
$PM_{2.5}$	24-hour	12.2

Contaminant	Averaging Period	Background Concentration (µg/m³)
$PM_{2.5}$	Annual	7.0
Benzene	24-hour	0.46
Benzene	Annual	0.31
Benzo(a)pyrene	24-hour	9.15E-05
Benzo(a)pyrene	Annual	5.13E-05
1,3-Butadiene	24-hour	0.025
1,3-Butadiene	Annual	0.014
Formaldehyde	24-hour	2.55
Acetaldehyde	24-hour	1.50
Acetaldehyde	½-hour	4.43
Acrolein	1-hour[2]	0.153
Acrolein	24-hour	6.28E-02

Source: RWDI Air Quality Assessment of Construction Activities 2025 Report RWDI # 1301992A

Notes:

1) Ambient Background Level estimated from PM2.5 levels using published emission factors (Lall et. al., 2004)
2) 1-hr average ambient acrolein data were not available; the maximum 24-hr concentration from NAPS Station 62601- Experimental Farm, Simcoe, ON was used.

3.2.2.1. Gross Estimate of Impact of Alternatives

According to the regional analysis completed during the air quality assessment, the annual Greenhouse Gas (GHG) emissions for the 2041 future scenario with the new Highway 413 in operation were predicted to be only slightly higher than for the future 2041 scenario without the new highway (0.3% increase in GHG emissions, or about 21,576 tonnes). The percent change in emissions were also estimated for the contaminants of interest between the 2041 no-build and 2041 build scenarios, see Table 3-3.

Table 3-3: Percent Change in Annual Tailpipe Emissions Between 2041 No-Build and 2041 Build Scenarios

Roadway Type	Annual Vehicle Kilometres Travelled (VKT)	PM2.5	NOx	CO	VOC
Freeway	11.1%	1.8%	4.9%	8.3%	6.9%
Highway	-5.7%	-11.8%	-11.0%	-7.0%	-9.0%
Arterial	-4.0%	-9.1%	-8.8%	-4.3%	-5.6%
Total	1.5%	-4.7%	-1.9%	-0.4%	-0.8%

3.3. Baseline Health Profile

The Baseline Health Profile presents high-level information on the overall current health status of the LSA. The LSA includes the Regional Municipality of Halton, the Regional Municipality of Peel and the Regional Municipality of York. Where possible, baseline health information is provided for the individual municipalities located within the LSA. Baseline health information is also provided for Indigenous communities listed in the consultation plan referred to under subsection 4(1) of the *Highway 413 Act, 2024*. The purpose of the baseline health profile is to provide context for the Assessment Phase, by describing at a high level how healthy the local population currently is, in comparison to other areas of Ontario, and identifying the health issues of top concern. Where available, disaggregated data has been provided in order to support GBA Plus.

The LSA includes the following regional municipalities and Indigenous communities:

Regional municipalities:

- Regional Municipality of Halton
- Regional Municipality of Peel
- Regional Municipality of York

Indigenous communities:

- Alderville First Nation
- Beausoleil First Nation
- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Council of the Wendat Nation
- Kawartha Nishnawbe
- Métis Nation of Ontario
- Mississaugas of Scugog Island First Nation
- Mississaugas of the Credit First Nation
- Oneida Nation of the Thames
- Six Nations of the Grand River
  - Elected Council
  - Haudenosaunee Confederacy Chiefs Council as represented by Haudenosaunee Development Institute

3.3.1. Data Sources

Data from the following sources was utilized:

- Statistics Canada 2021 Census Profile (Statistics Canada, 2021);
- Statistics Canada 2022 Health Characteristics (Statistics Canada, 2022);
- York Region Public Health (Regional Municipality of York, 2024);
- Peel Public Health (Regional Municipality of Peel, n.d.);
- Halton Region Public Health (Regional Municipality of Halton, n.d.);
- Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC, 2021);
- Ontario First Nations Regional Health Survey Phase III (Chiefs of Ontario, 2019);
- Walkscore.com (2022-2023); and
- Other publicly available reputable open data sources.

Publicly availably socioeconomic data was not available for Kawartha Nishnawbe.

It is important to note that during meetings with the Indigenous communities, many Indigenous communities have cautioned the Project Team that many of their members, living both on and off-reserve, do not participate in the federal census. Hence, the baseline information presented here may not fully capture the baseline conditions within Indigenous communities.

For some of the baseline health information, the information was not as granular as the individual municipalities and Indigenous communities listed above, due to urban Indigenous populations potentially reporting in regional census; information was provided for the larger public health units, that are included in the LSA. The health units that represent the LSA, as per Statistics Canada, include the Peel District Health Unit, Halton District Health Unit, and the York Regional Health Unit and are

compared to Ontario in the section below. Disaggregated data is presented for all indicators, where available.

Related data specifically for First Nations in Ontario was obtained from the Ontario First Nations Regional Health Survey (Chiefs of Ontario, 2019) and may not be completely representative of all Indigenous peoples in Ontario, or of individual Indigenous communities, but provides a high-level overview of First Nations in Ontario. The following First Nations participated in the Ontario First Nations Regional Health Survey: Alderville First Nation, Beausoleil First Nation, Biinjitiwaabik Zaaging Anishinaabek (Rocky Bay), Bkejwanong Territory (Walpole Island), Chippewas of Kettle & Stony Point, Curve Lake First Nation, Fort William, Hiawatha First Nation, Kasabonika Lake, Kee-Way-Win, Kitchenuhmaykoosib Inninuwug, M'Chigeeng First Nation, Mississaugas of the Credit First Nation, Mohawks of Akwesasne, Mohawks of the Bay of Quinte, Moose Cree First Nation, Moravian of the Thames (Delaware Nation), Naotkamegwanning, Oneida Nation of the Thames, Pic Mobert, Red Rock, Sagamok Anishnawbek, Serpent River, Sheshegwaning, Shoal Lake No.40, and Wiikwemkoong Unceded Territory. Additionally, the survey was only completed by First Nations people who live on-reserve.

In general, an important consideration when preparing and looking at data and information related to Indigenous peoples is the understanding that Indigenous peoples have a unique connection to the land, water, and the ecosystem (Berry et al., 2022). They are the stewards of the land, and have cultural, economic, social, health and spiritual connections to and reliance on the land and water (NCCIH, 2022; Berry et al., 2022). Indigenous peoples also experience systemic inequality and health disparities in Canada due to racism and the ongoing impacts of colonization and residential schools, which affect their health and wellbeing (PHAC, 2020). This context is necessary background when viewing data and information that identify disparities in health behaviours, health care access and health outcomes for Indigenous peoples.

3.3.2. Population Groups Considered in the GBA Plus

In the baseline health profile, the following population groups were considered in the GBA Plus where relevant information was publicly available:

- Women;
- Men;
- Youth and children;
- Older adults;
- Indigenous people;
- Those in a lower socioeconomic group;
- Racialized individuals;
- Refugees and immigrants;
- Those with disabilities; and
- 2SLGBTQI+ individuals.

Disaggregated data at the regional municipality level for specific health indicators was mainly available for women and men (and sometimes presented as 'males' and 'females' by Statistics Canada). Data is presented as available. Some data for youth was also available. Data for other population groups, for example, individuals with disabilities, racialized individuals, 2SLGBTQI+ individuals, etc., was mainly available at the national level. The peer-reviewed literature was used to supplement secondary data for these population groups.

3.3.3. Socio-demographic Profile

When assessing potential future health impacts, it is important to be aware of the size of a population as well as how that population is changing over time. It is also crucial to recognise and comprehend the diversity of communities since this knowledge may be used to better understand the obstacles that various groups could encounter both in their daily lives and while trying to access services. Some general highlights about population changes and sociodemographic data in the LSA are provided in this section.

Table 3-4 shows population demographics of the LSA, in comparison to Ontario. All locations within the LSA had positive population growth from 2016 to 2021, although most of this growth was lower than Ontario (i.e., 5.8%), except for the Regional Municipality of Halton (i.e., 8.8%). The percentage of visible minorities in all locations are higher than the Ontario average (i.e., 34.3%), the highest being the Regional Municipality of Peel (i.e., 68.8%), and with the lowest being the Regional Municipality of Halton (i.e., 35.5%). All of the regions report lower percentages of persons who identify as Indigenous (i.e., 2.9%). The locations with the lowest percentages of people who identify as Indigenous were the Regional Municipality of York (i.e., 0.5%) and the Regional Municipality of Peel (i.e., 0.5%). Table 3-7 shows the distribution of visible minorities within the population of each location in the LSA (%).

As shown in Source: Statistics Canada 2021 Census

Notes:

1) The following reflects the language that Statistics Canada used to express how the term "Indigenous identity" is to be understood for the purposes of analyzing the data: This category includes persons who identify as First Nations (North American Indian) Métis and/or Inuk (Inuit) and/or those who report being Registered or Treaty Indians (that is registered under the Indian Act of Canada) and/or those who report having membership in a First Nation or Indian band.

Table 3-5, most Indigenous communities, listed in the consultation plan referred to under subsection 4(1) of the *Highway 413 Act, 2024* , for whom population data is available for both the 2016 and 2021 census years, had a positive population growth. The much higher numbers noted for some of the change in population percentages could be due to change in reporting of population statistics for these Indigenous communities. Change in population statistics was not available for some of the Indigenous communities.

Table 3-4: Population Demographics

Demographic Criteria	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Population (2021)	1,451,022	596,637	1,173,334	**14,223,942**
Population Change (%) 2016 - 2021	5.0	8.8	5.7	**5.8**
Visible Minority Population (%)	68.8	35.5	55.0	**34.3**
Indigenous Identity[1] (%)	0.5	1.0	0.5	**2.9**
First Nations (North American Indian)	0.3	0.6	0.3	**1.8**
Métis	0.2	0.4	0.2	**1.0**
Inuk (Inuit)	0.008	0.008	0.009	**0.03**

Source: Statistics Canada 2021 Census

Notes:

2) The following reflects the language that Statistics Canada used to express how the term "Indigenous identity" is to be understood for the purposes of analyzing the data: This category includes persons who identify as First Nations (North American Indian) Métis and/or Inuk (Inuit) and/or those who report being Registered or Treaty Indians (that is registered under the Indian Act of Canada) and/or those who report having membership in a First Nation or Indian band.

Table 3-5: Indigenous Communities Population Demographics

Indigenous Community	Population (2016)[1]	Population Change (%) 2006 - 2016[1]	Population (2022)[2]	Population Change (%) 2016 – 2022
Alderville First Nation	495	-2	1,385	180
Beausoleil First Nation	655	5.7	655	0
Chippewas of Georgina Island First Nation	265	NA	953	260
Chippewas of Rama First Nation	870	3.6	870	0
Curve Lake First Nation	1,060	0	2,800	164
Hiawatha First Nation	365	NA	1,030	182
Mississaugas of Scugog Island First Nation	140	100	263	88
Mississaugas of the Credit First Nation	740	NA	2,774	275
Six Nations of the Grand River First Nation	NA	NA	28,562	NA
Council of the Wendat Nation	2,135	NA	4,871	128
Kawartha Nishnawbe	NA	NA	NA	NA
Oneida Nation of the Thames	NA	NA	6,421	NA
Métis Nation of Ontario	NA	NA	120,580	NA

Source: CIRNAC First Nations Details. Available at: https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/SearchFN.aspx?lang=eng
Notes: NA – Data not available.
1) 2016 Data from CIRNAC First Nations Details
2) 2022 Data from Statistics Canada

Table 3-6 below shows the population demographics of Indigenous communities on and off-reserve. As indicated below, the Indigenous community with the highest percent of the population residing on-reserve is Chippewas of Rama First Nation (i.e., 35%), followed by Curve Lake First Nation (i.e., 29%). For all the Indigenous communities shown here, there is a greater percentage of community members residing off-reserve than on reserve.

Table 3-6: Indigenous Population Demographics On and Off Reserves, 2022 (%)

Indigenous Community	Total Registered Population	Total Population on Own Reserve	On Own Reserve (RM)	On Other Reserves (RM)	Off Reserve (RM)	On Own Reserve (RF)	On Other Reserve (RF)	Off Reserve (RF)
Alderville First Nation[1]	1,370	22.48	10.66	0.15	37.45	11.82	0.36	39.56
Beausoleil First Nation[1]	3,099	21.52	10.52	0.39	36.46	11.00	0.42	41.11
Chippewas of Georgina Island First Nation[1]	950	22.0	10.11	0.11	37.79	11.89	0.0	40.11
Chippewas of Rama First Nation[1]	2,122	35.01	17.91	0.38	31.39	17.11	0.38	32.75
Curve Lake First Nation[1]	2,789	29.04	14.34	0.22	33.88	14.70	0.14	36.61
Hiawatha First Nation[1]	1,015	20.3	8.77	0.0	36.55	11.53	0.10	42.76
Mississaugas of Scugog Island First Nation[1]	261	18.77	10.73	0.77	39.46	8.05	1.15	39.85

Indigenous Community	Total Registered Population	Total Population on Own Reserve	On Own Reserve (RM)	On Other Reserves (RM)	Off Reserve (RM)	On Own Reserve (RF)	On Other Reserve (RF)	Off Reserve (RF)
Mississaugas of the Credit First Nation[2]	2,774	34.7	NA	NA	NA	NA	NA	NA
Six Nations of the Grand River First Nation[2]	28,562	NA	NA	NA	NA	NA	NA	NA
Council of the Wendat Nation[2]	4,871	30.4	NA	NA	NA	NA	NA	NA
Oneida Nation of the Thames[2]	6,421	33.9	NA	NA	NA	NA	NA	NA

Source: CIRNAC First Nations Details. Available at: CIRNAC; Highway 413 IPD Master Document June 2023 Report
Notes: NA – Data not available; RM – Registered Males; RF – Registered Females
1) 2022 Data from CIRNAC First Nations Details
2) 2022 Data from Highway 413 IPD Master Document June 2023 Report

Table 3-7 below shows the distribution of visible minorities within the population of each regional municipality in the LSA. The Region of Peel has the highest percentage of visible minority population and double that of Ontario (i.e., 68.8% vs. 34.4% for Ontario) followed by the Regions of York and then Halton. Gender disaggregated data for this indicator is available via the socioeconomic baseline.

Table 3-7: Population Demographics – Visible Minority Populations

Visible Minority Population	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Total visible minority population (25% sample data) (%)	68.8	35.5	55.0	**34.3**
South Asian (%)	37.4	13.8	11.0	**10.8**
Chinese (%)	4.2	5.4	24.6	**5.8**
Black (%)	9.5	3.5	2.8	**5.5**
Filipino (%)	4.2	2.2	2.4	**2.6**
Arab (%)	3.5	3.7	1.2	**2.0**
Latin American (%)	2.2	1.9	1.5	**1.8**
Southeast Asian (%)	1.9	0.7	1.3	**1.2**
West Asian (%)	1.1	1.0	5.3	**1.5**
Korean (%)	0.4	1.0	1.7	**0.7**
Japanese (%)	0.2	0.3	0.2	**0.2**
Visible minority, n.i.e. (%)	2.2	0.6	0.9	**0.9**
Multiple visible minorities (%)	2.0	1.4	2.0	**1.3**

Source: Statistics Canada 2021 Census
Notes: n.i.e. -- Includes respondents who reported a write-in response classified as a visible minority

Below, Figure 3-1 to Figure 3-10 show the population distribution within each regional municipality in the LSA and for Indigenous communities (for whom this data is available) listed in the consultation plan referred to under subsection 4(1) of the *Highway 413 Act, 2024*, by both age and sex. All three regional municipalities have a similar proportion of older adults (i.e., ages 75- 99 years old), and the Regions of

Halton and York have a slightly higher proportion of the population between 0-19 years in comparison to the Region of Peel.

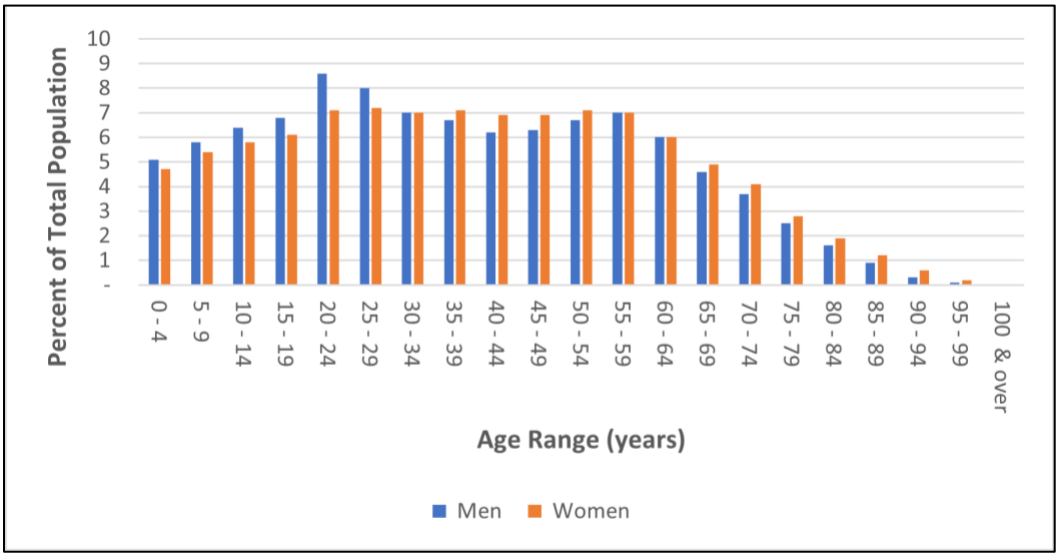

Figure 3-1: Region of Peel – Population by Age and Sex

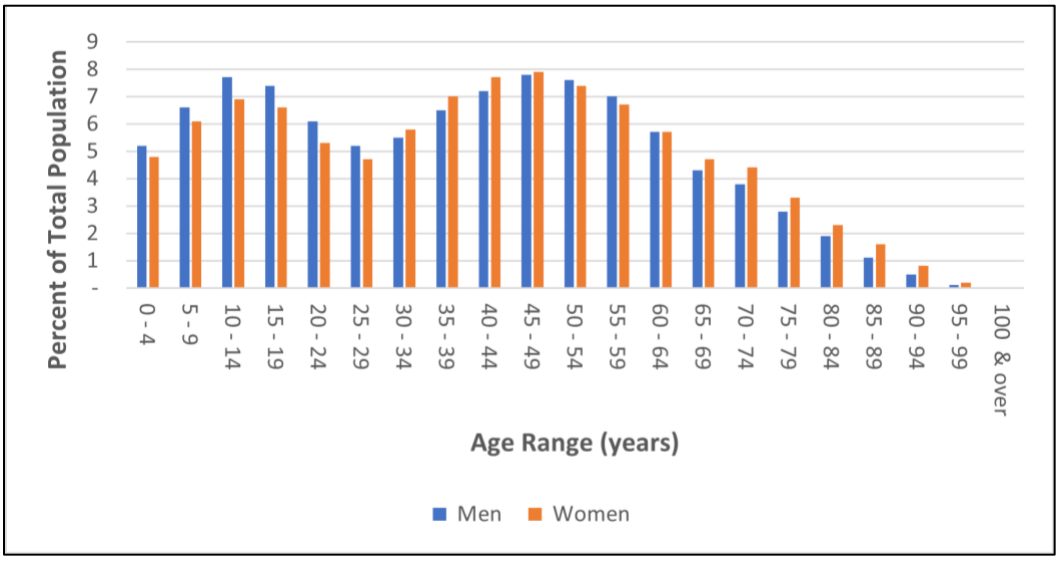

Figure 3-2: Region of Halton – Population by Age and Sex

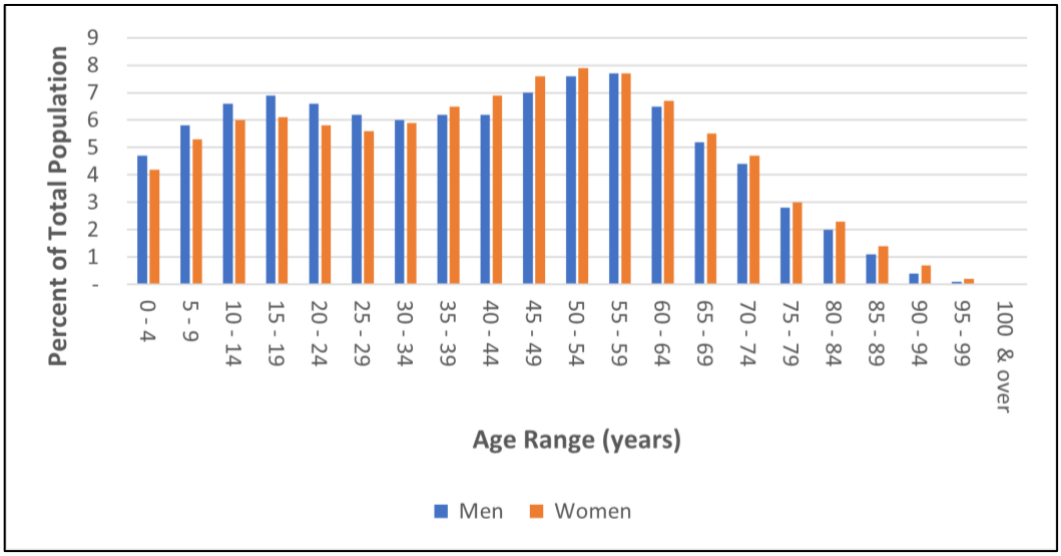

Figure 3-3: Region of York – Population by Age and Sex

When looking at the age distribution range in the Indigenous communities, of note is that Beausoleil First Nation and Chippewas of Rama First Nation have the highest percentages of the population between the 0-19 age range. Also of interest is that Curve Lake First Nation, Chippewas of Georgina Island First Nation and Hiawatha First Nation have slightly higher percentages of females as compared to males within the 20-64 age range. Population age demographics were not available for Six Nations of the Grand River, Mississaugas of the Credit First Nation, Council of the Wendat Nation, Kawartha Nishnawbe, Métis Nation of Ontario, or Oneida Nation of the Thames.

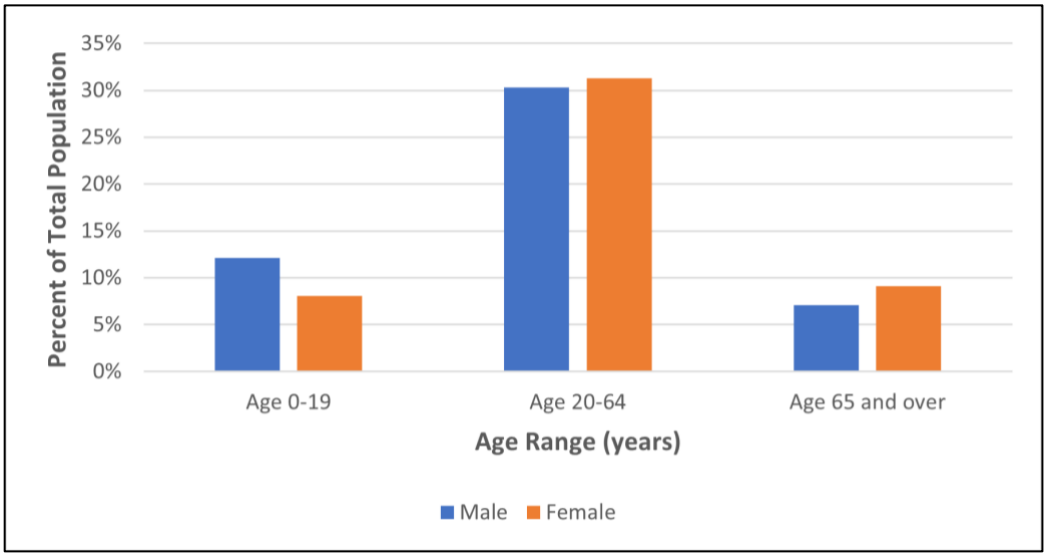

Figure 3-4: Alderville First Nation – Population by Age and Sex

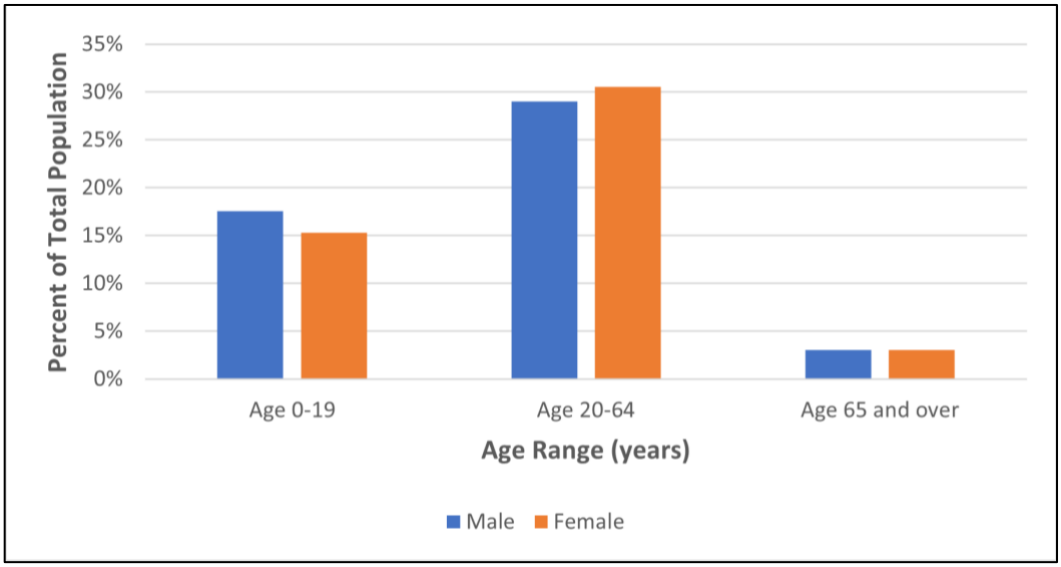

Figure 3-5: Beausoleil First Nation – Population by Age and Sex

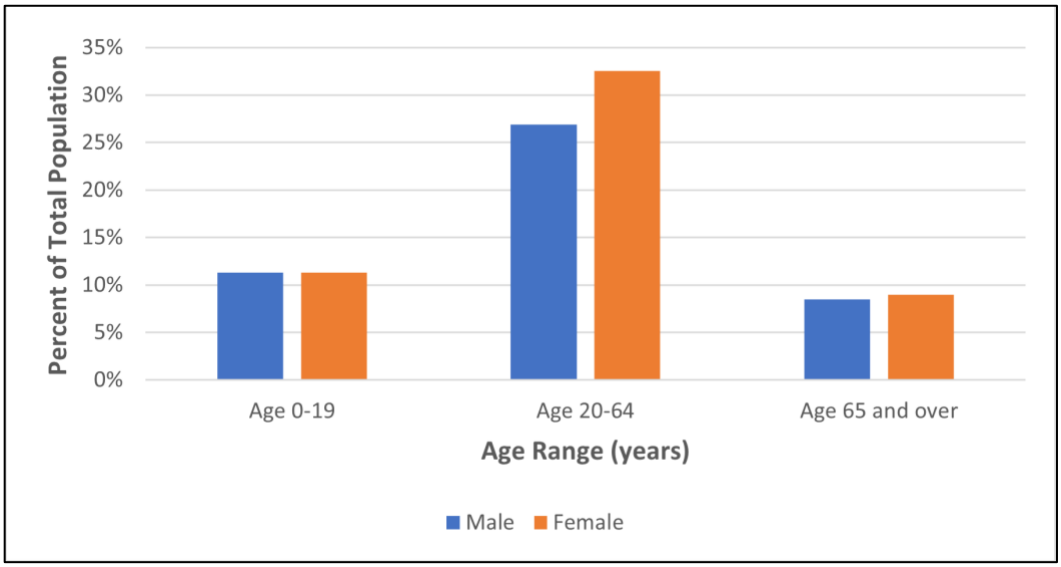

Figure 3-6: Curve Lake First Nation – Population by Age and Sex

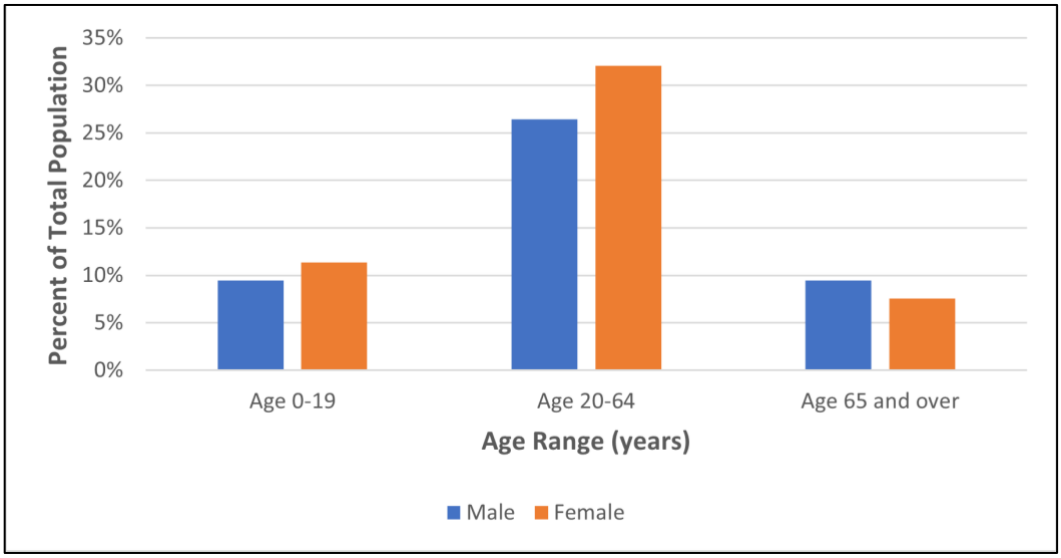

Figure 3-7: Chippewas of Georgina Island First Nation – Population by Age and Sex

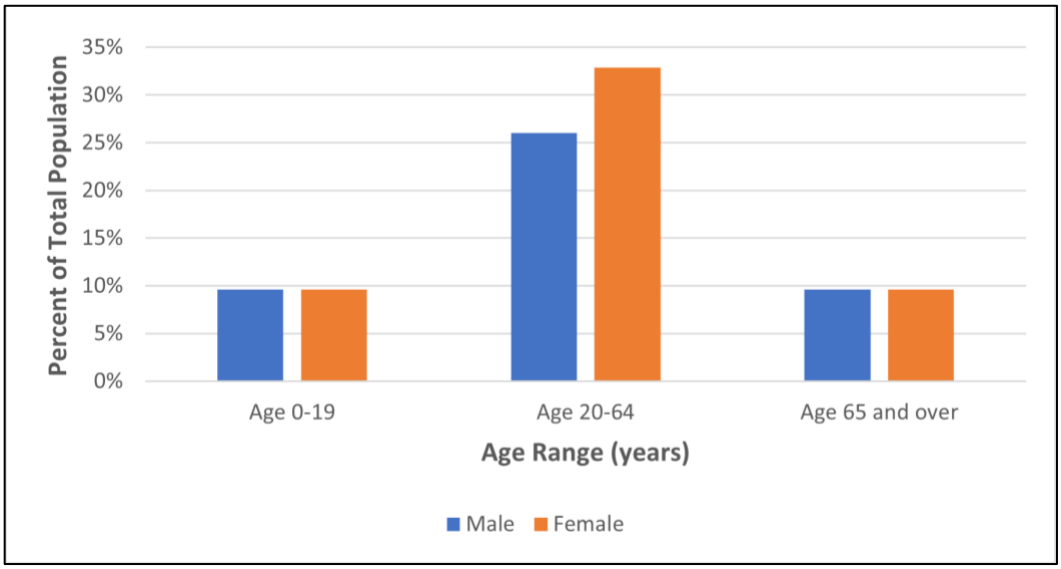

Figure 3-8: Hiawatha First Nation – Population by Age and Sex

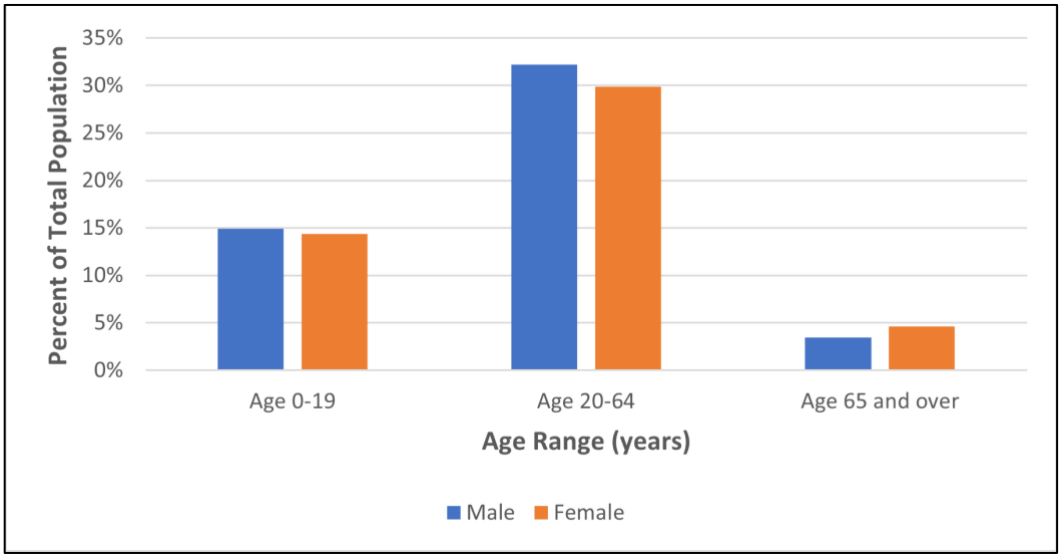

Figure 3-9: Chippewas of Rama First Nation – Population by Age and Sex

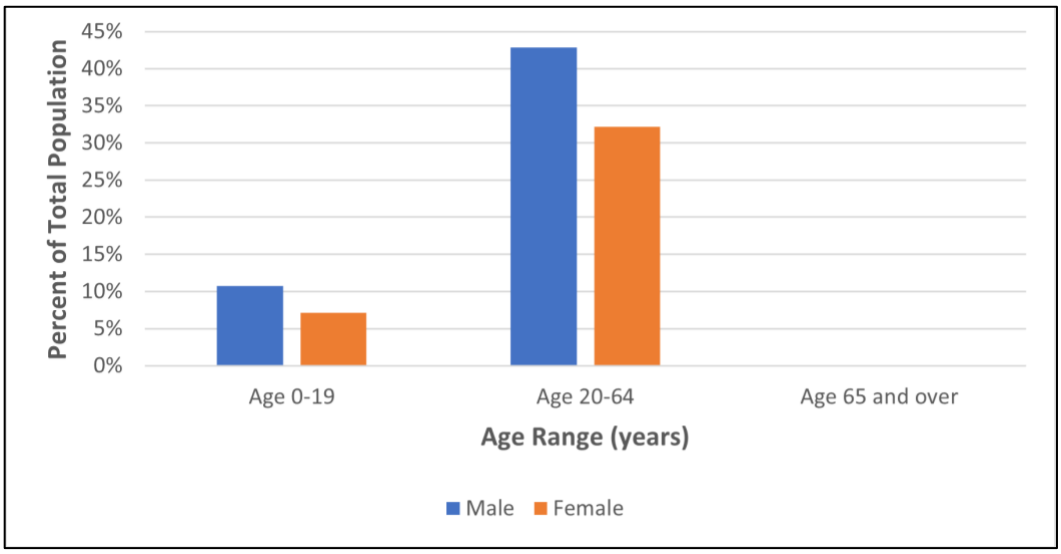

Figure 3-10: Mississaugas of Scugog Island First Nation – Population by Age and Sex

3.3.4. Education, Income and Employment

Education, income, and employment together contribute to socioeconomic status and are integral determinants of health that can determine access to services and contribute to overall health and wellbeing. Gender disaggregated data for this indicator is available via the socioeconomic baseline, but some gender disaggregation is provided here for income and labour force status. Individuals from lower socioeconomic groups face health disparities and unequal access to services, education and employment opportunities. Indigenous peoples, older adults, racialized individuals[2], refugees and

[2] Racialized individuals: From Statistics Canada (2018) – "People belonging to a group designated as visible minorities. The *Employment Equity Act* defines visible minorities as "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour." The visible minority population consists mainly of the following groups: South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and

immigrants, and those with certain disabilities can often face socioeconomic challenges. Also, as reviewed by the National Academies of Sciences, Engineering, and Medicine (NASEM) (2020), there is much research indicating that those who identify as bisexual or transgender tend to have lower earnings and experience higher levels of poverty compared to individuals who identify as lesbian, gay, cisgender, or heterosexual.

Where available, baseline data for the LSA has been provided in this sub-section.

Table 3-8 contains the highest level of education obtained in private households for each location in the LSA, in comparison to Ontario. All locations show higher rates of post-secondary degree attainment compared to Ontario (i.e., 67.8%). The highest percentage of post-secondary education within the population is in the Regional Municipality of Halton (i.e., 78.11%). The region with the highest percentage of 'no certificate, diploma, or degree' is the Regional Municipality of Peel (i.e., 8.7%), which is about the same as Ontario (i.e., 8.8%). Women (i.e., 70.8% to 80%) in all regions show higher percentages of post-secondary education when compared to men (i.e., 67% to 76.2%) from the same regions. While men in all regions show higher percentages of possessing no certificate, diploma, or degree (i.e., 4.8% to 9.3%) and obtaining a high school diploma (i.e., 19% to 23.7%) when compared to women (i.e., 3.5% to 8.1% & 16.6% to 21.1%, respectively).

Table 3-9 shows education characteristics for the Indigenous communities included in the LSA. The type of educational attainment with the highest percentage of individuals for all Indigenous communities is in the trades or other non-university certificates; the highest is within Beausoleil First Nation (i.e., 50%).

Table 3-8: Highest Level of Education in Private Household (25 – 64 yrs), 25% of Sample Data[1]

Education Level	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
No certificate, diploma or degree (%)	8.7	4.1	7.1	**8.8**
Women+[2]	8.1	3.5	6.5	**7.7**
Men+[3]	9.3	4.8	7.7	**9.9**
High (secondary) school diploma or equivalency certificate (%)	22.4	17.7	19.9	**23.3**
Women+	21.1	16.6	19.1	**21.4**
Men+	23.7	19.0	20.7	**25.3**
Postsecondary certificate, diploma or degree (%)	68.9	78.1	73.1	**67.8**
Women+	70.8	80.0	74.4	**70.8**
Men+	67.0	76.2	71.6	**64.7**

Source: Statistics Canada 2021 Census

Notes:

1) A sample of approximately 25% of Canadian households receive a long-form questionnaire. All other households receive a short-form questionnaire.
2) "Women＋" includes women (and/or girls), as well as some non-binary persons.
3) "Men＋" includes men (and/or boys), as well as some non-binary persons.

Japanese. Indigenous people have been excluded from the analysis as a focused article on this population will be released in the near future."

Table 3-9: Education Characteristics of Indigenous Communities, 2016 Census of Population

Indigenous Community	Population 15 years and over	No degree, certificate, or diploma (%)	High school diploma or equivalent only (%)	Trades/apprenticeship or other non-university certificate (%)	University certificate below bachelor level (%)	University degree (bachelor level or higher) (%)
Alderville First Nation	410	21	27	41	5	7
Beausoleil First Nation	500	22	19	50	6	3
Chippewas of Georgina Island First Nation	210	24	26	40	5	7
Chippewas of Rama First Nation	670	32	21	40	3	4
Curve Lake First Nation	880	25	26	39	3	7
Hiawatha First Nation	315	22	25	41	3	8
Mississaugas of Scugog Island First Nation	120	25	38	29	8	8
Mississaugas of the Credit	560	26	29	37	2	7
Six Nations of the Grand River First Nation	NA	NA	NA	NA	NA	NA
Council of the Wendat Nation	1,785	19	20	41	5	16
Kawartha Nishnawbe	NA	NA	NA	NA	NA	NA
Oneida Nation of the Thames	NA	NA	NA	NA	NA	NA
Métis Nation of Ontario	NA	NA	NA	NA	NA	NA

Source: CIRNAC First Nations Details. Available at: https://fnp-ppn.aadnc-aandc.gc.ca/fnp/Main/Search/SearchFN.aspx?lang=eng
Notes: NA – Data not available.

Table 3-10 shows various income statistics of economic families in the LSA in comparison to Ontario, including median income, average family size, and prevalence of low income. All the locations in the LSA show higher median incomes when compared to Ontario (i.e., $91,000). The location with the highest

median income is the Regional Municipality of Halton (i.e., $121,000), followed by the Regional Municipality of York (i.e., $112,000), and Regional Municipality of Peel (i.e., $107,000). For almost all of the age ranges within all locations, the prevalence of low-income is lower when compared to Ontario. The only exception is the 65 years and above age group within the Regional Municipality of York, which has a slightly higher prevalence of low-income rate than Ontario. For women ages 18 to 64 years old (i.e., 6.2% to 7.8%) and ages 65 years and over (i.e., 9.6% to 13.2%), in all regions, have higher prevalence of low income when compared to men in all regions (i.e., 5.7% to 7.4% & 6.5% to 11%, respectively). It is also important to note that women aged 65 years and above, have the highest prevalence of low income in all three regional municipalities in the LSA.

Table 3-10: Income Statistics of Households[1]

Income Statistics	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Median Income of Households ($) (2021)[5]	107,000	121,000	112,000	**91,000**
Median total income in 2020 of an individual ($)	38,400	48,400	39,600	**41,200**
Women+[3]	34,800	42,000	36,400	**37,200**
Men+[4]	41,600	58,000	44,800	**46,000**
Average Family Size	3.5	3.3	3.3	**3**
Prevalence of low income based on the Low-income measure, after tax[2] (%)				
0 to 17 years (%)	9.7	7.7	9.6	**11.5**
Women+	9.7	7.9	9.6	**11.5**
Men+	9.7	7.6	9.6	**11.5**
0 to 5 years (%)	10.4	7.4	10.0	**12.4**
Women+	10.5	7.3	10.0	**12.4**
Men+	10.3	7.5	10.0	**12.4**
18 to 64 years (%)	6.7	6	7.6	**9.1**
Women+	6.8	6.2	7.8	**9.4**
Men+	6.5	5.7	7.4	**8.9**
65 years and over (%)	10	8.2	12.2	**12.1**
Women+	11.3	9.6	13.2	**10.2**
Men+	8.5	6.5	11.0	**13.7**

Source: Statistics Canada 2021 Census

Notes:

1) Household is generally defined as being composed of a person or group of persons who co-reside in, or occupy, a dwelling.
1) The Low-income measure, after tax, refers to a fixed percentage (50%) of median adjusted after-tax income of private households (Statistics Canada, 2022a). Low-income status is typically presented for persons but, since the LIM-AT threshold and household income are unique and shared by all members within each household, low-income status based on LIM-AT can also be reported for households (Statistics Canada, 2022a). Available: Statistics Canada, 2022a
2) "Women＋" includes women (and/or girls), as well as some non-binary persons.
3) "Men＋" includes men (and/or boys), as well as some non-binary persons.
4) 2022 Data from Highway 413 IPD Master Document June 2023 Report

Due to income data not being available for 2020 for all Indigenous communities, Table 3-11 below shows the 'average income of families' in some Indigenous communities in 2016 and the 'median after-tax income of households' for 2020 for other Indigenous communities. Since the values are presented for different years and different indicators of income are used, comparisons cannot be made.

Table 3-11: Indigenous Community Average (Individual) Income, 2016 Census of Population

Indigenous Community	Average total income in 2016[1] ($)	Median after-tax income of households in 2020[2] ($)
Alderville First Nation	NA	45,200
Beausoleil First Nation	19,866	NA
Chippewas of Georgina Island First Nation	36,627	NA
Chippewas of Rama First Nation	NA	66,500
Curve Lake First Nation	NA	50,400
Hiawatha First Nation	NA	57,600
Mississaugas of Scugog Island First Nation	NA	NA
Mississaugas of the Credit First Nation	36,601	NA
Six Nations of the Grand River First Nation	NA	NA
Council of the Wendat Nation	36,808	NA
Kawartha Nishnawbe	NA	NA
Oneida Nation of the Thames	NA	NA
Métis Nation of Ontario	NA	NA

Source: CIRNAC First Nations Details. Available at: CIRNAC

Notes: NA – Data not available.

1) 2016 Data from CIRNAC First Nations Details
2) 2020 Data from Statistics Canada 2021 Census

In Canada, typically, racialized graduates experienced lower employment income compared to non-racialized, non-Indigenous graduates two years after obtaining a bachelor's degree (Statistics Canada, 2023a). In addition, females experienced lower employment income compared to males. The national average annual employment income for racialized women was $45,700, while non-racialized and non-Indigenous women earned $47,800 (Statistics Canada, 2023a). In comparison, racialized males earned $51,600, and non-racialized, non-Indigenous men earned $54,100 (Statistics Canada, 2023a).

Table 3-12 below shows the status of the labour force of the regional municipalities in the LSA, in comparison to Ontario. Unemployment rates range from 11.1% (i.e., Regional Municipality of Halton) to 13.5% (i.e., Regional Municipality of Peel). The Regional Municipality of Halton is the only region that has a lower unemployment rate than Ontario (i.e., 12.2%). Women in all regions have a higher unemployment rate (i.e., 12% to 16%) when compared to men in all regions (i.e., 10% to 12%). Alternatively, men have higher rates of participation (i.e., 68% to 72%) and employment (i.e., 61% to 65%). when compared to women in all regions (i.e., 60% to 62% & 51% to 55%, respectively). Additionally, for all regional municipalities and Ontario as a whole, rates of unemployment after the COVID-19 pandemic (i.e., in 2021) have almost doubled when compared to 2016. In all regions, women still have a higher unemployment rate than men.

Table 3-12: Labour Force Status, 25% Sample Data[1]

Labour Force	Peel (2016)	Peel (2021)	Halton (2016)	Halton (2021)	York (2016)	York (2021)	Ontario (2016)	Ontario (2021)
Participation Rate (%)	67.3	66	69.8	67	66.7	64	**64.7**	**63**
Women+[2]	62.1	60	65.4	62	62.2	60	**60.6**	**59**
Men+[3]	72.7	71	74.6	72	71.5	68	**69.1**	**67**
Employment Rate (%)	61.8	57	65.6	60	62.4	56	**59.9**	**55**
Women+	56.6	51	61.2	55	58.1	51	**56.1**	**51**

Labour Force	Peel (2016)	Peel (2021)	Halton (2016)	Halton (2021)	York (2016)	York (2021)	Ontario (2016)	Ontario (2021)
Men+	67.3	62	70.4	65	67.1	61	**63.9**	**60**
Unemployment Rate (%)	8.2	14	6.0	11	6.4	13	**7.4**	**12**
Women+	8.9	16	6.3	12	6.7	14	**7.4**	**13**
Men+	7.5	12	5.7	10	6.2	11	**7.5**	**11**

Source: Statistics Canada 2021 Census, Statistics Canada 2016 Census

Notes: Peel = Regional Municipality of Peel; Halton = Regional Municipality of Halton; York = Regional Municipality of York

1) A sample of approximately 25% of Canadian households receive a long-form questionnaire. All other households receive a short-form questionnaire.
2) "Women+" includes women (and/or girls), as well as some non-binary persons.
3) "Men+" includes men (and/or boys), as well as some non-binary persons.

Table 3-13 below shows labour force status for Indigenous communities included in the LSA. In 2016 Beausoleil First Nation had the highest percentage of unemployment (i.e., 17.5%), while Hiawatha First Nation had the lowest (i.e., 6.1%). It should be noted that the statistics for Indigenous communities for participation rate and unemployment rate are only available from 2016. Employment rate statistics for Indigenous communities are available for 2016 and 2022. In comparing employment rates for Indigenous communities from 2016 to 2022, it can be seen that all Indigenous communities had increased employment rates in 2022. In 2022, Council of the Wendat Nation and the Chippewas of Georgina Island First Nation had the highest employment rates (i.e., 78.4% and 70.3%, respectively) both of which are above the employment rate for the Province of Ontario as a whole (i.e., 55% in 2021).

Table 3-13: Indigenous Labour Force Status

Indigenous Labour Force	2016[1] Participation Rate (%)	2016[1] Employment Rate (%)	2016[1] Unemployment Rate (%)	2022[2] Employment Rate (%)
Alderville First Nation	58.5	52.4	8.3	64.9
Beausoleil First Nation	57	47	17.5	55.7
Chippewas of Georgina Island First Nation	61.9	59.5	NA	70.3
Chippewas of Rama First Nation	64.2	53.7	17.4	66.3
Curve Lake First Nation	50	43.8	12.5	54.8
Hiawatha First Nation	52.4	49.2	6.1	61.5
Mississaugas of Scugog Island First Nation	54.2	50	15.4	60.0
Mississaugas of the Credit First Nation	59.8	52.7	10.4	60.8
Six Nations of the Grand River First Nation	NA	NA	NA	NA
Council of the Wendat Nation	64.7	61.1	5.6	78.4
Kawartha Nishnawbe	NA	NA	NA	NA
Oneida Nation of the Thames	NA	NA	NA	NA
Métis Nation of Ontario	NA	NA	NA	59.8

Source: CIRNAC First Nations Details. Available at: CIRNAC

Notes: NA – Data not available.

1) 2016 Data from CIRNAC First Nations Details
2) 2022 Data from Highway 413 IPD Master Document June 2023 Report

In Canada, among those aged 25 to 64 years, persons with disabilities were less likely to be employed (59%) than those without disabilities (80%) (Statistics Canada, 2018). Unemployment rates in Canada are also highest among racialized women (9.6%), followed by racialized men (8.8%) (Block et al., 2019). Non-racialized men in 2016, had an unemployment rate of 8.2%, while non-racialized women had the lowest unemployment rate at 6.4% (Block et al., 2019). Overall, nationally in 2016, the unemployment rate for the racialized population was 9.2%, while the rate for the non-racialized population was 7.3% (Block et al., 2019).

Table 3-14 below shows the division of labour force by occupation, according to the National Occupational Classification, Canada's national system for describing occupations, of locations in the LSA, in comparison to Ontario for the general population. Women have half or less than half the rate of occupations in legislative and senior management occupations across the LSA and in Ontario. In most other occupations, the percentage of women in the labour force is higher than men. The exceptions include: the 'Trades, transport and equipment operators and related occupations', where men are employed in significantly higher percentages than women (5 – 10-fold higher); and in 'Natural resources, agriculture, and related production occupations', where there are almost twice as many men employed as compared to women; and 'Occupations in manufacturing and utilities', where more men are employed as compared to women.

Table 3-14: Labour Force by Occupation (> 15 years old) National Occupational Classification, 25% of Sample Data[1]

Occupation	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Legislative and senior management occupations (%)	1.0	2.4	1.7	**1.3**
Women+[2]	0.6	1.3	0.9	**0.8**
Men+[3]	1.4	3.5	2.5	**1.7**
Business, finance, and administration occupations (%)	20.0	21.9	22.0	**17.9**
Women+	27.2	28.5	30.2	**24.7**
Men+	13.8	15.8	14.4	**11.7**
Natural and applied sciences and related occupations (%)	10.9	11.6	12.2	**9.3**
Women+	6.0	6.0	6.5	**4.9**
Men+	15.2	16.9	17.6	**13.3**
Health occupations (%)	5.9	6.5	6.2	**7.3**
Women+	10.0	10.3	9.7	**12.2**
Men+	2.2	2.9	3.1	**2.9**
Occupations in education, law and social, community and government services (%)	8.3	11.6	10.4	**11.8**
Women+	12.4	16.5	15.2	**16.4**
Men+	4.6	7.1	6.0	**7.5**
Occupations in art, culture, recreation, and sport (%)	2.0	3.3	3.0	**3.1**
Women+	2.2	3.9	3.3	**3.6**
Men+	1.7	2.7	2.7	**2.7**
Sales and service occupations (%)	22.8	23.6	23.5	**23.5**
Women+	26.8	25.4	25.1	**26.9**

Occupation	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Men+	19.3	21.9	22.1	**20.3**
Trades, transport and equipment operators and related occupations (%)	18.7	12.0	12.9	**15.9**
Women+	5.0	2.6	2.4	**3.1**
Men+	30.7	20.7	22.7	**27.6**
Natural resources, agriculture, and related production occupations (%)	0.6	1.2	1.1	**2.0**
Women+	0.3	0.7	0.5	**1.0**
Men+	0.9	1.6	1.6	**2.9**
Occupations in manufacturing and utilities (%)	6.2	3.3	3.8	**5.0**
Women+	5.3	1.9	3.0	**3.3**
Men+	7.0	4.6	4.6	**6.6**

Source: Statistics Canada 2021 Census

Notes:

1) A sample of approximately 25% of Canadian households receive a long-form questionnaire. All other households receive a short-form questionnaire.
2) "Women＋" includes women (and/or girls), as well as some non-binary persons.
3) "Men＋" includes men (and/or boys), as well as some non-binary persons.

3.3.5. Affordable Housing

Having access to safe and affordable housing is one of the most important determinants of health and can have a cascading impact on other determinants of health, and also one's physical, mental and social wellbeing. As with the socioeconomic indicators above, various population groups experience higher than average housing insecurity. Individuals from lower socioeconomic groups, especially if they also identify as Indigenous, women, gender diverse people, racialized individuals, having disabilities or are older adults, face chronic housing affordability issues (Schwan et al., 2021).

Table 3-15 below shows housing status and Table 3-16 shows indicators of affordable housing, both in comparison to Ontario. All regional municipalities in the LSA have higher percentages of the population who own homes and lower rates of renters, when compared to Ontario as a whole (i.e., 68.4% & 31.4%, respectively). The municipality with the highest percentage of owners and the lowest percentage of renters is the Regional Municipality of York (i.e., 82.2% & 17.8%, respectively). Additionally, the municipality with the lowest percentage of owners and highest percentage of renters is Regional Municipality of Peel (i.e., 74.5% & 25.5%, respectively). Gender disaggregated data for this indicator, or for affordable housing below, is currently (as of July 28, 2023) not available through Statistics Canada.

When compared to Ontario as a whole (i.e., 75.8%), all the locations in the LSA have lower or similar percentages of households spending less than 30% of income on shelter costs, ranging from 69.5% (Regional District of York) to 75.8% (Regional District of Halton). Regional Municipality of Halton has an equal percentage of households spending 30% or more on shelter costs (i.e., 24.2%) when compared to Ontario. The Regional Municipalities of Peel (i.e., 28.9%) and York (i.e., 30.5%) both have higher percentages of spending 30% or more of income on shelter, when compared to Ontario.

Table 3-15: Housing Status, 25% of Sample Data[1]

Housing Status	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Owner (%)	74.5	78.5	82.2	**68.4**
Renter (%)	25.5	21.5	17.8	**31.4**

Source: Statistics Canada 2021 Census

Notes:

1) A sample of approximately 25% of Canadian households receive a long-form questionnaire. All other households receive a short-form questionnaire.

Table 3-16: Affordable Housing, 25% of Sample Data[1]

Affordable Housing	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Spending less than 30% of income on shelter costs (%)	71.1	75.8	69.5	**75.8**
Spending 30% or more of income on shelter costs (%)	28.9	24.2	30.5	**24.2**

Source: Statistics Canada 2021 Census

Notes:

1) A sample of approximately 25% of Canadian households receive a long-form questionnaire. All other households receive a short-form questionnaire.

In Canada, as per the 2016 census, persons with disabilities were more likely to live in rented dwellings (32.5%) than the total population (26.4%), and they were also more likely to live in subsidized rented dwellings (5.4%) than the total population (3.0%) (Statistics Canada, 2022b). Similarly, recent immigrants were more likely to live in rented dwellings (56%) than the total population (27%), owing to a greater proportion of individuals in both subsidized and non-subsidized housing (Statistics Canada, 2021b). Moreover, the proportion of recent immigrants residing in owner-occupied dwellings (39%) who face unaffordable housing is more than double that of the overall population residing in owner-occupied dwellings (15%) (Statistics Canada, 2021b). The rate of unaffordable housing among recent immigrants living in renter families (24%) is similar to that of the overall population (26%) (Statistics Canada, 2021b).

3.3.6. Burden of Disease and Mental Health

Physical and mental health and illnesses have a significant impact on how people live their lives. As such, it is crucial to understand the prevalence and incidence of chronic diseases as well as other health indicators in local communities, as this can help local governments and organisations define priorities for community health and manage health disparities. Indigenous individuals, families, communities, and nations who face historical inequities in the social determinants of health are more likely to bear an additional burden of illness and have difficulty accessing resources that could alleviate these concerns (Reading and Wien, 2009). The unequal status of the determinants of health in a society (such as high versus low-income households, having quality versus hazardous housing, stable versus precarious employment, etc.), as well as the related challenges that can arise as a result of this unequal distribution (such as food insecurity, mental illness, reduced access to services, etc.), are the underlying reasons behind disparate health outcomes in various population groups. Underpinning this unequal distribution of the determinants of health is the unequal distribution of money, power and resources at the local, national and global levels (WHO, n.d.). Hence, existing disparity in the determinants of health can, in many instances, be the driving force behind disproportionate health impacts experienced by individuals due to a project.

Burden of disease and mental health statistics are determined by Health Unit, as per Statistics Canada Census 2021. The Health Units that represent the LSA include the Halton Regional Health Unit, Peel Regional Health Unit and York Regional Health Unit, and are compared to Ontario in this section. Data for on-reserve First Nations peoples in Ontario who participated in the Ontario First Nations Regional Health Survey Phase III (2015 – 2017) is provided (see Section 3.3.1 above). It should be noted that the data from the Regional Health Survey is not entirely representative of individual First Nations, but provides a general trend of the health and wellbeing of those living on-reserve in Ontario.

Table 3-17 contains indicators related to burden of disease within the regional municipalities in the LSA, in comparison to First Nations in Ontario and Ontario as a whole. The regional health units represented in the LSA have lower rates of burden of disease when compared to Ontario as a whole, with the exception of York Regional Health Unit which has a higher percent of the population with high blood pressure (i.e., 18%). First Nations in Ontario have the highest burden of disease for all indicators when compared to the Regional Health Units in the LSA and Ontario as a whole, except for mood disorders.

Within municipalities, the Peel Regional Health Unit has the highest disease burden for diabetes (i.e., 7.7%), chronic obstructive pulmonary blockage (COPD) (i.e., 2.8%), and mood disorders (i.e., 7.2%). The Halton Regional Health Unit has the highest disease burden for arthritis (i.e., 17%) and asthma (i.e., 6.6%). The York Regional Health Unit has the same percentage (i.e., 7.7%) of diabetes as the Peel Regional Health Unit and the highest percentage of the population with high blood pressure (i.e., 18%).

Additionally, females in all locations have higher rates of arthritis (i.e., 16.4% to 22.6%) when compared to males (i.e., 10.8% to 12.4%). Males in all locations have higher rates of diabetes (i.e., 8.5% to 9.8%) when compared to females (i.e., 5.4% to 6.7%). Gender disaggregated data is not available for First Nations in Ontario.

Table 3-17: Burden of Disease (Percent of the Population)

Disease	Halton Regional Health Unit[1]	Peel Regional Health Unit[1]	York Regional Health Unit[1]	Ontario First Nations[2]	Ontario[1]
Arthritis (15 years and over) (%)	17.0	13.6	16.2	26.1	**19.1**
Females (%)*	22.6	16.4	19.8	NA	**22.7**
Males (%)	10.9	10.8	12.4	NA	**15.4**
Diabetes (%)	6.9	7.7	7.7	23.4	**8**
Females (%)	5.4[E]	6.7	5.7[E]	NA	**7.1**
Males (%)	8.5[E]	8.8	9.8	NA	**9**
Asthma (%)	6.6	6.1	5.0	12.6	**8**
Females (%)	5.0[E]	7.4[E]	6.8[E]	NA	**9.1**
Males (%)	8.3[E]	4.8[E]	3.2[E]	NA	**6.8**
Chronic obstructive pulmonary disease (COPD; 35 years and over) (%)	1.8	2.8	1.7	NA	**3.8**
Females (%)	2.2[E]	3.0[E]	F	NA	**3.8**
Males (%)	1.4[E]	F	F	NA	**3.7**
High blood pressure (%)	16.1	15.6	18.0	22.9	**17.5**
Females (%)	13	16.8	17.7	NA	**17.1**
Males (%)	19.4	14.4	18.3	NA	**18**
Mood disorder[3] (%)	6.3	7.2	5.9	7.6	**9.5**
Females (%)	9.0[E]	9.6	5.1[E]	NA	**11.4**
Males (%)	3.4[E]	4.6[E]	6.7[E]	NA	**7.6**

Source: Statistics Canada 2021 Health Characteristics; Ontario First Nations Regional Health Survey Phase III

Notes: NA – Data not available, COPD – Chronic obstructive pulmonary disease, E – Use with caution, F – Too unreliable to be published; "*" – In this instance StatsCan presents data as "males" & "females".

1) Statistics from 2019-2020 Data: Census Profile 2021.
2) Statistics from 2015-2017: Ontario First Nations Regional Health Survey Phase III.
3) Population aged 12 and over who reported that they have been diagnosed by a health professional as having a mood disorder, such as depression, bipolar disorder, mania, or dysthymia (Statistics Canada, 2021).

Table 3-18 shows both childhood and adult obesity rates for the LSA and for First Nations in Ontario, in comparison to Ontario as a whole. All of the regional municipalities in the LSA and the First Nations in Ontario have higher percentages of self-reported overweight adults, when compared to Ontario as a whole (i.e., 35.4%), the highest reported in Halton Regional Health Unit (i.e., 39.3%). In adults, without exception, females self-report much lower rates of being overweight than males. In comparison, all three regional municipalities have lower rates of self-reported adult obesity compared to Ontario (i.e., 28.1%), the lowest rate being in Peel Regional Health Unit (i.e., 22.7%). The adult obesity rate for First Nations in Ontario (i.e., 43%) is higher than the provincial rate.

The regional municipalities of Peel and York (data not available for Halton) have lower rates of self-reported overweight or obesity in youth, when compared to Ontario as a whole (i.e., 22%). Data for youth for the overweight and obese categories in Ontario and the regional municipalities is combined and not separated into 'overweight' and 'obese'. As such, this is hard to compare to self-reported rates of obesity and overweight in youth in First Nations in Ontario for whom data is available separately. In the overweight and obese indicators, adult males in all regional municipalities in the LSA have higher rates when compared to females, except for obesity rates for men in Peel Region.

Table 3-18: Childhood and Adult Obesity (Percent of the Population)

Obesity	Halton Regional Health Unit[1]	Peel Regional Health Unit[1]	York Regional Health Unit[1]	Ontario First Nations[2]	Ontario[1]
Body mass index, adjusted self-reported, adult (18 years and over), overweight (%)	39.3	36	36.3	36	**35.4**
Females (%)*	32.6	27.4	30.7	--	**30.5**
Males (%)	46.2	44.3	42.3	--	**40.3**
Body mass index, adjusted self-reported, adult (18 years and over), obese (%)	22.8	22.7	23.1	43	**28.1**
Females (%)	21	24	22.3	--	**27.9**
Males (%)	24.6	21.4	24	--	**28.2**
Body mass index, self-reported, youth (12 to 17 years old), overweight or obese (%)	F	17.6	16.4	32[3] & 14[4]	**22**
Females (%)	F	F	F	--	**19**
Males (%)	F	27.5[E]	F	--	**24.8**

Source: Statistics Canada 2021 Health Characteristics; Ontario First Nations Regional Health Survey Phase III

Notes: E – Use with caution; F – too unrealistic to be published; "*" – In this instance StatsCan presents data as "males" & "females".

1) Statistics from 2019-2020 Data: Census Profile 2021.
2) Statistics from 2015-2017: Ontario First Nations Regional Health Survey Phase III.
3) 32% of youth reported to be overweight.
4) 14% of youth reported to be obese.

Numerous studies have shown that Canadians with lower incomes have a significantly higher incidence of respiratory disease, adult-onset diabetes, and cardiovascular disease (Raphael et al., 2020). The

relationship between socio-economic standing and health can be perceived as cyclical; poor health has been identified as a primary factor individuals attribute their household's poverty (Galabuzi, 2001). Consequently, those with a low socio-economic level experience poor health, which in turn exacerbates their already disadvantaged position (Galabuzi, 2001).

The higher levels of inequality experienced by racialized groups lead to lower overall self-rated health as well as a wide variety of issues affecting both physical and mental health (Raphael et al., 2020). Individuals identifying as Indigenous, Black, immigrants, or Latinos in Canada are more likely to have mental health concerns (Raphael et al., 2020). Many of these people also report feelings of anxiety due to insecure and unpredictable living conditions, a perceived lack of control, disregard for their culture, discrimination based on multiple minority identities, and traumatic relationships with those in authority (Raphael et al., 2020). In Canada, in youth aged 15 to 24 years, mental health-related disabilities were the most prevalent type of disability (8%) (Statistics Canada, 2018).

Research on overall health and well-being has shown that 2SLGBTQI+ adults generally experience poorer health, lower quality of life connected to health, and a higher prevalence of disabilities compared to non-2SLGBTQI+ individuals (NASEM, 2020). Significant disparities in overall health have been identified among bisexual and transgender individuals, with a specific emphasis on non-binary individuals (NASEM, 2020).

Table 3-19 shows indicators of perceived health and mental health status of the regional municipalities in the LSA, compared to Ontario as a whole. Notably, Halton Regional Health Unit has the highest percent for both very good or excellent perceived health (i.e., 66.6%), and poor or fair perceived health (i.e., 8.9%). Halton Regional Health Unit also has the highest percentage of very good or excellent perceived mental health (i.e., 69%). York Regional Health Unit has the highest percentage of poor or fair perceived mental health (i.e., 8.5%). Females in all locations, except for females included in the York Regional Health Unit, have lower rates of their perceived health being very good or good when compared to males. Conversely, females in all locations, again except for females included in the York Regional Health Unit, have higher rates of their perceived health being fair or poor. Additionally, females in all locations have lower rates of their perceived mental health being very good and excellent when compared to males, while males have lower rates of their perceived mental health being fair or poor in all locations. Females in all locations also have higher rates of perceived life stress when compared to males. Statistics Canada indicates that disaggregated data for 'perceived mental health, fair or poor' should be used with caution. As such, these differences may indicate general trends at best.

First Nations in Ontario report the lowest percentage of overall mental health described at excellent or very good (i.e., 47%) as shown in

Table 3-20 when compared to the Regional Health Units and Ontario. Disaggregated data for this indicator for First Nations in Ontario is not available.

Table 3-19: Perceived Health and Mental Health (Percent of the Population)

Perceived Health and Mental Health	Halton Regional Health Unit	Peel Regional Health Unit	York Regional Health Unit	Ontario
Perceived health, very good or excellent (%)	66.6	62.1	65.1	**61.8**
Females (%)*	63.4	60.8	65.4	**61**
Males (%)	69.9	63.3	64.7	**62.7**
Perceived health, fair or poor (%)	8.9	8.4	8.7	**11.1**
Females (%)	10.8[E]	9	7.3[E]	**11.6**
Males (%)	6.9[E]	7.7[E]	10.2	**10.6**

Perceived Health and Mental Health	Halton Regional Health Unit	Peel Regional Health Unit	York Regional Health Unit	Ontario
Perceived mental health, very good or excellent (%)	69.0	66.2	65.9	**64.7**
Females (%)	65	64.2	60.5	**61.6**
Males (%)	73.2	68.2	71.8	**67.8**
Perceived mental health, fair or poor (%)	6.8	8.0	8.5	**9.8**
Females (%)	9.1[E]	9.3	9.1[E]	**10.6**
Males (%)	4.5[E]	6.8[E]	7.9[E]	**9**
Perceived life stress, most days quite a bit or extremely stressful (%)	23.9	18.1	22.3	**20.9**
Females (%)	26.7	19.4	22.4	**22.3**
Males (%)	20.9	16.8	22.2	**19.4**

Source: Statistics Canada 2021 Health Characteristics

Notes: Statistics from 2019-2020 Data: Census Profile 2021, E – Use with caution; "*" – In this instance StatsCan presents data as "males" & "females".

Table 3-20: Perceived Mental Health (Percent of the Population)

Perceived Mental Health	Ontario First Nations
Adult Mental Health	
Described overall mental health as excellent or very good (%)	47.2
Described overall mental health as good or fair (%)	51.2
Described overall mental health as poor (%)	1.6
Youth Mental Health	
Described overall mental health as excellent or very good (%)	64
Described overall mental health as good or fair (%)	34.3
Described overall mental health as poor (%)	1.7

Source: Ontario First Nations Regional Health Survey Phase III (2019)

Table 3-21 below shows the sense of belonging to community among the regional municipalities in the LSA, in comparison to First Nations in Ontario and Ontario as a whole. The lowest percentage of having a sense of belonging to community is in the York Regional Health Unit (i.e., 69.6%). For all regional municipalities in the LSA, females have higher rates of having a sense of belonging to their communities when compared to males. First Nations in Ontario report the highest percentage of sense of belonging to their community (i.e., 83.4%). Disaggregated data for this indicator for First Nations in Ontario is not available.

Table 3-21: Sense of Belonging to the Community (Percent of the Population)

Sense of Belonging	Halton Regional Health Unit[1]	Peel Regional Health Unit[1]	York Regional Health Unit[1]	Ontario First Nations[2]	Ontario[1]
Sense of belonging to local community (%)	74.5	74.1	69.6	83.4	**71.3**
Females (%)*	75.9	76.2	71.2	--	**72.7**
Males (%)	73	72	67.9	--	**69.9**

Source: Statistics Canada 2021 Health Characteristics; Ontario First Nations Regional Health Survey Phase III

Notes: "*" – In this instance StatsCan presents data as "males" & "females".

1) Statistics from 2019-2020 Data: Census Profile 2021. Population aged 12 and over who reported their sense of belonging to their local community as being very strong or somewhat strong.

1) Statistics from 2015-2017: Ontario First Nations Regional Health Survey Phase III. Adult population with a strong sense of belonging.

3.3.7. Walkability Score & Transit Score

Walkability, easy and equitable access to transit options, and well-connected, safe and age-friendly bicycle lanes provide communities with options for using active transportation to access services, have higher levels of physical activity, and for recreation. In the context of transportation projects and infrastructure, ensuring that communities have safe active transportation elements is vital.

Walkscore.com allows for the review of an address, neighbourhood, or city's walkability score, transit score, and bike score, of which is ranked on a 100-point system. Walkability, transit, and bike scores rankings are explained in Table 3-22 to

Table 3-24, below.

Table 3-22: Walk Score Rating System

Walk Score Rating	Walk Score Designation	Walk Score Explanation
90 to 100	Walker's Paradise	Daily errands do not require a car
70 to 89	Very Walkable	Most errands can be accomplished on foot
50 to 69	Somewhat Walkable	Some errands can be accomplished on foot
25 to 49	Car Dependent	Most errands require a car
0 to 24	Car Dependent	Almost all errands require a car

Source: Walkscore.com

Table 3-23: Transit Score Rating System

Transit Score Rating	Transit Score Designation	Transit Score Explanation
90 to 100	Rider's Paradise	World class public transportation
70 to 89	Excellent Transit	Transit is convenient for most trips
50 to 69	Good Transit	Many nearby public transportation options
25 to 49	Some Transit	A few nearby public transportation options
0 to 24	Minimal Transit	It is possible to get on a bus

Source: Walkscore.com

Table 3-24: Bike Score Rating System

Bike Score Rating	Bike Score Designation	Bike Score Explanation
90 to 100	Biker's Paradise	Daily errands can be accomplished on a bike
70 to 89	Very Bikeable	Biking is convenient for most trips
50 to 69	Bikeable	Some bike infrastructure
0 to 49	Somewhat Bikeable	Minimal bike infrastructure

Source: Walkscore.com

Table 3-25 below shows walkability, transit, and bike scores for the municipalities within the LSA as per walkscore.com. The City of Mississauga is the most walkable location, while the Town of Caledon is the least. The location with the highest ranked transit score is also the City of Mississauga and the Town of Milton has the lowest ranking. The City of Brampton is ranked to be the most bikeable of the locations, while the City of Vaughan is the least bikeable.

Table 3-25: Walkability, Transit, and Bike Scores (Scores out of 100)

Accessibility Scores	Town of Milton	Town of Halton Hills	City of Mississauga	City of Brampton	Town of Caledon	City of Vaughan	Township of King
Walkability Score	39	30	49	43	NA	35	NA
Transit Score	31	NA	56	53	NA	43	NA
Bike Score	52	39	54	55	NA	44	NA

Source: www.walkscore.com
Notes: NA – Data not available.
The values are accurate as of September 20, 2023.

3.3.8. Transportation and Commuting

Understanding a community's transportation needs and modalities is critical when planning new transportation infrastructure. Mode shift for communities to more active and sustainable methods of transportation is part of Ontario's Transportation Plan for the Greater Golden Horseshoe (MTO, 2022b) and is also desirable from a public health perspective, as active communities are healthier communities. Mode selection can have far-reaching and long-lasting effects on environmental factors such as air quality, noise pollution, climate change, physical activity levels, and the risk of developing acute and chronic diseases (Toronto Public Health, 2013). According to Dora and Hosking (2012), equitable transportation planning and infrastructure growth that enables communities to connect with one another and access their day-to-day activities, goods, and services while simultaneously encouraging physical activity may have the most positive effects on urban health and equity. Transportation systems that provide equitable access to work, education, commodities, and services meet the needs of lower socioeconomic groups, racialized individuals, and immigrant populations (Toronto Public Health, 2013).

Error! Reference source not found. shows the different modes of transportation that are utilized for commuting by the employed labour force within the LSA, in comparison to Ontario. The use of cars, trucks, or vans (i.e., driving) is the most utilized mode of transportation for all of the locations in the LSA, followed by public transit. The Region of Peel has the highest percentage of the sample population using public transit, which is also higher than Ontario. Men in all regional municipalities have a higher utilization of cars, trucks, or vans (i.e., 88.9 % to 91.5%) and bicycles (i.e., 0.3% to 0.6%) when compared to women (i.e., 79.8% to 86.9% & 0.1% to 0.3%, respectively). Alternatively, women are more likely to utilize active or public transportation methods such as public transit (i.e., 5.5% to 13.9%), walking (i.e., 2.9% to 4%), and other methods (i.e., 3.1% to 3.3%) when compared to men in all locations.

Table 3-26: Main Mode of Transportation Used to Commute by the Employed Labour Force (Ages 15 Years or Greater), 25% of Sample Data[1]

Mode of Transportation	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Car, Truck, or Van (%)	85	88.8	88.8	**83.6**
Women+[2]	79.8	86.9	85.5	**79.8**
Men+[3]	88.9	90.4	91.5	**86.7**
Public transit (%)	10.3	4.7	6.1	**8.6**
Women+	13.9	5.5	8.1	**11.1**
Men+	7.5	4.0	4.5	**6.6**
Walked (%)	2.1	3.4	2.5	**4.6**
Women+	2.9	4.0	3.2	**5.6**
Men+	1.5	2.8	1.8	**3.8**
Bicycle (%)	0.2	0.5	0.3	**0.8**

Mode of Transportation	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Women+	0.1	0.3	0.1	**0.6**
Men+	0.3	0.6	0.4	**1.1**
Other Method (%)	2.4	2.7	2.3	**2.4**
Women+	3.2	3.3	3.1	**2.9**
Men+	1.8	2.2	1.7	**1.9**

Source: Statistics Canada 2021 Census

Notes:

1) A sample of approximately 25% of Canadian households receive a long-form questionnaire. All other households receive a short-form questionnaire.
1) "Women＋" includes women (and/or girls), as well as some non-binary persons.
2) "Men＋" includes men (and/or boys), as well as some non-binary persons.

Table 3-27 and Table 3-28 below provide insight into commuting durations and times for the employed labour force in the LSA. Locations in the LSA have commute times typically between less than 15 minutes and up to 44 minutes. The Region of Halton has the highest percentage of commuting trips that are within 15 mins (same percentage as Ontario). Women in all regionals municipalities are more likely to have a commuting duration less than 29 minutes as compared to men, while men are more likely to have a commuting duration greater than 30 minutes in all locations compared to women.

Table 3-27: Commuting Duration for Employed Labour Force (Ages 15 Years or Greater), 25% of Sample Data[1]

Duration of Commute	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Less than 15 minutes (%)	16.7	28.2	19.8	**28.3**
Women+[2]	20.0	33.4	24.0	**32.4**
Men+[3]	14.2	24.0	16.3	**24.9**
15 to 29 minutes (%)	37	30.5	31.7	**33.7**
Women+	37.7	32.8	33.5	**34.5**
Men+	36.4	28.6	30.3	**33.1**
30 to 44 minutes (%)	26.7	22.5	26.6	**20.6**
Women+	23.9	18.9	24.2	**18.6**
Men+	28.8	25.5	28.7	**22.3**
45 to 59 minutes (%)	9.4	9.7	10.9	**8.3**
Women+	8.7	8.1	9.1	**7.3**
Men+	10.0	11.0	12.3	**9.1**
60 minutes and over (%)	10.2	9.1	11	**9.1**
Women+	9.7	6.9	9.2	**7.3**
Men+	10.6	10.8	12.5	**10.6**

Source: Statistics Canada 2021 Census

Notes:

1) A sample of approximately 25% of Canadian households receive a long-form questionnaire. All other households receive a short-form questionnaire.
1) "Women＋" includes women (and/or girls), as well as some non-binary persons.
2) "Men＋" includes men (and/or boys), as well as some non-binary persons.

Table 3-28 shows the various times that populations in each regional municipality choose to leave for their workplaces, in comparison to Ontario as a whole. In general, women tend to start their commutes slightly later than men.

Table 3-28: Time Leaving for Work for the Employed Labour Force (Ages 15 Years or Greater), 25% of Sample Data[1]

	Regional Municipality of Peel	Regional Municipality of Halton	Regional Municipality of York	Ontario
Between 5 a.m. and 5:59 a.m. (%)	7.8	6.5	5.9	**7.8**
Women+[2]	5.1	3.4	3.0	**4.6**
Men+[3]	9.8	9.1	8.2	**10.3**
Between 6 a.m. and 6:59 a.m. (%)	16.4	15.1	14.2	**17.6**
Women+	14.3	11.7	10.8	**14.0**
Men+	18.1	18.0	17.0	**20.6**
Between 7 a.m. and 7:59 a.m. (%)	21.2	24.5	22.2	**23.5**
Women+	22.5	25.2	22.7	**24.2**
Men+	20.2	23.9	21.8	**22.9**
Between 8 a.m. and 8:59 a.m. (%)	19.5	23.7	23.8	**20.7**
Women+	22.3	27.9	27.1	**25.1**
Men+	17.3	20.3	21.1	**17.1**
Between 9 a.m. and 11:59 a.m. (%)	15.7	15.6	21.0	**14**
Women+	17.4	17.7	23.7	**16.4**
Men+	14.4	13.9	18.9	**12.0**
Between 12 p.m. and 4:59 a.m. (%)	19.5	14.4	12.9	**16.5**
Women+	18.5	14.1	12.7	**15.7**
Men+	20.2	14.7	13.0	**17.1**

Source: Statistics Canada 2021 Census

Notes:

1) A sample of approximately 25% of Canadian households receive a long-form questionnaire. All other households receive a short-form questionnaire.
1) "Women+" includes women (and/or girls), as well as some non-binary persons.
2) "Men+" includes men (and/or boys), as well as some non-binary persons.

Table 3-29 shows the commuting destinations of the employed labour force in the LSA, compared to Ontario. The top two commuting destinations are either within the census subdivision of residence or outside of the census division of residence but within the province.

Table 3-29: Commuting Destination for the Employed Labour Force (Ages 15 Years or Greater), 25% of Sample Data[1]

Commuting Destination	Peel	Halton	York	Ontario
Commute within census subdivision of residence (%)	48.5	45.3	36.7	**58.7**
Women+[2]	53.0	50.7	40.8	**63.2**
Men+[3]	44.4	40.1	32.8	**54.4**
Commute to a different census subdivision[4] within census division of residence (%)	19.6	13.4	24.3	**17.3**
Women+	18.3	14.2	24.0	**16.9**
Men+	20.8	12.6	24.6	**17.8**

Commuting Destination	Peel	Halton	York	Ontario
Commute to a different census subdivision and census division[5] within province or territory of residence (%)	31.7	41.1	38.8	**23.5**
Women+	28.5	34.9	35.1	**19.5**
Men+	34.6	47.0	42.4	**27.3**
Commute to a different province or territory (%)	0.2	0.2	0.2	**0.5**
Women+	0.2	0.2	0.2	**0.4**
Men+	0.2	0.2	0.2	**0.5**

Source: Statistics Canada 2021 Census

Notes: Peel = Regional Municipality of Peel; Halton = Regional Municipality of Halton; York = Regional Municipality of York

1) A sample of approximately 25% of Canadian households receive a long-form questionnaire. All other households receive a short-form questionnaire.
2) "Women+" includes women (and/or girls), as well as some non-binary persons.
3) "Men+" includes men (and/or boys), as well as some non-binary persons.
4) As per Statistics Canada a "census subdivision is the general term for municipalities (as determined by provincial/territorial legislation) or areas treated as municipal equivalents for statistical purposes (e.g., Indian reserves, Indian settlements and unorganized territories)".
5) As per Statistics Canada "census divisions are intermediate geographic areas between the province/territory level and the municipality (census subdivision)."

Error! Reference source not found. shows the work environments of the employed labour force in the LSA, compared to Ontario. Municipalities in the LSA primarily work in a usual place of work, followed by working from home. Residents in the regions of Halton and York have slightly higher percentages of working from home as compared to the Region of Peel, which is also lower than Ontario as a whole. Most notably, when more recent data (i.e., 2021) is compared to pre-pandemic data (i.e., 2016), there has been a large increase (almost 4- to 6-fold fold increase) in those who work at home in all locations and for both women and men (i.e., 5.5% to 9.0% v. 28.2% to 38.9%). This increase in working at home in the middle of the pandemic is slightly higher for women as compared to men.

Table 3-30: Place of Work for the Employed Labour Force (Ages 15 Years or Greater), 25% of Sample Data[1]

Place of Work	Peel 2016	Peel 2021	Halton 2016	Halton 2021	York 2016	York 2021	Ontario 2016	Ontario 2021
Worked at home (%)	5.5	28.2	9.0	38.9	8.7	36.1	**7.3**	**29.7**
Women+[1]	5.6	32.1	9.2	42.1	9.1	39.9	**7.4**	**33.3**
Men+[2]	5.5	24.8	8.8	36.0	8.3	32.8	**7.1**	**26.5**
Worked outside Canada (%)	0.7	0.5	0.6	0.5	0.7	0.5	**0.6**	**0.5**
Women+	0.4	0.3	0.4	0.3	0.5	0.3	**0.4**	**0.3**
Men+	0.9	0.8	0.8	0.6	1.0	0.7	**0.8**	**0.6**
No fixed workplace address (%)	12.1	13.6	9.4	9.1	11.5	11.1	**11.1**	**11.8**
Women+	6.8	7.3	5.7	5.0	6.7	5.7	**15.7**	**6.1**
Men+	16.9	18.9	12.9	12.8	16	16.0	**6.3**	**16.9**
Usual place of work[3] (%)	81.7	57.7	81	51.6	79.1	52.3	**81**	**58**
Women+	87.2	60.3	84.7	52.7	83.7	54.2	**84.9**	**60.2**
Men+	76.8	55.6	77.6	50.5	74.8	50.6	**76.4**	**56.1**

Source: Statistics Canada 2021 Census; Statistics Canada 2016 Census.

Notes: Peel = Regional Municipality of Peel; Halton = Regional Municipality of Halton; York = Regional Municipality of York
A sample of approximately 25% of Canadian households receive a long-form questionnaire. All other households receive a short-form questionnaire.

1) "Women+" includes women (and/or girls), as well as some non-binary persons.
2) "Men+" includes men (and/or boys), as well as some non-binary persons.
3) As per Statistics Canada "place of work status refers to whether a person worked at home worked outside Canada had no fixed workplace address or worked at a specific address (usual place of work)".

3.4. Sensitive Receptors

The Project Study Area varies in development from rural, agricultural, and low-density neighbourhoods to medium-density neighbourhoods with parks, schools, community centres, churches, and commercial and industrial properties within 500 m of the Project. The Air Quality Impact Assessment Team has identified many sensitive receptors, including 3,337 locations representing existing and potential future receptors in total. Representative sensitive receptors include residential dwellings, and critical receptors include educational institutions (schools), childcare facilities (daycares), nursing/long-term care facilities, places of worship, etc., along the approximate 59 km of proposed highway (RWDI, 2025a).

Thus, the Study Area is broader than the Right-of-Way (ROW) for the preferred alignment of the proposed Highway 413 to intentionally capture air quality impacts and effects from diverting traffic loads from the adjacent municipalities and surrounding area onto the proposed highway. It also includes a 500-metre buffer to capture air quality impacts from major highway and roads within and close to the edge of the Study Area.

For typical risk assessments of stationary emission sources, relying on predicted ambient air concentrations at the maximum point of impingement from that emission source to evaluate human health risks, particularly chronic risks, is considered a very conservative (i.e., protective) approach. Unfortunately, this approach is not appropriate when considering multiple emissions sources (i.e., gasoline and diesel vehicles) moving along a transportation corridor. This requires complex air dispersion modelling to evaluate regional emission impacts of vehicles travelling on the corridor to individuals living, working or playing in the surrounding Study Area. To address this within the standard risk assessment paradigm, the most appropriate approach would be to evaluate exposures from modelled air concentrations for each chemical of concern and potential health risks at several specific selected receptor locations within the Study Area. As these modelled concentrations include the contributions of emissions from a variety of sources within and outside (i.e., contribution of background sources) of the Study Area, they provide a more accurate reflection of cumulative exposures experienced by residents located in a general area of the Study Area represented by a specific receptor location.

It is not possible to consider exposures to every person (human receptor) at all locations within the Study Area. On the other hand, it is important that the assessment is sufficiently comprehensive to ensure that overall risks have been adequately addressed. The Study Area is composed of a mixture of residential, commercial/industrial, and community land uses. Therefore, several receptor locations representative of residential, commercial, and community use receptor locations for a broad section of the Study Area were selected for the quantitative evaluation. Potential exposures and health risks for the assessed chemicals were based on air dispersion modelling conducted by the Air Quality Team for large number of discrete receptor locations throughout the Study Area, including 3,337 locations representing existing residences, educational institutions (schools), childcare facilities (daycares), nursing/long-term care facilities, places of worship, etc., along the approximate 59 km of proposed highway (RWDI, 2025a).

Ground-level air concentrations for each of the chemicals of concern will be modelled by the Air Quality Team with these values used to represent chemicals exposures as part of the SLHHRA.

3.4.1. Impacts to Population Sub-Groups

Certain population groups may be impacted due to the Project and associated infrastructure, including:

- Those who do not drive and/or commute by transit;
- Lower socioeconomic groups; and
- Individuals with chronic illnesses.

The addition to the proposed future transitway alongside the Highway 413 Transportation Corridor will benefit individuals who do not drive and/or rely mainly on public transit for commuting (i.e., no licence, older adults, people with disabilities, lower income individuals, recent immigrants, etc.) and rely on alternative modes of transportation to complete their daily routines. The proposed future transitway will provide additional transportation methods and options for those who do not drive, allowing for increased mobility. Individuals who rely on transit to commute may also experience similar benefits as the corridor will improve transit and commuting experiences. Across Canada, generally, women, youth, individuals with lower incomes and racialized individuals tend to use transit more (Hosford and Winters, 2022).

Individuals with lower income tend to have multiple jobs and sources of income (Statistics Canada, 2019; Statistics Canada, 2022c), and the Project and the associated transitway may provide benefits as commute times may be reduced. Also, in the last two decades in Canada, there has been a consistent higher prevalence of multiple jobholding among women in comparison to men, with a greater increase over time observed among the female population (Statistics Canada, 2019). Hence, any reduction in commute times may allow for individuals to better utilize their working hours as time constraints due to travel may be reduced. Additionally, shorter travel times allow for an increase in time budgeted for alternative leisure activities, which can positively benefit mental health and increase social cohesion (Section 4.4).

Additionally, commuting in high volume traffic can be extremely stressful for some individuals and can negatively affect mental health and wellness (Section 4.10). As such, individuals who experience difficulties with mental health may benefit from the Project and the associated proposed future transitway, as they provide an alternative transportation method. Once operational, if the Project maintains free-flowing traffic in the future, stress levels could potentially be reduced, ultimately easing an area of daily mental strain (i.e., traffic) that some individuals may experience. For those with chronic respiratory challenges, any potential air quality changes due to the Project may impact their health and wellbeing (also see Section 4.3).

3.5. Conclusions from the HHI Scoping Phase

The HHI Scoping Phase identified broad human health implications due to the Project, provided a high-level baseline community health profile of the study area, and identified preliminary potential impacts due to the Project at a high-level.

The Baseline Community Health Profile presents high-level information on the overall current sociodemographic and health status of the LSA. The LSA includes the Regional Municipality of Halton, the Regional Municipality of Peel and the Regional Municipality of York. Baseline health information is also provided in the LSA for Indigenous communities listed in the consultation plan referred to under subsection 4(1) of the *Highway 413 Act, 2024*. The purpose of the baseline health profile is to provide

context for the Assessment Phase, by describing at a high level how healthy the local population currently is, in comparison to other areas of Ontario, and identifying the health issues of top concern. Data from the following sources was utilized in the preparation of the baseline community health profile:

- Statistics Canada 2021 Census Profile;
- Statistics Canada 2022 Health Characteristics;
- York Region Public Health;
- Peel Public Health;
- Halton Region Public Health;
- Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC);
- Ontario First Nations Regional Health Survey Phase III (Chiefs of Ontario, 2019);
- Walkscore.com; and
- Other publicly available reputable open data sources.

The Baseline Health Profile suggests that:

- The percentage of visible minorities in all regional municipalities in the LSA are higher than Ontario as a whole. Additionally, all the municipalities report lower percentages of Indigenous peoples than Ontario.
- For all the First Nations included in this assessment, there is a greater percentage of registered First Nations individuals residing off-reserve rather than on their own or on other reserves.
- All three regional municipalities have a similar proportion of older adults (i.e., ages 75- 99 years old), and the Regions of Halton and York have a slightly higher proportion of the population between 0-19 years in comparison to the Region of Peel.
- Among the Indigenous communities, Beausoleil First Nation and Chippewas of Rama First Nation have the highest percentages of the population between the 0-19 age range.
- Compared to Ontario as a whole, households within the regional municipalities in the LSA have a higher median income.
- The regional municipalities, except for Halton, have higher unemployment, employment, and labour force participation rates than Ontario as a whole.
- The Indigenous communities included in this assessment all have higher rates of employment when compared to Ontario and are similar or higher than the regional municipalities in the LSA.
- The municipalities within the LSA all have a higher percentage of individuals who own their homes, as opposed to renting, when compared to Ontario as a whole. Although there is a higher number of homeowners, there is also a higher percentage of people spending greater than 30% or more of their income on shelter within the regional municipalities in the LSA as compared to Ontario as a whole.
- Information related to the overall burden of disease for Indigenous communities was available for people identifying as First Nations living on-reserve who participated in the Regional Health Survey in Ontario, and for municipalities it was available at the level of the regional health unit. These data indicate that First Nations in Ontario have the highest burden of disease for all illnesses including,

arthritis, diabetes, asthma, mood disorders[3], and high blood pressure when compared to Halton Regional Health Unit, Peel Regional Health Unit, York Regional Health Unit and Ontario as a whole.
  - Females in all regional municipalities have higher rates of arthritis when compared to males. Males in all locations have higher rates of diabetes when compared to women.
- Compared to Halton Regional Health Unit, Peel Regional Health Unit, York Regional Health Unit and Ontario as a whole, First Nations in Ontario have the highest rate of adults self-reporting as obese.
- When considering transportation, commuting and the use of public transit, the regional municipalities in the LSA have a higher percentage of people who utilize cars, trucks, or vans as their primary mode of transportation to commute, and lower percentage of those who use public transit to commute when compared to Ontario as a whole, except for the Regional Municipality of Peel.

The Air Quality Impact Assessment identified that although traffic on the Highway 413 would increase, overall traffic speeds would be higher (in the 2041 Build Scenario) leading to a decrease in air emissions (as compared to the "No Build" Scenario) for every vehicle km travelled. Additionally, the HHI Scoping Report identified the potential contaminants of concern that would be carried forward into the SLHHRA for assessment: CO, NO_2, $PM_{2.5}$, PM_{10}, Acetaldehyde, Acrolein, Butadiene, 1,3-, Benzene, Benzo(a)pyrene, Formaldehyde, and diesel particulate matter.

The main determinants of health scoped into the HHI Study for this Project, based on all feedback received related to human health include air quality & climate change, noise levels & vibrations, addition of active transportation elements & levels of physical activity, mental health & wellness, employment, social cohesion, traffic congestion & delay, traffic-related safety, neighborhood resources, food security and access to local healthy food sources, access to traditional foods and lands and ability to harvest and engage in cultural practices due to racism and colonialism. During the Scoping Phase, a short synopsis for each of these determinants of health was provided in the HHI Scoping Report identifying the health linkages between these determinants of health and transportation infrastructure like the Project.

A key takeaway based on the scoping-level assessment conducted in the HHI Scoping Report is that as the population within the study area and within Ontario continues to grow, new transportation infrastructure will help move residents within the Study Area as well as Ontarians. To reduce congestion and mitigate impacts to air quality and climate change, an important aspect of this transportation infrastructure should be the inclusion of multi-modal corridors that prioritize public transit and safe active transportation along roadways and highways. Planning and allowing for multiple modes of transportation can provide multifaceted benefits to those residing within these areas.

To better understand the human health implications due to the Project, the next step for the Highway 413 HHI Study is the Assessment Phase (Section 4), which includes an SLHHRA of potential air quality impacts, evaluating and characterizing Project-related impacts to health using a GBA Plus approach (a broader health assessment), and providing recommendations to enhance potential positive health impacts and mitigate potential negative health impacts.

3.6. Determinants of Health to be Assessed in the HHI Study

During engagement with Indigenous communities and regional and municipal stakeholders, the health issues of most concern were identified and then assessed in the HHI Study. Apart from being concerned about project-related impacts to the environment related to air quality and water quality, which tend to

[3] Population aged 12 and over who reported that they have been diagnosed by a health professional as having a mood disorder, such as depression, bipolar disorder, mania, or dysthymia (Statistics Canada, 2021).

be regional issues and more thoroughly assessed in studies dedicated to evaluating changes in these media (i.e., air quality study and the SLHHRA, and water quality study, respectively), stakeholders and Indigenous communities were concerned about potential impacts of the Project on the following broader health determinants:

- Active transportation and levels of physical activity
- Noise levels
- Climate change
- Social cohesion
- Traffic congestion and delay
- Traffic-related safety
- Access to neighbourhood resources
- Food security, including access to local healthy food sources
- Access to traditional foods and lands and ability to harvest traditional foods
- Mental health and wellness
- Human trafficking
- Potential Impacts to Indigenous cultural practices

The determinants of health, are the conditions in which we are born, grown, live, work and age (WHO, 2012). They are shaped and influenced by the distribution of power at the local, regional, national and global levels. Hence, the Assessment Phase evaluated how the Highway 413 would impact or change the above listed determinants of health and the potential impact on health as a result.

4. HHI Study Assessment Phase

The Assessment Phase involves preparation of a SLHHRA of air quality impacts (see report under separate cover), as well as the assessment of the potential broader health impacts due to changes to the determinants of health identified in the HHI Scoping Phase. Recommendations to enhance potential positive impacts and mitigate potential negative ones are also made in the Assessment Phase.

For the analysis of the selected determinants of health, relevant information includes: information and data from technical studies/assessments (e.g., land use, traffic, air quality, socioeconomics, climate change, noise, etc.); data on current conditions in the Study Area, where readily available; and, published peer-reviewed and grey literature identifying why and how impacts to the determinant of health changes health. Broadly, the following assessment approach was for each of the health determinants assessed in the HHI Study:

Health Context/ Linkages – making the connection to health

The first step in assessing potential health impacts is to identify the connection between a determinant of health and health, in the context of the Project. For each determinant of health, a description of how the determinant is relevant to health and well-being outcomes in the context of the Project is provided. Where available, both peer-reviewed and grey literature data on potential health impacts due to major transportation infrastructure projects like the Project is provided.

Current Conditions

In order to understand how the Project may change or affect the determinant of health, it is important to consider what the baseline or the current conditions for that particular determinant of health are. Much of this information is provided in Section 3.3, the Baseline Health Profile.

Project Impact

Using information from the relevant studies/assessments conducted on and for the Highway 413 Project, as well as the peer-reviewed and reputable grey literatures, an assessment was conducted for the selected determinants of health on the overall potential for health impacts due to the Project.

4.1. Levels of Physical Activity and Addition of Active Transportation Elements

4.1.1. Health Context / Linkages– Why is it Important to Consider the Health Impacts of Physical Activity and Active Transportation

Active transportation methods or human-powered travel can improve public health and help to support healthy communities (Government of Canada, 2014; MTO, 2022b). Participating in active transport such as walking, cycling, or skateboarding can reduce rates of chronic disease, improve mental health, reduce greenhouse gas emissions, and reduce traffic congestion (Government of Canada, 2014).

The addition of active transportation methods to transportation infrastructure can increase levels of physical activity, due to individuals utilizing human-powered modes of transport to travel to work or leisure activities (Reynolds et al., 2010). Those individuals who utilize active transport regularly in place of motor vehicular transport show increases in overall minutes of physical activity per/day or per/week (Reynolds et al., 2010). Furthermore, it has been shown that those who commute utilizing active transport, on average, engage in more physical activity than those who use motorized transportation (Oja et al., 1998).

In addition to active transport increasing levels of physical activity, it has also been shown to reduce energy consumption and greenhouse gas emissions, reduce national healthcare costs, reduce traffic volumes, improve quality of life, and create more accessible neighbourhoods (Reynolds et al., 2010).

Due to the physical activities required to access public transportation (such as walking to a bus stop or train station), users of public transportation (such as buses and trains) participate in more total physical activity than non-users and more frequently fulfill daily physical activity requirements (≥30 min/day) on most days (Besser and Dannenberg, 2005; Freeland et al., 2013). The addition of public transit to highway infrastructure has been shown to have benefits related to increased physical health, improved mental health, improved basic access to medical care, improved access to healthy foods, and can reduce financial stress due to public transportation affordability (Litman, 2012). Other active transportation means, such as walking and cycling, generally improve physical and mental health, but vulnerable subgroups such as low-income communities, people of color, and older adults may face unique challenges and disparities in accessing its benefits. While active transportation can increase physical activity and reduce the risk of chronic diseases, some groups experience greater barriers or negative impacts due to factors like inadequate infrastructure, safety concerns, and lack of access to suitable transportation options (Mizdrak et al., 2023).

4.1.2. Current Conditions

The Study Area currently contains hundreds of community centers and parks which include ice rinks, gymnasiums, pools, sports fields, splash pads, and/or multi-purpose rooms, all of which promote physical activity in a community.

Municipalities surrounding Highway 413 have reported that efforts are being made to advance and promote active transportation programs (MTO et al., 2023). The regions or York, Halton and Peel are all serviced by commuter rail (freight and passenger), and multimodal networks which include both bus and

light rail. GO Transit passenger rail services operate throughout the Highway 413 municipalities, in addition to VIA Rail offering services that connect to the Canada-wide VIA Rail network.

The Growth Plan for the Greater Golden Horseshoe (Government of Ontario, 2020) highlights the need for specific policies related to active transportation in the Growth Plan in Section 3.2.2:

The transportation system within the GGH will be planned and managed to:

a) provide connectivity among transportation modes for moving people and for moving goods;
b) offer a balance of transportation choices that reduces reliance upon the automobile and promotes transit and active transportation;
c) be sustainable and reduce greenhouse gas emissions by encouraging the most financially and environmentally appropriate mode for trip- making and supporting the use of zero- and low emission vehicles;
d) *offer multimodal access to jobs, housing, schools, cultural, and recreational opportunities, and goods and services.*

4.1.3. Project Impact

During engagement, stakeholders from regional and local municipalities along the Study Area expressed concerns regarding the impact of the Project on healthy development and healthy living. They expressed concern that car-centric and automotive-dependent communities can lead to sedentary lifestyles and ultimately more health challenges in the longer term.

Although MTO does have plans for the inclusion of a multiuse path adjacent to the Highway 413 corridor within the ministry's right-of-way, it is not assessed as part of this EIA study, and will be evaluated in the future. To integrate active transportation elements within the current Project, bridges spanning the Highway 413 corridor will integrate active transportation elements, aligning with planned or existing municipal active transportation features, in accordance with engineering best practices (MTO et al., 2023).

MTO is also exploring opportunities to integrate active transportation in its design work and discussions with municipalities, particularly at locations where local roads intersect with the highway, such as multi-use paths or pedestrian bridges. The ministry has engaged in discussions regarding a multiuse path with the Ministry of Energy and the Independent Electricity System Operator.

Based on current Project design, it is not fully known where and what shape MTO's plans for active transportation elements along the Highway 413 corridor will take, however, it is understood that the more the Project can contribute to increased physical activity via use of active transportation methods, the greater will be the benefit to health of communities around the corridor.

4.1.4. Mitigation / Enhancement Measures

At locations where local roads intersect with the highway, such as multi-use paths or pedestrian bridges, having crossings that accommodate the needs of those with disabilities is essential.

Overall, MTO is encouraged to consider, together with the respective municipalities, how the use of multi-use paths or pedestrian bridges accessible by users of all abilities and ages in different sections of the corridor can be further enhanced so as to achieve the objectives related to active transportation set out in the provincial Growth Plan (Government of Ontario, 2020).

4.2. Noise Levels

4.2.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Noise

Noise is typically defined as any unpleasant or unwanted sound, and as such noise pollution is “the noise beyond the permissible limits” (Singh et al., 2017). The WHO has reported that “noise is an underestimated threat that can cause a number of short- and long-term health problems” (WHO, 2010). Noise pollution caused by vehicular traffic is known to be associated with adverse effects to human health and is a rising hazard due to rapid urbanization and growth of traffic loads (Khreis et al., 2017, Singh et al., 2017). Communities of people who live near areas or roadways with high traffic volumes are exposed to noise pollution and can be at risk for potential health impacts (Singh et al., 2017). High levels of traffic noise has been linked to various adverse impacts to human health including irritation, annoyance, sleep disturbances, cardiovascular disease, risk of stroke, diabetes, hypertension, and loss of hearing (Singh et al., 2017).

According to the noise/stress concept proposed by Babisch (2002), noise exposure leads to adverse health effects through two primary pathways: the "direct pathway", which refers to exposure to extreme high decibel levels (>100 dB(A)), resulting in direct damage to the ear organ, and the "indirect pathway", which pertains to exposure to lower decibel levels (50–70 dB(A)), which negatively affects daily activities, sleep, and communication (reviewed in Hahad et al., 2025). Sleep disturbance is significantly associated with mental health issues, such as anxiety and depression (Alvaro et al., 2013; Hahad et al., 2025). The reduction in decibel levels results in sympathetic and endocrine activation, along with various cognitive and emotional stress responses including annoyance, depressive-like states, and mental stress (reviewed in Hahad et al., 2025). Noise annoyance, defined by feelings of displeasure and discomfort, may lead to heightened stress levels and the onset or worsening of mental health conditions (Hahad et al., 2019; 2025). Figure 4-1 below summarizes the potential links between noise-related stress and mental health impacts, which can lead to maladaptations and behavioural changes.

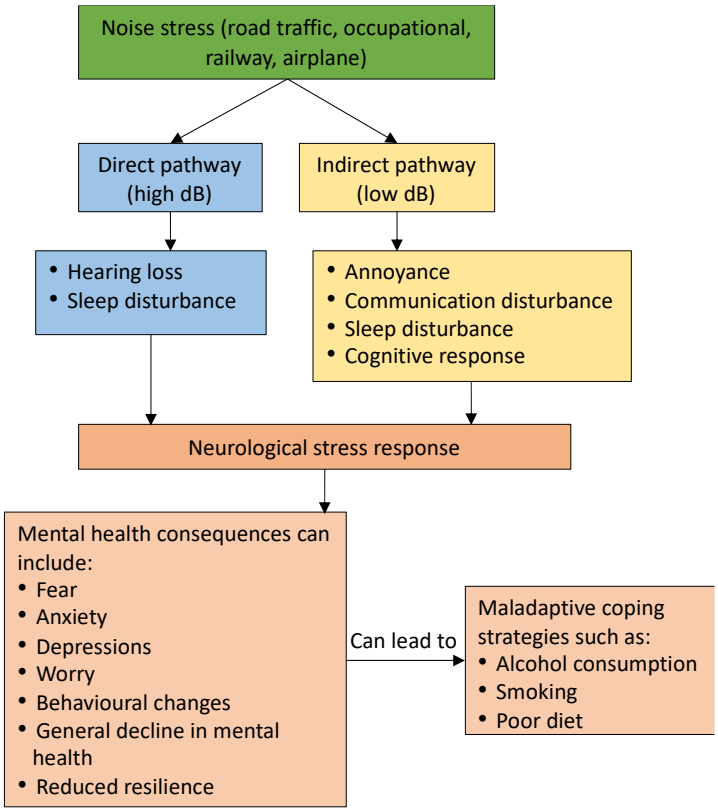

Figure 4-1: The Potential Mental Health Consequences of Noise and Noise-related Stress (Adapted from Hahad et al. (2025)

4.2.2. Project Impact

Health Canada's guidance (Health Canada, 2016) identifies suggested Mitigation Noise Levels (MNLs) for construction sound levels. When exceeded, Health Canada recommends the implementation of mitigation measures to reduce the potential for community complaints. In the noise assessment completed by RWDI, these MNL values were used as a threshold to determine if mitigation should be implemented for the construction activities (RWDI, 2025b). Along the Highway 413 Study Area, land uses can be identified as quiet suburban or rural, normal suburban, urban residential, noisy urban, or very noisy urban (RWDI, 2025b). Table 4-1 below shows the MNLs for each classification. Exceeding the classification MNLs may lead to complaints, hence mitigation is required.

Table 4-1: Construction Sound Level Criteria (from RWDI, 2025b)

Classification	Mitigation Noise Levels (MNLs), dBA Ldn
Quiet Suburban or Rural	47
Normal Suburban	52
Urban Residential	57
Noisy Urban	62
Very Noisy Urban	67

As per the DRAFT Noise Assessment, most receptors are predicted to experience construction-related sound levels exceeding the MNLs (RWDI, 2025b). Predicted sound levels at most sensitive receptors

were above Health Canada's MNL values, both with and without pile driving activities which necessitates the need to consider mitigation measures (RWDI, 2025b).

The population sub-groups who may be disproportionately impacted by excess noise levels include older adults, children, pregnant women, and individuals with chronic illnesses.

4.2.3. Mitigation / Enhancement Measures

Mitigation with noise barriers was evaluated using barrier locations that satisfied the administrative feasibility criteria. Noise control measures, where introduced, should achieve a minimum of 5 dBA attenuation averaged over first row receptors. All of the mitigation measures recommended in the Noise Assessment (RWDI, 2025b) are re-iterated from the perspective of health protection:

- Abide by Municipal by-laws where practicable;
- Minimize vehicle idling time and/or maximize distance between noise sensitive areas and idling vehicles;
- All construction equipment should be operated with effective muffling devices that are in good working order;
- Enforce on-site speed limits;
- Use equipment with broadband backup beepers instead of the common tonal backup beepers where possible;
- Use local noise barriers when in proximity to noise sensitive areas (i.e., using acoustic blankets around drivers);
- Implement a documented, regular inspection and maintenance program to ensure all equipment is in proper working order, as deterioration may increase equipment sound and vibration levels;
- Develop and implement a Stakeholder Communication and Complaint Process. The process should be developed in accordance with any MTO requirements;
- Develop and implement a Construction Monitoring Program to validate complaints and minimize off-site effects;
- Reduce the number of equipment pieces operating at the same time; and,
- Reduce the operating time of equipment.

In addition, it is recommended that MTO communicate with neighbourhoods where noisy construction-related activity is going to take place via dropping off pamphlets (or other methods) to let residents know the duration and timing (e.g., during the day) of construction activities. This will allow residents to be prepared for noise related to construction activities.

Similarly, it is recommended that MTO consult with Indigenous communities to understand potential impacts on traditional harvesting practices of Indigenous communities from construction noise-related disturbances to wildlife and fish, and where appropriate, develop accommodation measures.

4.3. Climate Change

4.3.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Climate Change

Climate change is defined as a change in global or regional climate patterns, primarily attributed to increased atmospheric concentrations of GHGs (Government of Canada, 2021). GHGs have the potential to affect future climate as they contribute to the greenhouse effect by absorbing infrared radiation in the atmosphere, increasing temperature, and changing weather patterns (Government of Canada, 2015). Transportation projects and policies can have impacts on climate change, whether it be related to creating heat islands or rising temperatures due to GHG emissions from vehicles (Zhang et al., 2013; Gago et al., 2013 & Estrada et al., 2017). For instance, increasing road capacity typically is related to the increase in impervious surfaces, like asphalt and concrete, which are known to increase local temperatures (Zhang et al., 2013; Gago et al., 2013). Additionally, traffic related air pollution such as methane, nitrous oxide, and carbon dioxide, are known for also increasing temperatures due to the greenhouse gas effect (Petralli et al., 2014; United States Environmental Protection Agency, 2016).

This impact of increasing local temperatures and additional GHG emissions can contribute to climate change. Some neighbourhoods with higher proportion of paved areas will be disproportionately affected by the rising temperatures and the heat island effect, as they will have fewer opportunities to seek refuge in shaded areas and fewer green spaces. There is not a uniform distribution of cool and shaded locations across different municipalities in the Study Area.

Heat-related illnesses are likely in individuals who are more susceptible to heat-related illnesses during heat events especially elderly people, children, pregnant women, and those who have various chronic illnesses.

4.3.2. Project Impact

Based on preliminary draft GHG assessment (RWDI, 2022), GHG emissions were estimated for construction activities based on the preliminary design. The estimates were based on construction activities and the associated equipment, including their respective fuel consumption and hours of operation to complete each activity (RWDI, 2022). The average annual net emissions, which includes the direct emissions from construction equipment, are estimated to be 19,600 tonnes of CO_2e per year. As construction is estimated to take approximately 10 years to complete, total preliminary construction emissions are estimated at about 196,000 tonnes CO_2e (RWDI, 2022). Construction is not anticipated to require any acquired energy and avoided domestic emissions and off-set credit measures have not been considered at this preliminary stage (RWDI, 2022). These estimate emissions are being refined, as necessary, along with the consideration of land use change impacts.

The maximum annual emissions for operations phase of the project are projected to be about 23 kilotonnes CO_2e/year, which is 0.02% of the 2020 Ontario-wide annual emissions, and 0.003% of the 2020 Canada-wide emissions (MTO et al., 2023). This value is based on a comparison between the 'no-build' and 'build' scenarios within the RSA which accounts for the traffic diversion (e.g., shift from arterial and highway to the new freeway). The maximum annual emissions make up approximately 0.02% of Ontario's 2030 emission targets, and 0.006% of Canada's 2030 emission targets (MTO et al., 2023). This differs from the maximum annual emissions typically calculated by MTO, which reflects the total GHG emissions from all vehicles travelling on the proposed project.

Hence, based on the projections from the climate change assessment provided above, the project's specific impact to GHG emissions and climate change may not be much different from the land use changes expected in the Study Area without the Project. As such, it is not expected that the Project would have a major impact on health due to changes in GHG emissions that would not already occur even without the Project.

The population sub-groups who may be disproportionately impacted by climate change include older adults, children, pregnant women, Indigenous peoples, individuals with chronic health conditions, and individuals with disabilities and/or mobility challenges.

4.3.3. Mitigation / Enhancement Measures

During engagement with stakeholders and Indigenous communities, one of the prominent concerns expressed was related to reducing the heat-island effect in the Study Area due to the amount of surface area that would be paved as a result of the Project. As such, the following mitigation measures are proposed that may limit the heat-island effect, or offset it:

- Promoting increased vegetation planting along the highway;
- Minimization of traffic and establishment of speed limits during construction (e.g., promoting carpooling for movement between locations within the construction site);
- Promoting carpooling by having an HOV lane in either direction on the Highway 413;
- Ensuring that construction and maintenance vehicles, machinery, and equipment are equipped with current emission controls and are in good repair;
- Utilizing idle reduction construction and maintenance vehicles;
- Employing electric construction and maintenance vehicles, such as electric pick-up trucks, whenever feasible;
- Utilization of sustainable, renewable, and recycled materials during construction while investigating methods to reduce waste;
- Employing traffic calming methods in the arterial roads during Operations phase; and
- Employing construction techniques that enhance the efficiency of vehicles navigating through construction zones.

4.4. Social Cohesion

4.4.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Social Cohesion

Social cohesion refers to "the extent of connectedness and solidarity among groups in society" and is related to a sense of belonging in a community and relationships among community members (Manca, 2014). Social cohesion is an important indicator of health, as a lack of social support and increased social isolation has been shown to lead to poor physical and mental health (Stansfeld et al., 2006).

In general, transportation networks connect people and communities and can increase social cohesion. However, poorly functioning transport corridors can have downsides. For example, Putman (2000) suggested that long commutes reduce community involvement. When travelers spend increased time intervals commuting, it results in less time for outside activities, such as extracurriculars or community

engagement (Putman, 2000), which can impact mental health and social cohesion. This can influence other community members to not participate due to the absence of their neighbours, thus creating a domino effect (Putman, 2000).

Additionally, it has been shown that increased commuting times by car was associated with reduction in social participation (Mattison et al., 2015). Congestion and commuting can result in vehicles operating for longer periods of time and thus requiring increasing maintenance, which can lead to a decrease in available household funds for activity expenditures (US Department of Transportation, 2020). Transport corridors that cut through communities can also negatively impact social cohesion within that community.

4.4.2. Current Conditions

As seen in Table 3-21, communities covered under Halton and Peel Region Health Units have slightly higher than the provincial average rates for 'sense of belonging to local community' and York Region communities have slightly lower than provincial average rates. However, Indigenous communities, in general, report a much higher rate of belonging to one's community.

4.4.3. Project Impact

The impacts of the Highway 413 Project on social cohesion and the resulting health impact in the Study Area will depend on the level of free-flowing traffic (see Section 4.4.4 below) and its impact to the fragmentation of communities within the Study Area.

In some areas of the proposed corridor, Highway 413 passes through rural areas where not a lot of commuting occurs. However, in the areas in the municipalities where the Highway 413 bisects existing neighbourhoods and communities, there will be disturbed social cohesion, as these residents may need to find alternate routes of connection within the community. For low income households without access to a car, this can be an issue, leading to potential negative impacts to health.

Overall, the perception of the project itself within communities may play a role in determining social cohesion due to the project. For example, in communities where community members are highly divided on their support for the project, the Highway 413 may, temporarily, lead to reduced social cohesion and some negative health impacts.

Lastly, Highway 413 has the potential to provide better, faster and easier connection between different areas within the Greater Golden Horseshoe (e.g., improved connection between Milton and Newmarket), which can boost social cohesion and improve health and wellbeing.

4.4.4. Mitigation / Enhancement Measures

The following mitigation measures are proposed:

- Traffic conditions in the Highway 413 corridor, and in the arterial roads that feed into and out from the corridor, should be optimized to allow for free-flowing traffic as much as possible;
- Consider how to work with municipal partners and stakeholders to ensure that land-use planning promotes transit and active transportation use and reduces the risk of induced demand; MTO is encouraged to consider HOV lanes to promote car-pooling, which will improve social cohesion;
- In areas where the Highway bisects a community and areas of communal gathering (e.g., a community centre that may cut off from some part of a community), MTO should consider alternate ways of connecting the community (i.e., a bridge);

- Focus on discussing identified mitigation measures with stakeholders and municipalities to ensure buy-in and more collaborative decision-making.

4.5. Traffic Congestion and Delay

4.5.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Traffic Congestion

Traffic congestion is typically defined as "excess of vehicles on a portion of roadway at a particular time resulting in speeds that are slower and is also referred to as stop-and-go traffic" (US Department of Transportation, 2020). Traffic congestion can often be exacerbated by physical highway features such as physical bottle necks, in addition to increased traffic demand (US Department of Transportation, 2020).

Congestion on roadways can impact a diverse variety of road users, including truckers, businesses, and residential households (US Department of Transportation, 2020). If congestion leads to delays in trucking, it can result in less reliable pick-up and delivery times increasing cost for both shippers and consumers (US Department of Transportation, 2020). Delays due to congestion impact business as it can affect business hours, perishable deliveries, inventory, and labour costs (US Department of Transportation, 2020).

There is data regarding both positive and negative impacts of major transportation infrastructure and the results of alleviation of traffic congestion. A positive outcome related to reduced traffic congestion through roadway expansion is a reduction in pollution and greenhouse gas emissions due to lessened congestion and shorter travel times (Handy & Boarnet, 2014). The caveat to the reduction in traffic congestion is that additional capacity can promote new vehicles to use the travel corridor. This is known as 'induced demand' (Handy & Boarnet, 2014; Duranton and Turner, 2011). Simply put, expansion of transportation infrastructure may increase travel volumes that can result in additional traffic congestion (Handy & Boarnet, 2014; Duranton and Turner, 2011).

Additionally, congestion and delay affect households as families often rely upon "time budgets" which can be negatively impacted due to high travel times (US Department of Transportation, 2020). It is important for congestion and travel times to be a consideration of governments as they can impact economies, affect where people choose to live, and reduce individuals' quality of life (US Department of Transportation, 2020).

4.5.2. Current Conditions

It has been noted by stakeholders that as communities grow in the Study Area, such as Halton Hills and Vaughn, traffic congestion is beginning to emerge as a concern (MTO et al., 2023). Concerns related to the increases in traffic congestion were especially noticeable during peak hours of the day, may be related to the observation of increases in commuters from Georgetown to Toronto (MTO et al., 2023).

The following locations within the Study Area have been identified as areas that experience traffic congestion and/or delays (MTO et al., 2023):

- Township of King, Highway 27 – identified for higher volumes and traffic slowdowns.
- Credit River crossing locations and Hurontario Street – identified as main traffic pinch points within Mississauga.
- Vaughan, most east-west arteries – identified as experiencing significant traffic congestion.

4.5.3. Project Impact

The Highway 413 Project will provide a new transportation corridor between the growing regions of York, Peel and Halton, located within the Greater Golden Horseshoe. The Greater Golden Horseshoe is an area in the Province that is expected to see significant population growth in the coming years. This growth is anticipated regardless of whether Highway 413 proceeds. Highway 413 will attract auto trips from local roads as well as the broader transportation network. The Highway 413 is being designed to meet the capacity needs in the year 2041. As with any facility, at times, particularly around morning and evening commutes, the facility may become congested. The congestion may worsen over time as the population increases past the growth assumed for studies completed as part of the effects assessment for the Project. This possibility, i.e., 'induced demand' (Duranton and Turner, 2011) was a concern expressed by stakeholders, who have also raised concerns that the Project may contribute to suburban sprawl. However, understanding of municipal development plans along the Highway 413 corridor reveal that development in the area will occur with or without the project, as municipalities have designated significant portions of the land in the study area for development.

Highway 413 is likely to encourage more car-based travel, including non-commute trips. The highway could spur the development of big-box retail, logistics hubs, and service centers along its corridor. This might increase the number of non-commute destinations accessible by car. For low income households without access to a car, this can be an issue, leading to potential negative impacts to health.

Based on the traffic assessment conducted for the Project (WSP, 2025), with the Highway 413, there can be expected to be more localized traffic volume in the peak AM and PM hours on the highway itself as drivers get to the highway (see Figure 4-2 and Figure 4-3; WSP, 2025). In these figures, the red lines indicate decreased traffic volume, and the blue lines and the purple corridor indicate increased traffic volume. As seen in the figures, it is expected that Highway 413 may draw some traffic volume away from the 407 and may also reduce some traffic volume along the arterial roads north and south of the corridor (WSP, 2025). However, there are some areas along the Highway 413 corridor that may see increased traffic volume, including some arterial roads in King City.

Also, as can be seen between the figures, there is not much difference in traffic volume between peak AM and PM times.

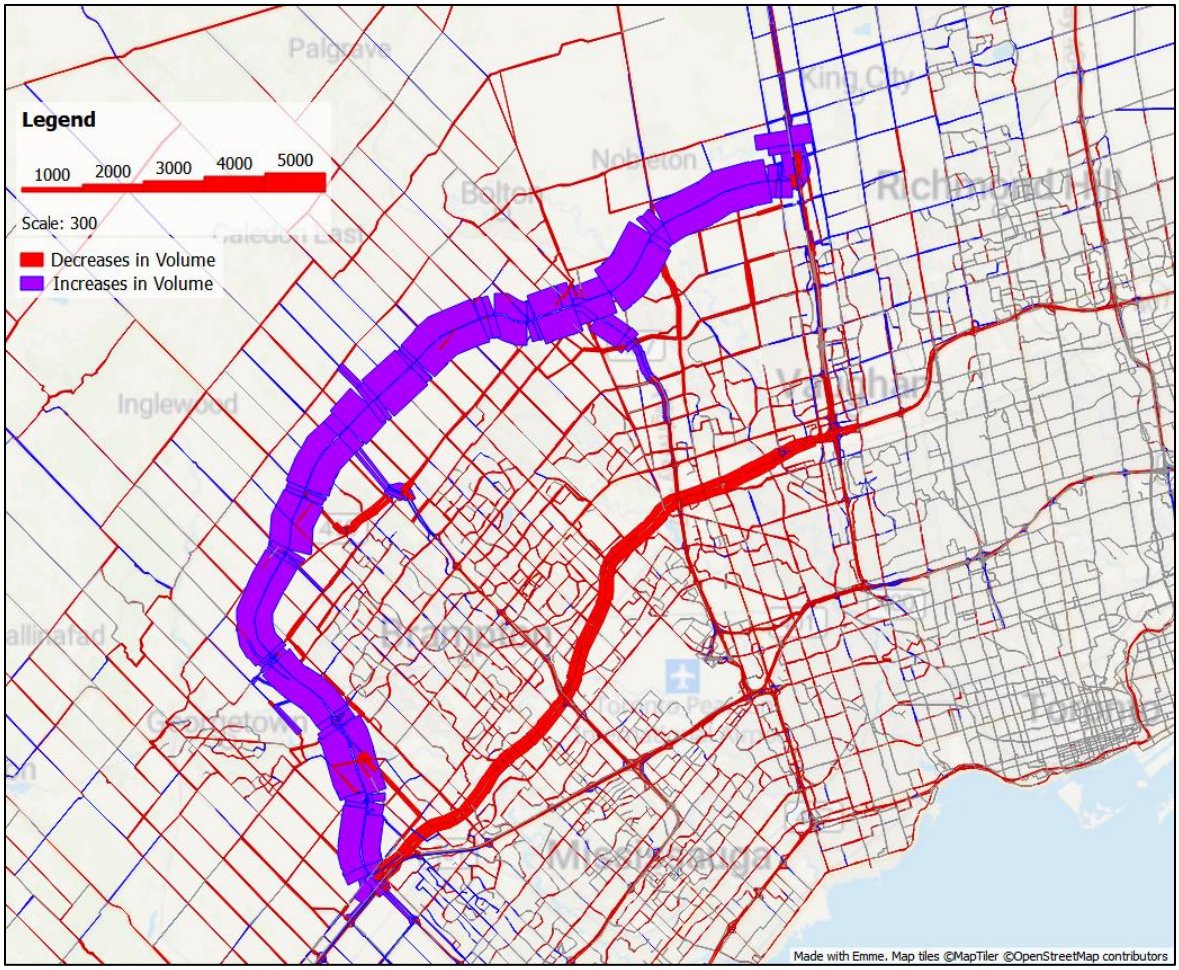

Figure 4-2: Changes in Traffic Volume With Highway 413 – AM

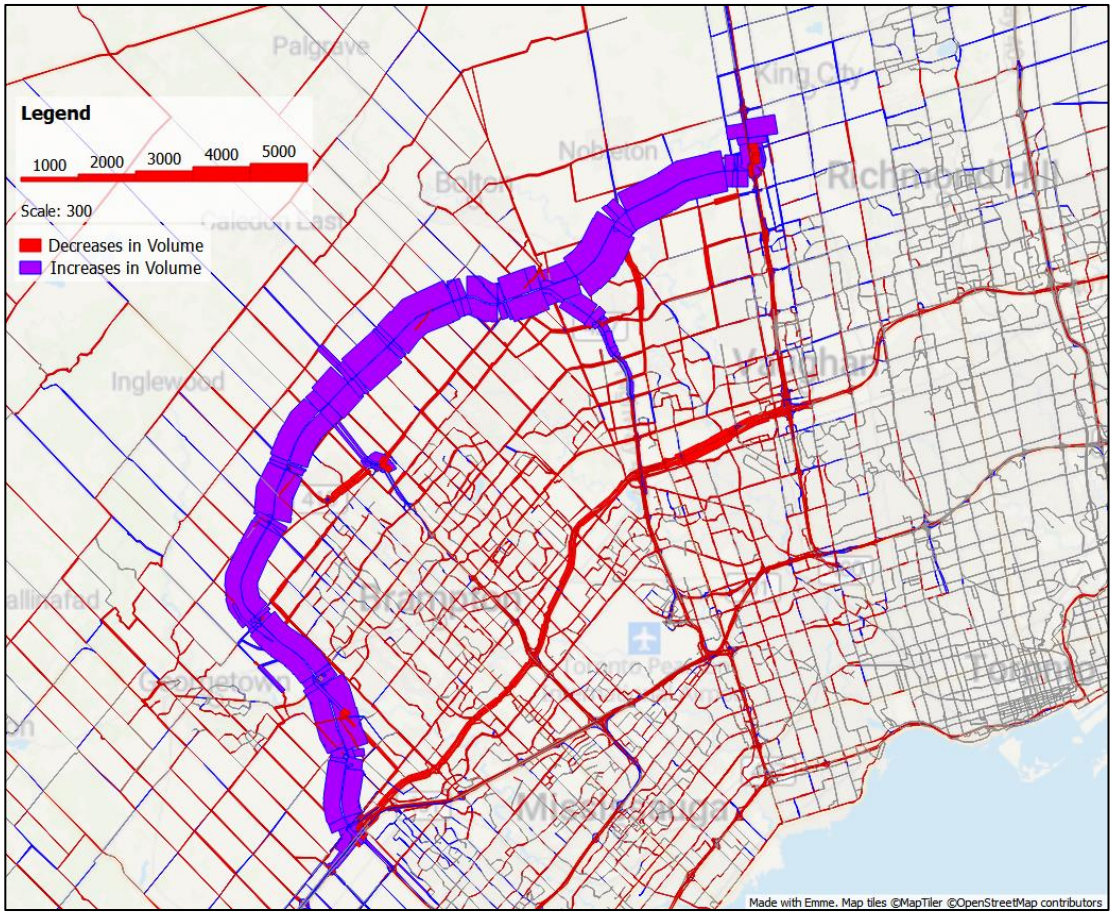

Figure 4-3: Changes in Traffic Volume With Highway 413 – PM

Additional preliminary assessment of future highway operations has showed that (WSP, 2025):

- traffic volumes are expected to be diverted from Highway 407 and arterial roadway segments to the Highways 413 as a result of the implementation of the Project. This results in more traffic that will travel at a higher average speed, resulting in an overall decrease in air emissions per unit of distance travelled.
- for the 2041 Build scenario compared to the No-Build, traffic modelling predicted a marginal increase in annual vehicle kms travelled overall in the Regional Study Area with a diversion of some traffic from arterial roads to the Highway.
- traffic modelling predicted a marginal increase in the average speed for each roadway type and each daily period, suggesting less congestion and marginally improved service across the regional roadway network.

4.5.4. Mitigation / Enhancement Measures

The following mitigation measures are proposed:

- Minimization of traffic and establishment of speed limits during construction (e.g., promoting carpooling for movement between locations within the construction site);

- Consider how to work with municipal partners and stakeholders to ensure that land-use planning promotes transit and active transportation use and reduces the risk of induced demand;
- Promoting carpooling by having an HOV lane in either direction on the Highway 413;
- Employing traffic calming methods in the arterial roads during Operations phase.

4.6. Traffic-related Safety

4.6.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Traffic-related Safety

High volumes of vehicular traffic and the resulting congestion on roadways can have negative impacts on traffic safety (Retallack & Ostendorf, 2019). In a literature review conducted by Retallack & Ostendorf (2019), it was reported that increased traffic density was related to increased fatal accidents.

Transportation infrastructure that incorporates high quality public transportation can positively influence the health of travelers due to its overall impact in travel activity, which includes reductions in traffic accidents (Litman, 2012). Casualty rates related to traffic have decreased as the usage of public transportation increased (Litman, 2012). Litman (2016) has also reported that when there is frequent and reliable public transit, travellers are able to better avoid high risk driving, such as drinking and driving. The US Department of Transportation (2020) has also stated that a neighbourhood's "quality of life" can be impacted by traffic as it affects perceptions of safety, reliability and, and convenience.

4.6.2. Current Conditions

Smaller hamlets in the Study Area are more impacted by traffic increases, as road options are limited in smaller population centers (MTO et al., 2023). Additionally, due to the limited road options, large truck traffic can exacerbate issues by creating safety hazards through tight intersections, as seen by gravel trucks hauling materials from quarries in Halton Hills (MTO et al., 2023).

The Ontario Provincial Police (OPP) has approximately 450 officers under its highway safety division, which services and patrols provincial highways, including the Study Area (MTO et al., 2023). It has been reported in the Study Area that highway-related crime, including speeding, erratic driving, road rage incidents, and impaired driving, have increased within the past three years (MTO et al., 2023).

4.6.3. Project Impact

In the areas where the Highway 413 will redirect truck traffic away from municipal roads, which have active transportation corridors and pedestrian traffic, it will improve the safety of municipal roads, leading to health benefits. However, should the proposed Project have high traffic volumes, it would negatively impact traffic-related safety in the Study Area, also because the traffic might 'spill onto' adjacent roads. During engagement with municipal and regional stakeholders, this 'spill on' effects of Highway 413 traffic onto the smaller arterial roads was of major concern. Highway 413 is likely to encourage more car-based travel, including non-commute trips. Increased traffic on smaller roadways incapable of handling large traffic volume could lead to increased collisions and safety impacts, which would lead to negative health impacts. However, as seen in Figure 4-2 and Figure 4-3, it may be likely that Highway 413 mainly draws traffic volume away from arterial roads and onto the highway itself, although there are some exceptions to this. Hence, potential for traffic-related accidents and collisions,

and the resulting health impacts, will depend on traffic volume on the corridor itself as well as traffic calming measures used on and around the Highway 413.

4.6.4. Mitigation / Enhancement Measures

Mitigation measures include:

- MTO is encouraged to collect data on traffic-related injuries and fatalities along and around the Highway 413 corridor to assess areas of intervention for infrastructure improvements;
- Consider how to work with municipal partners and stakeholders to ensure that land-use planning promotes transit and active transportation use and reduces the risk of induced demand;
  - use targeted mitigation measures for communities near priority traffic routes;
- MTO is encouraged to implement Vision Zero, i.e., targeting for zero pedestrian and bicycle crashes and accidents;
- MTO is encouraged to follow-up and improve on Disabilities Act requirements, guidelines and design standards.

4.7. Access to Neighbourhood Resources, Including Access to Emergency Response Services

4.7.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Access to Neighbourhood Resources

Easily accessible transportation infrastructure and reliable public transit can positively impact neighbourhood resources such as such as health and fitness centers, locations of work, shopping centers, and critical services by increasing accessibility to services and resources and the reliability of trucking and businesses. When major transportation infrastructure prioritizes the inclusion of public transit, they can greatly increase the accessibility of communities. It has been shown that approximately 20 to 40% of individuals in a typical community may not be able to drive and are not able to fulfill their daily needs using this mode of transport (Litman, 2022). Having affordable, reliable and convenient transportation options, including public transportation, can allow those who are unable to drive to better access neighbourhood resources. The ability to obtain and maintain employment is also significantly influenced by reliable transportation (Atherton et al., 2021). Those individuals or households who do not have access to a car typically fall into two groups, those who do not have a car for financial reasons and those who cannot drive due to health or ability-related challenges (Coveney & O'Dwyer, 2009). Leuthart and others (2022) have shown that for individuals and households, having the ability to move around and access their communities is critical for combatting poverty.

Community access barriers, such as arterials and roads that cut across neighbourhoods, can discourage physical activity, increase exposure to air and noise pollution from roadways, and separate people from neighbourhood resources (Burgos-Rodríguez et al., 2023).

As indicated above in Section 4.4.4, traffic congestion can negatively impact businesses and in return, neighbourhood resources. As congestion can increase travel times and operating costs, it results in less reliable pick-up times and increased costs of goods delivery (US Department of Transportation, 2020).

Importantly, having timely access to emergency response services can have a significant impact on the health of a population and is intrinsically tied to the overall health and well-being of individuals and communities. Any changes in access to emergency response services may have an impact on a person's

health by changing their sense of security and safety. For instance, insufficient emergency response services in a location may cause people to feel anxious and worried for their safety if a police car, fire truck, or ambulance cannot reach them in time.

4.7.2. Current Conditions

Regional Municipality of Halton

Policing services in the Halton Region are provided by the Halton Region Police Service (HRP) and the OPP (MTO et al., 2023). Alternatively, fire related services are provided by individual communities (MTO et al., 2023). Within Halton Hills, Milton, Burlington, and Oakville, there are a total of 25 fire stations (MTO et al., 2023). Halton Region Paramedic Services provides ambulance services, which includes 12 ambulance stations, greater than 250 paramedics, and 34 emergency response vehicles (MTO et al., 2023).

Halton Health care provides hospital and community healthcare services, which include four hospitals, four types of health clinics, nine specialized community programs which provide health related services, and several family health and walk-in medical clinics (MTO et al., 2023).

Regional Municipality of Peel

Policing services in the Peel Region are provided by the Peel Regional Police (PRP) and the OPP. Alternatively, fire related services are provided by individual communities which includes 42 fire stations (MTO et al., 2023).

The Peel Public Health, with support from the Government of Ontario, provide health services which includes three hospitals and approximately 79 medical clinics that provide both walk-in facilities and urgent care services (MTO et al., 2023). It should be noted that there are no hospitals in Caledon (as of 2023).

Peel Paramedics provides ambulance related services, which includes 30 paramedic stations, of these two are under construction (MTO et al., 2023). Peel Paramedics operates a fleet of 76 total ambulance all of which are available during the day, and 54 are available at night (MTO et al., 2023). Approximately 130,000 emergency calls are received by the Peel Paramedics, of which mental health related calls have increased in number since the COVID-19 pandemic. To support the Peel Paramedics and alleviate some strain, temporary clinics were created in locations with higher frequency of calls, like senior's centers (MTO et al., 2023). Additionally, a dedicated ambulance station was placed at the Pearson International Airport, due to challenge with limited access (MTO et al., 2023).

Emergency response related staffing is in a decline but is currently thought to be adequate for serving communities (MTO et al., 2023). The decline in staffing is thought to be related to the pandemic, which led to increase in sickness and fatigue making it difficult to sustain daily staffing needs (MTO et al., 2023).

Regional Municipality of York

Policing services in the Peel Region are provided by the York Region Police (YRP) and the OPP. Like the Regions of Peel and Halton, fire related services in the Region of York are provided by individual communities and includes 41 fire stations (MTO et al., 2023). Within the Regional Municipality of York there are four hospitals, approximately 53 medical clinics, and five sexual health clinics (MTO et al., 2023).

York Region Paramedic Services provides ambulance related services, which includes several paramedic stations (MTO et al., 2023). York Region Paramedic Services operates a fleet of 57 total ambulance, 22 paramedic response units, and 25 support vehicles.

4.7.3. Project Impact

The Highway 413 Project has the potential to improve access between neighbourhoods and improve the response times of emergency response vehicles, provided free-flowing conditions are maintained. This could lead to positive health impacts. In some areas, the Project may also cut across some communities and separate residents from their neighbourhood resources and how they move through their community, which may have negative impacts to health. However, in the long run, based on the municipal development plans, it is expected that the Project will lead to further development in the municipalities around it (MTO et al., 2023), which would increase the quantity and quality of neighbourhood resources, including but not limited to health care services, emergency response services, grocery stores, community centres, schools, clinics, places of worship, and parks.

Highway 413 is likely to encourage more car-based travel, including non-commute trips. The highway could spur the development of big-box retail, logistics hubs, and service centers along its corridor. This might increase the number of non-commute destinations accessible by car such as shopping, personal errands, and leisure trips. Without the expansion of public transit serving these new areas adequately, access to these areas may be limited or difficult to those who are low income and cannot afford to own a car, or don't drive because of a disability or other reasons. Hence, the level of access for different population groups may be different, and result in inequitable health impacts. The Highway 413 would only be accessible to those who own a car and able to drive/operate a motor vehicle. For individuals/households who are low income and do not own a car or have disabilities due to which they are unable to operate a vehicle, the Highway 413 provides limited benefit, and may further marginalize sections of population that have mobility challenges or are low income. In addition, the nearby Highway 407 ETR remains underused due to tolls, despite offering faster travel times. Without toll reform, Highway 413 may duplicate existing capacity rather than improve local mobility.

4.7.4. Mitigation / Enhancement Measures

Some measures include:

- MTO is encouraged to work with the local municipalities to indicate which areas may benefit from specific resources, should the Highway 413 bisect a neighbourhood and limit access to resources (e.g., community centre, park, grocery stores, etc.).
- Where possible, MTO is encouraged to provide alternate means of access to neighbourhood resources (e.g., via bridges) in those locations where the Highway 413 cuts off access for a specific community.
- Consider how to work with municipal partners and stakeholders to ensure that land-use planning promotes transit and active transportation use and reduces the risk of induced demand.

4.8. Food Security, Including Access to Local Healthy Food Sources

4.8.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Access to Local Healthy Food Sources

Food security is intrinsically related to overall physical and mental health and food insecurity can have multiple interconnected health impacts. According to the Health Canada (2020), "food insecurity is the inability to acquire or consume an adequate diet quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so." An individual's or household's income, in addition to accessibility of food, are the main indicators of food security. Food insecurity can have profound effects on a community or individual's well-being and health, including malnutrition and obesity rates in adults and adolescents. It is a public health concern as it impairs a household's capacity to afford adequate food and can impact both physical and mental health of those affected throughout their lifetimes (Health Canada, 2001).

As such, the availability of food and the subsequent accessibility of those food sources can influence if individuals and households have the requirements to lead a healthy and productive lifestyle (Pinstrup-Andersen & Pandya-Lorch, 2018). Having access to healthy and affordable foods is an indicator of health as a lack of access can be associated with food insecurity and unhealthy eating habits, which can lead to both acute and chronic health issues (Wright et al., 2016). Areas or communities which are low-income or have low-access to healthy food sources, also tend to have poor access to other services and resources, including (US Department of Agriculture, 2022):

- Access to healthy food sources (i.e., measured by distance to stores or number of stores in the region);
- Household level resources that affect access (i.e., family income, or the availability of a car); and
- Neighbourhood level indicators (i.e., average income of neighbourhood, availability of public transport).

4.8.2. Current Conditions

Food insecurity issues have been identified as a priority issue for urban Indigenous peoples in Ontario, as identified through the Urban Indigenous Action Plan completed by the Government of Ontario (MTO et al., 2023).

4.8.3. Project Impact

Based on the assessment of impacts of the Highway 413 to agricultural land, it is understood that the construction of Highway 413 will lead to the irreversible loss of designated agricultural lands, high-capability soils, agricultural structures, and it will affect agricultural tile drainage systems (MTO et al., 2023). Construction of Highway 413 will result in temporary alterations to local farm vehicle traffic patterns (MTO et al., 2023). The temporary impacts will relate to locations where the highway intersects with local roads, the construction of underpasses, or the temporary realignment of roads, potentially leading to narrower land and the deployment of traffic cones that may obstruct farm vehicle traffic (MTO et al., 2023).

The construction of Highway 413 will lead to the fragmentation of parcel fabric; 70 parcels will be severed in total (MTO et al., 2023). This figure encompasses all parcels, rather than being limited to designated agricultural lands.

Operations related to Highway 413, such as fuel oil spills and winter salt application on highway surfaces, may lead to the contamination of nearby agricultural lands with these substances (MTO et al., 2023), but there are no anticipated losses of infrastructure (grain storage and drying facilities, irrigation ponds, etc.) or agricultural services (tractor/equipment dealers, hydraulic hose supply and service, cold storage, etc.).

Hence, reduction in agricultural land which will reduce Ontario's ability in the future to grow our own foods, will have limitations on our food security and increase food prices, although it is not certain to what extent. This is a negative impact on health and wellbeing due to the Project.

However, the establishment of Highway 413 will also facilitate expedited access to a significant transportation corridor, thereby enhancing the distribution efficiency of agricultural products, livestock, and services (MTO et al., 2023) and potentially leading to lower grocery prices and positive impact to health.

In addition, if the Projects cuts off access to local sources of healthy foods such as grocery stores (e.g., the Highway bisects a community) it can also impact access to healthy food sources. This would result in negative health impacts to low income households or those with mobility issues. However, the Project can also increase accessibility to services and resources between communities (also between rural and urban areas) and the reliability of goods movement and businesses, which can improve access to healthy foods and food security overall. This in turn would result in positive health impacts to low income households or other marginalized sections of the population.

4.8.4. Mitigation / Enhancement Measures

The following mitigation measures are proposed:

- MTO should design the corridor to impact the smallest footprint and fewest agricultural operations, and locating the corridor along lot lines, to the extent practical, to reduce the chance of severing parcels (MTO et al., 2023);
- In areas where the proposed corridor will impact agricultural fields containing tile drainage, the remaining portions of the tile drainage system in the agricultural fields should be maintained and functional (MTO et al., 2023);
- MTO should use water or dust suppression materials to control dust, and the use of adequate noise control measures on all construction equipment (RWDI, 2025b). Windbreaks are vegetative barriers that can be used to reduce or eliminate the undesirable impacts of wind such as soil erosion, sand blasted crops, and salt spray (MTO et al., 2023). Mitigation of noise may also be obtained through the use of sound or noise barriers when in proximity to noise sensitive areas (MTO et al., 2023; RWDI, 2025b).
- MTO should also take into consideration the impact on adjacent agricultural lands.

4.9. Access to Traditional Foods and Lands and Ability to Harvest Traditional Foods

4.9.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Access to Traditional Foods and Lands

"Traditional food systems" or "country foods" are defined by Kuhnlein and Chan (2000, p. 596) as "including all food species that are available to a particular culture from local natural resources and the accepted patterns for their use within that culture." According to Elliott et al. (2012), the idea of traditional country foods considers Indigenous peoples' capacity to obtain, prepare, and consume

traditional foods within their own cultures. Harvesting and consuming traditional foods promotes both spiritual and physical well-being in Indigenous peoples. Traditional foods are essential to overall health and well-being as well as cultural continuity (Receveur et al., 1998; Lambden et al., 2007; Schuster et al., 2011).

Gathering, fishing, or hunting for food and then preparing it can foster a sense of community within Indigenous communities because it brings people together, promotes knowledge transfer (i.e., cultural continuity), frequently entails healthy physical activity (Willows 2005), and upholds a spiritual connection to the land (Receveur et al. 1998; Lambden et al., 2007; Schuster et al., 2011).

Large infrastructure projects can result in challenges for members of Indigenous communities who gather, fish or hunt in areas that may be impacted by the Project.

4.9.2. Current Conditions

Historically in the Study Area, Indigenous communities have used the land for traditional practices and activities, including hunting and fishing (MTO et al., 2023). Indigenous communities today may still use the land in the Study Area to practice traditional activities, although now many areas are privately owned which may limit access (MTO et al., 2023).

4.9.3. Project Impact

The Highway 413 Project may result in challenges for members of Indigenous communities who may harvest within the Study Area and challenges for Indigenous communities in maintaining a traditional relationship with the land. Although some of the lands within the Study Area may not currently be available to Indigenous peoples to practice traditional activities, MTO received feedback from some Indigenous communities related to potential impacts from the Project on their ability to continue to harvest in and around the Study Area. Specifically, some Indigenous communities noted that they consider further development in the area as impacting their rights because as the lands are developed with roads and other infrastructure, they are no longer available for harvesting and this has the potential to affect their health and wellbeing (also see Section 4.12).

The Project may have an impact on fish and fish habitat, terrestrial ecosystems (forests, wetlands, and meadows), provincial and federal Species at Risk and their habitat, protected areas and designated natural features (Greenbelt and other environmentally sensitive areas), and species important to Indigenous communities for cultural/sustenance/medicinal/crafting purposes (MTO et al., 2023). Six Nations of the Grand River has provided MTO with feedback on the list of species of interest to them observed during field investigations (MTO et al., 2023).

MTO has been told that one of the concerns associated with the development of the highway project is the potential impact on harvesting through habitat loss or fragmentation, which play an important role in supporting the environment by providing a home for seeds, animals, and pollinators (MTO et al., 2023). MTO has also noted during meetings with Indigenous communities that the health of the land and the environment is viewed by the communities as intertwined with the health of Indigenous peoples, and as such, Indigenous communities see strong mitigation, enhancement, and/or avoidance measures for the protection of the natural environment as a top priority for the Project (MTO et al., 2023).

4.9.4. Mitigation / Enhancement Measures

The following mitigation measures have been recommended in the natural environment assessment (MTO et al., 2023):

- Design proposed bridges to avoid and/or minimize potential impacts on fish and fish habitat. This can include modifying design and positioning bridge piers to avoid areas containing the biophysical attributes of critical habitat, avoiding, when possible, bridge deck drains, and reducing grading.
- Incorporating environmental design requirements to facilitate overall protection of ecological functions on a landscape level.
- Incorporating potential restoration requirements for habitat loss and/or loss of connectivity.
- Refinement of highway alignment to avoid and/or minimize impacts to sensitive natural features.
- Incorporate native pollinator-friendly plants into seed mixes and plantings to the extent possible within the ROW to allow for continuous bloom throughout the year (i.e., include plants that bloom in the spring, summer, and fall) to increase pollinator populations. Include milkweed to support monarch populations.
- Explore opportunities to work with Indigenous owned companies to source plants and seeds, where appropriate.
- Design crossing structures to facilitate wildlife movement and/or maintain/enhance fish passage.
- Work with federal and provincial agencies as part of the bi-lateral working group to obtain permits and/or authorizations as required.

4.10. Mental Health and Wellness

4.10.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Mental Health and Wellness

Transportation infrastructure that is associated with long travel times and high levels of congestion can impact travellers' mental health and well-being. Mental health can be linked negatively to high volume traffic situations as they can be incredibly stressful (Hennessy & Wiesenthal, 1997).

High levels of congestion and vehicle volume on roadways, also increase commuting times for travellers, resulting in more time spent in a vehicle and less time for other, more preferred activities (Clark et al., 2019). Vehicular traffic and commuting can also add stress to travelers' daily lives which can increase overall life stress decrease mental health (Clark et al., 2019).

A study conducted by Clark et al. (2019) analysed the impact of commuting on aspects of Subjective Well-Being, which included life satisfaction, job satisfaction, health, and satisfaction with leisure. This study reported associations of longer commute times with lower job satisfaction, lower leisure time satisfaction, increased strain, and poorer mental health (Clark et al., 2019). Commuting has been shown to be viewed as a negative experience that worsens moods and happiness during the journey (Clark et al., 2019).

Incorporation of active transport and public transportation infrastructure into transportation planning can alleviate mental health stressors for those who would choose to engage in alternative transportation methods. Both human-powered transport and public transport have been shown to improve mental health and reduce stress related to driving (Litman, 2012).

In a systematic literature review undertaken by Salerno and others (2021) on the impact of major project development on the mental wellness of Indigenous peoples, the authors found that in the

Indigenous worldview, for many Indigenous communities, a holistic view of mental wellness rather than mental health (i.e., absence of illness) is taken. For many Indigenous peoples, the presence of strong relationships with one's community, culture, and the broader environment is just as important as the absence of illness and infirmity when it comes to defining mental wellness (Salerno et al., 2021). Also emphasized is harmony of the mental, emotional, physical, and spiritual selves, as well as holism, which is the interconnectedness of these dimensions (Salerno et al., 2021).

4.10.2. Current Conditions

MTO et al. (2023) provides a summary of perceived mental health Statistic Canada data for Halton Regional Health Unit, Peel Regional Health Unit, and York Regional Health Unit which includes the following observations:

- Most of the health units reported similar results;
- Perceived mental health rates were similar across the three health units;
- Most residents of municipalities feel a sense of belonging in their home communities, ranging from 69.6% (York Health Unit) to 74.5% (Halton Health Unit); and
- Overall, reported life satisfaction was high, ranging from 94.6% in York Health Unit to 93.5% in the Halton Health Unit.

Residents in the Halton Regional Health Unit had the highest percentage of very good or excellent perceived mental health (i.e., 69%), while residents in the York Regional Health Unit had the highest percentage of poor or fair perceived mental health (i.e., 8.5%). Additionally compared to males, females in all locations have lower rates of their perceived mental health being very good and excellent when compared to males, and higher rates of perceived life stress (MTO et al., 2023).

It was noted that Ontario First Nations had the lowest percentage of overall mental health described as excellent or very good (i.e., 4.7%) when compared to residents in the Regional Health Units and Ontario, as reported in the Regional Health Survey Phase III (MTO et al., 2023).

An increase in mental health related emergency calls has been reported by the Peel Paramedics, which is noted to be a noticeable trend through the COVID-19 pandemic (MTO et al., 2023).

4.10.3. Project Impact

Should the Highway 413 Project include a functional and affordable transitway alongside a highway with free-flowing traffic, it could provide multiple transportation options (e.g., public transit, bicycle lanes, etc.) to communities and improve their mental wellbeing as transportation options that increase physical activity are beneficial to mental wellness. However, increased traffic congestion, loss of linkages to community (if the highway bisects a community) and environmental impacts have the potential to negatively impact the mental health and wellbeing of Study Area residents, including Indigenous peoples. In addition, MTO has plans for a multi-modal transitway to be planned and built alongside the Highway 413 in the future. This may increase levels of physical activity for those who live around and are able to utilize the multi-modal transitway in the future, including those who cannot afford a car, or are unable to drive.

Overall, there are a number of impacts to determinants of health evaluated in this HHI Study of the Highway 413 Project that can also impact mental health and wellness, including but not limited to:

- Physical activity and use of active transportation can boost mental wellness and reduce mental health impacts;

- Increased noise levels during the construction and operation phase of the Project can negatively impact mental wellness and lead to adverse mental health impacts;
- Worsening of climate change effects, e.g., loss of green spaces leading to increased temperatures and heat islands, can have adverse mental health impacts;
- Social cohesion is directly related to mental wellness, and should the project improve social cohesion, it would lead to potential positive health impacts;
- Traffic-related congestion and safety both impact mental health and wellness. Traffic congestion and delay can lead to stress, reduced time available for recreation and rest and reduce mental wellness. Driving in stressful and unsafe traffic conditions has negative impacts on mental health. Traffic improvements on the arterial roads around the Highway 413 would lead to positive health impacts due to an overall reduction in congestion and overall increase in access to services;
- Access to neighbourhood resources, food security and ability to harvest traditional country foods are all intimately connected to mental wellness;
- Connection to the land for Indigenous peoples is linked to mental wellbeing.

For those who cannot afford to drive or are incapable of operating a vehicle due to a disability, there is inequity in the distribution of positive health impacts due to the Project (e.g., increased access to resources via car), which can increase the negative burden of mental health impacts. In addition, others who may be disproportionately affected by impacts of the Project related to changes in air quality or noise levels, for example, who experience chronic respiratory or cardiovascular illnesses, are elderly, or pregnant, may also experience a higher burden of negative health impacts.

There can also be positive impacts to mental health due to the Project, especially for whom the Highway 413 will allow faster and easier access to areas of the province they previously had difficulty accessing. Should the Project include an adjacent multi-modal transitway, this would noticeably boost the positive health impacts of the Project by providing choice of access to transportation modes, encouraging active transportation and limiting air quality and climate change impacts.

4.10.4. Mitigation / Enhancement Measures

To improve mental health due to the Project, all mitigation measures identified above are re-iterated, and in addition, the following measures are proposed:

- Consider a multi-modal protected corridor adjacent to Highway 413;
- MTO is encouraged to communicate with communities during the construction phase to keep them informed of loud, dusty or disruptive construction-related activities and what residents should expect and plan for.
- MTO is encouraged to continue to communicate with Indigenous communities regarding any potential impacts due to the Project on areas of traditional harvesting and how it will be mitigated.

4.11. Human Trafficking

4.11.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts of Human Trafficking

According to the Canadian Centre to End Human Trafficking (CCTEHT) (n.d.), "[h]*uman Trafficking is defined as recruiting, transporting, transferring, receiving, holding, concealing or harbouring a person, or*

exercising control direction or influence over the movements of a person, to exploit them or to assist in facilitating their exploitation (sections 279.01 and 279.011 of the Canadian Criminal Code)."

Traffickers rely on the transportation industry in every phase of human trafficking: for recruitment, for moving and controlling victims, and for delivering victims to buyers (Federal Highway Administration, 2021).

It has been noted that police-reported human trafficking incidents often involve an offence related to the sex trade, assault or sexual offences (Cotter, 2020). Although individuals of any age or gender can be victims of human trafficking, existing research indicates that the majority of identified victims are girls and women, who are trafficked for the purposes of sexual exploitation (Cotter, 2020; Hepburn and Simon, 2010; UNODC, 2018).

As identified in the section above, young women and girls are particularly at risk, though boys, men and people who identify as 2SLGBTQ+ are also targeted (Government of Ontario, 2025). Indigenous women and girls experience heightened risks of being targeted by traffickers and comprise a disproportionate number of persons trafficked for the purposes of sexual exploitation in Canada. It is estimated that Indigenous women in Canada are three times more likely to experience violence than other women and six times more likely than non-Indigenous women to be murdered (Government of Ontario, 2021). Furthermore, Indigenous female youth are 3.1 times more likely than non-Indigenous youth to experience violent victimization (Government of Ontario, 2021). Statistics Canada research has found youth aged 15-29 have the highest rates of victimization. This has particular significance for Ontario, where 39 per cent of Indigenous women are under the age of 25 (Government of Ontario, 2021).

Being trafficked can cause severe trauma and survivors often need intensive, specialized services and supports to help them heal, rebuild their lives and regain independence (Government of Ontario, 2020).

4.11.2. Current Conditions

Ontario has the second highest rate of human trafficking in Canada. In 2019, Ontario accounted for 62% of Canada's human trafficking cases, totaling 316 incidents (Statistics Canada, 2021c). This translated to a rate of 2.2 incidents per 100,000 people in Ontario, which is nearly twice the national average of 1.4 per 100,000 (Statistics Canada, 2021c). In Ontario, the majority of reported cases of human trafficking involve sexual exploitation, which may also be referred to as sex trafficking (Government of Ontario, 2025). Young women and girls are particularly at risk, though boys, men and people who identify as 2SLGBTQ+ are also targeted (Government of Ontario, 2025).

Research indicates that traffickers utilize intra and inter provincial corridors to transport and move victims within and across provinces (CCTEHT, 2021). In Ontario, traffickers reportedly use Highway 401 as a key route to move victims between various sex trade hubs, including Windsor, London, Toronto, Ottawa, and Montreal according to the Canadian Centre to End Human Trafficking (CCTEHT) (Bhargava, 2023). Due to its strategic location between Windsor and Toronto, London has become a hotspot where elevated levels of sex trafficking activity are being observed. Almost half (48%) of all police-reported incidents of human trafficking in Canada between 2012 and 2022 were reported in five major urban centres, with Toronto reporting 23% of all incidents in Canada (Statistics Canada, 2023b).

Ontario's Anti-Human Trafficking Strategy 2020 – 2025 (Government of Ontario, 2025) focuses on raising awareness, protecting victims, intervening early, supporting survivors and holding offenders accountable. Ontario is renewing its Anti-Human Trafficking Strategy from 2025 to 2030, including a more than $345 million investment over the same period of time. Furthermore, Pathways to safety: Ontario's strategy in response to the Final Report of the National Inquiry into Missing and Murdered

Indigenous Women and Girls (MMIWG) was developed to build upon existing relationships and current collaborations on actions to end violence against Indigenous women, girls, and 2SLGBTQQIA+ people (Government of Ontario, 2021).

4.11.3. Project Impact

During engagement, concerns related to understanding and mitigating how Highway 413 can further contribute to human trafficking were noted to MTO. It was indicated that in Peel Region, the zone around the airport and the key highways around it are important transit networks for human trafficking. Multiple First Nations also highlighted issues related to human trafficking and the luring of Indigenous women and youth along the Highway 402 and Highway 401 corridors (MTO et al., 2023).

4.11.4. Mitigation / Enhancement Measures

In the design, construction, and operation of Highway 413, MTO should aim to implement the province's Anti-Human Trafficking Strategy. Given the concerns related to human trafficking that have been expressed by Indigenous communities, and the role the Project may play in providing a transportation corridor that can be used by traffickers, MTO should communicate with Indigenous communities that expressed concerns regarding trafficking, that the province is continuing to implement its Anti-Human Trafficking Strategy, and what this would look like as applied to the design and operation stages of the Project. MTO should also consider measures that help to advance Pathways to safety and address the MMIWG crisis by raising awareness, improving safety, and combating human trafficking on provincial transportation infrastructure (Government of Ontario, 2021).

As identified above, young women and girls, especially Indigenous women and girls, experience heightened risks of being targeted by traffickers and comprise a disproportionate number of persons trafficked for the purposes of sexual exploitation in Canada (Government of Ontario, 2025). As such, mitigation measures aimed at these population subgroups should be considered and implemented by MTO and Government of Ontario, in consultation with Indigenous communities.

MTO should also communicate to the public the Anti-Human Trafficking Strategy it has implemented in the development of the Highway 413 Project, and how it aims to monitor the efficacy of the Strategy and ways to improve.

4.12. Potential Impacts to Indigenous Cultural Practices

4.12.1. Health Context / Linkages – Why is it Important to Consider the Health Impacts in the context of Indigenous Cultural Practices

Historical and intergenerational trauma resulting from colonialism and related policies, such as residential schools and the Sixties Scoop, as well as individual and systemic racism, has led to many Indigenous peoples facing a number of profoundly entrenched social and economic challenges (NCCIH, 2014). This, in turn, has impacts on the ability of Indigenous peoples to transmit and practice their culture.

Colonization and racism are deeply interconnected (Reading, 2013), and the use of race as a category of identity dates back to the time when Europeans first settled other continents (Allan and Smylie, 2015). Race has been used for hundreds of years to justify and sustain hierarchies of alleged superiority and civility among "races" of people, despite the fact that it is a socially manufactured term without biological basis (Reading, 2013). Many Indigenous peoples in Canada encounter racism (NCCIH, 2014). A

2005 report from the First Nations Regional Longitudinal Health Survey found that 38% of participating First Nations adults had encountered racism at least once in the previous 12 months, and that 63% felt it had at least some negative impact on their self-esteem (First Nations Centre, 2005).

In addition to justifying historical colonization, research has found that racism exacerbates its effects today (Cunningham, 2009), such as preventing Indigenous peoples from exercising self-determination, failing to recognize Aboriginal and treaty rights, and restricting access to services and resources (Allan and Smylie, 2015).

4.12.2. Current Conditions

The provincial Urban Indigenous Action Plan from the Government of Ontario (2018) notes that during their first round of engagement with urban Indigenous communities and service providers they identified some of the priority issues affecting urban Indigenous peoples in Ontario including experiences of racism resulting from lack of cultural competency and service delivery.

This report also highlighted barriers that urban Indigenous populations and service providers face including lack of supports for youth and seniors, cultural conflict and systemic racism, competition for, or lack of, resources, lack of Indigenous representation and control in local planning processes and development of government policies and programs, a need to support service provider capacity, and a funding administration burden (i.e., supporting multiple sources of fixed-term funding is operationally burdensome) (Government of Ontario, 2018).

4.12.3. Project Impact

Some Indigenous communities have communicated to MTO that their ability to practice traditional activities, such as harvesting in the lands within the Study Area is difficult. Some of the Indigenous communities consulted by MTO for the Project consider any further development in the area (e.g., the Project) as impacting their ability to exercise harvesting rights.

The Project may have an impact on fish and fish habitat, terrestrial ecosystems (forests, wetlands, and meadows), provincial and federal Species at Risk and their habitat, protected areas and designated natural features (Greenbelt and other environmentally sensitive areas), and species important to Indigenous communities for cultural/sustenance/medicinal/crafting purposes. The Project may have the potential to impact Aboriginal rights or treaty rights related to hunting, fishing, trapping, and gathering during construction (MTO et al., 2023).

Indigenous communities may be affected by changes in the atmospheric environment if there are downstream effects that adversely impact the natural environment, including food sources and species of cultural significance (MTO et al., 2023). These effects may have the potential to impact Aboriginal or treaty rights related to hunting, fishing, trapping, and gathering (MTO et al., 2023).

The Project may have an impact on the acoustic environment through temporary noise and vibration impacts during construction and noise impacts on nearby receptors (e.g., residences) during future operations (MTO et al., 2023). If not mitigated, these potential impacts to the acoustic environment may cause changes to wildlife habitat, including movement and migration patterns and may have the potential to impact Aboriginal or treaty rights (MTO et al., 2023).

Potential impacts due to the Project include impacts to natural resources, such as wetlands and groundwater, as well as impacts to water quality and quantity for water well users (MTO et al., 2023). If not mitigated, these potential impacts to natural resources such as wetlands and groundwater may

make the water unsuitable for human consumption and may impact an Indigenous community's access to clean drinking water and may have potential impacts on harvesting rights (MTO et al., 2023).

Potential impacts as a result of the Project could occur due to potential land use changes which can result in greater peak flows, reduced channel capacity due to new culverts and bridges, increased suspended sediment loads downstream, and increased annualized volume of runoff downstream. These potential impacts could cause downstream flooding, upstream flooding, water quality degradation and erosion potential.

These potential impacts, if not mitigated, have the potential to impact the fish and fish habitat in the surrounding watercourse which in turn has the potential to impact Aboriginal or treaty rights related to fishing.

4.12.4. Mitigation / Enhancement Measures

As discussed above, there is the potential for impacts to fish and fish habitat in the surrounding watercourse, which, in turn, has the potential to impact Aboriginal or treaty rights related to fishing. As such, the mitigation measures identified in the EIAR to address the potential impacts on Aboriginal and treaty rights and to address potential impacts to fish and fish habitat, are re-iterated from a human health standpoint.

MTO should continue to consult with Indigenous communities to provide them with updates on the implementation of the mitigation measures, it any, and how it is following up and monitoring the outcomes of the mitigation measures, if applicable.

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