4.0 EXISTING CONDITIONS

This chapter outlines the existing environmental conditions in the study area. The existing conditions relate to the Natural Environment (**Section 4.1**), Socio-Economic Environment (**Section 4.2**), Cultural Environment (**Section 4.3**), Transportation Features (**Section 4.4**), and Utilities (**Section 4.5**). The material presented in this chapter was generated from available secondary source and field survey information. Supporting project-specific reports are on file at MTO and are listed in **Section 12.0**.

4.1 Natural Environment

4.1.1 Designated Natural Areas

A *Terrestrial Ecosystems Technical Memorandum* (December 2014) was prepared as part of the Preliminary Design and Class EA Study, and is on file at MTO. There are no Conservation Reserves or Provincial Parks located within the study limits. Designated natural areas present within the study limits are listed below and are mapped in **Exhibit 4-1**.

- The Welland Canal North Turn Basin Provincially Significant Wetland (PSW) is present to the south of the study area. No other evaluated wetlands, Areas of Natural Scientific Interest (ANSIs) or Environmentally Significant Areas (ESAs) are known to occur within or adjacent to the study area.
- Deer Wintering Areas are mapped by the Ministry of Natural Resources and Forestry (MNRF) at the south and east limits of the study area (See Exhibit 4-1). No other significant wildlife habitat (SWH) features (i.e. the habitats of seasonal concentrations of animals; rare vegetation communities or specialized habitats for wildlife; habitats of species of concern, excluding the habitats of endangered and threatened species; and animal movement corridors) are mapped in the study area.
- All of the study area east of the Welland Canal occurs within the Greenbelt Plan Area. A portion of the Greenbelt Plan Natural Heritage System extends within the south part of the study area (south of York Road, between Dorr Road and Homer Road), as shown on Exhibit 4-1. The remaining area east of the Welland Canal is considered Protected Countryside. The Niagara Escarpment Plan Area occurs to the south of the study area and is also included as part of the Greenbelt Plan Area.

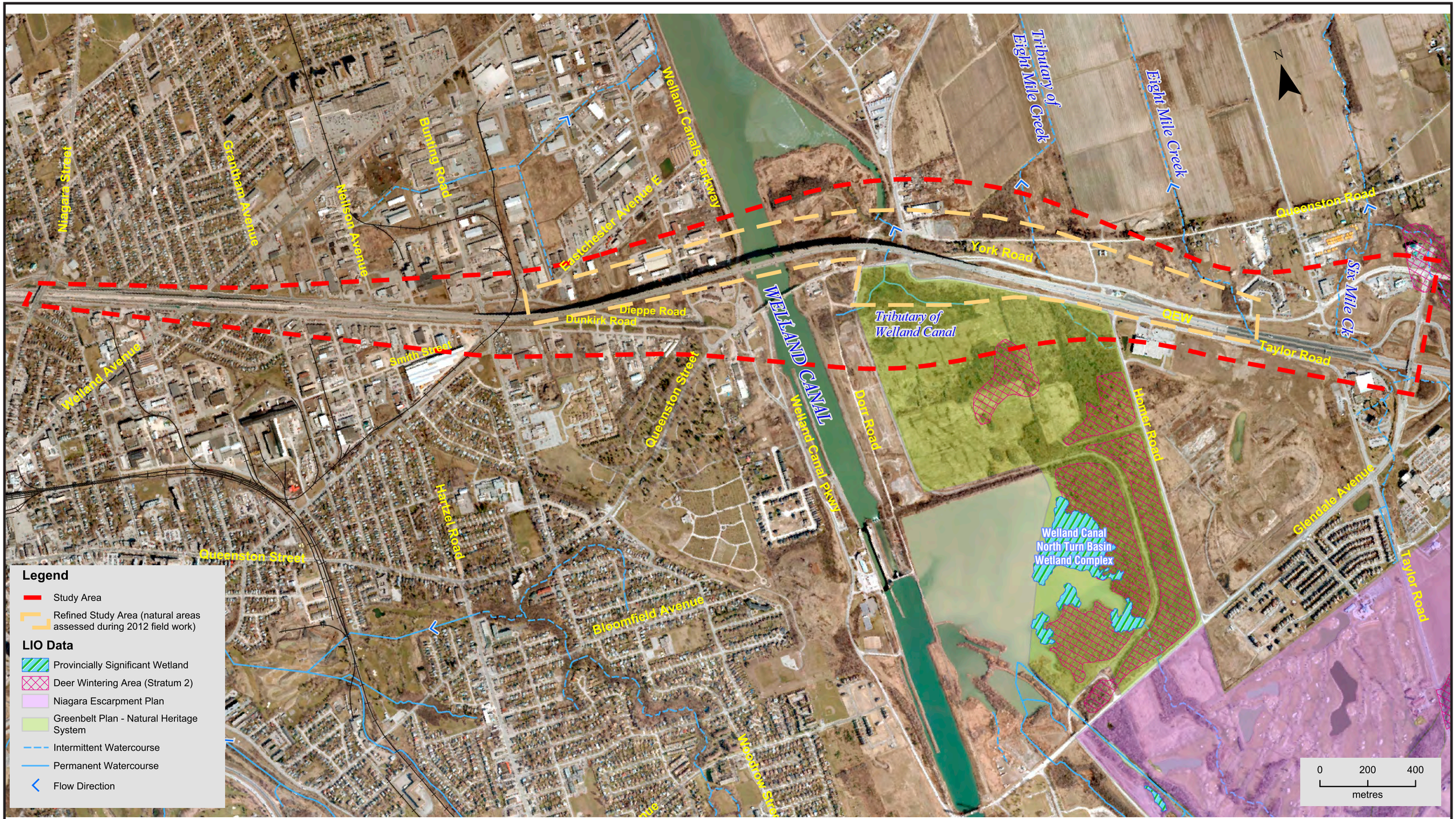
4.1.2 Vegetation

Vegetation field work was completed on July 7, 2011, with supplemental surveys completed on September 2, 2011, and August 29, 2012 to document natural and culturally-derived vegetation communities within the study limits. Initial field work was completed for the broad study area in 2011, and as the design options were narrowed, more comprehensive field investigations occurred in 2012 within a refined study area. The refined study area focused on the area to the north of the existing bridge / QEW as well as a smaller area to the south of the QEW in the area where municipal road realignments are proposed. A total of 16 vegetation communities were delineated in the refined study area as shown on **Exhibit 4-2a and 4-2b**. None of the vegetation communities are rare within Ontario and all are highly culturally influenced. Vegetation communities are described in **Table 4-1**. A total of 160 vascular plants were recorded in the broad study area during the 2011 and 2012 field surveys. Of these, 147 are located within vegetation communities located within the refined study area. Of the 147 vascular plants recorded in the refined study area, the majority (145, 98%) are common and secure in Ontario (i.e[2]. ranked S4, S5, SNR or SNA). A large percentage (50%) of the species observed in the refined study area are non-native (i.e. exotic) in Ontario. This high percentage of non-native species reflects the high degree of anthropogenic influence in the study area.

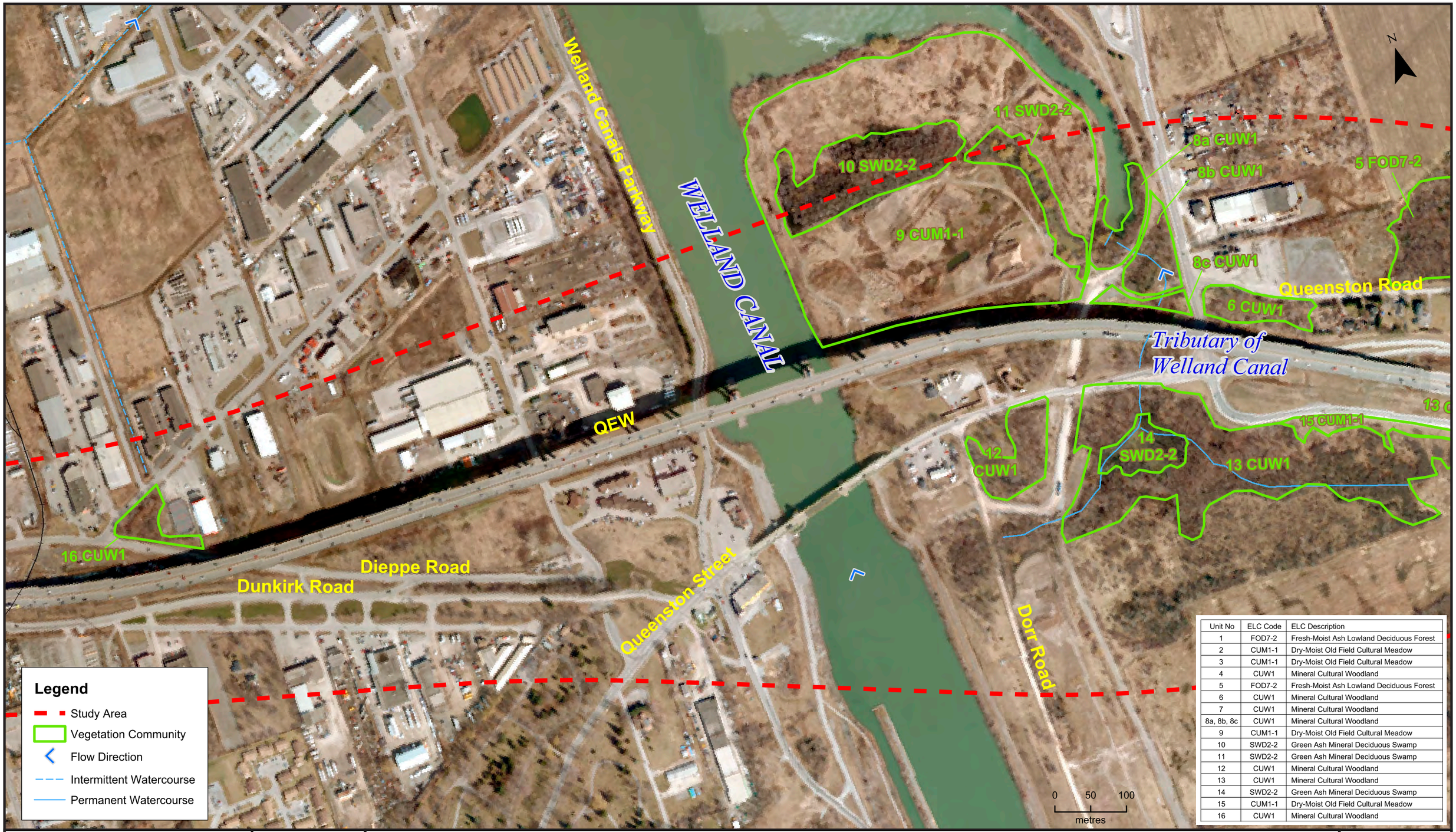
One Species at Risk (SAR), Butternut (*Juglans cinerea*), was observed in Unit 6 and is discussed in more detail in **Section 4.1.2.1**. One species considered uncommon in Ontario (i.e., ranked[3] S1 through S3) and rare in Niagara Region was also observed in Unit 7 and Unit 9: Honey Locust (*Gleditsia triacanthos*, ranked S2). Honey Locust is noted as 'frequently planted and occasionally escaped from cultivation throughout southern Ontario' (Oldham and Brinker, 2009, p. 102) and observations of Honey Locust in the study area likely do not represent native occurrences of this tree, particularly given their location in cultural communities. Native occurrences of Honey Locust are known from the Niagara Gorge and Niagara River area (Oldham, 2010).

[2] S1 - Critically Imperiled; S2 - Imperiled; S3 - Vulnerable; S4 - Apparently Secure; S5 - Secure; SX - Presumed Extirpated; SH - Possibly Extirpated (Historical); SNR - Unranked; SU - Unrankable; SNA - Not Applicable

[3] S1 - Critically Imperiled; S2 - Imperiled; S3 - Vulnerable; S4 - Apparently Secure; S5 - Secure; SX - Presumed Extirpated; SH - Possibly Extirpated (Historical); SNR - Unranked; SU - Unrankable; SNA - Not Applicable



QEW GARDEN CITY SKYWAY EA W.O. 08-2009	WSP Ontario	Designated Areas	Exhibit 4-1



Unit No	ELC Code	ELC Description
1	FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest
2	CUM1-1	Dry-Moist Old Field Cultural Meadow
3	CUM1-1	Dry-Moist Old Field Cultural Meadow
4	CUW1	Mineral Cultural Woodland
5	FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest
6	CUW1	Mineral Cultural Woodland
7	CUW1	Mineral Cultural Woodland
8a, 8b, 8c	CUW1	Mineral Cultural Woodland
9	CUM1-1	Dry-Moist Old Field Cultural Meadow
10	SWD2-2	Green Ash Mineral Deciduous Swamp
11	SWD2-2	Green Ash Mineral Deciduous Swamp
12	CUW1	Mineral Cultural Woodland
13	CUW1	Mineral Cultural Woodland
14	SWD2-2	Green Ash Mineral Deciduous Swamp
15	CUM1-1	Dry-Moist Old Field Cultural Meadow
16	CUW1	Mineral Cultural Woodland

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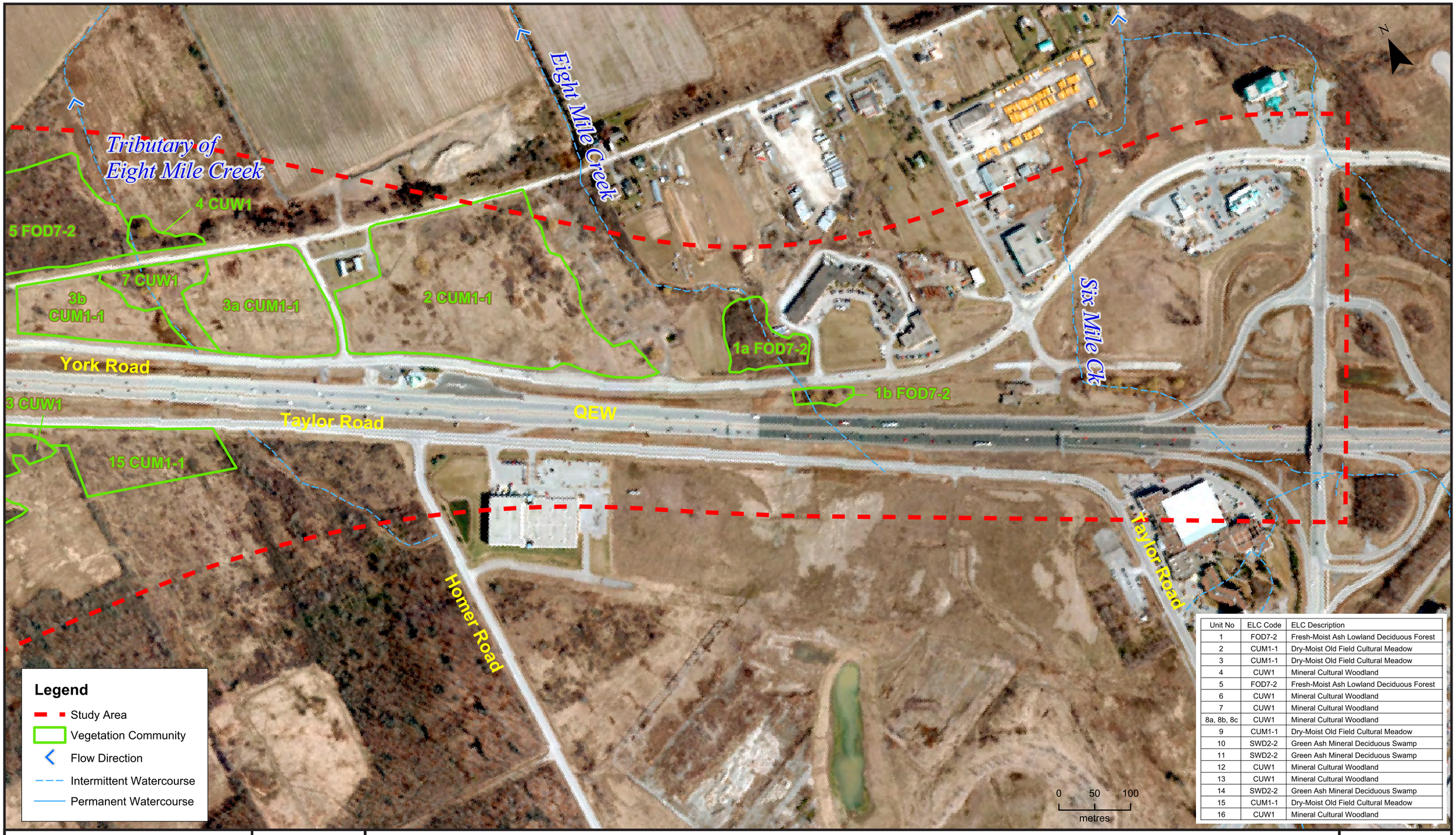
wsp

Ontario

Vegetation Communities

Exhibit
4-2a



Unit No	ELC Code	ELC Description
1	FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest
2	CUM1-1	Dry-Moist Old Field Cultural Meadow
3	CUM1-1	Dry-Moist Old Field Cultural Meadow
4	CUW1	Mineral Cultural Woodland
5	FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest
6	CUW1	Mineral Cultural Woodland
7	CUW1	Mineral Cultural Woodland
8a, 8b, 8c	CUW1	Mineral Cultural Woodland
9	CUM1-1	Dry-Moist Old Field Cultural Meadow
10	SWD2-2	Green Ash Mineral Deciduous Swamp
11	SWD2-2	Green Ash Mineral Deciduous Swamp
12	CUW1	Mineral Cultural Woodland
13	CUW1	Mineral Cultural Woodland
14	SWD2-2	Green Ash Mineral Deciduous Swamp
15	CUM1-1	Dry-Moist Old Field Cultural Meadow
16	CUW1	Mineral Cultural Woodland

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Vegetation Communities

Exhibit
4-2b

TABLE 4-1: VEGETATION COMMUNITIES DESCRIPTIONS

Vegetation Unit	Vegetation Community	Description
Unit 1	Fresh-Moist Ash Lowland Deciduous Forest [FOD7-2]	A small, disturbed lowland deciduous forest community surrounding Eight Mile Creek. There are moderate to steep slopes down to the tributary and a small floodplain swamp inclusion dominated by European Alder and Pin Oak. This community is dominated by Green Ash with the non-native European Alder as a common associate. Additional canopy trees observed include White Ash, Manitoba Maple, Pin Oak, Sweet Cherry, and White Elm. The understory is dominated by Buckthorn and Riverbank Grape vines. The ground layer includes Garlic Mustard, Yellow Avens, Enchanter's Nightshade, Cover-root, Catchweed Bedstraw, and Panicled Aster.
Unit 2	Dry-Moist Old Field Cultural Meadow [CUM1-1]	A large open cultural meadow between York Road and Queenston Road. It is dominated by a mix of common old field species (e.g. Kentucky Bluegrass, Canada Goldenrod, Queen Anne's Lace, Fuller's Teasel, Orchard Grass, Brown Starthistle, Annual Ragweed, Creeping Thistle and New England Aster) and scattered trees / patches of trees. Unit 2 also includes a few small wet pockets (inclusions) that are dominated by common wetland species (e.g. Reed Canary Grass, Narrow-leaved Cattail and Common Reed).
Unit 3	Dry-Moist Old Field Cultural Meadow [CUM1-1]	Similar to Unit 2, Unit 3 is an open cultural meadow dominated by a mix of common old field species (as noted for Unit 2) and scattered regenerating trees. Unit 3 is bisected by a tributary of Eight Mile Creek and its associated narrow riparian corridor (Unit 7).
Unit 4	Mineral Cultural Woodland [CUW1]	A narrow riparian woodland community along a tributary of Eight Mile Creek, north of Queenston Road. It is dominated by Green Ash and Manitoba Maple with Gray Dogwood dominating the understory and the ground layer comprised of a mix of common old field species.
Unit 5	Fresh-Moist Ash Lowland Deciduous Forest [FOD7-2]	A young, disturbed lowland deciduous forest that slopes down toward the northeast corner where the community grades into a deciduous swamp. The lowland forest is dominated by Green Ash with Black Walnut, White Elm, Manitoba Maple, Freeman's Maple, Pin Oak and Sweet Cherry as rare associates. Buckthorn dominates the sub-canopy and understory with Poison Ivy and Riverbank Grape vines abundant throughout the ground layer and into the understory. Gray Dogwood is also common, forming dense patches where the tree canopy is sparse. Poison Ivy and Garlic Mustard were the most common ground layer species observed.
Unit 6	Mineral Cultural Woodland [CUW1]	A small cultural woodland community with a canopy dominated by a non-native and invasive species, Tree-of-Heaven. Additional canopy associates include Black Walnut, Freeman's Maple and Staghorn Sumac at edges and in canopy openings. What appears to be a concrete foundation of an old home occurs in the centre of the woodland and is surrounded by a range of common garden escapes (e.g., European Lily-of-the-valley, Common Lilac, and Orange Daylily). Two Butternut trees were observed along the northeast edge of this woodland.
Unit 7	Mineral Cultural Woodland [CUW1]	A continuation of Unit 4 on the south side of Queenston Road. Like Unit 4, it is also a narrow riparian woodland community dominated by Green Ash and Manitoba Maple with Reddish Willow as an occasional canopy associate. The ground layer is dominated by common old field species and garden escapes and there are dense patches of Common Reed along the watercourse. An old foundation and associated refuse (concrete rubble, concrete blocks, etc.) were observed in this unit.
Unit 8a, 8b, and 8c	Mineral Cultural Woodlands [CUW1]	A group of highly disturbed and highly modified cultural woodland communities with small deciduous swamp inclusions at the base of the steep slope and surrounding a tributary of the Welland Canal. This area is part of a highly altered landscape resulting from the Welland Canal construction. The cultural woodlands are located on artificially steep slopes and support a large proportion of non-native species. Common canopy trees observed include European Alder, Manitoba Maple, Green Ash, Reddish Willow, Sweet Cherry, Siberian Elm, and Sycamore Maple. The understory includes Gray Dogwood, Riverbank Grape, Thicket Creeper and Buckthorn.
Unit 9	Dry-Moist Old Field Cultural Meadow [CUM1-1]	Primarily a cultural meadow community but also supports large patches of Common Reed and large disturbed areas. Only a portion of Unit 9 was accessible at the time of field surveys; however, the area that was visited was highly disturbed with several trails traversing the property and several large piles of refuse (e.g., shingles, old appliances, and furniture).
Unit 10	Green Ash Mineral Deciduous Swamp [SWD2-2]	Dominated by Green Ash with Cottonwood and Reddish Willow as occasional associates. Buckthorn and Poison Ivy vines dominate the understory. A large proportion of this community was covered with standing water during the July 7, 2011 site visit. Sedges and Northern Bugleweed were observed in the sparse ground layer.
Unit 11	Green Ash Mineral Deciduous Swamp [SWD2-2]	A continuation of Unit 10 along a tributary of the Welland Canal. Green Ash co-dominates the canopy with Manitoba Maple, and Cottonwood is again a common associate. Buckthorn, Gray Dogwood, Poison Ivy and Riverbank Grape dominate the understory and common wetland grasses and herbaceous plants were noted as ground layer species.
Unit 12	Mineral Cultural Woodland [CUW1]	A cultural woodland community that borders a cemetery property. The canopy is dominated by Black Walnut with Sugar Maple, Red Oak, Manitoba Maple and Bitternut Hickory as canopy associates. Buckthorn, Thicket Creeper, Riverbank Grape and Wild Red Raspberry were noted in the understory while the ground layer included Poison Ivy and Orange Daylily.
Unit 13	Mineral Cultural Woodland [CUW1]	An extensive cultural woodland and cultural thicket mosaic that surrounds a tributary of the Welland Canal. The woodland areas are dominated by Black Walnut with Green Ash as a common associate. Manitoba Maple, Wild Black Cherry, White Ash, Sugar Maple, Cottonwood and American Basswood are infrequent associates. Riverbank Grape, Poison Ivy and Thicket Creeper vines occur throughout. The ground layer includes Canada Goldenrod, Orchard Grass, Orange Daylily, White Avens, Enchanter's Nightshade, Tall Hairy Agrimony, Garlic Mustard, Slender Rush, and White-top Fleabane. Trails and refuse dumping were noted throughout the community.
Unit 14	Green Ash Mineral Deciduous Swamp [SWD2-2]	A wetland community that has developed around the tributary of the Welland Canal, south of York Road. The canopy is dominated by Green Ash with occasional Reddish Willow, Manitoba Maple, and European Alder as associates. Riverbank Grape was noted in the understory. The ground layer includes Rice Cutgrass, American Bugleweed, Orange Jewelweed, Yellow Avens, Climbing Nightshade, Broadleaf Arrowhead, and Lesser Duckweed.
Unit 15	Dry-Moist Old Field Cultural Meadow [CUM1-1]	Predominately a disturbed cultural meadow community south of Taylor Road, dominated by typical roadside old field species. Further to the south, the community supports scattered wetland-associated flora.
Unit 16	Mineral Cultural Woodland [CUW1]	A highly disturbed cultural woodland community located in an urban matrix and is the only community described that occurs on the west side of the Welland Canal. This woodland is dominated by Green Ash with Black Locust and Common Lilac as associates. A large patch of the exotic and invasive Japanese Knotweed occurs on the edge of the community. Buckthorn and Thicket Creeper were noted in the understory.

4.1.2.1 Species at Risk Flora

A list of potential Species at Risk (SAR) in Niagara Region was provided by the MNRF, Niagara Area office. The list was reviewed and screened for habitat suitability within the broad study area. From this list, it was determined that the likelihood of occurrence in the study area is extremely limited for all but nine species, based on the presence of suitable habitat. The nine species with potential habitat in the study area are listed below.

Endangered Species (COSEWIC [Committee on the Status of Endangered Wildlife in Canada] and COSSARO [Committee on the Status of Species at Risk in Ontario]):

- American Chestnut (*Castanea dentata*)
- American Columbo (*Frasera caroliniensis*)
- Butternut (*Juglans cinerea*)
- Eastern Flowering Dogwood (*Cornus florida*)

Threatened Species (COSEWIC and COSSARO):

- Kentucky Coffee-tree (*Gymnocladus dioica*)
- Round-leaved Greenbrier (*Smilax rotundifolia*)
- White Wood Aster (*Eurybia divaricata*)

Special Concern Species (COSEWIC and COSSARO)

- Green Dragon (*Arisaema dracontium*)
- Swamp Rose-mallow (*Hibiscus moscheutos ssp moscheutos*)

Of the above-noted species, only one, Butternut, was observed during field surveys. Butternut is designated by COSEWIC as Endangered in Canada and it is listed on Schedule 1 of the Species at Risk Act (SARA). It is also designated by MNRF as Endangered, and subject to the provisions of the Ontario Endangered Species Act (ESA 2007). This species also has a provincial rarity rank of S3?[4]. Although protected under both SARA and ESA, only the ESA applies in this scenario as the observations of Butternut are not on federal lands. Butternut status is based on its susceptibility and decline due to disease (Butternut canker) and not habitat limitations. A health assessment of the two Butternut trees was not conducted and therefore should be assessed at a future time that is closer to any anticipated impacts.

4.1.3 Wildlife and Wildlife Habitat

Surveys for wildlife and wildlife habitat assessments were conducted on July 7, 2011 with supplemental surveys on September 2, 2011. Additional wildlife surveys were undertaken in 2012 within the refined study area. The refined study area focused on the area to the north of the existing bridge / QEW as well as a smaller area to the south of the QEW in the area where municipal road realignments are proposed. Observations were attributed to one of eight Wildlife Survey Units (WSU) delineated in **Exhibit 4-3**

Survey units were partitioned based on broad habitat characteristics and continuity. The refined study area focuses on WSU 1, 2, 3, and 4, which are described in **Table 4-2**. WSU 5 and 7 are also described as minor impacts to these WSU are proposed. WSU 6 and 8 are not discussed in further detail as they are beyond the refined study area and there are no anticipated impacts to these WSU.

TABLE 4-2: WILDLIFE SURVEY UNITS DESCRIPTIONS

Wildlife Survey Unit	Description
WSU 1	WSU 1 is a cultural landscape mosaic including a mix of mown grass, a small, disturbed, second-growth deciduous forest and several small cultural meadow areas (including the highway right-of-way and Glendale Avenue interchange). The site is generally considered low quality wildlife habitat, common within the broader study area and the local landscape. Although Eastern Meadowlark (*Sturnella magna,* Threatened, COSSARO and COSEWIC) was observed in this unit (possible breeding evidence), the potential for SAR species, beyond those already confirmed, is low.
WSU 2	WSU 2 is a successional cultural meadow with a small cultural woodland at the west end and a few anthropogenic elements (church and residential properties) throughout. As with WSU 1, this unit supports possible breeding evidence for Eastern Meadowlark, although the habitats present are generally poor quality and common and widespread in the broader study area and local landscape. The relatively low quality of the unit is due to isolation and fragmentation (i.e., being bounded by busy roadways on all sides) and small size. Successional cultural meadow is very common and widespread in the Niagara Region, with many areas present that are much larger in size and with greater SAR potential.
WSU 3	WSU 3 supports a disturbed second growth deciduous forest at the west end, cultural meadow along the roadway, and small patches of thicket and cultural woodland throughout. Beyond the immediate roadside edge habitats, agricultural fields dominate. WSU 3 is generally poor quality habitat throughout with a large degree of fragmentation and disturbance with a low potential of supporting SAR species.
WSU 4	Though largely anthropogenic in nature, with the majority of the unit likely created by Welland Canal dredge spoil, WSU 4 is fairly diverse with a variety of habitats that are uncommon within the refined study area. WSU 4 supports several wetland habitats of moderate quality, as well as large areas of shrub / successional, semi-open and cleared lands. This habitat mosaic creates a site with higher than average SAR potential, largely due to the uncommon nature of the habitats relative to the rest of the refined study area. The wetlands have confirmed presence of Snapping Turtle (*Chelydra serpentine,* Special Concern, COSEWIC and COSSARO), and there is some potential for Eastern Ribbonsnake (*Thamnophis sauritus septentrionalis,* Special Concern, COSEWIC and COSSARO). The Green Ash Mineral Deciduous Swamp, located centrally, has some wetland bird breeding potential as well as good habitat for herpetofauna in general.
WSU 5	WSU 5 is almost entirely anthropogenic in nature, with a mix of cultural meadow, small cultural woodland and unmown roadside edges, and is bisected throughout by heavily travelled roadways. There is virtually no connectivity to adjacent natural features and the area represents very poor current or potential future wildlife habitat. The cultural meadow possesses somewhat higher quality of habitat, with some possibility of hosting Monarch (*Danaus plexippus*, Special Concern, COSEWIC and COSSARO) (Milkweed present) and Eastern Milksnake (*Lampropeltis Triangulum*, Special Concern, COSEWIC and COSSARO), although the long-term viability of any such populations would be limited. No SAR species were recorded in this WSU and very limited potential SAR habitat is present.
WSU 7	WSU 7 is a mix of cultural woodland, cultural thicket, deciduous swamp and roadside cultural meadow. This unit possesses higher than average breeding bird diversity, higher than average faunal diversity, several confirmed records of SAR and the potential to host additional SAR. In terms of SAR breeding birds, both Eastern Wood Pewee (*Contopus virens*, Special Concern, COSEWIC and COSSARO) and Wood Thrush (*Hylocichla mustelina*, Special Concern, COSSARO; Threatened, COSEWIC) were recorded in WSU 7 during the breeding bird season, with a strong likelihood of both species nesting as habitat is appropriate. Snapping Turtle (Special Concern, COSEWIC and COSSARO) was recorded from the wetland portion, as were numerous anurans, suggesting a viable wetland community. Eastern Milksnake (Special Concern, COSEWIC and COSSARO) was recorded along the edge of WSU 7 and Eastern Ribbonsnake (Special Concern, COSEWIC and COSSARO) is possible in the wetland portion, as habitat is appropriate. WSU 7 represents one of the most viable, intact and diverse units within the study area.

[4] S3? = Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation. The question mark indicates the rank is uncertain

Avifauna

There were a total of 66 avifauna recorded in the broad study area during the 2011 and 2012 field surveys. Of the 66 avifauna observed, 64 species showed some level of breeding evidence. There were 14 species 'confirmed' breeding, 31 'probable', and the remaining 19 displayed evidence of 'possible' breeding.

Six SAR avifauna were observed in the study area, as outlined below:

- Bobolink (*Dolichonyx oryzivorus,* Threatened, COSSARO and COSEWIC; SARA – no schedule, no status) – evidence of 'possible' breeding observed in WSU 3;
- Eastern Meadowlark (*Sturnella magna,* Threatened, COSSARO and COSEWIC; SARA – no schedule, no status) – evidence of 'possible' breeding observed in WSU 1 and 2;
- Barn Swallow (*Hirundo rustica,* Threatened, COSSARO and COSEWIC; SARA – no schedule, no status) – evidence of 'probable' breeding in WSU 1, 4, 6, and 8 (subsequent surveys would be required to determine availability of suitable nesting habitat in each listed WSU);
- Wood Thrush (Special Concern, COSSARO; Threatened, COSEWIC; SARA – no schedule, no status) – evidence of 'possible' breeding in WSU 7;
- Eastern Wood Pewee (Special Concern, COSSARO and COSEWIC; SARA – no schedule, no status) – evidence of 'possible' breeding in WSU 7; and
- Peregrine Falcon (*Falco peregrinus* presumed *anatum* subspecies, Special Concern, COSSARO and COSEWIC; SARA – Schedule 1, Special Concern) – evidence of 'probable' breeding on the QEW Garden City Skyway.

One *provincially rare* bird, Black-crowned Night-heron (*Nycticorax nycticorax*, S3) exhibited evidence of 'possible' breeding in WSU 4.

Mammals

A total of ten common mammal species were observed during the 2011 and 2012 field surveys, including: Eastern Cottontail (*Sylvilagus floridanus*), White-tailed Deer (*Odocoileus virginianus*), Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), Beaver (*Castor canadensis*), Muskrat (*Ondatra zibethicus*), Grey Squirrel (*Sciurus carolinensis*), Deer Mouse (*Peromyscus maniculatus*), Meadow Vole (*Microtus pennsylvanicus*) and Woodchuck (*Marmota monax*). No provincially or federally designated species at risk or provincially rare (S-Rank) mammal species were observed.

Herpetofauna

Searches for Eastern Milksnake, Eastern Ribbonsnake, and other snake species were conducted within the study area during the 2011 and 2012 field surveys, and two snake species were observed: Eastern Gartersnake (*Thamnophis sirtalis sirtalis*) and Eastern Milksnake. Potential habitat for two SAR snake species was identified within the study area: Eastern Milksnake and Eastern Ribbonsnake.

- Eastern Milksnake (Special Concern, COSEWIC and COSSARO; SARA – Schedule 1, Special Concern) – an adult Eastern Milksnake was observed adjacent to WSU 7 (beneath a cover object within the road right-of-way). Suitable habitat for Eastern Milksnake is found throughout the study area.
- Eastern Ribbonsnake (Special Concern, COSEWIC and COSSARO; SARA – Schedule 1, Special Concern) – Suitable habitat for Eastern Ribbonsnake is found in WSU 4 and 7.

Wetlands within WSU 7 as well as areas within the St. Lawrence Seaway Management Corporation property (i.e., WSU 4 and 8) provide potentially suitable turtle nesting and basking habitat. Searches for Snapping Turtle, as well as other turtle species, were conducted in these areas during the 2011 and 2012 field surveys.

Potential habitat for Snapping Turtle and Midland Painted Turtle was noted within WSU 4, 7 and 8. Both species were confirmed in the study area, though only Snapping Turtle is a SAR.

- Snapping Turtle (Special Concern, COSEWIC and COSSARO; SARA – Schedule 1, Special Concern) – one adult Snapping Turtle was observed in WSU 4 and one adult Snapping Turtle was observed in WSU 7.

A total of five amphibian species were recorded within the study area during the 2011 and 2012 field surveys: Green Frog (*Lithobates clamitans*), Northern Leopard Frog (*Lithobates pipiens*), Western Chorus Frog (Carolinian population) (*Pseudacris triseriata*), Gray Tree Frog (*Hyla versicolor*) and American Toad (*Anaxyrus americanus*). Observations were made in WSU 3, 4, 6, 7 and 8. All of these amphibians are common species in Ontario.

Lepidoptera and Odonata

A total of 13 Lepidoptera (butterflies and skippers) and 13 Odonata were observed during the 2011 and 2012 field surveys. Twelve of the 13 observed Lepidoptera and all of the Odonata species observed are common in Ontario. One SAR butterfly was observed in WSU 2 and 4:

- Monarch (Special Concern, COSEWIC and COSSARO; SARA – Schedule 1, Special Concern) – a single Monarch Butterfly was recorded in each of WSU 2 and WSU 4. Potentially suitable habitat is found in WSU 1, 2, 4, and 8.

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Wildlife Survey Units Locations

Exhibit
4-3

4.1.3.1 Species at Risk Fauna

A list of potential SAR in Niagara Region was provided by the MNRF, Niagara Area office. This list was reviewed and screened for habitat suitability within the broad study area. From this list, it was determined that the likelihood of occurrence in the study area is extremely limited for all but 22 species based on the availability of suitable habitat. The 22 species had some limited potential habitat and particularly attention was given to searching for these species or evidence of suitable habitat. Since corresponding with MNRF for the list of potential SAR, five additional species that have potential to occur within the broad study area have been added to the COSSARO and/or COSEWIC SAR lists, and have been included in the assessment. The 27 species observed or having some potential to occur in the study area are outlined below:

Endangered Species (COSEWIC and COSSARO):

- Barn Owl (Tyto alba)
- Gray Ratsnake-Carolinian population (Pantherophis spiloides)
- Spotted Turtle (Clemmys guttata)

Threatened Species (COSEWIC and COSSARO):

- Barn Swallow (*Hirundo rustica*)
- Blanding's Turtle (*Emydoidea blandingii*)
- Bobolink (*Dolichonyx oryzivorus*)
- Chimney Swift (*Chaetura pelagica*)
- Eastern Hog-nosed Snake (*Heterodon platirhinos*)
- Eastern Meadowlark (*Sturnella magna*)
- Grey Fox (*Urocyon cinereoargenteus*)
- Least Bittern (*Ixobrychus exilis*)
- Whip-poor-will (*Anthrostomus vociferus*)

Special Concern Species (COSEWIC and COSSARO, unless noted otherwise below):

- Bald Eagle (*Haliaeetus leucocephalus*) – Designated Not at Risk by COSEWIC
- Black Tern (*Chlidonias niger*) – Designated Not at Risk by COSEWIC
- Common Nighthawk (*Chordeiles minor*) – Designated Threatened by COSEWIC
- Northern Map Turtle (*Graptemys geographica*)
- Peregrine Falcon (*Falco peregrinus*)
- Red-headed Woodpecker (*Melanerpes erythrocephalus*)
- Short-eared Owl *(Asio flammeus*)
- Eastern Ribbonsnake (*Thamnophis sauritus)*
- Eastern Wood Pewee (*Contopus virens)*
- Eastern Milksnake (*Lampropeltis triangulum*)
- Monarch (*Danaus plexippus*)
- Snapping Turtle (*Chelydra serpentina*)
- Southern Flying Squirrel (*Glaucomys volans*) - no longer a species of Special Concern in Ontario or Canada
- Wood Thrush (*Hylocichla mustelina*) – Designated Threatened by COSEWIC

Provincially Rare Species

- Black-crowned Night-heron (*Nycticorax nycticorax*)

A total of nine of the above-noted SAR fauna were confirmed in the study area during field surveys, as well as one provincially rare bird, as summarized below:

- Three Threatened wildlife species were observed in the study area: Barn Swallow, Bobolink and Eastern Meadowlark; none of these species have status under SARA;
- Six Special Concern wildlife species were observed in the study area: Eastern Wood-Pewee, Eastern Milksnake, Monarch, Snapping Turtle, Wood Thrush (designated Threatened under COSEWIC), and Peregrine Falcon; Milksnake, Snapping Turtle and Peregrine Falcon are listed on Schedule 1 of SARA while the others have no status under SARA; and
- One Provincially rare wildlife species was observed in the study area: Black-crowned Night-heron.

Potential habitat for an additional 13 SAR wildlife species is present within the refined study area, although the likelihood of occurrence for most of these species is generally considered to be low or very low.

4.1.4 Aquatic Species and Habitat

A *Fish and Fish Habitat Existing Condition and Impact Assessment Report* (December 2014) was prepared as part of the Preliminary Design and Class EA Study, and is on file at MTO. Topographic maps, aerial photography, drainage maps and existing plans were reviewed to provide context and document the connectivity of the subject features within the surrounding landscape. Three watercourses cross the project limits: the Welland Canal, Tributary of the Welland Canal, and Tributary of Eight Mile Creek. Agencies including MNRF Guelph District Office, Niagara Peninsula Conservation Authority (NPCA) and Fisheries and Oceans Canada (DFO) were contacted, and available secondary information sources such as the MNRF Natural Heritage Information Centre database, DFO Species at Risk (SAR) Mapping and the Region of Niagara SAR list were consulted for relevant background information for the watercourses.

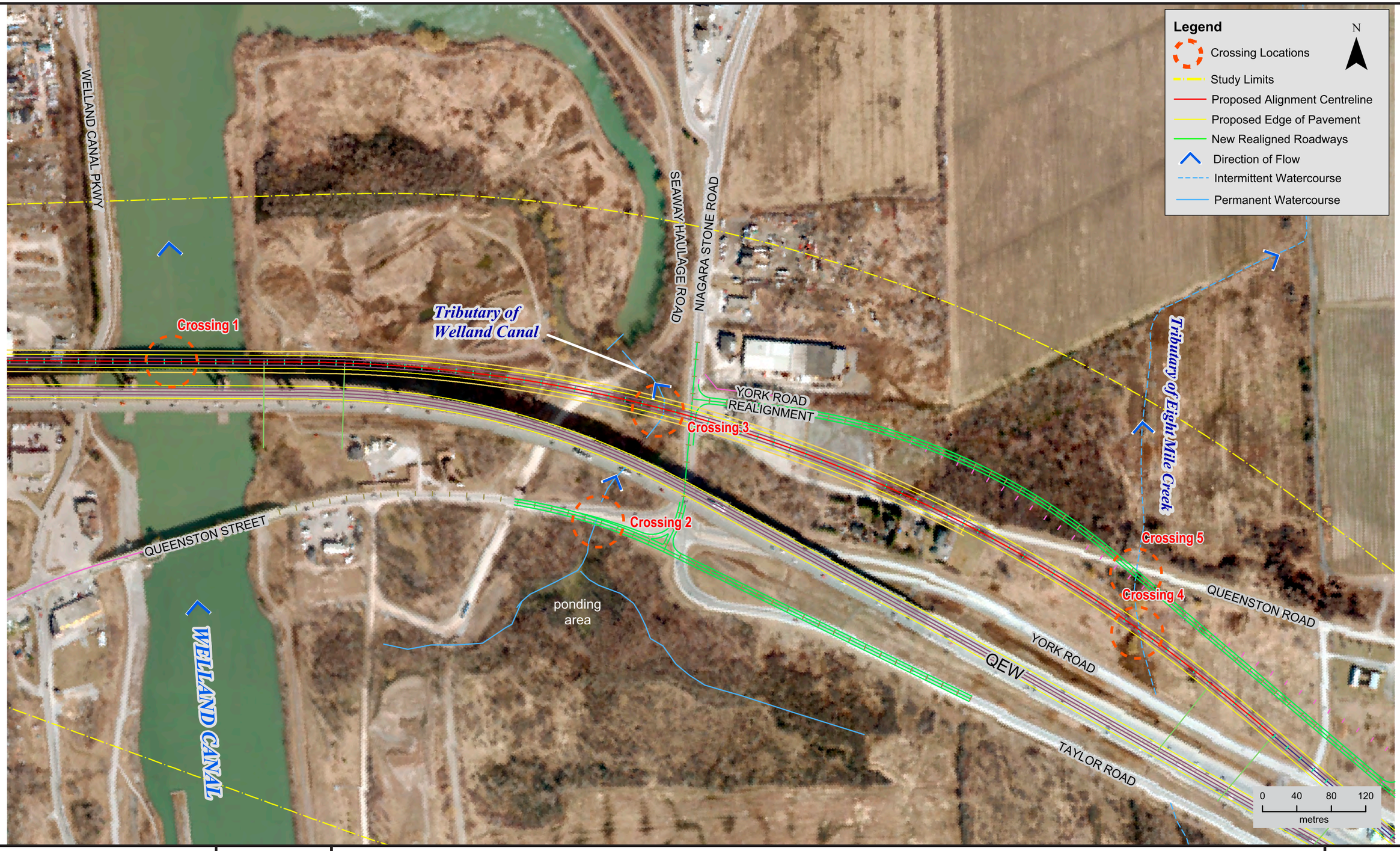
Fish habitat field surveys were conducted on July 7, 2011 and on October 25 and November 5, 2012. Fish habitat surveys were conducted in the vicinity of the bridge and culvert crossing sites, within the highway proposed right-of-way (ROW) and generally approximately 50 m upstream and 200 m downstream of the proposed ROW. Detailed assessments were conducted within the QEW ROW, as well as 20 m upstream and 50 m downstream of the limits of the ROW, a general assessment was conducted approximately 30 m further upstream and 150 m downstream of the limits of the detailed assessment.

4.1.4.1 Aquatic Species at Risk

A review of the NHIC database, DFO SAR Mapping (2013) and consultation with DFO and MNRF staff indicated that no aquatic species of conservation concern are present within the vicinity of the study area limits (including Eight Mile Creek and Six Mile Creek which are shown on **Exhibit 4-1**).

4.1.4.2 Existing Fish and Fish Habitat Conditions

Exhibit 4-4 shows existing watercourse locations and sensitivities, and natural and designated features in the vicinity of the study area. **Table 4-3** provides a summary of fish and fish habitat conditions in the vicinity of the study area.



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Study Area, Watercourse Locations and Sensitivities, Natural and Designated Features

Exhibit
4-4

TABLE 4-3: EXISTING FISH AND FISH HABITAT CONDITIONS SUMMARY

Waterbody (see Exhibit 4-4 for crossing locations)	Flow	Thermal Regime	Substrate Type	Vegetation	Supports a Fishery	MNRF Sensitivity Rating	Fish Species Present	In-Water Construction Timing Window
Welland Canal Crossing #1 (St. 16+820)	Permanent	Warm	Ru (20%), Gr (50%), Sa (30%) in nearshore zone along east bank. Mix of riprap, sand and gravel in nearshore zone along west bank.	No instream vegetation visible (to depth of visibility) Riparian- narrow band of mainly shrubs and trees along west bank (Red-osier Dogwood, Gray Dogwood, Crack Willow, Basswood, elm, Red Oak, Norway Maple, ash). Mowed lawn ~40 m downstream (north) of bridge. Along the east bank, mainly comprised of Common Reed and old field grasses and herbs (e.g., goldenrod spp., aster spp., Queen Anne's Lace), with band of trees and shrubs along bank further downstream (young ash and elm, Buckthorn, Sumac, Gray Dogwood).	Directly	Low	Common Carp (*Cyprinus carpio)*, Bluegill (*Lepomis macrochirus)*, and Brown Bullhead (*Ameiurus bebulosus)* caught by NPCA in vicinity of bridge (variety of other species present in canal system generally)	Between July 1 and February 28/29 of any given year
Tributary of Welland Canal at New Queenston Street, Crossing #2 (St. 9+920)	Likely Permanent (small flows observed during both site visits (July 2011, Oct. 2012)	Warm	Substrates in ponded wetland area upstream are muck and detritus. Muck substrate is found in the channel.	Instream vegetation includes some duckweed and pondweeds downstream of road and then dense Common Reed commencing ~12 m downstream of culvert (creating swale-like flow conditions). Riparian vegetation consists of mainly woody vegetation (ash, willow, Black Alder, Norway Maple, Manitoba Maple, Gray Dogwood) up and downstream of the culvert.	Directly	Low	Brook Stickleback (Culaea inconstans) and Creek Chub (*Semotilus atromaculatus)*	Between July 1 and February 28/29 of any given year
Tributary of Welland Canal at New Bridge, Crossing #3 (St. 17+360)	Likely Permanent (small flows observed during both site visits (July 2011, Oct. 2012)	Warm	Sand dominant with some silt and muck	No instream vegetation. Riparian- woody vegetation (e.g. Norway Maple, ash, willow, Black Alder, Wild Grape)	Directly	Low	Brook Stickleback (Culaea inconstans) and Creek Chub (*Semotilus atromaculatus*) found upstream at Queenston Street.	Between July 1 and February 28/29 of any given year
Tributary of Eight Mile Creek at New QEW, Crossing #4 (St. 18+000)	Intermittent	Warm	Clay dominant with some gravel, silt and chunks of concrete around old farm laneway culvert downstream of crossing.	Instream vegetation consists of dense Common Reed. Riparian vegetation through the QEW crossing area comprised of Common Reed, old field grasses and herbs (e.g., goldenrod and aster spp.) and occasional trees and shrubs (large Crack Willow, ash, Norway Maple).	Indirectly	Low	No fish found	Between July 1 and February 28/29 of any given year
Tributary of Eight Mile Creek at New Queenston Road, Crossing #5 (St. 30+535)	Intermittent	Warm	Mix of rubble and gravel in vicinity of crossing and clay dominant (with silt) further downstream through open agricultural fields	No instream vegetation in immediate vicinity of crossing, however further downstream (through open agricultural fields) there is very dense cattail and Common Reed found instream. Riparian vegetation through the crossing reach comprised of trees and shrubs (e.g., ash, Manitoba Maple, locust, apple, Gray Dogwood) and old-field grasses and herbs.	Indirectly upstream of Queenston Road and nominal potential for seasonal use downstream (limited by flow and dense vegetation)	Low	No fish found	Between July 1 and February 28/29 of any given year

4.1.5 Surface Water and Drainage

4.1.5.1 Surface Soil, Land Use and Drainage

The Welland Canal divides the study area into two parts. East of the Welland Canal, the majority of the study area lies within the watershed of the Eight Mile Creek Tributary. This tributary starts approximately 330 m upstream (south) of Taylor Road (South Service Road). It has a flat morphology and is densely vegetated channel. In the study area, the watercourse crosses Taylor Road, the QEW, York Road (North Service Road) and Queenston Road. It eventually discharges to Eight Mile Creek approximately 2 km downstream (north) of Queenston Road. West of the Welland Canal, runoff from the study area and external lands upstream of the study area are generally serviced by storm sewers, and eventually discharges to the Welland Canal.

According to the Ontario Soil Mapping, the predominant soil type in the study area on the east side of the Welland Canal is the Haldimand series consisting mainly of lacustrine heavy clay. The land use on the east side is dominated by vegetation. The predominant soil type on the west side of the Welland Canal is the Lincoln series also consisting of mainly lacustrine heavy clay. Land use on the west side is mostly urban including commercial and residential areas.

Exhibits 4-5 (a to d) illustrate the drainage mosaic in the vicinity of the QEW Garden City Skyway Bridge. The existing drainage systems consist primarily of open ditches, swales, culverts and storm/ditch inlets.

The headwater of the Eight Mile Creek Tributary starts from Catchment 115 and flows northerly collecting the runoff from Catchment 120 and drains via Culvert C1 on Taylor Road and Culvert C2 on the QEW. Runoff from a portion of the QEW on the south side and a portion of Taylor Road (Catchment 130) drains via a roadside ditch and discharges through Culvert C2. The high point of the Skyway Bridge is located at the center of the Welland Canal which divides the roadway runoff to the east and west of the canal. On the east side, runoff from highway Catchments 190, 200 and 165 are collected by catchbasins and storm sewers and drained to Culvert C2. Similarly, a portion of the QEW on the north side and a portion of York Road (Catchment 170) drains via a road side ditch and discharges on the downstream of Culvert C2 (upstream of Culvert C3). The tributary crosses Culvert C3 on York Road and Culvert C4 on Queenston Road, ultimately discharging to the Eight Mile Creek. Runoff from Catchments 175 and 180 ultimately drains to the Eight Mile Creek.

The Welland Canal Tributary originates from Catchment 125. Runoff from a 61.4 ha drainage area of Catchment 125 drains via Culvert C5 located on Queenston Street to the east of Seaway Haulage Road. Approximately 45 m downstream of Queenston Street, the tributary flows under the existing Skyway Bridge, which is approximately 30 m wide. Approximately 30 m downstream of the Skyway Bridge, the tributary flows through a culvert under a pathway. Further downstream it drains via a twin CSP culvert under the Seaway Haulage Road, and ultimately discharges on the embayment of the Welland Canal. Runoff from Catchment 135 also drains into the Welland Canal Tributary.

On the west side of the Welland Canal, runoff from Catchment 300 drains overland northerly below the Skyway Bridge and ultimately discharges to the Welland Canal. In some areas near Dunkirk Road, minor system runoff is conveyed via storm sewers to discharge to the Eastchester Avenue Storm Sewer System.

Minor system runoff from a 68.7 ha drainage area of Catchment 305 is drained via the Eastchester Avenue Storm Sewer System to the Welland Canal and major system runoff drains overland through Culvert C6.

Runoff from the highway Catchments 310, 315, 320, 325 and 330 are captured by catch-basins and conveyed via storm sewers. The storm sewers discharge to the north side ditch near Station 15+300 between the QEW and Dieppe Road. Highway Catchments 335 and 340 drain to Culvert C6 which ultimately discharges to the ditch located between the QEW and Dieppe Road. A small portion of the drainage area between the QEW and Dieppe Road (Catchment 332) is drained via the roadside ditch. The combined flows from the storm sewer, Culvert C6 and roadside ditch discharge to the ditch north of Dieppe Road via Culverts C7 and C8. The ditch runs northerly from the west side of Neilson Avenue and ultimately discharges to the Welland Canal.

Runoff from Catchments 350 and 365 is conveyed by storm sewers and discharges to the north side ditch of the QEW. Runoff from Catchment 345 drains overland to the south side ditch and runoff from Catchments 355 and 370 drains overland to the north side ditch.

WSP received 'As Constructed' drawings of the Eastchester Avenue Storm Sewer System from the City of St. Catharines (Dwg. 006-809, attached in Appendix C of the Drainage Stormwater Management Report). According to the drawing, 4 inlets (Catch Basin 20, Ditch Inlet Catch Basin 21, Ditch Inlet Catch Basin 23 and Ditch Inlet Catch Basin 24) drain to the Eastchester Avenue Storm Sewer. **Exhibit 4-5b** shows the drainage boundary for the area drained by these 4 inlets into the Eastchester Avenue Storm Sewer, which is 3.25 ha (Catchment 400).

Table 4-4 provides a summary of the characteristics of the existing eight (8) culverts located within the study area. Out of these, five (5) culverts are located on the east side of the Welland Canal and three (3) culverts are located on the west side of the Welland Canal.

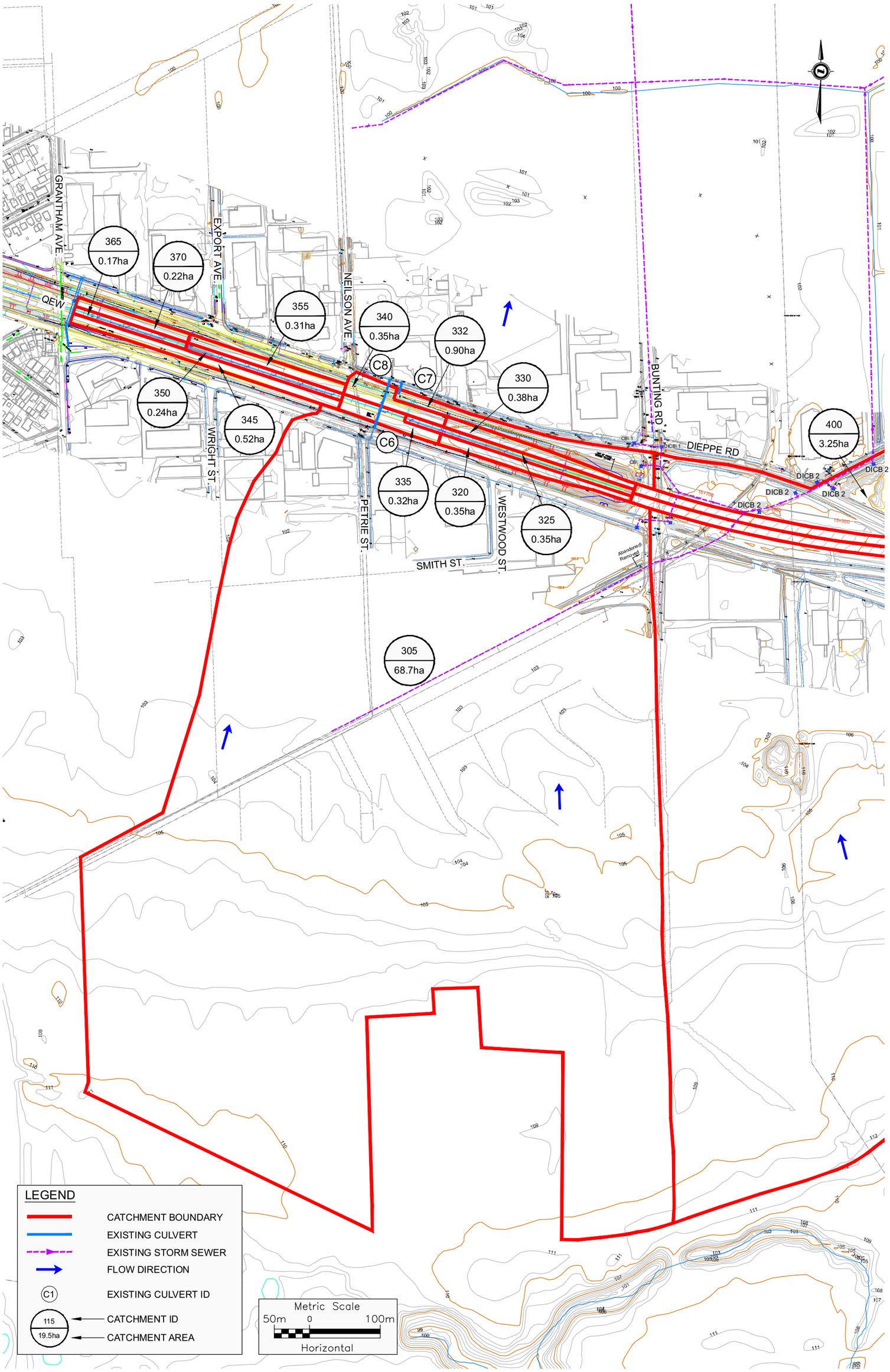
TABLE 4-4: SUMMARY OF EXISTING CULVERT CHARACTERISTICS

Culvert ID	Location	Station	Culvert Dimensions			Type	Material	Upstream Invert (m)	Downstream Invert (m)	Flow Direction
			Width	Height	Length (m)					
C1	Taylor Road, south side of the QEW east of the Welland Canal	18+060	940 mm	640 mm	19.5	NRFB	Concrete	111.51	111.43	S → N
C2	QEW, east of the Welland Canal	18+050	1000 mm diameter		59.0	Pipe Circular	Corrugated Steel	111.01	110.71	S → N
C3	York Road, north side of the QEW east of the Welland Canal	18+020	1.22 metres	0.96 metres	31.2	NRFB	Concrete	110.64	110.37	S → N
C4	Queenston Road, north of York Road, east of the Welland Canal	17+920	1.28 metres	1.28 metres	22.8	Circular	Corrugated Steel	107.68	105.78	S → N
C5	Queenston Street, east of Seaway Haulage Road	17+360	1.83 metres	1.40 metres	50.0	RFO	Concrete	102.56	102.38	S → N
C6	QEW at Petrie St. west of the Welland Canal	15+220	0.92 metres	0.92 metres	53.3	NRFB	Concrete	100.38	100.25	S → N
C7	Dieppe Road, east of Neilson Ave., west of the Welland Canal	15+220	500 mm diameter 500 mm diameter		15.0 15.0	Pipe Circular (Twin)	Corrugated Steel	100.21 100.23	100.20 100.20	S → N
C8	Dieppe Road, east of Neilson Ave., west of the Welland Canal	15+240	500 mm diameter 500 mm diameter 500 mm diameter		15.0 15.0 15.0	Pipe Circular (3-cell)	Corrugated Steel	100.25 100.25 100.23	100.22 100.23 100.21	S → N

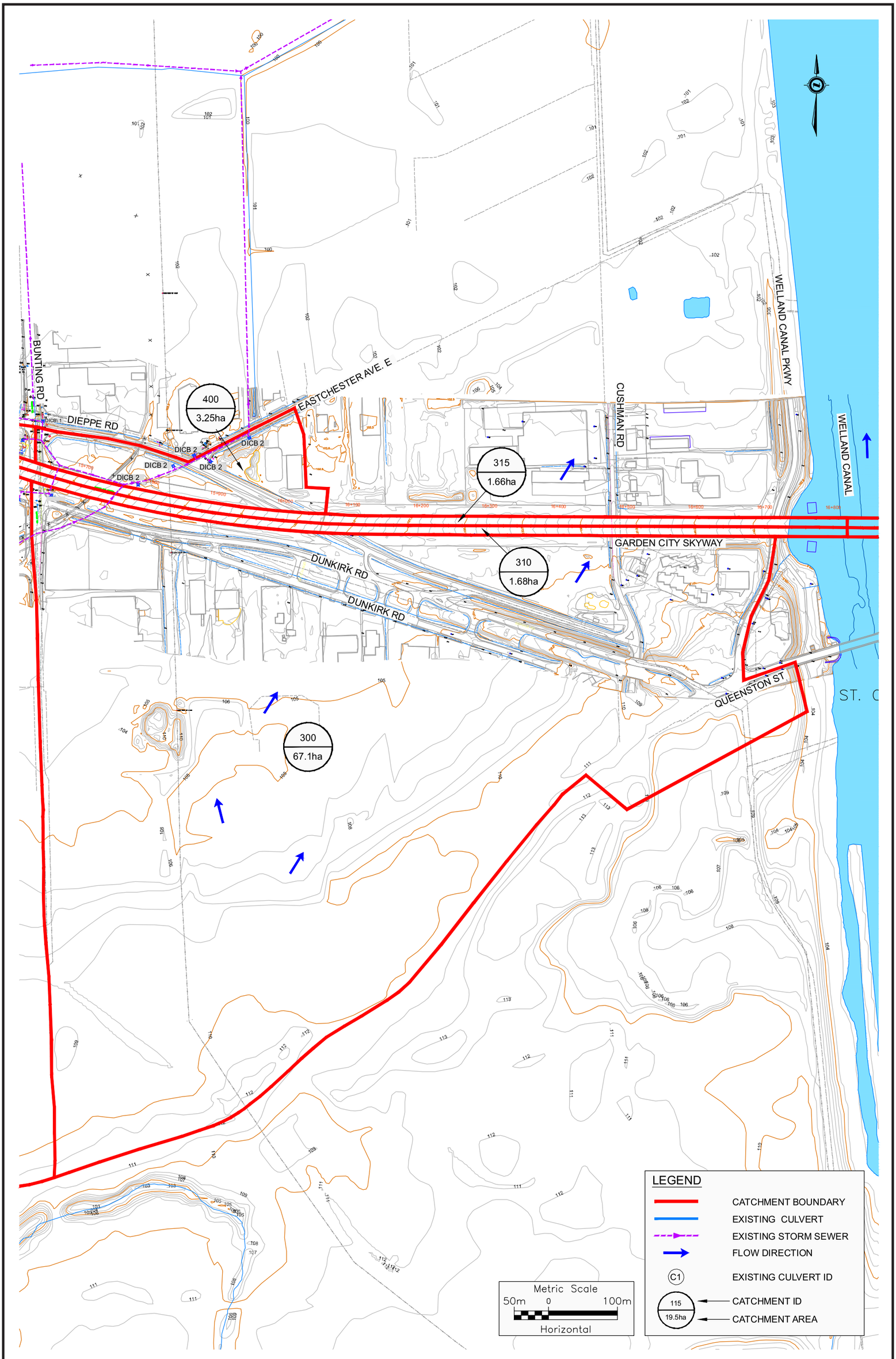
Note: NRFB = Non Rigid Frame Box

RFO = Rigid Frame Open

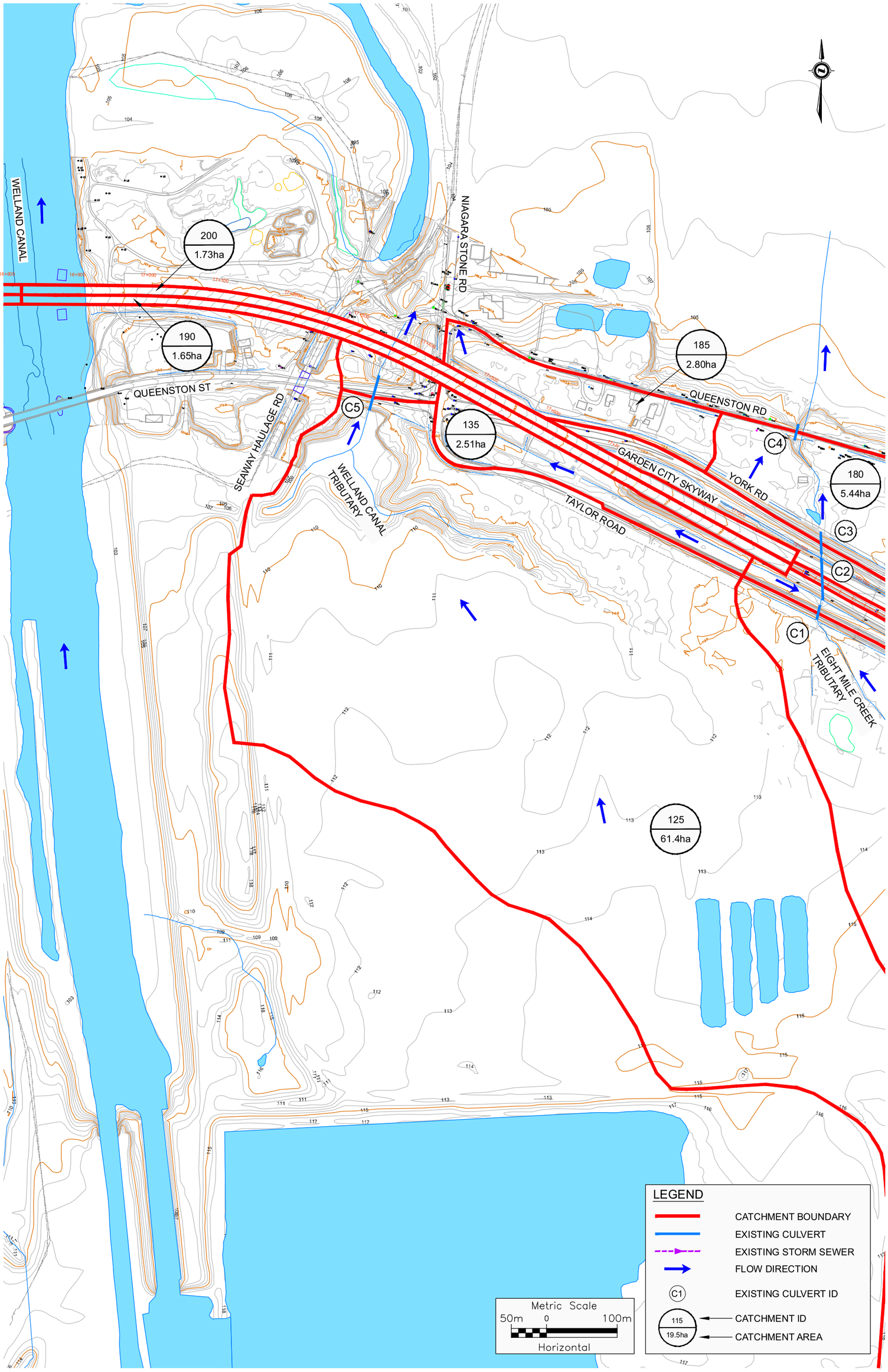
In most cases, existing culvert invert elevations were surveyed. However, for Culvert C5 invert elevations were estimated by subtracting the 1.40 m height from surveyed obvert elevations.



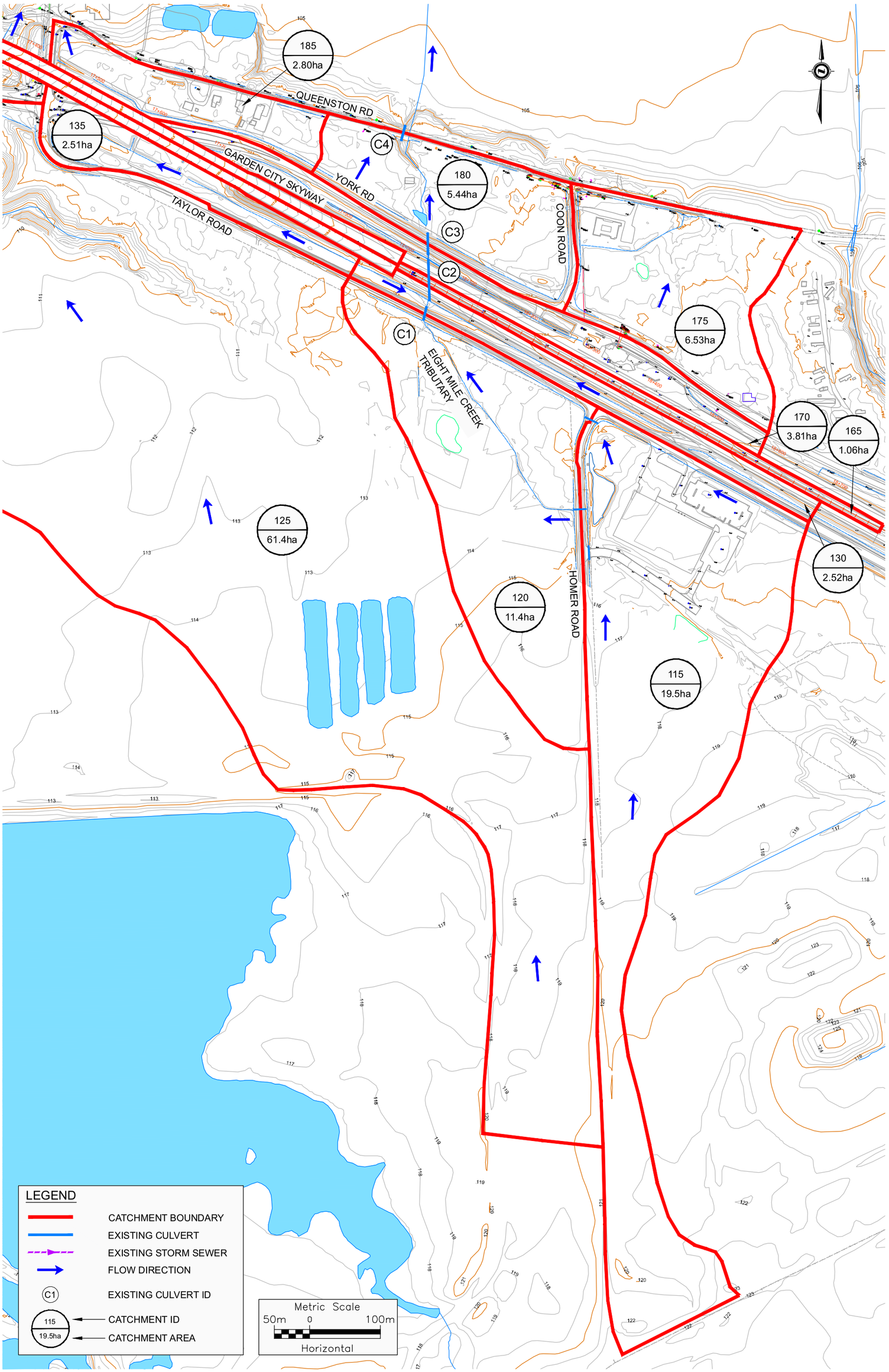
QEW GARDEN CITY SKYWAY EA W.O. 08-2009	wsp Ontario	Existing Drainage	Exhibit 4-5a



QEW GARDEN CITY SKYWAY EA W.O. 08-2009	wsp Ontario	Existing Drainage	Exhibit 4-5b



QEW GARDEN CITY SKYWAY EA W.O. 08-2009	wsp Ontario	Existing Drainage	Exhibit 4-5c



QEW GARDEN CITY SKYWAY EA W.O. 08-2009	wsp Ontario	Existing Drainage	Exhibit 4-5d

4.1.6 Groundwater

Stormwater runoff within the study area is primarily from urban to rural areas and from vacant areas. Stormwater in the study area is conveyed through municipal sewers or drainage ditches along the roadways. All stormwater is eventually discharged into surface watercourses. Surface watercourses in the study area are discussed in **Section 4.1.5**.

The study area is present within the Niagara Peninsula Source Protection Area (NPSP Area). The NPSP Area is divided into three major drainage areas: Lake Ontario, Niagara River (including Welland River) and Lake Erie Drainage Areas. The Clean Water Act (2006) requires Source Protection Plans to consider policies that relate to the Great Lakes. Since the Welland Canal is connected to Lake Ontario and Lake Erie, the same policies apply to protection of surface water in the Welland Canal. This includes the Canada-United States Great Lakes Water Quality Agreement; the Canada-Ontario Agreement Respecting the Great Lake Basin Ecosystems; the Great Lakes – St. Lawrence River Basin Water Resources Compact; and the Great Lakes Charter (MOECC, December 17, 2013).

A search of the MOECC water well information system identified 54 water well records within the 500 m evaluation zone of the study area. The well records were obtained through a MOECC database search.

Review of the MOECC website identified that there are no active Permits to Take Water within the study area as of January 12, 2015.

According to the Ontario Geological Survey Mapping “Surficial Geology of Southern Ontario” (OGS, 2010), several types of deposits are present within the study area. This includes fill (man-made) materials within the Welland Canal, in the west portion and to the south of the study area. Deposits of Silty Clay to Clayey Silt Till (Halton Till) are present within the northwest and east portions of the study area; sporadic glaciolacustrine deposits of clay and silt are present in the east portion of the study area (OGS, 2010). Deposits of silt / sand and sand / gravel can be found in the west and southwest portions of the study area. While glaciolacustrine deposits of silt and sand and deposits of sand and gravel have a medium to high permeability, deposits of Halton Till and clay and silt are low permeability deposits (see **Exhibit 4-6**).

The degree of groundwater susceptibility to contamination largely depends on the presence or absence of permeable surficial materials, the depth to the groundwater table and location relative to surface water features and water wells.

Based on available information reviewed for this study, general locations have been identified which may have groundwater susceptibility to contamination from construction activities. These areas were identified within the Study Area, considering the following criteria:

- Areas containing sand and gravel deposits have high permeability;
- Areas containing silt and sand and fill (man-made) deposits have medium permeability; and
- Areas where groundwater discharge is present at the surface have high susceptibility to contamination.

Based on the criteria described above, the following approach was taken to classify areas having low, medium or high groundwater susceptibility conditions in the Study Area. Sand and gravel deposits in the west and central portions of the study area were marked as areas with high groundwater susceptibility to contamination. The area with swampy conditions and areas with wetland pockets were interpreted to be areas with high groundwater susceptibility to contamination. Areas with silt and sand deposits and fill deposits were identified as having medium groundwater susceptibility to contamination. Areas with low permeability such as Halton Till were interpreted as having low groundwater susceptibility to contamination (see **Exhibit 4-6**).

The degree of surface water susceptibility to contamination, which may occur within the study area during construction activities of the project, was selected based on the following approach:

- Areas with open channel flow, and exposed surface water present in the study area were identified as having high surface water susceptibility to contamination;
- Areas where surface water flows through underground features or in ephemeral water features were identified as having medium susceptibility to contamination (see **Exhibit 4-6**).

Wellhead protection refers to the process of identifying areas where wells will potentially draw water supply from and are identified where wells serve large populations. As described in the Source Protection Plan for the NPSP Area (MOECC, December 17, 2013), there are no municipal wells in the NPSP Area and therefore there are no Wellhead Protection Areas in the Study Area.

There are six water treatment plants (WTP) that supply municipal drinking water to residents in the Niagara Region. The closest WTP to the Study Area is the Welland Water Treatment Plant. An intake of raw surface water from Lake Erie via the Welland Canal and Welland Recreational Canal (also known as Old Welland Canal) occurs approximately 18 km south of the study area (MOECC, November 28, 2013). This indicates that the study area relies predominantly on surface water rather than groundwater

An inspection of the study area was completed on November 6, 2014, to observe the general land use and topography of the study area, physiographic features that could have an influence on existing groundwater conditions, as well as confirm groundwater users / municipal supply areas in the study area. The following observations were made during the study area inspection:

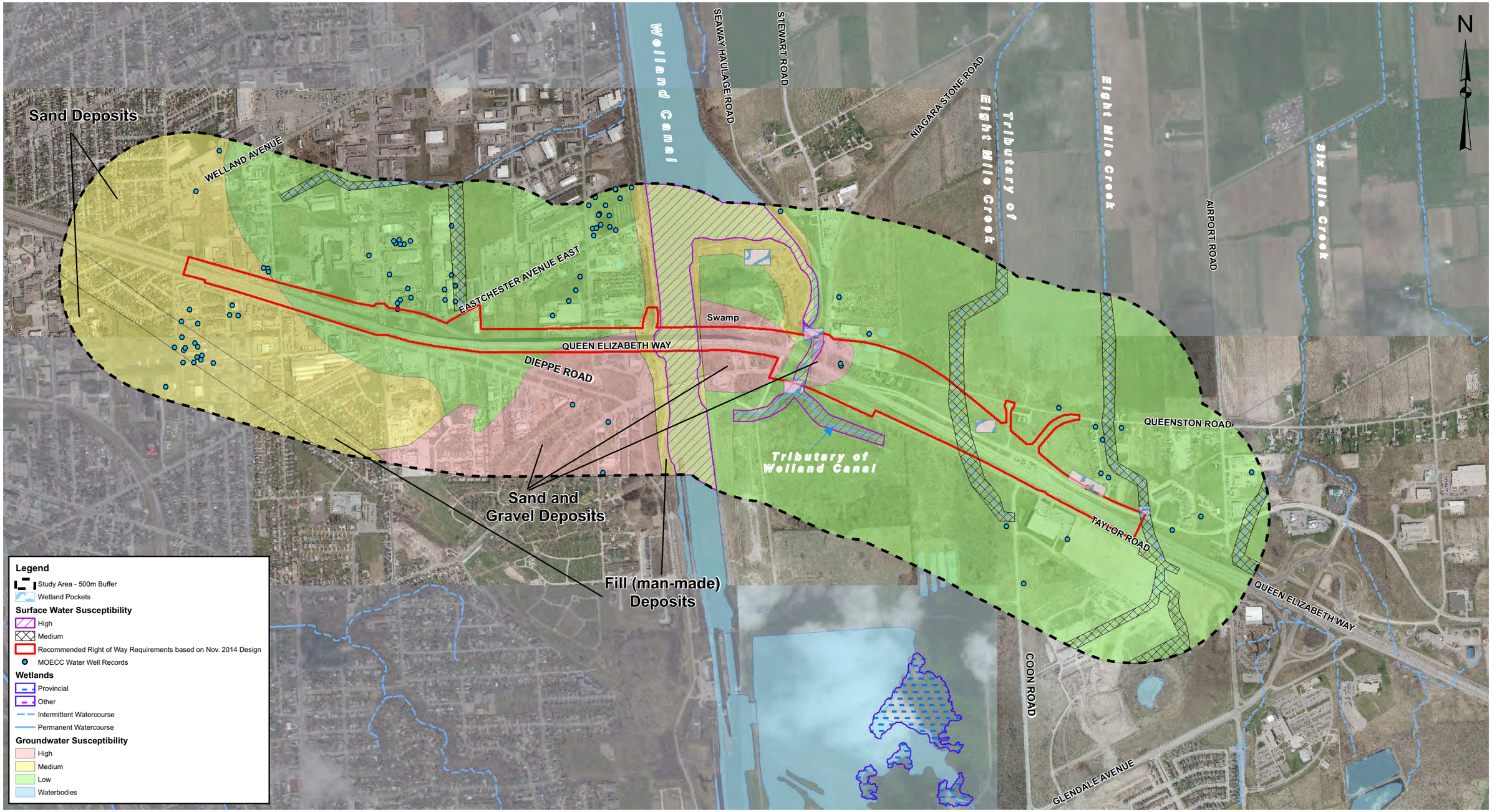
<u>Surface Water and Groundwater Findings</u>

- Six wetland pockets and one area with swampy conditions were observed to be present east of the Welland Canal. These areas may potentially be linked to a shallow unconfined aquifer.
- Surface water was observed in Eight Mile Creek and the Welland Canal, in the east and central portions of the study area.
- Some culverts and roadside ditches along roads in the study area were observed to be dry, which indicates that surface water flow in these areas is seasonal or weather-dependent.

<u>Municipal Serving and Water Supplies in Study Area</u>

- A water supply cistern was observed northeast of the Queenston Road and Niagara Stone Road intersection (**Exhibit 4-7**). It is unknown if the cistern is an active water supply; however, it is suspected that the cistern could be linked to water storage to water crops.
- Water wells were not observed in an old neighbourhood along Queenston Road and east of Niagara Stone Road.
- The area along Seaway Haulage Road to the east of the Welland Canal does not appear to be municipally serviced (**Exhibit 4-7**), based on a review of water well records and utilities drawings, and the absence of fire hydrants in the area.
- Developed areas in the west and east of the study area appear to be municipally serviced, based on the presence of fire hydrants in these areas and a review of utilities drawings.

Based on the results of the study area inspection, it appears that localized groundwater areas of concern may exist in the study area. This includes wetland pockets and the area with swampy conditions, which may be potentially groundwater-fed.



REFERENCE
Imagery © 2013 ESRI and its data suppliers, MTO
http://services.arcgisonline.com/ArcGIS/services
Projection: UTM Zone 17N Datum: NAD 83

0 1 2 Kilometers

Scale: As Shown

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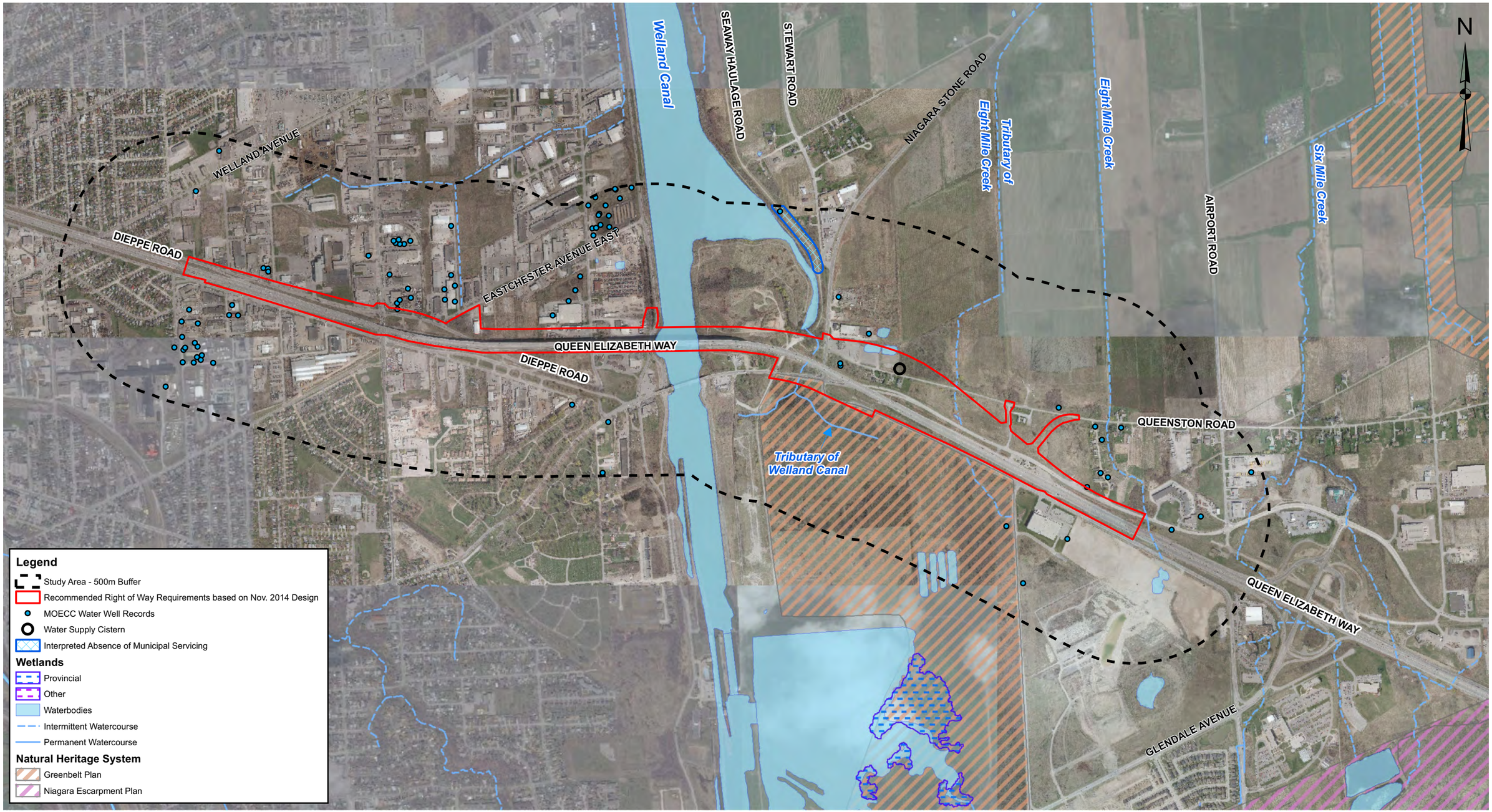
Areas of Potential Groundwater and Surface Water Susceptibility

Exhibit
4-6



REFERENCE
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Projection: UTM Zone 17N Datum: NAD 83

0 1 2 Kilometers

Scale: As Shown

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Ontario

Natural Features and Built Environment

Exhibit
4-7

4.1.7 Contaminated Properties

A Contamination Overview Study (COS) was undertaken to determine the presence and significance of any actual or potential contamination within the study area that may affect future corridor design and construction activities. The COS was based on the known current and former land uses and activities within and surrounding the corridor. The study involved a records review (including review of existing reports and historical records, and MOECC records) and study area inspection.

Based on the evaluation of the data collected from the records review and study area inspections, broad Areas of Potential Environmental Concern (APECs) were identified in the vicinity of the QEW Garden City Skyway. These areas have been categorized by assessing the overall relative potential of contamination from the findings and are summarized below.

APECs with High Potential for Contamination

West Extent

- Several spills have occurred in the industrial and commercial areas both north and south of the QEW from Grantham Avenue east towards the QEW Garden City Skyway;
- Several automotive repair and truck repair centres were also observed within the commercial / industrial areas;
- One gas station located on Niagara Street, north of the QEW;
- One former PCBs storage site located north of the QEW on Dieppe Road;
- Metal Recycler located north of QEW on the east side of Cushman Road (this is the former site of an auto wrecker); and
- Former auto wrecker located north of the QEW on the west side of Cushman Road.

East Extent

- One manufacturer on the east side of Niagara Stone Road, north of the QEW;
- Two car repair centres, one located north of the QEW on Niagara Stone Road and the other south of the QEW on Queenston Street (formerly a gas station);
- One gas station north of the QEW on York Road;
- An automotive parts warehouse, metal fabricator and a bus repair / storage on Airport Road, north of the QEW; and
- An industrial mall and construction company, north of the QEW, on York Road.

APECs with Moderate Potential for Contamination

West Extent

- A large cemetery (Victoria Lawn Cemetery) located south of the QEW along Queenston Street.

East Extent

- One large agricultural field located north of the QEW on the north side of Queenston Street; and
- One small cemetery (Homer Cemetery) south of the QEW on Queenston Street.

In addition to the properties listed above, another moderate potential for concern includes road salt impacts, the presence of spills along the QEW right-of-way and the Welland Canal, including the deposition of dredged materials located north of the QEW and east of the canal.

APECs with Low Potential for Contamination

All other areas were identified as having low potential for site contamination and primarily consist of residential and/or vacant lands.

Two phases of Contaminant Investigations were also undertaken in select APECs, as identified in the COS, where geotechnical borehole investigations were being drilled. The Contaminant Investigations were completed to determine the presence or absence of soil contamination within or adjacent to APECs with high concern, and to provide recommendations for further studies such as subsurface investigations (if warranted) and/or remediation options. Soil samples were collected and complete chemical and physical analyses of representative soil samples were undertaken.

Preliminary Site Screenings (PSS) were completed for properties anticipated to be impacted by the proposed works in November 2013, where Permission to Enter (PTE) was granted, and are on file at MTO. The purpose of completing PSS was to evaluate the potential for contamination at each PSS property, based on the current land use and indicators of presence of potential contamination at the property.

The recommendations are highlighted in **Section 8.1.5**.

4.2 Socio-Economic Environment

4.2.1 Land Use

The study area is located within Niagara Region, spanning the boundary between the City of St. Catharines and the Town of Niagara-on-the-Lake. The study limits are shown in **Exhibit 1-1.** In 2011, the City of St. Catharines had a population of 131,400, the Town of Niagara-on-the-Lake had a population of 15,400, and the Region of Niagara had a population of 431,346 (Statistics Canada [StatsCan] 2012a;StatsCan 2012b; StatsCan 2012c).

There are several federal properties located in the vicinity of the QEW Garden City Skyway. The properties include lands associated with the existing Welland Canal, including parcels with the following Property Identification Numbers (PINs): 463250099, 463250118, and 464150336. It is understood that an air rights agreement with the St. Lawrence Seaway Management Corporation may be required for PINs 463250099 and 463250118, as the future bridge will overpass the Welland Canal within these parcels. Impacted federal properties also include lands that were acquired by the federal government in the 1960s for a future realignment of the Welland Canal, including parcels with PINs 463590187, 463590188, 463590189, and 463590090. These parcels have been identified by Transport Canada as being surplus to operational needs. It is noted that the Homer Bridge, and the Bridge Operator's House and Electrical Transformer Building associated with the Homer Bridge, are not anticipated to be directly impacted by the proposed works.

There is an existing trail in the study area: the Welland Canals Parkway Trail runs north to south on the west side of the Welland Canal, and extends 42 km between Port Colborne and St. Catharines.

4.2.1.1 Provincial Planning Context

Provincial policy documents provide direction on land use, growth, infrastructure planning, trade, tourism and recreation, and environmental protection, and help dictate municipal planning policy. The following Provincial Plans were found to be applicable to the project.

Places to Grow Act 2005: Growth Plan for the Greater Golden Horseshoe, 2006

Given the Preliminary Design study was initiated in November 2010, this study was based on the policies within the 2005 *Places to Grow Act*. Since then, an amended *Places to Grow Plan* (2017) has been released which came into effect July 1, 2017.

The Places to Grow Act (2005) provides the Province with the authority to establish growth plans, and contains policies about urban expansion and settlement growth boundaries to which all municipalities within the Growth Plan area must conform. This study area is located within the boundaries of the *Growth Plan for the Greater Golden Horseshoe* (2006), which is a comprehensive growth management plan to the year 2031 for much of Southern Ontario. It directs growth to built-up areas, creates long-term density targets, and mandates a compact, transit-supportive, and efficient form of urban development. The Growth Plan identifies the study area lands in the City of St. Catharines as 'Built-Up Area', and the lands within the Town of Niagara-on-the-Lake as subject to the Greenbelt Plan.

Greenbelt Plan, 2005

Given the Preliminary Design study was initiated in November 2010, this study was based on the policies within the 2005 *Greenbelt Plan*. Since then, an amended *Greenbelt Plan* (2017) has been released which came into effect July 1, 2017.

Lands within the study area in the Town of Niagara-on-the-lake are protected under the *Greenbelt Plan*. The purpose of the Greenbelt is to protect agricultural lands, natural heritage areas, and water resources, and to provide socio-economic development for rural communities. The Greenbelt establishes areas where development is restricted by designating lands within the set boundaries as: Protected Countryside (Agricultural, Natural Heritage, and Settlement Areas), Towns/Villages/Hamlets, Niagara Escarpment Plan Area, and Oak Ridges Moraine. The study area lands within the Town of Niagara-on-the-Lake are identified as Protected Countryside in the Niagara Peninsula Tender Fruit and Grape Area which is a specialty crop area.

However, the *Greenbelt plan* allows for development within specialty crop areas of the Protected Countryside areas provided the following policies (*Greenbelt Plan*, Section 3.1.2) are followed:

1. *Within specialty crop areas, normal farm practices and a full range of agricultural, agriculture-related and secondary uses are supported and permitted.*
2. *Lands within specialty crop areas shall not be redesignated in municipal official plans for non-agricultural uses, with the exception of those uses permitted in the general policies of sections 4.2 to 4.6.*
3. *Towns/Villages are not permitted to expand into specialty crop areas.*
4. *New land uses, including the creation of lots (as permitted by the policies of this Plan), and new or expanding livestock facilities, shall comply with the minimum distance separation formulae.*

Additional policies (Greenbelt, 2005, Section 4.2.1) that apply for the development of general infrastructure within the Protected Countryside include the following:

1. *All existing, expanded or new infrastructure subject to and approved under the Canadian Environmental Assessment Act , the Environmental Assessment Act, the Planning Act , the Aggregate Resources Act , the Telecommunications Act or by the National or Ontario Energy Boards, or which receives a similar environmental approval, is permitted within the Protected Countryside, subject to the policies of this section and provided it meets one of the following two objectives:*
   a. *It supports agriculture, recreation and tourism, rural settlement areas, resource use or the rural economic activity that exists and is permitted within the Greenbelt; or*
   b. *It serves the significant growth and economic development expected in southern Ontario beyond the Greenbelt by providing for the appropriate infrastructure connections among urban growth centres and between these centres and Ontario's borders.*
2. *The location and construction of infrastructure and expansions, extensions, operations and maintenance of infrastructure in the Protected Countryside, are subject to the following:*
   a. *Planning, design and construction practices shall minimize, wherever possible, the amount of the Greenbelt, and particularly the Natural Heritage System, traversed and/or occupied by such infrastructure ;*
   b. *Planning, design and construction practices shall minimize, wherever possible, the negative impacts and disturbance of the existing landscape, including, but not limited to, impacts caused by light intrusion, noise and road salt;*
   c. *Where practicable, existing capacity and coordination with different infrastructure services is optimized so that the rural and existing character of the Protected Countryside and the overall urban structure for southern Ontario established by Greenbelt and any provincial growth management initiatives are supported and reinforced;*
   d. *New or expanding infrastructure shall avoid key natural heritage features or key hydrologic features unless need has been demonstrated and it has been established that there is no reasonable alternative; and*
   e. *Where infrastructure does cross the Natural Heritage System or intrude into or result in the loss of a key natural heritage feature or key hydrologic feature , including related landform features , planning, design and construction practices shall minimize negative impacts and disturbance on the features or their related functions, and where reasonable, maintain or improve connectivity.*
3. *Infrastructure serving the agricultural sector, such as agricultural irrigation systems, may need certain elements to be located within the vegetation protection zone of a key natural heritage feature or key hydrologic feature. In such instances, these elements of the infrastructure may be established within the feature itself or its associated vegetation protection zone but all reasonable efforts shall be made to keep such infrastructure out of key natural heritage features or key hydrologic features or the vegetation protection zones.*

The *Greenbelt Plan* (Section 4.2.3) also provides direction for developing stormwater management infrastructure within Protected Countryside designated areas:

1. *Storm water management ponds are prohibited in key natural heritage features or key hydrologic features or their vegetation protected zones, except for those portions of the Protected Countryside that define the major river valleys that connect the Niagara Escarpment and Oak Ridges Moraine to Lake Ontario. In these areas, naturalized stormwater management ponds are permitted provided they are located a minimum of 30 metres away from the edge of the river/stream and in the vegetation protection zones of any abutting key natural heritage features or key hydrologic features.*
2. *Applications for development and site alteration in the Protected Countryside shall be accompanied by a stormwater management plan which demonstrates that:*
   a. *Planning, design and construction practices will minimize vegetation removal, grading and soil compaction, sediment erosion and impervious surfaces;*
   b. *Where appropriate, an integrated treatment approach shall be used to minimize stormwater management flows and structures through such measures as lot level controls and conveyance techniques such as grass swales; and*
   c. *Applicable recommendations, standards or targets within watershed plans and water budgets are complied with.*
3. *The objectives of a stormwater management plan are to avoid, minimize and/or mitigate stormwater volume, contaminant loads and impacts to receiving water courses in order to:*
   a. *Maintain groundwater quality and flow and stream baseflow;*
   b. *Protect water quality;*

c. Minimize the disruption of pre-existing (natural) drainage patterns wherever possible;

d. Prevent increases in stream channel erosion;

e. Prevent any increase in flood risk; and

f. Protect aquatic species and their habitat.

Provincial Policy Statement, 2014

The Provincial Policy Statement (PPS) provides the framework to focus growth within settlement areas and support efficient development patterns to optimize the use of land, resources and public investment in infrastructure, through the wise management of natural heritage resources, water, agricultural lands and archaeological resources. The PPS contains policies focused on housing, infrastructure and public service facilities that are applicable to the QEW Garden City Skyway Class EA. Policy 1.6.3 stipulates that before consideration is given to developing new infrastructure and public service facilities, the use of existing facilities should be optimized and opportunities for adaptive re-use should be considered wherever feasible. Policy 1.6.7.2 requires efficient use of existing and planned infrastructure, including through the use of transportation demand management strategies where feasible. Policy 1.6.8.1 specifies that planning authorities shall plan for and protect corridors and ROWs for infrastructure, including transportation and transit facilities to meet current and projected needs. Policy 2.3.1 stipulates that prime agricultural lands must be protected for long-term agricultural use, and Policy 2.3.2 requires that planning authorities designate prime agricultural areas and specialty crop areas in accordance with guidelines developed by the Province.

4.2.1.2 Regional Planning Context

Niagara Region Official Plan (August 2014)

The August 2014 Niagara Region Official Plan indicates that the Urban Areas and Unique Agricultural Areas designations apply to the study area. There are also Core Natural Heritage System components within the study area. Where multiple policies apply, the more specific or restrictive policy will apply where there are conflicts. **Exhibit 4-9** illustrates the locations of designations in the vicinity of the study area

The **Urban Areas** designation (Chapter 4) identifies the location and extent of urban development sufficient to provide for housing, social and employment needs while preventing urban development on inappropriate sites. The majority of growth and development in Niagara Region is directed to existing Urban Areas. The designation permits urban development and indicates that these lands have municipally provided services.

The **Unique Agricultural Areas** designation (Chapter 5) affords the highest priority for agricultural lands preservation in the Plan, and is intended to ensure an efficient and orderly pattern of land uses that will minimize land use conflicts, require a minimum of municipal services and conserve natural resources. Associated policies permit agricultural and compatible uses. For example, the Plan permits transportation facilities of a linear nature within Unique Agricultural Areas, provided that they are located as to minimize the effects on surrounding agricultural lands.

There are also Core Natural Heritage System components in the vicinity of the study area. These include: Environmental Protection Areas; Environmental Conservation Areas; Potential Natural Heritage Corridors, connecting the Core Natural Areas; The Greenbelt Natural Heritage System; and Fish Habitat. According to the Plan, essential public uses of a linear nature may be permitted within the Core Natural Heritage System where an EA has been approved under Provincial or Federal legislation.

4.2.1.3 Municipal Planning Context and Existing and Future Land Use

St. Catharines Official Plan (January 2014 Office Consolidation)

The January 2014 consolidation of the St. Catharines Official Plan indicates that portions of the study area are designated as Neighbourhood Residential, Commercial, Employment, Mixed Use, and Parkland and Open Space**.** Additionally, the Official Plan provides District Plans with more specific planning guidance and fine-scale land use mapping. Portions of the study area fall within the North Planning District, Central Planning District, and East Planning District. **Exhibits 4-10 (a and b)** illustrate the locations of the designations in the vicinity of the study area.

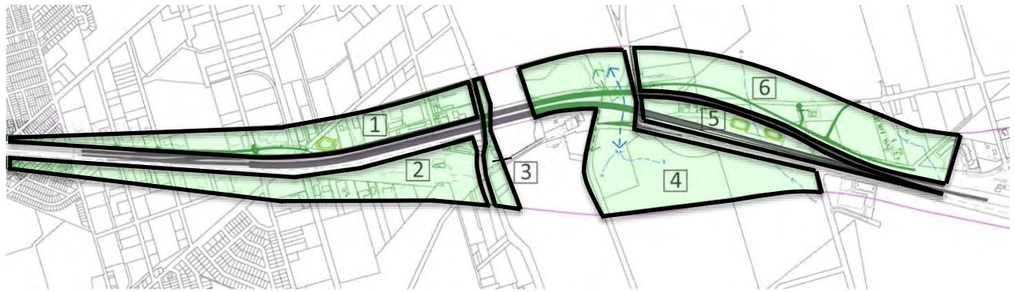
Town of Niagara-on-the-Lake Official Plan (2004 Office Consolidation)

The 2004 Office Consolidation of the Town of Niagara-on-the-Lake Official Plan indicates that lands in this portion of the study area are designated as Conservation, Major Open Space, Low Density Residential, Urban Residential, General Commercial, Regional Commercial, Prestige Industrial and Future Urban Use, and agricultural. It should be noted that there is a 2013 Office Consolidation in progress; however, at the time of this report filing, the 2013 Office Consolidation is still in draft form and as a result, this section discusses the approved 2004 consolidation. **Exhibit 4-11** illustrates the locations of the designations in the vicinity of the study area.

4.2.2 Landscape Composition

Landscapes within the study area are a mix of residential, industrial and commercial land use, as well as open spaces. There are man-made swales adjacent to the highway, and naturally occurring riparian features such as creeks, wetlands and swales. Landscape areas of study are shown in **Exhibit 4-8** and described below.

EXHIBIT 4-8: LANDSCAPE AREAS OF STUDY



Area 1

The west side of the study area is a mix of residential, commercial and industrial areas. Area 1 is located immediately north of the existing QEW Garden City Skyway and west of the Welland Canal. Most streets immediately adjacent to the bridge are rural or industrial in character, without curbs or sidewalks and lined by swales or gravel shoulders. When present, trees are in naturalistic arrangements with extensive underbrush growth. The QEW is lined with utility lines, somewhat restricting tree planting opportunities. West of Grantham Avenue, the streetscapes become more urban, with sidewalks, turf and more uniform tree arrangements adjacent to residential neighborhoods. The QEW embankment slopes down steeply to the adjacent service road (Dieppe Road) with a mix of grasses and shrubs planted on the slopes. The swale at the base of the QEW embankments contains tall, wetland grass species in wet areas.

The section of Dieppe Road that will be realigned as part of the proposed works is highly industrial with few trees and large expanses of gravel, with scattered piles of debris. Some vehicle-oriented retail occurs along this section. Approaching the bridge underpass, the vegetation becomes more dense and naturalized with a

buffer of trees, shrubs and tall grasses lining the swales. The area beneath the QEW Garden City Skyway is fenced and mostly gravel. East of Dieppe Road, the area beneath and immediately north of the existing QEW Garden City Skyway is fenced and consists mostly of tall grass, with occasional trees jotting the fence line, adjacent to the mostly industrial properties on the north.

There are existing noise barriers with landscaping at the western limit of the study area on the north side of the bridge.

Area 2

Area 2 is located immediately south of the existing QEW Garden City Skyway and west of the Welland Canal. Similar to Area 1, this area is a mix of residential, commercial and industrial areas. Most streets immediately adjacent to the bridge are rural or industrial in character, without curbs or sidewalks and lined by swales or gravel shoulders. When present, trees are in naturalistic arrangements with extensive underbrush growth. West of Grantham Avenue, the streetscapes become more urban, with sidewalks, turf and more uniform tree arrangements adjacent to residential neighborhoods. The QEW embankment slopes down steeply to the adjacent service road (Dunkirk Road) with a mix of grasses and shrubs planted on the slopes. The swale at the base of the QEW embankment contains tall, wetland grass species in wet areas.

East of where Dieppe Road passes beneath the QEW and continues on the south side of the QEW, the landscape becomes an open meadow with a woodlot located adjacent to the bridge. Immediately south of the woodlot, a series of dense tree plantings are located between Dieppe and Dunkirk roads.

There are existing noise barriers with landscaping at the western limit of the study area on the south side of the bridge.

Area 3

Area 3 is located along the western shoreline of the Welland Canal, beneath, north and south of the QEW Garden City Skyway. On the north side, expansive views of the canal, bridge and open areas to the east are presented from Welland Canal Parkway and the Welland Canal Parkway Trail. On the south side, a mixture of buildings and dense vegetation obscures most of the canal and bridge views from the streets and trail. The landscape adjacent to the canal is sparse with patchy turf, occasional shrubs and trees.

Area 4

East of the Welland Canal, the landscape character is much more naturalized compared to west of the canal, with trees, meadows, streams and wetlands surrounding occasional residences and commercial / industrial buildings. Area 4 is located immediately south of the existing QEW Garden City Skyway and east of the Welland Canal. Taylor Road runs parallel to the QEW on the south side. Queenston Street also runs parallel to the QEW, further west. The south side of the QEW is a combination of woodlot and meadow, with very naturalized and dense vegetation.

At the eastern limits of the study area, the cultural meadows and woodlots transition to large retail establishments including a newly constructed Outlet Mall. The most extensive and intact woodlot is immediately east of the canal, forming a greenway on both sides of Queenston Street along the gravel Seaway Haulage Road, and connecting to a Provincially Significant Wetland south of the study area. North of Queenston Street, a dense woodlot which crosses under the Garden City Skyway provides a greenspace connection to the open space along the Welland Canal Tributary. Area 4 has been identified as the only portion of the study area that includes a designated Natural Heritage System (see **Exhibit 4-1**).

Just before passing beneath the bridge, Queenston Street passes the Homer Cemetery, a heritage landscape which should be carefully protected during construction. A wide grassy swale runs along Taylor Road with a steep, fenced embankment leading to the highway. From Taylor Road, the view of the existing bridge is dramatic, and is enhanced by the open landscape and absence of trees adjacent to the highway. West of the Taylor Road and York Road intersection, the landscape beneath the bridge is fenced and mostly tall grass.

Areas 5 and 6

North of the QEW and east of the Welland Canal, the landscape is a mix of scattered residential, agricultural, woodlot and meadow. York Road crosses beneath and runs parallel to the highway on the north side. Currently, there are no views of the bridge from Queenston Road as it is surrounded by dense trees. York Road is more open with a rural street character, gravel shoulders and adjacent meadows and swales. Views of the bridge are very limited due to the angle, until the road passes directly beneath. The majority of landscapes along York Road are meadow with occasional clumps of trees and woodlots. Some commercial buildings line the street at the west edge of Areas 5 and 6.

4.2.3 Noise

Noise impacts are evaluated by assessing impacts to noise-sensitive receptors which are locations or points within the study area which may be sensitive to noise (e.g. dwelling units), or other fixed noise sensitive land uses (urban or rural) with an Outdoor Living Area (OLA). Noise sensitive receptors are represented by Noise Sensitive Areas (NSAs). Based on the *MTO Environmental Guide for Noise* (2006), NSAs include the following land uses:

- Private homes (e.g. single family units and townhouses) with an OLA;
- Multiple unit buildings such as apartments, provided they have a communal OLA associated with them; and
- Hospitals and nursing homes for the aged, provided they have an OLA for use by patients.

For the noise assessment, the area within a perpendicular distance of 600 m from the closest edge of the pavement was used as the Area of Investigation (AOI), in accordance with the *MTO Environmental Guide for Noise* (2006). Approximately 714 potential representative NSAs within the AOI were identified which meet the MTO requirements noted above, and include mainly residences. There are three existing noise barriers within the study area, all of which are owned by MTO. These are located within the City of St. Catharines, and extend from Vine Street to east of Grantham Avenue on the north side of the bridge, and from west of Welland Avenue to east of Grantham Avenue on the south side of the bridge. The general locations of NSAs within the AOI are indicated in **Exhibits 4-12 (a to c).** The “Build” Alignment is also shown in **Exhibits 4-12 (a to c)** which includes the proposed works discussed further in **Section 7.0**.

Potential noise-related impacts and proposed mitigation are discussed in **Section 8.2.3.**

4.2.4 Vibration

Existing vibration levels in the study area are linked to traffic-induced vibration. Potential vibration-related impacts and proposed mitigation are discussed in **Section 8.2.4**.

4.2.5 Air Quality

The MTO *Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects* (MTO Environmental Guide) (2012) identifies two categories of receptors to be considered as part of an air quality assessment:

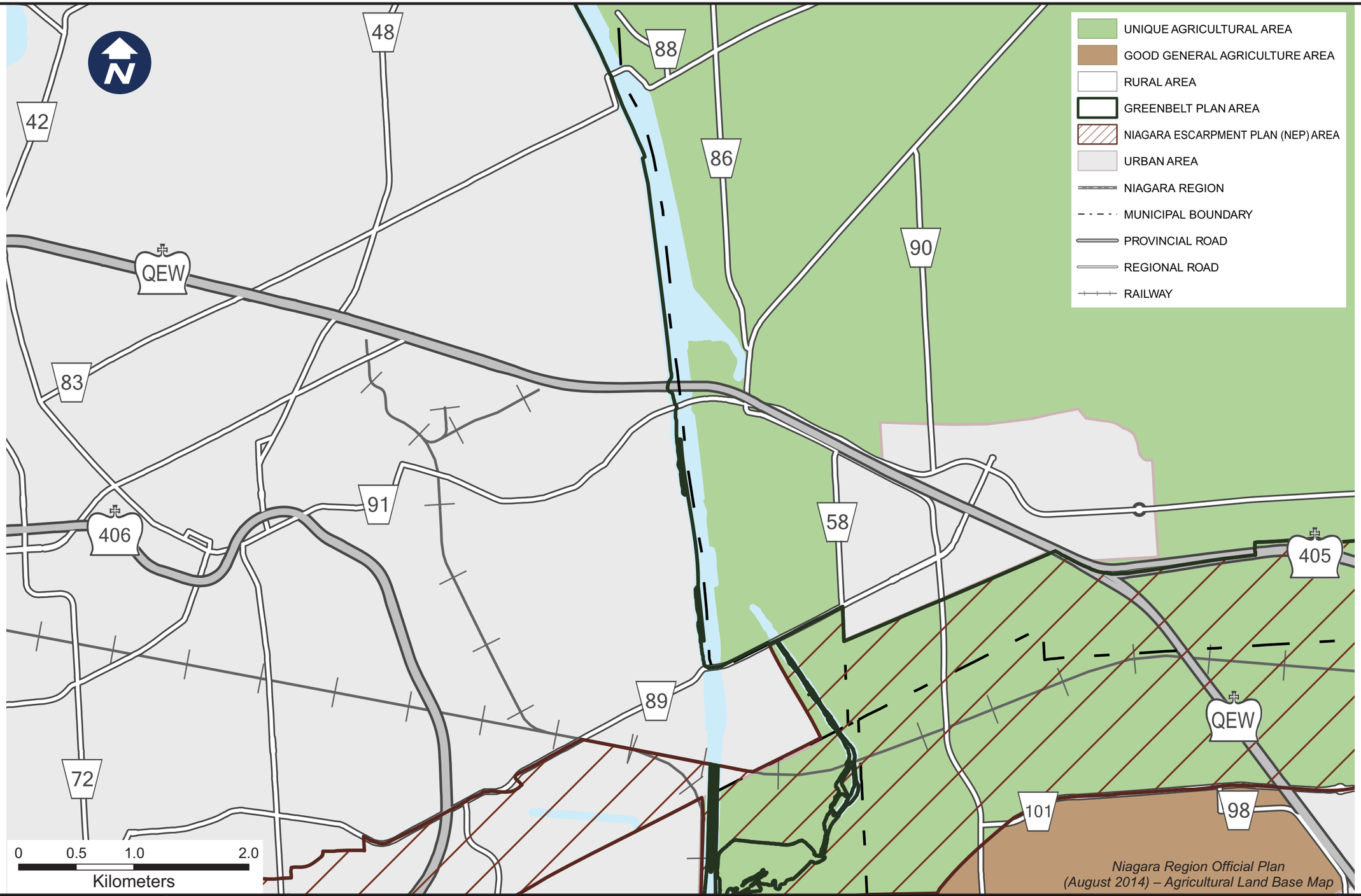
- Sensitive Receptors: i.e. residential dwellings
- Critical Receptors: i.e. retirement homes, hospitals, childcare centres, schools and similar institutional buildings

A total of 28 impact locations (representative receptors) were considered for the study. These receptors represent residences. There are no other types of receptors within 500 m of the project that would be

considered as sensitive or critical under the MTO Environmental Guide. Generally, concentrations at receptors that are more than 300 m from the roadway are nearing background concentration levels.

The contaminants of local concern which were assessed as part of the air quality assessment include air contaminants (nitrogen dioxide, carbon monoxide, and respirable and inhalable particulate matter) and key volatile organic compounds (benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and acrolein).

Potential air quality-related impacts and proposed mitigation are discussed in **Section 8.2.5**



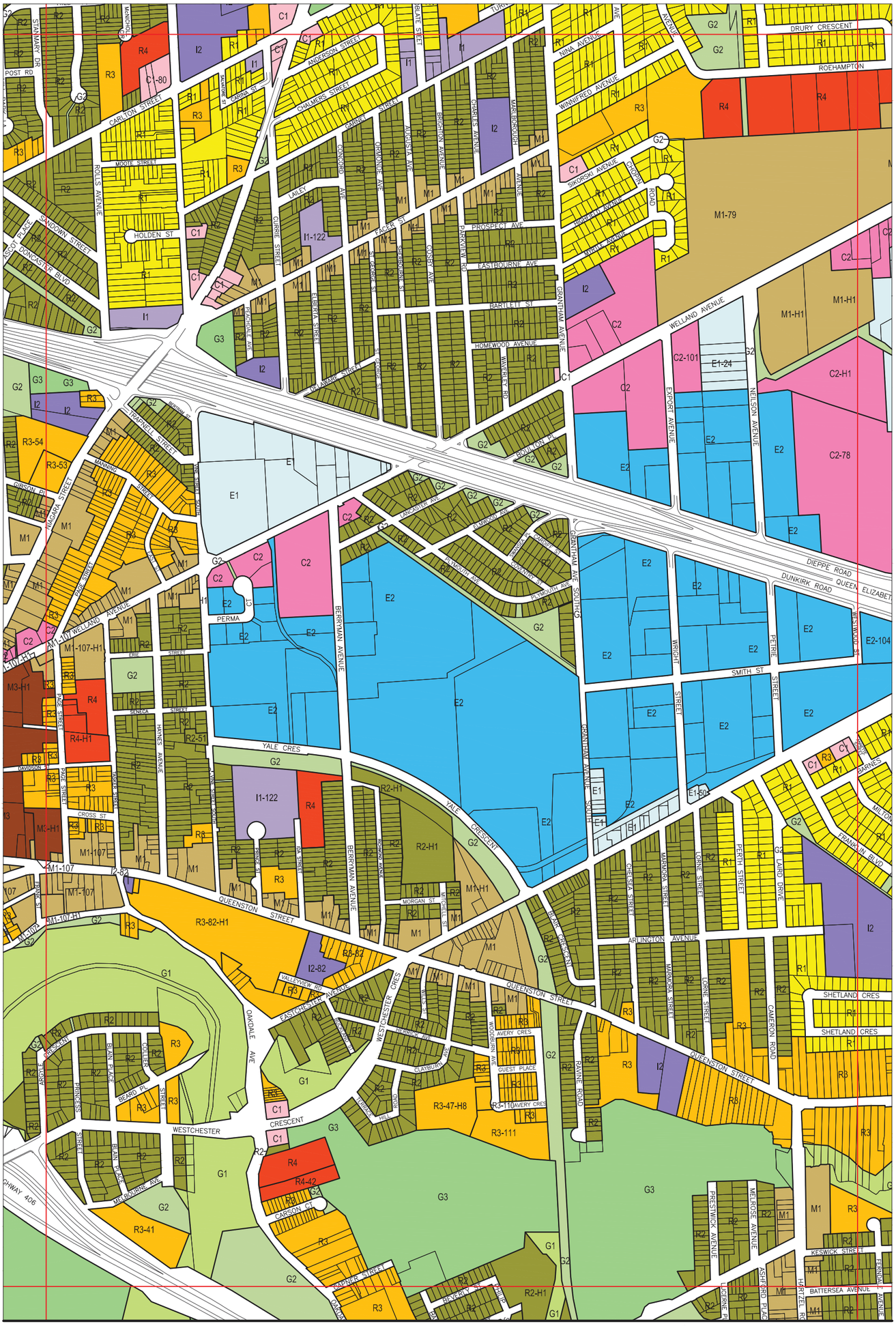
QEW GARDEN CITY SKYWAY EA
W.O. 08-2009

wsp

Ontario

Niagara Region Land Use Designations

Exhibit
4-9



Zones

- R1 Low Density Residential - Suburban Neighbourhood
- R2 Low Density Residential - Traditional Neighbourhood
- R3 Medium Density Residential
- R4 High Density Residential
- C1 Local Convenience Commercial
- C2 Community Commercial
- C3 Arterial Commercial
- C4 Major Commercial
- C5 Downtown Commercial Core
- C6 Downtown Traditional Main Street
- E1 Business Commercial Employment
- E2 General Employment
- M1 Medium Density Mixed Use
- M2 Medium / High Density Mixed Use
- M3 High Density Mixed Use
- G1 Conservation / Natural Area
- G2 Minor Green Space
- G3 Major Green Space
- I1 Local Neighbourhood Institutional
- I2 Community Institutional
- I3 Major Institutional
- A1 Agriculture
- A2 Agriculture Only
- A3 Agriculture Commercial / Industrial
- Municipal Boundary

1:10,000

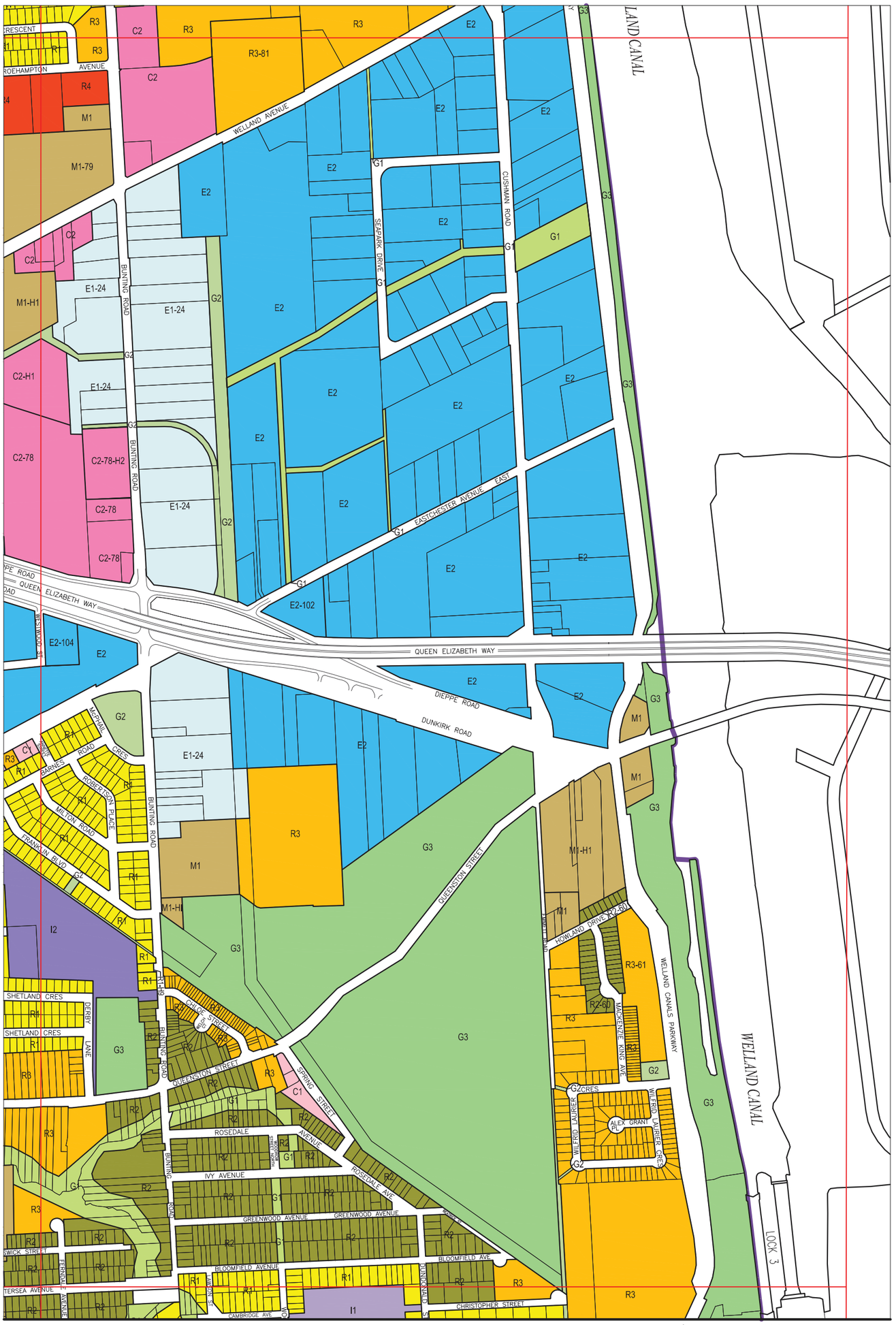
City of St.Catharines Zoning By-Law

December 16, 2013

A9 / A14 A15 A16 / A21

***** In addition to the zoning shown on this schedule, the use of land may be subject to additional regulations or restrictions by upper tier governments or agencies (refer to Sections 1.1.3 and 2.19, Schedule D, and Appendices 16.1.1 to 16.1.4). *****

QEW GARDEN CITY SKYWAY EA W.O. 08-2009	wsp Ontario	St. Catharines Land Use Designations	Exhibit 4-10a



Zones

- R1 Low Density Residential - Suburban Neighbourhood
- R2 Low Density Residential - Traditional Neighbourhood
- R3 Medium Density Residential
- R4 High Density Residential
- C1 Local Convenience Commercial
- C2 Community Commercial
- C3 Arterial Commercial
- C4 Major Commercial
- C5 Downtown Commercial Core
- C6 Downtown Traditional Main Street
- E1 Business Commercial Employment
- E2 General Employment
- M1 Medium Density Mixed Use
- M2 Medium / High Density Mixed Use
- M3 High Density Mixed Use
- G1 Conservation / Natural Area
- G2 Minor Green Space
- G3 Major Green Space
- I1 Local Neighbourhood Institutional
- I2 Community Institutional
- I3 Major Institutional
- A1 Agriculture
- A2 Agriculture Only
- A3 Agriculture Commercial / Industrial
- Municipal Boundary

1:10,000

City of St.Catharines Zoning By-Law

December 16, 2013

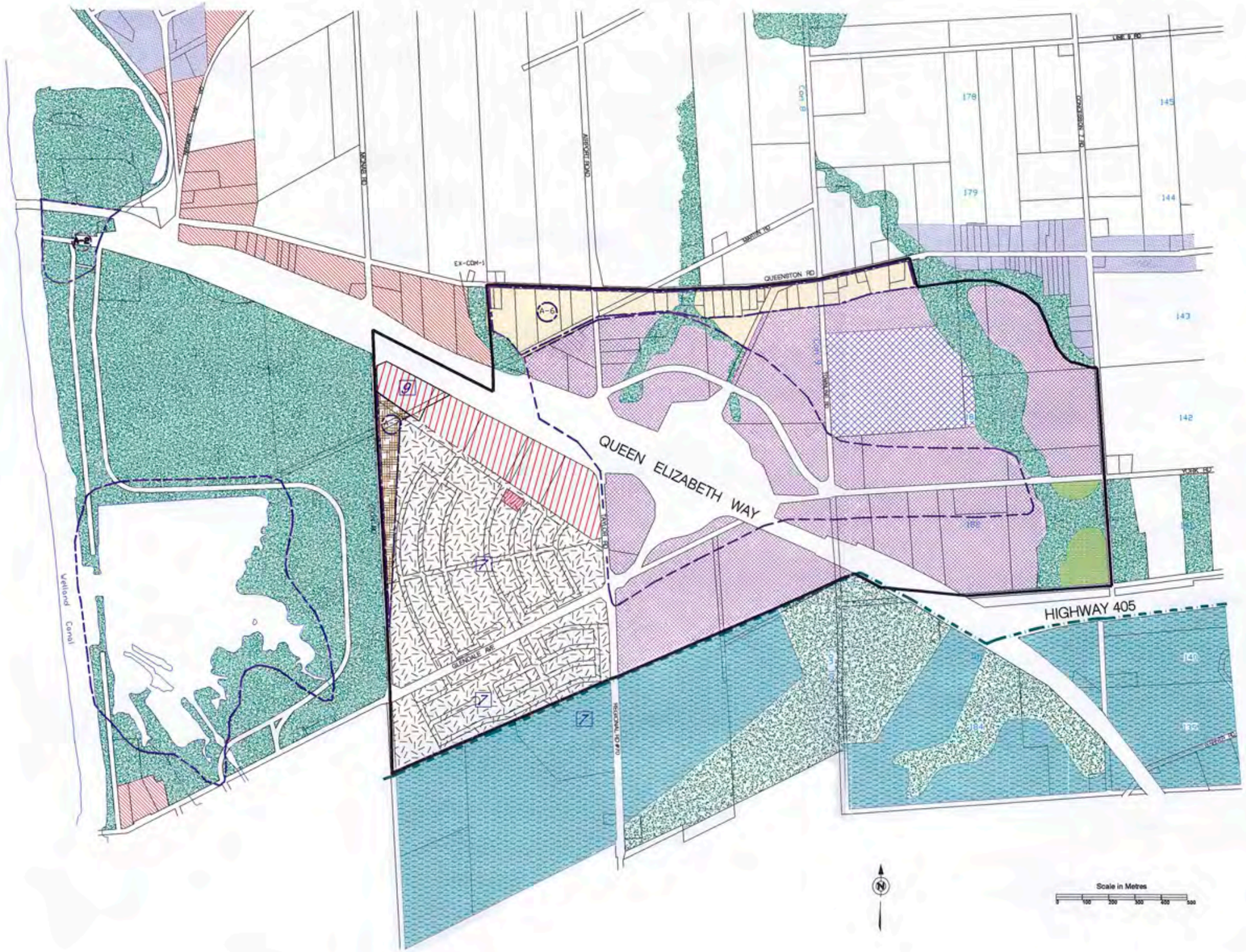
A10 / A15 A16 / A22

***** In addition to the zoning shown on this schedule, the use of land may be subject to additional regulations or restrictions by upper tier governments or agencies (refer to Sections 1.1.3 and 2.19, Schedule D, and Appendices 16.1.1 to 16.1.4). *****

QEW GARDEN CITY SKYWAY EA W.O. 08-2009	wsp Ontario	St. Catharines Land Use Designations	Exhibit 4-10b

SCHEDULE "F"
Land Use Plan

GLENDALE



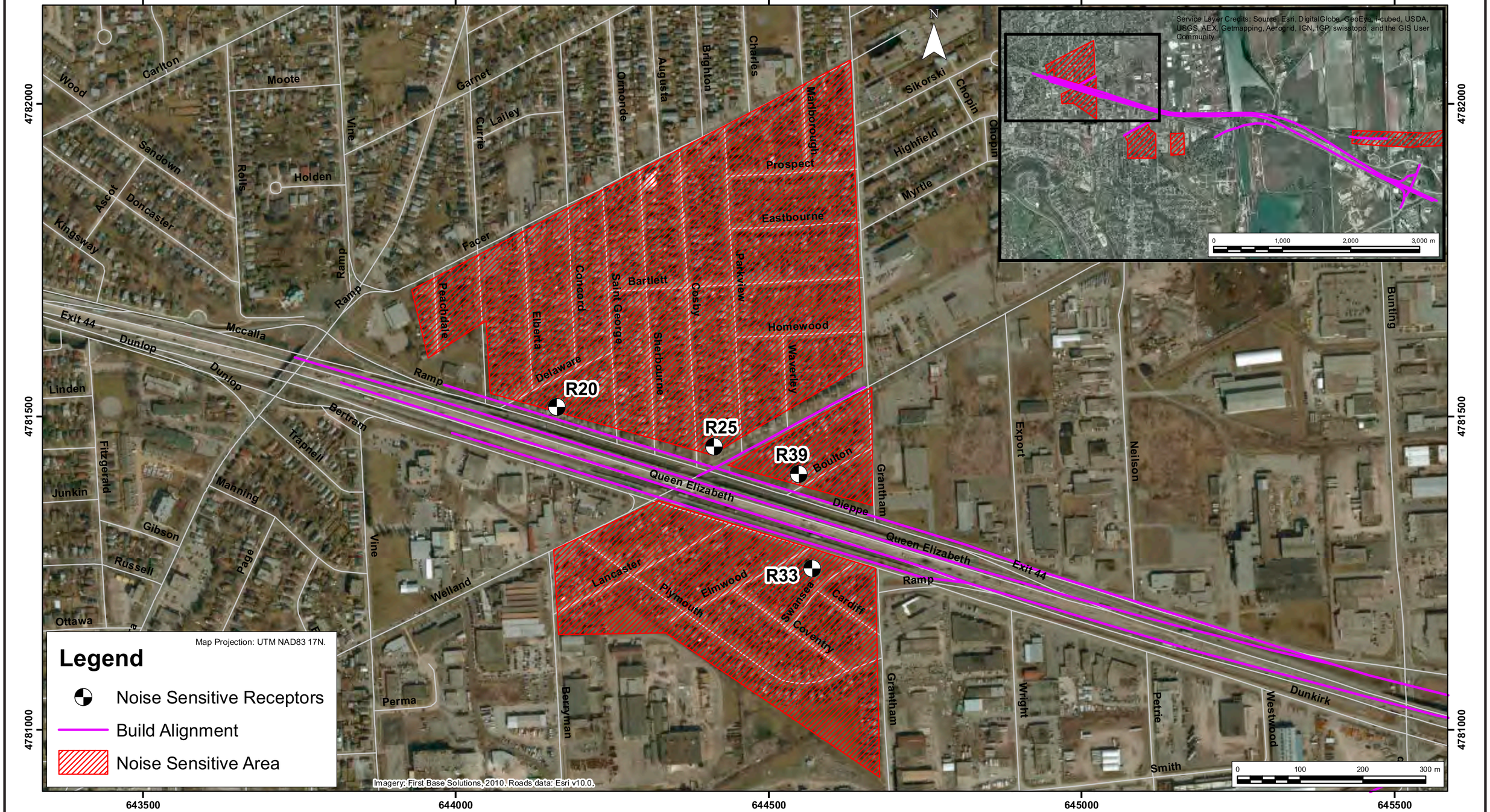
- Agricultural*
- Non-Farm Rural
- Low Density Residential
- Medium Density Residential
- Established Residential
- General Commercial
- Service Commercial
- General Industrial
- Light Industrial
- Prestige Industrial
- Extractive
- Institutional
- Marina
- Marine Commercial
- Open Space & Community Facilities
- Conservation
- Major Open Space
- Escarpment Protection Area
- Escarpment Natural Area
- Escarpment Rural Area
- Urban Residential (O.P.A. 72)
- Future Urban Use (O.P.A. 72)
- Regional Commercial (O.P.A. 72)

- Urban Area Boundary
- Wetlands (including adjacent lands)
- Special Study Area
- EX-AG Exception - See Exceptions, Section 7.4
- Prestige Industrial with Service Commercial
- Niagara Escarpment Commission Boundary
- Amendments

*This Plan and its policies recognize the policy distinctions that are made between Good General Agricultural Areas, Good Tender Fruit and Good Grape Areas in the Regional Policy Plan (Appendix 4). When a new Regional Agricultural Land Base Map and policies are approved by the Province, the Land Use Schedules and policies in this Plan will be amended to conform with the Regional Policy Plan.

Prepared by: MOTI, P&D Services
Last Revision Date: 07.26.01

QEW GARDEN CITY SKYWAY EA W.O. 08-2009	WSP Ontario	Niagara-On-The-Lake Land Use Designations	Exhibit 4-11



QEW GARDEN CITY SKYWAY EA
W.O. 08-2009

wsp

Ontario

Locations of NSAs with "Build" Alignment - West Section

Exhibits sourced from the Environmental Noise Impact and Screening Level Vibration Assessments Report completed by RWDI AIR Inc.

Exhibit
4-12a

644500 645000 645500 646000 646500

4781000

4780500

R39 R33 R43 R45 R47 R51

Dieppe Boul. Granthan Export Nelson Queen Elizabeth Queen Elizabeth Exit 44 Ramp Elmwood Plymouth Swansea Coventry Cardiff Wright Westwood Dunkirk Smith Ramp Petrie Connecting Ramp Service Ramp Service Seaway Haulage York Government Annette Barnes Milton Robertson Franklin Bunting Eastchester Yale Granita Marmora Lorne Perth Cameron Shetland Queenston Emmett

N

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 1,000 2,000 3,000 m

0 100 200 300 m

Legend

- Noise Sensitive Receptors
- Build Alignment
- Noise Sensitive Area

Imagery: First Base Solutions, 2010. Roads data: Esri v10.0.

644500 645000 645500 646000 646500

QEW GARDEN CITY SKYWAY EA
W.O. 08-2009

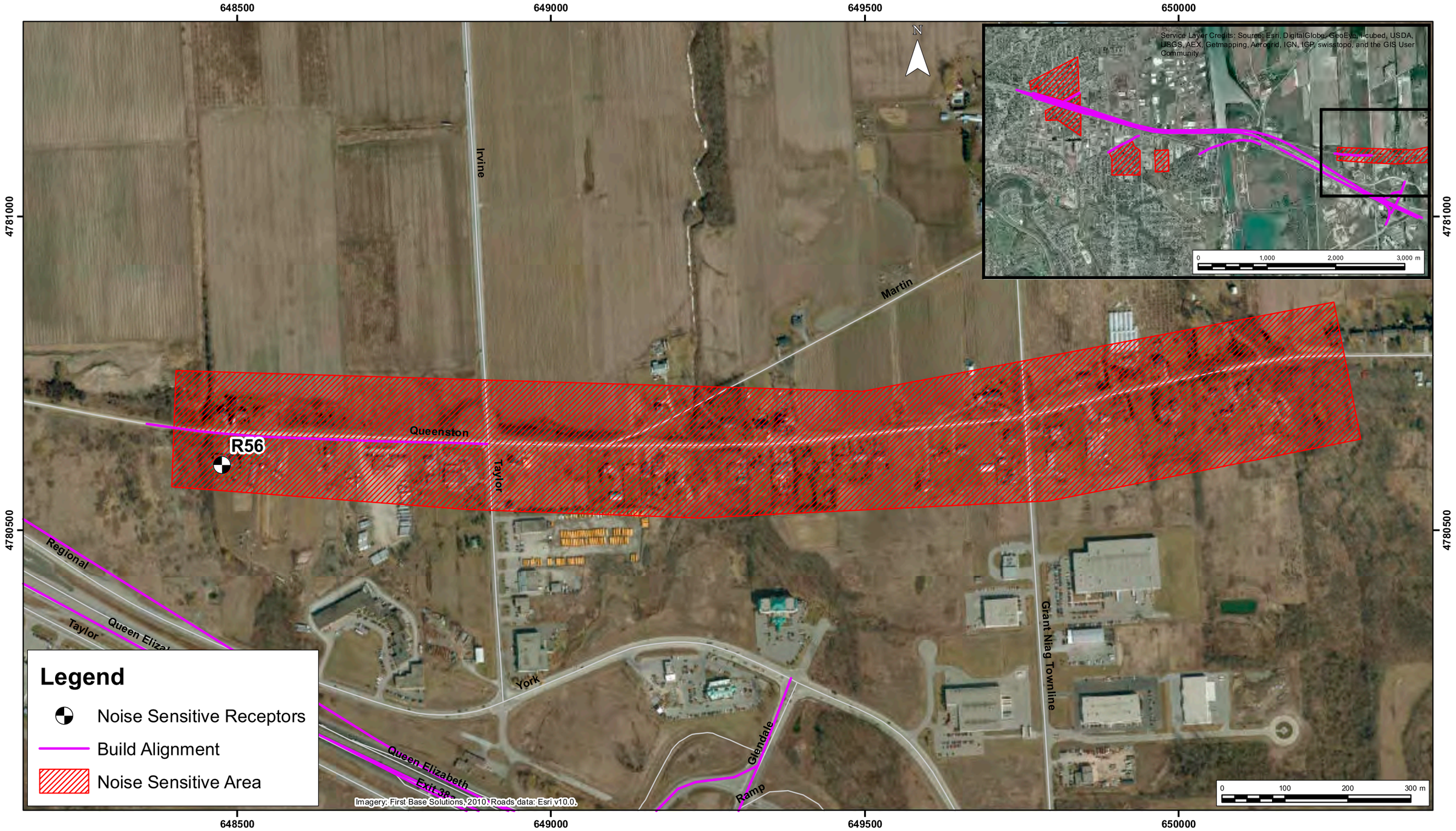
wsp

Ontario

Locations of NSAs with "Build" Alignment - Central Section

Exhibits sourced from the Environmental Noise Impact and Screening Level Vibration Assessments Report completed by RWDI AIR Inc.

Exhibit
4-12b



QEW GARDEN CITY SKYWAY EA
W.O. 08-2009

wsp

Ontario

Locations of NSAs with "Build" Alignment - East Section

Exhibits sourced from the Environmental Noise Impact and Screening Level Vibration Assessments Report completed by RWDI AIR Inc.

Exhibit
4-12c

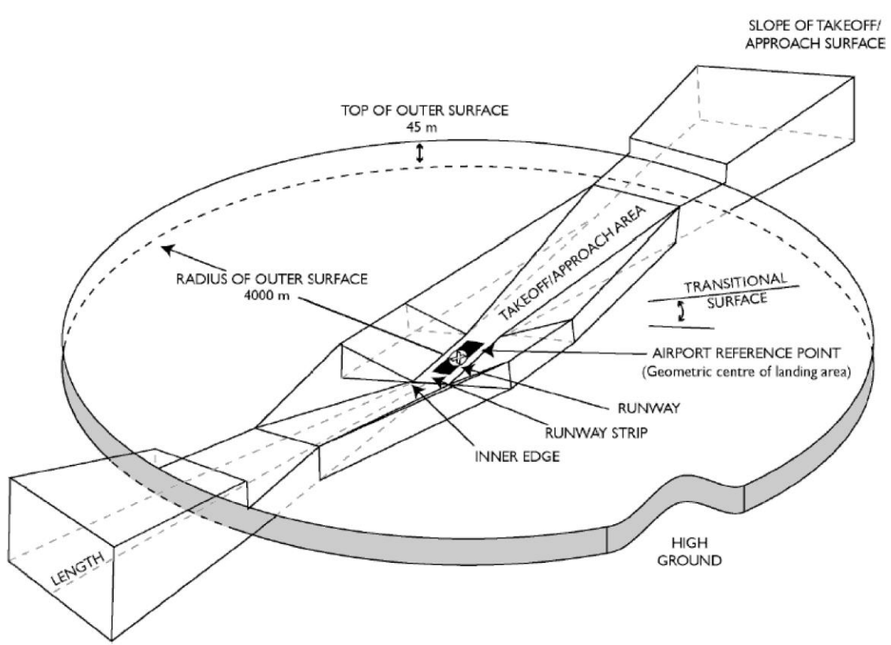
4.2.6 Niagara District Airport

The Niagara District Airport (CYSN) is located approximately 2.5 km to the northeast of the existing QEW Garden City Skyway in Niagara-on-the-Lake. It is a Transport Canada-certified airport with one primary runway and two intersecting secondary runways. The airport is financially supported by the City of St. Catharines, the Town of Niagara-on-the-Lake, and the City of Niagara Falls. On behalf of the three municipalities, the airport is managed by the Niagara District Airport Commission, which includes members of Council from each of the municipalities as well as individuals appointed by the municipalities.

The airport currently has no scheduled passenger services, is classified as an airport of entry by NAV CANADA, and is staffed by the Canada Border Services Agency. The airport is home base for the Civil Air Rescue Emergency Service Niagara, Unit #11 of Ontario Civil Air Search and Rescue Association. The lands surrounding the airport are subject to the St. Catharines Airport Zoning Regulations (SOR/84-901) that define maximum structure heights in reference to obstacle limitation surfaces (OLS), which are three-dimensional surfaces established to limit structure heights in the vicinity of an airport to protect the airspace from encroachments that would otherwise introduce a risk of collision to aircraft and/or limit the long-term development opportunities of the airport.

Objects constructed that exceed the maximum obstacle limitation heights per the Airport Zoning Regulations (AZRs) require an AZR exemption through Transport Canada. **Exhibit 4-13** illustrates the OLSs of a typical airport and the area of coverage of the AZRs over the study area is shown in **Exhibit 4-14**.

EXHIBIT 4-13: TYPICAL EXAMPLE OF OBSTACLE LIMITATION SURFACES (OLS)

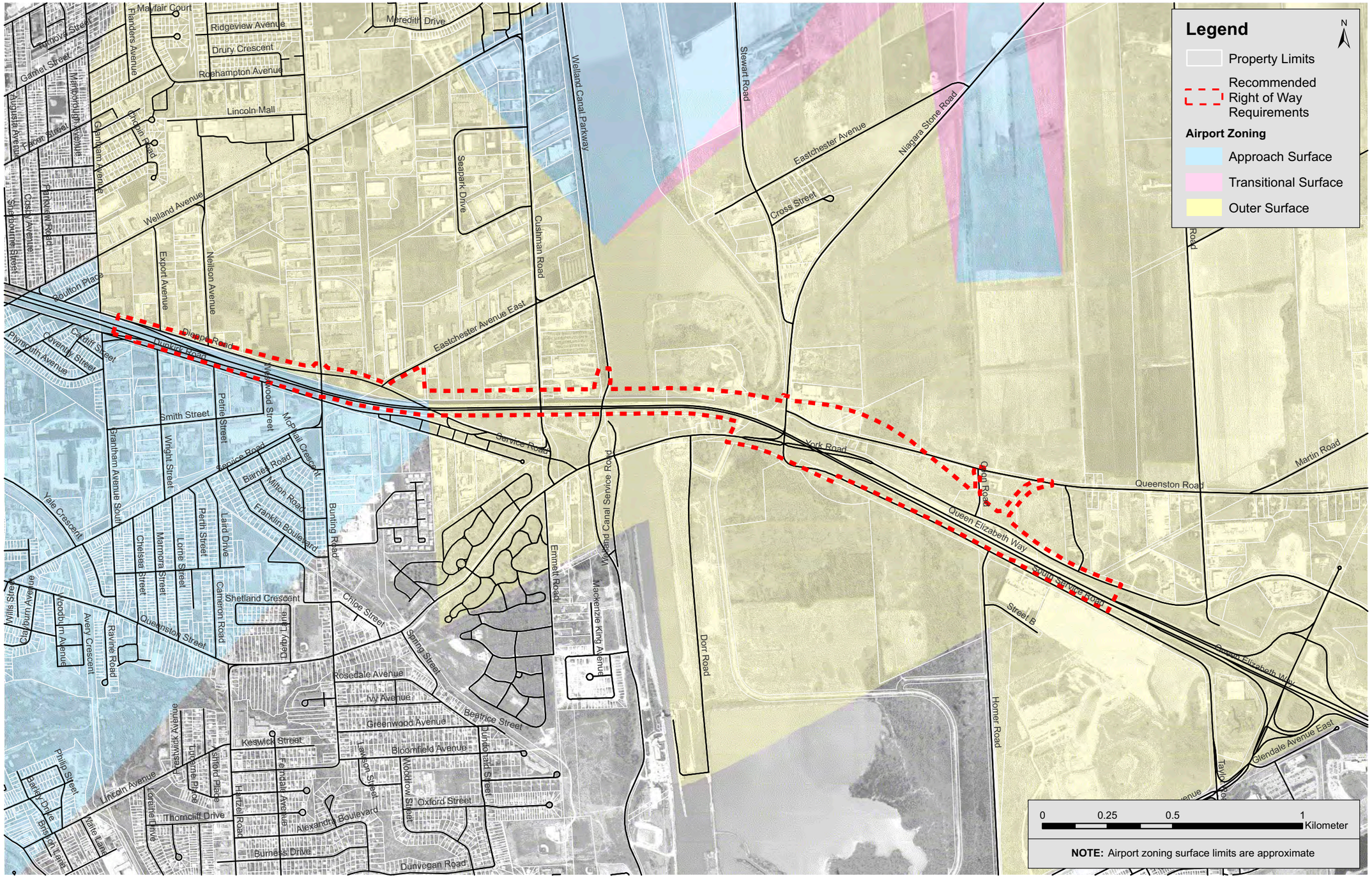


The AZRs of Niagara District Airport are detailed in **Exhibit 4-14**. The elevation of the outer surface for the Niagara District Airport is 140 m above sea level (ASL). The existing Garden City Skyway is within the airport's outer surface, and exceeds the obstacle limitation height specified in the AZR. It is noted that the existing Garden City Skyway pre-dates the creation of the AZRs, therefore the bridge did not require an AZR exemption for its initial construction. The AZRs and their implications for the Recommended Plan are detailed in **Section 7.2**. Mitigation and approvals required for the project related to the Airport are detailed in **Section 9.1.5**.

4.2.7 St. Lawrence Seaway Management Corporation

The St. Lawrence Seaway Management Corporation (SLSMC) is a not-for-profit corporation responsible for the management of the Welland Canal and other Canadian Seaway facilities. As the Garden City Skyway spans the Welland Canal, Seaway navigational clearances and other requirements must be considered. The maximum height of vessels in the Welland Canal is currently 35.5 m, which is dictated by the height of the existing Garden City Skyway. All other roadway or railway crossings of the Welland Canal are either movable bridges (of the vertical lift or bascule bridge types) or subterranean tunnels. The current clearance envelope at the QEW Garden City Skyway is 76.2 m horizontal (normal to and symmetrical about the centerline of the canal) and 36.78 m vertical (from a High Water Level of 102.82 m). **Exhibit 4-15** details this clearance envelope.

In **Exhibit 4-15**, the Niagara District Airport's outer surface (as described in **Section 4.2.6**) is also shown to illustrate that, as the outer surface is only 0.4 m above the existing navigational clearance of the canal, a new bridge alternative that adheres to both restrictions is impossible. This issue is further exacerbated should a bridge alternative with a higher profile be preferred; the St. Lawrence Seaway Management Corporation has stipulated that the navigational clearance at the new structure will be required to be greater than the clearance at the existing structure. The impact of a greater clearance requirement to the preferred alternative is further detailed in **Section 7.2**.



QEW GARDEN CITY SKYWAY EA
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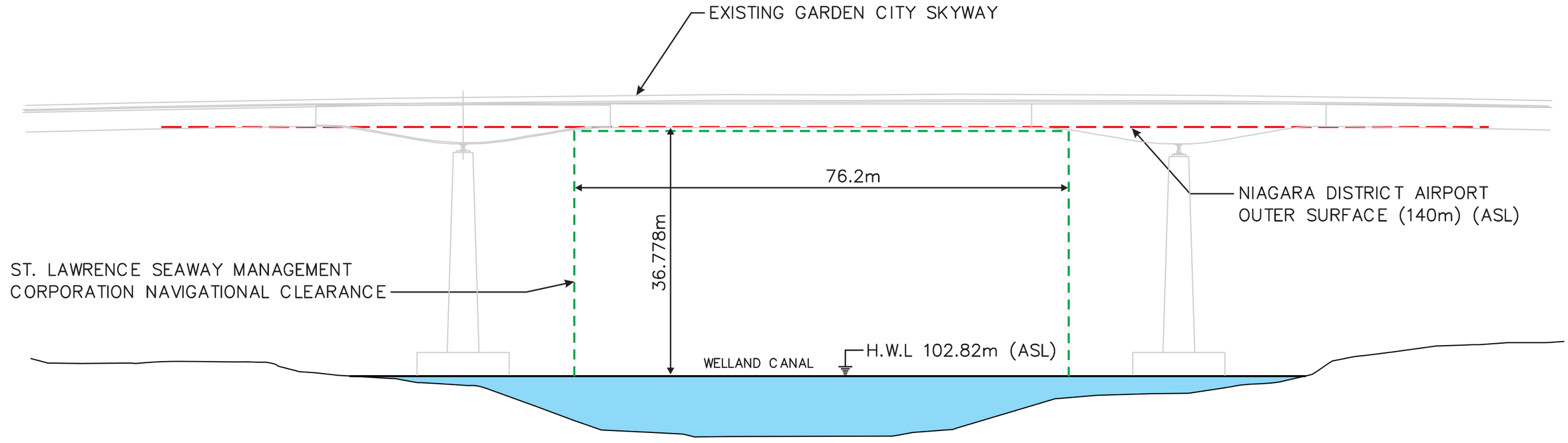
Niagara District Airport - Airport Zoning Regulations (AZRs)

Exhibit
4-14



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Ontario

Existing Bridge Navigational Clearance Requirements

Exhibit
4-15

4.3 Cultural Environment

4.3.1 Archaeological Resources

A Stage 1 Archaeological Assessment was carried out to identify potential archaeological resources within the study area. Assessment activities were performed in accordance with the provisions of the Ontario Heritage Act (R.S.O 1990, c.o. 18) in compliance with the Standards and Guidelines for Consultant Archaeologists (2011) under an archaeology consulting license (#P018) issued to Philip Woodley of New Directions Archaeology Ltd.

The Stage 1 Archaeological Assessment yielded three areas of archaeological potential along the corridor, with areas in between showing evidence of disturbance. A summary of the findings of the Stage 1 assessment, recommended mitigation measures and commitments to future work are provided in **Section 8.3.1**.

4.3.2 Built Heritage and Cultural Heritage Landscapes

A Cultural Heritage Assessment Report was carried out to identify existing built heritage resources and cultural heritage landscapes present within the study area, and was built on an Existing Conditions Report completed earlier in the study. Locations of the principle, person-made cultural heritage landscapes (CHL) and built heritage resources (BHR) 40 years and older identified within and/or adjacent to the study area are provided in **Exhibits 4-16 and 4-17.** Details of each CHL and BHR are provided in **Appendix D**.

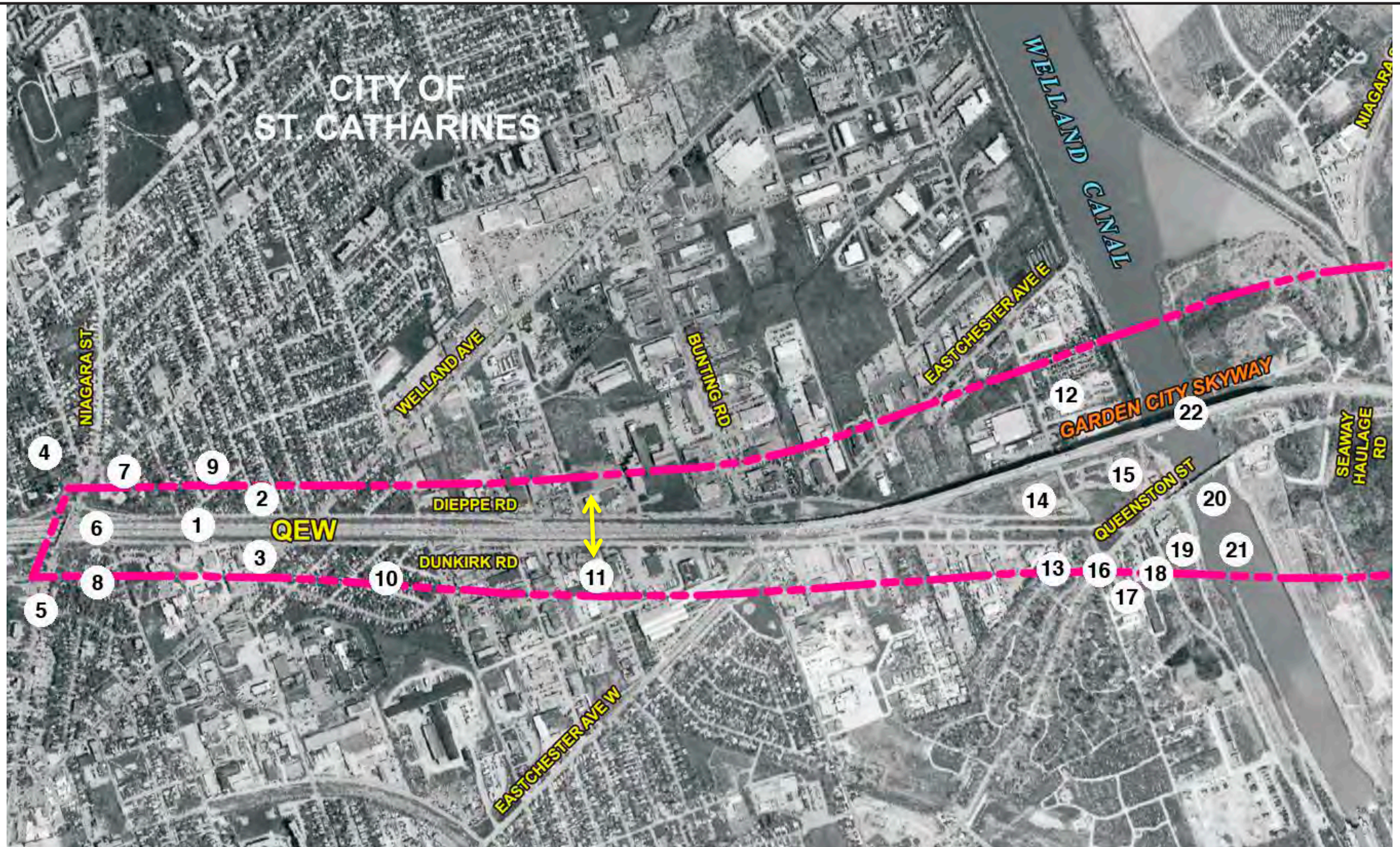
Municipal heritage planners from the City of St. Catharines and Town of Niagara-on-the-Lake were included on the study mailing list and have received study milestone notifications including invitations to attend PICs. In addition, they were provided with copies of the Cultural Heritage Assessment Report.

In addition, preliminary Cultural Heritage Evaluation Reports (CHERs) were completed for the properties at 49 Queenston Road and 61 Queenston Road, in the Town of Niagara on the Lake, in order to assess the cultural value or interest of these properties. The preliminary CHERs found the following:

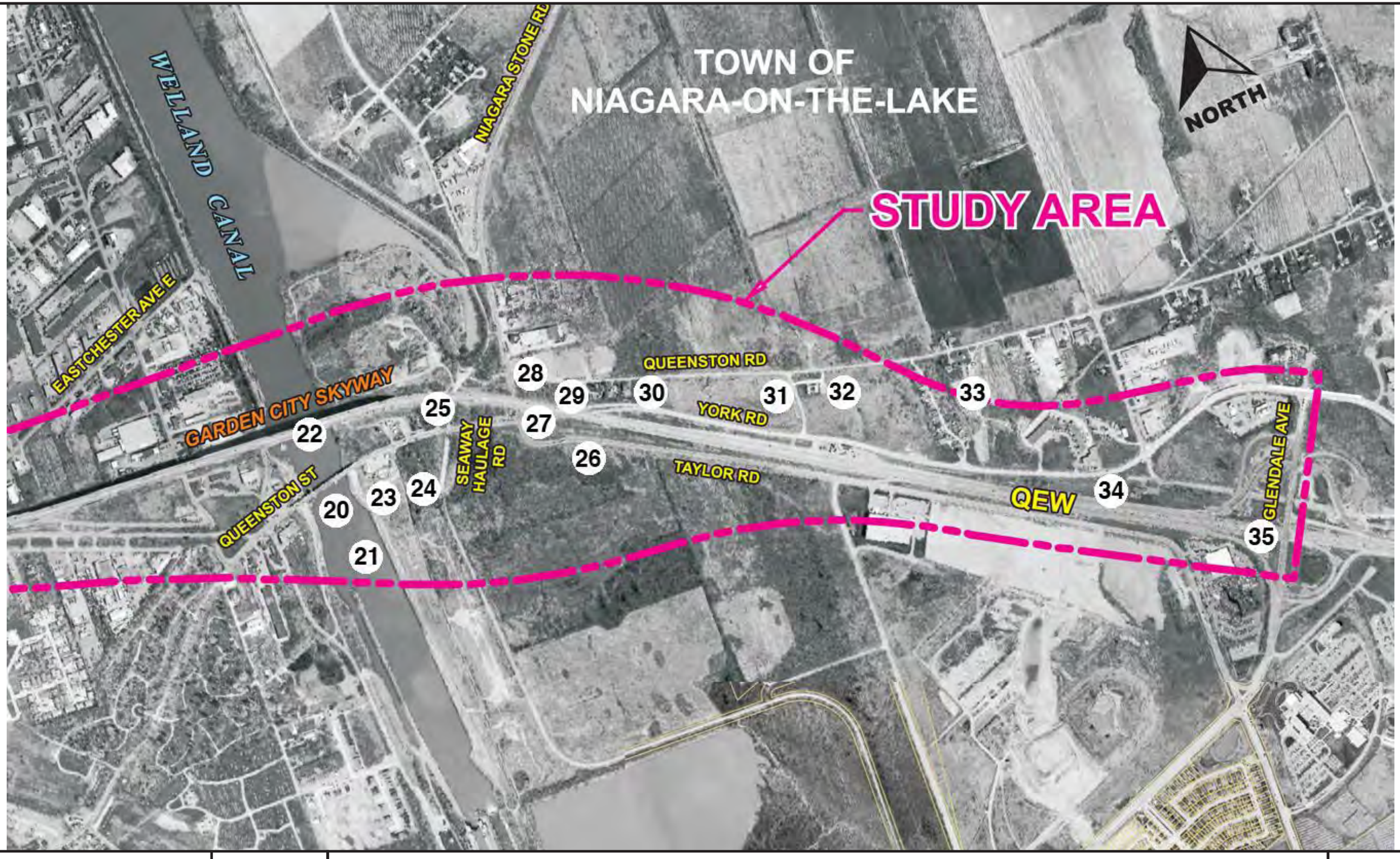
- It has been determined through the preliminary application of the “Criteria for Determining Cultural Heritage Value or Interest” under O. Reg. 9/06 that the subject property at 49 Queenston Road in the Town of Niagara-on-the-Lake is of cultural heritage value or interest, due to its physical or design value, historical or associative value and contextual value, and is considered a *provincial heritage property*. The preliminary evaluation indicates that the property does not fulfill the evaluation criteria for provincial significance as set out in O. Reg. 10/06, and therefore is not considered to be a *provincial heritage property of provincial significance* as defined by the *Standards & Guidelines for Conservation of Provincial Heritage Properties* (MTCS, 2010).
- It has been determined through the preliminary application of the “Criteria for Determining Cultural Heritage Value or Interest” under O. Reg 9/06 that the subject property at 61 Queenston Road in the Town of Niagara-on-the-Lake does not satisfactorily fulfil the evaluation criteria as set out in O. Reg. 9/06. Therefore, the property would not be considered a *provincial heritage property* as defined by the *Standards & Guidelines for Conservation of Provincial Heritage Properties.* Furthermore, the preliminary evaluation indicates that the property does not fulfill the evaluation criteria for provincial significance as set out in O. Reg. 10/06, and therefore is not considered to be a *provincial heritage property of provincial significance* as defined by the *Standards & Guidelines for Conservation of Provincial Heritage Properties.*

The existing QEW Garden City Skyway was evaluated under the *Ontario Heritage Bridge Guidelines* (Interim January 2008), which considers a variety of criteria including functional design, visual appeal, contextual value, and historical association (Cultural Heritage Evaluation Report, QEW Overpass at Garden City Skyway Bridge MTO #18-0111, Golder Associates, 2011). Subsequently, the QEW Garden City Skyway has been identified as a provincial heritage property of provincial significance and is included on the List of Provincial Heritage Properties.

A summary of the findings of the Cultural Heritage Assessment Report, recommended mitigation measures and commitments to future work are provided in **Section 8.3.2**.



QEW GARDEN CITY SKYWAY EA W.O. 08-2009	WSP Ontario	Identified Cultural Heritage Resources Within or Adjacent to the Study Area, City of St. Catharines	Exhibit 4-16



QEW GARDEN CITY SKYWAY EA W.O. 08-2009	wsp Ontario	Identified Cultural Heritage Resources Within or Adjacent to the Study Area, Town of Niagra-on-the-Lake	Exhibit 4-17

4.4 Transportation Features

4.4.1 Existing Road Network

4.4.1.1 QEW Mainline

The section of the Queen Elizabeth Way (QEW) within the study area, from Niagara Street in the City of St. Catharines to Glendale Avenue in the Town of Niagara-on-the-Lake, is a 6-lane freeway with a posted speed of 100 km/h and a design speed of 120 km/h. There are interchanges at Niagara Street and Glendale Avenue.

Typical sections of the QEW mainline through the limits of this study area are detailed in **Exhibit 4-18**.

4.4.1.2 Local Roads

Within the study area, the QEW passes through urban commercial, industrial, and residential areas with local roads in very close proximity. Several local roads cross the QEW and all but one pass under the QEW Garden City Skyway. The exception is Niagara Street, which crosses over the QEW. Moving from west to east, the local roads passing under the Garden City Skyway are as follows:

- Welland Avenue, a four-lane major arterial road
- Bunting Road, a four-lane major arterial road
- Dieppe Road, a two-lane major arterial road
- Cushman Road, a two-lane minor arterial road
- Welland Canal Parkway, a two-lane major arterial road
- Seaway Haulage Road, a two-lane local road
- Niagara Stone Road, a two-lane regional arterial road
- York Road (Regional Road 81), a two-lane regional arterial road

Queenston Street is a two-lane parallel road that crosses the Welland Canal immediately to the south of the QEW Garden City Skyway via the Homer Bridge, which is a double-leaf bascule bridge. Portions of Queenston Street, including the Homer Bridge (also known as Bridge 4), were part of the original QEW alignment until the construction of the QEW Garden City Skyway.

Homer Bridge

Homer Bridge (Bridge 4) was the original QEW crossing of the Welland Canal prior to the existing Garden City Skyway. The bridge was constructed in the 1930s. The bridge is maintained by the St. Lawrence Seaway Management Corporation.

4.4.1.3 Interchanges

The study area is bounded by two interchanges, with the Niagara Street interchange forming the west study area limit in St. Catharines, and the Glendale Avenue interchange forming the east limit in Niagara-on-the-Lake. Niagara Street and Glendale Avenue cross over the QEW on 6-span and 4-span bridges, respectively.

Niagara Street Interchange

The Niagara Street / QEW interchange is configured as a diamond interchange for the westerly ramps while the easterly ramps are configured as ‘slip’ ramps to/from parallel municipal roads. The ramp terminals for the westerly ramps (the QEW eastbound off-ramp and westbound on-ramp) are signalized.

The westbound off-ramp exits the QEW approximately 1.4 km east of Niagara Street. The ramp joins Dieppe Road, which is one-way (westbound) at that point. Drivers wishing to access Niagara Street would continue along Dieppe Road until it intersects Niagara Street, opposite the westbound on-ramp terminal. Prior to reaching Niagara Street, Dieppe Road intersects with Welland Avenue, a north-south arterial road, and several local roads.

The eastbound on-ramp joins the QEW approximately 1.4 km east of Niagara Street. Access to the ramp is from eastbound Dunkirk Road, which runs parallel to the QEW on the south side.

Glendale Avenue Interchange

The Glendale Avenue / QEW interchange has a hybrid Diamond/‘Parclo B4’ configuration. The westbound on- and off-ramps, on the north side of the QEW, are in a Diamond configuration. For eastbound traffic, there are two exits from the QEW: an eastbound off-ramp inner loop ramp for traffic heading north on Glendale Avenue, and an eastbound off-ramp direct ramp for traffic heading south on Glendale Avenue. The inner loop ramp and direct ramp configuration south of the QEW is a Parclo B4 configuration. The north ramp terminal (south of the Glendale Ave and York Road intersection) is signal-controlled, while the south ramp terminal (north of the Glendale Ave. and Taylor Road intersection) is stop-controlled.

4.4.2 Existing Bridge

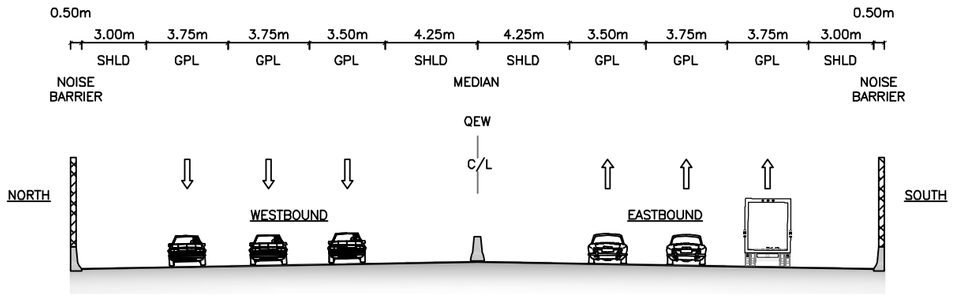
The Garden City Skyway (GCS) was constructed in approximately 1963 and carries the QEW over the Welland Canal. The bridge consists of forty-eight spans totaling approximately 2.2 km in length.

The GCS provides an important transportation and trade link between Canada and the Eastern Seaboard of the United States. Approximately 85,000 vehicles per day move across the Garden City Skyway Bridge. This includes a high percentage of trucks moving over the Queenston-Lewiston and Peace Bridges as part of the multi-billion dollar US-Canada Trades.

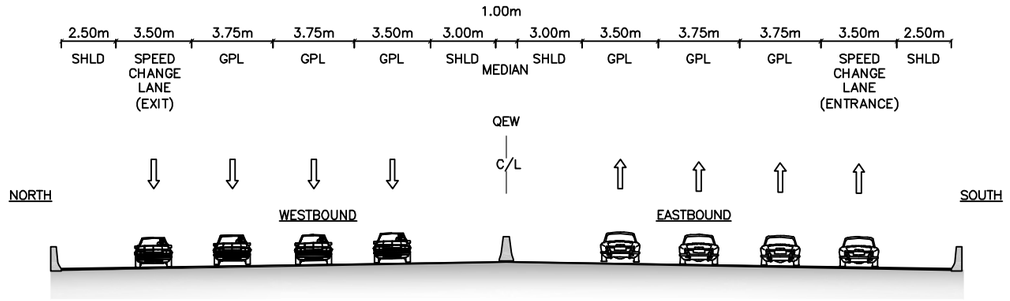
The bridge accommodates three lanes (of approximately 3.66 m width) in both the Niagara- and Toronto-bound directions. Directional traffic is separated by a concrete median barrier with typical concrete barriers on either side. Shoulder widths of approximately one metre are provided on the bridge resulting in a total bridge deck width of approximately 28 m.

The bridge superstructure is a reinforced concrete deck supported on painted steel girders. The approach spans are steel plate girders, while the navigation and adjacent spans consist of two variable depth steel box girders complete with floor beams and long cantilever floor beams. The substructure consists of reinforced concrete piers supported on a combination of spread footings and steel H piles.

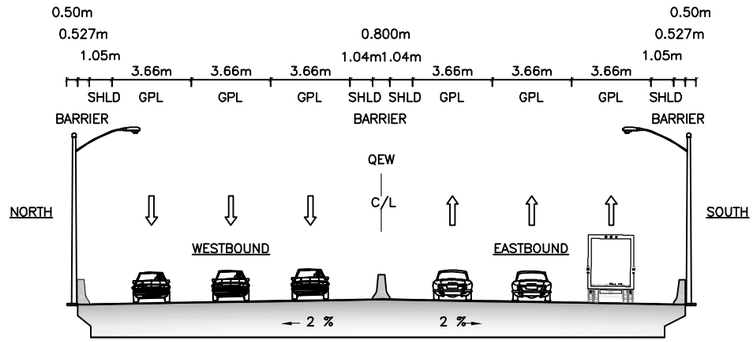
The bridge has also undergone a number of rehabilitations of various components. This includes deck patching, repairs to the barriers, fatigue detail repairs, substructure repairs, replacement of expansion joints and the construction of new light pole bases.



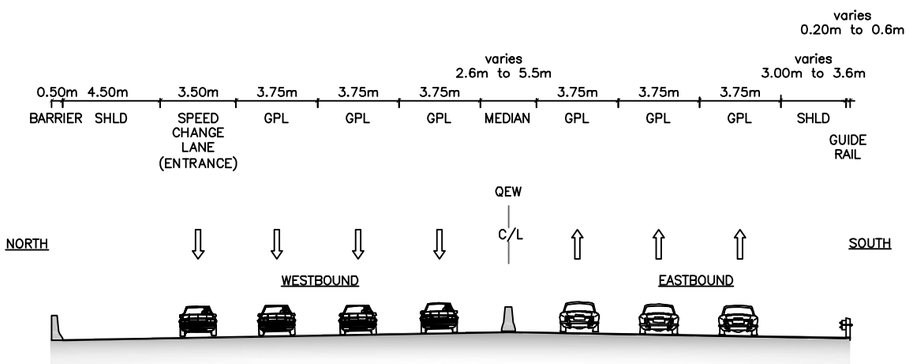
QEW
EAST OF NIAGARA STREET INTERCHANGE



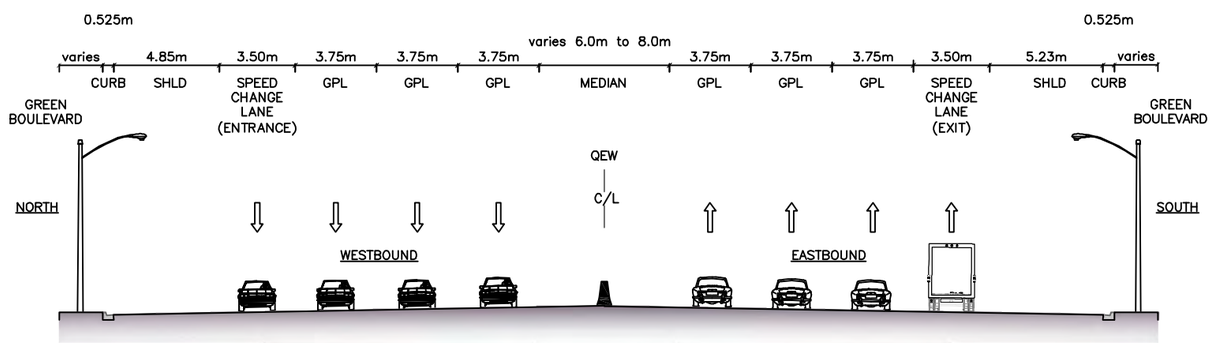
QEW
WEST OF GARDEN CITY SKYWAY WEST ABUTMENT



QEW
GARDEN CITY SKYWAY BRIDGE



QEW
WEST OF ONTARIO TRAVEL CENTER



QEW
WEST OF GLENDALE AVENUE INTERCHANGE

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Typical Cross Sections - Existing QEW Main Line

Exhibit
4-18

4.4.3 Existing Traffic Conditions

A detailed traffic operations study was undertaken to assess the existing traffic conditions within the study area. The traffic operational analysis for the mainline QEW and surrounding local roads was conducted using a micro-simulation model (AIMSUN). The model used an extension of the model prepared for the Niagara Region's Glendale Avenue / Highway 405 / QEW EA study. The adjusted extension included the local road network on the west side of the canal as well as an extended QEW corridor.

The model included the QEW Garden City Skyway and immediate local road network (as illustrated in **Exhibit 4-19)**. The model was set up according to existing (2014) conditions with further updating to include proposed improvements to be in place by 2031. The future traffic conditions are detailed in **Section 7.5**.

The intersections modelled include: Bunting Road and Dieppe Road; Bunting Road and Dunkirk Road; Bunting Road and Eastchester Avenue; Niagara Stone Road and Queenston Road; and, Niagara Stone Road and Queenston Street/Taylor Road

EXHIBIT 4-19: AREA OF TRAFFIC MODELLING

Existing volumes were based on turning movement counts mainly collected from 2011 to 2014 during summer and fall seasons. The information sources included Niagara Region, MTO, and independent counts undertaken for the west side of the canal in December 2012.

The traffic performance for the PM peak hour, measured in Level of Service (LOS), is detailed in **Table 4-5**; the PM peak hour time period is detailed as this is subjected to the most traffic demand and therefore is the worst-case scenario. As all intersections operate at a LOS D or higher, it is noted that no existing traffic performance concerns are identified (a key explaining Level of Service is included below **Table 4-5**).

4.5 Utilities

The following major utilities are located within the study area: Bell Canada; Cogeco Cable; Enbridge Gas Distribution; Hydro One; Niagara-on-the-Lake Hydro; Niagara-on-the-Lake Public Works; City of St. Catharines; Rogers Cable and Alectra Utilities (formerly Horizon Utilities).

In addition, there are existing municipal utilities, watermains and sanitary sewers along local roads. **Exhibit 4-20** details the utility infrastructure within the study area.

TABLE 4-5: EXISTING (2014) P.M. PEAK HOUR LEVEL-OF-SERVICE

Intersection	Movement	Demand (veh/h)	Volume (veh/h)	Delay (s)	Movement LOS	Approach LOS
Bunting Rd/ Dieppe Rd (signalized)	EBL	0	0	0	A	C
	EBT	27	27	27.4	C	
	EBR	83	81	29.0	C	
	WBL	82	80	64.1	E	D
	WBT	204	204	36.4	D	
	WBR	50	54	29.6	C	
	NBL	282	231	12.0	B	A
	NBT	489	515	6.8	A	
	NBR	114	104	6.7	A	
	SBL	56	64	29.0	C	D
	SBT	510	506	42.8	D	
	SBR	94	94	26.9	C	
Bunting Rd/ Dunkirk Rd (signalized)	EBL	150	147	54.6	D	D
	EBT	64	59	25.3	C	
	EBR	127	123	24.4	C	
	WBL	44	41	44.9	D	D
	WBT	13	11	29.6	C	
	WBR	25	26	37.4	D	
	NBL	4	6	10.4	B	B
	NBT	685	673	16.3	B	
	NBR	27	33	11.3	B	
	SBL	9	9	22.4	C	C
	SBT	637	640	25.5	C	
	SBR	23	21	10.5	B	
Bunting Rd/ Eastchester Ave (signalized)	EBL	314	310	43.4	D	D
	EBR	19	21	10.7	B	
	NBL	32	24	17.6	B	C
	NBT	400	400	27.6	C	
	SBT	468	447	28.9	C	B
	SBR	340	352	3.0	A	
Niagara Stone Rd/ Queenston Rd (unsignalized)	WBL	20	6	10.6	B	B
	WBR	18	3	12.1	B	
	NBT	298	317	1.0	A	A
	NBR	17	35	4.7	A	
	SBL	16	1	0.1	A	A
	SBT	469	357	1.6	A	
Niagara Stone Rd/ Taylor Rd/ Queenston St/ York Rd (signalized)	EBL	223	277	15.9	B	B
	EBT	123	124	11.9	B	
	EBR	199	233	7.3	A	
	WBL	13	5	19.7	B	B
	WBT	247	157	11.1	B	
	WBR	87	29	6.5	A	
	NBL	86	207	23.4	C	C
	NBT	83	45	12.9	B	
	NBR	2	2	6.1	A	
	SBL	84	44	28.2	C	A
	SBT	100	53	25.1	C	
	SBR	343	267	3.6	A	

Key:

LOS A = Light Traffic / Free Flow Speeds
LOS B = Slightly Increased traffic levels / Still free-flow speeds
LOS C = Approaching moderate congestion levels / Speeds near free-flow
LOS D = Speeds Reduced / Lane changes restricted due to traffic
LOS E = Congestion / Irregular traffic flow
LOS F = Road at capacity / Gridlock with frequent stops

L / R / T = Left Turn / Right Turn / Through
EB = Eastbound
WB = Westbound
Veh/h = vehicles per hour

ST. CATHARINES

NIAGARA-ON-THE-LAKE

Welland Canal

Niagara Street
Welland Avenue
Queen Elizabeth Way
Dunkirk Road
Gantham Avenue
Expott Avenue
Nelison Avenue
Bunting Road
Cushman Road
Welland Canal Parkway
Stewart Road
Eastchester Avenue
Niagara Stone Road
Diepppe Road
Eastchester Avenue East
Berryman Avenue
Grantham Avenue South
Wright Street
Eastchester Avenue
Queenston Road
York Road
South Service Road
Airport Road
Emmett Road
Dorr Road
Homer Road
Queen Elizabeth Way

Legend

- Hydro Tower
- Water System Valve
- Roads
- Storm Sewer
- Municipal Drain
- Sanitary Force Main
- Sanitary Gravity Main
- Potable Water Main
- Hydro Transmission Line
- Hydro Corridor
- Sewage Treatment Plant
- Recommended Right of Way Requirements
- Property Limits
- Study Area

N

0 0.25 0.5 1 Kilometer

QEW GARDEN CITY SKYWAY EA
W.O. 08-2009

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Ontario

Existing Utilities

Exhibit
4-20