

Milton Logistics Hub Project Environmental Assessment Report



prepared by

The Review Panel for the Joint Process

for the

Review of the Milton Logistics Hub Project

January 27, 2020

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

Milton Logistics Hub Project Environmental Assessment Report: Prepared by the Review Panel for the Joint Process for the Review of the Milton Logistics Hub Project.

Environmental Assessment Reference Number 80100: Canadian National Railway Company of Canada, proposed Milton Logistics Hub Project. Milton, Ontario

January 27, 2020

Cat. No. : En106-228/2020E-PDF

ISBN: 978-0-660-33668-8

Published by

Impact Assessment Agency of Canada

160 Elgin Street, 22nd Floor

Place Bell Canada, Ottawa, Ontario K1A 0H3

Telephone: 613-957-0700

Fax: 613-957-0941

Website: <https://www.canada.ca/en/impact-assessment-agency.html>

Summary

The Project

The Canadian National Railway Company (CN) is proposing to build an intermodal logistics hub on land in the Town of Milton, in the Greater Toronto and Hamilton Area, an area experiencing rapid urban growth. It would enable the transfer of shipping containers between railcars and trucks, and increase capacity of the intermodal network in Canada. The Project would be constructed adjacent to the existing mainline, covering approximately 400 hectares of CN-owned land. It would realign and double a portion of the mainline, and include construction of new pad and service tracks, a large work pad, an administration building and maintenance garage, a truck entrance gate and roadways to access the facility. The Project would also require the development of a stormwater management system, the realignment of two watercourses, and replacement of the existing grade crossing at Lower Base Line with a grade-separated rail over road underpass. At full operation the Project would handle approximately 450,000 containers per year, transporting primarily finished products, such as appliances, furniture, and household goods. Approximately 2.7 percent of the containers would contain dangerous goods, such as household cleaning and lawn care products. The Terminal would be serviced by four intermodal trains per day, two of which are already moving along the Halton Subdivision mainline through the Town of Milton. A maximum of 800 trucks per day would enter and exit the terminal.

This Summary

This summary contains some of the key points from the Report. We encourage you to read the full list of recommendations. Over the last three years the Panel conducted a comprehensive environmental assessment closely examining whether the Project was likely to cause significant adverse environmental effects, as defined under section 5 of CEAA 2012. Our findings on environmental effects of the Project are set out in boxed conclusions. For most of the factors reviewed, the Panel concluded that, with the mitigation proposed by CN and, in some cases, with additional mitigation recommended by the Panel, the Project would not have significant adverse environment effects. However, the Panel has concluded that the Project is likely to cause significant adverse environmental effects on air quality and on human health as it relates to air quality, and significant adverse cumulative environment effects on air quality, human health, wildlife habitat, and the availability of agricultural land. The Panel emphasizes that in each case, direct Project effects are relatively small but would be added to an environment where air quality, wildlife habitat and the available agricultural land have already been affected by development, and would continue to be affected by a substantial amount of planned future development in the region. The Panel notes that most of the adverse environmental effects identified by the Panel as significant are likely to occur whether or not the Project proceeds because the lands have been designated for future development.

Alternative Means of Carrying out the Project

CN described how it selected South Milton to be the Project site, looking at general location, size, slope and potential environmental effects. The Panel concluded that CN's criteria for site selection were

reasonable and their application supported the choice of the South Milton site. CN also assessed alternatives for Project components including the truck entrance, the grade separation, water supply and wastewater management, stormwater management system design, Indian Creek, and lift equipment. The Panel was satisfied with the options selected by CN.

Air Quality

CN reported that baseline levels of air contaminants were in general below the relevant federal and provincial ambient air quality standards except for benzo(a)pyrene and benzene. CN's dispersion modelling results showed that in 2021, with the Project, in certain areas benzo(a)pyrene, benzene and PM₁₀ would exceed standards on a few days a year. Halton Municipalities suggested that CN had not included road dust in their modelling and also underestimated the number of idling trucks.

CN then proposed additional mitigation that it predicted would reduce dust by 25 percent and emissions from idling trucks by 70 percent.

The Panel found that three contaminants would exceed the relevant ambient air quality criteria: Benzo(a)pyrene (by 2600%), Benzene (by 128%) and PM₁₀ (by 112%). In the Milton area, transportation and other activities have had an effect on air quality that the Panel considers to be already significant, as reflected in the existing baseline air quality data. The Panel concluded that, although the Project contribution would be limited, it would increase benzene, benzo(a)pyrene and cause new exceedances for PM₁₀ and PM_{2.5}, and therefore be likely to result in a significant adverse environmental effect. Similarly, because residential, industrial and commercial development in Milton will continue, the Panel concluded that the Project, in combination with other projects and activities, is likely to cause a significant adverse cumulative environmental effect to air quality.

Greenhouse Gases

CN predicted the total Project greenhouse gas emissions would be 23 kt of carbon dioxide equivalents (CO₂e) annually during construction and 63 kt CO₂e during operations. CN committed to various mitigation methods such as a no-idling policy, regular maintenance, and using high fuel efficiency engines. The Project would result in net reduced greenhouse gas emissions because containers would be moved by railway rather than long-haul trucks, which CN estimated would reduce emissions from 200 million truck kilometres annually.

Light

The Project would be a source of three types of obtrusive lighting effects: light trespass, glare and sky glow. Some night work requiring lighting would be necessary during construction. During operations, the Terminal would function day and night, lit by 30-meter high mast light fixtures on the pad area and 15-meter high light fixtures along roadways. CN's mitigation would include berms, landscaping, glare shields, and downward focused luminaires. Halton Municipalities asserted that the Project, with taller light fixtures and more powerful lights would have a much greater effect than other types of lighting in the area. The Panel recommended that the more stringent international standard for changes in light (rural rather than suburban) should be applied to the Project for light trespass and glare, noting that this would likely require some additional mitigation. The Panel also acknowledged the value of preserving dark skies to the extent possible and, following Halton Municipalities' suggestion, recommended that CN use amber light technology if feasible, as it may cut sky glow by a substantial amount.

Noise and Vibration

CN indicated that the existing noise levels were typical of a suburban environment and dominated by existing train traffic, local vehicular traffic, and urban hum from the developed areas. During operations, noise would be generated 24 hours per day, although 85 percent of truck movements would occur during business hours. Only two new trains would be added to the mainline. Noise mitigation would include speed limits, berms, barriers, enclosure of noise sources, and selection of quieter equipment. CN would install measures such as sound barriers during the early stages of construction. Noise sources along the mainline north of Britannia Road would include locomotive movements, idling and coupling noise. Developers would be required by the Town of Milton to extend the noise barriers along the main tracks. Halton Municipalities expressed concern about the lack of detail for proposed mitigation. Developers with land north of Britannia recommended additional barriers between future adjacent homes and noise sources. Health Canada raised concerns about sleep disturbance.

CN expressed confidence that all noise criteria would be met through mitigation, and the Panel has made recommendations to ensure this while also noting that additional enforcement would be available through the Canadian Transportation Agency. The Panel concluded that the limited Project noise north of Britannia would be adequately mitigated by the existing and future noise barriers and that the main Project activities at the terminal would occur more than 300 metres from all homes. The Panel was satisfied that vibrations from construction or trains on the mainline would not cause significant adverse effects.

Surface Water

Once construction is complete, approximately 50 hectares of the area would be covered by an impervious surface. CN would construct a stormwater management system with diversion ditches, culverts and stormwater management ponds to control drainage so that post-development peak flow rates would not change, up to and including the Regional Storm event. As a result, CN predicted that there would be no increase in flood risk to downstream areas. CN said that their proposed channel realignments would address channel erosion and instability, increase the environmental buffer, account for meander belt migration, and provide floodplain capacity. CN also said that the Project would potentially improve water quality through treatment of runoff and plantings along streams. Conservation Halton and Halton Municipalities had many questions and criticisms relating to CN's assessment of headwater drainage features, limited local flow data, channel design, floodplain mapping, thermal effects, and the capacity of the stormwater system to deal with an extreme storm event such as Hurricane Hazel.

The Panel concluded that additional water conveyance and storage infrastructure would be required and that CN has enough land available for such work to build this infrastructure. The Panel's recommendations included performance objectives that CN must meet to ensure there are no changes to flows or water quality offsite, and collaboration with other agencies to ensure the Project can satisfactorily manage the range of climate conditions.

Groundwater

CN found, and Natural Resources Canada agreed, that the Project site has low groundwater recharge potential and therefore groundwater is not vulnerable to hazardous material spills and other effects. The Panel was satisfied that proposed mitigation measures would avoid adverse changes to groundwater systems.

Changes to Wetlands

CN stated that it would remove 3.7 hectares of low-quality wetland habitat, and replace it by creating 7.1 hectares of new wetland habitat, with native vegetation. Halton Municipalities expressed concern that constructed wetlands can take a long time to establish, and need to be monitored regularly to manage invasive vegetation species. Conservation Halton stated that feature-based water balances should be completed for potentially affected wetlands. The Panel concluded that CN's wetland compensation proposal is appropriate and recommended consultation with Conservation Halton about its implementation.

Terrestrial environment

CN's geotechnical investigation found that soils on the site would provide stable support for infrastructure, and soil could be safely re-used on site. The Panel made recommendations regarding soil management and monitoring, and addressed issues relating to habitat protection and compensation in other sections.

Wildlife

CN identified habitat for species at risk and assessed potential effects on migratory birds. It proposed a variety of habitat creation and mitigation measures to protect these species, including exclusion fencing and awareness training for CN employees and contractors. The Panel concluded that the Project alone would not cause a significant adverse environmental effect on wildlife and wildlife habitat connectivity, but is likely to cause a significant adverse cumulative environmental effect in combination with the effects of past losses of agricultural and wild lands and the future effects of continuing rapid growth and development.

Fish and Fish Habitat

CN concluded that parts of Indian Creek and Tributary A provide poor to moderate quality fish habitat supporting a commercial, recreational or Aboriginal fishery, but no aquatic species at risk. CN's plans to realign sections of Indian Creek and Tributary A would require an authorization issued by Fisheries and Oceans Canada and a Habitat Compensation Plan. CN stated that meeting the terms of the Fisheries and Oceans Canada authorization would ensure no significant residual effect on fish or fish habitat. Fisheries and Oceans Canada agreed that the Project would be unlikely to cause serious harm to fish. Conservation Halton expressed concern that channel realignments and culverts could create barriers to fish passage and that the stormwater ponds could cause thermal effects. The Panel concluded that the proposed fish habitat compensation would satisfactorily offset effects on fish and fish habitat.

Air Quality: Health Effects

CN assessed the human health risks of exposure to a range of air pollutants, including particulate matter, nitrogen oxide, and diesel exhaust and its constituents, including diesel particulate matter, benzo(a)pyrene and benzene. CN stated that its relative risk analysis of diesel exhaust demonstrated

that the Milton airshed would be essentially the same with the Project as it would be without it, and that the relative risk to health would be at the lowest end of the risk range in Southern Ontario. Health Canada pointed out that there is no human health threshold for certain air quality parameters, and stated that CN had not adequately assessed the health risks from diesel exhaust. Halton Municipalities said that CN had failed to assess a range of other adverse health effects including premature non-cancer mortality, asthma, cardiovascular and acute respiratory symptoms. Health Canada recommended that CN reduce emissions of non-threshold contaminants associated with diesel exhaust. CN subsequently agreed to prepare a human health risk assessment of the effects of diesel exhaust, in consultation with Health Canada.

As air quality has already deteriorated due to human activities, especially traffic-related emissions, and the Project would further contribute air emissions, especially benzo(a)pyrene, benzene and cause new exceedances for particulate matter, the Panel found that the effects of Project air emissions on human health would be low on their own, but significant when combined with existing and anticipated background exceedances and human health exposure ratios that are near the maximum acceptable level, and therefore concluded there would be a likely significant cumulative adverse environmental effect.

Country Foods and Water Quality: Health Effects

CN modelled future concentrations of benzo(a)pyrene in soils and predicted that they would be well below health guidelines. The Panel concluded that risks to health associated with eating country foods would be low but recommended that CN implement a follow-up program. The Panel also concluded that the Project was unlikely to affect any groundwater sources used for drinking water and confirmed that surface water in or near the Project Development Area is not used for drinking water or recreation.

Noise: Health Effects

CN predicted that operation of the Project would result in only minor additional noise. In response to Health Canada's concerns, CN agreed to further analyse sleep disturbance to evaluate the impact of impulsive nighttime noise events – for example, the sound caused by two railcars connecting. The Panel recommended that CN should, if necessary, implement additional mitigation measures, such as noise barriers or operational changes to ensure that individual noise events remain under the target of 10 to 15 events of 60 dBA L_{max} outdoor per night. Other recommendations included noise monitoring and reporting, good communications with the community and a complaints response process.

Outdoor Recreation

CN reported that cycling is popular in the area and that the Mattamy National Cycling Centre is an important nearby sports facility. The truck entrance on Britannia Road would be designed to safely accommodate pedestrians and cyclists and the grade separation at Lower Base Line would include separate cycle lanes, which would allow cyclists to avoid crossing the mainline. CN would construct vegetated berms in key locations to reduce effects on the viewscales and noise from Project activities. Halton Municipalities stated that increased truck traffic would deter cyclists, and Milton Says No was concerned about the effects of air emissions and risks to cyclist safety particularly at roundabouts. The Panel noted that truck numbers would increase and arterial roads would be expanded even without the Project, making the roads less conducive to cycling. The Panel recommended that CN consult with cycling organizations about cyclist safety, and develop a cycling awareness program for truck drivers

accessing the terminal. CN also concluded that, even with the addition of Project lighting, it would still be possible to view stars on nights with good viewing conditions.

Property Value and Enjoyment of Property

CN stated that many parameters can affect property values and that all but one of the neighbourhoods adjacent to CN's mainline had been approved after CN acquired the land for railway-based infrastructure. Halton Municipalities stated that major industrial facilities should be appropriately designed, buffered or separated from sensitive land uses. Milton Says No reported that, according to local real estate agents, the Project could cause an initial short-term drop of 5-10 percent for properties close to the Project. However, the Panel did not hear evidence, other than conjecture, that the Project would cause a widespread, severe or permanent decline in property values.

Agriculture

The Project Development Area is mostly leased to local farmers, growing row crops like soybeans, corn, wheat, and hay. The Project would remove 147 hectares of agricultural land, including 30 hectares of Prime Agricultural land (0.1% of the total amount in the Region). Mitigation for this loss could include improvement of adjacent lands or a contribution to agricultural research. CN stated that the Regional Official Plan for Halton includes 36,011 hectares of agricultural land and that planned development in the Town of Milton, in combination with the Project, would convert 1,732 hectares, while future urban growth would require an additional 3,000 to 4,200 hectares of land. Halton Municipalities stated that the Project would not create enough jobs to compensate for the loss of agricultural land. The Panel observed that the Project would remove agricultural land sooner than might otherwise be expected, but this would happen eventually even without the Project. While the Project would cause only a small loss of agricultural land, in combination with past conversions and future rapid urbanization, in the Panel's view that loss becomes significant. The Panel concluded, considering those past and future losses, that the Project is likely to cause a significant adverse cumulative environmental effect to the availability of land for agricultural use in the region of Halton.

Land Use Planning

CN said that the Project was compatible with regional and provincial planning because Project lands had been designated for employment, and the Project would not impinge on the Greenbelt Plan areas. Under the 2019 Regional Official Plan, individual sites within the greenfield area are not required to meet the employment density targets. Halton Municipalities stated that Milton is aiming to ensure a complete community that balances housing and employment, and wishes to attract knowledge-based industries and innovation employment. Warehousing and logistics centers would be directed to locations close to the 400-series highways. Further, because the Project is only proposing 130 direct jobs, Halton Region would need to look at other opportunities and lands to achieve their employment targets. The Panel understands that Milton wants a larger, more diverse employment base, but, as CN owned this land and was not necessarily bound by the Regional Official Plan, the Panel concluded that Halton Region should have foreseen the possible need to alter its plans.

Demand for Community Services and Infrastructure

CN would use contractors to supply water and to collect and dispose of solid waste and wastewater at licensed facilities, but would consider connecting to the municipal network if services later became available. CN did not anticipate additional costs to public services such as road maintenance, fire-

fighting or snow removal. Halton Municipalities expressed concern that CN would not connect to the municipal system, which had been sized for CN's original 2008 proposal, and was also concerned that the proposed on-site water supply would not be sufficient for fire protection. Other concerns included increased wear and tear on arterial roads, and costs to upgrade intersections and the eventual future replacement of the Lower Base Line underpass. The Panel agrees that CN would mostly not rely on local services, but recommended that CN negotiate with Halton Region for provision of regional water and wastewater services.

Municipal Finances

CN predicted that the Project would contribute approximately \$1 million annually in property taxes, and attract intermodal-oriented development to Milton, generating between \$130 and \$213 million in property taxes and \$36-74 million in development charges over a 30-year period. Halton Municipalities stated that they had based their budget planning on CN's original 2008 concept for rail-based industrial development, and suggested this would have generated \$49 million in development charges and \$7 million annually in property taxes. Halton Municipalities considered these to be lost opportunity costs. The Panel recommended that that CN, Halton Region and the Town of Milton hold discussions to identify ways in which CN might contribute to Milton's vision of developing the complete community with a diverse employment base that includes but is not limited to an expanded logistics industry.

Effects on Road Transportation Networks

CN used provincial trip origin and destination-based surveys to estimate the proportion of trucks likely to follow each of the identified truck routes, concluding that primary truck routes would connect to the northeast. The Ontario Ministry of Transportation stated that Project traffic would have minimal impact on provincial highways. Halton Municipalities suggested that the route options with the least impact in the short term would be via James Snow Parkway or Trafalgar Road to Highway 401. Other participants questioned the implications of accidents and obstructions on Highway 401. CN stated that truck movements would be dispersed over a 24-hour period. The busiest time for trucks would not conflict with peak traffic and Project trucks would use 2% or less of the future capacity at signalized intersections, with the exception of the access intersection on Britannia Road. CN concluded that, at most, the Project would cause the percentage of heavy vehicles to increase by 0.75 to 1.5% during peak periods. Halton Municipalities argued that Project traffic could cause considerable delays at key intersections, particularly at Britannia Road and Trafalgar Road, and would impact sensitive residential and institutional land uses. Other participants were concerned about traffic on Tremaine Road and effects on road safety, particularly for cyclists and at roundabouts.

The Panel observed that a maximum of 800 trucks entering and exiting the Project per day is only a small percentage of the total number of vehicles currently operating on Milton roads (several thousand vehicles per hour). The Panel recommended that if the Project starts operating before the widening of Britannia Road has been completed, CN should reduce the number of trucks during peak traffic hours.

Effects on Passenger, Commuter and Freight Rail Services

CN noted that there are no passenger train movements along the portion of the Halton Subdivision where the Project would be located. While the Project would add two new trains per day to the Brampton-Georgetown corridor, this increase falls within the expected variability of existing train traffic

(25-30 trains/day). The Panel concluded that the Project would not have an adverse impact on passenger, commuter or freight rail services.

Cultural Heritage

CN stated that heritage properties within the Project Development Area would be vacated. The Project would remove one 19th century heritage building, a shed. Several cultural heritage properties could be vulnerable to vibration effects during construction. CN would protect vacant properties from weather and vandalism by boarding up windows and doors, and inspecting them regularly, until an adaptive re-use has been identified. Both Ontario Ministry of Tourism, Culture and Sport, and Halton Municipalities spoke of the risk of demolition by neglect. The Panel was satisfied with the proposed mitigation to address both the removal of the shed and the risk of vibration effects during construction, and made additional recommendations to determine the future for the vacated buildings.

Archaeology

CN carried out the four-stage archaeological assessment required by Ontario Ministry of Tourism, Culture and Sport, and conducted controlled salvage excavations at ten Aboriginal sites and three 19th century Euro-Canadian sites. Three Indigenous communities participated in the investigations. The Huron-Wendat Nation explained that their burial sites are typically ossuaries, of great spiritual and cultural value, and indicated that more than 2,000 Huron-Wendat Nation archaeological and burial sites had been destroyed by development in southern Ontario, without their knowledge or consent. The Mississaugas of the Credit indicated CN had collaborated with them to ensure that archaeological resources had been dealt with respectfully. They stated that many sites had been irretrievably lost because of past developments. The Six Nations of the Grand River stated that they are actively involved in archaeological monitoring throughout their area. The Panel recognizes that excavation, however respectful, represents a loss for Indigenous groups. However, the Panel believes that CN has worked diligently to build relationships with respect to this Project. The Panel recommended that any ossuary discovered remain permanently undisturbed unless the Huron-Wendat Nation agrees to an alternative, and that CN consult with Indigenous groups about mitigation.

Aboriginal and Treaty Rights and Current Use of Lands by Indigenous Communities

The Huron-Wendat Nation, the Mississaugas of the Credit First Nation and the Six Nations of the Grand River all presented information regarding their history, rights and treaties. The Huron-Wendat indicated that their interest was primarily related to their archaeological sites and protection of their ossuaries. The Mississaugas of the Credit stressed the importance of wetlands at the headwaters of Bronte Creek and Sixteen Mile Creek, where their members harvest plants and animals for food, medicinal and cultural purposes. The Six Nations of the Grand River want to be involved with air quality monitoring. At the hearing CN responded in turn to each Indigenous group, and made commitments with respect to archaeological monitoring, and employment and contracting opportunities. The Panel has made recommendations in the Report to mitigate adverse environmental effects on surface water, air quality and habitat connectivity, and concludes that the Project would not affect the use of lands and resources for traditional purposes. The Panel recommends that CN provide opportunities to strengthen the land base, the economies and cultural capacity of the affected Indigenous groups.

Accidents and Malfunctions

CN stated that Project features that would reduce both the probability and severity of environmental effects resulting from accidents include low train speeds, low volumes of dangerous goods, shut-off valves on the stormwater management system, and CN's network-wide safety culture. CN considered that the effects of a fire on air quality would be the main risk to human health, but the risk would be low because of the small volumes of combustible material on site. Transport Canada reported that intermodal terminals in Canada have an excellent safety record. Halton Municipalities suggested that numerous injuries and fatalities could be expected over the life of the Project, but CN clarified that Halton Municipalities had made those predictions based on data from all railway operations, not intermodal terminals. The Panel concluded that the risk of a serious accident, including a major derailment, was low and the environmental effects could be adequately mitigated through design and prompt and effective emergency response. The Panel recommended that CN regularly update emergency response plans; collaborate with local authorities; and work with the Community Liaison Group to address issues of concern to the community.

Effects of the Environment on the Project

CN considered how the Project could be affected by natural hazards such as extreme winds, severe precipitation, ice storms, tornadoes, lightning, and climate change. CN's mitigation includes addressing extreme conditions through design, storm warning systems, and safe working procedures. CN said that they had designed the proposed stormwater management system based on a reasonable worst case climate change scenario. Some participants stated that CN's stormwater management system would not have sufficient capacity to store and convey the Regional Storm in a changing climate. The Panel made recommendations regarding flood retention capability, and an emergency response plan to safeguard and restore Project infrastructure in the event of an extreme weather event.

Environmental Management

CN proposed monitoring most Project effects during construction and for a short period of operations to confirm the effectiveness of mitigation. CN also committed to prepare environmental management plans and establish a Community Liaison Group to address issues of concern to the community. Participants raised concerns about the lack of detail on monitoring, monitoring duration during operations (since the Project would not be operating at maximum capacity for a number of years), and the need to identify specific indicators to trigger corrective action. The Panel made recommendations addressing an overall environmental management strategy, adaptive management, a Community Liaison Group, a formal agreement between CN and Conservation Halton, and enforcement of mitigation measures.

Need for the Project

The *Canadian Environmental Assessment Act, 2012* did not require the Panel to address the need for the Project as one of the specific factors to be considered in its assessment. Nevertheless, the Panel heard a substantial volume of information on the need for the Project, which is summarized within the report. The Greater Toronto and Hamilton Area has been experiencing rapid growth and increased demand for household goods, which is expected to double by 2040. Customers, such as grocery stores and retailers, are demanding quicker container turnaround time for goods delivery, which require a more flexible, efficient and reliable supply chain. Congestion at intermodal terminals will cause delays and

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

inefficiencies all along the supply chain and slow economic growth. This view was shared by many business presenters. The Panel agreed there is a need for additional intermodal facility capacity in the Greater Toronto and Hamilton Area.

Ultimate Capacity

CN indicated the Project would handle approximately 450,000 containers per year at full operation for the foreseeable future, and that if they increased this throughput, efficiency and customer satisfaction would diminish. Halton Municipalities suggested that the Project could be expanded to handle up to a million containers a year, with increased environmental effects. The Panel found CN's predicted container throughput was reasonable and based its assessment and conclusions on the Project as proposed. However, the Panel has made additional recommendations that would limit air emissions and changes to water quality and quantity, even if capacity were to expand.

Table of Contents

Summary	i
Preface: About This Report	1
Part 1 – Environmental Assessment, Joint Process, and Project Context	1
1. Introduction	1
1.1. Panel’s Approach	1
1.1.1. Consideration of valued components and environmental effects	2
1.1.2. Approach to determining significant adverse environmental effects	4
1.2. Terminology and Names	8
2. Review Process.....	9
2.1. Joint Process for the Review	9
2.1.1. Pre-panel activities of Government	9
2.2. The Panel’s Mandate and Terms of Reference	10
2.3. Panel Sufficiency Review of the Environmental Impact Statement	11
2.3.1. Site visit and intermodal facility visits.....	11
2.4. Public Hearing	13
2.5. Participants and Interested Parties.....	14
3. Project Setting and Description	14
3.1. Project Overview.....	14
3.2. Project Setting.....	15
3.2.1. Temporal and spatial boundaries	17
3.3. Project Components and Activities.....	19
3.3.1. Project infrastructure.....	19
3.3.2. Stormwater management system	22
3.3.3. Channel realignment.....	24
3.3.4. Lower Base Line grade separation	24
3.3.5. Terminal-generated train traffic	25
3.3.6. Containers	25
3.3.7. Terminal-generated truck traffic.....	26

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

3.4.	Regulatory Framework.....	27
3.4.1.	Federal legislation and regulation.....	27
3.4.2.	CN’s consideration of provincial and municipal standards.....	28
4.	Purpose of the Project and Alternative Means of Carrying Out the Project	29
4.1.	Purpose of the Project	29
4.2.	Alternative Means of Carrying Out the Project	29
4.3.	Alternative Project Site Locations.....	30
4.3.1.	Technically and economically feasible alternatives for Project components.....	32
Part 2 – Changes to the Biophysical Environment		39
5.	Atmospheric Environment	39
5.1.	Air Quality	39
5.1.1.	Baseline air quality.....	40
5.1.2.	Air quality modelling and effects	43
5.1.3.	Panel Conclusions and Recommendations	48
5.2.	Greenhouse Gases	55
5.2.1.	Panel Conclusions and Recommendations	57
5.3.	Light.....	58
5.3.1.	Baseline light conditions and modelling	58
5.3.2.	Light trespass	60
5.3.3.	Glare.....	61
5.3.4.	Sky glow	62
5.3.5.	Panel Conclusions and Recommendations	63
6.	Noise and Vibration	68
6.1.	Noise	68
6.1.1.	Ambient noise levels.....	68
6.1.2.	Noise modelling	69
6.1.3.	Construction noise effects	72
6.1.4.	Operational noise effects.....	74
6.1.5.	Panel Conclusions and Recommendations	80
6.2.	Vibration Effects.....	86
6.2.1.	Panel conclusions.....	87
7.	Aquatic Environment	87
7.1.	Surface Water	87
7.1.1.	Changes to flows	88

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

7.1.2.	Changes to the erosion and sediment transport regime	94
7.1.3.	Changes to water quality	96
7.1.4.	Panel Conclusions and Recommendations	102
7.2.	Groundwater	112
7.2.1.	Change in groundwater flow and infiltration.....	112
7.2.2.	Panel Conclusions and Recommendations	114
7.3.	Changes to Wetlands	116
7.3.1.	Panel Conclusions and Recommendations	118
8.	Terrestrial Environment.....	120
8.1.	Changes to the Terrestrial Environment.....	121
Part 3 – Effects on Fish and Fish Habitat, and Wildlife		125
9.	Fish and Fish Habitat	125
9.1.	Fish Habitat	125
9.1.1.	Current condition of fish habitat and fish communities.....	125
9.1.2.	Project related changes to fish habitat.....	127
9.1.3.	Follow-up and Monitoring Program for Fish Habitat.....	130
9.2.	Fish Mortality	131
9.2.1.	Project-related Changes to Fish Mortality	131
9.2.2.	Follow-up and Monitoring Program for Fish Mortality.....	134
9.3.	Panel Conclusions	134
9.4.	Cumulative Effects	140
10.	Wildlife Habitat and Wildlife.....	142
10.1.	Species at Risk.....	143
10.1.1.	Western Chorus Frog	143
10.1.2.	Eastern Meadowlark and Bobolink.....	147
10.1.3.	Snapping Turtle and Midland Painted Turtle	150
10.1.4.	Barn Swallow and Bank Swallow.....	153
10.1.5.	Monarch Butterfly.....	155
10.1.6.	Eastern Milksnake	157
10.1.7.	Other Species at Risk.....	159
10.2.	Migratory Birds	161
10.3.	Habitat Connectivity	165
10.4.	Mitigation and Monitoring.....	169
10.5.	Cumulative Effects	172

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

Part 4 – Effects of the Project on the Human Environment	175
11. Human Environment	175
11.1. Human Health	175
11.1.1. Air quality: Health effects	176
11.1.2. Country food: Health effects.....	183
11.1.3. Water quality: Health effects.....	184
11.1.4. Noise: Health effects.....	185
11.1.5. Mental health.....	190
11.1.6. Cumulative effects on human health.....	191
11.2. Socio-Economic Effects	193
11.2.1. Compatibility with residential communities.....	194
11.2.2. Agriculture.....	202
11.2.3. Land use planning	209
11.2.4. Transportation networks	217
11.3. Cultural heritage and archaeology.....	232
11.3.1. Cultural heritage	232
11.3.2. Archaeology	239
12. Aboriginal and Treaty Rights and Indigenous Communities.....	245
12.1. Indigenous Matters	245
12.1.1. Huron-Wendat	246
12.1.2. Mississaugas of the Credit First Nation.....	248
12.1.3. Six Nations of the Grand River	251
12.2. Panel Conclusions, Observations and Recommendations.....	252
Part 5 – Other Matters	256
13. Accidents and Malfunctions.....	256
13.1. CN’s views	256
13.1.1. Summary of CN’s accidents and malfunctions scenarios.....	256
13.1.1. CN’s emergency management and response plans.....	265
13.1.2. Participants’ Views.....	266
13.2. Panel Conclusions and Recommendations	268
14. Effects of the Environment on the Project	271
15. Environmental Management	278
16. Other Important Information to Assist Decision Makers	284
16.1. Need for the Project.....	285

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

16.2.	Ultimate Capacity of the Project.....	288
16.3.	Project Benefits.....	291
17.	Panel Concluding Remarks.....	294

Appendices

Appendix A – Key submissions received at various stages of the environmental assessment process

Appendix B – List of participants at the hearing and members of the Review Panel Secretariat

Appendix C – Review Panel Biographical Notes

Appendix D – Agreement to Establish a Joint Process for the Review of the Milton Logistics Hub Project between the Minister of Environment and Climate Change and the Chair of the Canadian Transportation Agency and Terms of Reference

Appendix E – CN Commitments

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Appendix E2 – Final Follow-up and Monitoring Programs committed to by CN

Appendix E3 – Final Environmental management Plan and Detailed Design Plan Commitments

Appendix F – Glossary

Appendix G – Notice of Sufficiency of Information

Appendix H – Regulatory Framework

Appendix I – Constitutional Matters heard by the Panel

Appendix J – Summary of Panel Recommendations

List of Figures

Figure 1-1: Project Development Area and Regional Setting for the Project,

Figure 1-2: Preliminary Design of the Milton Logistics Hub Site Plan

Figure 1-3: Stormwater Management System Components and Configuration

Figure 6-1: Example Berm/Barrier from CN's Presentation at the Hearing

Figure 11-1: Agricultural Land Use Types

Figure 11-2: Built-up areas in Milton 1991 and 2017

Figure 11-3: 2021 Future Total Traffic Composition for Britannia Road East of First Line and Tremaine Road North of Britannia Road

List of Tables

Table 5-1: 2021 and 2031 maximum predicted ground-level concentrations of air quality contaminants of concern

Table 11-1: Forecast Terminal-Generated Heavy Truck Trips

Preface: About This Report

Writing this report had its challenges over and above the volume of the information and complexity of the subject matter. The Panel recognizes that readers may, at times, be similarly challenged. Different subjects are treated in different ways. These differences are rooted in the fact that the review of the Project was a joint process, involving two federal agencies and authorized by two pieces of legislation. This is explained in Section 1. Therefore, we will explain here why every chapter does not have the same format, why sometimes the Panel makes a finding about significant adverse environmental effects and sometimes does not, and why sometimes the Panel draws conclusions and at other times makes observations.

Under the *Canadian Environmental Assessment Act, 2012* we were required to do a variety of things. First, we needed to decide whether the Project was likely to have a significant adverse environmental effect on the natural, or bio-physical, environment. Then we needed to make similar findings about Project effects on the human or socio-economic environment, but only if these effects were caused directly by a change to the natural environment. Our Terms of Reference under the *Canadian Environmental Assessment Act, 2012* (found in Appendix D) directed us to also address other socio-economic effects, not directly caused by a change to the natural environment as an integral matter relevant to the environmental assessment, but we had no mandate to make findings of significance on those effects. At the beginning of each chapter we have explained how the subject of the chapter relates to *the Canadian Environmental Assessment Act, 2012*, the EIS Guidelines and our Terms of Reference.

The Panel also had a mandate to hear and report on other matters:

- the nature and scope of potential or established Aboriginal or Treaty Rights, and how these might be affected by the Project, but without making conclusions or recommendations as to the validity or strength of such potential or established Rights.
- additional information we heard about whether any significant adverse environmental effects may be justified in the circumstances.
- for the purpose of a potential decision on the Project under the *Canada Transportation Act*, information that relates to requirements for railway operations and services, and the interests of the localities that will be affected by the line. For the most part this information will be found throughout the report.

For most of the factors we reviewed under the *Canadian Environmental Assessment Act, 2012*, we concluded that the Project would not cause significant adverse environmental effects after mitigation. But we did find that there would be significant adverse environmental effects on air quality, and human health in relation to air quality exceedances and significant adverse cumulative environmental effects on air quality, human health, wildlife habitat and land available for agricultural use. To be very clear, these conclusions should be understood in context relating to the location of the Project in a rapidly urbanizing region of southern Ontario where past development has converted large areas of agricultural and wild lands and put many trucks and cars on the region's roads. The Panel's conclusions were based

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

less on the magnitude of the Project's effects and more on the fact that these effects would be added to an already compromised baseline situation.

Part 1 – Environmental Assessment, Joint Process, and Project Context

1. Introduction

The Canadian National Railway Company (CN) is proposing to construct and operate a new logistics hub on 160 hectares (400 acres) of land it owns in Milton Ontario. The Milton Logistics Hub Project (the Project) would include an intermodal terminal to transfer containers between trucks and trains, consisting of a railway yard with more than 20 kilometres (km) of new track, access roads, on-site operational facilities, and a doubling of the existing mainline railway.

The Project is subject to two federal reviews: an environmental assessment under the *Canadian Environmental Assessment Act, 2012*, and a determination under Section 98 of the *Canada Transportation Act*. To ensure an efficient, single-window approach for all those interested in the review of the Project, the Minister of Environment and Climate Change (the Minister) and the Chair of the Canadian Transportation Agency entered into an agreement to create a joint process for these two reviews. An independent review panel conducted the joint process, undertaking the environmental assessment of this proposal and gathering information for the purposes of the Canadian Transportation Agency.

The Minister of Environment and Climate Change appointed the Panel in accordance with Section 38(1) of the *Canadian Environmental Assessment Act, 2012*. The Panel was chaired by Ms. Lesley Griffiths; the other members were Dr. Isobel Heathcote and Mr. William McMurray. Mr. McMurray is also a member of the Canadian Transportation Agency. He was assigned by the Chair of the Canadian Transportation Agency to decide whether the location of the proposed railway line is reasonable, taking into consideration requirements for railway operations and services and the interests of the localities that will be affected by line, and whether the line should be approved under Section 98 of the *Canada Transportation Act*. The biographical notes on the Panel members, as announced at the time of their appointment, are included in Appendix C.

This is the report of the Panel for the purpose of the environmental assessment. It contains the Panel's rationale, conclusions and recommendations, principally recommendations for mitigation measures and requirements for follow-up programs. The report also includes a summary of comments received from the public, including interested parties who appeared at the public hearing.

If the Minister's decision allows the Project to proceed, the Canadian Transportation Agency would be required to make its determination on the Project, and would issue a separate report for that purpose.

1.1. Panel's Approach

The Panel's Terms of Reference required it to conduct an environmental assessment of the effects of the Project in a manner consistent with the *Canadian Environmental Assessment Act, 2012*. The following section describes the approach the Panel took to conduct its assessment. During the course of its assessment the Panel heard differing proposals from participants as to how it should conduct its work, and those perspectives are discussed throughout the report. While the detailed and technical

approaches are included within each of the report sections, the broad aspects of the Panel's approach are described below.

1.1.1. Consideration of valued components and environmental effects

Valued components refer to biophysical or human features that may be affected by a project. They are not a legislated requirement, but rather a means for the reviewers and decision-makers to focus their efforts in an environmental assessment. CN and other interested parties had different views as to how valued components should be defined for the assessment. The *Guidelines for the Preparation of an Environmental Impact Statement for the Milton Logistics Hub Project* (EIS Guidelines) identified the minimum information requirements for CN to include in its environmental impact statement, and provided guidance on the preparation of the EIS. The EIS Guidelines directed CN to identify the valued components linked to Section 5 of the *Canadian Environmental Assessment Act, 2012*, as well as species at risk and their critical habitat as outlined in Section 79 of the *Species at Risk Act*.

Because the Canadian Transportation Agency may need to make a determination on the Project, the EIS Guidelines also directed CN to consider changes to the atmospheric environment, changes to groundwater and surface water, changes to terrestrial landscapes that were directly linked or necessarily incidental to that authorization, and effects on the other health and socio-economic conditions and heritage resources as possible environmental effects considered under Section 5(2) of the *Canadian Environmental Assessment Act, 2012*.

CN's Approach

CN initially considered three biophysical valued components (fish and fish habitat, migratory birds, and species at risk) and four socio-economic valued components (Aboriginal traditional land and resource use, human health, socio-economic conditions, and archaeological and cultural heritage resources) as a focus for its environmental assessment.

Through early consultations with Indigenous groups, CN decided that traditional land and resource use by Aboriginal peoples identified in the vicinity of the Project would not be affected by Project-related activities because those activities occur outside of the Project Development Area and the Local Assessment Area (described in subsection 3.2.1). As a result, CN did not carry traditional land and resource use forward as a valued component.

Participants' Views

Halton Municipalities suggested that 19 biophysical valued components and 13 human valued components would be affected by the Project. The Panel notes that many of Halton Municipalities' valued components were subsection headings or items in bulleted lists within the EIS Guidelines for baseline information requirements, or subcomponents of more general valued components. This was particularly true of the valued components that Halton Municipalities listed under health and socio-economic conditions.

In its submission to the Panel for the orientation session in February 2017, Conservation Halton also identified what it thought the valued components within its areas of expertise should be: topography and soil, groundwater quantity and quality, drainage basins, surface water bodies, surface water quality, fish habitat, fish movement, human health, and human safety.

Panel's Approach to Considering Environmental Effects

While the selection of valued components is a useful way to focus an environmental assessment, ultimately the Panel was required to conclude on the environmental effects of the Project, as defined in Section 5 of the *Canadian Environmental Assessment Act, 2012*. Therefore, the Panel has provided its conclusions on the significance of those effects as well as recommendations in relation to mitigation measures and requirements for follow-up programs, regardless of whether any of the interested parties had identified a specific valued component.

Specifically, Section 5(1) of the *Canadian Environmental Assessment Act, 2012* defines environmental effects as:

- a) a change that may be caused to fish and fish habitat, aquatic species and migratory birds;
- b) a change that may be caused to the environment on federal lands, in another province or outside Canada;
- c) with respect to Aboriginal peoples, an effect of any change caused to the environment on:
 - i) health and socio-economic conditions;
 - ii) physical and cultural heritage;
 - iii) the current use of lands and resources for traditional purposes; and
 - iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

For projects requiring a federal authority to exercise a power or function under another Act of Parliament, Section 5(2) of that Act provides for the additional definition of environmental effects:

- a) a change, other than the ones mentioned above, that may be caused to the environment and that is directly linked or necessarily incidental to the exercise of the federal power or function.
- b) the effect of that change, other than the ones mentioned above, on:
 - i) health and socio-economic conditions;
 - ii) physical and cultural heritage; and
 - iii) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

During the course of the environmental assessment the Panel did not find an indication that the Project would cause effects on the environment on federal lands, in another province or outside Canada. It might be that greenhouse gas emissions could contribute to transboundary effects in other provinces or outside of Canada. However, the Panel treated the emissions of greenhouse gases in a manner similar to other air emissions, specifically as an effect on the environment under subsection 5(2)(a) of the *Canadian Environmental Assessment Act, 2012*.

The Panel notes that conclusions on significance for effects related to health and socio-economic conditions, as well as cultural heritage, are only required when the effects are a direct result of a change that the Project would cause to the environment.

While some of the socio-economic issues raised through the process were changes that result directly from changes to the environment (for instance, conversion of land currently used for agriculture), many others were not the result of changes to the environment (for instance, impacts to planning). As a result, the Panel has not concluded on the significance of the effects for these latter socio-economic issues under the *Canadian Environmental Assessment Act, 2012*. However, the Panel has reported the

information and opinions that it heard for these subjects in this report. The Panel has taken this information into account, and made some observations including recommendations. These recommendations are not intended for the Minister to consider as part the decision under the *Canadian Environmental Assessment Act, 2012*, but general recommendations for the consideration of CN and other parties.

The Panel considered the following to be environmental effects for consideration under the *Canadian Environmental Assessment Act, 2012*:

- changes to the atmospheric, noise, aquatic and terrestrial environments;
- effects on fish and fish habitat; wildlife including migratory birds; and species at risk;
- changes to human health that would be caused by a change in the environment, such as health effects caused by a change in air quality;
- socio-economic effects caused by a change in the environment, such as to recreational opportunities caused by a change in air quality, noise, or light; and
- effects on archaeological and heritage resources, if caused by a change in the environment, for example through soil disturbance or vibration.

Changes in the following components were not considered to be environmental effects under the *Canadian Environmental Assessment Act, 2012*, because in the Panel's view, these are not a direct result of a change to the natural environment. The Panel nevertheless recognizes that such changes may occur, and has included discussion about them in this report:

- demand for community services and infrastructure;
- truck traffic (congestion, road damage);
- land use planning;
- effects on passenger, commuter and freight railway services; and
- Project benefits.

To differentiate these types of Project-induced changes, the Panel has highlighted its conclusions on environmental effects defined in Section 5 of the *Canadian Environmental Assessment Act, 2012* in conclusion boxes throughout the report. Other effects that the Panel considered are discussed in the main text of the report, but without conclusion boxes. This information is provided to fulfill the Panel's mandate to gather and report on the information, but not to make conclusions in those areas, and it may assist decision makers to understand how the Panel took into consideration the information before it.

1.1.2. Approach to determining significant adverse environmental effects

To determine the significance of adverse environmental effects, the Panel followed the approach set out in the Canadian Environmental Assessment Agency's guidance document: *Technical Guidance - Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012*:

- The Panel first examined the interactions between the Project and the environment, considered possible mitigation measures, and determined whether there would be a residual effect after the application of those measures.
- The Panel then considered whether any residual effect was adverse, and then whether that adverse effect would be significant.

- For any significant adverse environmental effects, the Panel then considered whether those effects were likely to occur.

The Panel also considered all residual Project effects in the context of cumulative effects, as described below.

Additional detail of the Panel's approach is provided in the following sections.

Consideration of mitigation

The Panel's Terms of Reference (Appendix D, p7) state that the Panel must prepare a report "with respect to the environmental assessment that sets out its rationale, conclusions and recommendations [...] including mitigation measures [...]", and that the Review Panel must take into account "[...] mitigation measures that are technically and economically feasible and that would mitigate any significant adverse effects of the Project [...]".

In making its significance conclusions, the Panel considered the application of the measures proposed by CN that were technically and economically feasible to mitigate potentially significant adverse environmental effects. Throughout this report, those mitigation measures, and others recommended by the Panel, appear before the boxed conclusions on the significance of the environmental effects. In many cases, mitigation measures to minimize changes to the environment are also essential to avoid significant adverse environmental effects on other elements, such as fish habitat, migratory birds, or human health.

CN provided the Panel with a list of its proposed mitigation and other relevant commitments including additional commitments made during the hearing (See Appendix E). CN stated that its conclusions in the EIS and supplementary information regarding the predicted residual environmental effects of the Project on valued components reflected the consideration of technically and economically feasible mitigation measures.

At the public hearing, based on CN's position that the Project would have constitutional immunity and would be exempt from any provincial, regional or municipal regulation, Halton Municipalities stated that the Panel should only consider mitigation that is federally enforceable. Halton Municipalities concluded that the Project would likely cause significant adverse environmental effects for almost all valued components, because of the lack of enforceability of provincial, regional or municipal laws. In its oral closing remarks, Halton Municipalities stated its position that it did not believe Section 5(2) of the *Canadian Environmental Assessment Act, 2012* changes the constitutional division of powers and therefore it does not authorize the federal Minister or the Canadian Environmental Assessment Agency to regulate matters of a local nature under the Constitution.

In response, CN stated that it expected that the mitigation measures, management plans, and follow-up programs to which it had committed would be included as conditions in the Minister's decision statement and potentially as part of other federal authorizations, such as an approval that could be issued by the Canadian Transportation Agency under the *Canada Transportation Act*, or an authorization that could be issued by Fisheries and Oceans Canada under the *Fisheries Act*. CN stated that, together, these mechanisms would be adequate to ensure that the mitigation measures proposed by CN, including the commitments and measures CN had proposed to implement to protect the interests of the localities, could be enforced.

Throughout this report, the Panel has recommended the mitigation measures it considers are technically and economically feasible, and required to mitigate potential significant adverse environmental effects. The Panel leaves any questions regarding the federal enforceability of those measures as conditions of approvals to the relevant decision-makers and authorities. In the case where the mitigation cannot be applied or enforced, the Minister would be required to decide whether the environmental effect would be significant or not.

In some cases, the Panel has recommended mitigation measures that go beyond CN's commitments and which were suggested over the course of the environmental assessment. CN did not raise specific objections to these measures, and therefore the Panel considers that they are technically and economically feasible from CN's perspective.

Is there an adverse residual effect?

After consideration of the proposed mitigation measures, the Panel then determined whether the Project would have a residual effect, and then whether the effect was, in fact, adverse. In some cases, consideration of the adversity of an effect is subjective, and depends on the environmental component or the perspective of the person experiencing the effect. The Panel took the approach that if one party thought an effect was beneficial or neutral, but another felt an effect was adverse, the Panel considered the effect to be adverse for the purpose of its assessment.

Is the residual adverse effect significant?

In determining the significance of the various environmental effects, the Panel was guided primarily by the Canadian Environmental Assessment Agency's *Technical Guidance to Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012*. Based on this guide, the Panel considered the magnitude, geographic extent, timing, frequency, duration and reversibility of each residual effect.

In arriving at its decisions on the magnitude of effects, the Panel considered the environmental objectives established within various standards from international, federal, provincial and municipal sources. Halton Municipalities provided many standards it deemed applicable to the Project, but the Panel has only included those that it relied on in specific sections and conclusions of its report. The Panel found that many of Halton Municipalities' standards were procedural in nature, and that following a process is not in itself an environmental quality objective or target to be met. Rather, wherever possible, the Panel used performance standards or objectives relating to specific environmental effects and has identified them in the relevant sections of this report.

Halton Municipalities suggested that CN had not made an effort to apply the majority of relevant provincial or municipal standards through this Project. On that basis, Halton Municipalities predicted that there would likely be non-compliance with standards for the majority of the valued components of interest to Halton Municipalities. Halton Municipalities noted that, according to the *Canadian Environmental Assessment Agency Reference Guide (1994)*, if the level of an adverse environmental effect exceeds the limit of, or is otherwise inconsistent with, an applicable provincial or municipal standard, this is an indication that the adverse effect could be significant.

Halton Municipalities provided information on the standards, bylaws, and municipal laws of general application it thought the Panel should consider as part of its significance assessment and conclusions. These were presented in Halton Municipalities' Brief of December 2016, its comment on sufficiency of

information in April 2019, and were referred to throughout Halton Municipalities' hearing presentations.

CN stated that, as a federally regulated railway, provincial and local legislation that encroaches on CN's core activities would not apply to CN. Similarly, provincial or local legislation inconsistent with federal legislation governing CN's activities would not apply. CN indicated that it did not require any provincial or municipal permits or approvals with respect to the Project. However, CN noted that it had taken certain provincial laws into consideration where appropriate and for completeness. Specifically, CN stated that it sometimes used provincial standards to identify measurable parameters or significance thresholds. The Panel found that, of the provincial and municipal laws CN had considered in its assessment, CN only identified the Ontario *Endangered Species Act, 2007* and the *Ontario Heritage Act, 1990* as informing CN's definition of residual effects rating criteria and the threshold of significance of potential effects.

During its sufficiency review, the Panel inquired whether CN would voluntarily commit to meet targets or standards identified in provincial or municipal regulations. CN indicated it had taken into account certain standards and targets identified in provincial or municipal laws and guidance documents in its assessment of the Project, where it felt it was appropriate. However, CN did not commit to voluntarily meet any provincial or municipal standards. It noted that, from its perspective, there is a material difference between using standards or targets as assessment benchmarks, and using them as binding requirements. However, CN did state that it was open to exploring any particular standard or target that the Panel identified as warranting further consideration

In considering the environmental effects of the Project, the Panel focused on whether a standard was a meaningful indicator of an environmental objective that aided the Panel in characterizing residual Project effects and whether meeting that target would avoid a potentially significant adverse environmental effect.

Is it likely?

In the event that the Panel did consider an environmental effect to be significant after the application of mitigation, the Panel determined whether this effect was likely to occur. The likelihood of each effect is discussed within specific sections of this report. In cases where the Panel found there was uncertainty in whether or not an effect was likely to occur, the Panel generally looked at what measures CN put in place to avoid such an effect, such as in the accidents and malfunctions section (Section 13). In other cases, the Panel considered that these effects would be likely to occur, even after consideration of suggested specific mitigation measures.

Cumulative effects

The Review Panel Terms of Reference required the Panel to consider "the environmental effects of the Project, including [...] any cumulative environmental effects that are likely to result from the Project in combination with other physical activities that have been or will be carried out".

The Panel was informed by the Canadian Environmental Assessment Agency's *Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* on these matters. Where the Panel found a residual environmental effect, regardless of its significance, the Panel considered how that effect would combine with the effects of other projects and activities that

have been or will be carried out. The Panel's consideration of past projects and activities is contextual for each environmental effect, as set out in those sections. In some cases, the Panel found it appropriate to consider current baseline conditions to reflect past changes, but in others it was more appropriate to have a greater historical perspective in considering the context of broader trends in the region. In identifying which future projects or activities will be carried out, the Panel considered projects that were certain (those that had already received regulatory approvals or were under construction) or reasonably foreseeable (those that had been announced, or were already considered as part of municipal land use plans, including lands identified for future development). Where CN or other participants referred to reasonably foreseeable future projects and activities, the Panel considered this as meaning projects that will be carried out, as described above.

The Panel was particularly challenged in this environmental assessment due to the fact that the Project is being proposed in a rapidly developing area that has already been subject to extensive land use change. The Panel found that the majority of past effects and reasonably foreseeable future effects were related to the rapid expansion of the urban areas within the Town of Milton and Halton Region, converting lands from agricultural usage to urban or suburban landscapes. This in turn has caused the loss or alteration of terrestrial and aquatic habitat, and increased air emissions associated with a growing population reliant on personal automobiles.

The Panel focused on the significance of the cumulative effect itself, rather than on just CN's contribution to it. In the case that the effect of the Project contributed to an already significant adverse environmental effect, CN's contribution to that effect was considered and discussed within that chapter, including whether or not that significant adverse cumulative environmental effect was likely to occur even in the absence of the Project.

1.2. Terminology and Names

The Panel has prepared a glossary of key terms, acronyms and abbreviations to assist the reader; see Appendix C.

During the course of the environmental assessment, several organizations changed their names. For clarity, the Panel has used the following terms:

- Ontario Ministry of the Environment, Conservation and Parks (MOECP) for Ontario Ministry of the Environment and Climate Change (MOECC)
- Mississaugas of the Credit First Nation (MCFN) for Mississaugas of the New Credit First Nation (MNCFN)

After the Panel closed its record on July 19, 2019, the Ontario Ministry of Tourism, Culture and Sport changed its name to the Ministry of Heritage, Sport, Tourism and Culture Industries. Within this report the Panel refers to the former name of the Ministry, as it appears throughout the Panel's record.

On August 28, 2019 the *Impact Assessment Act* came into force, and the Canadian Environmental Assessment Agency became known as the Impact Assessment Agency of Canada. Within this report, the Panel has referred to the Agency as the Canadian Environmental Assessment Agency for its participation in the environmental assessment of the project up to the time of the Panel closing its record, given that the entire evidentiary portion of to process was held prior to the *Impact Assessment Act* coming into

force. Although the environmental assessment continues under the *Canadian Environmental Assessment Act, 2012* the Panel recognizes that, if the Project is approved and built, it would be the Impact Assessment Agency of Canada that would be responsible to enforce any conditions.

2. Review Process

2.1. Joint Process for the Review

As noted in Section 1, the Project is subject to an environmental assessment under the *Canadian Environmental Assessment Act, 2012*, and aspects of the Project also require approval from the Canadian Transportation Agency under Section 98 of the *Canada Transportation Act*. Both the Canadian Environmental Assessment Agency and the Canada Transportation Agency commenced preliminary work on the review of the Project prior to the start of the joint process.

The purpose of the joint process was to ensure an efficient single window process for CN, Indigenous groups, localities whose interests may be affected and other review participants. The joint process began with the Minister of Environment and Climate Change and the Chair of the Canadian Transportation Agency signing an agreement to establish a joint process for the review of the Project and preparing Terms of Reference for the Review Panel to follow in conducting its work.

2.1.1. Pre-panel activities of Government

CN submitted a Project description to the Canadian Environmental Assessment Agency on March 23, 2015. The Canadian Environmental Assessment Agency accepted the Project description and held a 10-day comment period to inform the decision as to whether an environmental assessment was required, and on May 22, 2015, the Canadian Environmental Assessment Agency decided that an environmental assessment was required. The Agency developed draft *Guidelines for the Preparation of an Environmental Impact Statement for the Milton Logistics Hub Project* (EIS Guidelines) for the Project and commenced a 30-day comment period on the draft guidelines. On July 20, 2015, the EIS Guidelines were finalized and the Minister of Environment and Climate Change announced the decision to refer the environmental assessment to a Review Panel under the *Canadian Environmental Assessment Act, 2012*. The Minister appointed the members of the Review Panel on December 6, 2016. The Minister of Environment and Climate Change also announced that the timelines for the environmental assessment would include a 150-day pre-Panel period, 480 days for the Panel to conduct its work, and a 150-day period for the Government of Canada to manage the preparation of the environmental assessment decision after the submission of the Panel's final report. The timelines did not include the time required for CN to respond to information requests from the Canadian Environmental Assessment Agency or the Panel.

Canadian Environmental Assessment Agency conformity review

Prior to the appointment of the Panel, the Canadian Environmental Assessment Agency conducted a conformity review of CN's Environmental Impact Statement (EIS). The conformity review was to determine whether the minimum information requirements for the environmental assessment, as set out in the EIS Guidelines, were met. On December 1, 2016, the Canadian Environmental Assessment

Agency concluded its conformity review and determined that the environmental assessment could proceed to the Review Panel phase.

In its conformity review, the Canadian Environmental Assessment Agency considered the Environmental Impact Statement (EIS) submitted by CN and CN's responses to information requirements from the Canadian Environmental Assessment Agency. The Canadian Environmental Assessment Agency also considered the information, advice and opinions received from federal government departments.

Canada Transportation Act section 98 application

Section 3.3 of the Terms of Reference required the Panel to take into account matters relevant to Section 98 of the *Canada Transportation Act*, specifically the requirements for railway operations and services, and the interests of the localities that would be affected by the railway line.

On January 22, 2016, CN filed an application in accordance with Section 98 of the *Canada Transportation Act* with the Canadian Transportation Agency. On December 16, 2016, the Canadian Transportation Agency submitted CN's Section 98 application to the Panel.

Process information sessions

The Canadian Environmental Assessment Agency and Canadian Transportation Agency held two public information sessions in the Town of Milton, at the Milton Sports Centre, in October 2016. The information sessions gave members of the public and Indigenous groups an opportunity to learn about the review panel process and the public participation opportunities, as well as to ask questions of federal representatives.

2.2. The Panel's Mandate and Terms of Reference

In December 2016, the Minister of Environment and Climate Change and the Chair of the Canadian Transportation Agency announced the Agreement to Establish a Joint Process for the Review of the Milton Logistics Hub. The joint process for the review provided a framework for the Panel to conduct an environmental assessment of the Project consistent with the *Canadian Environmental Assessment Act, 2012*, and allow the Canadian Transportation Agency to hear comments from the localities and responses by CN concerning the location of the railway line, taking into consideration requirements for railway operations and services and interests of the localities that would be affected by the lines, consistent with the *Canada Transportation Act*.

To facilitate the joint process for the review of the Project and to ensure an efficient single window process, the Terms of Reference required the Panel to take into account the factors listed in subsections 19(1) and 19(3) of the *Canadian Environmental Assessment Act, 2012* and, as required by the Minister of Environment and Climate Change under paragraph 19(1)(j) of the *Canadian Environmental Assessment Act, 2012*, the matters relevant to Section 98 of the *Canada Transportation Act*, including:

- a. requirements for railway operations and services; and
- b. the interests of the localities that will be affected by the line.

A copy of the Agreement and Terms of Reference is included in Appendix D.

In addition, in the letters notifying the Panel members of their appointment, the Minister of Environment and Climate Change asked that the Panel be guided by five principles associated with the

Government of Canada's interim approach to the conduct of environmental assessments for major projects. These principles were as follows: 1) to respect the legislative timelines for the environmental assessment, 2) to gather and evaluate information about the potential environmental effects of the Project based on science, traditional knowledge of Indigenous peoples, and other relevant evidence, 3) to carry out the process in a manner that would ensure the views of the public and affected communities would be sought and considered, 4) to ensure that Indigenous peoples would be meaningfully engaged throughout the process, and 5) to focus the analysis of the effects of greenhouse gas emissions on the direct emissions attributable to the Project, rather than on potential upstream greenhouse gas emissions linked to the Project since they would not be clearly delineable due to the varied nature of goods that would move through the Project.

In accordance with its Terms of Reference, the Panel conducted its assessment in three stages:

Stage 1 Review of the Sufficiency of the Environmental Impact Statement – December 2016 to April 2019

Stage 2 Public Hearing – April 2019 to July 2019

Stage 3 Report Preparation – August 2019 to January 2020

2.3. Panel Sufficiency Review of the Environmental Impact Statement

The first stage of the Panel's mandate was to determine whether the information provided by CN was sufficient to proceed to a public hearing. This stage commenced in December 2016 and continued until April 2019. During that time, the Panel reviewed the EIS and additional information provided by CN, provided opportunities for participants to comment, formulated information requests, held an orientation session and conducted a site visit.

After reviewing the EIS, CN's pre-Panel Additional Information Requirement responses to the Canadian Environmental Assessment Agency, CN's application under Section 98 of the *Canada Transportation Act*, and comments from participants, the Panel issued five packages of information requests to CN between April 2017 and October 2017. In June 2018, the Panel reviewed CN's responses to these information requests, along with comments received from participants, and issued a second round of information requests in three packages between March and September 2018. CN completed its responses to the second round of information requests by March 2019. On April 15, 2019, the Panel issued a notice of sufficiency indicating that it had sufficient information to proceed to a public hearing. The notice of sufficiency is included as Appendix E of this report.

As part of its sufficiency review, the Panel also held an orientation session on March 1 and 2, 2017 in Milton, Ontario. The Panel invited representatives of the federal, provincial and municipal governments to present their respective mandates and areas of expertise in relation to the Project and its potential environmental effects. At the orientation session, the Panel questioned presenters regarding the roles of their organizations in the joint review process.

2.3.1. Site visit and intermodal facility visits

During the sufficiency review period, the Panel undertook visits to the proposed location of the Project and to two of CN's existing intermodal terminals.

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

Visit to the proposed Project site

On May 16 and 17, 2017, the Panel visited the proposed location for the Project. The purpose of the site visit was to allow the Panel to gain a better understanding of the existing environment and of the spatial orientation and proportions of the Project as described in the Environmental Impact Statement.

During its visit, two CN personnel, neither of whom were connected to the proposal for the Project, escorted the Panel to the entrance of the site. The Panel and its staff did not engage in discussions with CN personnel about the details or merits of the Project, nor did the escort accompany the Panel and Secretariat as they walked around the site.

The Panel observed topographical and hydrologic features of the site, plants and wildlife. The Panel also observed several railway activities on the existing mainline, boards laid by CN to conduct snake surveys, and archaeological work that was occurring on the site.

The Panel provided a summary of its site tour, including photographs and details of the features observed, in its site visit report which it posted to the public registry as document #571.

Visits to existing intermodal facilities

On June 6, 2017, the Panel visited CN's Montreal Intermodal Terminal in Taschereau Yard. On June 7, 2017, the Panel visited the CN Calgary Logistics Park in Conrich, Alberta. The purpose of these site visits was to enhance the Panel's understanding of railway and intermodal container terminal operations.

To gain access to each facility the Panel was escorted by CN personnel, who provided descriptions of the terminal infrastructure and activities. The CN staff who escorted the Panel at each facility were not connected to the Project, and the Panel and its staff did not engage in discussions with the CN staff about the details or merits of the Project.

The Panel observed terminal infrastructure and railway operational activities from a passenger van during both of its visits. Features observed at both the Montreal Intermodal Terminal and the Calgary Logistics Park included mainline tracks; yard tracks; pad tracks; rail switches and signals; work pads; container storage areas (including climate controlled containers); lighting, electrical and communications infrastructure; noise berms and administrative buildings.

Train operations observed included locomotive arrival/departure; train building; locomotive idling; locomotive refueling; and track switching. The Panel also observed reach stacker operations to move containers, as well as loading and unloading containers from trucks and railway cars. Truck activities observed included entrance and exit procedures, queueing at the entrance of the facilities, and safety and security features and activities at the terminals.

The Panel included photographs in its intermodal facilities visit report, which it posted to the public registry as document #585.

Other participants' intermodal facility visits

On August 29 and 30, 2017, representatives from Halton Municipalities also visited the CN Montreal Intermodal Terminal and Calgary Logistics Park. Halton Municipalities submitted a report of its observations to the Panel.

CN reported that it had also hosted site visits at the Calgary Logistics Park for the Mississaugas of the Credit First Nation and the Six Nations of the Grand River.

2.4. Public Hearing

On April 16, 2019, the Panel issued a notice of hearing indicating that the public hearing would begin in Milton, Ontario on June 19, 2019. This met the minimum requirement for notice as established in the Panel's Terms of Reference. Members of the public, Indigenous groups, governments, and other organisations were invited to participate and the public hearing was open to anyone wishing to observe the proceedings. One of the key purposes of the hearing was to give interested parties an opportunity to present their views on the Project, its potential environmental effects, and how it might affect local interests. The hearing also provided an opportunity for CN to explain its Project and respond to questions, so that the Panel could clarify or test information and better understand the factors to be considered as described in its Terms of Reference.

The Panel held general hearing sessions and technical hearing sessions. General sessions provided CN with an opportunity to present an overview of the Project and its anticipated environmental effects, and for registered interested parties to present their views and recommendations. Technical hearing sessions allowed technical experts, including Indigenous traditional knowledge holders, to provide their views and analysis of the Project to the Panel. All hearing sessions allowed CN and other interested parties the opportunity to ask questions about the presentations.

Topics of the technical sessions included Project description, alternative means, and railway operations and services; socio-economic conditions; geology, soils and geochemistry; hydrology and water quality; fish and fish habitat; terrestrial environment; air quality, noise, vibration, light, and human health; and archaeological and heritage resources, including built heritage.

The Panel held the closing remarks session on July 19, 2019. While it had originally been scheduled for July 17, 2019, the Panel delayed the session after receiving requests from participants to allow more time to prepare written closing remarks.

As part of the review process for the Project, the Panel considered the 983 documents on the public registry, including 65 documents produced by the Panel over the course of its review.

In its closing remarks, Halton Municipalities commented on CN's use of what it termed a "caucus" procedure — consultation among members of the proponent's team before answering a question. Halton Municipalities suggested that, as a result of CN's repeated use of this caucus procedure, there were virtually no CN responses that have come from its experts directly.

As this concern was raised too late to be addressed during the hearing, the Panel informed the parties that same day that it would address the issue in its report. Consequently, the Panel makes the following observations.

CN asked and was given permission to caucus, although the Panel encouraged them to be as brief as possible. Other parties, including Halton Municipalities and some federal government departments, also occasionally used the caucus procedure. At times, the Panel heard answers from CN, following a caucus, which appeared to be position statements rather than direct answers (including substantive technical information) to the questions posed. However, the Panel believes that all parties were entitled

to answer questions as they saw fit. The Panel has used its best judgement to determine how to use information received at the hearing to reach its conclusions.

2.5. Participants and Interested Parties

During the public hearing, 48 different interested parties made 88 presentations to the Panel. Anyone was welcome to submit comments to the Panel, and any interested party was invited to register to make an oral presentation or ask questions during the public hearing. As defined in the *Canadian Environmental Assessment Act, 2012*, an interested party is a person or group who is directly affected by the carrying out of the designated project or has relevant information or expertise. The Panel considered anyone who had previously submitted information or a comment during the review process to be an interested party. Others were subsequently permitted to register at the hearing as an interested party. No one who sought interested party status was denied by the Panel.

3. Project Setting and Description

3.1. Project Overview

CN is proposing to construct and operate a new intermodal terminal including the realignment and extension of the existing mainline tracks. The terminal would provide facilities for the transfer of containers between railcars and trucks, including some temporary container storage. The Project is forecasted to handle approximately 350,000 containers annually at the start of operation and 450,000 containers annually at full operation. The intermodal containers would be used to transport finished products, such as appliances, furniture, apparel, electronics, toys, household goods, automotive parts and maintenance products, lawn care equipment, cosmetics, health care products and food products.

CN indicated that some containerized goods may be categorized as dangerous goods, such as household cleaning products, automotive parts and maintenance products, and lawn care equipment. CN assumed that, consistent with the average movement of goods across CN's entire intermodal network, dangerous goods would account for approximately 2.7% of the number of intermodal containers at the Project. These containers would be placarded accordingly and handled in accordance with the *Transportation of Dangerous Goods Act*. The terminal would not handle dangerous goods in bulk.

At the beginning of operation, approximately 650 trucks per day would enter and subsequently exit the terminal, increasing to a maximum of 800 trucks per day at full operations, in support of a planned four intermodal trains per day. Two of the trains to be handled at the terminal are already part of the 25 to 30 trains per day currently moving along the Halton Subdivision mainline through the Town of Milton, while two new trains per day would be added to this Subdivision.

The Project would consist of the construction and operation of an intermodal container terminal to transfer containers between trucks and trains, including:

- yard tracks (three pad tracks and three service tracks);
- work pads and container storage;
- truck entrance/gate and access road (including CN overpass);
- administration building and maintenance garage;
- stormwater management system;
- vegetation clearing, grading and berms;

- realignment of Indian Creek;
- realignment of Indian Creek's Tributary A;
- naturalization and restoration;
- relocation of existing petroleum pipelines; and
- electrical and communications infrastructure.

The Project would also include works outside of the main working area of the terminal, including

- realignment of the existing mainline tracks at the south end of the Project Development Area;
- double track extension of the existing mainline from Ash Station to approximately Derry Road; and
- construction of a grade separation (underpass) of Lower Base Line under the realigned mainline tracks.

CN had no expectation that the terminal would be closed and therefore did not include information about decommissioning and closure activities.

Details of the Project components most relevant to the environmental assessment are discussed in the sections below.

3.2. Project Setting

The Project would be located in the Greater Toronto and Hamilton Area within the Town of Milton and the Regional Municipality of Halton (Halton Region); see Figure 1-1. The Greater Toronto and Hamilton Area is one of Canada's largest population centres and has been experiencing rapid growth in recent years. An estimated \$3.5 billion worth of goods already move by truck and railway every day through Southern Ontario and the Greater Toronto and Hamilton Area. The economies of Milton, Halton, the Greater Toronto and Hamilton Area, and the area referred to as the Greater Golden Horseshoe, are characterized by a mix of businesses in the goods-producing and services sectors.

CN proposes to locate the Project adjacent and parallel to the existing CN mainline on properties entirely owned by CN. The Project would be built on approximately 160 hectares (400 acres) of the approximately 400 hectares (1,000 acres) of CN-owned land adjacent to CN's existing Halton Subdivision. The extent of the realignment and the extension of the mainline are within CN's property and are bounded by Derry Road to the north and 2nd Side Road to the south. The existing CN mainline, which is already double-tracked on part of the CN-owned land in this location, has been operating for more than 100 years. The main terminal operational footprint would generally be bounded by Britannia Road to the north, First Line to the east, Tremaine Road to the west, and Lower Base Line to the south. Halton Region plans to upgrade the existing two lane Britannia Road to a six lane arterial road in the coming years.

Within the general area of the Project, the existing Halton Region Waste Management Site is located east of the Project between First Line and Regional Road 25. The Highway 407 toll highway is located to the south and provincial public Highway 401 to the north, and the Burlington Airpark is located approximately 1.4 kilometres to the southwest.

The population of the Greater Toronto and Hamilton Area is expected to increase to ten million by 2041 (from 7.165 million in 2011). Rapid growth is resulting in expansion toward the towns and regions surrounding Toronto, particularly toward the west. CN reported that the Town of Milton has expanded from a population of 32,075 in 1991 to an estimated 98,000 in 2014, and with a projected population of 369,000 by 2041. Similarly, the region of Halton has grown from 313,136 in 1991 to an estimated 575,000 in 2016. By 2041, CN estimated that the region of Halton would grow to 898,300 residents. CN noted that the Boyne Survey Secondary Plan area is planned to accommodate 50,000 of these new residents by 2021.

The region of Halton and Town of Milton are home to a range of recreational uses, including cycling routes, hiking trails, golf courses and community-based recreation. Land use in the Project site consists of existing railway infrastructure and agriculture. Agriculture is the dominant land use in the region of Halton outside of the Town of Milton and other urban areas. The lands on which the Project is proposed is owned by CN and currently leased to local farmers and residents.

The land within the Project Development Area is composed largely of farm fields, sparse hedgerows and drainage features including Indian Creek and its tributaries. The areas where CN has proposed to realign or double the mainline are already relatively close to the existing mainline. There are a few dispersed residences fronting First Line, Tremaine Road and Lower Base Line. The Town of Milton has planned for and approved more densely populated future residential development north of Britannia Road. The Regional Official Plan has designated the lands located west of the CN mainline as employment lands and the lands located east of the existing mainline as a future strategic employment area.

The Project site is located within the Indian Creek sub-watershed of Bronte Creek. The headwaters of much of this sub-watershed drain from the Niagara Escarpment and descend the slopes to the Peel Plain south of Derry Road. The characteristic fine textured soils and extensive vegetation clearing over the Peel Plain generally limit the groundwater recharge. Indian Creek is the only creek located within the Project Development Area and has two main tributaries that connect to the creek within the Project Development Area, Tributary A and B, both of which experience intermittent flows.

Vegetation cover within the sub-watershed is sparse and fields extend to the stream banks. Nearby, there are several recognized natural features, including the Trafalgar Moraine Candidate Earth Science Area of Natural and Scientific Interest (ANSI), located several hundred metres south of the Project Development Area, and the Indian Creek Wetland Complex and North Oakville-Milton West Wetland Complex, located within approximately one kilometre of CN-owned lands. None of these features occur within the Project Development Area.

3.2.1. Temporal and spatial boundaries

CN identified spatial and temporal boundaries in its environmental assessment. Spatial boundaries are the areas within which the Project may interact with the environment and may cause an environmental effect, while temporal boundaries identify when an effect may occur over time in relation to specific Project activities. Generally, these boundaries are based on a single Project phase, or a combination of phases, to reflect the timing and duration of Project activities that are likely to cause adverse environmental effects on valued components within a specified area.

CN's effects assessment identified three spatial boundaries:

- **Project Development Area:** The Project Development Area is the immediate area in which Project activities and components may occur and as such represents the area within which direct physical disturbance, temporary or permanent, may occur as a result of the Project. The Project Development Area is consistent for all valued components and includes portions of the CN property as depicted by the orange line on Figure 1-1 above.
- **Local Assessment Area:** The Local Assessment Area is the maximum area within which environmental effects from Project activities and components can be predicted or measured with a reasonable degree of accuracy and confidence. It consists of the Project Development Area and adjacent areas where Project-related environmental effects are reasonably expected to occur based on available information and professional judgment. Each valued component has its own Local Assessment Area as described by CN in the Technical Data Reports provided in Appendices E of the EIS.
- **Regional Assessment Area:** The Regional Assessment Area is the area within which residual environmental effects from Project activities and components may interact cumulatively with the residual environmental effects of other projects and physical activities that have been or will be carried out. The Regional Assessment Area is based on the potential for interactions between the Project and other existing or future potential projects. The Regional Assessment Area is specific to each valued component. Figure 1-1 illustrates the overlap of individual Regional Assessment Areas identified in each Technical Data Report.

The Panel also found it helpful to consider a fourth spatial boundary related to the Project:

- **Terminal operational footprint:** The terminal operational footprint is the area south of Britannia Road, north of Lower Base Line, upon which the majority of container movements and other main activities associated with the operation of the intermodal terminal would occur. This area is approximately 59 hectares (146 acres) in size, and is depicted in Figure 1-1; it includes the work pads, track pads, SpeedGate, and administrative building and maintenance areas.

The Panel understands that some terminal operations, such as doubling over of trains, would require use of the mainline tracks north of Britannia Road or south of Lower Base Line, and has also considered those activities within its assessment as they occur within the Project Development Area.

CN considered only the construction and operation phases of the Project in its assessment.

Construction (18–24 months). The construction phase was considered to be the period when physical activities are undertaken in connection with vegetation clearing, site preparation, and building or installing components of the Project, prior to operation. In the EIS, CN indicated that the preliminary schedule for the development of the Project would have the construction phase planned to start in 2017 and extending over an 18- to 24-month period, with the operation of the Project to commence in 2019. In its closing remarks at the public hearing, CN noted that the anticipated timing of the upgrades to Britannia Road that Halton Region has planned for completion by the end of 2022 would be in line with the commencement of the operation of the Project, if approved.

Construction would occur in three phases:

- Phase 1 — site preparation, grading and site clearing (including vegetation), as well as construction of access roads, bridge construction and construction of berms and barriers.
- Phase 2 — construction, building construction, bridge construction, and drainage for major site works, realignment of the mainline track and preparation for paving activities
- Phase 3 — continued mainline track construction, construction of yard and pad tracks, and paving operations among other works.

Construction related activities include:

- site clearing and grading activities;
- track construction and signal installation;
- terminal infrastructure and paving;
- grade separations;
- installation of utilities;
- watercourse realignment, restoration and naturalization; and
- use of construction equipment and operation.

Operation. The operation phase would begin when the Project can start to receive containerized goods for handling by truck and train, including operation of the track realignment and stormwater management system. The terminal is anticipated to be operational for 24 hours a day, seven days per week, with the predominant flow of truck traffic occurring on weekdays, during the daytime. Additional detail on the anticipated truck volumes is presented in subsection 11.2.4.

Operational activities considered in the environmental assessment include:

- containerized goods handling through truck and train operations;
- lift operations for the loading and unloading of containers;
- temporary storage and movement of containers within the terminal;
- locomotive fueling in designated areas and minor railcar repair;
- equipment maintenance for terminal vehicles only; and
- maintenance of the wastewater and stormwater management systems.

CN did not consider decommissioning and closure activities as it does not expect that the terminal would be closed.

3.3. Project Components and Activities

3.3.1. Project infrastructure

To provide for the Project's infrastructure, CN would need to clear and grade portions of the Project Development Area in order to accommodate the following Project components:

- **Yard tracks:** Six yard tracks, including three pad tracks and three service tracks totaling approximately 20,510 metres;
- **Work pads:** Hard surface areas located in between the pad tracks, each approximately 65 metres wide by 2,000 metres long;

Milton Logistics Hub Project | REVIEW PANEL

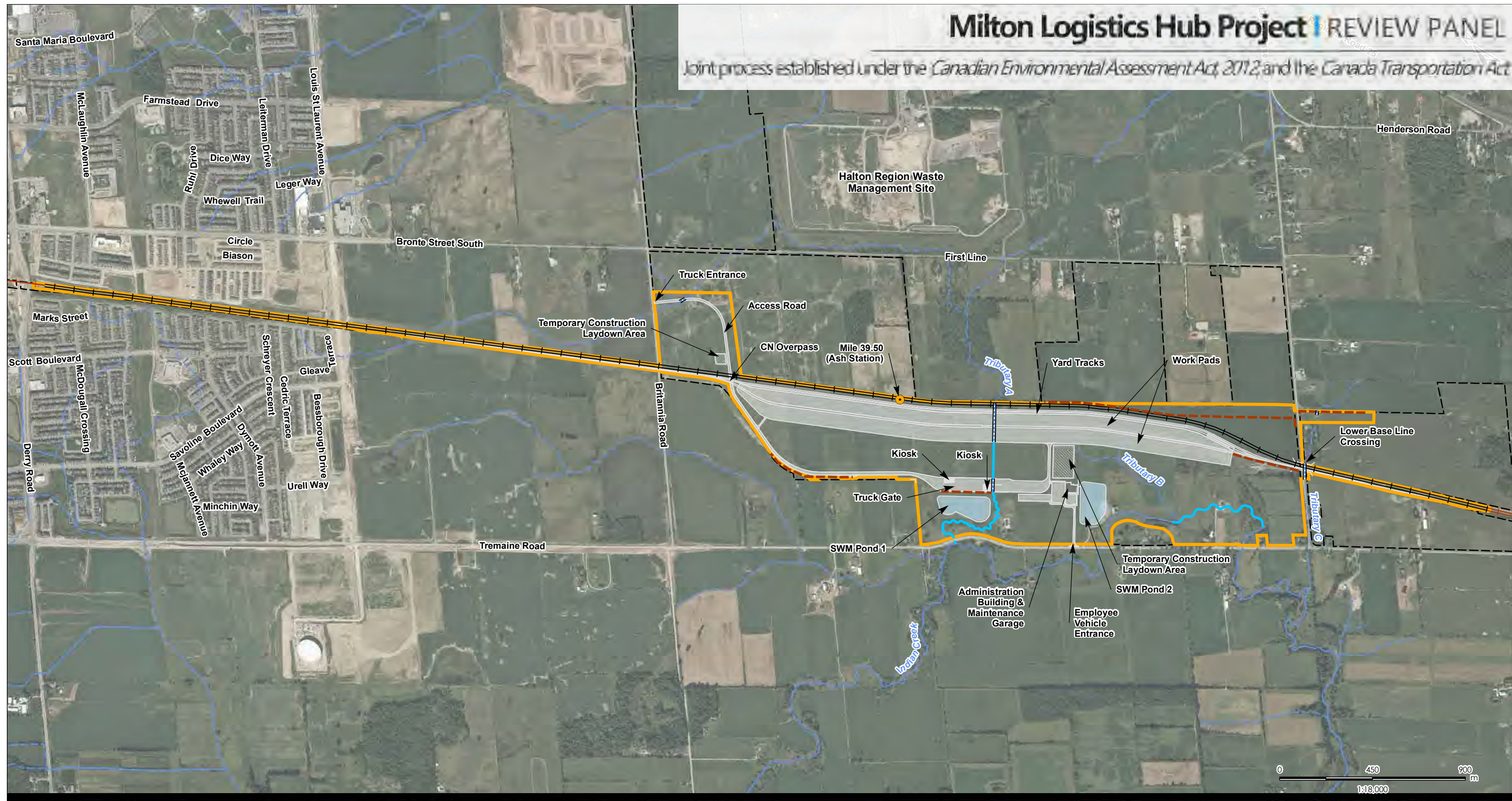
Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

- **Realignment of the existing CN mainline:** Realignment of the mainline tracks up to 98 metres eastward from the existing railway centre line, resulting in an additional 45 metres of new track to accommodate the terminal;
- **Double track extension of CN mainline:** The existing mainline would be doubled from Ash Station (Mile 39.50, Halton Subdivision) to a point south of Derry Road (Mile 36.86, Halton Subdivision), extending a second track by approximately 4,155 metres, resulting in a combined increase of track length (including realignment of existing mainline track) of approximately 4,200 metres;
- **Terminal truck entrance/gate and access road (including overpass):** Truck entrance/exit off Britannia Road to a controlled access gate, consisting of portal structures, canopies, kiosks and assistance booth. A new two-lane private road and overpass on CN property for access over the mainline and into the terminal. The approximately 1.7-kilometre private entrance road and designated queuing area would accommodate up to 140 trucks within the terminal on CN property. A signalized intersection is anticipated on Britannia Road to accommodate the terminal truck entrance;
- **Administration building and maintenance garage:** Additional permanent facilities currently planned include an administration building and attached maintenance garage. Employees would access the parking area for the administration building via Tremaine Road;
- **Berms:** Vegetated berms would be installed as required, to minimize the effects of noise and light on the community;
- **Realignment of Indian Creek:** Realignment of an approximately 570-metre section of Indian Creek;
- **Realignment of Tributary A:** Enclosure of a section of Tributary A within an approximately 125-metre concrete culvert beneath the yard tracks and work pads, as well as two smaller culverts under the proposed access road near Britannia Road and truck gate. Flows in Tributary A would be diverted around stormwater management Pond 1 through an approximately 500 metres realigned section of Tributary A. The existing online agricultural pond would be removed;
- **Stormwater Management Ponds:** CN would construct two stormwater management ponds as storage facilities to temporarily detain stormwater and release it gradually to manage the quality and quantity of stormwater runoff. Pond 1 would discharge into Tributary A, while Pond 2 would discharge into Indian Creek upstream of the proposed realignment;
- **Electrical infrastructure:** Installation of an eight mega-volt ampere transformer to support power requirements at the terminal. Electricity would be supplied through Milton Hydro Distribution, with on-site power generators to be used as backup power sources;
- **Communication infrastructure:** Installation of an on-site radio communications system and connection to fibre optic cables within the existing CN mainline right-of-way; and
- **Existing petroleum pipelines:** Relocation of two existing pipelines owned by Sun-Canadian Pipelines Ltd. (Sun-Canadian) to remain within CN property. Two existing natural gas pipeline crossings (owned by Union Gas) and one electrical transmission crossing located north of Britannia Road that do not require upgrades along the existing CN mainline right-of-way.

The elements described above are depicted in Figure 1-2: Preliminary Design of the Milton Logistics Hub Site Plan. The potential effects of the construction and operation of the Project are discussed in detail in Parts 2–5 of this report.

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012* and the *Canada Transportation Act*



\\Cd1220-H2\01_609\active\60960844\drawing\MXD\APC\Report_Figures\ES\160960844_ES_Fig03_Preliminary_Design_Milton_Logistics_Hub.mxd
 Revised: 2015-12-02 By: pworesell

Legend

Project Components

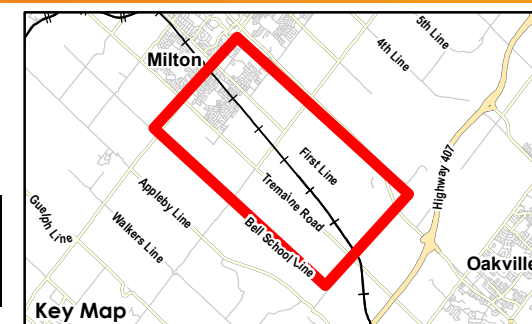
- Project Development Area
- Existing Single Track Mainline
- Existing Double Track Mainline
- Double Track - Mainline
- Project Component
- CN-Owned Property
- SWM Pond
- Milepost
- Channel Realignment
- Culvert Location
- Proposed Noise Berm

Panel Figure 1-2: Preliminary Design of the Milton Logistics Hub Site Plan

Source: CN's Environmental Impact Statement, Appendix B (CEAR document #57)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2015. Site layout: July 10, 2015.
3. Orthoimagery © First Base Solutions, 2015. Imagery taken in 2014.



Client/Project

Canadian National Railway Company
Milton Logistics Hub
Environmental Impact Statement

Figure No.

3

Title

**Preliminary Design of the
Milton Logistics Hub Site Plan**

December 2015
160960844

3.3.2. Stormwater management system

Components of the stormwater management system include a series of culverts, flow channels and two retention ponds, oil-grit separators, parking lot storage and rainwater harvesting. The proposed layout of the stormwater management system is shown in Figure 1-3.

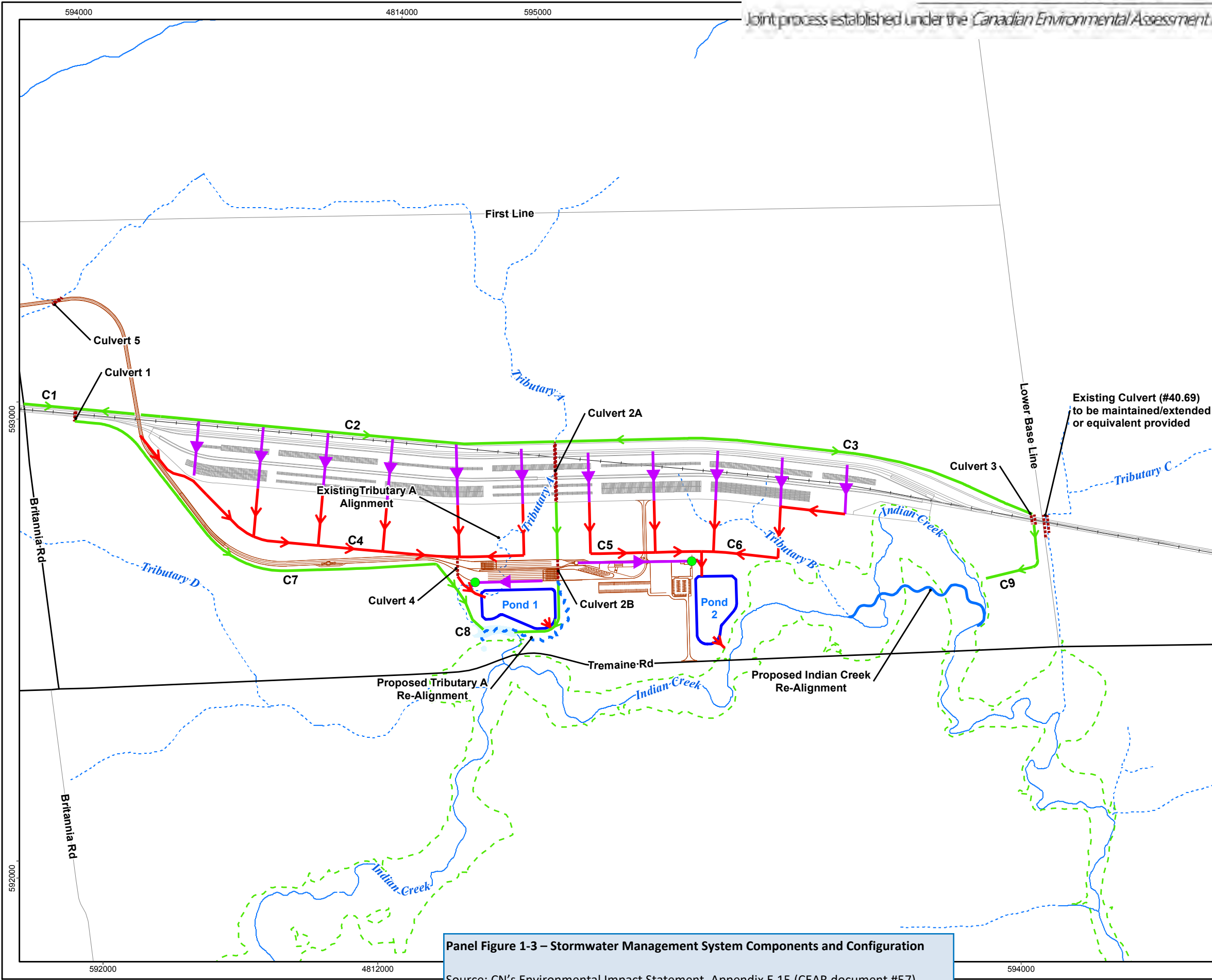
CN's stormwater management system would be further developed in the detailed design stage, but has been described to include the following considerations:

- diversion of Tributary A for the Regional Storm event around the Project Development Area and into Indian Creek via interception with a perimeter ditch;
- two stormwater management ponds that contain and attenuate flows up to the 1:100-year Storm event;
- a minimum of 0.6 metres of pond freeboard during the 1:100-year Storm event;
- low flow orifice outlets in the ponds for the 25-millimetre return period storm event that release the detention volumes over an approximately 5.5-day period;
- oil-grit separators proposed for the administration and maintenance buildings and gate area to capture sediments, oil and grease before discharge to the wet ponds. CN later amended its stormwater management system design to incorporate oil-grit separators for the gate area and work pads;
- shut off valves would be installed on the stormwater management pond outlets;
- channel realignment plantings and live stakes within the banks and riparian areas and in-stream features, such as woody debris toe protection, to provide shading for watercourse channels;
- surface water quality controls to provide Enhanced Level 1 Protection as identified in the Ontario Ministry of Environment Stormwater Management, Planning and Design Manual (2003); and
- winter road salt mitigation measures to be implemented to reduce salt runoff.

CN developed preliminary stormwater management criteria from a combination of elements drawn from the *Ministry of Environment Stormwater Manual (2003)*, the American Railway Engineering and Maintenance-of-Way Association (AREMA) design criteria, the Bronte Creek Watershed Study, the Indian Creek / Sixteen Mile Creek Sherwood Survey Subwatershed Management Study (Phillips, 2004), and the Functional Stormwater and Environmental Management Strategy, Boyne Survey Secondary Plan Area (AMEC, 2013).

The potential effects of the construction and operation of the stormwater management system are discussed in detail in Parts 2, 3 and 5 of this report, specifically its role as a mitigation measure for changes to water quality and quantity (Section 7) and changes to fish and fish habitat (Section 9).

ANS/B 279.4mm x 431.8mm
 Approved: _____
 Checked: JK
 Designer: IL
 Project Management Initials: _____
 File name: D:\PROJECTS\AECOM\60332275\920-929 (GIS-GRAPHICS)\MAPS\WORKING\OCT_2015\60332275_FIG2_SWMCONCEPT_ADMINAREA_R1.MXD
 Last saved by: LEVESQUEI (2015-10-22)
 Last Plotted: Thu Oct 22, 2015
 File name: D:\PROJECTS\AECOM\60332275\920-929 (GIS-GRAPHICS)\MAPS\WORKING\OCT_2015\60332275_FIG2_SWMCONCEPT_ADMINAREA_R1.MXD



- Legend**
- - - - - Proposed Culverts
 - C4 Proposed Ditches with Channel Identification No.
 - C6 Southern Swale with Channel Identification No.
 - Oil-Grit Separator
 - Proposed Storm Sewer
 - Proposed Ponds
 - Proposed Yard
 - Administration Building/ Gate Area
 - - - - - Proposed Tributary A Re-Alignment
 - Proposed Indian Creek Re-Alignment
- Water Features**
- Lake
 - - - - - Intermittent Stream
 - Permanent Stream
 - - - - - Existing Floodplain

1:12,000
 NAD 1983 UTM Zone 17N
 120 60 0 120 240 360
 Metres

Basemap: Ontario Ministry of Natural Resources.
 Additional Sources:
 Ortho-Imagery:
 This drawing has been prepared for the use of AECOM's client and may not be used, reproduced or relied upon by third parties, except as agreed by AECOM and its client, as required by law or for use by governmental reviewing agencies. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that modifies this drawing without AECOM's express written consent.

Panel Figure 1-3 – Stormwater Management System Components and Configuration
 Source: CN's Environmental Impact Statement, Appendix E.15 (CEAR document #57)

3.3.3. Channel realignment

To facilitate the construction of the Project, CN would realign Tributary A and portions of Indian Creek (as shown in Figure 1-2). The purpose of these realignments is to accommodate Project infrastructure and maintain existing natural flows through a meandering channel, but CN stated that the channel realignments would also offer the opportunity to restore and improve fish habitat in the affected watercourses.

Tributary A would be realigned to flow through a constructed drainage channel and pass beneath the mainline double track, work pad and gate area through two parallel concrete box culverts (1.52 metres wide, 1.52 metres in height and 125 metres in length). The Tributary A culvert that discharges from beneath the gate area would then connect into a new 513-metre long channel that would pass around a proposed stormwater management pond, reconnecting to the original channel upstream from the confluence with Indian Creek. The existing online agricultural pond would be removed and riparian wetlands and habitat features would be installed on the floodplain throughout the length of the realigned channel.

The proposed footprint of the Project also intersects the existing Indian Creek channel and would require that a 1,075-metre section of Indian Creek be removed and realigned. The realignment is proposed to include 570 metres of a new and enhanced channel which reconnects with the original creek approximately 150 metres upstream of the Tremaine Road bridge crossing. Riparian wetlands and habitat would be installed on the floodplain throughout the length of the realigned channel. Upstream of the realignment, 300 metres of Indian Creek would be subject to in-stream and riparian habitat enhancements.

The potential effects of the construction and operation of the channel realignments are discussed in detail in Parts 2, 3, and 5 of this report. The design and success of the channel realignments is vital to flood storage and conveyance (Section 7) and the offsetting and mitigation of changes to fish and fish habitat (Section 10).

3.3.4. Lower Base Line grade separation

CN would construct a grade separation where Lower Base Line crosses the existing mainline at grade, just east of Tremaine Road, in order to avoid disruption to vehicular traffic while trains enter or exit the terminal. The Lower Base Line underpass, which would be approximately 40 to 55 metres long and two lanes wide, would provide clearance beneath the terminal and mainline tracks to allow public vehicle movements. The proposed grade separation at Lower Base Line would include separated pedestrian and cyclist lanes at the request of the Town of Milton and therefore improve the safety for cyclist use in this area. CN committed to paying for the grade separation, including pedestrian and cyclist lanes, and to working with the municipal road authority to address its interests and concerns during detailed design.

The potential effects of the construction and operation of the grade separation are discussed in Section 11.2 and subsection 11.3.1 (Socio-Economic Effects, and Cultural Heritage).

3.3.5. Terminal-generated train traffic

Four intermodal trains per day would serve the terminal, and would arrive and depart at scheduled times designed to prevent backlogs across CN's network and ensure the timely delivery of goods. Trains would enter the terminal and go to either the service or pad tracks. CN would use the service tracks to facilitate both the transfers of a block of railway cars from one train to another, and the arrival and departure of other trains. The pad tracks (and work pad areas) would comprise the operating area or railway yard portion of the Project, where containers would be transferred from truck to train and train to truck. Rather than having a dedicated locomotive on site, inbound and outbound trains would be used to move the railcars at the terminal.

The terminal would also include three service tracks. These tracks are designed to handle arriving and departing trains and provide temporary staging of blocks or sets of railcars that would be transferred from one train to another. The service tracks would vary in length with a minimum length of around 2,438 metres (8,000 feet). Long tracks such as those proposed would minimize the number of train movements required to disassemble and assemble trains, thereby minimizing the amount of time a locomotive would spend on site and the number of coupling (connecting of two railway cars) events required.

Maximum train speeds are governed by the Canadian Railway Operating Rules; the maximum train speed on the mainline in this section of the Subdivision is currently 72 kilometres per hour (kph) (45 miles per hour (mph)). Trains entering and exiting the terminal would be required to travel at a maximum speed limit of 25 kph (15 mph) while any component of the train is entering, exiting, and moving within the terminal.

The length of the trains entering and exiting the terminal would vary based on demand, but would range between 2,438 metres (8,000 feet) and 4,267 metres (14,000 feet). A typical intermodal train would have two operating locomotives at the front end of the train and may at times have a third locomotive operating at the center of the train, known as distributed power. This is done to improve train handling by generating power in the middle of the train and helps to maintain air pressure in the braking system, particularly in winter months.

The potential effects of the train operations within the terminal are discussed throughout the various sections of the report.

3.3.6. Containers

The terminal would transfer intermodal containers between intermodal railway cars and heavy duty trucks. CN stated it would handle containers using telescopic reach stacker cranes that lift and place containers from the side of a train or truck. CN stated that a reach-stacker based operation is highly flexible, in that the cranes can perform the full task of moving a container within the terminal without additional equipment, thus minimizing the required staff and equipment on site. Containers that would not be put immediately onto a departing truck would be moved to a storage location within the terminal using a shunt truck, called a hostler.

CN was consistent throughout the environmental assessment process in stating that it would handle approximately 350,000 containers annually at the start of operation and 450,000 containers annually at full operation of the Project.

Containers transiting through the terminal would vary among 20-foot, 40-foot, 45-foot and 53-foot lengths. These could be either general purpose, climate controlled (refrigerated or heated), tank-containers, or specialized containers such as flat racks or open tops. CN noted that products such as food, beverages, paints, and pharmaceuticals require protection against low temperatures and therefore require heated containers during colder weather.

Products could also be shipped in an ISO standard tank-container or tanktainer which is a fluid/powder/gas filled tank that sits on and within the framework of a 20-foot container.

CN also noted that several types of dangerous goods are not permitted for carriage in intermodal traffic, including certain classes of explosives, infectious substances, Class 7 radioactive materials, poisonous/toxic inhalation hazards, hazardous wastes and hazardous recyclables, and calcium carbide. Further discussion of the carriage of dangerous goods is included in Section 13 (Accidents and Malfunctions).

CN stated that it would be difficult to predict travel direction or the likelihood of containers being full or empty, since intermodal transportation varies based on the economy, customer demand, destination, and the season. CN noted as a general illustration that, in 2016, its Brampton Intermodal Terminal handled a total of 14.05% empty and 85.95% full containers.

Halton Municipalities submitted information that it believed the Project footprint could potentially accommodate the movement of substantially more containers per year. For the purpose of its assessment, the Panel considered CN's proposed number of 450,000 per year. The discussion of the potential ultimate capacity for the number of containers is included in Section 16.2.

3.3.7. Terminal-generated truck traffic

Initially the Project would result in 650 trucks per day entering and exiting the terminal, which would increase to a maximum of 800 trucks per day once the terminal reaches full operation. Less than 45 trucks would enter and exit the Project per hour (90 truck trips) at the AM and PM peak hours, or approximately 1.5 trucks per minute. Truck trips to and from the terminal would be distributed throughout the day.

Approximately 20% of the trucks that would service the Project would be owned by CN Transportation Ltd. (CNTL), a subsidiary of CN, over which CN has care and control.

There are a number of feasible routes between the location of the terminal and 400-series highways. These include:

- Britannia Road east to Highway 407;
- Britannia Road east to Regional Road 25, James Snow Parkway, Trafalgar Road and north to Highway 401;
- Britannia Road east to Regional Road 25 and south to Highway 407 and Queen Elizabeth Way; and

- Britannia Road west to Tremaine Road and north to Highway 401.

CN committed to direct its CN Transportation Ltd. trucks to use the toll Highway 407 whenever practical and feasible.

Additional details on the anticipated truck traffic to serve the terminal and its associated potential effects are discussed in Section 11.2.4 (Transportation Networks).

3.4. Regulatory Framework

The Project is subject to a number of regulatory requirements if it is to be approved and built. This section describes the main regulatory approvals that CN would require prior to construction, and identifies some of the regulatory requirements with which the Project must comply. A more fulsome description of the various regulatory approvals required and other legislative requirements is presented in Appendix H (Regulatory Framework).

During the course of the joint process for the review of the Project, the Panel heard information regarding constitutional matters and whether various provincial or municipal approvals and standards would also apply to the Project. The positions of the various interested parties are reported in Appendix I (Constitutional Matters) for the consideration of the relevant decision-makers.

3.4.1. Federal legislation and regulation

Regulatory approvals required for the Project

Canadian Environmental Assessment Act, 2012

The Project is subject to an environmental assessment under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). The environmental assessment has the purpose of examining the environmental effects of the Project, and whether, after considering any technically and economically feasible mitigation measures, those effects would be adverse, significant, and likely. If, at the end of the environmental assessment, if the Minister of Environment and Climate Change determines, after consideration of the report of the Panel, that the Project is not likely to result in significant adverse environmental effects, the Minister may issue a decision statement that would allow the Project to proceed. If the Minister determines that the Project is likely to result in significant adverse environmental effects, then the Governor in Council (federal Cabinet) must decide whether those significant effects are justified in the circumstances.

Canada Transportation Act

The *Canada Transportation Act* is a federal statute.

Part III of the *Canada Transportation Act* is entitled Railway Transportation. The provision of Part III of the *Canada Transportation Act* most immediately relevant to this Project is Section 98, which prohibits a federally regulated railway company from constructing certain lines of railway without the Canadian Transportation Agency's approval.

On January 22, 2016, CN applied under Section 98 to the Canadian Transportation Agency for approval to construct the lines of railway relating to the Project. According to Section 98, the Agency may grant the approval if it considers that the location of the railway line is reasonable after taking into

consideration the requirements for railway operations and services as well as the interests of the localities that will be affected by the railway line.

The Canadian Transportation Agency can only proceed to determine whether or not it would approve an application, under Section 98 of the *Canada Transportation Act*, if the Minister of Environment and Climate Change issues a decision statement that would allow the Project to proceed under the *Canadian Environmental Assessment Act, 2012*.

CN further indicated that it may require Canadian Transportation Agency approval for certain road and utility crossings under Section 101 of the *Canada Transportation Act*.

Other regulatory requirements for aspects of the Project

CN would also require a number of other federal regulatory approvals, including an authorization under the *Fisheries Act*, the *Railway Safety Act*, and the *Radiocommunication Act*. CN would also be required to comply with a number of other legislative requirements, including the federal *Species at Risk Act*, the *Migratory Birds Convention Act*, the *Canadian Environmental Protection Act*, pollution prevention provisions of the *Fisheries Act*, as well as the *Transportation of Dangerous Goods Regulations*. These matters are discussed in the relevant sections of the report, as appropriate, and are described in more detail in Appendix H (Regulatory Framework).

3.4.2. CN's consideration of provincial and municipal standards

Early in the environmental assessment process, CN stated that it holds a federal certificate of fitness issued by the Canadian Transportation Agency under Section 92 of the *Canada Transportation Act*. Section 95 of that Act confers onto CN powers to construct and operate a railway. Additionally, CN stated that Section 16 of the *CN Commercialization Act* declares the railway as a work for the general advantage of Canada. As a federally regulated railway, CN declared that it is subject to applicable federal legislation, but that provincial and local legislation that encroaches on CN's core activities is not applicable to it. CN also noted that provincial or local legislation inconsistent with federal legislation governing CN's activities does not apply to CN.

A number of participants opposed CN's view that it was not subject to provincial or local legislation. The Panel heard primarily from Halton Municipalities, but other participants including Milton Says No, Conservation Halton and the Federation of Canadian Municipalities discussed these matters. Halton Municipalities had initiated a challenge in the Ontario Superior Court with respect to the applicability of certain provincial and municipal legislation to the Project. The Panel found that the discussion on whether provincial or local laws applied to CN was outside of its mandate and has therefore declined to comment on these matters. A summary of views on jurisdiction is provided in Appendix I (Constitutional Matters).

4. Purpose of the Project and Alternative Means of Carrying Out the Project

This section addresses the purpose of the Project and alternative means of carrying it out, which are a factors to be considered under subsection 19(1)(f) and subsection 19(1)(g) of the *Canadian Environmental Assessment Act, 2012* and found in Section 3 of the Review Panel Terms of Reference.

4.1. Purpose of the Project

The EIS Guidelines, at Section 2.1., required CN to describe the purpose of the Project by providing the rationale for the Project, explaining the background, the problems or opportunities that the Project is intended to satisfy and the stated objectives.

CN indicated that the purpose of the Project is to facilitate the transfer of intermodal containers between trains and short haul trucks, thereby efficiently moving goods in and out of the region of Halton and facilitating their transport to distribution centres and retail stores. No participant commented on the purpose of the Project or disagreed with CN's description of it.

Halton Municipalities indicated that a discussion on the need for the Project is not relevant because it is not something that the Panel has a mandate to review. In its view, CN's arguments regarding the need for the Project have no relevance when determining whether or not environmental effects are significant.

The Panel is satisfied that CN has explained, from its perspective, the reasons why the designated Project would be carried out and what CN intends to achieve by carrying out the designated Project in accordance with the guidance on *Addressing "Purpose of" and "Alternative Means" under the Canadian Environmental Assessment Act, 2012*.

The Panel agrees with Halton Municipalities that need is not a component of the Panel's mandate regarding the purpose of and alternative means of undertaking the Project. The question of need for the Project is discussed in Section 16 (Other Important Information to Assist Decision Makers) of this report.

4.2. Alternative Means of Carrying Out the Project

Section 2.2 of the EIS Guidelines directed CN to identify and consider the effects of alternative means of carrying out the Project that are technically and economically feasible. This section deals with Project's alternative means of carrying out the Project and summarizes the views of CN, participants and the Panel.

Guidance available from the Canadian Environmental Assessment Agency states that alternative means are the various technically and economically feasible ways under consideration by the proponent that would allow a designated project to be carried out. Identified by the proponent, the alternative means include options for locations, development and implementation methods, routes, designs, technologies, mitigation measures, etc. Alternative means may also relate to the construction, operation, expansion, decommissioning and abandonment of a physical work.

This section deals with CN's consideration of alternative means of carrying out the Project and summarizes the views of CN, participants and the Panel.

4.3. Alternative Project Site Locations

CN's Views

CN conducted a site selection study to identify potential sites that met its requirements. As a first step, CN reviewed available land using two principles related to 1) the general location within the Greater Toronto and Hamilton Area, and 2) the area of land required for the Project. To meet these requirements the Project would require 160 hectares (400 acres) directly adjacent and parallel to the existing mainline, and located somewhere between the Bayview Junction, near Hamilton, and Doncaster Junction on the northern edge of Toronto. CN found four sites that met these two principles: Brampton North, Halton Hills, North Milton and South Milton. Any sites that did not meet the two principles were disqualified from further consideration in the site selection process.

In response to residents' concerns that property ownership was a criterion used in the site selection study that had skewed the assessment to conclude that Milton was the preferred site, CN stated that property ownership was not explicitly considered in the site selection study.

As a second step, CN reviewed the four sites for technical feasibility, based on consideration of acceptable slope. CN concluded that Halton Hills and North Milton sites have mainline track grades that are too steep for the safe and efficient operation of trains and as such these two locations were not considered technically feasible. The Brampton North and South Milton sites were considered technically feasible with average topographic grades less than 0.3%.

CN indicated that the North Milton Site alternative was brought up frequently in its public consultations. CN stated that the North Milton Site did not meet the criterion of acceptable slope and that adjusting the grade to create a terminal at that location would require excavation of 50 feet in depth and cost about \$1.5 billion.

CN's third step was to compare the potential environmental effects of constructing and operating the Project at Brampton North and South Milton. CN determined that, from its perspective, the Brampton North site had a higher potential for adverse environmental effects, including the potential for an effect on the Redside Dace, a provincial aquatic species at risk, because the Brampton North site has habitat for this species, while the South Milton site does not.

CN concluded that choosing the South Milton site reduced the potential for adverse effects and therefore is the preferred site alternative. CN added that the South Milton site requires the least environmental mitigation, has suitable access to 400-series highways, is located near existing transportation and logistics infrastructure, and the Project and associated truck traffic are compatible with the South Milton site's existing and planned land and roadway uses. CN also indicated that the South Milton site is economically feasible because CN owns the land, while land ownership at Brampton North would have to be secured.

Participants' Views

Residents and groups of residents including Milton Says No and Milton Residents Affected by Intermodal Lines indicated that they were not against CN building an intermodal terminal. They agreed that such a facility was needed, but in their view the Project is located in the wrong place, and should instead be

located in a heavy industrial area near highways and away from residential areas and agricultural land use.

Residents and Halton Municipalities argued that the Project is not consistent with local land use and that the proximity of truck traffic to residential areas would add traffic, affect air quality, and affect their health, safety and the enjoyment of their homes, including effects from noise, lights and vibration. Residents expressed concerns that there is no way to sufficiently mitigate the adverse environmental effects because of the proximity of the Project to the residential areas.

All of the participating Chambers of Commerce and Boards of Trade supported CN's choice of location.

Residents did not provide comments with respect to CN's exclusion of the North Milton option based on matters of technical feasibility, such as slope requirements. However, residents did indicate that in their view the Project would be more appropriate if located in North Milton, which is an industrial area with close access to the main transportation hubs and would therefore require significantly less travel through the agricultural and urban areas of Milton. Residents argued that according to CN's site selection analysis, North Milton has nine criteria with highest preference, compared to South Milton's ten, but North Milton has fewer criteria with lowest preference compared to South Milton. Residents indicated that North Milton should have been ranked first, if criteria had been weighted on a scale of the relative importance of each criterion.

Milton Says No recommended that CN complete a capacity assessment and implement improvements at the existing Brampton Intermodal Terminal as an alternative to the proposed Project or explore alternative appropriate locations and withdraw its proposal for South Milton location.

Residents stated their belief that CN's site selection study focussed on proving that South Milton was the best option because that study was undertaken after CN already owned the property. They believe that CN had no intention of locating the Project elsewhere.

A resident indicated that the criterion for the site to be 160 hectares (400 acres) is too restrictive. They argued that it is not necessary for a site to be 160 hectares to allow for an intermodal terminal because other existing and operating intermodal terminals are smaller.

Panel Views

In reaching its conclusions on alternative Project site locations, the Panel considered the following factors to be particularly relevant:

- Residents expressed concern that the site selection study was undertaken to justify CN's selection of the South Milton site, as it already owned the land, and suggested that the North Milton site would be preferable because it would result in fewer adverse environmental effects on local residents and municipal infrastructure.
- CN rejected the North Milton site early in its analysis, on the grounds of technical feasibility.
- The Panel did not hear information to convince it that Brampton North would have been a better location or would have avoided any of the environmental effects at South Milton.

The Panel understands participants' concerns that CN's analysis of potential sites may have favoured selection of the South Milton site. However, the Panel concludes that, regardless of the timing of the site selection study and property acquisition, CN's criteria for site selection were reasonable and CN's

choice of the South Milton site was supported by those criteria. The Panel concludes that the proposed site could support an intermodal terminal. The Panel evaluated the Project as proposed, in the proposed location.

The Panel is satisfied that CN has identified and considered the effects of alternative means of carrying out the Project, including alternative Project locations, that are technically and economically feasible in accordance with the guidance on *Addressing “Purpose of” and “Alternative Means” under the Canadian Environmental Assessment Act, 2012*.

4.3.1. Technically and economically feasible alternatives for Project components

CN’s Views

CN considered alternative locations and design options for the following Project components: truck traffic and transportation corridors, truck entrance location, gate location, Lower Base Line crossing, water supply, wastewater management, stormwater management, Indian Creek realignment or retaining wall, terminal and track configuration, culvert design, utilities, and lift equipment.

In response to the Panel’s Package 2 information request #2.16 (August 31, 2017), CN explained that it considered alternatives for Project components based on whether technically and economically feasible alternatives exist and whether alternative locations or designs of each component could result in materially different environmental effects.

Truck traffic and transportation corridors

There are a number of corridors or routes that trucks could take to get to the terminal from 400-series highways, and back again. CN indicated that, as it had care and control over the CN Transportation Ltd. Trucks, it could direct which routes these trucks used, as required.

CN evaluated the option of allowing its trucks to disperse along a variety of routes to and from the terminal and also the option of directing those trucks to Highway 407 along Britannia Road, where practicable. CN committed to directing CN Transportation Ltd. drivers to take Highway 407 via Britannia Road, when feasible, depending, for example, on truck origin and destination and road and traffic conditions. CN stated that this option is the most direct route, avoids truck turns and reduces the number of trucks that would otherwise travel on regional arterial roads.

CN indicated that there are no other feasible alternatives for terminal-generated traffic. For example, CN cannot mandate that a higher percentage of CN Transportation Ltd. trucks serve the Project because it is the customer’s choice as to which truck company it hires. Similarly, CN cannot control when CN Transportation Ltd. trucks come to the terminal because trains are scheduled mainly during daytime hours to meet the needs of customers and containers need to be picked up and delivered during those hours.

Truck routing, and the effects related to trucks generally, are discussed in Section 11.2.4 (Transportation networks).

Truck entrance location

CN evaluated five alternative locations for the Project's truck entrance against eight criteria: land availability, designed truck road at full operation, facilitates efficient truck movements with the terminal, limits negative environmental effects, limits potential conflict with existing residences, straight line access to 400-series highway, dispersion opportunities and economic considerations.

CN indicated that the Britannia Road entrance alternative is the preferred truck entrance location as it addresses all criteria including being within the care and control of CN. CN stated that this alternative also limits potential conflict with existing residences, because it is located opposite to a planned residential collector road, which is anticipated to have a signalized intersection.

CN rejected truck entrance locations at Regional Road 25 because it would have required trucks to cross First Line which is beyond CN's care and control; and at First Line because First Line, south of Britannia Road, is not a designated truck road and is not planned to be upgraded by the Town of Milton in its budget forecast to 2025.

Additionally, and in response to Halton Municipalities' suggestion that an entrance on Tremaine Road would alleviate some of their concerns, CN indicated that it rejected two truck entrance options on Tremaine Road because it anticipated road upgrades in the future would occur after the planned Britannia Road upgrades, and therefore CN preferred Britannia Road. In addition, the North Tremaine Road truck entrance alternative would require the acquisition of additional lands.

CN stated that it is committed to refining the intersection design and committed to continue to consult with Halton Municipalities on this issue.

Truck gate (SpeedGate) location

CN evaluated alternative locations for the truck gate (SpeedGate), a checkpoint where all drivers, trucks and containers are checked before they are allowed to enter or leave the terminal. CN evaluated two alternative locations for the truck gate, one in close proximity to Britannia Road and one at a setback from the entrance, adjacent to the work pad. CN stated that the preferred location would be a gate positioned at a setback from the entrance to allow queueing of trucks on CN's private access road and prevent queueing on public roads.

Alternative for grade separation at Lower Base Line

CN indicated that the location of the terminal would require additional service tracks to cross Lower Base Line, thereby increasing potential disruption to vehicular traffic and creating safety concerns. Two alternatives were considered to avoid disruption to vehicular traffic along Lower Base Line: an underpass along Lower Base Line, or the diversion of Lower Base Line southward across CN property to a new grade separation with 2nd Sideroad.

CN stated that the diversion of Lower Base Line would cause additional environmental effects including building the new roadway through a provincially significant wetland complex, an Area of Natural and Scientific Interest and a portion of the Greenbelt Plan Area. CN indicated that building an underpass would have minimal effects on natural features and habitat, and that effects on Tributary C, which flows along Lower Base Line, would be mitigated. CN therefore concluded that the preferred alternative is the construction of an underpass where Lower Base Line crosses the CN mainline just east of Tremaine

Road.

Alternatives for water supply

CN evaluated three alternatives for potable water supply at the administration building: connection to the municipal system, drilling a new well, and transport and on-site storage. CN stated that, due to the lack of an available municipal connection and low quality groundwater conditions, the preferred alternative to provide potable water is to use a licensed bulk water delivery contractor to deliver potable water to the site, where it would be stored in underground storage tanks.

CN evaluated two alternatives for non-potable water which it would require to wash on-site equipment and for on-site irrigation: rainwater collection and water recycling. CN indicated that both alternatives would be implemented. Rainwater would be collected from the roofs of the administration building and maintenance garage and stored in underground tanks, while water generated from washing on-site equipment in the maintenance garage would be collected and treated for re-use. Treatment of wash water for recycling would include the removal of solids and chemical treatment as necessary. The water that is deemed unrecyclable after the treatment process to remove solids and oil would be transferred to the septic tanks for disposal at an approved industrial wastewater facility.

The connection to the municipal system is discussed in more detail in subsection 11.2.3 (Land Use Planning).

Alternatives for wastewater management

Due to the lack of municipal sanitary service available to the site, CN evaluated two alternatives for wastewater management: construction of an on-site wastewater treatment system consisting of a septic tank with subsurface distribution trench disposal field, or the use of on-site storage tanks with contracted services for regular cleanout handled by licensed haulers to approved wastewater treatment facilities. CN indicated that because the soil types at the Project site may not be suitable for a septic bed, it did not consider that option as being feasible. For that reason, CN determined that it preferred to collect domestic sewage in a holding tank on site, which would then be periodically pumped and disposed at a licensed disposal facility. The possibility of a future connection of the Project to the municipal system is discussed in more detail in subsection 11.2.3 (Land Use Planning).

Alternatives for the location and design of stormwater management components

CN evaluated two alternative locations for Stormwater Management Pond 1 and described its preferred location for Stormwater Management Pond 2. In CN's view, the preferred location for Pond 1 would avoid encroachment into Tributary A and its associated vegetation and would maintain existing flows through a meandering channel. The preferred location for Pond 2 would accommodate the preservation of Barn Swallow nesting habitat. The preferred locations of the ponds are shown in Figure 1-3, above.

In response to an information request from the Panel, CN indicated that extensive Low Impact Development measures are not proposed for the Project. These measures could include small scale structural practices that mimic natural or predevelopment hydrology through the processes of infiltration, evapotranspiration, harvesting, filtration and detention of stormwater. CN stated that it was not proposing such measures due to the industrial nature of site, including its large impervious surface geometry and the poor infiltration potential of local soils.

Indian Creek realignment or retaining wall

CN indicated that the design and layout of the proposed terminal would encroach on a portion of Indian Creek currently flowing along the CN mainline. CN evaluated two alternatives to address the encroachment: a retaining wall immediately adjacent to Indian Creek or the in-filling and realignment of Indian Creek. CN concluded that in-filling and realigning Indian Creek was its preferred option because the realignment would maintain natural stream function and riparian habitat along Indian Creek; eliminate worker safety concerns related to the retaining wall and maintenance concerns due to erosion; and allow for a wider work pad to support the safe and efficient movement of vehicles and provide sufficient space for container storage. CN evaluated two options to reconfigure the terminal to avoid the requirement to realign Indian Creek but determined that neither option was feasible. One would result in lower efficiency, higher costs, and greater environmental effects, while the other would increase the overall terminal footprint and further encroach on and in-fill Indian Creek.

Terminal and track configuration

CN evaluated two options to reconfigure the terminal: stub-end perpendicular or re-configuration of parallel tracks to the west. It considered a perpendicular track configuration was not feasible due to lack of room for train pullback. CN stated that it could not shift the mainline any farther east than is currently proposed because the adjacent land is part of the operation of the Halton Region Waste Management Facility. Placing parallel tracks to the west of the Project Development Area would reduce the buffer between the Project, Indian Creek and Tremaine Road and reduce the length of the pad tracks, and therefore would require additional pads and service tracks to compensate, resulting in a less efficient operation.

In CN's view, the proposed configuration, a through terminal located centrally on the property, provides additional buffer space between the Project and surrounding land uses, allows for additional space to control stormwater runoff, avoids new road crossings, minimizes scale of proposed crossings and uses land most efficiently.

Alternative culvert designs

CN evaluated three options for culverts for Tributary A: single-cell, twin box, or six-barrel cell culverts.

In CN's view, the proposed use of twin box culverts to convey the 100-year design flow under the terminal is technically and economically feasible and is CN's preferred alternative.

CN rejected the option of a single-cell culvert, as that would require specific structural engineering design and casting in-place, which would increase both construction time and, would increase costs. CN also rejected a six-barrel alternative as not being technically or economically feasible. Given that the proposed terminal would be perpendicular to Tributary A, CN stated that realigning Tributary A to avoid the need for a culvert crossing would not be technically feasible.

Alternatives for utilities

CN described its preferred approach for power requirements for electricity and natural gas supply. Electricity would be provided by Milton Hydro and emergency backup power generators would be installed near the administration building to supply temporary power in the event of a power outage. Since there are no natural gas lines available at the site to heat the administration building and to power

terminal equipment such as shunt trucks, CN indicated that site equipment would be powered by diesel fuel that would be transported to the site and stored in tanks.

CN described options available for radio communications including one transmission antenna and four receiver antennas, all co-located on five new approximately 30-metre light poles with 7.6-metre extensions, or one approximately 45-metre free standing transmission tower supported by approximately four receiver antennas on structures less than 15 metres high. The preferred option would be determined during the detailed design phase. This radio communications system would be subject to an approval under the *Radiocommunication Act*.

Lift equipment alternatives

CN evaluated two options for lift equipment: reach stacker and gantry crane operation. CN stated that gantry cranes would provide a more condensed terminal footprint because they can stack containers higher than reach stackers. Gantry cranes are therefore useful in ports where longer dwell times are expected and where there is a high throughput volume or in terminals with railway operations where there is significant sorting of containers. CN indicated that due to the geographic nature of CN's network, this type of train-to-train sorting is less frequent and gantry cranes are therefore seldom implemented. In addition, CN explained that gantry cranes are not preferred in intermodal terminals where there is a major trucking component because it takes longer to retrieve containers that are stacked higher and deeper. In CN's view, gantry crane operation would slow truck turn times and flow-through of the terminal. CN also assessed the environmental effects of gantry cranes compared to reach stackers and found that the height of gantry cranes would create greater visual effect, reduce the effectiveness of berms to mitigate light effects, and increase the potential for collisions with migratory birds. CN stated that a reach stacker based operation is highly flexible, in that the cranes can perform the full task of moving a container within the terminal without additional equipment, thus minimizing staff and equipment on site. This alternative is also responsive to fluctuations in the volume of container traffic at any given time, allows the terminal to optimize assets on site, and can address the cargo mix on a train without impacting the overall terminal operations. CN identified the use of reach stackers as lift equipment as the preferred alternative.

Participants' Views

Truck entrance location

Residents raised concerns that the entrance location is too close to planned neighbourhoods and would put residents at risk. Residents and the Milton Phase 3 Landowners Group requested that the truck entrance be located on Tremaine Road. The Milton Phase 3 Landowners Group indicated that a Tremaine Road truck entrance would be more logical as there is a future planned intersection of Tremaine Road and Highway 401 and the Transportation Master Plan identified a possible future intersection of Tremaine Road and Highway 407. A resident raised concerns that if the entrance was moved to Tremaine Road, it would affect their residence.

Halton Municipalities indicated that Regional roads are controlled access roads and therefore CN would be required to obtain approval from the Region to construct an access point for terminal-generated truck traffic. Halton Municipalities also expressed concern that the proposed Britannia Road entrance would affect the natural heritage system and encroach on land planned for agricultural uses. The

adjacent natural heritage system that would be affected by the Britannia Road entrance is intended for the long-term support of a watercourse's ecological function.

In addition, Halton Municipalities were concerned that the truck entrance on Britannia Road would affect Regional road safety, function and efficiency because of the type of intersection, spacing and the anticipated grade separation incline of Britannia Road over the existing mainline tracks. Halton Municipalities further indicated that CN is required to address operational criteria, such as sight distances and how the Project's entrance could affect planned uses of Britannia Road by public transit, pedestrians and cyclists.

To avoid effects on agriculture and keep the access to the regional road in an area zoned for urban uses, Halton Municipalities suggested that an entrance on the west side of the railway line, for example on Tremaine Road, would be better. Halton Municipalities also stated that CN could make improvements to First Line in order to make it appropriate for trucks and that CN could then locate its truck entrance on First Line, avoiding the natural heritage system and eliminating the need for trucks heading west having to accelerate up a steep incline over the proposed Britannia Road overpass.

Water supply and wastewater management

Halton Municipalities indicated that there is existing water and wastewater infrastructure on Britannia Road adjacent to the Project and that additional wastewater infrastructure and water mains are planned for locations along Tremaine Road. Halton Municipalities stated that these lines would be available for connection by approximately 2025–2026. They emphasized the importance of integrating any such connection plans into the planning process, to ensure that infrastructure would be correctly sized for the intended land uses. These matters are discussed in more detail in subsection 11.2.3 (Land Use Planning).

Panel Conclusions

In reaching its conclusions on the technically and economically feasible alternatives, the Panel considered the following factors to be particularly relevant:

- CN considered a range of alternatives for major Project components and evaluated the environmental effects of each. Some alternatives were eliminated from further analysis because they were not technically feasible.
- The Panel did not hear opposition at the hearing related to CN's proposed SpeedGate location, CN's proposal to construct a new grade separation where Lower Base Line crosses the CN mainline, CN's proposed terminal and track configuration, and CN's proposed approach to the provision of utilities.
- Some participants disagreed with CN's proposed truck entrance location, preferring an entrance on Tremaine Road or First Line.

The Panel notes that while Halton Municipalities suggested that a truck access location on First Line would be feasible and would avoid effects on the natural heritage system, CN had rejected that alternative because First Line is not a truck-capable road and therefore not technically feasible. The Panel is satisfied that either alternative — a truck entrance on Britannia Road or on First Line — would be acceptable. In the latter case, trucks exiting via First Line would eventually travel to Britannia Road. If CN and Halton Municipalities choose to change its preferred truck entrance location to First Line, and upgrade First Line to be a truck-capable road, the Panel would not object to that change.

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

The Panel is satisfied that CN's choice of reach stacker lift technology is appropriate, based on the rationale it provided.

The Panel notes that CN's preliminary design of stormwater management system components and culverts has consequences for other aspects of the Project, in particular the capacity of the site to store and convey extreme flood events and protect fish and fish habitat, both within the Project Development Area and in other parts of the watershed. These matters are discussed in more detail in Section 7 (Aquatic Environment).

Part 2 – Changes to the Biophysical Environment

5. Atmospheric Environment

This section addresses changes to the atmospheric environment, including air quality, greenhouse gas emissions, and nighttime light levels. The Panel considers these to be environmental effects under subsection 5(2)(a) of the *Canadian Environmental Assessment Act, 2012*, in consideration of the potential determination of the Canadian Transportation Agency with respect to the Project. Section 3 of the Review Panel Terms of Reference requires the Panel to take into account the environmental effects of the Project.

5.1. Air Quality

Subsection 6.1.1 of the EIS Guidelines required CN to provide baseline information regarding existing air quality conditions, and subsection 6.2.1 required that CN describe any changes the Project would cause to air quality. This section of the report deals with Project effects relating to air quality and summarizes the views of CN, participants and the Panel. For discussion on the effects of changes to air quality on human health, see subsection 11.1.1.

CN's Views

CN stated that the construction and operation of the Project would release chemicals of potential concern into the environment where they could potentially affect human health through short-term and long-term direct exposure via inhalation. Air emission sources during construction and operation would be from mobile or stationary equipment that discharge emissions from the combustion of fuels such as gasoline and diesel.

The mobile emission sources during the operation phase of the Project include locomotives passing along the mainline, locomotive idling, non-road equipment such as reach stackers and hostlers, and trucks transporting containers. The stationary emission sources include the three proposed on-site powerpack generators and one clip-on generator. The current daily average railway traffic is 26 freight trains consisting of 13 northbound and 13 southbound trains.

CN stated that the construction phase would last between one and two years. Site preparation and construction activities would generate fugitive dust emissions resulting from construction activities, earthwork, exposed topsoil, moved overburden, and vehicle movement on temporary dirt roads, increasing particulate concentrations in the Project area. The quantity of dust emissions would depend on the area of land being worked, type of equipment on-site, and level of construction activities. Excavators, loaders, graders, dump trucks, water trucks and other equipment would contribute combustion emissions such as nitrogen oxide (NO_x), carbon monoxide (CO), sulphur dioxide (SO₂) and particulate matter (PM) intermittently during daylight hours over the duration of the construction period, depending on the level of activity.

CN indicated that a temporary portable concrete plant would be used, consisting of silos or storage tanks for cement and concrete additives, aggregate material (sand, gravel) storage areas, mixers, truck loading and unloading areas. Particulate matter (dust) from cement and aggregate materials transfer, handling (including loading and unloading) and processing would be the primary pollutant of concern

from a concrete plant. Dust emissions would vary based on the design and production rate of the concrete plant.

During operations, CN stated that Project-related air emissions would be generated by trains travelling along the mainline and accessing the intermodal terminal, non-road equipment such as reach stackers, hostlers, and heated containers, generators, and on-road vehicles including trucks for shipping and receiving containers and employees' vehicles. These sources would operate 24 hours a day, seven days per week. Emissions would include diesel fuel combustion products and re-suspended particulate emissions from paved roads derived from the loose material present on road surfaces.

CN indicated that diesel emissions, in particular NO₂ and diesel particulate matter, would be the primary concern for air quality effects on human health resulting from the Project. Diesel particulate matter would be considered as a main contributor to PM_{2.5} levels.

5.1.1. Baseline air quality

CN's Views

CN developed a baseline survey of ambient air quality, including carbon monoxide, ozone (O₃), polycyclic aromatic hydrocarbons (PAHs), total suspended particulates (TSP), fine particulates (PM_{2.5}), particulate matter up to 10 micrometres in size (PM₁₀), diesel particulate matter, sulphur oxide (SO_x), volatile organic compounds (VOCs), nitrogen oxide, and ammonia (NH₃). There were two steps to this process. CN collected air quality data from existing federal and provincial air quality monitoring stations surrounding the Project area and then supplemented this air quality data with one year of monitoring conducted on the Project site.

In its initial air quality analysis, CN sourced ambient air quality monitoring data from nearby National Air Pollutant Surveillance stations located in Hamilton, Mississauga, Etobicoke, and Brampton and Ontario Ministry of the Environment, Conservation and Parks stations located in Burlington and Oakville. CN stated that, because air quality monitoring results can be highly variable and affected by very local and temporary activities such as construction, it removed the highest spikes by using results at the 90th percentile, according to guidance provided by Ontario Ministry of the Environment, Conservation and Parks. CN then used the 90th percentile data as a basis for the dispersion model predictions, to conservatively characterize the existing ambient air concentrations for Milton.

CN considered air quality data from the Mississauga station to be representative of the future background conditions since it is located in a developed area and close to major highways, and the Project site is currently in transition from a near rural to a more urban location. If a contaminant background level was not available at the Mississauga station, available data from one of the other sites were used.

During the second stage of developing the baseline for air quality, CN carried out monitoring at the Project site between July 2015 and August 2016. CN noted that the data from its on-site monitoring were broadly comparable to the values from the National Air Pollutant Surveillance and Ontario Ministry of the Environment, Conservation and Parks stations.

CN compared the baseline data to the National Ambient Air Quality Objectives, the Canadian Ambient Air Quality Standards, and, where federal criteria were not available, the Ontario Ambient Air Quality Criteria, which are health-based air quality standards for pollutant concentrations in outdoor air. CN reported that the baseline levels of contaminants in the Project area were in general below the relevant Canadian Ambient Air Quality Standards or Ontario Ambient Air Quality Criteria standards, and sometimes well below, with a few exceptions.

CN noted that maximum concentrations of benzo(a)pyrene measured at Hamilton and Etobicoke (South) for all available years exceeded the 24-hour Ontario Ambient Air Quality Criteria of $0.00005 \mu\text{g}/\text{m}^3$ criterion, and all measured annual averages exceeded the applicable Ontario Ambient Air Quality Criteria annual average criterion of $0.00001 \mu\text{g}/\text{m}^3$. CN's on-site monitoring results, while lower than the Hamilton and Etobicoke results, also exceeded the two standards. The maximum local 24-hour concentration of benzo(a)pyrene was $0.00014 \mu\text{g}/\text{m}^3$ and the annual average concentration was $0.000061 \mu\text{g}/\text{m}^3$.

CN sourced data for fine particulate matter ($\text{PM}_{2.5}$) from four National Air Pollutant Surveillance stations located in Mississauga, Oakville, Burlington, and Hamilton, obtaining ambient concentrations on a 1-hour, 24-hour and annual basis. The proposed 2020 Canadian Ambient Air Quality Standard for $\text{PM}_{2.5}$ is based on meeting a daily average concentration of $27 \mu\text{g}/\text{m}^3$, 98% of the time averaged over a three year period. CN observed a trend at four stations showing an increase of $\text{PM}_{2.5}$ concentrations between 2009 and 2013. CN's on-site monitoring of $\text{PM}_{2.5}$ resulted in measured concentrations that were higher than those used in the original round of modelling, but remained below the 2020 Canadian Ambient Air Quality Standards. The local maximum 24-hour concentration was $16.4 \mu\text{g}/\text{m}^3$ compared to the standard of $27 \mu\text{g}/\text{m}^3$, and the annual average concentration was $7.9 \mu\text{g}/\text{m}^3$, just below the standard of $8.8 \mu\text{g}/\text{m}^3$.

CN observed that during most years, the maximum 24-hour PM_{10} concentrations measured at Hamilton and Etobicoke were above the Ontario Ambient Air Quality Criteria standard of $50 \mu\text{g}/\text{m}^3$. However, while CN's on-site monitoring of PM_{10} resulted in a measured average concentration ($42.2 \mu\text{g}/\text{m}^3$) that was higher than the baseline used in the EIS, it was nevertheless below the annual average Ontario Ambient Air Quality Criteria Standard criterion of $50 \mu\text{g}/\text{m}^3$.

CN assessed five VOCs that derive from fuel combustion and obtained baseline data for two of these. The concentrations of 1,3-butadiene from both the National Air Pollutant Surveillance stations and CN's on-site air quality monitoring in Milton were well below Canadian Ambient Air Quality Standards. However, the annual average concentrations of benzene measured at Hamilton ($1.14 \mu\text{g}/\text{m}^3$) and Brampton ($0.54 \mu\text{g}/\text{m}^3$) over a five year period were above the applicable Ontario annual average criterion of $0.45 \mu\text{g}/\text{m}^3$. CN's on-site monitoring of benzene resulted in measured concentrations that were lower than both the original baseline data presented in the EIS and the applicable Ontario Ambient Air Quality Criteria Standard. CN measured an ambient 24-hour benzene concentration of $0.63 \mu\text{g}/\text{m}^3$ and an annual average concentration of $0.38 \mu\text{g}/\text{m}^3$, which are both below the applicable 24-hour and annual average criteria of $2.3 \mu\text{g}/\text{m}^3$ and $0.45 \mu\text{g}/\text{m}^3$, respectively. CN used the higher value instead of the measured value to develop their baseline, and predicted that in the 2031 cumulative effects operating scenario, background concentrations of benzene (annual) would be $0.79 \mu\text{g}/\text{m}^3$, which would exceed the Ontario Ambient Air Quality Criteria Standard criterion of $0.45 \mu\text{g}/\text{m}^3$.

Participants' Views

Environment and Climate Change Canada commented that verification of local baseline air quality was important both because there could be significant differences between measurements at the National Air Pollutant Surveillance stations and CN's on-site monitoring results, and because the background data from National Air Pollutant Surveillance stations showed exceedances of pollutants such as benzene and benzo(a)pyrene. Environment and Climate Change Canada also noted that CN had clearly explained the differences between the National Air Pollutant Surveillance or Ontario Ministry of the Environment, Conservation and Parks data and CN's on-site monitoring data and the department was of the view that CN's approach of using the more conservative data appeared reasonable.

Environment and Climate Change Canada was of the view that CN used appropriate baseline meteorology and baseline air quality; included all relevant air pollutant sources; used valid emission estimates; used appropriate air dispersion models and methodologies; and provided conservative, worst case scenario air quality predictions.

Halton Municipalities noted that the National Air Pollutant Surveillance stations used were all located in highly developed urban areas, whereas the Project would be located in a semi-rural region. Halton Municipalities observed that the National Air Pollutant Surveillance data alone would not necessarily reflect all of the sources interacting in the region surrounding the Project Development Area, such as the waste treatment facilities in the area and agricultural activities. They also argued that CN's use of the 90th percentile for baseline data from National Air Pollutant Surveillance stations should not be considered conservative and that CN should have used the 100th percentile in order to consider the maximum value for each chemical of potential concern.

Halton Municipalities raised a number of other concerns:

- that CN had not taken into account potential hotspots, areas where a micro-climate situation might concentrate contaminants. In their view, unless monitoring equipment is placed in these areas, pockets of high concentrations could be missed. CN responded that such hotspots were generally associated with tall buildings and dense downtown urban forms and that these were unlikely to be found in Milton;
- that it appeared that data from CN's on-site monitoring station had not been reviewed by a third party;
- CN's failure to provide the precise sampling locations of their on-site monitoring program (CN had stated only that they were within the Local Assessment Area);
- CN's failure to provide information on sampling methods and calibration procedures. Halton Municipalities gave the example of the non-detect measurements recorded for ammonia, stating that CN should have used instrumentation with a better detection limit;
- what Halton Municipalities saw as an absence of quality control, citing an instance where PM₁₀ was recorded as being higher than total suspended particulate; and
- CN had not properly taken into account that even when ammonia is measured to be below standards, because it is a precursor of PM_{2.5} it might contribute to elevated levels of PM_{2.5}.

5.1.2. Air quality modelling and effects

CN's Views

Using the baseline data described above, CN used the United States Environmental Protection Agency dispersion model, AERMOD, to predict how Project-related emissions from stationary and mobile sources would mix and move from the Project site into the surrounding airshed. For the cumulative effects assessment, CN used the United States Environmental Protection Agency model CAL3QHCR to predict pollutant concentrations near roadways and intersections within 150 metres of the Project Development Area.

CN's dispersion modelling was applied to a 20-by-20 kilometre grid around the Project site and involved more than 13,000 receptors, including 98 specific receptors close to the Project and along the routes that CN considered might be used by Project-related traffic.

CN indicated that a five-year regional meteorological dataset (1996–2000) available from the Ontario Ministry of the Environment, Conservation and Parks for the Halton–Peel area was used in the modelling assessment and that these data points were pre-processed by the Ontario Ministry of the Environment, Conservation and Parks for the Local Assessment Area. CN compared predicted contaminant concentrations against established air quality criteria, specifically the National Ambient Air Quality Objectives, the Canadian Ambient Air Quality Standards, and the Ontario Ambient Air Quality Criteria. For its cumulative effects assessment, CN assessed the predicted ground-level contaminant concentrations at receptor points, including participating receptors, and highlighted the locations of the maximum concentrations.

Table 5-1 is a summary of CN's overall predicted air quality concentrations during operation. This table was generated by the Panel using the 2021 and 2031 maximum predicted ground-level concentrations CN identified in its response to information request IR4.29 taking into account the combined effect of baseline air quality, predicted Project emissions, and future emissions from traffic and trucks:

Table 5-1: 2021, 2031 maximum predicted ground-level concentrations of air quality contaminants of concern

Contaminant	Averaging Period	Relevant Threshold ($\mu\text{g}/\text{m}^3$)		2021 Maximum Predicted Ground-Level Concentration ($\mu\text{g}/\text{m}^3$)***	2031 Maximum Predicted Ground-Level Concentration ($\mu\text{g}/\text{m}^3$)***
		AAQC*	0.00001	0.00011	0.00026
Benzo(a)pyrene	Annual	AAQC*	0.00001	0.00011	0.00026
	24 hours	AAQC	0.00005	0.00034	0.00069
Benzene	Annual	AAQC	0.45	0.4	0.80
	24 hours	AAQC	2.3	0.71	1.6
PM10	24 hours	AAQC	50	52	56
PM2.5	24 hours	CAAQS**	27	22	19
	Annual	CAAQS	8.8	9.1	8.8
NO ₂	24 hours	CAAQS	200	67	66
1,3-Butadiene	24 hours	AAQC	10	0.58	0.58
CO	8 hours	CAAQS	15000	756	687
Acrolein	1 hour	AAQC	4.5	0.2	0.032
SO ₂	24 hours	CAAQS	300	6.9	6.9
Formaldehyde	24 hours	AAQC	65	0.48	0.35
Acetaldehyde	0.5 hour	AAQC	500	0.91	0.73

* AAQC: Ontario Ambient Air Quality Criteria

** CAAQS: Canadian Ambient Air Quality Standards

***Source: CN's Response to Information Request 4.29 (Table 1 and Table 2, Attachment IR4.29-1 in CEAR document # 632).

CN's assessment concluded that most of the cumulative air contaminant concentrations during construction and operation would be below the relevant air quality criteria, meaning exposure to them was not expected to result in changes to human health. CN predicted exceedances for benzo(a)pyrene, benzene, PM_{2.5} and PM₁₀. Due to these exceedances, CN conducted a detailed assessment of the human health risks of these contaminants, which is discussed in Section 11.1.

Benzo(a)pyrene and Benzene

CN measured benzo(a)pyrene as a surrogate for polycyclic aromatic hydrocarbons (PAHs). During operation in 2031, baseline concentration of benzo(a)pyrene (annual) 0.00025 $\mu\text{g}/\text{m}^3$, combined with Project emissions of 0.0000077 $\mu\text{g}/\text{m}^3$ and other contributions from traffic, were predicted to be 0.00026 $\mu\text{g}/\text{m}^3$.

The baseline concentration of benzo(a)pyrene (24-hour) 0.00064 $\mu\text{g}/\text{m}^3$ combined with Project emissions of 0.000032 $\mu\text{g}/\text{m}^3$ and other contributions from traffic were predicted to be 0.00069 $\mu\text{g}/\text{m}^3$.

These values would exceed the Ontario Ambient Air Quality Criteria Standard 24-hour criterion of $0.00005 \mu\text{g}/\text{m}^3$, and the Ontario Ambient Air Quality Criteria Standard annual average criterion of $0.00001 \mu\text{g}/\text{m}^3$. Exceedances were also predicted during the 2021 operation scenario.

During operation in 2031, baseline concentration of benzene (annual) $0.79 \mu\text{g}/\text{m}^3$ combined with Project emissions of $0.011 \mu\text{g}/\text{m}^3$ and other contributions from traffic were predicted to be $0.80 \mu\text{g}/\text{m}^3$. This value would exceed the Ontario Ambient Air Quality Criteria Standard annual average criterion of $0.45 \mu\text{g}/\text{m}^3$.

CN indicated that the modelled mitigation measures for Project operation would result in decreased annual average concentrations for benzo(a)pyrene at all modelled locations. On the other hand, CN predicted that, counterintuitively, annual average concentrations for benzene would increase at all locations due to use of higher tier equipment, reflecting benzene emission factors that were updated by the United States Environmental Protection Agency after the EIS was submitted.

Particulate Matter (PM_{2.5} and PM₁₀)

CN stated that their assessment of PM_{2.5} was appropriate and based on conservative estimates. CN relied on methods recommended by the Ontario Ministry of Transportation and stated that these have also been used by Halton Region in their traffic environmental assessments.

From the comparison between the values in the EIS and subsequent on-site measurements, CN found that PM_{2.5} and PM₁₀ concentrations exceeded the background levels used in the EIS by 24% and 37%, respectively. CN noted that when the on-site measurements were taken, several projects requiring surface vegetation and ground removal were underway, which could have resulted in higher measurements of particulate matter.

CN predicted that during construction, without mitigation, the concentration of PM₁₀ (24-hour) would exceed the 24-hour Ontario Ambient Air Quality Criteria Standard of $50 \mu\text{g}/\text{m}^3$ on one or more days at some locations representative of current and future homes or businesses. There is no equivalent federal criterion for PM₁₀. CN predicted exceedances at 21 of 40 locations for a duration ranging from less than one day to 19 days per year. With the consideration of the additional mitigation measures proposed by CN before the public hearing, CN predicted reductions in Project emissions of PM₁₀ by up to 55% at receptors predicted to experience exceedances. With additional mitigation applied, CN predicted exceedances at five of 40 locations for a duration ranging from less than one day to five days over the course of the 18- to 24-month construction period.

CN predicted that, without mitigation, the maximum concentrations of PM_{2.5} and PM₁₀ during Project operation would exceed criteria at the Project boundary.

During operation, the exceedances for PM_{2.5} and PM₁₀ were close to the Project boundary, and not at a location where people would be expected to spend much time. The background PM_{2.5} 24-hour value presented in the EIS was $13 \mu\text{g}/\text{m}^3$ and the monitored PM_{2.5} 24-hour value was $16 \mu\text{g}/\text{m}^3$. When added to the predicted value of $18 \mu\text{g}/\text{m}^3$ from the Project at the maximum point of impingement, the total concentration from background and the Project would be 31 and $34 \mu\text{g}/\text{m}^3$ respectively. Using either background value resulted in an exceedance of the Ontario Ambient Air Quality Criteria Standard ($27 \mu\text{g}/\text{m}^3$) when Project emissions were considered.

Although CN predicted that PM_{2.5} (annual and 24-hour) would exceed criteria at the Project boundary, there were no predicted exceedances at a receptor, such as a home where there might be implications for human health. At the receptor locations where humans are expected to live, the maximum predicted concentrations were lower than criteria. CN noted that assumptions used in its modelling were conservative, and actual Project emissions would likely be reduced. In addition, CN expected emissions reductions based on additional mitigation measures proposed before the public hearing. Due to the additional mitigation measures, CN predicted that PM_{2.5} would continue to meet air quality criteria.

The background 24-hour PM₁₀ value presented in the EIS was 31 µg/m³ and the monitored 24-hour PM₁₀ value was 42 µg/m³. When added to the predicted value of 24 µg/m³ from the Project at the maximum point of impingement, the total concentration from background and the Project would be 55 and 66 µg/m³ respectively. Relying on either background value would result in an exceedance of the Ontario Ambient Air Quality Criteria Standard (50 µg/m³) when Project emissions were considered.

CN concluded that its proposed mitigation measures, discussed further below, would decrease emissions of PM_{2.5} and PM₁₀ at all modelled receptor locations.

Proposed Mitigation

In the EIS, CN proposes the following mitigation measures and monitoring related to air quality:

- submit an Environmental Protection Plan to the Canadian Environmental Assessment Agency that includes specific air quality mitigation measures;
- implement a construction air quality monitoring program for fugitive dust (PM_{2.5} and PM₁₀) levels at two locations along the fence line of the Project Development Area, upwind and downwind of the prevailing wind direction during the construction phase; and
- during the first year of operation, undertake continuous sampling on a five-minute basis, 24 hours per day, with initial daily review of data, once proven, move to less frequent review timing of ambient concentrations of NO₂, PM_{2.5}, PM₁₀, benzene, benzo(a)pyrene and meteorological conditions (wind speed, wind direction, temperature, relative humidity) to confirm the effectiveness of mitigation measures. If complaints are received, an adaptive management process, beyond the basic proposed mitigation measures, should be initiated.

In response to concerns raised by several participants, CN conducted a supplementary air quality assessment to predict changes in facility emission rates resulting from the implementation of additional mitigation measures that were not included in CN's original modelling. Based on the results of this supplementary assessment, CN proposes additional mitigation measures, described below.

During construction, CN indicated that dust emissions could be reduced during construction by implementing mitigation measures related to schedule management and batch plant operation. CN stated that construction activities would be managed according to a construction schedule. The number and type of equipment used in each stage would be reduced as well as the associated emissions. Batch plant activities would generate dust, including aggregate transfer, sand transfer, weigh hopper loading, and handling other materials. CN proposes to use water sprays, partial enclosures, and reducing the drop distance to reduce the amount of dust generated by up to 70%.

During operation, CN indicated that emissions of particulate matter (PM_{2.5} and PM₁₀), benzo(a)pyrene, and benzene could be reduced during operation by implementing mitigation measures related to dust

suppression, an anti-idling policy, and by using more efficient non-road and stationary equipment. CN stated that watering or sweeping on-site roadways could reduce fugitive dust emissions (PM_{2.5} and PM₁₀) by 25%. By implementing an anti-idling policy, CN predicted that the number of idling trucks could reasonably be reduced from the 20 assumed in the EIS to five, which CN predicted would reduce emissions from idling trucks by 75%. CN expected that, over time, older Tier 2 and Tier 3 equipment would be replaced with newer equipment with improved emissions controls. CN assumed that all non-road and stationary equipment used on site would meet Tier 4 emissions standards by 2031, which would reduce the emissions of all air contaminants from on-site non-road and stationary equipment.

CN predicted that by implementing the proposed additional mitigation measures, PM₁₀ emissions would be reduced by 59% during construction, 41% in the 2021 operation scenario, and 12% in the 2031 operation scenario. PM_{2.5} emissions would be reduced by 58% during construction, 50% in the 2021 operation scenario, and 5% in the 2031 operation scenario. Benzo(a)pyrene emissions would be reduced by 41% in the 2021 operation scenario, and 12% in the 2031 operation scenario; CN did not provide anticipated construction scenario reductions for benzo(a)pyrene. Elemental carbon emissions would be reduced by 53% in the 2021 operation scenario and 1.5% in the 2031 scenario as by then, much of the older Tier 2 and Tier 3 equipment would already have been replaced with more efficient Tier 4 equipment. CN stated that NO₂ emissions would be reduced by 34% during operation. As noted previously, benzene was predicted to increase by 40% with the use of higher tier engines in the 2021 operation scenario due to the use of higher tier equipment and updated emission factors, but emissions would be reduced by 1% in the 2031 operation scenario.

With respect to cumulative effects and general improvement of air quality in the regional airshed, one of CN's air quality experts provided highlights of their research on air quality management. They stated that their work had led to advancements in emission modelling and that they had also tested various policies at the neighborhood and regional level and measures that in their view would potentially achieve deep reductions in urban transportation emissions.

Participants' Views

Environment and Climate Change Canada reviewed the meteorological and baseline air quality data, the various emission sources and related emission estimates, air dispersion modelling, and predicted concentrations of air pollutants at downwind receptors. The focus of its review was on the anticipated release of air pollutants from Project activities and their transport from the Project site, alone and in combination with emissions from other sources. Environment and Climate Change Canada agreed that CN considered all relevant air pollutant sources in its air quality assessment and used appropriate methodology and dispersion modelling for determining baseline conditions and predicted effects. Environment and Climate Change Canada considered CN's air quality predictions to be a conservative worst-case scenario air quality assessment.

Health Canada stated it does not possess the specialist or expert information or knowledge necessary to verify air quality modelling results and assumed that correct, accepted validated methods were used.

Halton Municipalities stated that CN had likely underestimated PM_{2.5} levels because they had not included road dust when estimating on-road, off-site, terminal-related traffic emissions, and had assumed that 20 trucks would be idling in the queuing area in front of the SpeedGate at any one time.

Halton Municipalities conducted sensitivity studies using on-site silt level values for road dust, and found that the Project might increase the annual average concentration of PM_{2.5} by approximately 2.7 µg/m³ at special receptors. Halton Municipalities also predicted that PM_{2.5} concentrations might increase by ~6–7 µg/m³ (24-hour average) at special receptors if on-site truck idling had considered 140 trucks idling in the queuing area. They also noted that CN air quality baseline information suggested a general trend of increasing PM_{2.5} levels in the area, and that these increases would only be worsened by CN's contribution.

Halton Municipalities also stated that if CN had considered the full queuing capacity of 140 trucks for their assessment scenario, they would have predicted higher future levels of both nitrogen oxides and benzene. Halton Municipalities predicted that NO_x might increase to approximately 63 µg/m³ (24-hour) at special receptors, due to Project emissions alone, or ~30% of the National Ambient Air Quality Objectives guideline value of 200 µg/m³ (24-hour). Similarly, benzene air quality levels might increase to ~0.1 µg/m³ (24-hour) at special receptors, due to the Project alone, or ~4% of Ontario's guideline value. All of these predicted increases, over CN's predictions, would remain under the established guidelines and standards for those contaminants.

Halton Municipalities stated that while Best Management Practices would be expected to reduce emissions, CN had not provided sufficient detail to determine how effective they would be.

5.1.3. Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on air quality, the Panel considered the following factors to be particularly relevant:

- CN developed an air quality baseline using monitoring results from the National Air Pollutant Surveillance Program and provincial stations in larger urban and industrial areas of the region and supplemented this data using its own on-site monitoring.
- Environment and Climate Change Canada was satisfied with the baseline and dispersion modelling approach taken by CN, while Halton Municipalities had criticisms of the modelling results.
- The present air quality environment has already been, and will continue to be, degraded by a concentration of fuel combustion and dust producing activities in the region.
- In some locations within the Local Assessment Area, conditions are predicted to be close to exceeding federal and provincial air quality standards, and the Project would result in occasional exceedances near the Project boundary. The trend suggests the situation could continue to degrade as residential and industrial growth continues.
- The Project would potentially result in lower overall emissions at the national and provincial level for some air pollutants, by transferring long-haul container movement from trucks to more fuel-efficient train. However, the Project would add new sources of diesel fuel combustion and consequently higher concentrations of pollutants, including benzene, benzo(a)pyrene and particulate matter, into the local airshed.
- With or without the Project, Halton Region expects and is planning for an increase in truck traffic and significant construction activity, which would increase emissions locally.
- The Panel heard that the shift to higher-technology Tier 4 diesel engines, while reducing emissions of some air pollutants, may result in increased emissions of benzene.

The Panel concludes that CN has taken a reasonable and conservative approach to determining the baseline for air quality by using National Air Pollutant Surveillance Program and provincial data from more urbanized and industrialized locations, and by supplementing it with locally sourced data from its own on-site monitoring and relying on the higher of the two. The Panel believes that by selecting the highest recorded value at the 90th percentile, CN followed provincial guidance, and that this was a reasonable approach for air modelling. The Panel also notes that monitored results from, for example, Mississauga would reflect air emissions from a much larger city with many industrial sources of emissions.

The Panel also concludes that CN's dispersion and cumulative effects modelling was appropriate, but acknowledges that Halton Municipalities had many criticisms of the modelling results. It may be that some of these criticisms were justified; it was not possible to entirely resolve these differences of opinion during the hearing. Nonetheless, given the results of Environment and Climate Change Canada's review of the information, the Panel is satisfied that CN's modelling results are broadly accurate and do not require CN to remodel either the baseline information or the Project effects. The Panel finds that the conservatism built into CN's model, such as the assumption that all on-site equipment would be running continuously for 24 hours when that would not likely be the case in reality, provides an adequate level of conservatism to buffer for model uncertainty.

The Panel takes the approach that CN should be held accountable to remain at or under the predicted concentrations of contaminants that would be emitted by the Project. If CN underestimated its emissions of these contaminants, it should be required to carry out additional mitigation measures, up to and including a potential reduction in operations, to rectify the situation.

The Panel agrees with CN that air quality concentrations of the following contaminants would, in certain scenarios, exceed the Ontario Ambient Air Quality Criteria: benzo(a)pyrene (2600%), benzene (178%) and PM₁₀ (112%). The Panel also agrees that concentrations of PM_{2.5} would exceed the 2020 Canadian Ambient Air Quality Standard. The Panel understands that exceedances of benzene and benzo(a)pyrene are common throughout Southern Ontario, particularly in proximity to population centres. The Panel also recognizes that exceedances of PM_{2.5} would be limited to areas near the Project boundary, and exceedances of PM₁₀ would occur at the Project boundary and at some special receptors for a few days during the construction period. The health implications of the Project contributing additional contaminants into the local airshed are discussed in Section 11.1 Human Health.

The Panel concludes that it is clearly incumbent on CN to minimize its effects on air quality through minimizing dust generation from the Project by way of reducing soil exposure and maximizing implementation of dust suppression, fuel efficiency, the use of anti-idling practices, and by employing other accepted emissions management practices. In the longer term, the Panel believes it will be vital that CN make real progress toward employing Tier 4 equipment, electrifying its own truck fleet (or pursuing other low-emissions technologies), and incentivising the use of zero-emission technologies for other trucks that use the intermodal terminal.

The Panel recommends that CN establish an updated baseline by repeating the local air monitoring survey it conducted in 2015–2016 to account for any changes in the background concentrations that

may occur before Project construction begins. If necessary, predicted cumulative effects should be recalculated.

During construction, and for five years after the start of operation, CN should monitor air quality and compare the data to their predictions. If the monitoring data exceed the predicted results by more than 5%, CN should work with Environment and Climate Change Canada, the Ontario Ministry of the Environment, Conservation and Parks, and others, as appropriate, to develop and implement additional mitigation. After five years, air quality is likely to be further degraded due to regional population growth and industrial and commercial development, and so the Panel has recommended that air quality issues should be further tracked and managed through a regional airshed approach.

The Panel heard that the Canadian Ambient Air Quality Standards have been established with the objective of maintaining a high standard of air quality in Canada, while aiming for progressive improvement over time. The Panel supports those objectives. The Panel also concludes that CN's prime obligation is to ensure that emissions from the Project are no greater, and preferably less than, levels predicted by CN in the EIS, while simultaneously working on technological and operational improvements that would lead to continuous improvement in emission reduction. In the Panel's view, regional airshed management, led by governments with the active participation of all relevant parties in the region, will be essential in order to reduce exceedances and meet the Canadian Ambient Air Quality Standards long into the future.

CEAA Recommendation 5.1 — CN should implement the mitigation it has committed to undertake for air quality

The Panel finds that CN's commitments to implement mitigation measures for air quality are necessary to minimize a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- control dust and implement dust control measures, including the use of dust suppressants such as water or other approved materials, minimizing activities that generate large quantities of dust during high winds, covering truck-loads (as necessary) of materials which could generate dust, and paving areas as required, to control fugitive dust emissions;
- cover or wet materials stored on-site to prevent blowing dust, where practicable;
- construct temporary access routes and parking lots within the site using material such as gravel to reduce particulate matter emissions from dirt surfaces;
- apply vacuum sweeping and water flushing of the on-site roads when necessary to remove the loose material present on the surface of roads that could be re-suspended by road traffic;
- implement dust mitigation for the temporary portable concrete plant, including:
 - proper planning, design and construction of the portable concrete plant. The plant should be located away from residential areas. Excess material storage areas should be avoided;
 - installation of temporary berms/barriers where appropriate around the concrete plant equipment (mixing, silos, transferring and storage areas) to prevent dust emissions;
 - dust control equipment, such as fabric filter or suitable dust collector systems, for dry material transferring and handling;
 - material transfer points, conveyors and mixing equipment to be adequately covered or enclosed to eliminate fugitive dust emission;

- movable and telescoping chutes to be used as appropriate for truck loading activities. The drop height of the cement/ aggregate mixture into the truck shall be minimized to minimize the visible emissions.
- incorporate good management practices into Project design to reduce criteria air contaminants, hazardous air pollutants and greenhouse gas emissions;
- during construction, implement a no-idling policy to control mobile equipment and other vehicle emissions where applicable, for example construction equipment will be turned off when not in use;
- use SmartStart equipped locomotives as much as possible to reduce excessive idling during warm months;
- use non-road mobile and stationary equipment equipped with low emissions and high fuel combustion efficiency engines, specifically Tier 4 reach stackers;
- improve the operation process so that the out-going trucks can travel less distance on-site and expedite the container handling turnaround time; and maintain construction and terminal equipment in good working order and use ultra-low sulphur fuel when available.

CEAA Recommendation 5.2 — Additional mitigation for continuous improvement of air quality emissions

The Panel considers that additional mitigation measures, beyond CN's commitments, are necessary to minimize a significant adverse environmental effect. The Panel recommends that CN, in the spirit of the Canadian Ambient Air Quality Standards and continuous improvement, demonstrate continuous improvement to reduce air quality emissions over the life of the Project for all contaminants but in particular for non-threshold contaminants associated with diesel exhaust (NO₂, and diesel particulate matter). This continuous improvement should include implementation of Tier 4 equipment, or better, at such time as it becomes economically and technically feasible. CN should also share the results of the electric truck pilot project with relevant regulatory agencies and the Community Liaison Group described in Section 15; and periodically report on progress made in electrifying the CN Transportation Limited truck fleet that would use the terminal.

CEAA Recommendation 5.3 — Follow-up program for air quality

The Panel recommends that CN, in consultation with Environment and Climate Change Canada, develop and implement a follow-up program for air quality. The follow-up program should involve air quality monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that CN's air quality predictions prove to be exceeded or mitigation measures are not functioning as expected. The requirements should be set out in an Air Quality Monitoring and Adaptive Mitigation Plan that should include the following components:

- Prior to construction, update the local air quality baseline information by way of a new local monitoring survey to reflect any changes since the baseline was supplemented in 2016.
- Develop a monitoring protocol to be followed during the construction phase and for the first five years of operation, and compare estimated emissions and measured air quality levels against the predictions made in CN's environmental assessment.
- During construction, monitor dust (PM_{2.5} and PM₁₀) levels and meteorological conditions (wind speed, wind direction, temperature, relative humidity) at two locations (one upwind and one downwind of the Project Development Area) at or near the property line based on prevailing winds with 24-hour samples, once every six days (following National Air Pollutant Surveillance

schedule), with continuous visual observations. This will confirm the effectiveness of mitigation measures. If complaints are submitted, an adaptive management review should be initiated.

- During the first year of operation, at the locations described above, monitor ambient concentrations of NO₂, PM_{2.5}, PM₁₀, benzene, benzo(a)pyrene and meteorological conditions (wind speed, wind direction, temperature, relative humidity) with continuous sampling on a five minute basis, 24 hours per day. This monitoring should be repeated for the first year the Project operates at its full capacity, after which time, if results of the follow-up program indicate that CN's air quality predictions were accurate or overestimated, less frequent monitoring may be conducted to confirm no changes, on a timescale that is satisfactory to Environment and Climate Change Canada and Health Canada. This will confirm the assessment predictions and the effectiveness of mitigation measures. If complaints are submitted, an adaptive management review should be initiated.
- Compare the monitoring results to (a) the federal National Ambient Air Quality Objectives, Canadian Ambient Air Quality Standards, or, where federal criteria are not available, the Ontario Ambient Air Quality Criteria or (b) if the baseline already exceeds these standards, to the predicted levels.
- If the monitored results exceed the applicable standard on more than one day per month or if, in the case of (b) above, the results exceed the predicted level on more than one day per month, CN must work with Environment and Climate Change Canada to investigate the source(s) of the problem. If the exceedance(s) have occurred as a result of terminal operations, the Plan will specify the range of additional mitigation measures that should be considered to bring the results within the acceptable range, up to and including operational changes such as a temporary reduction in terminal operations.

Air quality monitoring results should be shared annually with the Impact Assessment Agency of Canada, Environment and Climate Change Canada, Ontario Ministry of the Environment, Conservation and Parks, Halton Region, the Town of Milton, the Community Liaison Group and made public through the CN website.

In the Milton area, transportation and other activities have had, and will have, an effect on air quality that the Panel considers to be significant, as reflected in the predicted baseline exceedance for benzene and benzo(a)pyrene. The Project will provide an additional contribution to this already significant effect, which the Panel considers to be high in magnitude and likely to be long-term or permanent in duration. The Panel recognizes that the Project would result in new exceedances for PM₁₀ and PM_{2.5}. The Panel understands that while these exceedances are likely common in the region and not entirely attributable to the Project, the situation must not be ignored, in particular due to the potential linkages with human health risks associated with diesel exhaust (see Section 11.1, Human Health). Therefore, the Panel must conclude that the further contribution of the Project to an already significantly affected baseline condition for air quality, specifically in relation to benzene and benzo(a)pyrene, would be likely to result in a significant adverse environmental effect. The Panel finds these effects are likely to occur, as combustion of fuel, and in particular diesel, is a central requirement for moving trains, trucks, and terminal equipment as part of the operation. The Panel did not hear information regarding the timing or indeed the likelihood of potential wide-spread use of electric or other zero-emission vehicles, which would allow the Project to operate without the predicted air emissions.

The Panel concludes that the Project is likely to cause a significant adverse environmental effect on local air quality because it would further contribute to degraded baseline air quality conditions.

The Panel considers that, even with mitigation, the Project will add to the predicted baseline exceedances of ambient air quality standards for benzene and benzo(a)pyrene and cause new exceedances for PM10 and PM2.5, resulting in a high magnitude effect that, without improvements to general emissions technology, would be long-term.

The Panel notes that CN is carrying out a pilot test of electric vehicles for potential inclusion in the CN Transportation Limited fleet. The Panel also heard that one of CN's regular customers, J.B. Hunt Transportation Inc., is similarly exploring this option. The Panel hopes and assumes that, increasingly, a combination of government support and sanctions will result in the improvement and widespread adoption of electric or other zero-emission vehicles. Both the climate emergency and the need to protect public health make this an imperative. In further support of the objective of continuous improvement identified in Recommendation 5.2, the Panel makes the following recommendation.

Additional Recommendation 5.4 — Incentivise use of electric or other zero-emission trucks using the intermodal terminal

The Panel recommends that in order to reduce levels of contaminants of potential concern emitted by vehicles using diesel fuels, CN should identify and implement incentive procedures that would encourage other truck operators using the intermodal terminal to convert to electric vehicles or the use of other zero-emission technology. These procedures could include priority reservation access or contractual incentives.

Cumulative Effects

The Panel heard that the Town of Milton and Halton Region plan to expand greatly over the coming decades through planned developments such as the Boyne Survey Secondary Plan Area that would add at least an additional 50,000 homes and associated emissions to the local airshed. As described in Section 3.2 (Project Setting), Halton Region had an estimated population of 575,000 in 2016, and it is estimated to grow to 898,300 by 2041. Halton Municipalities stated that on average there are more than two cars per home in the region. As a result, the planned residential expansion within Milton would increase the number of cars and non-Project-related trucks in the area. This additional influx of residents and businesses will continue to degrade air quality conditions long into the future. While the Panel understands that in theory these effects would be reversible through broad implementation of cleaner technologies, the Panel did not hear specific or even general discussion from participants that this is likely to occur in a reasonably foreseeable future timeframe. Rather, the Panel expects that, with the addition of planned future projects and activities, the significant adverse environmental effects on air quality, as evidenced by predicted baseline exceedances of the Ontario Ambient Air Quality Criteria Standards, would continue as a future significant adverse cumulative environmental effect.

The Panel notes that the information before the Panel led it to conclude that the Project would combine with other past and future projects and activities to have a significant adverse effect on three of the components for air quality. However, given the trajectory of developments, and the related additional

emissions for other contaminants of concern, it is possible that in the long term the region of Halton area could see consistent exceedances for other air quality contaminants as well. The Panel believes that all industries have a responsibility to improve their practices over time, particularly with regard to air emissions, and that CN is well placed to exert a positive influence over those industries that would utilize the Project.

The Panel concludes that the Project, in combination with other projects and activities that have been or will be carried out, is likely to cause a significant adverse cumulative environmental effect on air quality.

The Panel finds that baseline air quality standard exceedances and the Project emissions would combine with emissions from planned future developments in the area, and these are expected to cumulatively result, at minimum, in a continuation of the predicted air quality standard exceedances for benzene, benzo(a)pyrene and new exceedances of PM₁₀ and PM_{2.5}.

The Panel observes that the review of CN's Project, particularly with respect to air quality, underscores a dilemma. The region of Halton is a magnet for residential growth, and for industrial and commercial development, all of which will increase the ubiquity of diesel powered vehicles — construction equipment, trucks carrying consumer goods to residential and retail destinations, trucks serving manufacturing and distribution centres and so on. The Panel was told that economic activity in the Region of Peel already focuses to a major extent on freight distribution and logistics industries. The Province of Ontario has published Freight-Supportive Guidelines that anticipate efficient freight movement with appropriate facilities and infrastructure as being a critical factor in Ontario's growth. Until the use of clean fuels is widespread, diesel emissions, with their associated health risks, will increasingly affect the airsheds of the region of Halton and beyond.

While the Panel has made findings of significance in relation to diesel emissions, ironically most existing and planned developments and activities that will generate such emissions are not required to undergo environmental assessment. The Panel is aware that regional airshed management is no easy task but observes that air quality trends are not encouraging. The Panel suggests that municipal and provincial support for economic development through increased freight movement and logistics developments must also address the implications of increased diesel emissions.

The Panel is aware that the Province has initiated some airshed management projects in neighbouring areas but did not receive evidence about these on the record. One of CN's air quality experts told the Panel about advancements being made in modelling and about research on potential policy approaches and measures that could achieve deep reductions in urban transportation greenhouse gas emissions. It is reasonable to assume that these policies and measures, if proven efficient and adopted, could also, in part, address diesel emissions.

Additional Recommendation 5.5 — Management of regional air quality, particularly with respect to diesel emissions

In recognition of the fact that there are already exceedances of a number of air quality objectives in the region around Milton and evidence of downward air quality trends, the Panel recommends that the Province of Ontario and Halton Region, in collaboration with Health Canada, jointly investigate how best to achieve and maintain appropriate ambient air quality objectives in the regional airshed, particularly with respect to the increasing generation of diesel emissions from all sources in the Region.

5.2. Greenhouse Gases

In March 2016, the Canadian Environmental Assessment Agency, operating on a new policy direction for the assessment of projects, required CN to provide an estimate of direct greenhouse gas emissions associated with the Project, an estimate of the Project's contribution to the provincial and national emissions, and a cumulative effects analysis. The Minister of Environment and Climate Change confirmed this as a matter for the Panel's mandate by way of the letters appointing the members to the Panel, in December 2016. This section of the report deals with Project effects relating to greenhouse gases and summarizes the views of CN, participants and the Panel.

CN's Views

CN's assessment of the Project's greenhouse gases consisted of the following elements:

- assessment of baseline greenhouse gas emissions for the Project area from existing published sources of greenhouse gas data;
- compilation of greenhouse gas emissions inventories within the study area for predicted future emissions of the Project, including construction activities and operations; and
- comparison of emissions from Project operations to provincial, national and global emissions.

CN noted that a greenhouse gas is any gas that contributes to potential climate change. Greenhouse gases are known to contribute to warming of the climate, leading to many other changes around the world, in the atmosphere, on land, and in the oceans. Greenhouse gases absorb heat radiated by the Earth and subsequently warm the atmosphere, leading to what is commonly known as the greenhouse effect.

CN clarified that the relative measure of how much heat a greenhouse gas absorbs in the atmosphere is characterized as the global warming potential, relative to CO₂. CN assessed the global warming potentials of CO₂, CH₄ and N₂O as 1, 25, and 298, respectively, based on Canada's *National Inventory Report 1990–2014*. As different greenhouse gases contribute to different extents to the greenhouse effect, the unit of kilotonnes of carbon dioxide equivalent (kt CO₂e) is used to express the total quantity of greenhouse gases. This unit is calculated by multiplying the tonnage emission of each greenhouse gas by its global warming potential, then summing the contributions from all relevant greenhouse gases.

CN stated that the Project would release greenhouse gases, such as oxides of carbon and nitrogen, through combustion emission sources during construction and operation. Greenhouse gases in the form of perfluorocarbons and hydrofluorocarbons might also be emitted from on-site refrigerant units as a result of refrigerant leakage. During construction, CN predicted that the total emissions would be 23 kt carbon dioxide equivalents (CO₂e) annually within Ontario and Canada. Construction would occur for up to two years. These emissions are less than Environment and Climate Change Canada's 50 kt CO₂e

annual greenhouse gas reporting threshold, and therefore, in CN's view, the Project should be considered a low emitter during construction. During operation, the direct on-site emissions for the Project are predicted to be 63 kt CO₂e annually within Ontario and Canada.

CN stated that greenhouse gas emission sources expected as a result of construction included non-road equipment used on-site such as excavators, dozers, graders, loaders, off-road dump trucks, compactors, rollers, scrapers and augers/drill rigs and on-road mobile equipment used on-site such as dump trucks and water trucks. During operation, CN stated that greenhouse gas emission sources would be non-road equipment used on-site, such as reach stackers, hostlers, and heated and refrigerated containers; stationary combustion equipment used on-site, such as power pack generators and a clip-on generator; locomotives servicing the Project on-site; on-road mobile equipment used on-site, such as trucks transporting containers; and other on-site sources such as the administration building and the maintenance garage.

CN committed to implementing technically and economically feasible mitigation measures to prevent and control greenhouse gas emissions during the construction and operation of the Project including:

- applying a no-idling policy to reduce mobile equipment and other vehicle emissions where possible and appropriate;
- ensuring proper maintenance of equipment and vehicles operating in work areas;
- using SmartStart equipped locomotives as much as possible to reduce excessive idling during warm months;
- equipping non-road mobile and stationary equipment with low emissions and using high fuel combustion efficiency engines; and
- streamlining and further improving the operation process so that the out-going trucks could travel less distance on-site and expedite the container handling turnaround time.

CN explained that, compared to moving container goods only with trucks, the Project's railway transportation would provide a reduction of 459 truck kilometres per container. When applied to the 450,000 containers anticipated at the terminal, CN calculated the reduction to be just over 200 million truck kilometres annually on the 400-series highways.

Participants' Views

Environment and Climate Change Canada conducted a science-based review of CN's greenhouse gas estimates for the Project, focused on ensuring that the Project's direct greenhouse gas emissions were appropriately calculated and appropriately compared to provincial and national inventories. It stated that CN's estimation of the Project's direct greenhouse gas emissions was appropriately conservative and confirmed that the predicted direct emissions of greenhouse gases from the Project's construction and operation phases are 23 kt CO₂e/year and 63 kt CO₂e/year, respectively. Environment and Climate Change Canada had questions about the details of the refrigerated units expected on the Project site, accompanied by an estimation of the associated hydrofluorocarbon and perfluorocarbon emissions or a rationale for predicting these releases to be near zero.

Environment and Climate Change Canada recommended that the Panel consider measures to reduce the greenhouse gas emissions for all new on-road Project-generated heavy-duty vehicles that are under CN's care and control. For example, these could include the use of newer vehicles that have lower

emissions, training programs for employees to reduce emissions, and maintenance programs for vehicles and equipment used during the life of the Project.

Halton Municipalities agreed that integrating Best Management Practices to reduce greenhouse gas emissions into Project design wherever possible would have some impact in reducing emissions. However, at the present level of detail provided, and given the vagueness of actual intent by CN to fully implement these measures, Halton Municipalities stated that they could not determine how effective those practices would be.

No other participants in the review provided specific comments on greenhouse gas emissions, however many did note that generally they understood that intermodal transportation over long distances via railway was likely to result in lower emissions as compared to moving goods by trucks over the same distance.

5.2.1. Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on greenhouse gas emissions, the Panel considered the following factors to be particularly relevant:

- The Project would emit 23 kt CO₂e/year during the two-year construction period and 63 kt CO₂e/year during operation.
- Environment and Climate Change Canada confirmed that CN had carried out an appropriate and accurate assessment of greenhouse gas effects, and that the construction emissions would be below national reporting thresholds.
- CN identified a range of mitigation measures and management practices that relate to the reduction of greenhouse gas emissions and other air quality contaminants.
- While the Project itself would emit greenhouse gases, the Project would generally contribute to relative greenhouse gas emission reductions at the provincial and national level as containers would be moved by trains rather than long-haul trucks.

The Panel understands that one of the benefits of intermodal transportation, and hence also of the proposed intermodal terminal, is the removal of trucks from highways, to be replaced by the transportation of containers over long distances by trains. This reduces fuel consumption on a per-container basis, and therefore also greenhouse gas emissions. The Panel understands that this would not necessarily lead to an overall reduction in greenhouse gas emissions because if trade continues to increase, emissions may go up, albeit less than they would if the containers were travelling the same distances by truck.

Nonetheless it is incumbent on CN (and indeed on all businesses, governments, institutions and individuals) to continue to reduce greenhouse gas emissions. CN should endeavour to accomplish this by carrying out the mitigation measures identified in Section 5.1 (Air Quality) to reduce adverse air quality and associated health effects, including its ongoing commitment to commission Tier 4 equipment throughout CN's network, and by steady progress in electrifying the CN Transportation Limited fleet or otherwise implementing zero-emission technologies. In addition, CN should develop and apply access incentives at the Project to encourage other transportation firms to switch to the use of electric vehicles or other zero-emission technology, such as priority reservation access or contractual incentives.

The Panel finds that its recommendations and CN's commitments with respect to air quality will also mitigate greenhouse gas emissions and has included consideration of these measures in its conclusion on greenhouse gas emissions. For the life of the Project, the Panel recommends that CN should investigate and implement measures to continuously reduce annual greenhouse gas emissions from the Project.

Cumulative Effects

While air quality contaminants are best considered at local and regional levels, the effects of greenhouse gas emissions are experienced at provincial, national and global scales. The Panel notes that, when considered at a provincial or national level, the Project is likely to result in an avoidance of emission increases due to shifting goods movements for increased trade off of trucks and onto rail. This may result in an overall reduction of greenhouse gas emissions, although given that CN could not provide specific origin and destination information for the containers, it was not possible to calculate the specific greenhouse gas avoidance or reduction from moving these goods by rail, as compared to trucks. As noted above, overall reductions in greenhouse gas emissions may not be achieved if trade continues to increase.

The Panel concludes that, if CN carries out the recommended mitigation measures, the Project is not likely to cause a significant adverse environmental effect resulting from greenhouse gas emissions or a significant adverse cumulative environmental effect.

The Panel finds that the Project itself would have relatively minor emissions of greenhouse gases, and by shifting long distance goods movement from trucks to trains, would remove 200 million truck kilometres off highways annually, likely resulting in a net cumulative reduction in greenhouse gas emissions.

5.3. Light

Subsection 6.1.1 of the EIS Guidelines required CN to provide baseline information regarding existing ambient nighttime light levels at the Project site and at any other areas where Project activities could have an effect on light levels. Subsection 6.2.1 required that CN describe any changes the Project would have on nighttime light levels. This section of the report deals with Project effects relating to light and summarizes the views of CN, participants and the Panel. For discussion on the effects of changes to nighttime light on outdoor recreational activities, see subsection 11.2.1.

5.3.1. Baseline light conditions and modelling

CN's Views

CN indicated that the Project would emit light at night during construction and operation. The Project would be a source of three types of obtrusive lighting effects: light trespass, glare and sky glow. While most construction would take place between 7 am and 7 pm, paving operations could occur 24 hours a day, seven days per week for a period of six weeks. Periodic night work might also be necessary, involving temporary lighting. The majority of that work would occur after berms had been constructed, which would mitigate effects of temporary lighting.

During the operation phase, the terminal would add background light to the area seven nights a week. CN assumed it would require thirty 30-metre high mast light fixtures (ten fixtures per pole) along the pad area and seventy-one 15-metre high light fixtures along the truck entrance and employee entrance

road and parking lot; the final number of lights to be confirmed during detailed design. CN indicated that Project lighting would be similar to lighting on a highway or at a highway interchange.

CN measured baseline light conditions at the Project site in 2014 and 2018 and then modeled predicted light levels at nearby residences, including light emitted both by the Project and by other projects and activities that have been or will be carried out in the area. Because there were no federal or provincial legal requirements that regulate the amount of obtrusive light emitted from development, CN used the *Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations (2003)* published by the International Commission on Illumination (participants also referred to this as the Commission Internationale de l'Éclairage). This guidance suggests maximum acceptable levels of light trespass and glare based on environmental zones and time of day. To determine the environmental zone classification for the Project site, CN measured existing sky glow and compared measured levels to values provided in a peer-reviewed article, published in 1976, which identified sky glow measurements for rural and urban environments. Using this reference CN concluded that the Project Development Area should be classified as Environmental Zone 3, described as a suburban environment with medium distinct brightness.

Though berms and landscaping elements could reduce transmission of light from the Project to nearby residences, CN did not consider this mitigation in its predictions because the final location of these elements would only be confirmed during the detailed design phase.

CN proposes various mitigation methods to minimize light effects during the construction and operation phases. These are discussed further in the Panel's conclusions below.

CN committed to measure light levels before the Project is constructed, during nighttime construction, and after the lights for operation had been installed. Otherwise, CN did not propose a follow-up or monitoring program for light because it believed the accuracy of the effects prediction and the effectiveness of mitigation measures would result in a low level of uncertainty.

In addition, CN committed to hire an independent lighting consultant to carry out observations and measurements when installing the lights to minimize light spill, verify light measurements once they are installed and ensure mitigation measures remain effective. CN would send a report with those observations and measurements to the Impact Assessment Agency of Canada.

CN stated that residents would be able to register light complaints through a complaints resolution process, or through the proposed Community Liaison Group. CN indicated that, should issues occur, corrective measures would be carried out so that the Project would not be a source of obtrusive light that exceeds the International Commission on Illumination guidelines. By adjusting the location of lighting masts and glare shields, CN expected that glare could be further reduced if required.

Participants' Views

Halton Municipalities stated that, although the region is already affected by sky glow, the local area is much darker than would be indicated by the suburban (E3) environmental zone classification selected by CN, and argued that therefore the baseline conditions in the Project area should be classified as a rural (E2) environmental zone.

5.3.2. Light trespass

CN's Views

Light trespass is the transmission of light from a facility to the environment outside the facility, for example, lights shining through the windows of nearby residential homes in the middle of the night.

The International Commission on Illumination's guideline for light from overnight operations in a suburban location (E3) for light trespass is 2 lux, and CN predicted that the Project would not exceed this guideline.

CN modeled light trespass due to Project terminal lights, truck headlights on the overpass toward Tremaine Road and truck headlights on site. The maximum predicted Project illuminance (the amount of light falling on a surface) due to terminal lights was 0.25 lux. The maximum measured light trespass due to truck headlights on the overpass toward Tremaine Road would be 0.1 lux immediately outside of the Project site. CN indicated that headlights from trucks exiting the terminal would be directed for a short period of time toward the planned mixed-use development north of Britannia Road. As the roadway would be lit, trucks would not be using high beams. CN indicated that light trespass at this intersection would be the same with or without the Project and that due to changes in lighting predicted in the area, the effect of truck headlights would likely not be noticeable and would not exceed the International Commission on Illumination's guideline for light trespass in a suburban environment. CN did not expect lights from vehicles on-site (trucks, trains, on-site loading and transfer equipment) to have a substantial effect due to the combination of the distance to the nearby residences and the presence of noise berms and trees.

CN disagreed with Halton Municipalities' comparison of light trespass effects on the brightness of moonlight to define magnitude of effect and indicated that it would be more appropriate to compare the Project's light effects on street lighting.

CN indicated that the Project would cumulatively add to trespass lighting from multiple sources including planned housing subdivisions immediately north of Britannia Road and future road expansions, and that these other sources would affect residents substantially more than the planned terminal lighting. The cumulative light trespass that would be likely to result from the Project in combination with projects and activities that have been or will be carried out was predicted to be greater than the International Commission on Illumination's 2-lux guideline at four nearby residences: two houses on Tremaine Road (receptors number POR006 and POR008), and two houses on Lower Base Line (receptors number POR011, and POR019).

CN said that, if necessary, supplementary mitigation could include shading elements such as five-metre high berms, barriers and vegetation. For example, CN indicated that berms would help minimize light trespass from low level vehicle headlights.

Participants' Views

Halton Municipalities stated that without knowing the exact location of berms or vegetation it would not be possible to quantify the effectiveness of the mitigation measures. Halton also argued that CN's assessment of light trespass due to vehicle headlights was not a worst-case scenario because it did not analyse effects from high beam headlights and modern high intensity headlight technologies.

Halton Municipalities agreed that the Project's light trespass would not exceed the International Commission on Illumination's guideline, but maintained that, nonetheless, the predicted effects represented a dramatic increase above the current values. They explained that nine of the 27 receptors would experience the equivalent of approximately half of the illumination of a full moon or an increase of four times the brightness compared to the baseline conditions. Two residences would experience the equivalent of full moonlight or a 40 times increase in brightness if the Project were built.

Halton Municipalities argued that light trespass effects from lights from non-Project roadway or area lighting would affect a smaller geographical extent because those luminaires would be mounted at heights of 10 to 15 metres as opposed to the Project's 30-metre high mast light fixtures in the pad area.

5.3.3. Glare

CN's Views

Glare is intense, harsh, or contrasting lighting conditions that reduces people's and animals' ability to see; for example, high beam headlights that result in poor visibility for people looking in the direction of the light.

The International Commission on Illumination's guideline for glare at night in a suburban location (E3) is 1,000 cd. CN's assessment of glare from the Project alone predicted that the 1,000 cd guideline would be exceeded at two locations: a house on Lower Base Line and at a house on Tremaine Road. However, CN said that it would ensure that the guideline is met at all nearby residences when lights are installed, by implementing site-specific mitigation measures. This could involve modifying the lighting layout or adding glare shields in such an event.

In response to Halton Municipalities' comparison of glare to the brightness of a star to define magnitude of effect, CN stated that it is not appropriate to use such a comparison because astronomical bodies like stars do not result in glare effects.

CN indicated that, when considering projects and activities that are occurring or will be carried out, the Project would cumulatively add to glare effects from multiple sources including planned housing subdivisions, other planned industrial or residential development, roadways, future road expansions, and the proposed roadway lighting that would be built around the Project Development Area unrelated to the Project.

The cumulative glare that is likely to result from the Project in combination with projects that have been or will be carried out was predicted to be greater than the International Commission on Illumination's 1,000 cd guideline at six nearby residences: three houses on Tremaine Road and three houses on Lower Base Line.

Participants' Views

Halton Municipalities indicated that the International Commission on Illumination's guideline can be interpreted to allow light sources up to 460 times brighter than the brightest star in the night sky. Furthermore, they said that, when compared to current conditions where very few areas have direct visibility of lighting of any significant brightness, the Project's glare effects would have a comparatively high level of effect. They indicated that due to the height of the Project's luminaires, the light would be

visible over a large area. The brightness of a single light fixture mounted on the 30-metre poles could appear brighter than the brightest star in the night sky out to a distance of approximately 8 kilometres.

Despite its critique of the International Commission on Illumination's guidelines, Halton Municipalities again argued that the applicable guideline for glare effects should be based on a darker rural baseline (E2) rather than the suburban baseline (E3).

In defense of its planned developments for the area, Halton Municipalities argued that glare effects from lights from future physical activities, including roadway and area lighting, would be of lower magnitude and affect a smaller geographical extent compared to the Project lights. Halton Municipalities indicated that typical light output for roadway and area lighting would be of approximately 27,000 lumens per fixture, compared to the Project's approximately 550,000 lumens per fixture. Roadway and area lighting are usually mounted at heights of 10 to 15 metres, which limits glare to areas within 100 to 200 metres of each light. In addition, Halton Municipalities argued that at ten metres tall, the fixtures will most likely be blocked from long distance views by nearby structures and vegetation. This would be less likely for the Project luminaires that would be 30 metres above ground.

Halton Municipalities stated that use of amber lights, which they recommended to reduce sky glow, might also reduce glare.

5.3.4. Sky glow

CN's Views

Sky glow is the illumination of the sky or clouds by light sources such as street lighting and haze in the atmosphere that replaces the natural nighttime sky (and stars) with a translucent to opaque lighted dome.

CN indicated that the International Commission on Illumination provides guidance to limit sky glow by providing a recommended maximum limit on upward light ratio, which is the percentage of light emitted at or above the horizon. The maximum guideline for overnight operation in a suburban location (E3) for sky glow is a 5% upward light ratio. CN indicated that the Project design has a 0% upward light ratio and that the Project by itself would be responsible for only 1% of the expected 2021 sky glow, which would be an average decrease in sky quality equivalent to 0.1 mag/arcsec².

CN proposes to use full cutoff luminaires that are downcast and prevent light from being directed upward. These are therefore considered to be dark sky friendly.

CN indicated that sky glow is assessed by focussing on the zenith, which is the portion of the sky that is useful for star gazing. CN conducted sky glow measurements in 2014 and 2018 and noted an average decrease of 0.3 mag/arcsec² in sky quality caused by the increase in sky glow between those years. CN attributed this decrease in sky quality to illumination from new residential subdivision lighting and new street lighting near the Project site. CN predicted that between 2014 and 2031, sky quality in the area would decrease by approximately 1.0 mag/arcsec², and that the Project's contribution to the total change would be approximately 10%. CN indicated that existing lighting, Project lighting and future lighting are part of a consistent trend where the sky quality values are decreasing over time, as development in the urbanizing environment continues.

In response to Halton Municipalities' arguments that the Project would cause a substantial increase in sky glow, CN indicated that Halton Municipalities' assessment had overestimated the effect of the Project on sky glow as it relied on outdated baseline measurements and omitted some recent developments that have contributed to sky glow.

Participants' Views

Halton Municipalities argued that since CN measured changes to sky glow at the zenith, their effects assessment underestimated the effect of the Project on sky glow. They argued that the Project would cause an increase in sky brightness near the horizon that would double the current baseline conditions, visible approximately 6 kilometres from the Project boundary.

Halton Municipalities agreed that fully shielded fixtures that block light from shining upward, as planned by CN, are effective in reducing sky glow by at least 50%. Halton Municipalities' expert recommended that CN consider the use of amber lights that would further reduce sky glow up to 70%, because amber lights produce approximately one-third of the sky glow of the white LED light source proposed for the Project. Halton Municipalities suggested that cost implications would be minor in terms of energy usage when using amber lights as opposed to white LED lights. In response CN noted this was an interesting suggestion and agreed to investigate amber light technology.

Halton Municipalities indicated that future physical activities including new roadway and area lighting would also contribute to sky glow, exceeding the Project's contribution.

5.3.5. Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on light trespass, glare and sky glow the Panel considered the following factors to be particularly relevant:

- CN only used sky glow measurements, not light trespass or glare, to determine that Environment Zone 3 (E3) was the correct characterization of the existing baseline area around the Project site.
- There was disagreement between CN and Halton Municipalities as to whether baseline conditions were more comparable to an urban (E3) or rural setting (E2). Depending on the darkness of baseline conditions, the annoyance represented by increases in light trespass and glare from Project lighting would vary.
- The Project would insert a concentration of industrial light masts into a relatively dark existing environment. The 30-metre height would exceed the height of other lighting sources in the vicinity.
- CN carried out its assessment of light trespass effects without taking into account some mitigation measures (including berms, barriers and plantings) because decisions about where these would be located would be made during the detailed design phase.
- Both CN and Halton Municipalities agreed that the Project itself was not likely to result in an exceedance of the International Commission on Illumination's 2 lux guideline for light trespass, although Halton Municipalities said that the increases in light levels at 29 receptors would be dramatic. CN predicted that four residences would experience cumulative light trespass effects that exceed the guideline of 2 lux.
- CN has predicted that Project glare effects would exceed the International Commission on Illumination's E3 guideline of 1,000 cd at two residences, and at a total of six when cumulative effects were taken into consideration.

- Both CN and Halton Municipalities agreed that planned developments in the area (roadway expansion and new residential areas) would increase the overall ambient lighting in the area around the Project, affecting light trespass, sky glow and glare levels.
- CN predicted that the Project's contribution to sky glow changes would be less than 1% of sky glow in 2021, and approximately 10% of the anticipated increase in sky glow that is likely to occur between 2014 and 2031 from non-Project-related activities.
- CN stated that its proposed mitigation measures, including focusing lights downwards and inwards, installing glare shields and relocating individual light masts, would ensure that guideline for glare would be met for each residence in the vicinity of the Project.
- Halton Municipalities' expert recommended consideration of amber lighting as a cost-effective measure to further diminish effects on glare and sky glow. CN agreed to investigate this technology.

The Panel observes that CN and Halton Municipalities differed in their views on how the existing light baseline should be characterized and therefore what International Commission on Illumination guideline should be met for light trespass and glare. CN surveyed baseline sky glow conditions, concluding that the E3 suburban guideline was correct. Halton Municipalities maintained that the area is in fact still rural and felt that an E2 rural designation was more appropriate. The Panel understands that both could in fact apply. The area close to the Project Development Area is currently mainly agricultural in character but subject to higher levels of lighting from neighbouring development.

The International Commission on Illumination's E3 suburban zone guideline for light trespass is 2 lux. Halton Municipalities argued that an E2 rural zone would be more appropriate and therefore that a guideline of 1 lux should apply. The Panel notes that CN's predictions show that residences in the vicinity of the Project would not receive more than 1 lux of trespass light from the Project alone and would therefore meet the International Commission on Illumination's guideline for both a rural and a suburban setting. The Panel therefore concludes that CN must ensure that its light trespass effects do not exceed its prediction of 1 lux of trespass light and therefore the International Commission on Illumination's guideline for an E2 rural zone should apply.

The International Commission on Illumination's E3 suburban zone guideline for glare is 1,000 cd. Halton Municipalities has argued that an E2 rural zone would be more appropriate, and that the E2 guideline of 500 cd should instead apply. The Panel was not provided with an analysis of light glare predictions compared to the International Commission on Illumination's E2 guideline. Given that glare at two residences is likely to exceed the less stringent E3 guideline, the Panel considers it likely that glare at a greater number of residences would exceed the E2 guideline during Project operations. However, the Panel is persuaded that CN's mitigation measures could address specific instances of glare, and therefore concludes that CN must ensure that glare from Project lights does not exceed the International Commission on Illumination's E2 guideline of 500 cd.

The Panel concludes that the Project would contribute to an increase in sky glow, and that there is growing awareness of the value of dark skies and the need to minimize the contribution of outdoor lighting to this continued increase. The Panel notes CN's commitment to use dark sky friendly luminaire technology, and CN's intention to look into the use of amber lighting. As the issue was raised for the first time at the public hearing, the Panel was not provided with detailed evidence about the effectiveness of these technologies. The Panel considers, however, that the predicted benefits warrant serious evaluation, and that amber lighting should be used for the Project unless there is convincing evidence that it does not substantially reduce sky glow or glare, has negative effects on wildlife or would result in

the safety of individuals on CN's property being compromised. The Panel believes the Project could serve as a demonstration example for other developments if use of amber light technology is demonstrated to have the predicted benefits.

The Panel believes that there are a range of measures available to address light trespass and glare problems that arise during the construction phase, up to and including not scheduling nighttime activity in specific locations. It would be essential that a qualified environmental light expert be employed during the detailed design stage; that CN's complaints and community liaison processes be easy to access, and are transparent and effective; and that residents have recourse to an independent body if complaints are not satisfactorily resolved (see Recommendation 15.3 detailed in Section 15).

CN expressed its own satisfaction with the reliability of its predictions and therefore did not propose to monitor light effects, although it committed to carry a single set of light measurements before and after the Project is built and also during the construction phase. However, the Panel believes that more extensive monitoring is warranted during the first year of operation.

The Panel concludes that CN has proposed mitigation that, if rigorously applied, would ensure that the effects of light trespass, sky glow, and light glare would remain at a low to moderate level, below the International Commission on Illumination's applicable guidelines. The Panel also observes that, if these guidelines are not met, and if additional mitigation does not address the exceedances satisfactorily, a significant adverse environmental effect is possible. To mitigate such an effect, there would always be the option to reduce or reverse light effects by curtailing nighttime construction or operation. The Panel understands that this would be a significant move, likely to be opposed by CN, but nonetheless it should remain as a backstop measure if the effects of changes in lighting exceed International Commission on Illumination's applicable guidelines.

The Panel's conclusions regarding the effects of changes in light to wildlife and socio-economic conditions are presented in Sections 10 and 11.2.

CEAA Recommendation 5.6 — Light objective to be achieved

The Panel recommends that CN ensure that light trespass and glare from the Project do not exceed 1 lux and 500 cd respectively at neighbouring properties. The Panel further recommends that CN measure the ambient lighting before the Project is built and submit the measurement methodology and results to the Impact Assessment Agency of Canada for verification. If ambient light levels in the Project area exceed the International Commission on Illumination E2 rural guideline for light trespass or glare, CN should instead mitigate the Project's obtrusive lighting to the International Commission on Illumination E3 suburban guidelines (2 lux for light trespass and 1,000 cd for glare) instead of the E2 rural guidelines.

CEAA Recommendation 5.7 — CN should implement the mitigation it has committed to undertake for light

The Panel finds that CN's commitments to implement mitigation measures for light are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- Ensure terminal lighting design will be as efficient as possible, while providing enough light for on-site safety.
- Direct any perimeter lighting inward toward the terminal to minimize potential light trespass.
- Use down-cast, full cut-off lighting equipment fixtures that are dark sky friendly and minimize horizontal component of light.
- Direct construction lighting at the specific construction location (nighttime construction).

- Reduce lighting in areas not being used for construction activities.
- Fit individual fixtures with specific glare mitigation, such as side shields, as required.
- Supplement mitigation through lighting design, strategic shading elements (berms, barriers and vegetation).

CEAA Recommendation 5.8 — Additional mitigation to reduce obtrusive lighting

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following additional mitigation measures:

- Retain an environmental consultant with relevant lighting experience to direct lighting decisions during the detailed design stage.
- Within operational safety limits, require truck drivers to dim headlights when inside the facility, and monitor compliance.

CEAA Recommendation 5.9 — Use of amber lighting to reduce sky glow and glare

The Panel recommends that CN employ amber lighting technologies in outdoor lighting fixtures, wherever feasible, to reduce sky glow and glare. In order to determine feasibility, CN should conduct a technical analysis of the effectiveness of amber lights, possibly through a demonstration project. The results of this investigation should be shared publicly with the Impact Assessment Agency of Canada, Environment and Climate Change Canada, and the Community Liaison Group. If this investigation demonstrates that significant further reductions in the Project's contribution to sky glow and glare can be achieved at a reasonable cost, while meeting operational requirements, through the use of amber lighting, the Panel believes this information would benefit CN in its operations at other intermodal terminals, and also assist other proponents in managing the effects of obtrusive lighting.

CEAA Recommendation 5.10 — Follow-up program for light

The Panel recommends that CN develop and implement a follow-up program for light. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should:

- monitor light trespass and glare during the construction phase and during the first year of operation and ensure results meet or surpass the E2 rural zone guidelines; and
- report the results of the light trespass and glare monitoring to the Impact Assessment Agency of Canada and the Community Liaison Group.

As part of the follow-up program, CN should consult with both the Town of Milton and with the residents living in the four houses where light trespass guidelines could be exceeded, when considering projects that have been or will be carried out, to ensure that appropriate mitigation is installed and that cumulative light effects do not exceed the International Commission on Illumination E2 rural guideline.

The Panel concludes that, if CN carries out the recommended mitigation measures, the Project is not likely to cause a significant adverse environmental effect on nighttime light levels.

With the application of the mitigation measures recommended by the Panel, the Project effects on light trespass are expected to be below 1 lux, glare is expected to be below 500 cd and the Project's contributions to sky glow are not expected to exceed 1% of sky glow in 2021 and into the future.

Cumulative Effects

Both CN and Halton Municipalities anticipated that the Project would combine with future planned developments in the area, including roadway expansion and new residential areas, to increase the overall ambient lighting in the area around the Project. CN predicted that, in the future, the Project's lighting would combine with lights from those future developments, and that lighting affecting four residences would exceed the International Commission on Illumination's guideline of 2 lux for light trespass. Likewise, CN anticipates that lighting affecting six residences would exceed the 500 cd guideline for glare when considering future urban developments.

CN anticipated that its contribution to increased sky glow, currently predicted to be 1% of the existing sky glow contribution, would account for approximately 10% of the total increase expected between now and 2031, resulting in sky glow levels between 18.00–18.62 mag/arcsec². The Panel concludes that the Town of Milton light environment has been changing in recent years, and is expected to continue to change as the Town continues to grow. The associated increases to the lighting of the area have likely been considered and accepted as a consequence of urban development in the area as part of the town and regional planning process. Participants did not seem particularly concerned about the cumulative levels of sky glow anticipated for the Town of Milton as it continues to grow. Given the Project's relatively minor contribution to sky glow, the context of rapid regional development, and that there is no recognized threshold for lighting effects from sky glow, the Panel does not consider the cumulative effects on the light environment to be significant. However, the Panel notes that benefits for humans and wildlife exist if these effects are minimized and so the Panel also reiterates the importance of embracing amber light technologies, if technically and economically feasible, to reduce sky glow and glare.

The Panel concludes that, in combination with other projects and activities that have been or will be carried out, the Project is not likely to cause a significant adverse cumulative environmental effect on nighttime light levels.

6. Noise and Vibration

This section addresses changes to the noise environment, including effects of vibration. The Panel considers these to be environmental effects under subsection 5(2)(a) of the *Canadian Environmental Assessment Act, 2012*, in consideration of the potential determination of the Canadian Transportation Agency with respect to the Project. Section 3 of the Review Panel Terms of Reference requires it to take into account the environmental effects of the Project.

6.1. Noise

Subsection 6.1.1 of the EIS Guidelines required CN to provide baseline information regarding current ambient noise levels at key receptor points, and subsection 6.2.1 required that CN describe any changes the Project would cause to ambient noise levels. This section of the report deals with Project effects relating to noise and summarizes the views of CN, participants and the Panel. For discussion on the effects of changes to noise on human health, see subsection 11.1.4.

6.1.1. Ambient noise levels

CN's Views

CN collected baseline (ambient) sound level data in the vicinity of the Project to quantify the existing acoustic environment at existing residences, existing subdivisions, and the location of future residential developments using calibrated sound level meters.

CN stated that the current daytime and nighttime ambient noise environment was dominated by noise from railway operations along the mainline railway corridor (the existing 25–30 trains per day), urban hum associated with development located north of the Project area, and vehicular traffic. CN indicated that the existing sound level conditions were typical of a suburban acoustical environment, ranging between L_{DN} (level day, night) of 53 to 77 decibels (dBA). The L_{DN} is the energy average noise level over a 24-hour period, with a bias of + 10 dB applied to the nighttime hours before averaging. This bias reflects the greater sensitivity or responsiveness of the community to noise effects during the night.

CN stated that the measurement periods were selected so that precipitation, humidity and temperature would not affect the measured ambient noise levels. CN also stated that there were no extreme weather events of concern limiting the performance of the measurement system or artificially elevating the ambient sound level during the measurement periods. CN stated that conditions during data collection were considered appropriate by acoustical experts and the measured background noise levels were considered typical for the area.

CN claimed that the number and distribution of receptors provided a comprehensive representation of all existing and future residential areas that may be affected by noise from the Project.

In response to concerns raised by a number of participants, including Halton Municipalities and Health Canada, CN conducted additional noise modelling and confirmed that the measured baseline noise levels, ranging between L_{DN} of 53 to 77 dBA, used in the environmental assessment were appropriate.

Participants' Views

Health Canada, in its comments on the sufficiency of the information on the Panel's record, suggested that due to uncertainties in model predictions, the measured baseline conditions should be validated with modeling at all points of reception.

Halton Municipalities suggested that noise from birds and insects during the summer may result in an overestimation of ambient noise levels during the rest of the year and therefore an underestimation of facility effects. Halton Municipalities was also concerned with the selection of weather data locations. In their view, the inclusion of adverse weather conditions would result in artificially high ambient levels and lead to an underestimation of Project effects.

A number of participants disagreed with CN's view that the raw data and subsequent analysis had not been contaminated by inclement weather conditions, birds, insects, and wildlife events that might have elevated the ambient background noise levels. The participants pointed to Health Canada's guidance that indicated that noise contributions from all seasonal noise sources must be excluded from the measured baseline noise levels. The participants suggested that CN validate the ambient background levels through noise modelling.

6.1.2. Noise modelling

CN's Views

CN assessed the potential effects of operational and construction noise using the noise modelling software package CADNA/A, Version 2014, with algorithms contained in the Federal Transit Administration's traffic noise methodology, as well as the ISO 9613-1 and ISO 9613-2 standards from the International Organization for Standardization's publication *Attenuation of sound during propagation outdoors - General method of calculation*. CN provided additional details on the modelling parameters including terrain effects, ground absorption, meteorological conditions, and barriers.

CN indicated that its assessment included Project-related noise from stationary and transportation sources. Stationary sources are mainly continuous in operation and generally remain in one location; these typically include the sources within the terminal operation. Transportation sources include mobile activities such as train passbys, truck and crane movements in the terminal and the majority of construction activities which would occur at various locations within the study area. CN indicated that the guidelines suggested by Halton Municipalities do not allow for the joint consideration of both transportation and stationary noise sources, a scenario that applies to the Project.

CN took into consideration various points of reception (receptors), including existing residences and future residential developments. In choosing the location for the receptors, CN considered that homes close to the railway line in this area would have the greatest potential to be affected by Project noise. While homes located within the interior of the proposed residential development could have quieter levels of background noise from the railway and road traffic, those interior locations are also likely to be shielded from Project-associated noise by the other buildings around them. However, homes located near the railway line would not benefit from that additional shielding, and would be exposed to greater noise levels. CN concluded that these sites would reasonably be expected to be the worst case locations and would therefore provide the most conservative assessment.

CN assessed changes in the acoustical environment for both construction and operations against criteria from the U.S. Federal Transit Administration and Health Canada. The U.S. Federal Transit Administration criterion allows for assessment of the changes in acoustical environment due to the Project, and evaluation of whether the change could be considered an allowable noise exposure increase. If the change meets or is below the allowable noise exposure increase, the Project noise effects are considered to be acceptable. The Health Canada criteria provide objectives for noise levels based on day–night equivalent sound levels (L_{DN}) and percent annoyance. As a metric, percent highly annoyed is a measure of community response to noise that recognizes that there are differences in the way individuals perceive noise.

CN argued that the criteria used provided comprehensive standards to support the noise assessment, and there was therefore no need to consider other guidance or standards. CN indicated that the Project is federally regulated, and operational effects have been assessed consistent with the Canadian Transportation Agency's *Railway Noise Measurement and Reporting Methodology*. CN stated that the Canadian Transportation Agency's methodology is protective of human health and addresses impulsive sound and tonality of noise sources. CN also stated that the *Guidelines for New Development in Proximity to Railway Operations* by the Federation of Canadian Municipalities and the Railway Association of Canada (Railway Association of Canada and Federation of Canadian Municipalities guidelines) are not intended for use in the development of railway operations in proximity to existing land uses; instead that guidance is for the consideration of future developers in their land use planning applications to municipalities. In addition, with respect to the provincial *Environmental Noise Guideline – Stationary and Transportation Sources - Approval and Planning*, Publication NPC-300, dated August 2013 (NPC-300), CN indicated that such guidelines are applicable to new developments encroaching on existing land uses (including railway facilities) that would have to comply with the sound level limits and mitigation requirements for approval of their development by the Town of Milton.

CN noted that the provincial NPC-300 guidelines specify that they do not apply to federally-regulated railway yards. Similarly, the Town of Milton Bylaw and the Railway Association of Canada and Federation of Canadian Municipalities guidelines do not include methodology to address the operations of a railway yard. The Railway Association of Canada and Federation of Canadian Municipalities guidelines identify that applicable federal regulations are used to assess new railway facilities.

CN stated that Halton Municipalities' suggestion of using additional guidelines require higher standards for the noise assessments, but disagreed that these were a higher standard. CN stated the criteria it applied were the most closely linked to noise exposure and human response based on the available research. Further, these criteria allow the assessment of the combined influence of all source types from the proposed facility, and provide for comparison of the results to established health-based criteria.

Unlike the parameters used in provincial guidelines, CN indicated that the Health Canada criterion relies on the L_{DN} metric, which is health-based. According to CN's noise analysis peer review, such an approach is consistent with most major national guidelines including in Canada, the USA, and the European Union. CN also noted that the L_{DN} parameter includes conservatism by adding a 10 dB adjustment to the nighttime component. Thus, CN argued that sounds during the night have a greater contribution to the L_{DN} to reflect when populations are more sensitive to noise.

With respect to noise effects from activities on the mainline north of Britannia Road, CN suggested that the noises that would occur north of Britannia Road would be similar to the types of noise generated by existing mainline operations. CN stated that the municipality had already approved residential land use in areas within 300 metres of the existing mainline tracks, which have been there for more than a hundred years. CN therefore disagreed that a 300-metre separation distance between the railway tracks and the subdivision would be required. CN stated that the municipality's approval of residential development much closer to the mainline than 300 metres signalled their understanding that standard setback mitigation measures, such as noise barriers, would be effective.

Participants' Views

Halton Municipalities indicated that CN should provide additional information on the computer model it used in the assessment, in order to understand how the calculations and analyses were performed. Halton Municipalities also stated that other federal, provincial and municipal noise guidelines are applicable to the Project and should have been used for assessing stationary noise, including the Canadian Transportation Agency methodology, provincial NPC-300 (which sets out relevant criteria and assessment methodologies, and requires assessment of the worst-case hour rather than the 24-hour average), provincial NPC-115 (which outlines sound emission standards for construction equipment), the Town of Milton Noise Bylaw, and the Railway Association of Canada and Federation of Canadian Municipalities proximity guidelines. In addition, Halton Municipalities were of the view that the proposed intermodal terminal is a stationary source of sound and should therefore be assessed against a 1h equivalent continuous sound level (L_{eq}).

Halton Municipalities also stated that the assessment technique was inconsistent with the Canadian Transportation Agency methodology that recommends using hourly sound exposures to assess stationary noise sources. Halton Municipalities further stated its opinion that, although the Railway Association of Canada and Federation of Canadian Municipalities guidelines note that evaluations of new railway facilities or significant railway expansions are conducted in accordance with applicable federal regulations, this did not prevent other guidelines from being used as well. Halton Municipalities stated that the provincial guideline's approach provides a more rigorous assessment than the guidelines considered.

During the hearing, Halton Municipalities indicated that additional points of reception should be included to take into consideration the fact that the total noise level experienced by residents changes with different points of reception. As an example, Halton Municipalities recommended that additional points of reception be included in the centre of certain development areas. The contribution of the mainline noise versus the facility noise, as Halton Municipalities explained, would vary depending on the location.

Prior to the hearing, several participants suggested that CN should consider provincial NPC-300 guidelines and seek a third-party, unbiased peer review to validate the guidelines used, measurement methodology, calculations, modelling accuracy, and proposed mitigation measures. One participant stated that without this peer review, there is no way for the public to trust the CN noise and vibration reports. In response to these comments CN hired a company to review its work ahead of the hearing; that company provided its analysis as a written submission to the Panel and appeared at the public hearing.

6.1.3. Construction noise effects

CN's Views

Construction activities would include excavators, loaders, graders, concrete plant, dump trucks, mobile cranes, pile driving and other equipment. CN modelled the construction activities in three phases based on a preliminary construction schedule and estimated that construction would occur over 18 to 24 months.

CN stated its noise modelling had conservatively assumed that all construction equipment units would operate simultaneously. CN indicated that the majority of construction activities would occur during the daytime with some construction work extending to 9 pm, on occasion. During Phase 3 of construction, paving operations may occur continually during day and night.

CN noted that the changes in acoustical environment were assessed against U.S. Federal Transit Administration and Health Canada's criteria for all three construction phases to establish whether the effects were acceptable. CN indicated that with noise mitigation measures in place, the Project's noise effects would meet both the U.S. Federal Transit Administration and the Health Canada criteria and therefore the noise effects of the Project would be acceptable.

CN indicated that noise mitigation measures would include limiting the overall sound power level of the generators used for construction activity to 107 dBA for each individual unit, and a temporary sound barrier around the concrete batch plant for Phase 3 paving operations. CN also proposed to implement best noise management practices to minimize construction noise, which could include:

- major construction activities, where possible would be scheduled to take place during daytime hours;
- mufflers equipped on construction vehicles;
- noise mitigation measures, such as muffler systems, installed on construction equipment would be properly maintained;
- construction equipment would be turned off when not in use, for example a no idling policy;
- in case of a complaint during construction, CN would investigate expeditiously and take appropriate action to ensure that the issue is managed responsibly;
- on-site vehicle traffic would be restricted to approved access routes to and from the Project site area;
- vehicles would be routinely maintained and serviced to ensure proper operation;
- enforcement of speed limits (for truck traffic) within the Project area to reduce the intensity of impulsive noise;
- installation of broadband backup alarms;
- contractors would be instructed to minimize tailgate slams. CN would have monitors on site to address any issues; and
- signage around the terminal, site monitors, and instructions to personnel to ensure compliance with CN's anti-engine braking policy.

CN clarified that the concrete batch plant was modelled as a point source, and railway liners, tampers, and regulators as line sources. CN indicated that it modelled the remaining construction sources, such as

dump trucks, graders excavators, etc., as area sources assuming that such construction equipment could operate anywhere within the Project Development Area. CN stated that modelling construction equipment as fixed concentrations of noise sources at certain locations closer to the receptors (Points of Reception or PORs) for extended periods of time would not represent a realistic scenario.

In response to concerns from Halton Municipalities, CN conducted additional noise modelling for the construction of the Lower Base Line grade separation and demonstrated that all points of reception would meet the noise criteria for the Project, with the exception of one house on Tremaine Road (G1-POR011) and one house on Lower Base Line (G1-POR018). To address the predicted exceedance of 1 dB above the U.S. Federal Transit Administration noise criterion, CN proposes to install hoarding (a temporary noise barrier, three metres to five metres in height) around the construction site. CN indicated that the hoarding would be wood construction, with a solid façade and no large openings.

Proposed Mitigation Measures and Monitoring

CN committed to a communication protocol to inform the local community of the different construction stages and the work that would be happening on the site (for example, a website would be set up, newspapers ads would be placed, nearby residents would be notified by mail, and there would be dedicated information lines including an information centre, phone line, and email address). CN also committed to establishing a Community Liaison Group to facilitate ongoing dialogue with the community regarding Project activities. CN would communicate its complaint process through this Community Liaison Group prior to and during construction. Additional discussion of the proposed Community Liaison Group is provided in Section 15 (Environmental Management).

CN stated that construction noise monitoring would be undertaken during the first four weeks of the construction phase, and the results compared to the predictions and applicable guidelines. CN indicated that it is committed to implementing a noise monitoring program and would address noise complaints should they arise. Noise monitoring results would be submitted to the Impact Assessment Agency of Canada.

Participants' Views

Health Canada observed that CN has only planned a noise audit during Phase 1 of construction. Health Canada claims that noise auditing during a short time frame may not capture important noise events. Health Canada explained as an example that nighttime work activities during Phase 3 would not be captured. Health Canada recommends that CN conduct noise audits during all three phases of construction and periodically during operation.

Halton Municipalities was of the view that certain types of construction operations would be localized in one area for much of the construction phase, with significant amounts of equipment operating for extended periods of time, including equipment associated with:

- the construction of the grade separation at Lower Base Line and the on-site overpass over the CN mainline;
- construction of facility buildings; and
- pipeline relocation and horizontal directional drilling.

Halton Municipalities further stated that these activities would occur near clusters of existing residences, though they did not identify the specific location of the residences of concern. Halton Municipalities suggested that treating these sources as part of an overall area source instead of as point sources would likely under-predict construction noise effects. Halton Municipalities stated that CN should reassess the localized construction operations in proximity to clusters of existing residences.

During the hearing, Halton Municipalities indicated that it is not concerned with noise effects due to construction activities and are of the view that these effects can be adequately controlled.

6.1.4. Operational noise effects

Terminal operations

CN's Views

CN stated that noise sources associated with Project operations could include container movement operations, train assembly and generators associated with thermally controlled containers and other equipment. CN noted that the 85% of truck movements would be expected to occur during regular business hours, with peak operation occurring mid-day between approximately 10 am and 1 pm. Although CN explained that typical operation might be heavier during regular business hours, this assessment conservatively assumes that there are no significant differences between daytime and nighttime operations except with respect to incoming and outgoing truck traffic.

CN stated that the mainline railway traffic noise sources, which would occur 24 hours a day, seven days per week, for Project operations were modeled using the U.S. Federal Transit Administration methodology. CN stated that according to the U.S. Federal Transit Administration, as the existing noise exposure increases the allowable change in noise exposure levels decrease. For the Project, given existing noise levels, the allowable change would be 1-5 decibels. CN noted that the railway traffic is only expected to increase by two trains per day from the existing volume — among the four terminal trains, two already move along the Halton Subdivision mainline. In addition, CN confirmed that the mainline speed limits, train types, train traffic volume, and whistle procedures would remain unchanged in the future.

Before the hearing, in response to questions regarding the noise model, CN made additional modelling refinements including higher noise emission values for locomotives consistent with values provided by the Canadian Transportation Agency methodology, additional receptors, adjustments to receptor heights, adjustments to existing and future barriers, inclusion of backup alarms at the truck parking lot, updated elevation contours, removal of shunting noise source as no shunting was expected, and the addition of railway coupling noise. The updates and refinements to the operational noise model resulted in no additional administrative or physical noise mitigation being required beyond those CN had initially identified.

CN noted that the expected idling time of the four terminal trains would be less than one hour per train. For assessment purposes, CN indicated that the trains were conservatively assumed to operate 24 hours per day. CN also stated that wheel squeal noise would not occur at the facility because there would be no curves in the Project that would cause this type of noise.

CN indicated that a penalty (higher weighting) was applied in modelling impulsive noises, to recognize that such noises might cause greater disturbance or annoyance than other types of noise. CN clarified that there would be no shunting, humping or kicking of cars at the proposed terminal. Therefore, the only type of impulsive noise would be limited low-speed impulsive coupling noises associated with doubling over. CN therefore removed the shunting/train assembly noise source in the operational noise model. CN stated that although the coupling activities would be impulsive, they would be infrequent and not have a high degree of intrusiveness, and therefore a +5 dB penalty was considered appropriate.

CN noted that whistle cessation is in place on several crossings in this area. Railway crossings at Derry Road, Britannia Road, Lower Base Line, and Tremaine Road all have anti-whistling procedures in effect; however, whistling is required at the railway crossing at Burnhamthorpe Road West. CN explained that the whistling requirements would be expected to remain unchanged at all of the listed crossings.

CN assessed the changes in acoustical environment against U.S. Federal Transit Administration and Health Canada's criteria to establish whether the effects are acceptable. The assessment indicated that with noise mitigation measures in place, the Project's noise effects would meet both the U.S. Federal Transit Administration and Health Canada's criteria. However, through additional analysis in response to questions about low frequency noise, CN confirmed that low frequency noise due to idling trains, while not an issue at most locations, could potentially be an issue at closer locations with the potential for rattling inside the buildings. CN pointed out that these results indicate only the potential for rattling; the actual experience would depend on the nature of the particular building. Rattling would only occur if there are sympathetic resonances in that construction and where there are objects such as plates that could be affected by rattling.

CN indicated that noise mitigation measures could include administrative controls such as enforcing speed limits to avoid the need for engine brakes and training equipment operators. Physical noise mitigation measures include berms, barriers, and enclosure of noise sources. CN stated that it could also opt to select quieter equipment, or a combination of all three options.

CN indicated that, with these mitigation measures in place, the noise from terminal operations would be concentrated at the highest levels within the Project Development Area, and would decrease to a much lower level outside the area.

CN stated that extremely high noise barriers would not be needed to reduce facility noise to acceptable levels. Physical measures would include five-metre high barriers at strategic locations around the terminal to reduce the noise to meet the Health Canada and the U.S. Federal Transit Administration criteria. The proposed locations of the berms are shown in Figure 1-2: Preliminary Design of the Milton Logistics Hub Site Plan.

CN predicted that the overall sound power level for the power pad generators would not exceed 106 dBA (total sound levels from the exhaust, casing, air intake, and discharge). In addition, CN proposes to implement noise management practices to minimize operational noise, which include:

- enforce speed limits (for truck traffic) within the Project area to reduce the intensity of impulsive noise;
- adoption of anti-idling and anti-whistling policies;

- train or instruct CN employees that operate container handling machines such as reach stackers operators) to avoid excessive impulsive noise during loading and unloading operations;
- consider installation of broadband backup alarms;
- signage around the terminal, site monitors, and instructions to personnel to ensure compliance with CN's anti-engine braking policy; and
- housing the generators inside a building or structure to reduce noise, including the backup generators or compressors.

In addition, CN stated that its locomotives are equipped with SmartStart technology which would reduce idling times in the terminal.

During the hearing, CN clarified that the noise berms, indoor generators and noise policies and procedures would be in place early, before the start of operation. The berms, for example, would be installed in the first phase of construction.

Participants' Views

Health Canada stated that low frequency noise is typically considered to include frequencies below 200 Hertz. Because low frequency noise has very long sound waves, it easily passes through and around barriers without significant reductions. Once indoors, it can interact with lightweight structures, causing rattles and vibrations. Health Canada explained that the human ear is relatively insensitive to low frequency noise in comparison to higher frequencies. However, once low frequency noise is detectable, people tend to have an extremely low tolerance to it, and additional changes lead to disproportionate changes in annoyance.

Health Canada noted that annoyance associated with rattles from low-frequency noise sources may be prevented if the sound levels in the 16-, 31.5- and 63-Hz octave are less than 70 dB using a Z-weighting (dBZ). According to Health Canada, above 70 dBZ, there is a higher probability that annoyance would increase due to perceptible rattles and vibrations. Health Canada indicated that this annoyance might result in increased complaints from nearby residents.

Health Canada also stated that the C-weighted decibel (dBC) criterion proposed by CN, can provide some protection against low frequency noise; however, it might not capture effects that result from vibrations at frequencies such as 16 Hz, which are not included in the dBC metric.

To guard against this possibility of low frequency noise, Health Canada advised the use of American National Standards Institute Standard, to consider low frequency noise that includes 16 Hz. Health Canada suggested that CN:

- as part of the case-by-case noise complaints resolution process, compare low frequency noise monitoring results to American National Standards Institute standard; and
- consider relocating idling trains to a location where fewer receptors exist or to locations where receptors are located at a greater distance from the railway line.

Halton Municipalities stated that substantial issues with CN's assessment of operational noise from the Project resulted in the under-assessment of potential operational noise effects. These issues include the inadequate use of guidelines, the noise modelling and noise measurement assumptions used in the analysis, insufficient and potentially contaminated baseline ambient noise monitoring, and the lack of an

assessment of sleep disturbance. As a result, Halton Municipalities concluded that noise mitigation measures are insufficient to ensure that the applicable noise guidelines would be met.

Of particular concern to Halton Municipalities was that expanded arterial roads in the vicinity of the Project would be anticipated to carry larger amounts of traffic. Their opinion was that the magnitude of operational noise from the Project may exceed 5 dB in some areas, triggering the need for noise mitigation under Provincial guidelines, although the higher traffic sound levels may reduce predicted Project effects at some receptors. Halton Municipalities suggested that operational noise would be permanent and continuous. They expected that the geographic extent would be one kilometre from the Project boundaries or less.

Halton Municipalities indicated that CN did not specify or assess which mitigation recommendations would be implemented for the operation phase of the Project, nor had CN assessed the full implementation of such mitigation.

Pony Pines Developments, Stevenson Land Development, and Shadybrook Development asserted that CN's approach to mitigation is problematic because the detailed design occurs after approval. CN's commitment is only to consider further mitigation, and CN has already indicated that landowners, and not CN, are responsible to mitigate noise effects on the future residents of these lands.

Pony Pines Developments suggested that the final height of the barriers should break the line of sight between the second story windows of the adjacent residential community and the noise source. They also requested that CN install a noise barrier running generally in an east-west direction with a minimum height of five metres north of the truck access road, but south of Britannia Road. Pony Pines Developments indicated this barrier should be on both the east and west sides of the mainline and could be comprised of a berm or a berm and acoustic fence. The final height should be sufficient to break the line of sight between the second story windows of the adjacent residential community and the noise source and should achieve a noise reduction of at least 10 dBA.

Mainline and Terminal Activities North of Britannia Road

CN's views

CN noted that as part of the Project operations, CN would be using the mainline tracks north of Britannia Road to conduct its double-over operations with up to two trains per day. The noise sources would include idling locomotives and the movement of trains as they are coming in, slowing down, and speeding up. As part of the typical Town of Milton approval process for new residential developments, CN assumed that the developers would extend the noise barriers along the main tracks from Louis Saint Laurent Avenue southward to Britannia Road, consistent with the existing noise barriers north of Louis Saint Laurent Avenue. Existing noise barriers have a total height of 5.5 metres, comprising of a 3-metre high earth berm and 2.5-metre high acoustic wall on top of the berm. A general example of a berm and barrier is shown in the Figure 6-1.

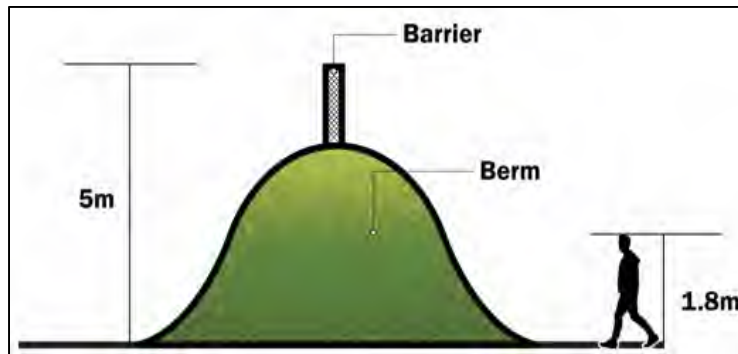


Figure 6-1: Example Berm/Barrier from CN's Presentation at the Hearing
Source: CN Hearing Presentation for Noise and Vibration (CEAR document #932)

CN indicated that with mitigation in place, the future noise environment with the Project in place would meet the Health Canada and U.S. Federal Transit Administration criteria.

CN further noted that once the Milton Logistics Hub Project is in operation, there would be stacks of containers on the work-pad area. Noise from hostlers and reach stackers operating on the work-pad would be further shielded by the stacked containers, which could be up to four containers in height. Shielding from the containers was not considered in the model.

In addition, CN stated that the major road upgrades planned by Halton Region for Britannia Road, upgrading from a two lane to six lane configuration, would result in higher background ambient noise level. However, that effect was also not included in CN's assessment.

Finally, CN indicated that once the open space between Britannia Road and Louis Saint Laurent Avenue was developed, the new houses immediately north of Britannia Road would become part of the sound attenuation process and further reduce terminal effects into the development.

Participants' Views

Halton Municipalities pointed to the Province of Ontario's *Guideline D-6 Compatibility Between Industrial Facilities, July 1995* (D-6 Guidelines) that state that for Class III heavy industrial use, the potential influence area is 1,000 metres and the recommended minimum separation distance is 300 metres. Halton Municipalities claimed that there was inadequate separation between the Project and neighbouring sensitive land uses. In response, CN argued that the 1,000-metre zone is simply an area or zone of potential influence, within which provincial guidance suggests a closer examination of specific facility affects sensitive receptors.

Halton Municipalities argued that a 300-metre heavy industrial facility separation zone should apply along the existing mainline as far north as Derry Road because train building activity involving coupling noises would take place in this area. In response, CN stated that container transfers would not occur on the tracks north of Britannia Road, and that the train movements that would occur on the tracks north of Britannia Road would be very similar to train movements that already occur on the existing mainline in that area.

Off-site truck traffic

CN's Views

CN modeled noise for future off-site truck noise using the STAMSON noise model, which CN stated is a qualified road noise model, and was the same as used for the Britannia Road and Tremaine Road environmental assessments. CN predicted that, based on the results of the model, noise generated by terminal-generated truck traffic along off-site haul routes would meet the Health Canada and U.S. Federal Transit Administration criteria. As a result, no change to the proposed mitigation measures would be required.

Participants' Views

Halton Municipalities predicted that noise from the planned and approved major roadway upgrades on Tremaine Road and Britannia Road would increase the cumulative noise effect by up to 5 dBA, and would therefore combine with predicted Project effects on noise to cause significant adverse cumulative environmental effects on residents. However, Halton Municipalities also confirmed that this predicted increase would be primarily due to the increase in car traffic, and not the increase in terminal-generated truck traffic.

A number of participants suggested that CN should carry out a noise study on truck traffic, including those entering and leaving the intermodal. A participant indicated that noise generated by a single truck, including starting, engine braking, and noise created by its container when it goes over a bump or pothole, is much worse than the noise of two cars on the roads. As CN plans to operate 24 hours a day, seven days per week, the noise from a larger number of trucks at night would be a nuisance when people are sleeping.

Follow-up Program and Monitoring

CN's Views

CN indicated that its proposed mitigation measures were based on comprehensive and robust noise modeling, and show that the Project would meet the U.S. Federal Transit Administration and Health Canada criteria at all receptors. In addition, CN stated that noise monitoring would be undertaken to confirm the predicted sound levels during both construction and operation, and, if required, CN would consider additional noise mitigation measures to address issues as they arise. CN would submit operational noise monitoring results to the Impact Assessment Agency of Canada.

In addition, CN indicated that if concerns regarding low frequency noise emerged in the future, it would monitor noise from the idling locomotives. If exceedances occurred, CN would investigate implementation of mitigation measures for low frequency noise. Such mitigation measures could include administrative controls; idling speed modifications to reduce revolutions per minute so that they do not generate low-frequency noise; and implementing new technologies, such as Automatic Engine Start-Stop Control Technology, Auxiliary Power Unit Technology, or Shore Power Plug-In Technology.

Participants' Views

Health Canada suggested that a complaints resolution process could be effective for haul routes as it could be used to help tie complaints to Project-related activities. As an example, Health Canada noted that if there was heavy terminal-related truck activity along the haul routes at 3 am that was linked to a

noise complaint, CN could possibly mitigate the noise with alternate truck routes, or some other form of mitigation.

6.1.5. Panel Conclusions and Recommendations

In reaching its conclusions on the environmental effects of Project-related noise and vibration, the Panel considered the following factors to be particularly relevant:

- The Project would be constructed next to the existing mainline that has been in operation for over 100 years.
- The Project would add two new trains to the 25–30 trains that currently operate on the mainline every day.
- CN indicated that the existing sound level conditions are typical of a suburban acoustical environment, ranging between the L_{DN} of 53 to 77 decibels.
- After criticism by a number of participants that CN's original baseline survey could have reflected higher ambient noise levels because of weather events or summer bird and insect noises, CN carried out modelling that confirmed its baseline results were appropriate.
- CN used the noise modelling software package CADNA/A, Version 2014, with supplementary information, to model Project noise effects, and assessed the results using U.S. Federal Transit Administration criteria and Health Canada's criteria. Some participants disagreed with the criteria used for noise assessment and how the location of receptors should have been determined. They argued the merits of other standards and guidelines.
- Construction noise from multiple sources would last for 18–24 months, with some nighttime work, especially during paving. Operations noise would occur all the time, day and night.
- The measures proposed by CN to mitigate noise from the construction phase of the Project were ultimately acceptable to Halton Municipalities. Concerns focused on mitigation for operational noise.
- Halton Municipalities argued that the provincial D-6 Guidelines that address zones of influence for major industrial facilities would support a finding that Project activities (especially train movements) on the mainline north of Britannia Road would have unacceptable effects on surrounding residences. CN refuted this argument by saying that new railway activities in this area would not substantially change the noise levels and that standard setback mitigation would be effective.
- Halton Municipalities expressed concern about the potential for operational noise effects north of Britannia Road. CN indicated that the additional noise would come from idling locomotives and the movement of additional trains, typical of the existing mainline noises, and that it assumed that an extension of the existing noise barrier would be built by the developers in the Boyne Survey area and would effectively mitigate this noise. Other participants were less confident.
- Most noise from the transfer of containers would occur within the terminal operational footprint of the Project, located entirely south of Britannia Road and separated by a distance of more than 300 metres from the nearest existing houses, the current residential subdivision located north of Louis Saint Laurent Avenue and the planned future residential subdivision under construction north of Britannia Road.
- In addition to the separation distances, CN proposes a range of mitigation measures including scheduling, a no idling policy, equipment improvements and temporary and permanent noise

barriers and five-metre noise berms, but did not specify exactly which measures it would commit to.

- While CN identified the proposed location of some noise berms, decisions about specific siting, and selection of other mitigation measures would be made during the detailed design stage.
- Any noise complaints arising from the operation of the Project could be addressed directly with CN, through the recommended Community Liaison Group or through the Canadian Transportation Agency's complaint process.

Baseline noise levels

The Panel is satisfied that the current ambient noise environment of the Project Development Area is dominated by the existing arterial roads that border the site and associated vehicular traffic, and the 25–30 trains per day that currently operate over the existing CN mainline. The Panel is also satisfied that CN has addressed the concerns raised by various parties that CN's initial ambient sound measurements were not sufficiently comprehensive.

Vehicular traffic, including cars, trucks and trains, generally operates 24 hours a day, seven days per week. CN indicated that the existing sound level conditions were typical of a suburban acoustical environment, with the L_{DN} ranging between 53 and 77 dBA. The Panel heard that the estimated average L_{DN} in rural areas is less than 45 dBA. The Panel is therefore satisfied that the current ambient noise environment of the Project site is higher than a typical rural environment, largely due to existing vehicular noise and railway noise along the mainline.

The Panel agrees that as the area surrounding the Project Development Area develops further in the future, with planned upgrades to the arterial roadway network and additional railway traffic along the mainline, background ambient noise levels will increase. The Panel agrees that CN took a conservative approach in its noise assessment by not taking this future increase in background noise levels into consideration.

Noise model and predicted effects

The Panel agrees that the guidelines CN used in the assessment, including the Canadian Transportation Agency's *Railway Noise Measurement and Reporting Methodology*, Health Canada's criteria, and Federal Transit Administration guidance, are appropriate to assess the predicted noise levels associated with the Project.

The Panel finds that the noise assessment conducted by CN was conservative. The conservative factors built into CN's modelling provide an adequate buffer for noise effects uncertainty; those factors included noise sources running simultaneously and continuously through the day or night, noise effect assessed in downwind conditions, and the exclusion of future baseline ambient noise levels which will most likely be higher as the area continues to develop.

The Panel concludes that the provincial D-6 Guidelines do not apply to the Project, and even if they did, would not mandate a fixed separation distance. The Panel believes that the noise assessment carried out by CN respects the spirit of the D-6 Guidelines by assessing specific effects on receptors within the zone of influence defined by the Guidelines. The Panel observes that the track pad and work pad areas,

where the majority of container movements would occur, all located south of Britannia Road, would be more than 300 metres from the nearest or existing residential houses or proposed subdivisions.

During operation, the Panel notes that Project-related noise would originate from operations within the Project Development Area, limited train activity north of Britannia Road, and from Project-related truck traffic on arterial roads. The Panel observes that the primary railway noises arising from the day-to-day activities of the intermodal terminal would be limited to low-speed impulsive coupling noises associated with the doubling over of trains within the Project Development Area. The Project would not create noises often associated with other types of railway yards, such as shunting, humping or kicking of railway cars. The Panel concludes that non-railway noises generated from within the terminal operational footprint would include reach stacker activities including container movements, truck movements, and engine idling and backup beepers generating from the track and service pad areas.

The Panel is satisfied that the noise mitigation measures proposed by CN, in particular avoidance of construction activities at night, would be sufficient to manage noise at acceptable levels during the construction phase of the Project.

The Panel understands that the majority of participants' concerns were associated with the operational noises of the terminal. CN has predicted that noise levels, after mitigation, would meet U.S. Federal Transit Administration and Health Canada criteria. Mitigation would involve a combination of constructed noise barriers on CN land, extensions by private developers of existing noise barriers alongside the mainline north of Britannia Road on private land, CN equipment requirements and upgrades, and management practices (such as scheduling, and operating policies). CN has expressed its confidence that all noise criteria could be met through mitigation, including adaptive management should residents log subsequent complaints.

The Panel notes that proposed noise barriers on the Project Development Area are mainly located to the west of the operational facility, and that CN has relied on distance and noise buffering provided by Britannia Road, particularly after the arterial road is upgraded, to mitigate noise from reaching the Boyne Survey area. The Panel recommends that CN should consider whether additional noise barriers should be located to the north of the Project Development Area to provide added protection for the anticipated new developments in this area.

The Panel agrees that the standard 300-metre setback mitigation measures CN considered, as well as physical noise control measures and operational changes would satisfactorily attenuate sound at the few existing residences located on the arterial roads bordering the Project Development Area, the existing residential subdivisions located north of Louis Saint Laurent Avenue, and the future residential developments currently under construction north of Britannia Road. The Panel finds that these measures should be sufficient to keep noise levels below the U.S. Federal Transit Administration's standard of a less than one to five decibel change, and Health Canada's criterion of no more than a 6.5% increase in Highly Annoyed. The Panel therefore concludes that the residual noise effects of the Project would be low to moderate in magnitude and limited to the immediate vicinity of the Project.

CEAA Recommendation 6.1 — Achieve minimum noise performance objectives

The Panel recommends that CN ensure that noise from the Project changes by less than the U.S. Federal Transit Administration's guideline of one to five decibel allowable change, and less than Health Canada's criterion of an increase of 6.5% Highly Annoyed.

CEAA Recommendation 6.2 — CN should implement the mitigation it has committed to undertake for noise

The Panel finds that CN's commitment to implement mitigation measures for noise are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- Construct vegetated berms or barriers with a required minimum height of five metres to mitigate noise effects during operation. These berms will be created during on-site grading activities.
- If noise complaints occur, log and investigate complaints to assess whether they are linked with Project activities, and take appropriate action to ensure that the issues are managed.
- Enforce speed limits (for truck traffic) within the terminal area to reduce the intensity of impulsive noise.
- Train or instruct reach stacker operators to avoid excessive impulsive noise during loading and unloading operations.
- Implement a temporary sound barrier around the concrete batch plant for Phase 3 paving operations.
- Implement a temporary sound barrier (hoarding) as needed for the construction of the Lower Base Line grade separation.
- House generators inside a building or structure to reduce noise.
- Limit the overall sound power level of generators used for construction activity to 107 dBA for each individual unit.
- Implement a communication protocol to keep the local community informed of different construction phases and the work that would be happening on-site during all three construction phases (for example, a website would be set up, newspapers ads would be placed, nearby residents would be notified by mail, and there would be dedicated information lines including an information centre, phone line, and email address).

CEAA Recommendation 6.3 — Additional mitigation to ensure the Project meets acceptable noise levels

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following additional mitigation measures:

- Implement a schedule for construction activities that avoids noise producing activities after 9 pm. If CN considers that overnight activity is unavoidable, nearby residents should be alerted ahead of time and provided with information regarding the complaints resolution process. CN should also monitor the overnight noise levels.
- Ensure all construction vehicles are equipped with mufflers that must be properly maintained.
- Ensure all vehicles are routinely maintained and serviced to ensure proper operation.
- Design and rigorously apply a no-idling policy so that, where feasible, construction equipment would be turned off when not in use.

- Identify preferred access routes to and from the Project site for construction related vehicle traffic, and require staff and contractors to use these routes.
- Avoid annoyance from back up alarms, including consideration of installing broadband backup alarms on CN equipment, such as reach stackers.
- Require all contractors to minimize tailgate slams. CN should monitor and enforce this requirement with appropriate consequences.
- Enforce speed limits for truck traffic within the terminal area to reduce the need for and intensity of engine-braking noise.
- Ensure compliance with its anti-engine braking policy by installing signage around the terminal and using site monitors to identify offenders.
- Ensure that contractors comply with noise abatement requirements, and employ site monitors with appropriate powers to educate, warn and enforce.
- Locate idling trains to locations with fewer receptors, or where receptors are the greatest distance from the railway line to avoid potential low frequency noise effects.
- Ensure that all residents likely to be affected by Project-related noise know how to record a complaint. When a complaint is received, CN should respond in a timely fashion and take appropriate action to resolve the problem. All communications and subsequent actions should be recorded and reported to the Town of Milton and to the Community Liaison Group.

CEAA Recommendation 6.4 — Additional mitigation if noise exceeds acceptable levels north of Britannia Road

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. In the case that monitoring data shows that noise from the Project exceeds the allowable 1-5 decibel change, or an increase of greater than 6.5% Highly Annoyed, the Panel recommends that CN implement the following additional mitigation measures:

- Install additional noise mitigation, potentially including noise barriers at the north end of the terminal operational footprint. Those noise barriers should run generally in an east-west direction with a minimum height of five metres and be located north of the truck access road, but south of Britannia Road, so as to mitigate Project noise north of Britannia Road to acceptable levels.
- To support this, during the detailed design phase, CN should identify and protect the areas where it could potentially place such a noise barrier or berm, until such time as it has confirmed, through the follow-up program, that noise levels do not exceed the acceptable levels of less than 1-5 decibel increase in noise, or an increase in 6.5% Highly Annoyed.
- Review noise monitoring results in response to noise complaints and provide information on the complaint investigation process to potentially affected residents and communities. In the event that deviations from baseline result in a calculated change in %Highly Annoyed of 6.5% or more, implement additional mitigation measures.

CEAA Recommendation 6.5 — Follow-up program for noise

The Panel recommends that CN develop and implement a follow-up program for noise. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected. The follow-up program should ensure that:

- During construction, sound levels (L_{DN} dBA) are measured at locations acceptable to Health Canada and the Canadian Transportation Agency continuously for four weeks during each of the three phases of construction. CN should verify compliance with predicted noise effects of the Project to confirm the effectiveness of mitigation measures.
- At the start of operation, CN measure sound levels (L_{DN} dBA) at locations acceptable to Health Canada and the Canadian Transportation Agency continuously for four weeks at the start of operation, and again for an additional four weeks when the terminal reaches its full operational scenario. CN should compare the measured results to verify compliance with predicted noise effects of the Project and effectiveness of mitigation measures.
- As part of the case-by-case noise complaints resolution process, CN compare low frequency noise monitoring results, including for 16 Hz, to the American National Standards Institute 2005 standards.

The Panel concludes that, if CN carries out the Panel's recommendations, including required mitigation measures, the Project is not likely to cause a significant adverse environmental effect on the noise environment.

The Panel finds that for the operation phase the Project would result in a low magnitude effect due to the implementation of mitigation measures, including the separation distance between the Project and neighbouring residences, the proposed sound berms and barriers, and good operational practices. Taken together, these measures are expected to ensure the change to the existing ambient noise levels would be less than the U.S. Federal Transit Administration guideline of 1–5 decibel allowable change, and less than Health Canada's criterion of an increase of 6.5% Highly Annoyed.

Cumulative Effects

The Panel finds that there would be a residual adverse environmental effect from the Project with respect to noise, though it would be a low magnitude effect. That residual effect would interact as an additive effect with various nearby activities, including existing and future non-Project related road traffic, railway traffic along the mainline, and other future developments, such as the Boyne Secondary Survey Area. The Panel notes that this additional noise is expected to result from a tripling of road traffic associated with the widening of Britannia Road from two lanes to six. A small portion of the traffic would be terminal-generated truck traffic, but as noted in subsection 11.2.4 (Transportation Networks) the majority of the projected increase in traffic would be associated with new developments planned by Halton Municipalities. The increased traffic is expected to result in an approximate 5 dB increase.

The Panel understands that with the addition of higher road traffic sound levels resulting from future residential developments, the noise effects of the Project could actually decrease in perceptibility, and that may in fact reduce predicted Project effects at some receptor locations. The Panel further notes that the developers in the Boyne Subdivision who have elected to build their residential developments adjacent to the existing mainline or railway are required to install noise mitigation. The requirement for the developer to construct these noise mitigation measures exists regardless of whether or not the Project proceeds. Developers are also required to install noise mitigation in relation to arterial roads, again regardless of whether or not the Project proceeds. Those measures would be designed to protect

residences from noise from existing railway infrastructure and future increases in noise from typical activities in the Town of Milton.

The Panel finds that with the recommended mitigation measures in place for the Project, and the mitigation that Halton Municipalities require from developers, that the cumulative environmental effect on the noise environment would be low in magnitude. The Panel finds that CN would not be required to implement additional mitigation measures to mitigate any cumulative noise effects.

The Panel concludes that the Project, in combination with physical activities that have been or will be carried out, is not likely to cause a significant adverse cumulative environmental effect on the noise environment.

6.2. Vibration Effects

CN's Views

CN assessed two types of vibration effects: vibration effects of the Project construction and the change in vibration due to the realignment and extension of the mainline. The vibration effects were assessed following U.S. Federal Transit Administration methods for both construction and railway activity, and International Standards Organization (ISO 2631-2) criteria for railway activity.

CN concluded that construction vibration levels would be within an acceptable range. However, the construction activities necessary to install the grade separation at Lower Base Line would be conducted in proximity to two existing residences owned by CN located on Lower Base Line, to the east of the existing mainline track (E19 and E20). Using standard construction equipment, vibration associated with construction activities might be perceptible at these residences, although there were no concerns for structural or cosmetic, such as, cracking damage. CN indicated that if impact piling were required, there might be a concern for cosmetic damage at E19, although structural damage is unlikely.

The vibration effects from train movement along the railway, due to realignment and extension of the mainline, were compared to existing vibration levels to establish whether the increased vibration effects would be acceptable. CN predicted that vibration levels would not be higher than the existing baseline after the mainline was realigned and extended.

CN proposes to adopt vibration monitoring at two receptors located on Lower Base Line to the east of the existing mainline track (E19 and E20), at construction locations, as well as in proximity to heritage locations (See subsection 11.3.1). CN would notify these residents of expected construction activities and associated vibration that might occur. CN stated that if piling activities were required at this location, and vibration monitoring identifies concerns for cosmetic damage to these buildings during piling, then alternative piling methods such as auguring and vibratory piling might be adopted to minimize vibration effects on these buildings.

Participants' Views

Halton Municipalities indicated that they were confident that vibration effects could be adequately controlled.

One participant indicated that CN incorrectly chose the ISO 2631-2 standard and the U.S. Federal Transit Administration guidelines as they are not appropriate for the evaluation of intermittent train passby vibrations. The participant suggested that CN instead use the Railway Association of Canada and Federation of Canadian Municipalities guidelines to provide protection to human beings in residential buildings in terms of sleep disturbance and the quiet enjoyment of life.

6.2.1. Panel conclusions

The Panel is satisfied that vibration from the operation of the Project would be limited to a relatively small geographic extent, within 50 metres or less of construction works and as associated with the main railway movements during operation. At worst, only minor effects would impinge on CN-owned properties and could be mitigated satisfactorily. The Panel concluded that no other properties would be affected. Therefore the Panel finds that vibration would not cause a residual effect. A recommendation regarding the protection of heritage buildings is in subsection 11.3.1 (Physical and Cultural Heritage).

The Panel concludes that the Project is not likely to cause significant adverse environmental effects from vibration.

The Panel finds the geographic extent of the change to the environment would be small and the changes would be short term and of low magnitude during construction, and infrequent and low magnitude during operation.

7. Aquatic Environment

This section addresses changes to the aquatic environment, including surface water, groundwater and wetlands. The Panel considers these to be environmental effects under subsection 5(2)(a) of the *Canadian Environmental Assessment Act, 2012*, in consideration of the potential determination of the Canadian Transportation Agency with respect to the Project. Section 3 of the Review Panel Terms of Reference requires it to take into account the environmental effects of the Project.

7.1. Surface Water

Subsection 6.1.4 of the EIS Guidelines required CN to provide a characterisation of the local and regional hydrogeology, and subsection 6.2.2 required that CN describe any changes the Project would cause to surface water. This section of the report deals with Project effects relating to surface water and summarizes the views of CN, participants and the Panel. For discussion on the effects of changes to surface water on fish and fish habitat, see Section 9.

7.1.1. Changes to flows

Existing flow conditions

CN's Views

CN stated that both surface and groundwater systems are overland flow-driven. Infiltration rates are low and there is limited exchange between surface and groundwater. CN also stated that flows within the Project Development Area respond rapidly to precipitation events.

CN characterized long-term averages, extremes and probability of occurrence of extreme events using available Environment Canada HYDAT stream gauging data. Flood flow frequency analysis was conducted using the annual maximums for selected hydrometric stations. Low flow frequency analysis was conducted using the low flow indices (seven day average for return periods of two and twenty years).

CN used a variety of tools and computer simulation models to predict flood flow, low flow and environmental flow frequencies without the Project present. CN also installed three hydrometric monitoring stations within the Project Development Area, two on Indian Creek and one on Tributary A. Two flow rating curves were developed for each stream station. CN found that both curves had good visual agreement. The baseline flow rating curve CN used in this study is a combination of the two methods.

CN conducted flow monitoring in June, 2015, which it stated was a wet month with a total precipitation amount of 160.2 millimetres, compared to the 1981 to 2010 climate normal total precipitation for June (68.2 millimetres) as measured at the Toronto Pearson Station. CN indicated that these wet weather conditions facilitated the collection of water depth, velocity and flow data during higher runoff events and that this, in conjunction with monitoring during inter-event periods, provided a good span of stage discharge data over which to build rating curves. Single day measurements were taken in August and September, with no flow observed at the Tributary A station.

CN stated that all three observed hydrographs for the monitoring stations have a similar pattern of high and low flows. All three stations had flows that were relatively responsive to precipitation events, with peak flows observed in less than 24 hours from baseflow conditions and returning to baseflow three to four days after the precipitation events.

Participants' Views

Conservation Halton was critical of CN's hydrologic and geomorphic assessment of streams within the Project Development Area. Their criticisms included:

- CN had not conducted a formal meander belt assessment of Indian Creek or Tributary A.
- CN had not adequately assessed the role of Tributaries B and C, which Conservation Halton considers to be headwater drainage features, in governing downstream hydrologic and ecological function. Conservation Halton stated that headwater drainage features are important for downstream hydrologic and ecological function even if they are ephemeral. In Conservation Halton's view, CN's claim that these headwater drainage features require no management under guidelines is not demonstrated and these streams should not be altered without a formal assessment of their current functions and the provision of mitigation measures to replace those functions.

- Conservation Halton stated that CN only used six weeks of data for calibration of their flow model, and consequently their modelling is inadequate to accurately predict flood risk. Halton Municipalities shared this concern, stating that a six-week period of monitoring should not be used as a basis to estimate or characterize runoff responses and thereby establish criteria for managing effects on flooding and erosion. Halton Municipalities recommended a minimum monitoring period of three seasons in order to obtain data that can be validly used to predict runoff.
- Conservation Halton stated that formal geomorphic analysis using Rapid Geomorphic Assessment or the Rapid Stream Assessment Technique is required to identify geomorphic processes such as stream flow and sediment supply. CN has not done this, but rather has only conducted walkthrough analysis and computer modelling. Conservation Halton stated that they therefore believe there is a high risk that fluvial processes will not be replicated in Tributary A.

Post-construction streamflow regime and flood potential

CN's Views

CN proposes several measures to minimize and mitigate Project-related effects on surface water quantity during construction, including minimizing the construction footprint; minimizing drainage interaction and alterations; managing surface runoff and drainage with diversion ditches, culverts and stormwater management ponds; sizing drainage ditches, culverts and stormwater management ponds appropriately; and designing stormwater management ponds for a 100-year return period event at minimum.

Of the 100-hectare Project footprint, a total area of approximately 50 hectares would potentially become impervious under the proposed development conditions. The proposed development could impact the stormwater quantity (runoff). To address these changes, CN proposes to construct a stormwater management system that would control post-development peak flow rates to the pre-development level during the 2-year event through to the Regional Storm event, and apply peak flow controls of 0.01 (25-year) and 0.023 (100-year) m³/s/ hectare of development. An overview of the stormwater management system is provided in subsection 3.3.2.

CN indicated that it plans to convey the existing Tributary A streamflows through the Project Development Area in a straight line under the terminal. The water would travel through proposed culvert 2A, then overland into culvert 2B, as shown in Figure 1-3 (Stormwater Management system elements). The water would exit culvert 2B to the southwest, before turning to the northwest around Pond #1. At the northwest corner of Pond #1, the new channel would bend back toward the southwest before flowing under Tremaine Road and ultimately into Indian Creek.

CN stated that in designing the system, it has considered the erosion control volume and flow rate for the Boyne Survey and the 100-year rate from Boyne. In its view, the entire proposed stormwater management system collectively assists in managing the Regional Storm through storage in the ponds, storage in the conveyance system, and surface storage. As a result, CN predicted that there would be no increase in flood risk to downstream properties and no effect on streamflows, flood line elevations, or the Indian Creek watershed more generally. CN stated that it has matched hydrographs and would use the stormwater management ponds to reduce peak discharge rates, with the goal of not worsening floodlines. It noted that flood storage must be balanced with conveyance.

CN proposes to construct a large floodplain berm between the mainline and the Indian Creek realignment. This berm is intended to prevent rapid expansion of the floodplain so as to manage and control active conveyance. This berm is illustrated in two diagrams in Appendix E.2 of the EIS, Figures 2.11 and 2.12 (and partially illustrated in a third, Figure 2.13) but is not described in the text of the EIS or subsequent responses to information requests.

CN stated that all proposed culverts within the Project Development Area are designed to meet or exceed the highest design requirements for the Ontario Ministry of Transportation and are sized to pass the Regional Storm event. The exceptions are culverts 2a and 2b, which pass under the terminal and are designed to convey only the 100-year Storm. In those cases, Regional Storm flows would be diverted to the east of the mainline and then through culvert 3 to the retained section of Indian Creek.

CN proposes to replace round culverts with box culverts, which it estimates would increase capacity by 30%; see subsection 4.3.1 (Alternative Culvert Designs).

CN indicated that culverts would need periodic maintenance to remove debris at joints. The nature of that maintenance depends on the size of the culvert but can involve the use of long poles with a rake on the end, or a mechanical device.

CN stated that it would develop and implement a Stormwater Management Strategy that would include the following flow-related design features:

- the diversion of Tributary A for the regional event around the Project Development Area and into Indian Creek via interception with a perimeter ditch;
- two stormwater management ponds that contain and attenuate flows up to 1:100-year Storm event;
- a minimum of 0.6 metres of pond freeboard during the 1:100-year Storm event;
- low flow orifice outlets in the ponds for the 25 millimetres return period storm event that release the detention volumes over an approximately 12-day period in order to mitigate against receiving water erosion; and
- shut off valves installed on the stormwater management pond outlets.

CN predicted that changes to hydrologic and hydrometric conditions (surface water quantity) during the construction phase would include changes to localized drainage and the environmental water balance within the Project Development Area, with minor effects into the Local Assessment Area. Mean annual flows and flood flows within Indian Creek and Tributary A are not expected to change once construction is complete. Localized changes to hydrologic conditions are predicted to include:

- Tributary B mean annual and flood flows would be lower with minimal changes to Indian Creek flows, with surface runoff diverted to stormwater management Pond 2 discharging upstream of the Tributary B outlet.
- The Tributary B drainage area east of the mainline would drain into the Regional diversion ditch and discharge into Indian Creek upstream of Tremaine Road (prior to Indian Creek exiting the Project Development Area).
- The Regional Storm event diversion for Tributary A would result in reductions in channel flow in Tributary A and Indian Creek from the Tributary A discharge location and be transferred to where the regional diversion ditch enters Indian Creek, at a flow rate of approximately 22.14 m³/s.

- The expected flow rate downstream of the Project Development Area along Indian Creek is not expected to be affected by the diversion ditch.
- The expected changes in average floodline elevations within Indian Creek are negligible (0 metres) and existing condition environmental flows would be maintained.
- There are no projected changes in mean annual flows and environmental flows within the Tributary A and Indian Creek channels with augmented baseflows and peak flow reductions from stormwater management pond outflows.
- A negligible change (0 metres) in Regional Storm event floodline elevation upstream and downstream of the Project Development Area along Indian Creek is anticipated.
- There is not anticipated to be a change in local hydrology outside of the Project Development Area mainline right of way for the section within the Fourteen Mile Creek watershed.

Participants' Views

Participants' views focused on the accuracy of CN's floodplain mapping and consequently the potential for stormwater runoff; CN's evaluation of flood potential, especially associated with the Regional Storm or larger events; and a variety of concerns associated with the sizing and orientation of infrastructure for stormwater conveyance and storage. Both Conservation Halton and Halton Municipalities expressed strong concern about the potential for the Project to create a substantial flood hazard on the site and in downstream. Both parties drew attention to the fact that CN has only designed components of the storage and conveyance systems for the 100-year flood, emphasizing that the system as a whole has not been designed to meet Regional Storm standards and therefore CN has not adequately assessed the flood risk of the Project. Halton Municipalities noted that Hurricane Hazel, which occurred in 1954, represents the governing provincial standard for defining regulated flood limits in the Milton area. The current provincial direction requires that the flood impacts associated with the Regional Storm be considered in designing new developments in this region. Conservation Halton stated that they are currently updating their floodplain mapping to reflect climate change. They noted that the Regional Storm represents a 250- to 300-year event.

Specific concerns included the following:

- Halton Municipalities stated that CN had not used all available information in predicting peak flows, noting that missing information includes: (1) hydraulic structure and grading advanced for the Britannia Road project and (2) the recommended watercourse corridors advanced in the Boyne Survey Block 1 Sub-watershed Impact Study.
- Halton Municipalities also noted that accurate prediction of the effects of the Project on drainage and hydrology must be built from accurate topographic mapping of the area, including current characterization. CN has used information from the Land Information Ontario Database, which contains older information than is currently available, for example LiDAR topographical data.
- Halton Municipalities stated that the design difference for the Regional Storm, as opposed to a 100-year Storm, could be a factor of two.
- Halton Municipalities were critical of CN's use of models other than the Town of Milton's existing HSP-F continuous simulation model. That model has been in use since 1998 on Indian Creek and can be used to generate a more accurate prediction of the area's water budget than CN has produced. Halton Municipalities stated that accurate predictions of flood potential are

especially important because there are potential at-risk properties downstream of the Project Development Area, including areas that have been or would be designated for residential use.

- Conservation Halton also stated that, given calibration and baseline condition deficiencies, the hydrologic model CN used for the Project would not be able to accurately predict flows. In their view, this means that planned infrastructure required to prevent flood hazards has a high potential to be undersized. Where this is the case, the conveyance and storage of flood waters would be insufficient and the risk of flooding increased. In their view, the Project design could require significant change to meet Ontario's flood hazards standards.
- Halton Municipalities also stated that although CN performed a climate change assessment, it is not clear if that assessment was used to develop or assess the preferred flood mitigation strategy.
- Halton Municipalities observed that the proposed sizing and orientation for the stormwater management pond channels may not be appropriate for large storm events, noting that the size difference required can be a factor of two for the Regional Storm.
- Halton Municipalities observed that there are different ways to store water and design the facility than have been proposed by CN. For example, an offline area could be designed for Regional Storm storage, perhaps elevated above the active stormwater management facility, as has been done within the Boyne Survey area. Natural heritage areas can provide a place to store high flood events within a stream buffer zone. This would be surface storage in an area that can be designed to be multifunctional, for instance for recreational use during low-flow periods.
- In response to Conservation Halton's concern that no worst-case flood mapping has been provided, CN provided an updated map as part of Undertaking 20, showing the Regional Storm floodplain for Indian Creek and Tributary A with the Project as proposed. Conservation Halton accepted this analysis but noted that the floodplain mapping seems to show an increased risk to stormwater management Pond 1 due to the works associated with realigning Tributary A and backwatering within the old Tributary A channel from Indian Creek. Conservation Halton stated that a geotechnical analysis would be needed to ensure the long-term stability of the pond embankment under Regional Storm flood conditions.
- Conservation Halton completed its own preliminary flood assessment based on the information provided by CN in its EIS documents and Conservation Halton's current models (including the Boyne hydrologic model). The results of this analysis support the figure provided by CN, but Conservation Halton reiterated that this figure should not be considered conclusive in determining potential flood impacts until a comprehensive assessment of floodplain models and supporting design has been completed.
- Halton Municipalities stressed the importance of testing and validating CN's conclusions about downstream flood impacts, in particular the timing of hydrographs. They pointed out that Indian Creek and its tributaries are essentially mid-level in this watershed and therefore have the potential to attenuate flow or exacerbate flows downstream of the Project Development Area if on-site flows are not properly managed.
- Conservation Halton stated that CN's proposed new stormwater management facilities and the proposed loss of 505 metres of channel length would result in a proposed channel that is twice as steep as the existing channel. In their view, additional information is required to ensure there is no increase of fill placement within the floodplain. Excess fill may result in increased flooding and loss of riparian flood storage. They believe that CN has not adequately demonstrated that the cut-fill is balanced to maintain flood storage.

- Conservation Halton stated that they believe that a wider creek corridor than proposed is appropriate for Tributary A, to ensure no loss of riparian storage.
- Halton Municipalities suggested that the proposed floodplain berm could actually exacerbate, rather than resolve, flood potential because new problems with higher flow velocities would be created along the berm, and because the presence of the berm would reduce flood storage. CN responded that the purpose of this valley wall is to prevent rapid expansion of the floodplain, which can cause the stream to jump its banks. Floodplain storage is retained behind the berm; it is not removed. CN provided examples of this through Undertaking #22.
- Conservation Halton stated that they understand that the berm was proposed to prevent scour due to floodplain expansion. They noted, however, that the three examples provided in Undertaking 22 are in areas where the channel is at a steeper grade than Indian Creek, places including Alberta, Colorado, and Kentucky. It is Conservation Halton's opinion that this berm may not be needed due to the flat topography of the Project Development Area. However, this cannot be confirmed without being able to comprehensively review the supporting modeling or designs in detail. Conservation Halton stated that they still have concern with respect to flood risk because CN has completed neither a comprehensive assessment of the floodplain models nor a riparian storage analysis for Tributary A.
- Both Conservation Halton and Halton Municipalities expressed concern that CN's proposed culverts are undersized for their intended function, especially the culverts that would enclose portions of Tributary A. Conservation Halton stated that the conveyance of flows through the site in undersized twin culverts substantially increases the risk of debris blockages, which would further exacerbate the flood risk. Conservation Halton typically requests that new watercourse crossings be sized to convey the Regional Storm event.
- Halton Municipalities did not agree with CN's proposal to split flows into two culverts, because of concerns about channel function and maintenance. They stated that the culverts should be the same width as the existing watercourse, whereas the proposed culverts are much smaller. In their view, this is likely to result in problems because the water flow through a smaller culvert would be accelerated, resulting in erosion and scouring of the bed and banks. They recommended that alternate designs that correspond more closely with existing watercourse features should be provided.
- Halton Municipalities stated that the proposed culverts appear to be undersized and inappropriate for the existing channel functions, fish passage and scour potential. These matters are discussed in more detail in subsection 7.1.2.
- Conservation Halton stated that they believe that it would be prudent to size all culverts to convey the Regional Storm event; Halton Municipalities shared this concern. CN responded to this criticism by saying that there are design constraints to the sizing of culverts from the thalweg (bottom of the stream elevation) to the rail bed. CN responded that their design team believe the proposed culverts can handle the 100-year Storm, with Regional Storm flows diverted down the east side of the mainline and connected back to Indian Creek via culvert 3.
- Conservation Halton recommended the use of open-bottom three-times-bankfull width culverts as opposed to the box culverts proposed by CN. Conservation Halton described a preferred openness ratio of height and width to length for culvert design. They suggested that CN's proposal could be measured against this standard and discussed. Conservation Halton also noted that the culvert crossing under the pad is particularly long, and asked whether it might be replaced with two or more smaller culverts.

7.1.2. Changes to the erosion and sediment transport regime

Existing erosion and sediment transport conditions

CN's Views

CN stated that sediment loading from surface water runoff to freshwater systems contributes to turbidity and the total suspended solid concentration within the water column, which can affect aquatic organisms and habitat. CN estimated baseline average annual sediment load to Indian Creek from the present land uses in the Project Development Area using the Revised Universal Soil Loss Equation (RUSLE), which is an empirical.

CN conducted geomorphic assessments of existing conditions of Tributary A and Indian Creek within the Project Development Area. It identified Tributary A as a moderately well-defined stable channel with a grassed channel, bed and banks and good access to the floodplain. A section of the channel was straightened prior to 1954. CN identified Indian Creek as a stable channel with a gravel dominated channel substrate. It is a moderately well-defined channel that is partially confined within its watercourse valley. The channel has relatively small meanders that have a low sinuosity and good access to the floodplain. CN did not conduct a geomorphic assessment of Tributary B, which it stated frequently had a dry channel bed during summer visits to the Project Development Area in May to September 2014 and 2015.

CN evaluated existing channel planform and erosion hazard using topographic maps and aerial photography. CN stated that without channel realignment, and using an annual recession rate of 0.6 m/year, Indian Creek is expected to recede to the CN embankment toe in approximately 12 to 15 years, after which the Creek would continue eroding the CN embankment slope.

Participants' Views

Conservation Halton stated that there are two types of erosion hazards that need to be evaluated for the Project: the stability of the steep valley slopes associated with the main Indian Creek valley; and the stream meander of all watercourses within the Project Development Area. In their opinion, the documentation provided by CN does not provide a complete assessment of existing and potential post-development erosion hazards for either of these.

Halton Municipalities agreed with Conservation Halton that CN has not conducted sufficient work to understand how the balance between flow and sediment would change in these watercourses, post-construction. These parameters have significant impacts on erosion potential, and therefore it is crucial to have a good understanding of the original conditions when considering new designs. They suggested that CN consider information about how Indian Creek has responded to any past alterations, and the extent of its natural migration in cm/year. In their view, such information is important in order to understand how sensitive Indian Creek is to alteration.

Conservation Halton expressed concern about slope stability in the vicinity of the track pads and twin tracks, which they believe are within the hazard zone. They did not believe that CN's design incorporates adequate setbacks to prevent erosion hazards. They stated that the regulated erosion hazard zone includes the erosion hazard and a 15-metre allowance. Without a comprehensive determination of

erosion hazards, there is the potential for failure of the slope that could jeopardize the safe operation of the mainline.

Post-construction erosion and sediment transport conditions

CN's Views

CN stated that their proposed channel realignments would address existing channel erosion and instability; increase the environmental buffer/setback; account for meander belt migration; and provide floodplain capacity.

In response to a question about whether the realigned stream channels would migrate over time, CN responded that the design should prevent this. It stated that it has used a reference reach approach for the design of the channel realignments, and the reference reaches are stable. The threshold design (100-year flows) is based on resisting erosion and scour.

CN stated that its stormwater management system would provide erosion control of 375 m³/ha and provide erosion flow control of 0.0004 m³/s/ha of impervious development.

CN stated that it would design the channel realignments such that they do not excessively aggrade or degrade; convey existing flows so that flood elevations are not increased; maintain bankfull frequency; downstream channel morphology is not altered; and limit barriers to fish migration.

During construction, CN stated that it would undertake regular inspections of disturbed areas before and after every significant rainfall event and daily during extended rain periods, to ensure that all damaged or ineffectively functioning erosion and sediment control measures are repaired or replaced within 24 hours of the inspection.

CN has also committed to conducting a three-year post construction monitoring program for the channel stabilization to confirm that installed channel features are stable and that no excessive erosion is occurring though the Project reach, and assess vegetation establishment and propagation of native species.

CN has also proposed to implement adaptive management to ensure that the monitoring elements remain valid, meet regulatory requirements and are responsive to evolving objectives. The results of this program would be formally documented for submission to the Impact Assessment Agency of Canada and other applicable agencies, as required.

Participants' Views

Conservation Halton stated that the proposed works for Tributary A involve splitting flows (base flow up to 100-year flows for one portion and Regional Storm flows into another) and then discharging into Indian Creek in two locations (base flow to 100-year flows one location and Regional Storm flows further downstream). Without a comprehensive investigation that identifies mitigation measures and net effects, Conservation Halton stated there would be a high risk that fluvial geomorphological (stream) processes would not be replicated and mitigated under proposed conditions, leading to increased channel instability, resulting in a change in the balance of sedimentation and erosion. Based on available information, Conservation Halton believes that it is likely that proposed watercourse alterations would negatively affect stream processes and exacerbate or create erosion issues.

Halton Municipalities expressed concern about the capacity of CN's event-based modelling approach to accurately predict erosion impacts. In their view, the Town of Milton's HSP-F continuous simulation model would provide for a more scientifically robust analysis of the potential effects of the Project on erosion.

7.1.3. Changes to water quality

Existing water and sediment quality conditions

CN's Views

CN characterized baseline water chemistry for the Regional Study Area using historical data from the Provincial Water Quality Monitoring Network. Water quality data from Station 6006000802 on Indian Creek for the period 2000–2012, Provincial Water Quality Monitoring Network Station 6006301102 on East Oakville Creek (also referred to as Sixteen Mile Creek) for the period 2002–2012 and Station 6006301202 on West Oakville Creek for the period 2002–2012 were used to characterize regional water quality. CN stated that these stations represented the locations in proximity to the Local Assessment Area that had readily available water quality data at active monitoring stations.

CN also collected water quality samples at the three hydrometric monitoring locations within the Project Development Area, using autosamplers. Sediment samples were collected at ten locations, including the three hydrometric and water quality monitoring locations

CN stated that all three Provincial Water Quality Monitoring Network stations display similar water quality trends. Mean total phosphorus concentrations are above the Provincial Water Quality Objectives of 0.03 mg/L at all stations (0.048–0.092 mg/L), while the mean concentrations of other inorganic parameters are generally below applicable guidelines, with the exception of mean dissolved chloride concentrations in West Oakville Creek (140 mg/L), which exceed the long-term Council of Canadian Ministers of the Environment's Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME CWQG-FAL) guideline of 120 mg/L. CN stated that mean total phosphorus levels at the Indian Creek station are above 0.092 mg/L for the entire monitoring record.

CN observed that mean total cadmium concentrations at all three Provincial Water Quality Monitoring Network stations exceed the CCME CWQG-FAL of 0.09 µg/L and the Provincial Water Quality Objective of 0.5 µg/L. Concentrations of mean total aluminum, silver, and iron also exceed the Provincial Water Quality Objectives and there are transient exceedances of guideline concentrations (maximums and some 75th percentile concentrations) for some other metals at these stations.

CN found that the poorest water quality within the Bronte Creek watershed was at the Indian Creek station, with levels of total phosphorus, total aluminum and total iron all exceeding the Provincial Water Quality Objectives for those parameters. CN determined that the likely sources of the phosphorus to Indian Creek were agricultural land use surface runoff and erosion, while the high total aluminum and total iron concentrations were thought to have arisen from erosion of local soils and sediments and represent natural, background levels for the region. In Tributary A, all water quality parameters were below applicable regulatory guidelines or objectives with the exception of total phosphorus, mean dissolved chloride, total aluminum, total iron, total copper and, in one case, nitrate.

CN stated that water quality results for the two sampling locations in Indian Creek showed similar trends of elevated total phosphorus, total aluminum and total iron concentrations, with some samples showing regulatory exceedances for other metals. Dissolved chloride levels approached or exceeded the long-term CCME CWQG-FAL of 120 mg/L at both stations, but station means remained slightly below 120 mg/L for both stations.

The levels of certain other metals including cobalt, vanadium, and zinc exceeded the Provincial Water Quality Objectives in single samples. The highest concentrations of total aluminum (7,200 µg/L) and total iron (8,800 µg/L) at IC2 occurred for the same sampling event. Similarly, the June 8, 2015 sampling event at IC3 exceeded the Provincial Water Quality Objectives for total cobalt, vanadium, and zinc, and the CCME CWQG-FAL for total cadmium and total copper. Although total suspended solids concentrations were very low (3 mg/L) at IC2 for the June 8, 2015 sampling event, they were found above 90 mg/L at IC3. CN speculated that the elevated metals concentrations detected on June 8 were associated with a rainfall-runoff event. With the exception of isolated CWQG exceedances for cadmium and copper at IC3, all other sampling dates showed much lower metal concentrations, in most cases below the relevant guideline value.

CN concluded that the water quality of Indian Creek and Tributary A is typical of a small rural stream in southern Ontario, showing elevated total phosphorus, aluminum and iron concentrations with transient and marginal exceedances of Provincial Water Quality Objectives and CCME CWQG-FALs for some metals. It observes that these short-term observations are consistent with trends in the regional water quality data and water quality results from the Conservation Halton Bronte Creek Watershed Study (2002). It cites Conservation Halton as noting that the Indian Creek subwatershed has historically had substantial issues with water quality and stated that Conservation Halton considers this reach of Indian Creek to be impaired, with the main causes hypothesized to be erosion, agricultural activities and livestock access.

CN stated that most metal concentrations (including mercury) from sediment samples were below their respective CCME CSQG Interim Sediment Quality Guideline (ISQG) and Probable Effect Level (PEL) values as well as the Ontario Sediment Quality Guidelines (OSQG; Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario) Low Effect Level and Severe Effect Level. The exceptions are copper, nickel and chromium, the latter only in Tributary A. With respect to inorganics, only total Kjeldahl nitrogen exceeded the OSQG Low Effect Level of 550 µg/g, with concentrations ranging from 371 µg/g to 1,510 µg/g in Indian Creek and 375 µg/g to 4,000 µg/g in Tributary A. All other samples in both Indian Creek and Tributary A were below the OSQG Severe Effect Level of 4,800 µg/g for this parameter.

CN also found that all petroleum hydrocarbon and semi-volatile organics concentrations from sediment samples were well below their respective CCME CSQG Interim Sediment Quality Guidelines and Probable Effect Levels, as well as applicable OSQGs (both Low Effect Level and Severe Effect Level).

Although no CCME CSQGs or OSQGs exist for salinity, CN found that the Sodium Absorption Ratio ranged from 1.5 to 3.1 at all sample sites, which is below 5, a value considered acceptable for agricultural production (Canadian Council of the Ministers of the Environment 2001).

Participants' Views

Halton Municipalities noted that the Sherwood Survey development area is directly north of the Project Development Area, and its runoff water quality has been under detailed study and monitoring for over five years. In their view, the water quality information from that study should be used to confirm the validity of the baseline measurements and estimates performed by CN, so that the baseline can be rationalized locally and better predictions made in relation to effect of the Project on runoff water quality.

Halton Municipalities also observed that weather conditions at the time of sample collection make a significant difference in contaminant levels, as rain causes the mobilization of certain contaminants, which would influence the chemistry of the water sample collected. They recommended that water quality sampling occur and be reported separately for wet and dry conditions.

Halton Municipalities also stated that CN has provided little information on the manner of collecting the sediment quality data, and its intended use. In their view, this information is necessary to assess the validity of the collection method, and how this information would be used in site effect management.

Changes in water and sediment quality as a result of Project activities

CN's Views

CN stated that water quality changes in the Project Development Area would result primarily from the channel realignments, as a result of altered drainage, leaching, erosion and use of construction materials. With the implementation of appropriate mitigation measures, CN did not anticipate that operation and maintenance of the train and terminal facilities would result in adverse effects on water quality. Rather, CN predicted that construction of stormwater management facilities associated with the Project would reduce concentrations of total suspended solids and other deleterious substances, resulting in a positive, low-magnitude effect on water quality, because watercourse reaches in the Project Development Area and Local Assessment Area receive inputs from outside those areas. In addition, CN predicted that channel realignment plantings and live stakes within the banks and riparian areas and in-stream features, such as woody debris toe protection, would increase shade over the realigned and enhanced Tributary A and Indian Creek channel sections. The shaded areas would have the potential to reduce in-stream water temperatures and increase dissolved oxygen concentrations.

CN stated that it would mitigate potential water quality effects during the construction phase through:

- a riparian buffer established before start of clearing;
- erosion and sediment control measures at appropriate locations adjacent to all watercourses and water bodies, or as directed by the Environmental Monitor(s);
- stabilized construction access and roadways to reduce the tracking of construction sediment (mud and dirt) onto public roads by construction equipment;
- ensuring water from flumes, dam and pumps, diversion or other methods do not cause erosion or introduce sediment into the channel;
- restricting grubbing, stripping and grading on approach slopes to watercourses and water bodies to the amount required to allow safe passage of equipment and completion of the relevant work;

- delaying grading of the primary banks of watercourses and water bodies until immediately before construction of temporary crossings and watercourse realignment, where practicable; and
- completing dewatering in a manner that does not cause erosion or allow sediment to re-enter a watercourse or water body through the use of appropriate sediment control devices.

During operation, CN predicted that the stormwater management system and changes in land use within the Project Development Area would reduce existing contaminant loading into Indian Creek and Tributary A. The stormwater management ponds would be designed to remove 70% and 80% of the phosphorus and sediment, respectively, for all of the runoff from the 100-hectare stormwater management pond drainage area, consistent with the Ontario Ministry of the Environment's *Stormwater Management Planning and Design Manual* (2003) guidelines. CN stated that further reductions would be achieved from the change in land use from agricultural row crops to pavement, buildings and railway tracks within the Project Development Area, which would reduce soil erosion and therefore sediment and the phosphorus attached to soil particle loads. CN estimated that changes in contaminant loads to local receiving watercourses would result in reductions in current annual sediment and phosphorus loads of 44% and 40.5%, respectively.

CN stated that metal and nutrient compounds, such as phosphorus, are typically transported to watercourses via overland surface runoff by adsorbing to sediment particles from agricultural amendments. Mitigation would be in place to treat all surface runoff from the developed areas within the Project Development Area and would meet applicable federal discharge requirements. CN did not specify which federal discharge requirements would apply.

Together, CN predicted that these measures would result in localized positive changes to surface water and sediment quality with respect to in-water concentrations of sediment, nutrients, metals and hydrocarbons within Tributary A and Indian Creek. Residual effects are predicted to be low in magnitude, meaning a detectable effect would occur but is within normal variability of baseline conditions and contained within the Local Assessment Area. Changes in water quality from the introduction of hydrocarbons or other deleterious substances related to equipment use are expected to be of low magnitude.

CN stated that it will monitor stormwater effluent to determine water quality draining from the terminal into Tributary A and Indian Creek on a quarterly basis during the ice-free season, for a period of three years post-construction. CN would use indicators to assess the effectiveness of the mitigation measures for changes in water quality, including chemical concentrations or loads and physical parameters such as temperature, for a minimum of three years following completion of the construction phase of the Project. CN will summarize these monitoring results in an annual report. Monitoring results will be compared annually against the baseline condition (June 2015 to June 2016) and Regional Assessment Area water quality data, predicted changes in water quality or contaminant loads and applicable CCME CWQG-FAL criteria.

If monitoring confirms that a water quality parameter is trending toward or exceeding applicable criteria outside the range of variability predicted in the EIS, CN would investigate the cause to confirm whether an unforeseen adverse effect is anticipated. If necessary, CN would assess appropriate mitigation measures, including additional erosion and sedimentation control measures and changes to

maintenance schedules of the terminal for timing of sweeping, inspection of culverts, and storm sewers. CN may also revise the monitoring program, including additional surface water quality monitoring sites and increased monitoring/sampling frequencies, to provide more detailed assessment of the modified/additional mitigation measure effects on surface water quality.

CN stated that it will develop several management plans relevant to water and sediment quality:

- an Environmental Protection Plan that would include a section detailing the mitigation and contingency measures to be implemented in the event that water quality monitoring detects sediment exceedances resulting from construction;
- a Salt Management Plan to describe measures that will mitigate salt loading into the stormwater management system. The plan will identify snow storage areas and measures to manage salt application within the terminal;
- a Stormwater Management Plan to provide more detail on the proposed stormwater management measures, including end-of-pipe controls to protect water quality, aimed at providing Enhanced Level 1 Protection consistent with guidance in the Ontario Ministry of the Environment's *Stormwater Management Planning and Design Manual* (2003); and
- an Erosion and Sediment Control Plan to provide site specific measures to minimize site erosion and protect watercourses and other sensitive receptors from sedimentation during construction of the Project.

Participants' Views

Environment and Climate Change Canada confirmed that the proposed stormwater management ponds have been appropriately sized to achieve the intended detention and pollutant removal and accommodate a large storm event such as the 100-year Storm. In its view, this would help to ensure that storm events do not cause the system to be overwhelmed and ineffective at mitigating the discharge and potential effects of deleterious substances.

Citing Section 36(3) of the *Fisheries Act* which states that, unless otherwise authorized by regulations meeting specific criteria, no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substances or any deleterious substance that results from the deposit of the deleterious substance may enter any such water, Environment and Climate Change Canada recommended that stormwater management pond effluent should also be monitored for agricultural contaminants, such as herbicides, pesticides, pathogenic organisms, in all Project implementation phases.

Environment and Climate Change Canada raised a number of concerns about CN's proposed water quality mitigation measures. It agreed that water quality effects from the Project would largely be from inputs of contaminants discharged into water bodies via surface drainage, but it noted that during the construction phase, surface drainage may receive contaminants from exposed soils and leaks from heavy equipment. During the operation phase, surface drainage may receive contaminants from road salt and leaks and spills from equipment and vehicle fueling and maintenance.

Environment and Climate Change Canada referred to CN's statement in EIS subsection 6.2.1.3.1.5 that the proposed storm water management infrastructure is not designed to remove dissolved compounds such as salts, yet CN predicted that with the implementation of mitigation measures, salinity

concentrations in surface water runoff from the Project Development Area will be minimized and there will be no observable changes to in-stream salinity concentrations within Tributary A and Indian Creek. Environment and Climate Change Canada recommended that chloride concentrations be monitored at the discharge points and in the receiving water bodies to assist in determining the effectiveness of these proposed measures.

Environment and Climate Change Canada also cited evidence from CN's Calgary Logistics Park (a similar project) that showed exceedances of aluminum above CCME CWQG values, and stated that aluminum may also occur in effluent from the proposed Project. Environment and Climate Change Canada is of the view that including aluminum in the post-development monitoring program would provide information to support an assessment of effects on downstream receivers. CN responded to this recommendation by stating that Calgary has different conditions than Milton and therefore elevated aluminum levels are not expected to be an issue in the proposed Project.

Conservation Halton stated that the most stringent federal, provincial and municipal water quality criteria should be used for the Project, to prevent environmental degradation of local watercourses. They also stated that discharge from the site should meet standards consistent with discharge criteria upstream and downstream throughout the sub-watershed. They noted that it is important that the Project meet water quality standards for the Boyne Survey, which have been established based on watershed conditions. If less stringent requirements are applied to the Project, there is a high potential that the Project could cause downstream degradation of fish habitat. In response, CN confirmed that the water quality standards it had employed are the same as used in the Boyne Survey.

Halton Municipalities stated that while CN has considered stormwater management scenarios, their derivation and assessment has not been appropriately documented in order to understand the advantages and disadvantages of each, including their implications for water quality.

Halton Municipalities also stated that local practice is to have stormwater management pond drawdown times between three and seven days to avoid odour and remixing of pollutants, and to ensure sufficient capacity to accommodate consecutive storm events. They asked if CN would be willing to amend their design to three to seven days. In response, CN indicated that the 11–12 days stated in the EIS is actually likely to be 5.5–5.6 days, and therefore would be consistent with Halton Municipalities' recommendation.

Halton Municipalities agreed that the stormwater management treatment train approach is appropriate and as recommended by Ontario Ministry of the Environment, Conservation and Parks. They noted that the treatment train approach is intended to provide a multi-barrier approach to pollutant removal, and that the individual components CN proposes, such as oil-grit separators and conveyance swales, are standard in these kinds of systems. However, Halton Municipalities stated that the challenge is the configuration, the sizing, and perhaps the alternatives chosen to incorporate in the treatment train. Configuration can be a function of volume.

Conservation Halton stated that there should be a firm commitment that the stormwater management strategy would provide 80% total suspended solids removal in accordance with provincial/municipal guidelines, Conservation Halton guidelines, and the Bronte Creek Watershed study. They agreed that

80% removal of total suspended solids is possible and can be achieved by appropriate stormwater management pond sizing, but emphasized the importance of ongoing monitoring to confirm performance. They recommended that stormwater management ponds be cleaned out roughly every ten years, or once treatment efficiency drops by 5%.

Conservation Halton expressed concern that the stormwater management pond design may not be sufficient to mitigate thermal effects, and that additional design options, such as those required for the Boyne Area (cooling trenches, use of stone core outlet wetlands, a three-metre deep permanent pool and one-metre deep plunge pockets at outlets) could improve thermal mitigation. They noted that thermal mitigation measures are now required for new stormwater management ponds, based on studies reported in the Ontario Ministry of the Environment's *Stormwater Management Planning and Design Manual* (2003), which found an average 5.1 °C difference between stormwater management pond inflows and outflows.

Halton Municipalities expressed concern that the swales and permeable pavers proposed by CN may not function as intended because of the heavy vehicular traffic and offloading equipment planned for the Project. They also drew attention to the fact that trucks and associated vehicles tend to be coated in contaminants which, if washed off in an intermodal terminal and drained to swales and permeable pavers, have the potential to contaminate groundwater.

Conservation Halton stated that their long-term environmental monitoring program has shown increased salinity within the watershed due to development. Dissolved salts are extremely difficult to remove from stormwater and are being found within receiving watercourses. Increased salinity can adversely affect the aquatic ecosystem and threaten drinking water supplies. It is expected that salinity levels would increase within Tributary A and Indian Creek as a result of the proposed de-icing activities at the Project. In the opinion of Conservation Halton staff, a Salt Management Plan is required in order to manage salt and to keep it from entering nearby watercourses. Halton Municipalities stated that a Salt Management Plan for the Project should include the rates and locations of use, and consideration of alternatives to chloride.

7.1.4. Panel Conclusions and Recommendations

Surface Water Flows and System Capacity

In reaching its conclusions about surface water flows and system capacity, the Panel found the following factors to be particularly relevant:

- CN predicted minimal to no changes in mean annual and flood flows within the Project Development Area, and no changes in mean annual flows and environmental flows within the Tributary A and Indian Creek channels. CN predicted a negligible change (0 metres) in Regional Storm event floodline elevation upstream and downstream of the Project Development Area along Indian Creek and no change in local hydrology outside of the Project Development Area mainline right of way for the section within the Fourteen Mile Creek watershed.
- While CN has assessed flood potential, some aspects of its analysis have been conducted using methods other than those used by Conservation Halton and generally accepted in southern Ontario.
- In some cases, CN has not conducted analyses that would be typical of projects in this area, including a formal meander belt assessment of Indian Creek and Tributary A; an assessment of

the role of headwater drainage features in overall (sub)watershed hydrologic and ecological function; and formal geomorphic analysis of streamflow regimes.

- CN has designed culverts passing under the mainline to convey only the 100-year flood event, with higher flows conveyed through a diversion ditch. These culverts are much smaller than the stream that would be conveyed through them, which could lead to higher flow velocities and promote erosion and scouring of the stream bed and banks.
- CN has not used the most current mapping in their assessment of runoff potential and may therefore have underestimated runoff volumes occurring with larger and less frequent rainfall events.
- CN has not used a continuous simulation model to assess flood potential but has instead used an event model that does not incorporate considerations related to seasonality or antecedent conditions.
- As a result of these factors, several participants have raised serious concerns that CN has underestimated the flood potential for the Project.

The Panel acknowledges CN's assurances that its channel realignments have been designed to develop a stable channel planform with good floodplain access; that it does not predict changes in existing floodline conditions; and that its threshold design (100-year flows) is based on resisting erosion and scour. However, the Panel also notes the strong concern voiced by Conservation Halton and Halton Municipalities, both of which have extensive experience in managing streamflows within this watershed, that these efforts may not be sufficient to achieve the predicted results. In large part, these concerns centered on uncertainty — uncertainty associated with the potential for runoff generation within the Project footprint, and more generally the uncertainty associated with a warming climate and shifting weather patterns. The Panel agrees with Conservation Halton and Halton Municipalities that the appropriate design standard is the Regional Storm, but notes also that there is no guarantee that storms — and floods — will not be larger or more frequent in the future. The Project Development Area is not an isolated system but rather part of a larger watershed with complex hydrologic, geophysical, and ecological dynamics. In the Panel's view, it is essential that the Project be designed in a manner that ensures the safe storage and conveyance of flows, and thus protection of downstream systems, throughout the life of the facility.

The Panel concludes that, during the operation phase of the Project, if CN implements its proposed mitigation, the system would have sufficient capacity for CN to manage flows in a manner that would not result in changes to the hydrograph outside of the Project Development Area under a typical range of climate conditions. However, the Panel has remaining concerns about various flood scenarios, which are discussed in the following section.

Streamflow regime and flood potential

The Panel did not hear persuasive evidence that CN has adequately assessed the full range of potential rainfall and streamflow conditions that might occur in a warming climate. While CN has stated that the Project has been designed to incorporate resilience to climate change, and based its analysis of a reasonable worst case climate change scenario on a 100-year return period future (2080) inflow design flood precipitation amount, other participants emphasized the importance of designing to a higher standard. For example, Halton Municipalities noted that the Ontario design standard for defining flood limits in this region is the Regional Storm, based on Hurricane Hazel (1954). Conservation Halton stated

that it is awaiting updates from the Ministry of Natural Resources and Forestry related to climate change requirements, the implication being that a past event like Hurricane Hazel would not necessarily be the definitive design standard for the Regional Storm in the future.

CN made a number of design decisions intended to accommodate large storm/flood events, but it is not always clear how those decisions were made. The Panel notes evidence that the Regional Storm represents a 250- to 300-year event and that the infrastructure size difference required to accommodate the Regional Storm can be a factor of two relative to the 100-year Storm. In addition, the Panel heard concern expressed by Conservation Halton and Halton Municipalities that CN may not have based its predictions on the most accurate information available, and may therefore have underestimated subwatershed areas and thus the potential for stormwater runoff in portions of the Project Development Area. The Panel finds that uncertainty is inherent in understanding and mapping dynamic natural systems and in managing the effects of human activities, especially in a changing climate. For this reason, the Panel supports CN's emphasis on adaptive management, and has made recommendations to that effect in Section 15 (Environmental Management).

The Panel notes, however, that caution is especially warranted in the management of high flows, which have the potential to affect neighbouring landowners and downstream reaches. The Panel agrees that some elements of CN's design have focused on the 100-year Storm, with regional flood waters accommodated in swales and the Indian Creek floodplain. Flood waters in Tributary A would be diverted east of the mainline and discharged through culvert 3 in the retained section of that stream. The Panel notes that this flow path would direct regional flood flows along First Line and Lower Base Line, immediately adjacent to Project and municipal infrastructure and lands under private ownership. If CN has in any way underestimated the spatial distribution, depth or flow velocity of flood waters, that infrastructure and those adjacent properties would be placed at risk.

The Project Development Area is located mid-way through a larger subwatershed, portions of which have already experienced extensive disturbance and alteration. The Panel agrees with Halton Municipalities and Conservation Halton that it is important to consider the potential effects of this Project within the broader watershed context: it is a part of an existing system, and activities on this site have the potential to affect ecological and hydrologic function in upstream (including headwater drainage features) and downstream reaches.

The Panel concludes that there is considerable uncertainty about the capacity of the Project, as currently designed, to store and convey the Regional Storm or larger flood event, and therefore to protect upstream and downstream systems, including riparian wetlands, from altered streamflow and flooding regimes. The consequences of a design error are potentially very serious, both on site and for residents and aquatic features downstream, such as riparian wetlands. The Panel observes that there is a need to manage all parts of the streamflow regime, but the greatest risks to downstream systems and the Project itself are peak flows and associated flood potential.

In light of the uncertainty associated with a changing climate, and the potential for a flood event equivalent to or larger than the Regional Storm to result in infrequent but high magnitude effects on neighbouring lands and downstream systems, such as wetlands used by the Mississaugas of the Credit First Nation, the Panel concludes that additional water conveyance and storage infrastructure will be

required. The Panel is satisfied that CN has sufficient land available, both within the Project Development Area and on surrounding lands under its ownership, to create sufficient conveyance and storage infrastructure to accommodate such large events. The Panel notes that agencies such as Environment and Climate Change Canada, Fisheries and Oceans Canada, and Conservation Halton have specialized expertise to advise CN on these matters during the detailed design phase.

The Panel concludes that, if such additional conveyance and storage infrastructure is created, any infrequent but high magnitude effects of the Project on the streamflow regime and flood potential, and consequential downstream effects on neighbouring properties, fish habitat, and wetlands, would be avoided.

Erosion and Sediment Transport Regime

In reaching its conclusions about the erosion and sediment transport regime, the Panel found the following factors to be particularly relevant:

- While CN has assessed erosion potential, some aspects of its analysis have been conducted using methods other than those used by Conservation Halton and generally accepted in southern Ontario.
- In some cases, CN has not conducted analyses that would be typical of projects in this area, including a formal meander belt assessment of Indian Creek and Tributary A; slope stability analysis for the track pad and twin track area; and formal geomorphic analysis of erosion and sediment regimes.
- As a result of uncertainties about the capacity of the Project to store and convey high flow events, some participants found that CN had underestimated the potential erosion risks of the Project, and therefore potential effects on infrastructure and downstream fish and fish habitat.

The Panel understands that a stream's flow regime is a driving factor in its geomorphic condition and erosion and sediment transport regime. An error in predicting the magnitude, timing or duration of flooding would therefore result in an erroneous prediction of erosion and channel form. Flood events that exceed capacity therefore would have consequences for bank and channel stability, infrastructure integrity, and downstream fish and fish habitat.

During the hearing, and in written hearing submissions, the Panel learned that CN had not conducted analyses that would be typical of projects in this area, including a formal meander belt assessment of Indian Creek and Tributary A; an assessment of the role of headwater drainage features in overall (sub)watershed hydrologic and ecological function; slope stability analysis for the track pad and twin track area; and formal geomorphic analysis of stream flow and sediment regimes. The Panel finds that CN's detailed design of the channel realignments in particular would benefit from advice from Conservation Halton and others with specialized expertise and knowledge of local systems, in addition to the oversight provided by Fisheries and Oceans Canada (see Section 9.1 Fish Habitat).

The Panel concludes that there is considerable uncertainty about the potential effects of the Project on the erosion and sediment transport regime of streams within the Project Development Area and the larger watershed. As with evaluation of flood potential, the consequences of a design error are potentially very serious, and there is a need for an abundance of caution in the design of water conveyance and storage infrastructure.

The Panel is satisfied that if CN can design the Project to maintain downstream hydrology and floodlines and safely accommodate the Regional Storm, high magnitude effects of the Project on the erosion and sediment transport regime, and consequential downstream effects on downstream fish habitat and wetlands, would be avoided.

Water Quality

In reaching its conclusions about water and sediment quality, the Panel found the following factors to be particularly relevant:

- There was general agreement that water quality within the Project Development Area is typical of southern Ontario streams, with elevated concentrations of total phosphorus and some metals.
- CN predicted that its mitigation would result in localized positive changes to surface water quality for these parameters.
- Concentrations of some water quality constituents appear to be driven by rainfall events.
- Sediment quality within the Project Development Area is generally within Canadian Council of Ministers of the Environment CSQG Interim Sediment Quality Guideline and Probable Effect Levels as well as OSQG Low Effect Levels and Severe Effect Levels, with the exception of copper, nickel, chromium and Kjeldahl nitrogen.
- Water and sediment quality changes in the Project Development Area would result primarily from the channel realignments, as a result of altered drainage, leaching, erosion and use of construction materials.
- CN proposes to mitigate potential water quality effects through a combination of measures including stormwater management infrastructure, channel realignment, paving, and land use change.
- CN would employ a treatment train approach for stormwater management, incorporating a series of lot-level or at-source controls, conveyance and end of pipe controls, which together provide multiple barriers to surface water contamination.
- Participants did not express concern about current sediment quality within the Project Development Area or the potential for the Project to affect sediment quality during construction or operation.
- Health Canada, Environment and Climate Change Canada, and Conservation Halton all recommended at least monthly monitoring of surface water quality. Continuous monitoring of some parameters may be feasible.
- It is unclear whether the proposed stormwater management system will reduce salinity concentrations in surface water. Additional monitoring may be necessary to confirm the effectiveness of these measures.
- Conditions at the Milton site differ from those at the Calgary site, where elevated aluminum concentrations were detected, and make it unlikely that the same conditions would occur in the Project Development Area.
- CN's proposed follow-up program does not include monitoring of the temperature of stormwater management pond effluent, and therefore may not provide an adequate foundation for adaptive management of thermal effects on fish.

The Panel is satisfied that CN has considered an acceptable range of water quality parameters in its analysis of existing water quality conditions. The Panel concludes that CN's proposed water quality mitigation measures and stormwater management system, if properly maintained, would likely result in

reduced levels of suspended solids, phosphorus, and other parameters (including metals) transported through the Project Development Area and into downstream systems. The Panel expects that the consequence of this would be a small and localized positive effect on water quality within the Project Development Area, as CN predicts. The exception is the potential for thermal effects from the stormwater management ponds, which the Panel concludes are likely without additional mitigation; see Section 9.2 Fish Mortality.

The Panel observes, however, that CN's proposed quarterly monitoring may not be sufficient to respond to changing water quality conditions, in support of adaptive management. To confirm the predictions of the environmental assessment and the effectiveness of mitigation measures, the Panel finds that monthly monitoring is preferable, and continuous monitoring of some parameters is feasible and already used elsewhere in the watershed.

The Panel finds that sediment quality is not an issue of concern in this environmental assessment.

CEAA Recommendation 7.1 — CN ensure that there are no changes to flow off-site

The Panel recommends that CN should ensure floodplain storage and flood conveyance within the Project Development Area function in a manner that, in accordance with its EIS conclusions and June 27, 2019 presentation to the Panel, the Project has no effect on streamflows, flood line elevations, or the Indian Creek watershed as demonstrated by matching the hydrographs in the area for maximum and minimum flows, as well as the timing of those.

The Panel further recommends CN should ensure that flows leaving the Project Development Area into any tributary or Indian Creek match existing hydrographs and floodlines and that CN use the stormwater management ponds, balanced with appropriate conveyance, to reduce peak discharge rates and so as not to exacerbate or worsen floodlines.

CEAA Recommendation 7.2 — CN should implement the mitigation it has committed to undertake for surface water flows

The Panel finds that CN's commitments to implement mitigation measures for surface water flows are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- apply natural channel design principles to the design and dimension of the realigned channels, including incorporating natural bed morphology (pools, riffles) and planform geometry:
 - design the channel realignments such that they do not excessively aggrade or degrade, convey existing flows so that flood elevations are not increased and bankfull frequency is maintained, downstream channel morphology is not altered and to limit barriers to fish migration;
 - not permit fording of watercourses or water bodies unless approved by the applicable regulatory authority;
 - re-establish vegetation on disturbed areas as soon as practicable following construction and in areas not subject to further construction activity / disturbance (App G, page G.3);
 - buffer wetland and riparian areas by up to 30 m (final buffer size subject to final design);
 - plan the landscape and culvert installation to maintain drainage to and from wetlands;
 - maintain downstream flow at all times when conducting in-water construction activities;

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

- ensure water and pump intakes reduce or avoid disturbance of the watercourse bed and are screened in accordance with Fisheries and Oceans Canada's *Freshwater Intake End-of-Pipe Fish Screen Guideline* (Fisheries and Oceans Canada, 1995); and
- remove the on-line agricultural pond, which, combined with the construction and implementation of a stormwater management system, will improve water quality.
- to mitigate thermal effects, consider a combination of various measures during the detailed design stage including but not limited to:
 - plantation along the wet ponds and outlet channel to provide dense shading;
 - reverse bottom draw outlet pipe with installation of cooling towers/cooling trenches; and
 - vegetated berms.
- develop and implement a Stormwater Management Strategy that incorporates collection and treatment of all stormwater runoff from the terminal prior to release to Indian Creek or Tributary A, and which includes the following key design features:
 - diversion of Tributary A for the Regional Storm event around the Project Development Area and into Indian Creek via interception with a perimeter ditch;
 - two stormwater management ponds that contain and attenuate flows up to 1:100-year Storm event;
 - a minimum of 0.6 m of pond freeboard during the 1:100-year Storm event;
 - low flow orifice outlets in the ponds for the 25 mm return period storm event that release the detention volumes over an approximately 12-day period in order to mitigate against receiving water erosion;
 - oil grit separators proposed for the administration and maintenance buildings and gate area to capture sediments, oil and grease before discharge to the wet ponds;
 - shut off valves to be installed on the stormwater management pond outlets;
 - channel realignment plantings and live stakes within the banks and riparian areas and in-stream features, such as woody debris toe protection, to provide shading for watercourse channels;
 - surface water quality controls to provide Enhanced Level 1 Protection; and,
 - winter road salt mitigation measures to be implemented to reduce salt runoff.
- build permanent stormwater management during the first stage of the construction phase to manage construction site surface runoff and drainage;
- establish and clearly identify a riparian buffer to the satisfaction of Fisheries and Oceans Canada before the start of clearing activities. Disturbance in this area will be restricted to activities associated with realignment, restoration and naturalization;
- install erosion and sediment control measures at appropriate locations adjacent to all watercourses and water bodies, or as directed by the Environmental Monitor(s). Appropriate temporary erosion and sediment control structures shall be installed, maintained and monitored through all phases of construction;
- implement stabilized construction access and roadways to reduce the tracking of construction sediment (mud and dirt) onto public roads by construction equipment;
- ensure water from flumes, dam and pumps, diversion or other methods do not cause erosion or introduce sediment into the channel;

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

- restrict grubbing, stripping and grading on approach slopes to watercourses and water bodies to the amount required to allow safe passage of equipment and completion of the relevant work, in order to facilitate the restoration of shrub communities;
- delay grading of the primary banks of watercourses and water bodies until immediately before construction of temporary crossings and watercourse realignment, where practicable;
- complete dewatering in a manner that does not cause erosion or allow sediment to re-enter a watercourse or water body through the use of appropriate sediment control devices;
- establish designated refueling areas for yard equipment at a safe distance (30 m setback minimum distance from top of bank) from fish habitat;
- protect concrete pours from rainfall with an impermeable cover for a minimum of 48 hours, or until the concrete cures, in order to prevent high pH runoff;
- isolate in-stream cast-in-place concrete from fish-bearing waters until the concrete has properly cured (minimum of 48 hours). Alternatively, pre-fabricated concrete will be used for culverts;
- use accelerants as appropriate to shorten curing times;
- store open bags of concrete mix in a protected dry area;
- have a CO₂ tank with regulator, hose, and diffuser available on-site during concrete work to neutralize pH levels;
- treat wastewater and wash waters to CCME CWQG criteria for the protection of aquatic life (between pH 6.5 and 9.0) and the turbidity will be less than 25 NTU above background when it is discharged;
- have spill containment kits present on-site in designated locations where there is a higher risk of spills, such as refueling areas);
- Should dewatering of excavated area be required (due to rain or minor amounts of groundwater), any water pumped from the excavated area will be pumped through a filter bag or into an area of undisturbed vegetation at least 30 metres from the watercourse or an alternate area approved by the engineer and fisheries biologist;
- implement the following specific erosion and sediment control measures:
 - vegetation seeding and planting would be stabilized, where necessary, by erosion control matting and blankets; and
 - erosion and sediment control measures around channel realignments will remain in place, at least until vegetation has established.
- prior to construction, implement the following agricultural row crop management activities:
 - prior to the fallow period, the crops would be harvested from the fields. The agricultural crop fields would be left in an untilled condition with a cover crop for this fallow period; and
 - prior to ground disturbance as part of construction activities for the terminal, the agricultural fields within the Project Development Area will be harvested and planted with an erosion protection and nitrogen scavenging cover crop, for example winter wheat, cereal rye or barley, and remain fallow with no active agricultural or construction activities for a minimum six-month fall and winter period.
- conduct biannual (spring and fall) geomorphic assessment to confirm that installed channel features are stable and that no excessive erosion is occurring throughout the Project reach based on stream characteristics within the realigned channels, including profile, pattern, dimensions and pebble count at established monitoring stations and photo points, as follows:

- spring assessment: visual assessment, including photo documentation of in-stream structures for geomorphic conditions; and
- fall assessment: geomorphic assessment of stream characteristics (profile, pattern, dimensions, pebble counts).

CEAA Recommendation 7.3 — Additional mitigation to accommodate extreme weather events through water conveyance and storage infrastructure

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following additional mitigation measures and ensure that:

- the Project's water conveyance and storage infrastructure has sufficient capacity to adequately manage the range of climate conditions that could reasonably be expected during the Project's lifetime. In doing so, CN should work with Conservation Halton, the Town of Milton, Environment and Climate Change Canada, and Fisheries and Oceans Canada during the detailed design stage to determine appropriate design specifications;
- the Project Development Area and surrounding CN-owned lands, if necessary, have sufficient capacity to safely accommodate and convey at least the Regional Storm into the foreseeable future in a manner that ensures no downstream effects on neighbouring properties, downstream fish habitat, or downstream wetlands. In doing so, CN should work with Environment and Climate Change Canada, Fisheries and Oceans Canada, Conservation Halton, Halton Municipalities and others as appropriate to modify the design of the stormwater management system and other aspects such as cut-fill strategies; and
- every five years following construction, CN should meet with Conservation Halton, the Town of Milton, Environment and Climate Change Canada and Fisheries and Oceans Canada to review the performance of Project stormwater conveyance and storage infrastructure in light of the most current climate change projections, and determine whether additional mitigation is required to maintain downstream hydrographs and floodlines.

CEAA Recommendation 7.4 — Confirm erosion and sediment transport regime analysis

The Panel recommends that CN consult with Conservation Halton, Halton Municipalities and others as appropriate to confirm the results of its evaluation of the erosion and sediment transport regime of Indian Creek, Tributary A and Tributary B, especially with respect to potential erosion hazard.

CEAA Recommendation 7.5 — Maintain surface water flows and water quality

The Panel recommends that:

- CN ensure that downstream hydrographs and floodlines are unaltered unless otherwise directed or advised by Environment and Climate Change Canada in consultation with Conservation Halton;
- CN ensure that, at the point water leaves the Project Development Area via Indian Creek or any of its tributaries, the annual average concentrations of water quality parameters be equivalent to annual average concentrations measured at the point where water flows onto the site from those same water bodies; and
- these conditions should be confirmed during each stage of construction and for a period of at least five years of full operation, and periodically reviewed in consideration of the Panel's recommendations on adaptive management in Section 15.

CEAA Recommendation 7.6 — Follow-up program for surface water

The Panel recommends that CN, in addition to the monitoring programs CN has already committed to, in consultation with Conservation Halton, Environment and Climate Change Canada, and others, develop and implement a follow-up program for surface water. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program requirements should be set out in a Surface Water Monitoring and Adaptive Management Plan that includes the following components:

- continuous water level monitoring during construction and for a period of at least five years post-construction, to confirm CN's prediction that downstream hydrology will be unchanged once the Project is built;
- a water quality monitoring program that extends throughout the construction period and for a minimum of five years post-construction. This program should incorporate monthly routine monitoring supplemented by continuous monitoring of selected parameters during high flow or upset conditions, to support comparison of measured parameters to the levels predicted in the EIS;
- this monitoring should include locations where water flows into the Project Development Area from surrounding areas, and at the point of outflow from the Project Development Area, to confirm the absence of any adverse effects from the Project;
- monitoring of the temperature of stormwater management pond effluent to provide an adequate foundation for adaptive management of thermal effects on fish; and
- every year, monitoring results and monitoring approaches should be reviewed with Environment and Climate Change Canada, Conservation Halton and the Community Liaison Group to ensure monitoring is sufficient to respond to changing streamflow and water quality conditions, in support of adaptive management.

The Panel concludes that if CN carries out the Panel's recommendations including required mitigation measures, and including designing the Project to accommodate the Regional Storm, the Project would not cause a significant adverse environmental effect on surface water flows, water quality or the erosion and sediment transport regime.

CN has committed to ensuring that Project-related changes to surface water would be limited to the Project Development Area, and the Panel finds that this commitment would sufficiently limit the geographic extent of these effects. The Panel has recommended an extensive follow-up program so that CN can verify its prediction that the Project will not change existing hydrographs, floodlines or measured water quality parameters at all points where surface water leaves the boundary of CN-owned lands.

Cumulative Effects

The Panel considers that past agricultural activity has resulted in the online agricultural pond having negative effects on the watercourses within the Project Development Area. However, CN has committed to remove the existing online agricultural pond and remediate some of its associated problems. The Panel does not find that the effects of the Project on surface water would combine with any future

projects that will be carried out, given the Panel's finding that the effects on surface water would be limited to the Project Development Area. Therefore, the Panel has not conducted a cumulative effects assessment for surface water.

7.2. Groundwater

Subsection 6.1.4 of the EIS Guidelines required CN to provide a characterisation of the local and regional hydrogeology, and subsection 6.2.2 required that CN describe any changes the Project would cause to groundwater. This section of the report deals with Project effects relating to groundwater and summarizes the views of CN, participants and the Panel.

7.2.1. Change in groundwater flow and infiltration

Existing groundwater conditions

CN's Views

CN assessed existing groundwater conditions through a review of available studies and literature and by evaluating conditions at 14 boreholes across the Project Development Area, supplementing the 44 boreholes that were drilled for a previous geotechnical investigation. A total of 24 of the 58 boreholes were equipped with groundwater monitoring wells. In addition, Indian Creek and other on-site surface water features were equipped with drive-point piezometers. CN measured groundwater levels in the monitoring wells and drive-point piezometers using a combination of manual and automatic Levellogger techniques. This data was used to evaluate seasonal fluctuations in the groundwater table, determine groundwater flow direction and identify the hydrogeological relationship between the on-site surface water features and local groundwater system, including groundwater recharge or discharge function.

CN found that existing groundwater conditions represented a surficial aquifer consisting of low permeability sandy to silty clay deposits, which would impede the infiltration of an inadvertent release to the subsurface. The aquitard is located at depths ranging for 0.67 to 9.03 metres, with vertical hydraulic conductivity estimates ranging from 10^{-7} to 10^{-8} m/s.

CN stated that the Project Development Area is characterized by low groundwater recharge potential, with pre-construction water balance calculations indicating that 92 millimetres of infiltration occurs across the Project Development Area on an annual basis. This calculated value is within the lower range of recharge rates published by the Ontario Ministry of the Environment, Conservation and Parks for clayey silt to clay-based soils.

In terms of groundwater quality, CN stated that groundwater throughout the Project Development Area is predominantly characterized by elevated concentrations of dissolved organic carbon, hardness, manganese, sodium, sulphate and total dissolved solids, which often exceed corresponding Ontario Drinking Water Standards and Canadian Drinking Water Quality values. However, these results are in agreement with regional groundwater quality trends, with groundwater residing within shale of the Queenston Formation and the glacial till derived from this bedrock unit typically of poorer quality.

With respect to groundwater as a drinking water source, CN cited provincial Water Well Records plotted within the Local Assessment Area, which indicate that local private wells draw their groundwater supply from the deep overburden or bedrock. Well yields are relatively fair to poor, with average yields in the

range of 0.8 L/s and 0.6 L/s, respectively, reflecting the low permeability nature of the deposits that characterize the subsurface. CN also cited the Halton-Hamilton Source Protection Committee (2015), which stated that the Local Assessment Area is not situated on lands designated as a highly vulnerable aquifer and a significant groundwater recharge area. CN also stated that the Local Assessment Area intercepts no intake protection zones or wellhead protection areas. As such, there are no restrictions to land use under the Ontario *Clean Water Act, 2006*.

CN concluded that surface water runoff is more likely to pool in low lying areas after precipitation events given that the Project Development Area is characterized as having low groundwater recharge potential of less than 100 mm/year, where pooled surface water is more likely to be lost to evaporation than via infiltrating to the subsurface.

CN also found that there is localized surficial groundwater perched at the ground surface in various areas across the Project Development Area, accumulated primarily as runoff across the ground surface and seepage into the surficial clay and till sediments. CN stated its belief that the recharge capability of this source would be limited as the surficial clay and till soils have a low permeability, in the order of 10^{-6} cm/sec, thus resulting in a shallow perched condition.

Participants' Views

Natural Resources Canada agreed with CN's conclusion that the site does not appear to be vulnerable to surface contamination. No other interested party objected to this view.

Natural Resources Canada also noted that while CN had provided maximum water levels, it had not included hydrographs or other data on seasonal fluctuations of groundwater in its assessment. However, Natural Resources Canada confirmed that, while it would be desirable to have all of the available data available, the seasonal maximum water levels were sufficient for the department to be confident that the site provides a good barrier against surface contamination.

No other participant commented on CN's assessment of existing groundwater conditions.

Changes to groundwater conditions

CN's Views

CN stated that it plans to pave or otherwise render impervious about half of the 100-hectare Project footprint area; this would further decrease infiltration potential. Compared to the pre-construction water balance, the post-construction model indicated that the projected increase in imperviousness at the Project Development Area would result in annual infiltration being reduced from 92 millimetres to 68 millimetres, representing an annual infiltration loss of 24 millimetres. CN noted that local private wells draw their water supply either from deeper, higher permeability overburden deposits or the bedrock aquifer, both of which are hydraulically separated from the upper overburden of the Project Development Area receiving infiltrating precipitation. As a result, CN is of the belief that a reduction in infiltration throughout the Project Development Area post-construction is very unlikely to affect groundwater quantities in these wells.

CN indicated that the low permeability of the soils within the Project Development Area limits the capacity for precipitation to infiltrate the soils and therefore recharge the groundwater table. This water table does not discharge to Indian Creek or other on-site surface water features. CN therefore

concluded that a reduction in infiltration due to the Project would not impact the hydraulic function of these features.

CN stated that it would install anti-seepage collars within servicing trenches in trenches to prevent the preferential movement of groundwater along the servicing alignments. This would avoid potential effects on existing groundwater patterns that could be caused by these trenches during the construction and operation phases of the Project, and would maintain preconstruction groundwater flow patterns under the post-construction condition.

CN stated that it would complete a groundwater dewatering assessment following preliminary design to estimate Project dewatering needs. In the event of dewatering, CN stated that it would monitor any private wells expected to be located within the dewatering cone of depression, for drawdown interference, which could potentially affect the operation of private wells with regard to water quantities.

Should construction dewatering volumes be projected in excess of 50,000 L/day, CN stated that a Groundwater Discharge Management Plan would be prepared.

CN also indicated that it would establish an appropriate dewatering system that would dissipate the energy and reduce the sediment content of discharging water to limit potential erosion effects.

Should dewatering of the excavated area be required (due to rain or minor amounts of groundwater), CN stated that any water pumped from the excavated area would be pumped through a filter bag or into an area of undisturbed vegetation at least 30 metres from the watercourse or an alternate area approved by the engineer and fisheries biologist.

Participants' Views

Natural Resources Canada agreed that there is no reason to suspect that dewatering could significantly affect nearby wells. As such, Natural Resources Canada had no recommendations to provide on mitigation measures. However, Natural Resources Canada concurs with CN's proposal to conduct monitoring to confirm that the pre-construction groundwater flow patterns are maintained, and to monitor private wells during Project construction as appropriate to ensure that dewatering does not affect groundwater levels.

7.2.2. Panel Conclusions and Recommendations

In reaching its conclusions about groundwater, the Panel found the following factors to be particularly relevant:

- Existing groundwater conditions include a surficial aquifer consisting of low permeability sandy to silty clay deposits, which would impede the infiltration of an inadvertent release to the subsurface.
- Infiltration rates are low and there is limited exchange between surface and groundwater.
- There is low groundwater recharge potential in the Project Development Area. Surface water runoff is more likely to pool in low lying areas after precipitation events and be lost to evaporation than infiltrate to the subsurface.
- There was general agreement that the Project site does not appear to be vulnerable to surface contamination and that that dewatering is unlikely to affect nearby wells.

The Panel is satisfied that CN's proposed mitigation measures would be sufficient to avoid a significant adverse environmental effect on groundwater systems.

CEAA Recommendation 7.7 — CN should implement the mitigation it has committed to undertake for groundwater

The Panel finds that CN's commitments to implement mitigation measures for groundwater are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- install anti-seepage collars in trenches to prevent the preferential movement of groundwater along the servicing alignments and, subsequently, maintain pre-construction groundwater flow patterns;
- complete a groundwater dewatering assessment following preliminary design, to estimate Project dewatering needs;
- in the event of dewatering, monitor private wells expected to be located within the dewatering cone of depression for drawdown interference, which could potentially affect the operation of private wells with regard to water quantities;
- should construction dewatering volumes be projected in excess of 50,000 L/day, prepare a Groundwater Discharge Management Plan; and
- establish an appropriate dewatering system to dissipate the energy and reduce the sediment content of discharging water for the purpose of limiting potential erosion effects.

CEAA Recommendation 7.8 — Follow-up program for groundwater

The Panel recommends that CN, in consultation with Natural Resources Canada, Environment and Climate Change Canada, Conservation Halton and others as appropriate, develop and implement a follow-up program for groundwater monitoring to verify the accuracy of the environmental assessment predictions.

The follow-up program should include the following components:

- CN should work with Natural Resources Canada, Environment and Climate Change Canada, Conservation Halton, and others as appropriate to develop a monitoring program for groundwater levels and quality, both within the Project Development Area and at nearby private wells.
- This monitoring of groundwater levels and quality should continue for a minimum of one year after construction in the geological units used for water supply in the area.
- If monitoring data shows that groundwater conditions are not as predicted, the Panel recommends that CN work with Natural Resources Canada and others as appropriate to diagnose the cause and develop and implement appropriate mitigation measures.

The Panel concludes that, if CN carries out the proposed mitigation measures, the Project is not likely to have a residual adverse environmental effect on groundwater resources.

Cumulative Effects

The Panel did not undertake a cumulative effects assessment for ground water, as the Panel does not anticipate, given the implementation of the mitigation measures, that the Project would have a residual effect on groundwater.

7.3. Changes to Wetlands

Subsection 6.1.4 of the EIS Guidelines required CN to provide baseline information regarding wetlands, and subsection 6.2.3 required that CN describe any changes the Project would cause to the terrestrial landscape, including wetlands. This section of the report deals with Project effects relating to wetlands and summarizes the views of CN, participants and the Panel. For discussion on the effects of changes to wetlands on species at risk, on migratory birds and on fish habitat, see Sections 9.1, 9.2, and 10.2.2.

Existing wetland conditions

CN's Views

CN identified 3.7 hectares of wetland habitat within the Project Development Area, consisting mostly of a monoculture of a non-native species called reed canary grass. CN did not initially evaluate wetlands (or the effects of wetland removal) using the Ontario Wetland Evaluation System but rather considered the hydrologic and biological functions of existing wetlands. Wetlands were delineated and characterized using ecological land classification. CN indicated that the Ontario Wetland Evaluation System process comprises a formal evaluation aimed to establish whether wetlands warrant formal designation under provincial policy, and the formal wetland evaluation protocols would not have added any further understanding of the wetland features on site. However, CN noted during the public hearing that, since the EIS was completed, CN had undertaken a comparative analysis with the Ontario Wetland Evaluation System protocols and determined there were no provincially significant wetlands on the site. CN found that two wetlands with potential to be provincially significant wetlands did not achieve the score necessary for designation.

Changes to wetland conditions

As compensation for the loss of 3.7 hectares of wetland habitat resulting from Project construction, CN would create 7.1 hectares of new wetland habitat that would be established with native vegetation and provide a variety of habitats. Wetland habitat would therefore increase in size and diversity, and biological function would improve. Within the Regional Assessment Area, wetland habitat would increase by 7.8% to 47.1 hectares.

The 7.1 hectares of new wetland habitat would include new creek channels for Tributary A and Indian Creek (0.7 hectares); riparian meadow marsh wetlands of (5.7 hectares); and riparian wetlands: 12 small, shallow marsh wetlands along the new channel for Tributary A, and four larger wetlands along Indian Creek (0.7 hectares). CN would establish riparian wetlands along the floodplain to Indian Creek in Tributary A. Existing channels would be retained and enhanced as wetland habitat to provide a function similar to the riparian wetlands. Both the existing channel and the riparian wetlands would be established with emergent and native riparian vegetation. CN also proposed to enhance the meadowland marsh wetland habitat in the Project Development Area, currently dominated by reed canary grass, by establishing native vegetation.

Some of the proposed new wetlands would be online (directly connected to surface waterways), while others would be offline (not directly connected). Wetland enhancements would be designed for different life processes of the wetland species using those habitats, including water birds with upland habitat; breeding pools for amphibians; and foraging, overwintering, and nesting habitat for turtles.

CN proposes to construct a combination of offline and online wetland pockets in Indian Creek. There would be four pockets offline in Tributary A and two online. The wetland pockets are designed to provide habitat for water birds as well as amphibians and reptiles; for example, water birds may move their young into wetland pools.

CN stated that in addition to the proposed channel realignment, the online agricultural pond would be drained and removed by the installation of a dam breach. Riparian wetland features would be installed in the new floodplain area within the online agricultural pond footprint.

Participants' Views

Environment and Climate Change Canada observed that the creation of approximately seven hectares of new wetland would provide enhanced habitat for wildlife species at a 2-to-1 ratio.

Halton Municipalities expressed concern that constructed wetlands can take a long time to establish and do not support the same populations present in natural wetlands. In their view, it may also be difficult to prevent constructed wetlands from succeeding to non-native species or monocultures.

Conservation Halton criticized CN's wetland evaluation as lacking rigour and accuracy, and stated that it undervalued the wetlands on site. They recommended that CN should follow the process established in Ontario to determine if provincially significant wetland habitat is present. This would involve a desktop assessment, possibly further fieldwork, mapping, and protection of any significant wetland habitat, including the use of buffers. In response to this criticism, during the public hearing, CN completed an evaluation of wetlands using the Ontario Wetland Evaluation System and found that no wetlands would be considered provincially significant, consistent with their earlier conclusion.

Conservation Halton stated that their records show two wetlands within the Project Development Area that would be removed or substantially altered if the Project proceeds. A riparian wetland upstream of the existing online agricultural pond along Tributary A would be removed, and a marsh wetland that runs along Tremaine Road north of the confluence of Indian Creek and Tributary A would be substantially altered. In their view, these wetlands have not been adequately assessed by CN.

Conservation Halton stated that they require that feature-based water balances be completed for potentially affected wetlands to ensure that there are no negative effects and the wetland's functions can be maintained over the long term.

Conservation Halton recommended that all wetlands deemed to be significant should be retained and appropriately buffered from development; a feature-based water balance should be conducted for all retained wetlands; and a revised stormwater management strategy should be developed to ensure the viability of the identified wetlands. Where protection of existing wetlands is not feasible, CN should replicate their function within the sub-watershed and demonstrate a net gain of wetland features and functions.

Conservation Halton stated that it is possible to create a stable wetland restoration where native vegetation becomes established.

Halton Municipalities commented that it is important to maintain natural water level fluctuations in constructed wetlands. In addition, they stated that smaller constructed wetlands may serve a hydrologic function but would not provide the same habitat function as larger wetlands, as they may not be able to contain water level fluctuations and may be more likely to revert to a monoculture over time. Conservation Halton shared this view.

Halton Municipalities also noted that replacement wetlands do not adequately support invertebrate populations; rather, they tend to develop non-native species such as reed canary grass and *Phragmites*. Regular monitoring is therefore important. Halton Municipalities noted that regular monitoring and control of invasive species is therefore important in constructed wetlands, and such monitoring should continue for the life of the Project.

A resident noted that although they had been skeptical about the potential for mitigation of wetland removal and channel realignment in Milton Heights, in fact those severely degraded streams now look better and they were persuaded those mitigation measures work.

7.3.1. Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on wetland habitat, the Panel considered the following factors to be particularly relevant:

- Wetlands provide important habitat for many species of wildlife including species at risk such as Snapping Turtle and Western Chorus Frog.
- CN's evaluation determined that none of the existing wetlands within the Project Development Area were ranked as provincially significant under the Ontario Wetland Evaluation System process.
- CN would remove 3.7 hectares of wetland and compensate for that loss by constructing 7.1 hectares of both online and offline wetland.
- There was general agreement that careful monitoring and maintenance would be required to ensure that constructed wetlands maintain a diversity of native plant species and reach long term sustainability.

The Panel understands the importance of protecting wetlands for wildlife (Section 7.3), fish and fish habitat (Section 9) and for their role in maintaining surface water flows and water quality characteristics (subsections 7.1.2 and 7.1.3, respectively). The two existing wetlands that would be removed total 3.7 hectares in size and are vegetated by invasive species; they were evaluated by CN as not being of high value. The Panel did not hear persuasive evidence disputing this evaluation. Nonetheless, the Panel agrees that these wetland areas must be replaced on site and concludes that the proposal to compensate for 3.7 hectares by creating almost double that area through the construction of a variety of wetland types is a reasonable approach. The key uncertainty is how well the wetlands would function and sustain themselves over the life of the Project, which currently has no end date. CN asserted that the technique of constructing wetlands is well established but presented no longitudinal studies as to the long-term stability and diversity of constructed wetlands. CN indicated that it would monitor the new wetlands and replant as required until the plant community reaches stability.

The Panel finds that the loss of these wetlands would be of limited geographic extent and low magnitude, given that they are currently vegetated by invasive species.

The Panel observes that Conservation Halton has detailed local knowledge and experience regarding the role and alteration of wetlands in the Bronte Creek watershed, and believes that CN should collaborate with Conservation Halton in designing the proposed wetland features and evaluating their effectiveness.

The Panel observes that it would be important to retain or enhance both wetland area and wetland function within the Project Development Area. The Panel is uncertain whether the new wetlands would be able to retain the initial plant community diversity, as outlined by CN, over the long term. However, if some or all of the constructed wetlands are eventually populated by an invasive species such as reed canary grass, the Panel observes that this would not represent a large change compared to the current situation. Nonetheless, the Panel also concludes that development and maintenance of a high quality wetland environment within the Project Development Area should be pursued vigorously to offset other habitat changes and losses in the terrestrial environment.

CEAA Recommendation 7.9 — CN should implement the mitigation it has committed to undertake for wetlands

The Panel finds that CN's commitments to implement mitigation measures for wetlands are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- construct and maintain a minimum of 7.1 hectares of online and offline wetland, to replace the 3.7 hectares of wetland removed in Project construction;
- implement mitigation measures in other sections of this report, in particular for surface water, fish and fish habitat, the terrestrial environment and species at risk, as those measures are important to maintaining wetland area and functionality; and
- plan the landscape and culvert installation to maintain drainage to and from wetlands:
 - Design drainage features around the Project and culverts beneath the mainline to accommodate existing flows; and
 - Ensure hydrologic regime of riparian wetlands along proposed channels in Tributary A and Indian Creek will support wetland vegetation.

CEAA Recommendation 7.10 — Additional mitigation for wetlands

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that, in order to replace wetland habitat losses and provide environmental enhancements to offset disruption and future uncertainty, CN implement the following mitigation measures:

- complete a feature-based water balance for all retained wetlands with drainage areas that may be affected by the Project. These wetlands must be considered when CN makes changes to its stormwater management system design to ensure long-term viability of the identified wetlands; and
- consult with Conservation Halton regarding the design and construction of the replacement wetland features so that they support the maintenance of ecological function in the wider Bronte Creek watershed.

CEAA Recommendation 7.11 — Follow-up program for wetlands

The Panel recommends that CN, in consultation with Conservation Halton, Environment and Climate Change Canada, and others as appropriate, develop and implement a follow-up program for wetlands. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should:

- monitor the extent (area) of wetlands within the Project Development Area. CN should also monitor to determine whether invasive species have encroached on the wetlands, and if so to remove those, and conduct ongoing monitoring to confirm that such removal has been effective over time. This monitoring should continue for a minimum of five years post-construction;
- measure the areal extent of existing and constructed wetlands, such that wetland area is maintained or increased over time;
- ensure that wetland water level fluctuations remain as similar as possible to the pre-construction condition;
- evaluate the success of native vegetation planting and replace any failed plantings;
- include regular engagement with Conservation Halton to ensure that constructed wetlands retain their planned function over time and provide high quality wildlife habitat with protection against invasive species through ongoing maintenance; and
- include development of an adaptive management program, in consultation with Environment and Climate Change Canada and Conservation Halton, to identify when and how additional mitigation would be carried out if these objectives are not being met.

The Panel concludes that, if CN carries out the Panel's recommendations including required mitigation measures, the Project is not likely to cause a significant adverse environmental effect on wetlands.

The Panel finds the loss of 3.7 hectares of wetlands to be of limited geographic extent and low magnitude, given that existing wetlands are small, degraded in quality and vegetated by invasive species. The Panel also finds that CN would offset this effect through its commitment to replace the lost wetlands at an almost 2:1 ratio and to plant the replacement wetlands with native species.

Cumulative Effects

Given that the Panel anticipates CN will satisfactorily offset wetland losses from the Project so that there is additional wetland habitat, the Panel finds there would be no residual effect on wetlands from the Project, and therefore the Panel did not undertake a cumulative effects assessment of this issue.

8. Terrestrial Environment

This section addresses changes to the terrestrial environment. The Panel considers these to be environmental effects under subsection 5(2)(a) of the *Canadian Environmental Assessment Act, 2012*, in consideration of the potential determination of the Canadian Transportation Agency with respect to the Project. Section 3 of the Review Panel Terms of Reference requires it to take into account the environmental effects of the Project.

8.1. Changes to the Terrestrial Environment

Subsection 6.1.3 of the EIS Guidelines required CN to describe the existing conditions of topography and soils. Subsection 6.2.3 of the EIS Guidelines required CN to assess the changes to the terrestrial landscape, including a description of changes related to landscape disturbance, migratory bird habitat, critical habitat for federally listed species at risk, and key habitat for species important to Indigenous peoples. In this section the Panel addresses changes to the terrestrial environment, including changes to habitat. For discussion of the Project's effects on species at risk and on migratory birds, see Sections 10.1 and 10.2.

CN's Views

CN stated that the Project Development Area is a relatively flat area mostly covered by vegetation on topsoil underlain by sandy silty clay till and silty clay till soil. The surface cover across the Project site is composed largely of farm fields, sparse hedgerows and drainage features including Indian Creek and its tributaries. Most of the Project Development Area consists of active agricultural land, growing annual row crops of soybeans, corn, and wheat. Properties owned by CN are currently leased to local farmers and residents. For details on the Project's effects on agriculture, see subsection 11.2.2.

CN conducted a geotechnical investigation of the Project Development Area to document and confirm the subsurface conditions, identify geotechnical issues, and provide recommendations for the design and construction of the Project. CN found that soils on the site would provide stable support for structures and infrastructure, and it would be appropriate to re-use soil on site, including in berms around the terminal. CN proposes to develop and implement a soils management plan for the proper handling and storage of soils to protect soil quality for re-use.

CN evaluated erosion hazards and slope stability along watercourses and valley slopes in the Project Development Area and identified limited erosion and slope stability issues at certain locations along Indian Creek within the Project Development Area. CN noted that these issues were addressed in the design of the channel realignment and riparian zone renewal in these areas. CN proposes to develop and implement an erosion and sediment control plan to minimize site erosion (see subsection 7.1.2). CN expected that following construction, there would be no ongoing concerns regarding erosion or slope stability in the Project Development Area. CN proposes to monitor the channel realignments and related works for a period of three years after construction to ensure stable conditions are achieved.

CN conducted five years of field studies, from 2013 to 2017, to identify habitats, in addition to a desktop review including aerial photograph interpretation. CN found that approximately 25% of the Project Development Area was grassland. Grassland was primarily comprised of hayfields, or pastures, or fields that had been previously disturbed by agriculture and been left fallow. CN identified 3.7 hectares of wetland habitat in the Project Development Area (see Section 7.3). CN stated that there was no forested habitat in the Project Development Area, but it identified a forested area on adjacent lands approximately 80 metres from the southernmost point of the Project Development Area where Project work would be limited to the installation of signals. The area south of the Local Assessment Area, but outside of the Project Development Area, also includes a wetland and woodland complex.

CN stated that the Project would directly affect the terrestrial features within the Project Development Area through site clearing and grading during construction. Project construction would disturb topsoil

and remove vegetation and some grading would be required to create a flat area for the terminal. CN stated that Project construction would result in the loss or alteration of 54.6 hectares of terrestrial habitat, including 50.9 hectares of grassland habitat, and 3.7 hectares of wetland habitat. There would be no loss of woodland habitat. CN indicated that habitat would be enhanced or compensated to result in no net loss of habitat.

CN proposes to offset the loss to grassland habitat by creating and maintaining 40.7 hectares of suitable grassland habitat in the Luther Marsh Wildlife Management Area. Existing agricultural fields would be converted into native grassland habitat. The Luther Marsh site is in the traditional territory of the Mississaugas of the Credit First Nation, and they have indicated that the creation of new grassland habitat in this area would integrate with their own habitat enhancement projects. CN noted that only 40.7 hectares of the 50.9 hectares of grassland habitat that would be lost would be suitable for grassland species at risk.

As compensation for the 3.7 hectares of wetland habitat that would be affected by the Project, CN proposes to create 7.1 hectares of new wetland habitat on site. The wetland habitat would be established with native vegetation and it would provide a variety of habitats for wildlife species. Wetland habitat would therefore increase in size and diversity, and biological function would improve. Additional details on wetland habitat can be found in Section 7.3.

The Greenbelt planning area is an area that surrounds the greater Toronto area. The Project Development Area would overlap with the Greenbelt in a small area to the south; however the only Project construction activity at this area would involve installing track signals in CN's mainline right-of-way, which is existing infrastructure within the Greenbelt.

The Niagara Escarpment planning area runs along the Niagara Escarpment, from Niagara Falls to the Bruce Peninsula. The closest point of the Escarpment planning area to the Project is more than one kilometre west from the northern end of the Project Development Area and more than two kilometres from the Project. CN indicated that the actual escarpment cliff face is set back more than four kilometres from the Project Development Area.

CN stated that while the provincially identified natural heritage features were not included as a valued component in the EIS Guidelines, it had assessed the potential effects of the Project on valued components within these features, specifically migratory birds and species at risk and their habitats.

Participants' Views

Conservation Halton stated that wildlife habitat in the Project Development Area would be lost. Conservation Halton considered CN's assumption that there would be sufficient habitat for wildlife outside the Regional Assessment Area to be unsubstantiated, especially given the rapid urbanization in the area. Conservation Halton suggested that the fieldwork and analysis conducted by CN did not adequately assess the presence or absence of significant wildlife habitat, which could be adversely affected by the Project along with the species that rely on such habitat.

Halton Municipalities explained the origin of the Natural Heritage Systems planning process and how Halton Region uses a systems-based process to enhance the biological diversity of ecological functions. Fundamental steps involve identifying core areas and ecological linkages, and ensuring appropriate

buffers. Halton Municipalities criticized CN for not using a systems-based approach, which could result in important wildlife habitat areas being isolated from each other if Project components create barriers to movement for terrestrial species, such as culverts that are not suitable for wildlife passage.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on the terrestrial environment, the Panel considered the following factors to be particularly relevant:

- CN indicated that soils in the Project Development Area would provide stable support for structures and infrastructure, and it would be appropriate to re-use soil on site.
- CN expected that following construction there would be no ongoing concerns regarding erosion or slope stability in the Project Development Area and proposed to monitor the channel realignments to ensure stable conditions are achieved.
- The existing topography is generally flat; while CN would carry out cut and fill operations to prepare the site for terminal facilities, post-construction the topography would not have changed fundamentally.
- The Project would remove or disturb 40.7 hectares of grassland habitat, a small amount of hedgerow habitat, and 3.7 hectares of wetland habitat.
- CN proposes to create 7.1 hectares of new wetland habitat on site and to create and maintain 40.7 hectares of grassland habitat in the Luther Marsh Wildlife Management Area.
- Woodlands near the Project Development Area would not be directly affected by the Project.
- While CN did not assess natural heritage features as valued components, CN assessed Project effects on the valued components within these features.
- The Panel did not hear major concerns relating to geology and geochemistry on the site, and understands that cut and fill operations would not require soil being moved on or off the site. The Panel observes that slope stability and soils management would play an important role in protecting watercourses, fish and fish habitat.
- The Project would remove grassland and wetland habitat, and CN has proposed habitat compensation. The Panel draws conclusions and makes recommendations regarding habitat losses related to species at risk and migratory birds, and about habitat connectivity, in Section 10.

CEAA Recommendation 8.1 — CN should implement the mitigation it has committed to undertake for soils

The Panel finds CN's commitments to implement mitigation measures for soils are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- follow the proper screening and disposal requirements for excess soils if any are deemed to require off-site disposal;
- conduct additional testing when soils suspected of contamination are observed during construction, to characterize these types of soils to determine suitability for re-use on-site;
- develop and implement a soils management plan for the proper handling and storage of soils to protect soil quality for re-use and
- ensure stable slope conditions are achieved and monitor the channel realignments and related works for a period of three years after construction.

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

CEAA Recommendation 8.2 — Follow-up program for geology, soils and topographical features

The Panel recommends that CN develop and implement a follow-up program for geology, soils and topographical features. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should verify the installation of plant materials as per CN's planting plan and verify successful propagation of native plant species with periodic audit monitoring during operation.

The Panel concludes that, if the recommended mitigation measures are implemented, the Project is not likely to cause a significant adverse environmental effect on the geology, soils, and topographic features of the terrestrial environment.

The Panel finds that the overall changes to soils, slope and grading will be of low magnitude, given that the area is already relatively flat and would remain so after construction, and that soil will be re-used on-site and only in a portion of the Project Development Area.

Cumulative Effects

The Panel expects that, with the recommended mitigation measures, the Project effects on soils, slope and grading will be limited to the Project Development Area and are not likely to interact with future projects in the area. Therefore the Panel did not conduct a cumulative effects assessment.

Part 3 – Effects on Fish and Fish Habitat, and Wildlife

9. Fish and Fish Habitat

This section addresses changes to fish and fish habitat. The Panel considers these to be environmental effects under subsection 5(1)(a)(i) of the *Canadian Environmental Assessment Act, 2012*. Section 3 of the Review Panel Terms of Reference requires it to take into account the environmental effects of the Project.

9.1. Fish Habitat

Subsection 6.1.5 of the EIS Guidelines required CN to provide baseline information regarding fish habitat, and subsection 6.3.1 required that CN describe any changes the Project would cause to fish habitat. This section of the report deals with Project effects relating to fish habitat and summarizes the views of CN, participants and the Panel.

9.1.1. Current condition of fish habitat and fish communities

CN's Views

CN identified known watercourses in the Project Development Area, Local Assessment Area and Regional Assessment Area using imagery and geo-referenced data obtained through Land Information Ontario. CN identified watersheds and subwatersheds in the Regional Assessment Area using Conservation Halton data, including mapping at various scales. CN also used available digital imagery (including satellite and air photos with 15 cm resolution) to identify any additional potential watercourses in the Local Assessment Area and Project Development Area where field investigations would be conducted. CN considered surface features with evidence of channel definition (upstream or downstream from the Project Development Area) to be potential watercourses and therefore potential fish habitat.

CN then conducted field assessments of all potential watercourses identified in the Local Assessment Area during the background data review; these field surveys occurred during July and August 2013, and in June, July, September, and October 2015. The objectives of the field assessments were to confirm the presence or absence of watercourses identified in the preliminary review, including any that might be affected by the Project; document the biophysical characteristics and water quality; characterize fish habitat in representative reaches; and sample the fish community at representative locations.

CN recorded fish habitat characteristics at representative reaches for each watercourse confirmed in the Local Assessment Area during field investigations. Additional observations were recorded at two road crossings in the Regional Assessment Area to provide supporting characterization downstream of the Local Assessment Area. Site investigations were conducted on July 4, 2013 using methods described in the Ontario Stream Assessment Protocol, with supplemental investigations on August 28, 2013 to assess mapped headwater features, using the Credit Valley Conservation and Toronto and Region Conservation Authority guidance document *Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines 2009*. Assessed characteristics included presence of water flow and origin, wetted width, wetted depth, bank height, bed form and materials, stability and connectivity.

CN completed detailed habitat mapping for watercourses in the Local Assessment Area (including the Project Development Area) on June 3 and 4, 2015 and July 27, 2015 using an approach adapted from Stanfield et al. (2013) and the Ontario Ministry of Transportation *Environmental Guide for Fish and Fish Habitat* (2009). CN stated that these methods are generally accepted as appropriate assessment protocols, in the absence of applicable federal legislation or guidelines.

CN summarized their conclusions about existing fish habitat conditions as follows:

- The reaches of Indian Creek in the Local Assessment Area provide moderate quality fish habitat that supports a commercial, recreational or Aboriginal fishery.
- Tributary A, downstream of the existing CN tracks in the Local Assessment Area provides poor quality fish habitat that supports a commercial, recreational or Aboriginal fishery.
- Tributary A (at Britannia Road), Tributary B and the assessed headwater features do not support a commercial, recreational or Aboriginal fishery.
- Tributary C, within the Project Development Area and Local Assessment Area provides low quality fish habitat on a seasonal basis that supports a commercial, recreational or Aboriginal fishery.
- The online agricultural pond that is part of Tributary A provides poor quality fish habitat that supports a commercial, recreational or Aboriginal fishery, but the negative thermal, sediment loading and eutrophication effects of the pond outweigh the poor quality habitat functions and it is a prime candidate for removal and habitat enhancement that will benefit the overall fishery.

CN observed no obstructions to fish movement or migration in Indian Creek in the Project Development Area or Local Assessment Area, but stated that reaches of intermittent or diffuse flow would likely create obstructions to fish movement and migration in Tributary A and in Tributary C. Site access restrictions did not permit observations downstream of the Local Assessment Area to determine the presence of physical barriers to fish movement, passage or migration.

CN sampled fish communities using methods following the Ontario Stream Assessment Protocol. The 2013 and 2015 fish sampling data were then combined with historical data to characterize the local fish community of the watercourses in the Project Development Area and Local Assessment Area. CN stated that the combined data provided sufficient information to characterize the qualitative composition of the fish community in these watercourses.

Fish community sampling in 2013 and 2015 revealed the presence of 17 species of fish in the Project Development Area. Based on this field work, visual inspection, and a review of available reports, CN found that the watershed supports typical warmwater fish species, consistent with other impacted systems in the region.

CN did not encounter or anticipate any aquatic species at risk or species with highly specialized habitat requirements in the Local Assessment Area. CN stated that one historical (1983) record of a provincially and federally regulated fish species at risk (Silver Shiner) was found in the Regional Assessment Area well outside of the Local Assessment Area, and habitat conditions in the Local Assessment Area are not suitable for this species.

Participants' Views

Fisheries and Oceans Canada stated that CN had adequately characterized the existing fish habitat features and values in Indian Creek and Tributary A watercourses and that CN's characterization of the direct Project footprint was accurate.

Fisheries and Oceans Canada noted that it considers the online agricultural pond as a waterbody that supports fish that are part of a commercial, recreational or Aboriginal fishery. Even though the pond is not a natural feature and is considered lower quality habitat, it does provide potential overwintering habitat and feeding and rearing value. Therefore, in the department's view, the decommissioning or loss of this waterbody should be included in the calculations of overall habitat loss. However, Fisheries and Oceans Canada did acknowledge the potential benefits of its removal.

Halton Municipalities agreed that CN's characterization of habitat in Indian Creek was conducted using appropriate methods, with the exception of the riparian buffers. In their view, CN did not provide a quantitative characterization of existing riparian buffers within the Project Development Area, and the type of vegetation they contain. Halton Municipalities indicated that such a characterization was vital in order to evaluate the riparian enhancement that CN had stated would be part of the mitigation for the elimination of 1,075 metres of Indian Creek and its replacement with 571 metres of constructed channel.

Conservation Halton stated their belief that Tributary B functions as a headwater drainage feature and not a watercourse. In their view, the effects of removing this feature on downstream fish habitat have not been adequately addressed because the full function of the feature was not assessed in the EIS or additional CN responses to Panel Information Requests. They stated that the headwater drainage feature assessments submitted by CN focus primarily on the feature's hydraulic function but failed to evaluate its ecological function. While Tributary B has been shown to be unlikely to support fish directly, it has not been demonstrated how its removal would affect the other functions that headwater drainage features provide. In Conservation Halton's view, the removal of this feature, without a comprehensive assessment of its current functions and the provision of proper mitigation measures to replicate those functions, would have an indirect effect on downstream ecologic function, including effects on fish habitat. They recommended that, should the Project be recommended for approval, approval should be conditional on the completion of an assessment of Tributary B as a headwater drainage feature including identification of hydraulic and ecologic functions and implementation of mitigation measures which replicate these functions.

No participant challenged CN's characterization of the fish community.

Halton Municipalities stated that CN's fish sampling was conducted used appropriate methods.

9.1.2. Project related changes to fish habitat

CN's Views

CN stated that it intends to realign and revegetate sections of Indian Creek and Tributary A. The purpose of the proposed channel realignments is to accommodate Project infrastructure and maintain existing natural flows through a meandering channel, but CN stated that the channel realignments also offer the opportunity to restore and improve fish habitat in the affected watercourses.

CN used a reference reach approach for the design of the new channels, trying to match the meander form and channel slope of the constructed channels as closely as possible to the reference reaches. The realigned channels will also be designed to limit barriers to fish migration and provide aquatic and riparian habitat that is functional over a range of flows.

CN proposes to restore riparian habitat and create a series of riparian wetlands, both offline and connected (see Section 7.3). The connected wetlands would include an invert channel that would allow water to spill in during higher flow events, bringing smaller fish with it. When the water recedes, the fish would stay in until the next high flow event.

CN stated that its design objectives and considerations are intended to satisfy potential requirements under the *Fisheries Act* to mitigate or partially offset potential serious harm caused by Project-related activities. CN stated that habitat altered or destroyed as a result of Project-related activities during construction would be offset by direct measures in the Project Development Area, including natural channel design incorporating 2,400 m² of new channel and an increase in diversity of habitat types. Additionally CN would also offset using indirect measures in the Project Development Area, Local Assessment Area, and Regional Assessment Area, including improved water quality, enhanced riparian cover, reforestation in the watershed, and improved habitat conditions to facilitate the future re-establishment of Silver Shiner.

CN stated that while some decrease in total fish habitat area is predicted as a result of these activities, this quantitative effect will be offset by improvements in the quality of the habitat, resulting in similar fish habitat productivity and an increase in ecosystem resilience. Direct habitat disturbance will be limited to the bed and banks of streams within the Project Development Area. CN concluded that overall, the proposed Tributary A and Indian Creek realignment, rehabilitation and enhancement plans will improve habitat for aquatic and terrestrial species and develop a stable channel planform with good floodplain access to maintain existing floodline conditions.

CN observed that fish passage in the tributaries within the Project Development Area is already constrained at times due to the seasonal intermittent or ephemeral conditions that prevail, during which the creek bed is entirely dry. CN also noted that some existing culverts within the Project Development Area are characterized by perched high-slope conditions not amenable to fish passage. CN stated that the proposed new and upgraded culvert designs would improve opportunities for fish passage relative to existing conditions. They are designed to mimic existing low-channel slopes to improve fish passage, both by ensuring culverts remain accessible to fish and by reducing water velocity within the culverts.

CN's proposed mitigation measures for fish and fish habitat all relate to activities during design and construction; none are intended for the operation phase of the Project. These measures include habitat compensation for the loss of freshwater fish habitat, provision of aquatic and riparian habitat that is functional over a range of flows and increases the diversity of habitat types, establishment of riparian buffers prior to clearing activities, and only allowing realignment or restoration activities within that buffer. Additionally, CN committed to plan construction activities to avoid or minimize the duration of watercourse diversions required during the realignment of Indian Creek and Tributary A, construct

channel realignments for Indian Creek and Tributary A outside of the existing channels and maintain downstream flow at all times when conducting in-water construction activities.

CN has committed to work with Fisheries and Oceans Canada on additional mitigation measures as appropriate for a *Fisheries Act* authorization. CN will develop and implement a final offsetting plan through an authorization under the *Fisheries Act* to the satisfaction of Fisheries and Oceans Canada; the department test will be no serious harm to fish or fish habitat. CN stated that satisfying the conditions of Fisheries and Oceans Canada authorization will, by definition, ensure that the Project has no significant residual effect.

CN concluded that with implementation of the final offsetting plan and appropriate mitigation measures, there will be no change in fish habitat, fish movement, migration, or fish passage as a result of Project-related activities.

Participants' Views

Fisheries and Oceans Canada stated that the proposed offsetting may not be sufficient to offset the serious harm caused by the channel realignments, due to the loss of and shortened overall stream length. Final offsetting requirements will need to be discussed and approved by Fisheries and Oceans Canada to ensure that there is no significant residual harm to a commercial, recreational or Aboriginal fishery.

Fisheries and Oceans Canada agreed that detailed design of offsetting measures would involve quantifying the areas of riparian restoration. The department stated that it will work with CN to develop an offsetting plan where habitat that is destroyed or permanently altered is replaced by habitat of similar quantity and quality, with additional habitat offsetting required to account for uncertainty and time lags.

Fisheries and Oceans Canada stated their position that, with the application of appropriate mitigation measures, finalization and implementation of offsetting plans, and with follow-up and monitoring programs, the productivity of the fisheries can be maintained.

Conservation Halton raised a number of concerns about CN's baseline geomorphic and hydrologic assessment, as discussed in subsection 7.1.2. In their view, streams within the Project Development Area should not be altered without a formal assessment of their geomorphic and hydrologic processes. They confirmed that CN's stream realignment designs generally employ good natural channel design approaches but stated that those design elements have not been fully applied to the Project, especially at crossings such as culverts.

Conservation Halton stated that, in their view, the Project will fragment fish habitat by separating the Tributary A realignment from the upstream portion of habitat in the Indian Creek Natural Heritage System and that indirect effects on fish habitat would include reduced riparian vegetation and diversity.

Conservation Halton also stated that the loss of 500 metres of channel along Indian Creek will result in a loss of direct fish habitat, indirect and contributing habitat, riparian cover and associated organic material and ecological inputs (for example, leaf litter; invertebrate prey), as well as altered sediment loads and flow velocities. Since this reach of Indian Creek is contributing habitat to a diverse fish

community, including a population of Silver Shiner downstream from this site, it is Conservation Halton's opinion that the loss of 500 metres of channel in this reach will also result in a significant negative effect on the overall ecological function of Indian Creek.

Conservation Halton stated that the proposed realignment configuration does not adequately compensate for lost fish habitat. In their view, compensation should occur as close to the site as possible. They also concluded that the enhancement of a shortened channel section would not adequately compensate for the direct loss of fish habitat and will result in a net loss of fish habitat and the natural heritage system generally.

Conservation Halton also commented that if the Project is constructed as designed, it will cause the loss of riparian habitat associated with the net loss of over 500 metres of creek channel, which has not been properly offset, resulting in an adverse ecological effect on the overarching Indian Creek watershed.

Conservation Halton stated that the Project does not appear to meet their requirement that fluvial processes not be impacted. In addition, in their view the channelization of approximately 400 metres of Tributary A by twinning of 125-metre culverts across the pad site and a 75-metre stretch across the kiosk and truck gate will alter stream processes and create a barrier to fish passage.

In Conservation Halton's view, it is important that the Project meet water quality standards currently applied to developments within the Boyne Survey Area; otherwise there will be downstream degradation of watercourses. When asked at the hearing whether the recreated habitat will be completely equivalent to the Boyne Survey objectives and standards, CN responded that it was not sure the habitats are completely equivalent, although it confirmed that the water quality standards it had used are the same as those Conservation Halton has used for the Boyne Survey Area.

9.1.3. Follow-up and Monitoring Program for Fish Habitat

CN's Views

CN will conduct monitoring to confirm that fisheries offsetting measures have been implemented and meet their intended objectives. This will include compliance monitoring to confirm that planned habitat offsets are constructed according to approved plans; and habitat effectiveness monitoring to confirm habitat offsets are functioning as intended after construction.

CN also stated that it will work with Fisheries and Oceans Canada to monitor the channel realignments twice a year (spring and fall) in years zero, one, two and three following construction of the realigned channels. The purpose of this monitoring is to confirm that installed channel features are stable and that no excessive erosion is occurring throughout the Project reach based on stream characteristics within the realigned channels. Monitoring will include profile, pattern, dimensions and pebble count at established monitoring locations and photo points. The spring assessment would involve a visual assessment, including photo documentation of in-stream structures for geomorphic conditions; the fall assessment would involve a geomorphic assessment of stream characteristics (profile, pattern, dimensions, pebble counts).

CN also stated that it will verify the installation of plant materials as per the planting plan and confirm the successful propagation of native plant species. Monitoring is proposed for three years, essentially

through the construction phase and into the operation phase until the point at which vegetation has become established.

Participants' Views

Fisheries and Oceans Canada stated its opinion that CN has designed an appropriate monitoring and follow-up plan for fish and fish habitat, based on information available thus far.

Fisheries and Oceans Canada recommended monitoring the success of fish habitat offsetting measures for a minimum of three years up to five years. Such monitoring should include confirmation that offsetting measures have been effective in counterbalancing the loss or effects on fish or fish habitat.

Fisheries and Oceans Canada stated that CN should have contingency measures or a more formal contingency plan in place to deal with unexpected situations or occurrences that may arise throughout construction and offsetting.

Conservation Halton and Halton Municipalities expressed concern about several aspects of CN's proposed follow-up program, as discussed in subsection 7.1.2. They recommended a more extensive channel monitoring program than CN has proposed, including pre-construction baseline monitoring, followed by post-construction monitoring immediately upon completion and again after five and ten years. In their view, this monitoring should include cross-sections, bed substrate, bed morphology and detailed longitudinal profiles to track channel migration. Conservation Halton also recommended that triggers for implementing adaptive management measures be established within the plan, including requirements to take action in the event of any changes in cross-sections in excess of 20%; restoration or substrate grain size adjustments in excess of an order of magnitude; or annual migration rates in excess of 15 cm/year.

Halton Municipalities also recommended more extensive monitoring, including system monitoring for watercourse stability, riparian lands and natural systems to determine whether the overall objectives of the plan are being met.

Conservation Halton noted that thermal monitoring is not proposed but is a requirement for the first five years for all stormwater management ponds and channels in the Boyne Area and should be required for the Project.

9.2. Fish Mortality

Subsection 6.1.5 of the EIS Guidelines required CN to provide baseline information regarding fish populations. Subsection 6.3.1 required that CN describe any changes the Project would cause to fish populations. This section of the report deals with Project effects relating to fish mortality and summarizes the views of CN, participants and the Panel.

9.2.1. Project-related Changes to Fish Mortality

CN's Views

CN stated that changes in increased fish mortality can occur in two ways during construction of Project components and channel realignment, restoration, and naturalization: through the direct risk of mortality during in-water construction activities, by way of contact with machinery, impingement on

pump intakes, accidental removal from a watercourse or water body via construction equipment or asphyxiation as a result of dewatering activities. Mortality could also occur through the introduction of a deleterious substance during construction.

CN also stated that fish are subject to effects from a change in water quality through two pathways: change in water quality parameters, and change in sediment load and quality.

CN observed that the presence of suspended sediment in a watercourse or water body can induce a wide range of biological effects, including subtle behavioural changes, reduced feeding efficiency, decreased predator avoidance, and lower growth rates in fish. High sediment concentrations can cause fish mortality or reduce overall fish production because of turbidity-related reductions in algae and in benthic and aquatic invertebrate production. Slow water velocities can cause suspended sediment to settle out and smother benthic invertebrate communities or fish eggs and larvae or alter stream bottom substrate, which in turn affects the abundance and diversity of benthic invertebrate communities and availability of spawning areas.

CN stated that several recreational species present in the Project Development Area, Local Assessment Area, and Regional Assessment Area require clear water with gravel, pebble or rock substrate in which to spawn, and therefore increased suspended sediment concentrations and mobilization or deposition of sediment might affect spawning activities of those species. CN did not indicate which species might be affected by such conditions.

CN proposes the following mitigation measures for potential effects on fish mortality during construction:

- Project personnel will not be permitted to fish on the work site.
- Contractors must notify CN 72 hours before construction of any watercourse or water body crossing or diversions to ensure fish salvage operations are conducted, where required.
- Fish salvages must be conducted by a qualified aquatic biologist, where required, in accordance with permit conditions.
- Release captured fish to areas within the same watercourse, outside of the work, where suitable habitat exists. In addition to the recommended measures listed above, activities near water should be carried out following standard guidance, including Fisheries and Oceans Canada's *Measures to Avoid Causing Harm to Fish and Fish Habitat* that reduce effects on fish and fish habitat.

CN predicted that construction of the Project's stormwater management facilities would reduce concentrations of total suspended solids and other deleterious substances, resulting in a positive, low-magnitude effect on water quality.

CN stated that the removal and naturalization of the existing online agricultural pond and breach of the existing berm would help to improve water quality in Indian Creek, remove a source of thermal heating, and improve fish and riparian habitat. CN stated that a predicted minor reduction in stream temperature of 3.7–4.6 °C in Tributary A and 1.0–2.0°C within Indian Creek would not affect resident fish due to the wide range in thermal preferences for species inhabiting these watercourses.

CN predicted that the adverse residual environmental effects from the Project on fish, once mitigation and offsets have been implemented, would be limited to a change in fish mortality. CN anticipated that

the risk of this change would be low as it would occur only during construction and outside of the Ontario Ministry of Natural Resources and Forestry construction timing window for in-water work. CN predicted that the change in fish mortality would be an adverse effect of low magnitude, short-term in duration, and would occur as an irregular event. CN therefore concluded that the proposed mitigation measures would be sufficient to result in no significant residual effects on fish mortality during construction.

Participants' Views

Fisheries and Oceans Canada concluded that serious harm to fish habitat is likely to result from the destruction of more than approximately 11,503 m² of fish habitat within Indian Creek, and 2,594 m² within Tributary A as a result of the proposed watercourse realignments, including the installation of twin box concrete culverts on Tributary A within the new watercourse realignment and the permanent alteration of approximately 30 m² as a result of the culvert installation on Tributary C.

Fisheries and Oceans Canada stated that the potential of the Project to cause a serious harm by death of fish is not likely, due to the short term and incidental nature of any required fish captures and relocations. It noted that the proposed mitigation measures are aimed at minimizing the harm to fish during Project activities.

Fisheries and Oceans Canada noted that the department does not have criteria for thermal mitigation but agreed that reduction of thermal effects is desirable and that any measures that achieve this are desirable. Fisheries and Oceans Canada agreed with CN that the predicted reduction in temperature is unlikely to affect resident fish in Tributary A and Indian Creek

Conservation Halton stated that fish species in these streams are sensitive to thermal effects, but the proposed stormwater management ponds incorporate only riparian vegetation and bottom draw outlets and thus may not provide sufficient mitigation of thermal effects. It noted that traditional stormwater management ponds, like those proposed, do not properly mitigate thermal and water quality effects. Other options would improve thermal mitigation, including cooling trenches, use of stone core outlet wetlands, three-metre deep permanent pools and one-metre deep plunge pockets at outlets. Conservation Halton cited the Ontario Ministry of the Environment's *Stormwater Management Planning and Design Manual* (2003), which found an average 5.1 °C difference between stormwater management pond inflows and outflows. Conservation Halton stated that the thermal mitigation designs CN has proposed are not as extensive as those currently proposed for ponds upstream in the Boyne Survey. In their view, it may be necessary to modify the design of the stormwater management system to achieve the necessary thermal mitigation.

In response to these concerns, CN stated that in addition to the two mitigation measures acknowledged by Conservation Halton, CN has proposed additional measures to mitigate increases in water temperature in the stormwater management system, including the use of permeable pavement, below-grade pipes, grassed swales, pond configuration, riparian planting with shade-providing vegetation, and nighttime release of water from the stormwater management ponds. CN predicted that the measurable reductions from the overland flow collection and conveyance system (below-grade pipes and grassed swales) and stormwater management pond components (riparian plantings in conjunction with

minimum length:width ratio, bottom draw outlet and nighttime release) will discharge the collected overland runoff flow at a temperature equal to or less than the existing condition.

9.2.2. Follow-up and Monitoring Program for Fish Mortality

CN's Views

CN did not propose a follow-up program or monitoring specific to fish communities or fish mortality. CN's proposed follow-up and monitoring program for fish habitat, fish movement, migration and fish passage is discussed in Section 9.1.

Participants' Views

Fisheries and Oceans Canada stated that proponents are responsible for implementing monitoring plans to demonstrate the effectiveness of mitigation and offsetting measures. This monitoring must demonstrate that the offsetting measures have effectively counterbalanced the serious harm to fish. In its view, monitoring needs to be undertaken for a period of time sufficient to allow for:

- biological or physical changes to be reflected in the data collected;
- possible adjustments to monitoring to estimate changes in fishery productivity; and
- the offset habitat can reach full ecological functionality (supports fish reproduction, growth and survival).

It noted that there is uncertainty associated with the development of an offsetting plan, and with habitat creation there is uncertainty with lag time between when the habitat destruction or permanent alteration is incurred and when the created offsetting habitat is functional. It recommended the use of adaptive management, using the results of monitoring to target successful practices and modify regulatory approvals. Where uncertainty exists, monitoring of outcomes and targets can inform adaptive management options and the information can be used to improve best practices. Fisheries and Oceans Canada stated that the department will require in any *Fisheries Act* authorization provided to CN, a monitoring program to ensure predictions made in the environmental assessment regarding the effects on fish and fish habitat are accurate and that offsetting goals are achieved. Fisheries and Oceans Canada will also require as a condition of any *Fisheries Act* authorization that CN verify the effectiveness of mitigation measures and offsetting measures. Fisheries and Oceans Canada requires financial security, in the form of an irrevocable Letter of Credit, to ensure that the conditions of the authorization are implemented as it relates to offsetting and monitoring.

Fisheries and Oceans Canada's additional comments on follow-up and monitoring programs for fish habitat are discussed in Section 9.1.

9.3. Panel Conclusions

In reaching its conclusions about fish and fish habitat, the Panel found the following factors to be particularly relevant:

- Existing fish habitat in Indian Creek and Tributary A ranges from low to moderate quality for spawning, overwintering, rearing and migration.
- Tributary B is not part of, and does not contribute to, a commercial, recreational or Aboriginal fishery. Its ecological function is unclear but could be important in delivering organic and inorganic materials to downstream reaches.

- The reaches of Tributary C within the Project Development Area provide low quality fish habitat only during the spring freshet and substantial precipitation events.
- Excess sediment load and elevated stream temperature (thermal effects) could potentially affect fish species within the Project Development Area and downstream.
- Culverts have the potential to create barriers to fish movement, migration and fish passage. Two existing culverts are already considered to create such a barrier.
- CN has used a reference reach approach and natural channel design for its proposed channel realignments. Participants generally agreed with this approach, although questions were raised about the fish habitat viability respecting culverts passing under the tracks.
- CN's proposed stream realignments would remove existing fish habitat. CN would offset these losses by improvements in the quality of habitat over a shorter channel length. Some participants felt that this loss would not be adequately compensated by improvements in habitat quality in the restored and realigned channels.
- The effectiveness of the channel realignments, and therefore of the proposed fish habitat compensation, depends on the stability of the new channels, their streamflow regimes and their erosion and sediment transport processes. The design and success of the channel realignments are part of the Fisheries and Oceans Canada authorization.
- Fisheries and Oceans Canada agreed with CN that, with the application of appropriate mitigation measures, finalization and implementation of offsetting plans, and with follow-up and monitoring programs, the productivity of the fisheries can be maintained.
- Uncertainty associated with climate change makes it difficult to accurately predict the future streamflow and erosion/sediment transport regime in Indian Creek and Tributary A, and therefore the long-term success of fish habitat compensation measures.

The Panel concludes that three important factors contributing to high quality fish habitat are flow velocity, sediment load (which affects both substrate quality and water clarity), and thermal conditions, all of which have the potential to be altered by Project activities.

In light of the Panel's finding that, without additional mitigation the Project would have a significant adverse environmental effect on surface water and system capacity, the Panel concludes that the additional mitigation proposed in Section 7.1 (Surface Water) is essential to avoid a significant adverse environmental effect on fish and fish habitat. In particular, adverse effects on fish and fish habitat are likely if CN's proposed stormwater management system does not perform as expected; if streamflows exceed predictions and result in increased erosion and sediment transport or wash out downstream fish habitat; or if accidental releases of sediment or other materials into watercourses occur. The Panel observes that an error in CN's predictions would have serious consequences not only for fish and fish habitat within the Project Development Area, but also for downstream systems, including those that are part of an Aboriginal fishery.

The Panel therefore concludes that if the proposed mitigation for potential effects on surface water, especially as related to streamflows and the erosion and sediment transport regime, is not implemented or is not successful, the Project would potentially have a significant adverse effect on fish and fish habitat over a wide area encompassing the Project Development Area and downstream reaches. The Panel further concludes that in the absence of recommended mitigation, the frequency of such effects

would likely be intermittent and event-related, resulting from floods and associated sediment transport. These effects could result in a permanent net loss of fish habitat.

However, considering the Panel's additional recommended mitigation measures for surface water, and CN's commitments to mitigate the effects of the Project on fish and fish habitat to the satisfaction of Fisheries and Oceans Canada, the Panel finds that the residual effect on fish and fish habitat would involve some fish mortality, likely limited to the construction phase, and a net loss of habitat along Indian Creek would be offset by the creation of a shorter channel with higher quality and more diverse fish habitat, and the productivity of the fishery would be maintained over the long term.

CEAA Recommendation 9.1 — CN should implement the mitigation it has committed to undertake for fish habitat and compensation

The Panel finds that CN's commitments to implement mitigation measures for fish habitat and compensation are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- implement a Habitat Compensation Plan to compensate for the loss of freshwater fish habitat as part of the process of obtaining the authorization of a harmful alteration, disruption or destruction of fish habitat under Section 35(2) of the *Fisheries Act*. Though CN has committed to implement such a Plan, the Panel specifically recommends that the Plan should:
 - delineate existing and future fish habitat, including riparian buffers;
 - describe how created habitat will meet the requirements of life stages for the fish species likely to be affected by Project activities;
 - set out monitoring requirements for channel stability including channel cross-sections, bed substrate, bed morphology and detailed longitudinal profiles to track channel migration; and
 - establish triggers for implementing adaptive management measures.
- before the commencement of in-water activity, ensure that all equipment and materials are available and are on-site, including contingency equipment and materials;
- apply natural channel design principles to the design and dimension of the realigned channels, including incorporating natural bed morphology (pools, riffles) and planform geometry;
- design the channel realignments such that they do not excessively aggrade or degrade, convey existing flows so that flood elevations are not increased and bankfull frequency is maintained, downstream channel morphology is not altered and to limit barriers to fish migration;
- design the Project so that it provides aquatic and riparian habitat that is functional over a range of flows with an increase in diversity of habitat types;
- when clearing vegetation to accommodate channel realignment, fell trees away from watercourses and water bodies. Immediately remove trees, debris or soil inadvertently deposited below the high watermark of a watercourse;
- develop a detailed site-specific mitigation plan that meets all applicable requirements prior to initiating any watercourse or water body crossing activities not already approved as part of channel realignments;
- not permit fording of watercourses or water bodies unless approved by the applicable regulatory authority;
- re-establish vegetation on disturbed areas as soon as practicable, including following construction; in areas not subject to further construction activity / disturbance;
- buffer wetland and riparian areas by up to 30 m (final buffer size subject to final design);

- construct the channel realignment predominantly outside of the existing channels and commission such new channels upon completion of all works to minimize the time period for diversion of flows within the existing channel; and
- plan the landscape and culvert installation to maintain drainage to and from wetlands.

CEAA Recommendation 9.2 — CN should implement the mitigation it has committed to undertake for fish movement, migration and fish passage

The Panel finds that CN's commitments to implement mitigation measures for fish movement, migration and passage are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- construct the new channel associated with Indian Creek and Tributary A in the dry, while leaving earthen plugs in the connection points. Any in-water work associated with channel realignment activities should be conducted outside the Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat for warmwater fish species:
 - construct the new channel offline prior to receiving flows minimizes the need for in-water work to avoid disruption to the movement of fish and habitat and allow the new channel to be vegetated (stabilized) prior to receiving flows in order to reduce erosion and degradation of water quality;
 - comply with established Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat to avoid work in waters frequented by fish during periods when they are most sensitive to disturbance and disruption including migration and spawning; and
 - based on the warmwater characteristics of the channel through the Project site, only permit in-stream construction between July 1 and March 14 unless otherwise negotiated with Fisheries and Oceans Canada. Offline channel construction is not restricted by this timing window.
- conduct stream diversions and culvert installation in isolation of stream flows, through, for example, using dam and pump, flume, and diversion;
- isolate work areas during periods of in-water work to prevent direct effects on fish, including harm and mortality, and reduce potential release of sediments to downstream areas; and
- maintain downstream flow at all times when conducting in-water construction activities.

CEAA Recommendation 9.3 — CN should implement the mitigation it has committed to undertake for fish mortality

The Panel finds that CN's commitments to implement mitigation measures for fish mortality are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- carry out construction activities near water following Fisheries and Oceans Canada's *Measures to Avoid Causing Harm to Fish and Fish Habitat*;
- require any contractors to notify CN 72 hours before construction of any watercourse or water body crossing or diversions to ensure any necessary fish salvage operations are conducted, including all culvert installations, channel diversions or in-water work;
- require contractors to use a qualified aquatic biologist to conduct fish salvages prior to dewatering areas for in-stream work:
 - fish salvages or fish rescues allow for the capture and release of fish in areas to be dewatered;

- fish salvages are standard practice prior to in-water work and supported by regulatory authorities including Fisheries and Oceans Canada; and
- captured fish will be released to areas within the same watercourse, outside of the work, where suitable habitat exists.
- before the commencement of in-water activity, ensure that all necessary equipment and materials are available and are on-site, including contingency equipment and materials
- ensure water and pump intakes reduce or avoid disturbance of the watercourse bed and are screened in accordance with Fisheries and Oceans Canada's *Freshwater Intake End-of-Pipe Fish Screen Guideline*;
- when clearing vegetation to accommodate channel realignment, avoid felling trees so that they end up in watercourses and water bodies. Any trees, debris or soil inadvertently deposited below the high watermark of a watercourse must be immediately removed; and
- plan construction activities to avoid or minimize the extent and duration of watercourse diversions required during the realignment of Indian Creek and Tributary A.

CEAA Recommendation 9.4 — CN should implement the mitigation it has committed to undertake for thermal effects on fish

The Panel finds that CN's commitments to implement mitigation measures for thermal effects on fish are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- implement a combination of various measures during the detailed design stage including but not limited to:
 - plantation along the wet ponds and outlet channel to provide dense shading;
 - reverse bottom draw outlet pipe with installation of cooling towers/cooling trenches; and
 - vegetated berms.
- implement other measures to mitigate increases in water temperature in the stormwater management system, including permeable pavement, below-grade pipes, grassed swales, pond configuration considerations, riparian planting with shade-providing vegetation, and nighttime release of water from the stormwater management ponds.

CEAA Recommendation 9.5 — Additional mitigation to reduce effects on fish and fish habitat

The Panel's recommended mitigation measures regarding streamflows, erosion and sediment transport are discussed in Section 7.1. However, the Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect on fish and fish habitat. Therefore, the Panel recommends that CN implement the following additional mitigation measures:

- incorporate enhanced thermal mitigation measures into the detailed design of the stormwater management ponds and develop these enhanced measures in consultation with Fisheries and Oceans Canada and Conservation Halton;
- maintain streamflows as necessary to avoid effects on fish and eliminate obstacles to the movement of desired species as identified by Fisheries and Oceans Canada. In doing so CN should consult with Fisheries and Oceans Canada, Conservation Halton, and others as appropriate; and
- work with Fisheries and Oceans Canada to develop contingency measures and relevant contingency plans to deal with unexpected situations or occurrences that may arise throughout

construction and offsetting that could potentially affect fish and fish habitat in downstream watercourses that are outside of the Local Assessment Area.

CEAA Recommendation 9.6 — Follow-up program for fish and fish habitat

The Panel recommends that CN develop and implement a follow-up program for fish habitat and offsetting measures. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should include:

- monitoring and reporting requirements to demonstrate to the satisfaction of the Impact Assessment Agency of Canada and Fisheries and Oceans Canada that the offsetting measures have been effective in counterbalancing the environmental effects on fish and fish habitat over a timeframe of five years;
- reporting on mitigation measures applied, on the effectiveness of those measures and on any changes to the mitigation measures that are required if the original measures prove ineffective;
- development and implementation, if necessary, of an adaptive management strategy to ensure fish habitat compensation is functioning as expected, to be updated at least every five years during the operation phase, and implementation of corrective actions or contingency measures, if required; and
- a description of how feedback received during Indigenous consultation and consultation with other stakeholders regarding the Plan has been considered or incorporated, as appropriate.

The Panel concludes that, if the recommended mitigation is carried out, the Project is not likely to cause a significant adverse environmental effect on fish and fish habitat.

The Panel finds that the effects would be limited to the Project Development Area, and the fish habitat compensation, which would be overseen by Fisheries and Oceans Canada, would satisfactorily offset the short-term effect on fish mortality and fish habitat that would occur during construction and be restored during operation.

The Panel agrees with Conservation Halton that there is a need to understand how headwater drainage features influence fish and fish habitat elsewhere in the watershed system. The Panel acknowledges that analysis of the ecologic function of such features may be more challenging than analysis of hydraulic function. Nevertheless, the Panel supports the need to understand the role of headwater drainage features in the ecological function of the watershed system as a whole.

Additional Recommendation 9.7 — Collaboration between CN and Conservation Halton for headwater drainage features identification and protection

The Panel recommends that CN should work with Conservation Halton to conduct an assessment of Tributary B as a headwater drainage feature, including identification of its hydraulic and ecologic functions, and consult with Conservation Halton and Fisheries and Oceans Canada to develop any necessary mitigation measures which replicate those functions.

9.4. Cumulative Effects

CN's Views

CN noted that past activities upstream of the Project Development Area have influenced the diversity and structure of aquatic habitat, with conditions deteriorating with distance downstream. Water quality shows similar patterns. In addition, CN stated that it is not uncommon for reaches of Indian Creek to experience dry conditions during summer months.

CN stated that the Project is within the Indian Creek subwatershed, which has been subject to the pressures of urbanization, including agricultural conversion, residential and infrastructure development and linear infrastructure development, affecting water quality and quantity and subsequently resulting in downstream degraded aquatic habitat. CN listed a variety of past and present physical activities and resource uses that have contributed to a change in fish mortality in the Regional Assessment Area.

CN stated that the Project is located in a region where growth rates for urbanization are among the highest in the country. Urbanization pressures within the Indian Creek subwatershed, the largest within the Bronte Creek watershed, have affected water quality and quantity and resulted in downstream degraded aquatic habitat. CN also stated that within the Regional Assessment Area, agricultural conversion, residential and infrastructure development and linear development have contributed to direct fish mortality due to in-water construction or by the introduction of deleterious material, such as sediment, within Indian Creek and its tributaries within the Regional Assessment Area. CN indicated that current and future urban growth within the Regional Assessment Area and Town of Milton may also contribute to fish mortality.

CN noted that the Boyne Planning District, the Britannia Road Transportation Corridor and the Union Gas Hamilton-Milton Project overlap the Project Local Assessment Area spatially and temporally for construction and that residual effects from a change of fish mortality area may occur. CN indicated that residual Project effects would not overlap with effects from the Tremaine Road Widening and Union Gas Burlington-Oakville Project, and so it did not assess cumulative effects on fish mortality for the Union Gas Burlington-Oakville Project.

CN stated that other projects and activities that may result in fish mortality in combination with the Project include the Boyne Planning District, Britannia Road Transportation Corridor and the Union Gas Hamilton-Milton Project. Potential cumulative effects on fish mortality would be limited to the construction phase. Construction activities for all four projects may increase mortality risk through a number of pathways including in-water works by way of contact with machinery, impingement on pump intakes, accidental removal from a watercourse or water body via construction equipment, or asphyxiation as a result of dewatering activities. Mortality could also occur through the introduction of a deleterious substance during construction, such as sediment.

CN therefore concluded that current and future physical activities in combination with Project activities will contribute to fish mortality in the Regional Assessment Area through in-water works, construction of the terminal and channel realignment, removal of natural vegetation, restoration and naturalization within each project footprint. CN predicted that conditions at any watercourse within the Project Regional Assessment Area and the footprints of the Boyne Planning District, Britannia Road Transportation Corridor and the Union Gas Hamilton-Milton Project will all be short-term in duration,

and Indian Creek and tributaries will be restored to pre-developed conditions or a naturalized, realigned condition.

CN proposes a number of mitigation measures for Project effects on fish mortality, including working outside of restricted activity periods designated by the Ontario Ministry of Natural Resources and Forestry; see Section 9.2. In its view, implementation of these measures will reduce Project-related effects and the Project's contributions to cumulative effects on fish mortality.

CN concluded that the Project's overall contribution to cumulative effects on fish mortality will be adverse, as mortality of fish may occur, but that cumulative effects would be low in magnitude based on location and duration of activities and through proper mitigation implementation. Residual cumulative effects will be permanent.

Participants' Views

Fisheries and Oceans Canada acknowledged the importance of recognizing the cumulative effects on fish and fish habitat in the watershed. The department noted that the EIS stated that cumulative effects of past industrial and commercial development and agricultural conversion have cumulatively led to the degradation of the Indian Creek aquatic ecosystem. Given the overall existing low quality of fish habitat and water quality in Indian Creek, Fisheries and Oceans Canada stated that the proposed works as a result of the Project provide an opportunity to enhance aquatic habitat in the watercourse.

Enhancement includes designated riparian buffers, redesigning stream morphology using natural channel designs and improving stormwater management. Fisheries and Oceans Canada did not comment specifically on cumulative effects on fish mortality.

Halton Municipalities generally agreed with CN's analysis of the geographic extent, duration, frequency, reversibility of cumulative effects on fish populations and concluded that such effects are unlikely.

Halton Municipalities was critical of CN's assessment of the magnitude of cumulative effects on fish mortality. They stated that the information CN submitted does not speak to the likelihood of effects or how the effects from several projects might interact. In their view, the submitted information is therefore not sufficient to assess the magnitude of the cumulative effects of the Project in combination with other projects for this valued component. Halton Municipalities did however agree with CN's analysis of the geographic extent, duration, frequency, reversibility of cumulative effects on fish populations.

Panel Conclusions and Recommendations

The Panel agrees with Fisheries and Oceans Canada and other participants that extensive land use changes over many decades have cumulatively resulted in the degradation of the Indian Creek aquatic ecosystem. These changes are typical of aquatic systems throughout urbanized portions of Southern Ontario, and parallel the historic effects on wildlife described in Section 10 (Wildlife Habitat and Wildlife).

As in the case of wildlife, the Panel did not hear detailed information about the progression of losses to fish and fish habitat over time. The Panel acknowledges Conservation Halton's extensive contribution to the development of sound watershed management practices and responsible land development, however, the Panel was not surprised to learn that fish mortality and fish habitat alteration in the region

of Halton have occurred over many years, and will continue to occur, as a result of construction-related watercourse alterations and associated releases of sediment and other pollutants into receiving waters. These effects can be expected to continue well into the future, with or without the Project, as urban growth proceeds. There is no question that good construction practices, which CN proposes to employ, can help to offset or prevent further losses, but the full extent of past damage cannot be undone. The Panel concludes that CN's obligation is to limit or prevent additional effects.

The Panel finds that the Project's contribution to cumulative effects on fish and fish habitat will be small if CN implements its proposed mitigation and the additional measures recommended by the Panel, overseen by Fisheries and Oceans Canada.

Both CN and Fisheries and Oceans Canada have addressed the question of the future productivity of the Indian Creek fishery, and the potential contribution of the Project to that system. The Panel agrees with both parties that the Project offers an opportunity to enhance aquatic habitat through improved channel form, enhanced riparian vegetation, and reduction of sediment and nutrient inputs to streams. Once again, the Panel emphasizes that the Project is located in the centre of a larger watershed system and has the potential to influence cumulative effects on fish and fish habitat both upstream and downstream. The Panel notes, for example, Conservation Halton's concern that the net loss of channel along Indian Creek could result in unintended changes to the overall function of the Indian Creek ecosystem. It is therefore incumbent on CN, and in the Panel's view possible, to carefully steward lands under its ownership.

The Panel agrees with CN that the risks to fish mortality will be associated mainly with construction. Several projects, including ongoing construction in the Boyne Planning District, the Britannia Road Transportation Corridor and the Union Gas Hamilton-Milton Project, overlap the Project Local Assessment Area spatially and temporally, and the Panel agrees that it is likely that adverse residual effects on fish mortality in the area are likely to occur as a result. These effects are likely to be reversible once construction has ended. The larger challenge for all parties will be creating and maintaining high quality fish habitat long into the future. For that reason, the Panel observes that, as with wildlife and wildlife habitat, it will be essential that CN place a high value on fish and fish habitat, and demonstrate that commitment through ongoing engagement with Fisheries and Oceans Canada and Conservation Halton; see Section 15 (Environmental Management). In the Panel's view, development need not and should not be at odds with environmental protection, but it will take leadership and sustained commitment from CN to achieve sustainable improvements in the Indian Creek aquatic ecosystem.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to have a significant adverse cumulative environmental effect on fish and fish habitat.

10. Wildlife Habitat and Wildlife

This section addresses changes to the wildlife and its habitat, including species at risk and habitat connectivity. The Panel considers these to be environmental effects under subsection 5(2)(a) of the *Canadian Environmental Assessment Act, 2012*, in consideration of the potential determination of the Canadian Transportation Agency with respect to the Project. This section also addresses effects on

migratory birds, which are environmental effects under subsection 5(1)(a)(iii) of the *Canadian Environmental Assessment Act, 2012*. Section 3 of the Review Panel Terms of Reference requires it to take into account the environmental effects of the Project. The Panel also considered adverse environmental effects of the Project on species at risk in support of the government's obligations under Section 79 of the *Species at Risk Act*.

10.1. Species at Risk

Subsection 6.1.7 of the EIS Guidelines required CN to provide baseline information regarding species at risk. Subsection 6.3.3 required that CN describe any changes the Project would cause to federally listed species at risk, and species listed by the Committee on the Status of Endangered Wildlife in Canada classified as extirpated, endangered, threatened or of special concern (flora and fauna) and their critical habitat. This section of the report deals with Project effects relating to species at risk and summarizes the views of CN, participants and the Panel.

The Project has the potential to interact with species at risk and their associated habitat due to changes in landscape as a result of construction, and operation of infrastructure and vehicle traffic associated with the Project. The Project could cause direct mortality through construction and operation activities, loss of habitat as a result of land clearing, and sensory disturbance during both construction and operation of the Project.

In its analysis of the Project's effects on species at risk, CN stated that it considered all wildlife habitat and functions, regardless of the size, abundance and diversity of the species observed. CN noted that wildlife species in the Project Development Area are characteristic of agricultural settings, and the species at risk that were found are commonly encountered throughout southern Ontario. CN also considered species that had been recommended for at-risk status but were not yet formally protected.

CN indicated that its wildlife surveys were consistent with all appropriate federal and provincial protocols and that members of the Mississaugas of the Credit First Nation participated in the biophysical field studies. It also concluded that the site had no significant wildlife habitat based on Ontario Ministry of Natural Resources and Forestry criteria.

CN identified habitat for the following species at risk in the Local Assessment Area and Project Development Area: Western Chorus Frog, Eastern Milksnake, Snapping Turtle, Midland Painted Turtle, Eastern Wood-Pewee, Barn Swallow, Bobolink, Eastern Meadowlark, Monarch butterfly, and Little Brown Myotis.

10.1.1. Western Chorus Frog

CN's Views

Western Chorus Frog is listed as threatened under the federal *Species at Risk Act*, and has been observed in the Local Assessment Area. CN identified suitable habitat for Western Chorus Frog along the woodlot to the south which includes shallow pools for breeding. An adjacent meadow habitat patch provides important summer habitat, and the woodlot provides wintering habitat for the species. Halton Municipalities informed CN that Western Chorus Frog has also been observed on private property adjacent to CN lands; the exact details are subject to a confidentiality agreement.

CN stated that constructing new track along the mainline and the replacement and extension of a culvert might disturb the species or its habitat during construction.

CN proposes mitigation for Western Chorus Frog to be implemented at the location where they were observed, including exclusion fencing, sediment and erosion control, and timing windows when certain construction activities could be carried out safely. CN indicated it would erect exclusion fencing around the construction area when individuals are actively calling and confined to the breeding ponds. CN also agreed to implement mitigation measures recommended by Environment and Climate Change Canada, including the timing and sequencing of temporary and permanent exclusion fence installation and habitat replacement and enhancement. CN would consult with Environment and Climate Change Canada to identify suitable locations and attributes for new Western Chorus Frog habitat.

CN estimated that there was 69 hectares of potential suitable habitat for Western Chorus Frog in the wider Regional Assessment Area that would not be affected by foreseeable future projects and activities, and CN predicted that the Project would not cause mortality or habitat loss to the regional Western Chorus Frog population.

Participants' Views

Environment and Climate Change Canada indicated that known Western Chorus Frog occurrences are very close to the existing mainline right-of-way and would likely be affected by the doubling of the line and the installation of new culverts. In its view, doubling the line could further impair connectivity between breeding and hibernation sites. With Western Chorus Frog individuals occurring in close proximity to the Project, there is a strong possibility that there could be habitat for the species within the Project Development Area. Environment and Climate Change Canada observed that there may be up to two hectares of hibernation habitat permanently removed as a result of the Project and up to two additional hectares temporarily affected.

Environment and Climate Change Canada made a number of recommendations for mitigation including targeted surveys in the spring prior to Project construction, followed by additional mitigation if required, and restoration of temporarily and permanently removed hibernating sites at a one-to-one ratio within the existing Project site. Survey methodologies and count locations should follow protocols developed in consultation with Environment and Climate Change Canada. If the recommended surveys identify the presence of the species within the Project footprint, Environment and Climate Change Canada recommended that CN should consult with them on additional mitigation measures, which might include physical avoidance, or changes to the site layout or timing of certain Project activities. Environment and Climate Change Canada also recommended that hibernating sites being restored by CN should be connected to the track right-of-way and within 300 metres of the location where the Western Chorus Frog was observed in 2014 and 2016.

Environment and Climate Change Canada noted that habitat on the site had not been identified, at the time of the hearing, as critical habitat in the species recovery strategy as defined under the federal *Species at Risk Act*. Since an order is not in place for non-federal lands, *Species at Risk Act* habitat protections do not apply.

Environment and Climate Change Canada recommended that CN, in consultation with the department, consider creating breeding and dispersal/movement habitat and ecopassages under the railway line within the Project Development Area to help mitigate any potential effects of habitat loss and impaired connectivity resulting from the Project activities. Any restored habitat or installed ecopassages should be monitored to evaluate use and success, and the results should be shared with Environment and Climate Change Canada to help inform future habitat creation and restoration efforts.

Environment and Climate Change Canada agreed with CN's proposal to install exclusion fencing when individuals are actively calling and confined to breeding ponds. The department noted that the timing of this period depends very much on local weather conditions, but it typically starts March 20th and concludes on June 11th. Construction areas must not include Western Chorus Frog breeding habitat in order for this mitigation to be effective. CN indicated that the habitat restoration and enhancement plan would be circulated to Environment and Climate Change Canada for input.

Halton Municipalities expressed concern that since potentially suitable Western Chorus Frog breeding habitat within the Project Development Area, Local Assessment Area and adjacent lands were not surveyed, non-breeding and overwintering sites might have been overlooked.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on Western Chorus Frog the Panel considered the following factors to be particularly relevant:

- Western Chorus Frog is a threatened species under the federal *Species at Risk Act* and Environment and Climate Change Canada published a recovery strategy for the species in 2015.
- While CN did not identify habitat for the species within the Project Development Area, information brought forward during the review and public hearing suggests that there is habitat in close proximity to the mainline and more might exist in the Project Development Area. Environment and Climate Change Canada has identified up to four hectares that might contain suitable habitat for Western Chorus Frog and could be directly affected by Project activities. Halton Municipalities raised concerns about the effectiveness of the surveys within the Project Development Area.
- As with other species in the Project Development Area, there are likely to be habitat connectivity challenges.
- Environment and Climate Change Canada has made mitigation recommendations and CN has committed to work with Environment and Climate Change Canada on those recommendations.

The Panel notes that both Environment and Climate Change Canada and Halton Municipalities have suggested that additional habitat, beyond that identified by CN, may exist in the Project Development Area. The Panel concludes that protection of this species would require a thorough understanding of the habitat areas it uses and travel patterns between the areas.

CEAA Recommendation 10.1 — CN should implement the mitigation it has committed to undertake for Western Chorus Frog

The Panel finds CN's commitments to implement mitigation measures for Western Chorus Frog are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- place exclusion fencing between Western Chorus Frog habitat and the mainline to avoid interactions with frogs during construction and operation; and
- avoid replacement of the culvert adjacent to Western Chorus Frog habitat during the breeding season for Western Chorus Frogs from March to June (temperature dependent).

CEAA Recommendation 10.2 — Additional mitigation to protect Western Chorus Frog

The Panel considers that additional mitigation measures, beyond CN's commitments, are necessary to avoid a significant adverse environmental effect on the Western Chorus Frog. Therefore the Panel recommends that CN implement the following mitigation measures:

- Ensure that sensitive areas are not disturbed during construction of the Project and are maintained throughout operation. To achieve this prior to Project construction, CN should carry out additional targeted surveys during the spring for Western Chorus Frog to identify breeding and hibernating habitat within the Project Development Area and nearby areas. These surveys should be carried out in consultation with Environment and Climate Change Canada and should also identify connections between these areas. CN should develop survey methodologies in consultation with Environment and Climate Change Canada.
- If the presence of the species is confirmed as a result of surveys, CN should consult with Environment and Climate Change Canada and Conservation Halton to develop additional mitigation measures to ensure no net loss of habitat and no mortality to the species. Where necessary, these measures should include physical avoidance, changes to the site layout or changes to the timing of certain Project activities.
- If any hibernation sites are temporarily or permanently affected by the Project, CN should replace these at a one-to-one ratio at a minimum. Restored sites should be connected to the track right-of-way and within 300 metres of the 2014 and 2016 observations that were noted by the Town of Milton.
- When individual frogs are actively calling, exclusion fencing should be used to keep Western Chorus Frogs out of construction areas and confined to breeding ponds for the period of breeding (typically March 20th to June 11th, but weather-dependent). CN should determine dates annually in consultation with Environment and Climate Change Canada.
- CN should ensure that construction areas do not contain any Western Chorus Frog breeding habitat prior to commencing work in those areas.
- CN, in consultation with Environment and Climate Change Canada and Conservation Halton, should construct ecopassages under the railway line to ensure habitat connectivity for Western Chorus Frog.

CEAA Recommendation 10.3 — Follow-up program for Western Chorus Frog

The Panel recommends that CN develop and implement a follow-up program for the Western Chorus Frog. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the predictions prove to be incorrect or mitigation measures are not functioning as expected. The follow-up program should monitor restored Western Chorus Frog habitat and installed ecopassages to evaluate use and success and the results should be shared with Environment and Climate Change Canada and Conservation Halton to help inform future habitat creation and restoration efforts.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to have a significant adverse environmental effect on the Western Chorus Frog.

The Panel finds that the Project would permanently affect up to two hectares of identified Western Chorus Frog hibernation habitat, which the Panel considers to be of limited geographic extent, because CN will be required to work with Environmental and Climate Change Canada to identify suitable attributes and locations, and to create replacement habitat.

10.1.2. Eastern Meadowlark and Bobolink

CN's Views

Eastern Meadowlark and Bobolink are both listed as threatened under the federal *Species at Risk Act* and the Ontario *Endangered Species Act*. Breeding habitat for both species includes hay, pasture and meadow fields. Both Eastern Meadowlark and Bobolink nest on the ground in June, which coincides with the first hay-cutting in southern Ontario. CN stated that 90% of the nests are lost when hay is cut, and for that reason, CN considered the habitat on site to be degraded and of low quality. CN estimated that there was a total of 266.7 hectares of suitable habitat in the Regional Assessment Area and that the Project would remove 40.7 hectares within the Project Development Area.

CN proposes to offset this loss by creating and maintaining 40.7 hectares of suitable habitat outside the Regional Assessment Area in the Luther Marsh Wildlife Management Area, where the two species would no longer be subject to the risk of mortality due to hay-cutting. CN stated that this habitat is within the same ecoregion as the Project. This habitat would also be suitable for Monarch butterfly and other grassland wildlife. CN has entered into a partnership with Ducks Unlimited Canada to convert existing agricultural fields into native grassland habitat, following established guidelines. Ducks Unlimited Canada would be responsible for the long-term monitoring and management of this habitat and would conduct annual breeding season surveys for Eastern Meadowlark and Bobolink for five years, beginning in 2019. The Luther Marsh site is in the traditional territory of the Mississaugas of the Credit First Nation. The Mississaugas of the Credit First Nation have indicated that the creation of new grassland habitat in this area would integrate with their own habitat enhancement projects.

CN predicted that this habitat enhancement would contribute to population growth of Eastern Meadowlark and Bobolink, as opposed to population decline. CN also predicted no cumulative effects in the wider Regional Assessment Area because under Ontario law, the developers of any foreseeable future projects and activities would be required to compensate for any habitat loss and such projects would therefore not cause loss of habitat.

Participants' Views

Environment and Climate Change Canada stated that Eastern Meadowlark and Bobolink have shown a substantial population decline over the past 30 to 40 years. A 2019 report provided by Environment and Climate Change Canada during the public hearing, *The State of Canada's Birds*, showed that Canadian grasslands have lost 300 million birds since 1970, or two out of every three birds. Environment and Climate Change Canada confirmed their understanding that the Luther Marsh area is within the same ecoregion as the Project and that Eastern Meadowlark and Bobolink are well established in that area; for those reasons, the department considered it to be one of the most important parts of the province

for both species. The compensation habitat would be adjacent to existing and restored grassland habitat, thereby creating a larger contiguous area able to support a greater number of Bobolink, Eastern Meadowlark and Monarch butterfly individuals. Environment and Climate Change Canada also observed that grassland habitat is human-made and easy replicated, so that the one-to-one ratio of replacement habitat is appropriate. The new habitat in Luther Marsh would be managed to prevent losses due to development pressure or natural succession into shrubland. Environment and Climate Change Canada recommended that CN consult with the department and other interested authorities when developing the proposed grassland habitat offset plan, which should be completed prior to Project commencement. Other interested authorities could include the Ontario Ministry of the Environment, Conservation and Parks, conservation authorities, municipalities and other local groups.

The Ontario Ministry of the Environment, Conservation, and Parks stated that the Project's removal of Eastern Meadowlark and Bobolink habitat would be one of the largest single removals in the Greater Toronto Area since the two species were listed in 2010 and 2012, respectively, but concluded that this loss would be appropriately mitigated by CN's proposed compensation habitat.

Halton Municipalities expressed concern that Eastern Meadowlark and Bobolink habitat was inadequately characterized and not properly surveyed. Halton Municipalities remained concerned that Eastern Meadowlark and Bobolink nests might be inadvertently cleared during the construction phase. Halton Municipalities also expressed concern that the compensation habitat would be outside the region and that CN was only intending to fund the management program for 20 years.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on Eastern Meadowlark and Bobolink the Panel considered the following factors to be particularly relevant:

- Both species are threatened and in serious decline.
- The Project would permanently remove grassland habitat.
- Grassland habitat within the Project Development Area is compromised by hay cutting during the nesting season.
- While the new grassland habitat in the Luther Marsh Wildlife Management Area proposed by CN to offset the loss of 40.7 hectares in the Project Development Area is not in the region of Halton, it is located in the same ecoregion as the Project, and in a region of the province that already provides important habitat for the two species and will help consolidate a larger area of habitat for them.
- The new habitat would not be subject to agricultural activities, thus removing one source of potential mortality.
- Grassland habitat is relatively easy to replicate.
- CN is proposing to create and manage the new habitat in a contract with Ducks Unlimited Canada, an organization with extensive experience in wildlife habitat management.

The Panel acknowledges with concern the alarming decline in the populations of grassland birds in Canada. At the same time the Panel concludes that CN's proposal to offset the habitat loss caused by the Project would be a valid and potentially permanent mitigation approach. The Panel believes that the new habitat to be created in the Luther Marsh Wildlife Management Area will be of significantly higher quality than the existing agricultural fields. This together with the consolidation of a much larger area of

habitat, in the Panel's opinion, would likely create more positive outcomes than establishing smaller areas of lower quality habitat closer to the Project Development Area. The Panel considers that the only completely effective method to avoid destroying active nests (those containing viable eggs or chicks) is to schedule land clearance outside the breeding season.

The rapid decline of grassland species underscores the importance of collaborative study and action to slow or reverse the decline. Due to the uncertainty associated with the potential effects of climate change on the species and its habitat, the widespread loss of habitat and the decline of grassland bird populations, it is especially important that CN and relevant authorities, including Environment and Climate Change Canada and the Ontario Ministry of the Environment, Conservation and Parks, take measures necessary to ensure the recovery of the Eastern Meadowlark and Bobolink populations. The Panel encourages CN to work closely with these government agencies.

CEAA Recommendation 10.4 — CN should implement the mitigation it has committed to undertake for Eastern Meadowlark and Bobolink

The Panel finds that CN's commitments to implement mitigation measures for Eastern Meadowlark and Bobolink are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- ensure land clearance activities do not destroy nests during the breeding season by means such as restricting the clearing of vegetation within habitat of Eastern Meadowlark or Bobolink to periods outside of the breeding season (which occurs from the end of March to the end of August); and
- create and protect off-site grassland habitat in the Luther Marsh Wildlife Management Area to offset loss of Eastern Meadowlark and Bobolink residences within the Project Development Area.

CEAA Recommendation 10.5 — Follow-up program for Eastern Meadowlark and Bobolink

The Panel recommends that CN develop and implement a follow-up program for Eastern Meadowlark and Bobolink. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should include:

- monitoring surveys within Luther Marsh Wildlife Management Area for a period of 20 years following the start of Project construction and analysis to verify whether there is adequate breeding success in the new habitat, and thus ensure it is functioning as CN predicted and is an effective mitigation measure. The results of these surveys should be made available to Environment and Climate Change Canada and other parties with relevant knowledge or expertise;
- identification of remedial actions, including improvement of the new habitat at Luther Marsh Wildlife Management Area or creation of additional habitat there or closer to the Project, if the monitoring shows that breeding success is not adequate, and therefore mitigation measures are not proving to be successful, to offset habitat losses caused by the Project; and
- an evaluation of the stability of the new habitat before the 20-year funding agreement elapses. If the evaluation shows that ongoing maintenance is required to sustain the habitat after 20

years, and no other resources are assured, CN should extend the funding agreement to ensure the mitigation remains effective in the long term.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to cause a significant adverse environmental effect on Eastern Meadowlark and Bobolink.

The Panel finds that scheduling the timing of construction activities outside the breeding season would reduce mortality to a low magnitude, and habitat losses would be adequately offset by the proposed compensation habitat in the Luther Marsh Wildlife Management Area.

10.1.3. Snapping Turtle and Midland Painted Turtle

CN's Views

Snapping Turtle is listed as a species of special concern under the federal *Species at Risk Act* and the Ontario *Endangered Species Act*. CN found five Snapping Turtles in ponds adjacent to the woodlot to the south of the Project and two in Indian Creek. CN indicated that since Snapping Turtles do not usually use flowing water systems for overwintering, Indian Creek most likely provides a movement corridor for Snapping Turtles to move between habitat patches. Snapping Turtles were also found in the online pond in Tributary A. Midland Painted Turtle is a species that was recommended for special concern status under the federal *Species at Risk Act* in the fall of 2018. CN found 20 Midland Painted Turtles in ponds in the forested area outside the Project Development Area and one Midland Painted Turtle in the online pond in Tributary A. CN reached similar assessment conclusions for both species of turtle.

CN anticipated that the Project would remove 3.7 hectares of turtle habitat in the Project Development Area but proposed to create 7.1 hectares of additional habitat in new wetlands for a net increase of 3.4 hectares. The new shallow water riparian wetlands along Indian Creek would provide both overwintering habitat and foraging habitat for turtles.

CN has prepared a Snapping Turtle Conceptual Management Plan. Proposed mitigation measures include sequencing of construction phases, the relocation of individual turtles as necessary, and temporary and permanent exclusion fencing to keep turtles away from construction activities, the facility and roadways. During operation, connectivity between Snapping Turtle habitat areas would be maintained along Indian Creek with exclusion fencing installed between work areas and existing water channels prior to work commencing, and through the woodland community to the south of the Local Assessment Area; the realigned channel would be in place before channel diversion takes place; and new foraging and nesting habitat would be added along the Indian Creek corridor. CN predicted that the risk of mortality to turtles caused by the Project would be low to negligible as habitat would be protected and the safe movement of Snapping Turtles throughout the Local Assessment Area would be enhanced.

Participants' Views

Environment and Climate Change Canada predicted that the Project would result in the loss or alteration of Snapping Turtle habitat and residences during construction and might result in turtle mortality. In its view, mortality from interactions with vehicles could occur during Project construction and operation, and any Project-induced increase in traffic on internal and off-site roads could increase this risk.

Consequently, Environment and Climate Change Canada made a number of recommendations for the Panel's consideration, including the necessity for CN to consult with Environment and Climate Change Canada and other interested authorities to develop a Snapping Turtle management plan that addresses habitat offsetting and includes measures to protect turtles during construction and operation. Environment and Climate Change Canada also recommended that CN implement timing windows and exclusion fencing, habitat connectivity, nesting mounds, and manage the risk caused by roads. Environment and Climate Change Canada anticipated a net gain in Snapping Turtle habitat in the Regional Assessment Area due to CN's commitments to create and enhance on-site habitat.

Halton Municipalities emphasized that Snapping Turtle is a slow-moving species that takes years to mature to reproductive condition. It has varied habitat needs. Snapping Turtle often overwinters in ponds that are deep enough to not freeze in the winter, but young turtles can overwinter in creek beds and in seepage areas. Halton Municipalities noted that CN had not identified nesting habitats for turtles or the movement corridors between nesting sites, which could be hundreds of metres apart. Halton Municipalities also stated that the connections to habitat outside the Project Development Area likely provide access to a variety of foraging, nesting and overwintering sites in the wider region.

Halton Municipalities stated that turtle movements are unpredictable; they can follow creek courses or travel over land. They also noted that turtles are extremely vulnerable to road kill. In their view, the corridor along Tributary A to the forest and wetland areas to the northeast of the Project Development Area is an important connection. CN has proposed to replace this corridor with a culvert and a ditch.

Halton Municipalities raised a number of concerns regarding the effectiveness of both silt fencing and exclusion fencing. They observed that if silt fences collapse, especially after a storm event, silt then migrates into the areas that need to be protected, and species that are supposed to be kept out by the silt fence may travel through. Similarly, exclusion fencing may break, allowing wildlife to pass through. In addition, exclusion fencing may cause habitat fragmentation, trapping turtles in an area that lacks nesting areas or preventing them from reaching overwintering areas.

Conservation Halton recommended that surveys within the exclusion fenced zone should be conducted by a qualified individual, transfers of any turtles encountered to the transfer site location should use appropriate containment and transfer methods, and construction workers should be trained to safely capture and release turtles should they encounter one when the turtle expert is not on site.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on Snapping Turtle (and, by extension, the Midland Painted Turtle) the Panel considered the following factors to be particularly relevant:

- Snapping Turtle is a species of special concern under the federal *Species at Risk Act*.
- Although the Midland Painted Turtle is not designated as a species at risk, it is under considerable pressure, and the Panel anticipates mitigation measures for the Snapping Turtle would support both species.
- Turtles are particularly vulnerable because of their slow maturation, slow movement and vulnerability during road crossings.
- While the Project will remove habitat in the Project Development Area, CN has committed to replace and expand it.
- Snapping Turtles travel considerable distances so habitat connectivity is vital.

- The expanded mainline and new roadways within the terminal represent a connectivity challenge and an increased risk of mortality to turtles.
- Besides wetland habitat replacement, the main mitigation measure CN has proposed is exclusion fencing. The long-term effectiveness of the fencing is uncertain. There is also a possibility that such fencing could increase habitat fragmentation.
- Environment and Climate Change Canada has made mitigation recommendations and is prepared to work with CN on a Snapping Turtle management plan.

The Panel acknowledges that the existing mainline already presents a habitat fragmentation challenge to the Snapping Turtle and other wildlife. In order to ensure that Snapping Turtles are not further affected, it will be important for CN to focus on maximizing connectivity through the careful design of culverts and other crossings; ensuring that new wetlands are suitable and sustainable habitat; and through the careful design, placement and maintenance of exclusion fencing. In particular, the Panel is concerned that exclusion fencing may lose its effectiveness over time if it is not regularly checked and maintained to ensure it stays in place and is generally in good condition. A broken fence would not impair facility operations and could therefore be otherwise easily ignored.

Conclusions and recommendations with respect to habitat connectivity are included in Section 10.3 Habitat Connectivity. Conclusions and recommendations with respect to wetlands are included in Section 7.3 Changes to Wetlands.

CEAA Recommendation 10.6 — CN should implement the mitigation it has committed to undertake for Snapping Turtle and Midland Painted Turtle

The Panel finds that CN's commitments to implement mitigation measures for Snapping Turtle and Midland Painted Turtle are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- implement turtle habitat enhancements in Indian Creek and on-site ponds;
- avoid construction in-water during the Snapping Turtle overwintering period from October to April;
- place permanent exclusion fencing between retained/enhanced turtle habitat and the terminal to avoid interactions with turtles and Project vehicular traffic; and
- under direction from CN, a qualified biologist/ecologist should conduct turtle rescues to relocate Snapping Turtles before in-water works occur in their habitat. Exclusion fencing will be installed to prevent individuals from re-entering until construction is complete.

CEAA Recommendation 10.7 — Additional mitigation to protect Snapping Turtle

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following additional mitigation measures:

- In order to determine the appropriate placement of permanent exclusion fencing, before construction begins, CN, in consultation with Environment and Climate Change Canada and others as appropriate, should identify Snapping Turtle foraging, nesting and overwintering habitat within the Project Development Area and the Local Assessment Area.
- To prevent mortality and reduce the risk of individuals entering the construction area, CN should erect exclusion fencing prior to the active season for Snapping Turtles and conduct visual sweeps of construction areas within and outside the exclusion area during the active season to

identify areas where individuals are active. Visual sweeps should be conducted by a qualified expert. In addition, some personnel on the site during construction and operation should be trained to safely handle and relocate turtles.

- All exclusion fencing, temporary and permanent, should be designed to a high standard and correctly installed to ensure that it remains intact and can withstand seasonal variations. The fencing should be inspected at least monthly, and maintained or replaced as necessary to ensure that turtles are not able to breach the fencing. Results of the monitoring of the effectiveness of the fencing should be made available to relevant authorities, including Environment and Climate Change Canada, Conservation Halton, Halton Municipalities, and the Community Liaison Group.
- To avoid attracting predators and providing colonization opportunities for invasive species, CN should not locate constructed nesting mounds in areas where adequate nesting habitat is already present.
- To minimize the risk of collisions, CN should identify areas where Snapping Turtles have potential to cross, and should monitor roads during Project construction and operation phases. In these higher risk areas, CN should make drivers aware through signage, posted speed limits and other appropriate measures.
- CN should consult the following reference document to identify and implement additional mitigation measures: *Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species at Risk in Ontario*, Ontario Ministry of Natural Resources and Forestry, April 2016.
- CN should submit turtle sightings to the Ontario Herpetofaunal Atlas. Details are available at www.ontarioturtle.ca.

The Panel has identified requirements for a follow-up program for many of the species considered in the environmental assessment, including Snapping Turtle and Midland Painted Turtle, in Section 10.4.

The Panel concludes that if the recommended mitigation is carried out, and fencing is confirmed to be effective, the Project is not likely to cause a significant adverse environmental effect on the Snapping Turtle or the Midland Painted Turtle.

The Panel finds that while the Project would temporarily remove turtle habitat, the recommended mitigation measures, including replacement and enhancement of existing habitat and ensuring habitat connectivity, would reduce potential for Project-related turtle mortality to a low level.

10.1.4. Barn Swallow and Bank Swallow

CN's Views

Barn Swallow is listed as threatened under the federal *Species at Risk Act* and the Ontario *Endangered Species Act*. The species typically nests in human-made structures such as barns, culverts, or under bridges or structures that provide shelter. Barn swallows currently nest in a barn and a shed in the Project Development Area and in another location outside the Project Development Area near Indian Creek and Tremaine Road. Eleven of the 38 nests identified by CN were considered active and 25 to 30 barn swallows were observed flying in close proximity to the structures. CN considered suitable breeding habitat in the wider Regional Assessment Area to be widespread. CN proposes to retain the barn but remove the shed to make way for the construction of the stormwater management ponds.

Only one nest was found in the shed. A new structure would be built to replace the shed and would incorporate enhancement measures including the installation of predator guards and nesting cups, which reduce the amount of effort and resources the Barn Swallows have to expend to build a nest.

CN stated that Bank Swallow is also listed as threatened under the federal *Species at Risk Act*. Potential Bank Swallow nesting habitat could occur along Indian Creek, but three years of breeding bird surveys did not record any Bank Swallows in the Project Development Area or Local Assessment Area and did not identify any burrows. Therefore, CN predicted that Bank Swallow would not be affected by the Project.

Participants' Views

Environment and Climate Change Canada confirmed that both Barn Swallow and Bank Swallow are listed as threatened under the federal *Species at Risk Act*. To avoid disturbance to nesting Barn Swallows, Environment and Climate Change Canada recommended that CN consult with the department before commencing Project activities that could affect barn structures in the Project Development Area at any time of the year. Environment and Climate Change Canada also noted that the species is tolerant of human presence.

Environment and Climate Change Canada stated that while Bank Swallows have not been detected within the Project Development Area, they could be attracted to soil piles in the Project Development area and potentially harmed during the construction phase. Therefore, the department recommended that CN grade or cover stockpile slopes to discourage nesting prior to Bank Swallow breeding season.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on Barn Swallow and Bank Swallow the Panel considered the following factors to be particularly relevant:

- Both species are listed as threatened under the federal *Species at Risk Act*
- Nesting habitat (a barn and a shed) for Barn Swallow has been clearly identified within the Project Development Area.
- The barn would be retained, and the shed removed and replaced by a new building with enhancements to reduce predation and improve nesting success.
- Bank Swallow had not been seen in the Project Development Area but could be attracted by soil piles during construction.

The Panel is satisfied that the mitigation proposed by CN would protect and improve Barn Swallow nesting habitat in the Project Development Area. The Panel notes that culverts were also identified as potential nesting habitat for this species. The Project would involve removal of some existing culverts and construction of new ones; however as there was no discussion of this aspect during the public hearing, the Panel can reach no conclusions with respect to potential effects. The Panel concludes that CN should explore this while developing the Wildlife Management Plan (Recommendation 10.20).

CEAA Recommendation 10.8 — Mitigation to Protect Bank Swallow and Barn Swallow

The Panel finds that CN's commitments to implement mitigation measures with respect to Bank Swallow and Barn Swallow are necessary to avoid a significant adverse environmental effect. The Panel recommends that CN:

- ensure the continued and ongoing availability of the barn as nesting habitat for Barn Swallow and retain and maintain the existing barn within the Project Development Area over the life of the Project;
- avoid displacement of nesting Barn Swallows by constructing the replacement habitat structures before removing the shed;
- avoid Bank Swallows nesting in soil piles during the construction phase by ensuring that soil piles are suitably graded or covered;
- contact Environment and Climate Change Canada if a nest is encountered during the removal of a culvert, as the *Migratory Birds Convention Act* prohibits the destruction of nests; and
- explore opportunities to provide further nesting habitat for Barn Swallows when designing culverts or other structures within the Project Development Area.

The Panel has identified requirements for a follow-up program for many of the species considered in the environmental assessment, including Barn Swallow and Bank Swallow, in Section 10.4.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to have a residual effect on Barn Swallow or Bank Swallow.

The Panel finds that the loss of the shed, which currently houses only one nest, would be a low magnitude effect that would be offset by CN's commitment to maintain the main Barn Swallow habitat (the barn) and create additional nesting habitat in a new structure with enhanced nesting and predator avoidance features.

10.1.5. Monarch Butterfly

CN's Views

Monarch butterfly is listed as special concern under the federal *Species at Risk Act* and the Ontario *Endangered Species Act*. Suitable habitat includes meadows and thickets and milkweed plants are an essential habitat component. CN identified a total of 66.8 hectares of Monarch butterfly habitat throughout the Regional Assessment Area. Within the Project Development Area itself, CN predicted that the Project would remove 10.8 hectares of Monarch butterfly habitat. In the wider Regional Assessment Area, projects and activities that will be carried out are expected to remove an additional two hectares.

CN proposes to offset the lost habitat with both on-site and off-site mitigation. Within the Project Development Area, CN proposes to create 18.8 hectares of new Monarch butterfly habitat by planting milkweed in association with stream and wetland enhancements. The new grassland habitat CN proposes in the Luther Marsh Wildlife Management Area (see Eastern Meadowlark and Bobolink in subsection 10.1.2) would also be suitable for Monarch butterfly because it would include planting of milkweed for the larvae as well as nectaring wildflowers as a food source for the adult butterflies. CN indicated that these on- and off-site enhancements would result in higher concentrations of both milkweed and nectaring wildflowers. In addition to Monarch butterfly, CN predicted that these off-site and on-site habitats would provide excellent foraging habitat for a variety of other pollinators.

Participants' Views

Environment and Climate Change Canada noted that a process is underway to reclassify Monarch butterfly from special concern to endangered under the federal Species at Risk Act. Environment and Climate Change Canada will develop a Recovery Strategy and mitigation measures or habitat compensation, and offsets would need to be consistent with objectives under the Recovery Strategy.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on Monarch butterfly, the Panel considered the following factors to be particularly relevant:

- The Monarch butterfly is listed as a species of special concern under the federal *Species at Risk Act*. Its status is likely to be changed to endangered in the near future.
- The Project would remove 10.8 hectares of Monarch butterfly habitat, with an additional loss of two hectares in the Regional Assessment Area predicted as a result of other projects and activities that will be carried out.
- CN proposes to plant milkweed in association with riparian habitat enhancements to create 18.8 hectares of new habitat in the Project Development Area.
- CN also proposed to enhance the 40.7 hectares of new grassland habitat in the Luther Marsh Wildlife Management Area to ensure the availability of milkweed and suitable foraging plants for Monarch butterfly.

The Panel is satisfied that the mitigation proposed by CN, carried out in consultation with Environment and Climate Change Canada, would adequately replace Monarch butterfly habitat removed by the Project.

CEAA Recommendation 10.9 — CN should implement the mitigation it has committed to undertake for Monarch Butterfly

The Panel finds that CN's commitments to implement mitigation measures for Monarch Butterfly are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- create and enhance 18.8 hectares of Monarch habitat to offset the loss of 10.8 hectares of Monarch habitat within the Project Development Area, considering both breeding and nectaring components of the habitat; and
- create and protect off-site grassland habitat in the Luther Marsh as offsets for loss of Monarch habitat.

CEAA Recommendation 10.10 — Additional mitigation to protect Monarch Butterfly

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN consult with Environment and Climate Change Canada to ensure that mitigation measures for Monarch butterfly, both on-site and off-site, are consistent with the new Recovery Strategy for Monarch butterfly under the *Species at Risk Act*.

CEAA Recommendation 10.11 — Follow-up program for Monarch Butterfly

The Panel recommends that CN develop and implement a follow-up program for Monarch butterfly. The follow-up program should involve monitoring and identify appropriate adaptive management steps to

provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should ensure that replacement Monarch butterfly habitat successfully mitigates the effects of the Project. CN should monitor and evaluate Monarch butterfly use of the on-site compensation habitat, as well as the enhanced habitat in Luther Marsh, and share results with Environment and Climate Change Canada.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to have a residual effect on Monarch Butterfly.

The Panel finds that CN's commitment to create 18.8 hectares of new Monarch butterfly habitat within the Project Development Area and enhance additional habitat in the Luther Marsh Wildlife Management Area would be sufficient to offset the anticipated loss of 10.8 hectares.

10.1.6. Eastern Milksnake

CN's Views

Eastern Milksnake is listed as a species of special concern under the federal *Species at Risk Act*. CN recorded one occurrence of Eastern Milksnake outside the Project Development Area and stated that it can occur throughout agricultural landscapes but is most commonly encountered in proximity to large forested areas. While scarce, CN presumed that Eastern Milksnake could be present within the Project Development Area. When asked on the first day of the hearing which element of the assessment had caused the proponent the most uncertainty, CN's answer was the Eastern Milksnake.

CN committed to capture and relocate Eastern Milksnake individuals to suitable habitat within the Local Assessment Area, in accordance with wildlife care protocols.

Participants' Views

Environment and Climate Change Canada stated that Eastern Milksnake could potentially be affected by Project activities and noted that CN would develop standard mitigation and put it in place if any individuals were detected.

Environment and Climate Change Canada recommended that CN develop an Eastern Milksnake mitigation management plan in consultation with Environment and Climate Change Canada and other interested authorities to exclude the snakes from active work areas during Project construction and operation using exclusion fencing. The department further recommended that, the plan for Eastern Milksnake include a description of timing for undertaking the prescribed mitigation measures; description of the appropriate installation of exclusion fencing around the PDA and strategic placement of cover boards to lure individuals of the species for capture and relocation; description of the selection and preparation of a suitable transfer site for the captured snakes; appropriate snake containment and transfer methods; plan for a survey and verification of the exclusion zone by a qualified expert; and a training plan for Project staff on the safe capture and release of any snakes encountered onsite.

Halton Municipalities suggested that not all potentially suitable Eastern Milksnake habitat features were surveyed, especially those directly affected by the footprint of the operational area. Tributary A should have been surveyed as well as all the wooded features in the vicinity of where Indian Creek and the railroad tracks come together. Halton Municipalities stated that no effective mitigation measures were identified for Eastern Milksnake. In their view, enforcing speed limits to prevent road mortality is difficult, and likely ineffective given that drivers in large trucks are unlikely to spot small snakes on the road. Halton Municipalities also felt that staff education on snake encounters would be of marginal value, as the species is secretive and difficult to detect. Halton Municipalities also stated that the snake capture and release program mitigation measure would result in the displacement of the species from the local landscape.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on Eastern Milksnake the Panel considered the following factors to be particularly relevant:

- There is apparently uncertainty about the likely presence of the Eastern Milksnake in the Project Development Area.
- If the species is present, now or in the future, elements of the Project would increase the risk of mortality.
- There are likely to be difficulties implementing mitigation that relies on Project personnel or drivers being able to spot an individual snake.
- Environment and Climate Change Canada has recommended that mitigation focus on exclusion fencing.
- Recommendations regarding ecopassages may also pertain to Eastern Milksnake.

The Panel recognizes the challenge of protecting a species that is difficult to find, and that not finding it during fieldwork does not mean that it is absent from the Project Development Area. The Panel therefore agrees with CN's approach that assumes the snake would be present. The Panel also agrees with Environment and Climate Change Canada that exclusion fencing should be the primary mitigation measure to avoid risk of mortality on roadways. The Panel observes that there are challenges in ensuring that exclusion fencing remains effective over the long term, as also discussed in the section on Snapping Turtle and Midland Painted Turtle.

CEAA Recommendation 10.12 — CN should implement the mitigation it has committed to undertake for Eastern Milksnake

The Panel finds that CN's commitments to implement mitigation measures with respect to Eastern Milksnake are necessary to avoid a significant adverse environmental effect. The Panel recommends that CN employ a snake capture and relocation program using the coverboards already in place, prior to construction, to remove Eastern Milksnake individuals from the Project Development Area, if present. Snakes will be relocated in accordance with wildlife care protocols to suitable habitat within the Local Assessment Area.

CEAA Recommendation 10.13 — Additional mitigation to protect Eastern Milksnake

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following additional mitigation measures:

- to prevent mortality to Eastern Milksnake, consult with Environment and Climate Change Canada and other parties as appropriate to develop and implement an Eastern Snake Mitigation Management Plan;
- identify and conduct any additional survey work required in the area of Tributary A or wooded areas near Indian Creek prior to construction, to the satisfaction of Environment and Climate Change Canada. If the survey indicates the presence of snakes, CN should consult with Environment and Climate Change Canada to effectively implement required mitigation measures;
- identify how exclusion fencing for other wildlife species can be appropriately adapted to the requirements of Eastern Milksnake; and
- identify contingency measures in the plan to address any snake sightings during both construction and operation.

The Panel has identified requirements for a follow-up program for many of the species considered in the environmental assessment, including Eastern Milksnake, in Section 10.4.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to have a significant adverse environmental effect on Eastern Milksnake.

The Panel finds that, given the uncertainty of whether or not the species is present, the proposed mitigation and response strategies should suffice to reduce the magnitude of any effect to a low level.

10.1.7. Other Species at Risk

Eastern Wood-Pewee is a forest breeding bird listed as a species of special concern under the Ontario *Endangered Species Act*, and CN found it in the woodland forested community to the south of the Project. Forest bird habitat is limited on CN property and occurs outside the Project Development Area. The Project would not remove any of this habitat, and CN does not anticipate that other projects and activities that will be carried out would cause any habitat loss in the wider Regional Assessment Area. With noise mitigation in place, CN also stated that operations would not cause sensory disturbance in adjacent habitats.

Little Brown Myotis is listed as endangered under the federal *Species at Risk Act* and the Ontario *Endangered Species Act*, and it was observed in the Local Assessment Area. CN estimated that there are 40 hectares of suitable habitat (deciduous and mixed woodland), including potential maternity roost habitat, in the wider Regional Assessment Area but none in the Local Assessment Area. CN predicted no mortality to Little Brown Myotis, no loss of habitat in the Project Development Area, and no loss of habitat in the Regional Assessment Area from future projects and activities that will be carried out. Conservation Halton stated that surveys for bat species were only conducted in the woodlot east of the site, not on the Project Development Area. They noted that deciduous thicket communities located along Indian Creek were not surveyed for bats despite the potential for maternity roost trees and their proximity to a prime foraging area and source of water, Indian Creek. Conservation Halton also felt that the coniferous plantation and deciduous woodland fragment just west of the railway tracks next to Indian Creek should have been surveyed.

The Grasshopper Sparrow is listed as special concern under the Ontario *Endangered Species Act*. Because the bird was observed in 2013 only, CN assumed that it is not breeding in the Local Assessment Area but stated that the compensation habitat for grassland migratory birds would also be suitable for this species. Conservation Halton commented that roadsides were overrepresented in bird surveys and may have overlooked grasshopper sparrow since its high-pitched, weak and insect-like call could be missed from a roadside location.

CN determined that the Jefferson Salamander was not present in the Local Assessment Area. Environment and Climate Change Canada agreed that CN had provided adequate evidence to support its conclusion. However, Halton Municipalities stated that the techniques used to detect Jefferson Salamander might overlook the species. Halton Municipalities suggested that potentially suitable habitats located within one kilometre such as woodlands to the northeast and southeast should have been surveyed, as well as Tributary B, and trapping should have been used to detect Jefferson salamander instead of egg mass surveys.

The Panel is of the view that, although other survey methods may also have been appropriate, most of these species have been adequately surveyed, and, and given Environment and Climate Change Canada's satisfaction with CN's work, concludes that adverse environmental effects are unlikely to occur. CN also committed to refining mitigation measures based on any additional species observations. It is also expected that some mitigation measures proposed for other wildlife would also be effective in reducing effects on other species at risk if they are present in the Project Development Area. The one exception is the Little Brown Myotis. Consequently the Panel recommends that further fieldwork be conducted before alterations to Indian Creek begin.

CEAA Recommendation 10.14 — Additional mitigation to protect Little Brown Myotis

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect on Little Brown Myotis. Therefore, the Panel recommends that CN implement the following mitigation measure:

- Before construction work begins in the area of Indian Creek, CN should survey thicket communities along Indian Creek and the coniferous plantation and deciduous woodland fragment west of the railway tracks. If the presence of Little Brown Myotis habitat is confirmed, CN should consult with Environment and Climate Change Canada to determine appropriate mitigation to permanently protect or adequately replace this habitat.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to have a residual adverse environmental effect on the Eastern Wood-Pee-wee, Grasshopper Sparrow or Jefferson Salamander.

The Panel finds that, with the exception of the Little Brown Myotis, it is unlikely the Project would interact with these listed species as they were not found in the Project Development Area. The Panel has recommended additional field work to verify the accuracy of CN's prediction that no mortality and no loss of habitat would occur for the Little Brown Myotis.

10.2. Migratory Birds

Subsection 6.1.6 of the EIS Guidelines required CN to provide baseline information regarding migratory birds and their habitat. The EIS Guidelines, at subsection 6.2.3, required that CN describe any changes the Project would cause to migratory bird habitat and, at subsection 6.3.2, to migratory birds. This section of the report deals with Project effects relating to migratory birds and summarizes the views of CN, participants and the Panel.

CN's Views

CN stated that the Local Assessment Area provides limited habitat for migratory birds during spring and fall migration, and in the winter. It is some distance from areas that are known to concentrate migratory birds, such as the Great Lakes and the Niagara Escarpment. It also lacks the habitat where birds stop to feed in large numbers, such as large wetlands or shorelines.

No critical habitat, as defined under the federal *Species at Risk Act*, was identified within the Project Development Area or the Local Assessment Area for migratory bird species at risk.

Results of CN's breeding bird surveys confirmed that habitat for other grassland and wetland migratory birds was present within the Project Development Area. Woodland migratory bird habitat was present within the Local Assessment Area, but not in the Project Development Area.

CN predicted that the Project would reduce grassland habitat by 50.9 hectares, and wetland habitat by 3.7 hectares, for a total loss of 54.6 hectares of migratory bird habitat within the Project Development Area. Woodland habitat would not be directly affected. CN estimated that the loss of grassland habitat would displace 407 pairs of breeding birds, while the loss or alteration of 3.7 hectares of wetland habitat would displace 14 pairs of breeding birds during construction. CN stated that suitable habitat is common in the Regional Assessment Area and expected to support the displaced birds. CN indicated that the proposed habitat enhancements and compensation both on- and off-site would result in no net loss of habitat, and there would be a net gain for some species. CN suggested that there would be an improvement in grassland habitat quality with the elimination of sources of mortality in hayfields since there would be no hay cutting in the compensation grassland habitat to be located in Luther Marsh; see subsection 10.1.2. CN expected a net increase of 13 pairs of wetland breeding birds and increased diversity of species within the Project Development Area due to the creation of 7.1 hectares of wetland habitat. CN stated that the Project would not remove woodland, so there would be no displacement of woodland migratory birds as a result of habitat loss during construction other than potentially a small number of individuals that might be temporarily displaced during construction due to increased noise. CN expected that 55 hectares of habitat within the Regional Assessment Area would be able to support any displaced woodland migratory birds.

CN stated that the Project could result in direct migratory bird mortality, habitat loss or alteration, and sensory disturbance. Construction and operation including the clearing of sites, watercourse realignment, tree clearing, vehicle strikes, collisions with infrastructure, and contact with contaminated water might result in direct mortality of migratory birds. Site clearing and preparation during construction and disturbance effects during operation might result in the displacement of breeding and foraging birds, changes in species composition, and loss of breeding and foraging habitat. Project lighting might result in sensory disturbance by attracting migratory birds.

CN predicted that bird mortality during construction would range from zero to a small number of individual migratory birds. During operation, a spill affecting stormwater facilities, which CN expected to be a rare event, could result in mortality to a small number of individuals. Migratory bird collisions with the Project's administration building and maintenance garage could result in a range between 0.4 to 55 migratory bird fatalities per year, but CN expected the number to be at the lower end of that range. Other Project infrastructure, such as light masts, was expected to have low risk of bird collisions. CN expected that birds would avoid vehicular traffic in the area, and changes to traffic-related mortality would be negligible.

CN noted that physiological responses to noise exposure in animals may begin to appear at exposure levels of 55 to 60 dB(A), but most wildlife species in the area are already well adapted to human activity and disturbance. Construction noise might temporarily displace woodland birds from the Local Assessment Area but since the amount of woodland habitat in the Local Assessment Area is small, anticipated mortality rates were too small to be quantified.

CN proposes the following mitigation measures:

- avoiding construction activities with the potential to remove migratory bird habitat during the breeding season (from the end of March to the end of August) to reduce the necessity for nest searches;
- if vegetation clearing during the breeding bird season is unavoidable, conduct of a nest search by a qualified wildlife biologist prior to the activity taking place;
- provision of new grassland habitat in the Luther Marsh Wildlife Management Area;
- replacing wetland habitat removed in the Project Development Area with new wetland areas at a ratio of approximately 2:1; and
- noise and light mitigation measures (as discussed in Sections 6.1 and 5.3).

CN indicated that recommendations provided by Environment and Climate Change Canada regarding migratory birds and species at risk would be implemented with details developed in consultation with the department through the Environmental Protection Plan.

CN noted that mitigation to avoid migratory bird mortality would also protect the six migratory bird species protected under the Ontario *Fish and Wildlife Conservation Act*: Wild Turkey, Turkey Vulture, Northern Harrier, Red-tailed Hawk, Blue Jay and Northern Raven.

CN identified 398.6 hectares of suitable migratory bird habitat in the wider Regional Assessment Area, including 55 hectares of woodland habitat, 43.7 hectares of wetland habitat, and 299.9 hectares of grassland habitat. CN estimated that these habitats could support 3,005 breeding bird pairs. Of this area, CN predicted that 351.1 hectares of suitable migratory bird habitat in the Regional Assessment Area would continue to exist after agricultural land conversion due to the Project and other projects and activities that will be carried out.

Participants' Views

Environment and Climate Change Canada stated that migratory bird mortality, and nest and egg disturbance and destruction could occur during vegetation clearing, site grading, creek realignment and site restoration or enhancement, if conducted while birds were using the affected areas, particularly

during the nesting period. Migratory bird breeding success could be impaired by elevated noise levels due to adjacent Project activity during the site preparation, construction and operation phases. Project activities could also cause disturbance or destruction of a residence as defined under the federal *Species at Risk Act* for extirpated, endangered and threatened species.

Environment and Climate Change Canada stated that CN might have overestimated the affected breeding bird population within the Project Development Area and consequently the Project effects on breeding bird habitat loss. Environment and Climate Change Canada agreed with CN that migratory stopover and overwintering use of the Local Assessment Area is not extensive because there are no landscape features to concentrate migrating or overwintering birds.

Environment and Climate Change Canada advised that vegetation clearing during bird breeding periods should be restricted, and nest sweeps to determine nest activity used only under very limited circumstances because the ability to detect nests is low, while the risk is high that searchers may disturb or stress nesting migratory birds and increase the risk of birds abandoning their nests.

Environment and Climate Change Canada emphasized that general prohibitions under the federal *Species at Risk Act*, Sections 32 and 33, apply to migratory birds protected by the *Migratory Birds Convention Act*, but do not apply to other species on non-federal land. As noted in subsection 10.1.2, Environment and Climate Change Canada submitted that grasslands have lost 300 million birds since 1970, or two out of every three birds.

Environment and Climate Change Canada asked to receive all components of CN's Environmental Protection Plan pertaining to migratory birds, once available, and the results of any monitoring to determine the effectiveness of implemented mitigation measures, including the off-site grassland bird habitat and use survey results.

Conservation Halton stated that Project noise during the breeding season could interfere with birdsong, which affects social behaviours, mate-finding strategies and therefore nesting success.

Halton Municipalities expressed concern that the Project would harm migratory birds or their nests as a result of clearing trees and other vegetation and draining or flooding land, as well as noise effects and visual disturbance to birds during the breeding season. They stated that CN's noise assessment was based on flawed assumptions because existing noise data was almost exclusively based on human noise receptors located close to major roads, rather than the habitats that are located at least 200 to 500 metres away from roads. Halton Municipalities also suggested that artificial light at night would negatively affect nocturnal birds. Halton Municipalities expressed their view that the Project's light effects would affect thousands of hectares in the Natural Heritage System, and this effect would be experienced every night during operation.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on migratory birds the Panel considered the following factors to be particularly relevant:

- The location and nature of the Project area are not conducive to large concentrations of migratory birds.
- The Project would remove 50.9 hectares of grassland and 3.7 hectares of wetland habitat.

- Wetland habitat will be replaced in the Project Development Area; grassland habitat will be replaced off-site in the Luther Marsh Wildlife Management Area.
- The replacement grassland habitat is likely to be of higher quality than the existing habitat on site.
- CN estimates that over 400 pairs of breeding birds would be displaced by the Project, mostly from grassland habitat.
- Environment and Climate Change Canada gave its opinion that CN may have overestimated the numbers of breeding birds and the effects of the Project on them.
- CN predicted that displaced birds would find suitable habitat in the Regional Assessment Area.
- A range of Project effects (noise, light, bird strikes, and accidental spills) could result in migratory bird mortality or cause birds to avoid the area.
- CN and Environment and Climate Change Canada agree on the types of mitigation measures required to reduce effects on migratory birds.

The Panel is aware that, despite the stringent requirements of the *Migratory Birds Convention Act*, migratory birds are under pressure from habitat loss and change across North America and beyond. Populations of grassland birds are in particularly steep decline. As a result, a thorough and detailed approach to mitigation for migratory birds is justified.

The Panel concludes that the off-site replacement of grassland habitat in the Luther Marsh Wildlife Management Area would provide effective mitigation for the loss of habitat within the Project Development Area. The Panel did not receive detailed evidence regarding the effects of nighttime lighting on migratory birds, but has recommended the use of amber lighting, if feasible, to reduce sky glow and glare; see subsection 5.3.5. This technology should also be investigated to see if it would reduce effects on birds. The Panel does not expect that the proposed administration and maintenance buildings would cause large numbers of bird strikes but observes that CN should build appropriate design into these buildings to avoid or minimize this risk.

CEAA Recommendation 10.15 — CN should implement the mitigation it has committed to undertake for Migratory Birds

The Panel finds that CN's commitments to implement mitigation measures for migratory birds are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- ensure, in consultation with Environment and Climate Change Canada, that detailed mitigation proposals for migratory birds, both on-site and off-site, are consistent with advice from Environment and Climate Change Canada;
- ensure that construction activities do not impinge on migratory birds' use of different areas of habitat within the Project Development Area by developing and implementing timing windows. For example, construction activities with the potential to remove migratory bird habitat should not be permitted during the breeding season (March to August);
- avoid harm to migratory birds, CN should not carry out nest sweeps except in exceptional circumstances and only after consultation with Environment and Climate Change Canada.
- construct replacement wetland habitat before removing existing wetlands, where possible, to reduce displacement of migratory birds;
- design the administration and maintenance buildings in such a way as to minimize the risk of bird collisions (for example, by avoiding large expanses of glass or confusing reflections); and

- limit the use of site flood lighting during bird migration periods.

The Panel has identified requirements for a follow-up program for many of the species considered in the environmental assessment, including migratory birds, in Section 10.4.

The Panel concludes that, if the recommended mitigation is carried out, the Project is not likely to have a significant adverse environmental effect on migratory birds.

The Panel finds that while the Project could displace over 400 pairs of breeding birds and the loss of 50.9 hectares of grassland habitat within the Project Development Area, because there is currently available habitat elsewhere within the Regional Assessment Area, and grassland habitat would be offset within the Lither Marsh area, the overall effect would be low magnitude with a limited geographic extent.

Given the seriousness of the current situation regarding the steep decline in grassland birds and their habitat, the Panel strongly recommends that CN goes beyond the goal of avoiding a residual effect and creates additional grassland habitat on CN-owned lands outside the Project Development Area. The Panel acknowledges that new grassland habitat is planned for Luther Marsh Wildlife Management Area, but believes that providing permanent high quality habitat in close proximity to the Project Development Area would make a valuable contribution to addressing an alarming situation and would set an excellent example for other land developers.

Additional Recommendation 10.16 — Grassland bird habitat creation

CN should explore with Conservation Halton and other appropriate bodies the possibility of returning a portion of the land in the Local Assessment Area now under cover crop to grassland habitat, to offset at least a part of the habitat removed in the Project Development Area and reduce pressure on habitat in the Regional Assessment Area. This restored grassland habitat would also provide habitat for other terrestrial species and potentially improve habitat connectivity. It should be periodically maintained so as to ensure continued habitat availability for grassland birds and other species. While the Panel recognizes that this would remove more land from agricultural use, the effect would not be permanent – the land returned to grassland could still be available for agricultural purposes in the future if required.

10.3. Habitat Connectivity

Subsection 6.2.3 of the EIS Guidelines required that CN describe any changes the Project would cause to changes to the terrestrial landscape, including species at risk and migratory bird' habitat changes. This section of the report deals with Project effects relating to habitat connectivity in support of the species considered elsewhere in this section of the report, and summarizes the views of CN, participants and the Panel.

CN's Views

CN stated that it considered connectivity and linkages in a systems-based approach, drawing on the Bronte Creek Watershed Study that made recommendations for protection, enhancement, and restoration of features and functions in the Bronte Creek watershed. CN stated that its proposed on-site habitat restoration and enhancements would provide a range of habitat types, improve habitat connectivity, and result in increased diversity and abundance of species relative to existing conditions.

CN indicated that the only distinct wildlife corridor currently within the Project Development Area is along Indian Creek.

CN noted that there are existing culverts on Tributary A where it passes under the mainline embankment. CN stated that the proposed twinned box culverts, compared to the existing round culverts, would increase the capacity through the culverted area by approximately 30%, and the width of these two box culverts is approximately the bankfull width for Tributary A. CN indicated that there would be significant engineering challenges involved in using open-bottom culverts with three times bankfull widths. These challenges relate to the physical weight of the train and to railyard activity on the culvert structure when there is no base. Making a culvert significantly wider than currently proposed could also result in structural issues. Box culverts could cause debris to collect, but CN expected that with appropriate maintenance the concerns could be adequately mitigated.

CN is confident that the design of the Project would accommodate safe movement of terrestrial wildlife species in and around the Project Development Area, considering the technical constraints imposed by the linear nature of the Project elements, and the static and dynamic loading forces of the trains on the mainline, pad, and service tracks.

CN agreed to consult with Environment and Climate Change Canada about ecopassages to facilitate movement of terrestrial species under the railway line, while developing environmental management plans for species at risk.

Participants' Views

Environment and Climate Change Canada indicated that it intends to be fully engaged in the development of plans for habitat connectivity. It suggested that the choice of location of ecopassages would be particularly important for Western Chorus Frog, although it indicated that the department has relevant experience with ecopassages designed for turtles but not for Western Chorus Frog.

Environment and Climate Change Canada stated that culvert design might include light penetration, and there could also be terrestrial culverts that do not necessarily follow a watercourse.

Conservation Halton said that CN had not demonstrated that the proposed design of the Tributary A realignment would allow for viable passage for terrestrial and aquatic species, and that it would therefore create an ecological barrier between the upstream portions of Tributary A and the rest of the Indian Creek watershed. Conservation Halton suggested that options should be explored to meet the needs of both the environment and CN.

Conservation Halton made a number of recommendations including the installation of open bottom culverts with natural substrate beds spanning a minimum of three times bankfull width, a low flow channel and terrestrial passage on banks. They noted that where a culvert is only wide enough to accommodate water flow, terrestrial species may be forced to cross over the railroad, increasing the potential for wildlife mortality. Conservation Halton indicated that a closed-bottom culvert could still be suitable for the passage of terrestrial organisms if there is enough width for a dry terrestrial bank in addition to the water flow. Shelves that run along the inside of the culvert could also be used.

Conservation Halton also recommended that CN apply the standards established for other developments within the Indian Creek sub-watershed, which include applying the restoration

framework that CN has already adopted in part; using natural channel design principles for all road or railway crossings; and incorporating Conservation Halton's road ecology best management practices. This would include crossings or culverts that are a minimum of three times bankfull width, with dry banks for terrestrial passage; culverts with an openness ratio that promotes terrestrial passage in accordance with the Conservation Halton road ecology best management practices guidelines; crossing height appropriate for target species; the inclusion of wildlife fencing at the ends of culverts and around work areas to direct wildlife to the crossing corridors and culverts; minimizing channels for wildlife crossing on the pad site, road or railway; and, the inclusion of terrestrial wildlife habitat features throughout the Indian Creek valley corridor. Conservation Halton noted that some amphibian habitat features associated with Tributary B would be affected by the Project, and recommended that CN should restore nearby areas to mitigate for that potential loss of habitat.

Halton Municipalities raised concerns that the Britannia Road truck entrance would compromise the Natural Heritage System in that area, and suggested that had CN selected the alternative of using First Line for its truck access point, the Natural Heritage System could be avoided.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on habitat connectivity, the Panel considered the following factors to be particularly relevant:

- The Project would affect habitat connectivity through the expansion of the existing mainline, the construction of multiple new linear features (tracks, the pad, and the access road), the realignment and channelling of portions of Tributary A and Indian Creek, and the removal and relocation of wetland habitat.
- If wildlife has to cross roadways and railway lines, increased mortality could be expected.
- These connectivity effects have implications for species at risk within the Project Development Area, particularly Snapping Turtle and Western Chorus Frog, and possibly Eastern Milksnake.
- During the public hearing there was considerable discussion about measures to mitigate these effects, including culvert design and, more broadly, the role of ecopassages.
- Environment and Climate Change Canada and Conservation Halton both have substantive experience related to this issue. In particular, Conservation Halton has prepared culvert design guidelines and roadway ecology best management practices for the local area.
- Culvert design for railway lines is not, however, identical to culvert design for roadways because of the heavier loadings and other railway operational issues.

The Panel appreciates that the issue of habitat connectivity relates directly to the Natural Heritage System-based planning addressed earlier. The Panel also recognizes that Halton Region has dedicated significant resources over decades to the objective of embedding the Natural Heritage System approach into its land use planning, and that the system represents a fundamental ecological principle around which plans have been developed. While CN used the Bronte Creek Watershed Study as a source document, the Panel was not presented with evidence that CN and Conservation Halton had collaborated in a manner that would ensure the integration of CN's Project into the regional Natural Heritage System; indeed, rather the opposite. The Panel concludes that the absence of meaningful collaboration could have implications for habitat connectivity. The Panel has included a recommendation to address the importance of collaborative relationships in Section 15 (Environmental Management).

The Panel recognizes that CN is proposing to implement a range of mitigation measures to address habitat connectivity but is not convinced that the current culvert, roadway and pad designs have fully addressed the needs of terrestrial species. Habitat connectivity should be a key element of the Project design so that animals can access specific habitat areas for all life stages both within and outside the Project Development Area, while at the same time minimizing the risk of mortality from interaction with trains and Project-related vehicles. If habitat connectivity is seriously impaired, protected or restored habitat in the Project Development Area would be isolated, reducing its ecosystem function.

CEAA Recommendation 10.17 — Additional mitigation to maintain habitat connectivity

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that, in order to maintain important ecosystem connections within the Project Development Area and between the area and the wider region, and to reduce adverse interactions between animals and project equipment and activities, CN should:

- ensure habitat connectivity is maintained for terrestrial species. CN should consider and accommodate the context of wildlife corridors and travel patterns across the regional area, including habitat connections to adjacent lands within Halton Municipalities' Natural Heritage System, and use that information in its detailed design of Project components;
- map terrestrial and wildlife habitat in the regional area and the essential movement corridors;
- ensure adequate habitat corridor widths and buffering where required. In determining what width of corridor is adequate, CN should consider the species expected to use the corridor and refer to expertise of Environment and Climate Change Canada and Conservation Halton;
- maintain a system of culverts and ecopassages through the mainline embankment, pad tracks, the pad, and associated roadways that ensures habitat connectivity for terrestrial and aquatic species, while meeting all engineering requirements for safe railway and facility operation;
- ensure, where possible, culverts and ecopassages address the need for light penetration; and
- work with Conservation Halton to identify and maintain wildlife corridors and connectivity both within the Project Development Area and with other habitat on adjacent properties and, to the degree possible, minimize the effects of the terminal truck entrance on the Natural Heritage System.

CEAA Recommendation 10.18 — Follow-up program for habitat connectivity

The Panel recommends that CN develop and implement a follow-up program for habitat connectivity. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the mitigation measures are not functioning as expected.

The follow-up program should:

- monitor to verify the effectiveness of the mitigation measures for habitat connectivity, including reporting on the use and success of these measures. CN should share these results with Environment and Climate Change Canada, Conservation Halton and the Community Liaison Group; and

- if monitoring results demonstrate that mitigation measures are not having the intended effect, CN should work with Environment and Climate Change Canada and Conservation Halton to develop and implement additional mitigation measures to improve habitat connectivity.

The Panel concludes that, if CN carries out the recommended mitigation, the Project is not likely to have a significant adverse environmental effect on habitat connectivity.

The Panel finds that by maintaining connections for on-site habitat to the regional Natural Heritage System the geographic extent of Project effects would be reduced, resulting in a residual effect on habitat connectivity that is of low magnitude and limited geographic extent.

10.4. Mitigation and Monitoring

CN's Views

CN stated that mitigation and follow-up monitoring for terrestrial wildlife would be refined during the detailed design phase when the specifics of the Project components are known. CN proposes a suite of environmental management plans that would be finalized prior to the start of any relevant activity. CN expected that proposed mitigation would be federally enforceable. CN also generally concurred with Environment and Climate Change Canada's recommendations for additional mitigation measures for species at risk.

CN indicated that the proposed timing windows were selected to reduce the effects on migratory birds during the breeding season, when they are less mobile, and effects on reptiles and amphibians during vulnerable life stages.

CN has committed to measures to protect individuals of the species, such as sequencing of construction activities, relocation of turtles and snakes during construction, and exclusion fencing. Exclusion fencing would be used both during construction, which would be temporary fencing that would be sequenced and staged around the different stages of construction. That temporary fencing would be monitored and maintained to ensure that it is effective. CN indicated that if the fencing were slumping, there would be ample opportunity to fix it. Permanent fencing would be installed once the facility is constructed to exclude reptiles and amphibians from the facility and from on-site and off-site roads.

CN noted that before any employee or contractor enters the construction site, they would have to go through a safety orientation that would incorporate wildlife sensitivity training. The training would raise awareness of what wildlife could be on site, the potential activities that could affect them, and the importance of the mitigation measures that are being implemented. Environmental monitors would be on site during key periods of construction, and would be responsible for ensuring that the training is carried out.

CN noted that the Project is expected to be fully built out in less than two years, so there would not be ongoing construction activity that would warrant ongoing monitoring. CN proposes three years of post-construction monitoring of the channel realignments and habitat enhancements to ensure they are functioning as predicted and the native vegetation is established and stabilized. The successful establishment of native vegetation is considered most effective for preventing the establishment of

invasive species. CN also described ongoing monitoring and inspection activities during construction and operation.

CN committed to continue to consult with Fisheries and Oceans Canada and Environment and Climate Change Canada to refine the monitoring programs. CN was confident that the appropriate duration of monitoring would be determined through that process, and that provisions for adaptive management would be agreed upon in the event that monitoring identifies unforeseen effects or indicates that mitigation is not as effective as expected. CN also committed to establishing a Community Liaison Group that would have access to the results of monitoring programs.

CN indicated that it would consider any additional information related to wildlife if it becomes available, such as observations of Western Chorus Frog. During construction, wildlife monitors on site would be looking for additional wildlife especially during clearing activities. CN indicated that the duration for monitoring periods would vary. Monitoring for riparian vegetation would occur over a three-year period, and a report would be produced each year documenting all the vegetation.

Participants' Views

Environment and Climate Change Canada noted that maintenance is important for exclusion fencing. The timing of the installation of the exclusion fencing is also important to ensure that individuals, especially Western Chorus Frogs, are not caught within a construction area. If those two main factors are adequately addressed, exclusion fencing can be an effective means of protecting species at risk, including amphibians and reptiles. Environment and Climate Change Canada found that CN's proposed timing windows followed a conservative approach according to federal and provincial guidance documents.

Conservation Halton detailed a set of proposed conditions in its written closing remarks to the Panel. These conditions would mitigate some of the Project's effects on wetlands, wildlife habitat and the movement of terrestrial species. Conservation Halton recommended a condition requiring CN to conduct a desktop assessment of significant wildlife habitat, consistent with provincial requirements, to demonstrate where candidate significant wildlife habitat may exist within the Project Development Area. Where further field studies to confirm or refute candidate significant wildlife habitat are not feasible, Conservation Halton recommended that significant wildlife habitat should be assumed and protected in conformity with the provincial requirements, and in accordance with the precautionary principle.

Panel Conclusions and Recommendations

The Panel has provided its views on the significance of the environmental effects on species at risk and migratory birds in the sections above. However, in conducting its assessment, the Panel found that, in addition to the species-specific mitigation measures identified in those sections, there were a number of mitigation measures that would mitigate environmental effects on multiple species at risk and migratory birds identified in this report, as well as other species in general.

CEAA Recommendation 10.19 — CN should implement the mitigation it has committed to undertake for various wildlife species, including species at risk and migratory birds

The Panel finds that many of CN's commitments to implement mitigation measures with respect to migratory birds and species at risk would benefit multiple species and are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- avoid construction activities with the potential to remove migratory bird habitat during the breeding season (end of March to end of August). Should vegetation clearing activities be unavoidable during the breeding season, implement a program to avoid effects on migratory birds and their nests;
- implement speed limits for vehicles on internal roads;
- implement a Spill Response Plan to contain contamination, including shut-off valves on stormwater management ponds in the event of an accidental spill to protect the downstream environment. In the event a stormwater management pond becomes contaminated with a spill, implement bird deterrents to prevent use of the pond by birds until cleanup measures have been completed;
- retain natural habitat features such as wildlife trees; retain vegetation wherever practicable to provide nesting opportunities for cavity-dependent birds;
- provide employees with sensitivity education for on-site wildlife encounters;
- implement best management practices, including locating vegetation or greenery away from glass to minimize risk of avian collision with windows (refer to the Bird Friendly Development Guidelines, City of Toronto 2007);
- wherever practicable, avoid unnecessary vegetation clearing around the Project, access roads and railway lines;
- enhance wetlands or create new ones to improve breeding opportunities for wetland birds;
- create or protect off-site grassland habitat as an offset for loss of grassland habitat;
- demarcate construction work area to avoid incidental encroachment into adjacent areas;
- retain natural vegetation along the boundaries of the Project to act as a buffer from the Project;
- maintain construction and terminal operational equipment in good working order, for example effective mufflers on vehicles;
- design Project layout to avoid effects on natural features, including:
 - Trafalgar Moraine Earth Science Area of Natural and Scientific Interest (ANSI);
 - North Oakville-Milton West Wetland Complex; and,
 - Protected Countryside land use designation under the Greenbelt Plan.
- during construction, ensure all equipment brought on-site is thoroughly cleaned (for example, remove dirt from other work sites that has accumulated on the tracks, undercarriage, tires) prior to arrival, to avoid the introduction of invasive species seeds or plant parts, or other contaminants;
- avoid using imported fill from known sites of invasive plant infestation;
- minimize the size and extent of disturbed soil and vegetation during construction, including brushing, pruning and clearing activities, and preserve existing habitat conditions wherever and whenever possible;
- schedule construction activities during daylight hours whenever practicable to minimize the need for staging lights;

- during construction, limit the use of site flood lighting during the migration periods, generally occurring in April to May and late August through October;
- if nighttime construction is required, direct lighting at the specific construction location.
- Complete paving operations after the berms are constructed to mitigate off-property light effects;
- direct perimeter lighting inward toward the terminal to minimize light trespass to the environment and surrounding areas; and
- shield outdoor lights to minimize light spillage beyond the required areas.

CEAA Recommendation 10.20 — CN to design and implement a Wildlife Management Plan

The Panel recommends that, to coordinate mitigation measures and follow-up programs related to wildlife and migratory birds, CN should develop and implement a Wildlife Management Plan that:

- Incorporates all of the specific sub-species plans recommended by Environment and Climate Change Canada during the environmental assessment.
- Identifies all mitigation measures CN has identified for all wildlife, including migratory birds, but with a particular focus on Western Chorus Frog; habitat compensation for Bobolink and Eastern Meadowlark, Snapping Turtle and Midland Painted Turtle; Eastern Milksnake; and general habitat connectivity both within CN's property and connecting to wildlife corridors and networks that are existing or planned on neighbouring properties within the Regional Assessment Area.
- Identifies reporting intervals for the results of follow-up programs in relation to wildlife, including migratory birds.
- Makes the reports on the accuracy of the environmental assessment predictions and the effectiveness of mitigation measures publicly available through its website and through distribution to the Community Liaison Group, and submits these to the Impact Assessment Agency of Canada for publication on the public registry internet site for the Milton Logistics Hub Project.

In developing and implementing the Wildlife Management Plan, CN should consult with Environment and Climate Change Canada and Conservation Halton. Where appropriate, CN is encouraged to develop and implement plans with input and partnership from other organizations such as Ducks Unlimited Canada and interested Indigenous groups that CN has worked with throughout the environmental assessment.

10.5. Cumulative Effects

CN's Views

CN stated that development of the Town of Milton and elsewhere from the rural town conditions of the 1950s to present day conditions, as well as industrial development, has resulted in direct loss of habitat including woodlots, grasslands and wetlands. While agricultural fields can attract wildlife, they are subject to frequent disturbances, such as hay cutting. In this way, hayfields act as ecological sinks: habitats that appear attractive to wildlife, and thus attract wildlife, but are of low quality and thus ultimately contribute to population decline.

CN indicated that other projects and activities that will be carried out that may affect migratory bird habitat in the Regional Assessment Area include the Boyne Planning District, the Britannia Road

Transportation Corridor Improvements, the Union Gas Hamilton-Milton Project, and the Milton Education Village. CN went on to state that there is no migratory bird habitat within the Milton Educational Village study area that overlaps with the Regional Assessment Area. It noted that the Britannia Road Transportation Corridor Improvements would occur along existing roadways and not result in changes to migratory bird habitat in the Regional Assessment Area, but might affect Barn Swallow habitat, because the species was observed nesting in a culvert beneath Britannia Road within the Regional Assessment Area.

CN made the following assumptions:

- Woodlands and wetlands would be protected under the provincial *Planning Act*, the Town of Milton Official Plan, and Halton Regional Official Plan policies during development in the Boyne Planning District, resulting in no direct loss of these habitats.
- Developers in the Boyne Planning District would be required by the provincial *Endangered Species Act* to offset the loss of grassland habitat for species at risk. These offsets would likely be outside the Regional Assessment Area.
- Any Barn Swallow nesting structures would be protected under the provincial *Endangered Species Act*, and proponents of other projects and activities that will be carried out in the Regional Assessment Area would be required to offset any associated habitat loss.

Participants' Views

Environment and Climate Change Canada stated that available on-site habitat had been heavily influenced by human uses, with grassland habitat in particular being maintained through agricultural practices. While there is no federal *Species at Risk Act* critical habitat identified within or near the Project Development Area, Environment and Climate Change Canada stated that there is high *Species at Risk Act* species richness in southern Ontario, and critical habitat has been identified for several species within the region.

Environment and Climate Change Canada noted that understanding the geographic context and current land uses in the vicinity of the Project is vital to establishing the availability and condition of habitat and predicting the potential effects of the Project on wildlife. It stated that Halton is the census division with the highest anticipated trend in population growth from 2013 to 2021 in the Great Lakes St. Lawrence Canadian Shield region, and it can be assumed that it will experience a high trend in urban development relative to other census divisions.

In the department's view, much of the loss of wildlife habitat in the region is the result of other development, including residential development. The Project would represent an incremental loss of wildlife habitat. However, with the proper implementation of CN's proposed on-site and off-site habitat creation, enhancement and rehabilitation and the proper implementation of its recommendations, Environment and Climate Change Canada expected that the cumulative effects of the Project together with the effects of other projects and activities that will be carried out would be minimal.

Environment and Climate Change Canada anticipated a net gain in Snapping Turtle and Monarch butterfly habitat in the Regional Assessment Area due to CN's commitments for on-site habitat creation and enhancements.

Environment and Climate Change Canada noted that Barn Swallow habitat identified within the Project Development Area would be retained throughout the construction and operation of the Project, and other similar habitat would be available in the Local Assessment Area and Regional Assessment Area.

Conservation Halton stated that wildlife habitat in the Project Development Area would be lost and wildlife would be displaced to outside the Project Development Area. Conservation Halton considered CN's assumption that there would be sufficient habitat for wildlife outside the study area to be unsubstantiated, especially given the rapid urbanization in the area. Conservation Halton suggested that if the assumption was incorrect there would be negative effects on these wildlife populations, and recommended that compensation be provided within the sub-watershed to accommodate displaced wildlife.

Panel Conclusions

The Panel notes Environment and Climate Change Canada's statement that the Project's contribution to the ongoing cumulative loss of wildlife habitat and reduction in populations would be small because CN has committed to an extensive program of mitigation. The Panel has also recommended additional mitigation measures. The Panel also notes a difference of opinion between Environment and Climate Change Canada and Conservation Halton regarding the extent of potential effects and the effectiveness of proposed mitigation measures.

However, the Panel observes that the task of ensuring that adverse environmental effects are avoided or minimized throughout the life of the Project would not be easy. While CN staff and contractors might address this task with zeal in the first years of the Project, would the same zeal be possible in year 20 and beyond? Therefore, the Panel observes that it will be vital that a high value be placed on wildlife and habitat protection and that this value be engrained in CN's corporate culture, with staff being empowered to act as champions. Similarly, the Panel observes that ongoing collaboration with relevant agencies and organizations, particularly Environment and Climate Change Canada and Conservation Halton, will be essential. The Panel has made further recommendations with respect to this matter in Section 15 Environmental Management.

The Panel found that there would be residual adverse Project effects on wildlife. Ultimately, the conversion of the current agricultural land to an intermodal terminal would introduce lights, noise, and other emissions that would cause a disturbance and make habitat for some species in the area unavailable. However, the Panel found that the mitigation proposed by CN was satisfactory for the Project to avoid a significant adverse environmental effect.

The Review Panel Terms of Reference required the Panel to consider the environmental effects of the project, including any cumulative environmental effects. The Panel has considered the effects of projects and activities that have been and will be carried out, including the effects of past land conversions. While the Panel did not hear extensive evidence about the cumulative effects that have occurred to wildlife in recent decades, the amount of farmland and wild land lost to development in the region is evident, and has necessarily become the object of many planning initiatives, including the Greenbelt Plan, Natural Heritage Systems, and Areas of Natural and Scientific Interest (ANSIs). In terms of future activities, the Panel considers various planned subdivisions, and developments and land use

designations within municipal lands as being reasonably foreseeable and that those lands will be lost to the use of wildlife as it is converted to various urban and suburban uses.

The Panel concludes that there has been a large loss of wildlife and available habitat in the region of Halton to date, but also generally in southern Ontario. The Project's minimal residual effect will contribute to this, and in considering future developments such as the Boyne Secondary Survey area and the anticipated developments shown in Halton Region's Official Plan and the Town of Milton's Official Plan, the Panel concludes that the permanent past and expected future losses of wildlife species and habitat in general within the region of Halton, are high in magnitude.

The Panel concludes that the residual effect of the Project, in combination with other projects and physical activities that have been and will be carried out, is likely to cause a significant adverse cumulative effect on wildlife habitat and wildlife.

The Panel finds that, although the Project effect is low in magnitude, when combined with the effects of past conversions of agricultural and wild lands and the future effects of continuing rapid residential, commercial, industrial and transportation development, the cumulative effects would be high in magnitude, over an extensive geographic extent within the Regional Assessment Area.

Part 4 – Effects of the Project on the Human Environment

11. Human Environment

This section encompasses the human health, socio-economic effects, and cultural heritage and archaeology aspects of the Project. For designated projects requiring a federal authority to exercise a power or function of various federal legislation, Section 5(2) of the *Canadian Environmental Assessment Act, 2012* provides for consideration of environmental effects on health and socio-economic conditions; physical and cultural heritage; and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

With respect to Aboriginal peoples of Canada, subsection 5(1)(c) of the *Canadian Environmental Assessment Act, 2012* considers environmental effects on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance where those effects are caused by a change to the environment. Environmental effects of the Project related to the current use of lands and resources for traditional purposes by Aboriginal peoples of Canada are discussed in Section 12 of this report.

This section also considers some effects that are not considered environmental effects under Section 5 of the *Canadian Environmental Assessment Act, 2012*. The Panel has included this information in accordance with Sections 2.4, 3.3 and 4 of its Terms of Reference.

11.1. Human Health

This section addresses changes to human health. The Panel considers these to be environmental effects under subsection 5(2)(b)(i) of the *Canadian Environmental Assessment Act, 2012*, in consideration of the potential determination of the Canadian Transportation Agency with respect to the Project. Subsection

6.1.10 of the EIS Guidelines required CN to provide baseline information regarding health conditions. Subsection 6.3.5 required CN to describe any changes the Project would cause to human health, considering, but not limited to potential changes in air quality, drinking water quality, and noise exposure in the Project vicinity.

11.1.1. Air quality: Health effects

This section will discuss the effects of air quality on human health. For additional discussion on the assessment of air quality, see Section 5.1.

CN's Views

CN conducted a human health risk assessment to assess the potential for changes to human health. For non-carcinogenic contaminants of potential concern, CN used exposure ratios (defined as the predicted concentration of contaminant divided by the relevant criterion value) to evaluate the health risk from short-term (acute) and long-term (chronic) exposure in air. If an exposure ratio was predicted to be less than a target benchmark, such as 1.0 (indicating that predicted concentrations, and therefore exposure, would not exceed the criterion), then CN considered health risks negligible. For carcinogenic contaminants of potential concern, CN assessed human health risks as expressed by incremental lifetime cancer risk. The incremental lifetime cancer risk represents the increased probability of contracting cancer over a lifetime due to exposure to a carcinogenic chemical emitted by the Project. CN considered an incremental lifetime cancer risk less than 1 in 100,000 to be acceptable.

CN's human health risk assessment involved several scenarios: the baseline and Project construction health risks; and the baseline and Project operation health risks in 2021; and the cumulative effects scenario for 2031 which included baseline, the Project, and emissions associated with other projects and activities that will be carried out. The risk assessment considered potential exposure at 40 special receptors. The special receptors selected in the Local Assessment Area included existing and potential future residences in the vicinity of the Project.

Non-threshold substances: particulate matter (PM_{2.5} and PM₁₀) and nitrogen oxide (NO₂)

CN's Views

CN found that nitrogen oxide (NO₂) would not exceed exposure ratios of 1.0 at any of the special receptor locations for all of the scenarios. However, CN predicted that exposure ratios of 1.0 would be met or exceeded for particulate matter (PM₁₀ and PM_{2.5}) in certain scenarios near the Project boundary or at some special receptors during construction.

During construction, CN predicted exceedances of exposure ratios for PM₁₀ at five of 40 locations for a duration of less than one day to five days per year.

During operation in 2021, CN predicted that the Project, in combination with terminal-generated truck traffic, future traffic, and background levels would result in an exposure ratio of 1.0 for both PM₁₀ (24-hour) and PM_{2.5} (annual). The Project alone would be responsible for an exposure ratio of 0.17 for PM₁₀ (24-hour) and 0.13 for PM_{2.5} (annual) at the receptors with maximum exposures from the Project.

With respect to the cumulative effects scenario for operation in 2031, CN predicted that the Project, in combination with terminal-generated truck traffic, anticipated future traffic associated with residential

and commercial developments, and background levels would result in an exposure ratio of 1.0 for PM_{2.5} (annual). The Project alone would be responsible for an exposure ratio of 0.057 for PM_{2.5} (annual) at the receptor with the maximum exposure from the Project. CN predicted that the Project, in combination with terminal-generated truck traffic, future traffic, and background levels would result in an exposure ratio of 1.1 for PM₁₀ (24-hour). The Project alone would be responsible for an exposure ratio of 0.11 for PM₁₀ (24-hour) at the receptor with the maximum exposure from the Project. CN noted that the exposure ratio for PM₁₀ (24-hour) would exceed the target of 1.0 at only one location, however, 31 of the 98 special receptors were predicted to have exposure ratios of 0.95 or more, including five with exposure ratios of 1.0.

CN predicted that implementation of additional mitigation measures (discussed in Section 5), would reduce emissions of PM₁₀ and PM_{2.5}.

Participants' Views

Health Canada stated that non-threshold substances are those for which health effects may occur at any level of exposure. Health Canada stated that the Canadian Ambient Air Quality Standards provide the benchmarks against which air quality management is evaluated across the country with respect to major air contaminants such as PM_{2.5} and NO₂. It also noted that benchmarks, such as an incremental lifetime cancer risk of less than 1 in 100,000 or the Canadian Ambient Air Quality Standards, are used for comparison purposes, but do not guarantee an absence of risk for non-threshold substances such as diesel particulate matter, PM_{2.5}, and NO₂.

Health Canada noted that diesel particulate matter, which is a major contributor of PM_{2.5} for the Project, and NO₂ are substances of concern associated with the diesel exhaust mixture. PM_{2.5} and NO₂ are predicted to be above the Canadian Ambient Air Quality Standards for those parameters.

Halton Municipalities stated that CN's human health assessment was flawed because it did not quantitatively assess adverse health effects including premature mortality, hospital admissions, asthma, and acute respiratory symptoms. Halton Municipalities was of the view that, based on predicted PM_{2.5} levels, the Project would result in a 1.7% increase in residents' lifetime risk of death from heart attack and 3.2 new asthma cases per 1,000 local child residents between ten to 14 years of age over the life of the Project.

Diesel exhaust

CN's Views

CN stated that diesel exhaust is a mixture of various contaminants including diesel particulate matter, formaldehyde, acetaldehyde, benzene, 1,3-butadiene, and polycyclic aromatic hydrocarbons; see Section 5.1.

CN indicated that its assessment of the effects of diesel exhaust on human health appropriately considered all important emissions needed for a complete analysis, and in its view the analysis was robust and conservative. While CN did not assess the incremental lifetime cancer risk of diesel exhaust as a whole, it did calculate the incremental lifetime cancer risks of the principal individual constituents of diesel exhaust: benzene, benzo(a)pyrene, NO₂, and particulate matter. CN predicted that Project-related exposure to emissions of these substances would not result in changes in human health.

CN stated that there is no scientific consensus on how to best assess the cancer risk from exposure to diesel exhaust. CN rejected the California Environmental Protection Agency method, published in 1998 and recommended by Health Canada, stating that the method had several flaws and would likely misrepresent risk. CN stated that one of the primary authors of the studies underlying this method had warned about uncertainties associated with his data, and that the California Environmental Protection Agency method would not adequately account for factors like smoking, which is a primary factor in lung cancer. CN also observed that the California Environmental Protection Agency method relied on studies based on diesel emissions and engines from the 1980s and earlier that do not reflect advances in diesel engines and emissions. CN cited a statement by the United States Environmental Protection Agency in 2002 that the data used in the California Environmental Protection Agency method were too uncertain to derive a confident assessment of cancer unit risk. CN also noted that using this method is not required by Health Canada.

Because of its concerns about the California Environmental Protection Agency method, CN chose to assess risk associated with diesel exhaust using the relative risk approach described in a paper by Vermeulen et al. (2014). The approach relies on an exposure-response relationship between predicted lifetime exposure to elemental carbon, used as a surrogate for diesel exhaust, and the risk of mortality from lung cancer relative to a population considered to be unexposed to diesel exhaust.

CN was of the view that its use of the relative risk method was more appropriate because it relies on more substantial and recent scientific data to provide more accurate assessments of risks. Furthermore, CN stated that the relative risk method was recommended by an expert panel convened by a health effects institute. Since Health Canada and provincial agencies have not established a negligible risk threshold for interpreting the results of a relative risk calculation, CN provided a qualitative assessment of relative human health risks.

CN stated that its relative risk analysis of diesel exhaust demonstrated that, from a human health risk perspective, the Milton airshed would be essentially the same with the Project as it would be without. CN noted that a relative risk of 1.0 for diesel exhaust would mean zero exposure to diesel exhaust, while a relative risk of 1.04 reflects some exposure. CN determined that the maximum relative risk from the contribution of the Project and terminal-generated off-site traffic would be 1.01. Combined with the baseline condition of 1.04, the result would be a relative risk of 1.05. CN stated that this difference does not translate into a statistically significant change in risk. CN observed that this estimated relative risk would be at the lowest end of the health risk range in Southern Ontario, and air quality close to the Project during operation would be similar to typical urban and suburban areas in southern Ontario, based on values from a 2017 study by Healy et al.

The relative risk values CN calculated were the same with or without mitigation. However, CN indicated that the number of locations with a relative risk equal to the baseline conditions (1.04) increased from 75 of 98 locations without mitigation, to 82 of 98 locations with mitigation applied.

CN criticized Halton Municipalities' prediction that the Project would result in increased frequency of heart attack deaths and asthma, since Halton Municipalities appeared to have applied the maximum concentration of PM_{2.5} across the airshed. CN suggested that this would overestimate risk since concentrations of PM_{2.5} would decrease rapidly with distance away from the Project Development Area.

Participants' Views

Health Canada stated that CN had not adequately characterized the health risks associated with exposure to the carcinogenic components of diesel exhaust. It noted that diesel particulate matter and NO₂ are the predominant contaminants of concern associated with diesel exhaust. Health Canada stated that certain contaminants in diesel exhaust (diesel particulate matter, formaldehyde, acetaldehyde, benzene, 1,3-butadiene, and polycyclic aromatic hydrocarbons) are carcinogenic or known to cause cancer. Health Canada noted that CN only provided the cancer risk, calculated as the incremental lifetime cancer risk, for benzene and benzo(a)pyrene, as a surrogate for polycyclic aromatic hydrocarbons.

Health Canada stated that the incremental lifetime cancer rate for diesel particulate matter should be calculated using the unit risk provided by the California Environmental Protection Agency (CalEPA, 2015). Health Canada reviewed CN's discussion document on the relative risk of lung cancer mortality from exposure to diesel particulate matter, noting that it was based on an approach described in a single paper, Vermeulen et al. (2014). Health Canada noted that benzene and benzo(a)pyrene also form part of the diesel exhaust mixture, and that baseline concentrations are or will be at levels higher than provincial health-based standards.

Health Canada maintained that an assessment of the carcinogenicity of diesel exhaust should be conducted by calculating the incremental lifetime cancer risks of diesel particulate matter using the California Environmental Protection Agency's unit risk or by providing a robust qualitative assessment. Health Canada recommended that if a relative risk approach was used, the results should be presented in a meaningful manner, such as by comparison to Health Canada benchmarks. In this way, an incremental lifetime cancer risk of less than 1 in 100,000 would be defined as essentially negligible risk. Since CN's assessment did not include any of these options, Health Canada was of the view that CN had not adequately characterized the human health risk associated with exposure to the carcinogenicity of diesel exhaust.

Health Canada also noted that diesel particulate matter is a very complex mixture and there is extensive literature on occupational health studies (miners, truckers) going back decades. Health Canada stated that CN should have evaluated a much wider range of studies and literature to understand the range of potential effects and risks.

Health Canada stated that exposure to diesel particulate matter may exacerbate existing diseases such as asthma, which affects about 10% of the general population. In its view, exposure to diesel particulate matter could cause people to develop new symptoms. Health Canada noted that the effects of diesel particulate matter relate largely to cardiovascular and respiratory disease but can also include premature non-cancer deaths. Halton Municipalities and a resident also raised concerns regarding the non-lethal effects of diesel particulate matter.

In response to Health Canada's concerns, CN stated that it would be prepared to prepare a robust, qualitative risk assessment in consultation with Health Canada to better understand the risk profile of diesel exhaust. This assessment could be done in consultation with Health Canada as part of the detailed design phase and the results could inform CN's monitoring programs.

Health Canada stated its preference for CN to take its analysis a step further and evaluate changes in risk relative to the incremental lifetime cancer risk by applying the relative risk value to the numbers of cases to be expected in 100,000 people.

Health Canada stated that proposed mitigation measures should not be restricted to meeting the Canadian Ambient Air Quality Standards, but should also work toward reducing overall population exposure to non-threshold contaminants associated with the Project. Health Canada recommended that CN consider additional mitigation measures to reduce emissions of non-threshold contaminants associated with diesel exhaust (NO₂, PM_{2.5}, and diesel particulate matter).

Halton Municipalities were also of the view that CN did not sufficiently assess increased cancer risk. Based on CN's own air emission numbers, Halton Municipalities found that there is a quantifiable increase in cancer risk, and agreed with Health Canada that CN should have estimated the incremental lifetime cancer risk from diesel particulate matter. Halton Municipalities used the California Environmental Protection Agency approach to estimate risk associated with the Project and concluded that the risk from diesel particulate matter would exceed the essentially negligible risk rate used by Health Canada (i.e., an incremental lifetime cancer risk less than 1 in 100,000) and result in adverse health effects.

Halton Municipalities suggested that Tier 4 vehicles could emit higher levels of ultrafine particles of diesel particulate matter, which could get into the bloodstream and deep into the lungs, and cause adverse health effects.

Milton Says No expressed concerns with diesel exhaust and air quality in general, and shared information from studies that discussed health effects for people living near certain railyards in the United States. Other participants that live near the Project also expressed concerns about potential human health effects related to air quality, including cardiac disease, asthma, and cancer.

Acrolein and crystalline silica

CN's Views

CN considered the potential for human health effects of acrolein and crystalline silica and concluded that neither substance poses a human health risk. CN stated that, based on its air quality predictions, the exposure ratios for acrolein with the Project would be well below 1.0. CN did not conduct a quantitative assessment for crystalline silica, but stated it would not be typical for consideration in intermodal terminal projects. In CN's view, the risks Halton Municipalities raised over not having a quantitative assessment of this were overstated.

Participants' Views

Halton Municipalities noted that crystalline silica is a contaminant found in road dust that has been identified as a potentially carcinogenic substance. Halton Municipalities were critical of CN's assessment of acrolein and crystalline silica.

Panel Conclusions

In reaching conclusions about the human health effects of air quality, the Panel considered the following factors to be particularly relevant:

- As noted in Section 5.1 (Air Quality), baseline levels of several air quality contaminants of potential concern, including benzo(a)pyrene and benzene approach or will exceed human health objectives established in the federal and provincial air quality standards.
- Project construction and operation would increase emissions of some contaminants of potential concern that have been demonstrated to cause human health effects.
- No safe threshold has been established for human health effects resulting from exposure to particulate matter (PM_{2.5}, PM₁₀). Non-lethal effects of particulate matter and diesel particulate matter can include cardiovascular and respiratory disease.
- Exposure to particulate matter, including diesel particulate matter, may exacerbate existing disease or cause new symptoms in people with conditions like asthma, and can also include premature non-cancer deaths.
- The Panel heard that there is no consensus on how best to assess the risks of diesel exhaust, but those risks are likely to be captured in assessment of PM_{2.5}, PM₁₀ and diesel particulate matter.
- During the construction period, exposure ratios of 1.0 would be exceeded for PM₁₀ at five of 40 special receptor locations for a duration of less than one day to five days per year.
- When considering adding Project emissions to the existing air environment, PM₁₀ (24-hour) and PM_{2.5} (annual) were predicted to result in exposure ratios of 1.0 or slightly below 1.0 at several special receptors during operation in 2021.
- Exposure ratios for PM₁₀ (24-hour), for Project emissions combined with the existing air quality levels, were predicted to exceed the target of 1.0 at one special receptor during the cumulative effects scenario for operation in 2031. At this receptor location, an exposure ratio of 1.1 would still be predicted even if emissions from the Project were excluded.
- Several contaminants in diesel exhaust (diesel particulate matter, formaldehyde, acetaldehyde, benzene, 1,3-butadiene, and polycyclic aromatic hydrocarbons) are carcinogenic or known to cause cancer, but CN did not assess the incremental lifetime cancer risk for a mixture of these contaminants.
- While CN has assessed the relative human health risk of exposure to Project-related air emissions, it has not conducted the robust qualitative assessment requested by Health Canada.

The Panel concludes that air quality in the Project Development Area and Local Assessment Area already exhibits deterioration as a result of human activities including urban development and associated vehicular traffic. The Panel did not hear persuasive evidence that CN's proposed air quality mitigation measures would be sufficient to offset or reverse these effects. Rather, the Project would further contribute air emissions to an already degraded environment.

The Panel notes that air quality constituents vary in their human health effects.

Baseline concentrations of benzo(a)pyrene and benzene already or will exceed some health-based air quality criteria, and while CN's proposed mitigation measures may reduce CN's contributions of benzo(a)pyrene, the Panel heard it is likely that concentrations of benzene would increase as a result of CN's proposed shift to higher-tier engine technologies. The Panel notes that there is considerable uncertainty associated with the Project-related human health risks of exposure to these substances, although both are known human carcinogens.

In addition, the Panel heard persuasive evidence that there is no threshold for human health effects for NO₂, PM_{2.5}, PM₁₀ and diesel particulate matter, and indeed that sub-lethal health effects, including

respiratory and cardiovascular effects, are likely to occur even when ambient concentrations of those pollutants are below the Canadian Ambient Air Quality Standards.

The Panel concludes that airborne acrolein or crystalline silica emissions from the Project are unlikely to cause adverse effects on human health. Predicted exposure ratios for acrolein are well below 1.0 and while CN did not assess crystalline silica, such an assessment would not be typical for projects of this type. Halton Municipalities was the only party to express concern about the human health risks of these parameters.

The Panel did not hear about feasible mitigation measures that CN could undertake to reduce human health effects at the receptors. The most effective mitigation for human health effects resulting from air quality is avoidance through emissions controls.

The Panel finds that the residual effect of Project air emissions on human health would be low on its own, but becomes significant when combined with existing baseline exceedances and existing exposure ratios that are already near the maximum acceptable level of 1.0 for some parameters. Some exceedances might be short in duration, only above acceptable limits for hours or a few days, however in light of the importance of maintaining high levels of human health, the Panel found these exceedances to be of concern.

While the exceedances may be infrequent or of short duration the Panel found those effects to be adverse and significant, given Health Canada's position that there are no safe exposure limits established for non-threshold air contaminants, and Halton Municipalities' suggestion that acute effects may be reversed by limiting exposure but some chronic health effects, specifically as a result of exposure to diesel particulate matter, are likely to be permanent and irreversible.

In coming to its conclusions on the significance of the environmental effects on human health, the Panel considered the mitigation measures it had recommended for Air Quality in Section 5.1 of this report. The Panel finds that CN's commitments to implement those air quality mitigation measures, along with the Panel's own additional recommendations are necessary to minimize a significant adverse environmental effect on human health. Therefore, the Panel recommends that CN implement the Panel's recommendations in Section 5.1. In addition, the Panel acknowledges Health Canada's recommendation that CN conduct a robust, qualitative risk assessment in consultation with that agency. The Panel notes, however, that such an assessment would be most valuable if carried out in the context of a regional airshed assessment that encompasses all regional sources of and responses to diesel exhaust, consistent with the Panel's Recommendation 5.5.

The Panel concludes that the Project, even with the recommended mitigation, is likely to cause a significant adverse environmental effect on human health caused by air quality because it would contribute to exceedances of health-based exposure standards.

The Panel finds that the effects of Project air emissions on human health in isolation would be low, but become significant when combined with baseline exceedances and exposure ratios that are at or near the maximum acceptable level, and when considering there are no safe exposure limits established for non-threshold air contaminants and that some predicted exceedances are known human carcinogens.

11.1.2. Country food: Health effects

CN's Views

CN assessed the potential health effects of deposition of airborne contaminants onto soils and garden produce. It found that the maximum potential concentrations of contaminants in soil were well below the soil quality guidelines for human health. To assess potential deposition of contaminants onto soil, CN modelled the concentration of benzo(a)pyrene in soils for the baseline scenario and predicted future scenario including the Project. Predicted Project-related benzo(a)pyrene deposition on soil was compared to the Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Human Health. Based on the modelling, CN predicted that future soil concentrations of benzo(a)pyrene would be substantially less than the relevant soil quality guidelines and therefore that the potential risk to human health due to exposure through uptake of contaminants by food plants or by dermal exposure to soils would be negligible.

CN noted that food-related concerns had not been raised directly with CN in past consultations, although concerns were raised during the public hearing regarding possible exposure to contaminants through food and soil. CN stated that engagement with residents about dust and country foods could be best accomplished through the Community Liaison Group. CN suggested that it could look into any concerns raised by members of the community regarding country foods, and follow up with that group on a plan of action where necessary.

Participants' Views

Although CN qualitatively considered other exposure pathways, Health Canada noted that inhalation was the only route of exposure considered by CN in its Human Health Risk Assessment. Health Canada indicated that airborne particulate matter generated from the Project may also deposit onto the ground and accumulate in soils and country foods, including food harvested or grown for non-commercial consumption or medicinal purposes. This can include contaminants associated with airborne particulate matter, such as benzo(a)pyrene.

Health Canada acknowledged that CN's proposed air quality mitigation measures would decrease the possibility for food and soil contamination but recommended that CN engage local residents regarding concerns about dust and country foods. If there are concerns, Health Canada recommended that CN develop a soil and food monitoring program that considers monitoring locations, contaminants of concern, reference values for the comparison of results, and the method of communicating findings.

Health Canada also recommended that CN consider future monitoring to validate modelled predictions of concentrations of benzo(a)pyrene to ensure they are below the Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health.

Milton Says No noted that some community members are gardeners and consume produce from their gardens. Several participants raised concerns about the potential for exposure to contaminants through food and soil, and one resident expressed concern that trucks would be travelling close to where food is grown.

Panel Conclusion

The Panel did not hear strong concerns about the potential Project-related human health effects of consumption of country foods. The Panel understands that the primary pathway for contamination of country foods from the Project would be from air emissions, and the associated deposition of contaminants such as benzo(a)pyrene. The Panel understands that managing air emissions would reduce the amount of material being deposited on country foods and home gardens in the area. The Panel finds that concentrations of benzo(a)pyrene would be below the Soil Quality Guidelines for the Protection of Environmental and Human Health established by the Canadian Council of Ministers of the Environment, and considers that any associated human health effect would therefore be low magnitude.

While the Panel heard concerns from residents about exposure to contaminants through food and soil, it did not hear that residents rely on food grown near the Project for a large portion of their diets. The Panel therefore finds that, while there may be some exposure, any consumption of dust from the Project would be fairly infrequent. Nevertheless, the Panel supports Health Canada's recommendations for a follow-up program for country foods, and that CN engage local residents about any concerns regarding dust and country foods.

CEAA Recommendation 11.1 — Follow-up program for country foods

The Panel recommends that CN develop and implement a follow-up program for human health and country foods. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected. The follow-up program should:

- develop a food and soil monitoring program in consultation with Health Canada and others as appropriate, to validate model predictions and ensure concentrations are below the Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health. This monitoring program should continue through construction and for a minimum of five years of Project operation; and
- include a means of communicating the findings of the follow-up program to local residents through the Community Liaison Group.

The Panel concludes that the Project is not likely to cause a significant adverse environmental effect on human health in relation to the consumption of country foods.

The Panel finds concentrations of benzo(a)pyrene would be below the *Soil Quality Guidelines for the Protection of Environmental and Human Health* established by the Canadian Council of Ministers of the Environment, and any effect would be of low magnitude.

11.1.3. Water quality: Health effects

CN's Views

CN stated that existing groundwater conditions in the area are generally not of high quantity or quality for drinking water. The municipal water supply for the Town of Milton originates from Lake Ontario and not from a groundwater source. Some residential wells occur in the area for private residences, and

water quality issues in those wells have been noted by area residents. CN concluded that the drinking water exposure pathway is not relevant to the evaluation of human health effects of the Project.

CN did not comment on existing or potential recreational or body-contact water use within the Project Development Area or downstream. However, CN noted that access to the Project Development Area would be restricted, with some agricultural use.

Participants' Views

Health Canada drew attention to Halton Municipalities' concerns that weathered till and fractured bedrock may act as conduits for contaminants into the deeper aquifer. Given the uncertainty in the subsurface migration of groundwater, Health Canada emphasized the importance of describing potential effects on potable water wells in the area due to site operations or accidents and malfunctions, such as spills, and to clearly present any proposed notification or monitoring plans. Groundwater monitoring is discussed in subsection 7.2.2.

The Ontario Ministry of the Environment, Conservation and Parks stated that the Project is located within the Halton Source Protection Area but is not located in a vulnerable drinking water area based on the approved Assessment Report; it did, however, note that Assessment Reports may be amended in the future and the boundaries of vulnerable areas may change. If it is determined in the future that the Project is located in a vulnerable area and the proposed sewage management facility is a significant drinking water threat, additional mitigation efforts will be required to manage the activity.

Panel Conclusions

The Panel concludes that, while exceedances of some water quality parameters currently occur within the Project Development Area, the nature and extent of these are unlikely to affect human health. The Panel does not anticipate the Project would affect any groundwater sources used for drinking water, and surface water was not identified as a source of drinking water within the Regional Assessment Area. Therefore, the Panel finds that there is no pathway for a potential effect of the Project on human health in relation to water quality.

The Panel observes that recreational water use does not exist and is not likely to commence in the Project Development Area.

The Panel concludes that the Project is not likely to result in a residual effect on human health in relation to recreational water use or the consumption of drinking water.

The Panel finds that current water quality exceedances are unlikely to affect human health. Local wells are not likely to be affected by Project activities, and surface water is not a drinking water source in the Regional Assessment Area. Water bodies within the Project Development Area are not currently used for recreation and would not be used for that purpose with the Project in place. Groundwater and surface water are therefore not pathways for Project-related human health effects.

11.1.4. Noise: Health effects

This section will discuss the effects of noise on human health. For additional discussion on the assessment of noise in general, see Section 6.1.

CN's Views

CN stated that the noise criteria it used, including Health Canada's, are applied to railway operations across the country. They are comprehensive and take into account all types of noises, including impulsive noise and short duration effects such as sleep disturbance. CN explained that those guidelines apply penalties for impulsive noise, and a nighttime penalty. This means these types of noises are considered in the model to be louder than they may be in reality, and therefore these penalties are applied as a conservative measure.

Sleep disturbance

CN's Views

CN indicated that Health Canada's guidance for assessing sleep disturbance identifies several criteria, and the application of those criteria depends on the circumstances. CN stated that the existing environment has an elevated baseline noise level, with ambient baseline noise levels measured between 45 and 63 decibels (dB), which is already louder than the World Health Organization's recommended threshold of 40 a-weighted decibels (dBA). CN stated that, according to Health Canada's guidance, in such an environment, a community response criterion should be applied for the change in percentage of people highly annoyed by noise. According to Health Canada, percent highly annoyed refers to a strong and long-lasting (greater than one year) level of annoyance in a community in relation to long term average sound levels. CN predicted that construction and operation of the Project would result in only minor additional noise, amounting to an increase over ambient noise levels of less than 3 dB with mitigation. CN stated that since this difference is generally considered imperceptible, Project construction was not expected to cause sleep disturbance.

CN predicted that the Project, with mitigation, would not exceed Health Canada's criterion of a change of 6.5% of people highly annoyed due to Project noise at any of the points of reception. CN stated that Halton Municipalities' concern about noise exceedances at night was speculation since there was no data to support the concern.

During the hearing, CN committed to conducting further sleep disturbance analysis in consultation with Health Canada during the detailed design phase of the Project, to evaluate the effect of individual nighttime noise events. If this analysis reveals that there is concern about such events, CN would consider additional mitigation measures. CN stated that through their existing complaints resolution process and the Community Liaison Group, it would be able to identify and investigate any complaints related to noise and sleep disturbance.

Participants' Views

Health Canada stated that CN had failed to carry out a proper nighttime sleep disturbance assessment. Health Canada indicated that to assess potential effects on sleep, the number of occurrences and time of nighttime noise events at each receptor location under baseline conditions should be considered in comparison to the predicted individual noise events from Project-related activities. Understanding the predicted change in nighttime noise events would allow for a better characterization of potential sleep effects and may allow for the inclusion of proactive mitigation measures, such as altering the timing of nighttime events, when sleep disturbances are more likely.

Health Canada stated that physiological reactions can occur even at very low levels of noise that do not cause awakenings. Health Canada recommended that CN assess the potential for short-term sleep

disturbance by providing details on how baseline noise events would be distributed at night and comparing those to predicted individual noise events at night from Project-related activities at each receptor location. If noise events are predicted to be higher than 60 dB, 10 to 15 times per night or more, then in Health Canada's view, CN should consider additional mitigation measures. Health Canada also recommended that CN consider additional mitigation measures if sleep-related Project noise complaints are received. As noted previously, CN committed to work with Health Canada during detailed design to carry out that analysis and consider mitigating any issues that may be identified. CN also committed to implementing Health Canada's recommendation to provide the distribution of baseline noise events at night in comparison to predicted individual noise events at night at each receptor location. Where noise events at night are predicted to exceed the World Health Organization guidelines of 60 dB outdoors more than 10 to 15 times per night at noise receptor locations, or if sleep-related Project noise complaints are received, CN would consider additional mitigation measures. CN said that it cannot speculate on the outcome, and the choice of mitigation approach would depend on the results of the analysis.

Health Canada indicated that it had confidence in the Canadian Transportation Agency's dispute resolution process for noise. The Canadian Transportation Agency's dispute resolution process would not extend to noise associated with terminal-generated off-site traffic but Health Canada noted that those complaints could be resolved through CN's existing complaints resolution process and the Community Liaison Group. Health Canada recommended that CN's complaints resolution process be available for the duration of the Project, including along haul routes; that it include review of noise monitoring results; that CN communicate the complaint investigation process; and that CN consider additional mitigation measures when noise complaints are received.

Health Canada suggested that CN's proposal to calculate the percentage of people highly annoyed from monitored noise levels during operation be expanded to include the construction phase.

Halton Municipalities asserted that CN had not completed a sufficient nighttime sleep assessment. Halton Municipalities noted that CN did not assess individual short term excursions over 60 dB, and noted that impulsive noises can be much louder than continuous noise, and can disturb sleep. Halton Municipalities emphasized that the sleep disturbance criteria area likely to be exceeded at many receptor locations. In their view, the effectiveness of mitigation of noise effects cannot be assessed because CN did not assess sleep disturbance or noise events above 60 dB at night.

A participant indicated that CN's selection of the U.S. Federal Transit Administration noise criteria was inappropriate as those criteria were developed to evaluate the noise effect from mass transit projects and therefore the proposed Project does not fit into any of the U.S. Federal Transit Administration project categories. The same participant stated that CN did not address sleep disturbance from individual noise events and that sleep disturbance is more important than the percent highly annoyed criterion. The participant was also of the view that the provincial NPC-300, Health Canada sleep disturbance, and CN's noise and vibration criteria should be used in the assessment to provide adequate protection to the environment and local residents.

A resident raised concerns about noise and the effects on sleep disturbance and the ability to enjoy outdoor activities. Another resident raised concerns about the mental health effects of noise and noted that train noise had caused them to wake in the night.

Low frequency noise

CN's Views

As discussed in subsection 6.1.4, CN predicted that low frequency noise from idling would not be an issue, and that most receptors would be unlikely to experience rattling. CN's modelling predicted low frequency noise that is slightly above the 70-decibel criterion, although below the 75- to 80-decibel criterion for annoyance.

Participants' Views

Health Canada explained that the human ear is relatively insensitive to low frequency noise in comparison to higher frequencies. However, once low frequency noise is detectable, people tend to have an extremely low tolerance to it, and additional changes lead to disproportionate changes in annoyance. Health Canada made recommendations regarding low frequency noise, which are included in subsection 6.1.4.

Speech interference

CN's Views

CN did not anticipate that the Project would cause speech interference concerns although Halton Municipalities expressed concern that CN had not conducted a speech interference analysis. In response to this concern, CN submitted Undertaking 31 at the public hearing, and found that for existing residences, the speech interference criterion would be met at all receptor locations surrounding the facility with windows closed. Two locations would exceed the criterion by 1 or 2 dB when windows are partially open, while one of these locations already exceeds the criterion without the addition of Project noise. All locations would meet Health Canada's speech interference criterion for the outdoors (55–60 dBA). All points of reception for existing subdivisions would also meet that criterion. CN also predicted that the speech interference criterion at Jean Vanier School would be met unless windows were partially open. However, CN expected that since that is a new school that likely has a heating, ventilation and air conditioning system, the windows would normally be closed. If windows were partially opened, the criterion, which currently equals the baseline noise level, would be exceeded by 1 dBA.

CN predicted that, with mitigation, the Project would meet human health criteria at all receptors around the Project, and no additional measures beyond those that already exist or are proposed are expected to be required.

Participants' Views

Halton Municipalities suggested that CN had not assessed the Project's noise effects to speech interference, however CN provided information in response to undertaking #31 at the hearing.

Panel Conclusions and Recommendations

In reaching its conclusions about the human health effects of noise, the Panel considered the following factors to be particularly relevant:

- The Project would create noise from a variety of sources, including mobile and stationary sources. Some of the noise would have different characteristics from the existing baseline ambient noise, particularly impulsive noises associated with terminal operations.
- CN predicted, and Health Canada agreed, that the Project was not likely to exceed Health Canada's threshold for noise effects on human health, defined as an increase in greater than 6.5% of people highly annoyed.
- Health Canada indicated that the Project had potential to cause short term sleep disturbance from nighttime impulsive noises. CN had not conducted a formal sleep disturbance analysis, but committed to work with Health Canada to complete this analysis.
- Additional noise mitigation measures are feasible and available, if required, including additional berms within the Project Development Area and timing of operations to avoid effects.
- Noise objectives to avoid speech interference would be met for outdoor locations and for indoor locations with windows closed.

The Panel concludes that CN did not assess individual Project noise events at night that may result in sleep disturbance. During the hearing, CN committed to working with Health Canada to undertake a formal sleep disturbance study. CN and Health Canada agreed that, if sleep disturbance effects were identified, additional mitigation measures should be considered to reduce these effects.

The Panel accepts Health Canada's recommendation that CN should consider additional noise mitigation where impulsive noise events at night exceed 60 dBA L_{max} outdoors more than 10 to 15 times per night at any receptor location. The Panel is satisfied that, should the sleep disturbance modelling or measured monitoring results indicate that these levels are being exceeded, additional mitigation, such as use of quieter equipment, changing the timing of certain impulsive noise-generating operations to outside of sleep hours, or construction of additional berms or noise walls, must be implemented.

The Panel also notes that, as with all predictions in the environmental assessment, the reality of the noise emissions from the Project can only be verified when the Project is operating and monitored. The Panel has suggested a follow-up program to verify the accuracy of CN's predictions and effectiveness of the mitigation measures. Provided that CN meets the Health Canada criterion for sleep disturbance by ensuring that nighttime noise events do not exceed 60 dBA L_{max} outdoors, 10 to 15 times a night or more, the Panel finds that the Project's noise effects on human health would be low to moderate.

CEAA Recommendation 11.2 — CN should implement the mitigation it has committed to undertake for health effects from noise

The Panel finds that CN's commitments to implement mitigation measures for noise are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends:

- CN should conduct further sleep disturbance analysis in consultation with Health Canada, during the detailed design phase of the Project, to evaluate individual nighttime impulsive noise events. If the results of this analysis demonstrate the potential for Project-related effects on sleep disturbance, CN should identify and implement additional mitigation measures, including additional noise barriers or operational changes to ensure the individual noise events experienced at receptors remain under the target of 10 to 15 noises of 60 dBA L_{max} outdoor per night.

- CN should work with the Community Liaison Group described in Section 15 to receive complaints related to noise and sleep disturbance and ensure that they are reported to residents on a regular basis to promote transparency and accountability.
- CN should communicate its complaint investigation process clearly to neighbouring residents and businesses and provide prompt and transparent resolution for any complaints. If the complainant is still dissatisfied with CN's response, they would have the option to forward their complaint to the Canadian Transportation Agency.
- CN should make its noise resolution process available for the duration of the Project.

CEAA Recommendation 11.3 — Follow-up program for health effects from noise

The Panel recommends that CN develop and implement a follow-up program for human health effects from noise. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should undertake noise monitoring during all three phases of construction and for a period of at least two years after the start of operations to determine the accuracy of the environmental assessment predictions, and effectiveness of mitigation measures, and specifically to ensure CN is in compliance with relevant standards for sleep disturbance, meaning fewer than 10 to 15 impulsive noise events of 60 dBA L_{max} outdoors per night at receptors. If required, CN should implement additional noise mitigation measures to address noise issues as they arise. CN should submit noise monitoring results to the Impact Assessment Agency of Canada on a monthly basis.

The Panel concludes that the Project is not likely to cause a significant adverse environmental effect on human health from noise.

The Panel finds that anticipated noise levels would not exceed Health Canada's criterion of 6.5% of people highly annoyed. The Panel notes that the separation distances between the Project and residences, in combination with the additional measures suggested by the Panel, would mitigate the majority of the Project noise.

The Panel also finds that CN committed to resolve the remaining uncertainty about the effects of impulsive noises on sleep disturbance at night by carrying out a sleep disturbance assessment in collaboration with Health Canada. If the potential for sleep disturbance exists, CN would be required to implement additional mitigation measures including additional berms, noise walls, operational changes or other appropriate measures, and that these mitigation measures would likely be effective to eliminate any significant effect on human health.

11.1.5. Mental health

CN's Views

CN did not expect serious mental health effects from the Project. CN has proposed mitigation measures related to air quality and noise, but did not conduct a specific study of mental health.

Participants' Views

Milton Says No submitted information at the public hearing citing studies that found that adverse levels of noise might indirectly affect mental health.

A resident stated that CN aimed to downplay or minimize the adversity of environmental effects by focusing on one effect at a time. He suggested that residents may tolerate the additional air pollution generated by the terminal and 1,600 trucks per day, but the increased noise or traffic congestion could trigger anxiety attacks and adversely affect residents' mental health.

Another resident at the public hearing also expressed concerns about the potential for mental health effects resulting from the Project.

Panel Conclusions

The Panel did not hear extensive evidence about the potential for Project-related mental health effects. While CN stated that it does not anticipate such effects, it did not conduct a formal mental health study.

Although the Panel was not required to specifically consider mental health in its environmental assessment, it recognizes mental health as an important issue that was raised by several individuals at the public hearing. The Panel concludes that some residents may experience stress and anxiety related to the environmental effects of the Project, the environmental assessment process, and a general sense of loss of power and control over the situation. The Panel encourages CN to include mental health considerations in its ongoing monitoring and evaluation of human health effects.

The Panel has also made recommendations relating to communications, transparency and ongoing community involvement through a Community Liaison Group that may address some aspects of the Project development process with the potential to cause stress and anxiety.

11.1.6. Cumulative effects on human health

CN's Views

CN predicted that Project air emissions would combine with terminal-generated traffic, future traffic and background (non-Project) levels to cause exposure ratios for non-threshold contaminants to occasionally exceed the target of 1.0. During construction, CN predicted exposure ratio exceedances for PM₁₀ at 5 of 40 receptors for a duration of less than one day to five days per year at those receptors. During operation in 2021, CN predicted that the Project in combination with terminal-generated traffic, future traffic and background levels would result in exposure ratios of 1.0 for PM₁₀ (24-hour) and PM_{2.5} (annual). The Project alone would account for an exposure ratio of 0.17 for PM₁₀ and 0.13 for PM_{2.5}.

During operation in 2031, CN predicted that the Project in combination with terminal-generated traffic, future traffic and background levels would result in exposure ratios of 1.0 for PM_{2.5}. The Project alone would account for an exposure ratio of 0.057 for PM_{2.5} at the receptor with the maximum exposure from the Project. CN also predicted that during operation in 2031, the Project in combination with terminal-generated traffic, future traffic and background levels would result in an exposure ratio of 1.1 for PM₁₀ and the Project alone would account for an exposure ratio of 0.11 for PM₁₀ at the receptor with the maximum exposure. The exposure ratio for PM₁₀ would only exceed the target at one location, but

31 of the 98 special receptors would have exposure ratios of 0.95 or more, including five with exposure ratios that equal the criterion of 1.0.

With respect to diesel exhaust and its constituents, including carcinogenic contaminants of concern, CN concluded that the Milton airshed would be the same with the Project as without. A relative risk of 1.0 for diesel exhaust would indicate no exposure. The current baseline relative risk is 1.04 and with the Project it would be 1.05. CN stated that this is not a statistically significant change in risk and the estimated relative risk would be typical of urban and suburban areas in southern Ontario.

CN's estimated relative risk of exposure to diesel exhaust was the same with or without mitigation, but with mitigation seven fewer locations would increase to 1.05 (75 of 98 would have a relative risk of 1.04, equal to baseline, without mitigation; 82 of 98 would have that relative risk with mitigation).

Participants' Views

As discussed in subsection 11.1.1, Health Canada stated that there are no thresholds for certain contaminants, and that meeting the criterion does not guarantee an absence of risk. Halton Municipalities estimated that the Project would result in a 1.7% increase in lifetime risk of death from heart attack and 3.2 new asthma cases per 1,000 child residents between 10 and 14 years of age.

Health Canada stated that exposure to diesel particulate matter can exacerbate existing diseases, including asthma, and cause people to develop new symptoms. Most health effects are cardiovascular or respiratory in nature, but they can also include premature non-cancer deaths. Halton Municipalities agreed with this point.

Health Canada stated that CN should not just try to meet the Canadian Ambient Air Quality Standards, but should instead try to reduce overall exposure and consider additional mitigation to achieve this.

Panel Conclusions

The Panel found that the Project would not be likely to cause a residual effect to human health through consumption of country foods or water quality impairment.

The Panel's conclusions on noise indicate that anticipated future increases in background noise could make the Project's effects less perceptible. From a health perspective the Panel did not hear information from participants that concerns regarding sleep disturbance would be exacerbated in combination with past or other projects and activities that will be carried out. As a result, the Panel's concerns regarding cumulative effects on human health centred around the health effects of air quality, and in particular with diesel and other vehicular emissions.

The Panel discussed the changes to air quality that have occurred in the Milton area, as well as the changes that are expected to occur due to future activities, in Section 5.1. The Panel recognizes that the baseline air quality in the Project area has already been degraded, to various degrees, for contaminants of concern.

With respect to non-carcinogenic contaminants of concern, the Panel recognizes that exposure ratios are predicted to meet or exceed the criterion of 1.0 during construction and operation of the Project. However, the Panel notes that such an exceedance indicates only the exceedance of a criterion, but not the absence of health effects. Exceedances are not predicted for many of the receptors, but the Panel

heard that health effects can be expected at lower levels of exposure. Over time, with future activities, the Panel expects that these non-threshold contaminants will increase, even though the Project's contribution will be relatively small.

The Panel recognizes that baseline concentrations of carcinogenic contaminants of concern, including benzo(a)pyrene and benzene, are predicted to exceed applicable criteria, and notes that the health effects of other diesel exhaust constituents have not been quantitatively evaluated as a mixture. The Panel is of the view that it will be important for CN to work with Health Canada to ensure risks to human health from exposure to diesel exhaust are minimized as much as possible. However, the Panel notes that while emissions can be managed to some degree, there are no feasible mitigation measures that CN could undertake to reduce human health effects at the receptors. The most effective mitigation for human health effects resulting from air quality is avoidance through emissions controls. The Panel concludes that baseline exceedances are likely to become more frequent and more severe over time, as a result urban development and associated traffic, unless there are fundamental and widespread changes in engine technology.

The Panel concludes that the Project, even with the recommended mitigation, in combination with other projects and activities that have been or will be carried out, is likely to cause a significant adverse cumulative environmental effect on human health caused by air quality, because it would further contribute to the existing degraded air quality conditions and associated human health risks.

11.2. Socio-Economic Effects

This section addresses the socio-economic effects of the Project. The Panel considers that the effects on the compatibility with residential communities and agriculture arise from changes to the environment and are therefore environmental effects under subsection 5(2)(b)(i) of the *Canadian Environmental Assessment Act, 2012*, in consideration of the potential determination of the Canadian Transportation Agency with respect to the Project. Section 3 of the Review Panel Terms of Reference requires it to take into account the environmental effects of the Project.

This section also addresses the effects the Project may have on land use planning and on transportation networks. These have been included as factors to be considered in accordance with Sections 2.4 and 3.3 of the Review Panel Terms of Reference.

Subsection 6.1.10 of the EIS Guidelines required CN to provide baseline information regarding socio-economic conditions, including the functioning of the socio-economic environment, encompassing a broad range of matters that affect communities in the study area in a way that recognized interrelationships, system functions and vulnerabilities. Based on the predicted changes to the environment resulting from the Project, subsection 6.3.5 required that CN describe any effects on socio-economic conditions, including use of navigable waters for recreational purposes; commercial and recreational activities including tourism, fishing, hunting and gathering activities; as well as effects on existing municipal and regional land use planning, including present and approved land uses.

The Panel heard many views and concerns related to potential effects of the Project on socio-economic conditions. In particular, CN and Halton Municipalities proposed various valued components for the Panel to consider in relation to that topic.

As part of the EIS, CN assessed the Project's potential effects on socio-economic conditions by considering changes to the availability and types of land and resource use activities in the Project Development Area and Local Assessment Area, as well as changes in demand for community services and infrastructure. CN concluded that these effects could occur as a result of changes to land cover and navigability of Indian Creek, and changes in views and atmospheric emissions. CN also observed that the construction of the grade separation at Lower Base Line could result in changes in demand for community services and infrastructure due to potential lane closures or detours that would have to be planned in collaboration with the local and regional authorities.

Throughout the process, CN and other participants also provided views on potential socio-economic effects outside federal jurisdiction such as compatibility with planned land uses, traffic management, safety, municipal finances, employment and community infrastructure and services.

The Panel has chosen to regroup concerns under four main categories. The Panel considered that effects related to compatibility with residential communities and to agriculture resulted from changes to the environment, and thus would be subject to the *Canadian Environmental Assessment Act, 2012*.

The Panel also examined effects of the Project on transportation networks, and land use planning, neither of which the Panel found would be directly affected by changes to the environment, and which would therefore not be subject to the *Canadian Environmental Assessment Act, 2012*.

The following sections describe what the Panel heard and its views about all four of those issues.

11.2.1. Compatibility with residential communities

The Panel heard many concerns about the location of the Project and its effects on the neighbouring community. The following sections address the compatibility of the Project with residential communities, for which the Panel considered the effects of the Project to the quality of experience for outdoor recreation, and the effects of the Project on property value and general property enjoyment.

Quality of experience for outdoor recreation

CN's Views

CN reported that cycling is a very popular activity in the region and may attract cyclists from outside the region of Halton. The Mattamy National Cycling Centre is also located within the Local Assessment Area (which in this case extends 1.5 kilometres around the Project Development Area) and attracts visitors as well as cyclists. CN noted that there are five established cycling routes within the Local Assessment Area. Of those five, only portions of two routes would intersect with the Project Development Area on Lower Base Line, at the grade separation. CN said that no usage statistics for the five cycling routes were available in the area near the Project. No dedicated bike lanes or paths currently fall within the Project Development Area.

Aside from cycling, CN noted that recreational amenities within the Local Assessment Area consist of a number of hard surface trails for recreational use and the Rattlesnake Point Golf Club, none of which are located within the Project Development Area.

CN indicated that the presence of the Project, including associated acoustic and atmospheric emissions and changes in the landscape, has the potential to reduce the quality of the experience for land users within the Local Assessment Area. To mitigate those potential effects, CN proposes to construct vegetated berms in key locations around the Project Development Area. These would reduce sound effects and effects on viewscales. Restoration and naturalization areas would also be incorporated into the Project and would improve the viewscales within the footprint of the Project and the Regional Assessment Area. CN also indicated that interactions between existing biking trails and traffic associated with the Project could be managed through consultation with cyclists and other road users.

CN reported that there was no evidence that the Project Development Area and Local Assessment Area were used for fishing, hunting or boating. For hunting, CN explained that this was probably due to high level of agricultural activity and an ongoing prohibition to discharge firearms. Indian Creek may be considered navigable, but the varying water levels and the presence of wire agricultural fences reduce the potential for boating. CN stated that, with the proposed watercourse realignments, navigability would overall be similar to existing conditions, although the realignment would remove existing fences and thus remove a barrier to navigation. CN did not present evidence of any current fishing or boating use within the Project Development Area.

With regard to the effect of light emissions from the Project on stargazing, CN concluded, that with the Project in place, it would still be possible to view approximately 500 stars on nights with good viewing conditions. CN explained that this determination was based on current sky quality, changes already underway to the lighting in the area with and without the Project, and expected changes associated with planned future projects and activities. See Section 5.3 for additional discussion of light effects.

CN concluded that, with mitigation measures in place for the management of the acoustic and atmospheric emissions and light, including standard management practices, the effects of the Project on recreation in the adjacent area would be reduced to an acceptable level. CN stated that the proposed truck entrance intersection on Britannia Road would include design features to safely accommodate pedestrians and cyclists moving along Britannia Road and to and from the residential communities to the north.

CN noted that the current road network around the Project Development Area was not equipped with bike lanes or any bike facilities. Traffic surveys completed in 2015 recorded only two cyclists using Britannia Road. CN also mentioned that Milton was rated as bronze by the Share the Road Cycling Coalition, indicating that they were a community in the early stages of becoming more bike friendly. CN stated that the proposed grade separation at Lower Base Line would include separated pedestrian and cyclist lanes at the request of the Town of Milton and therefore improve the safety of cyclists in this area. The design of CN's truck entrance would be aligned with Halton Region's planned intersection on Britannia Road to accommodate cycling and the bike lanes that would be constructed by Halton Region when it upgrades Britannia Road from two to six lanes.

Participants' Views

Halton Municipalities stated that the Project could have effects on outdoor recreation and active transportation. Noise and air emissions caused by trucks, together with splashing during wet road conditions, could deter cyclists and pedestrians from using the area or raise their level of anxiety. Delays at crossings could also increase as a result of the Project. Halton Municipalities considered that those effects would not be significant because proposed haul routes are on arterial roads that are designated truck routes accommodating relatively high volumes of traffic, and because the incremental increase in traffic was not expected to materially change conditions. However, it suggested that relocating the truck entrance planned for Britannia Road to First Line could alleviate some of the concerns for active transportation users.

Halton Municipalities confirmed that they plan to provide separate on-road bike lanes as well as multi-use paths when Britannia Road is widened to six traffic lanes.

Milton Says No indicated that Milton is home to hundreds of large greenspace areas, protected trails, roads for cycling, and opportunities for other outdoor activities, and that those benefits were among the reasons why people chose to live in Milton. They pointed out that Milton and Halton Region have a substantial cycling community, due in part to the location of the National Cycling Centre. Milton Says No were concerned about the effects of air emissions on cyclists using Britannia Road from trucks (potentially as many as 140) idling on the access road to the terminal.

The organization was also concerned by the effect of increased truck traffic on cyclist safety. Milton Says No disagreed with CN's statement that cyclists were restricted to the road shoulder in the absence of a bike lane. Milton Says No explained, that according to the Ontario Ministry of Transportation, cyclists are considered vehicles on the road and are not restricted to the shoulder. Milton Says No particularly identified roundabouts on Tremaine Road as a source of concern. They also indicated that forms of cycling infrastructure that are designed to accommodate slower cyclists and pedestrians (multi-use paths for example) are of limited use for road cyclists. They added that it would not be safe or appropriate for road cyclists to be on the multi-use paths because of their speed.

Milton Residents Affected by Intermodal Lines (R.A.I.L.) stated that it was unlikely that the area around the Project would be used for recreational cycling given the amount of trucks predicted.

A participant raised concerns that the Project could affect the use of the Mattamy National Cycling Centre because increased truck traffic would conflict with local pedestrian and cycling traffic, together with parents bringing their children to the Velodrome. They stated that this would be an adverse effect that could not be satisfactorily mitigated by traffic lights or crossing guards, or other measures to slow down traffic in the area.

Milton Says No suggested that the Project may increase light pollution, making it difficult to see stars and planets. A resident noted the popularity of astronomy in the area, citing the example of a neighbour with a large telescope.

Property value and enjoyment of property

CN's Views

CN indicated that no data regarding the effects of its terminals on residential property values exist. However, CN cited the Vancouver Intermodal Terminal as an example of residential neighborhoods that continue to grow and thrive despite being in proximity to a CN terminal. CN stated that the multitude of parameters affecting property values, and the interplay between them, varies over time and by area. As a consequence, CN did not think it was feasible to draw meaningful conclusions about the likely effect (positive or negative) of any one variable. However, CN stated that, in their experience, the introduction of an intermodal terminal like the one in Milton is a net positive for the business prospects of the surrounding area, which would reasonably be expected to contribute to local prosperity and indirectly improve local land values. Consequently, CN did not see a need for measures to mitigate reduction in property values.

CN stated that it was aware that participants had raised concerns about land use compatibility within a 1,000-metre area around the site, which was derived from provincial guidance regarding the siting of industrial developments. CN noted that this 1,000-metre zone was simply an area or zone of potential influence within which effects on sensitive receptors should be assessed. CN stated that their assessment encompassed the geographic range over which the Project's potential environmental effects may occur. In some cases, such as for air quality, the study area extended beyond 1,000 metres. CN also noted that the terminal's operational footprint would be located at a distance of at least 300 metres from any nearby residential use, which in its view made the Project compatible with its surroundings. CN stated that Halton Municipalities' claim that residences were located within 300 metres of the Project was incorrect because Halton Municipalities had considered an area along the existing mainline north of Britannia Road far more extensive than the zone where container transfers would actually occur. According to CN, the information on the record, based on the depiction of the working footprint of the terminal provided at the hearing, clearly shows that the operational footprint of the facility would be more than 300 metres from the nearest or existing residential community.

CN stated that Halton Municipalities had been aware for nearly twenty years that CN owned the lands between Britannia Road and Lower Base Line and intended to use them for rail-based infrastructure, and that all but one of the neighbourhoods adjacent to CN's mainline (Bristol Survey) had been approved since CN acquired the land. CN argued that it was therefore inconsistent for Halton Municipalities to suggest that the rail-based infrastructure and activity would be incompatible with those residential uses. Rather, CN stated that it was reasonable to conclude that Halton Municipalities' past approval of residential development in the area indicated an understanding and acceptance of the fundamental compatibility of these land uses.

Participants' Views

Halton Municipalities stated that major facilities such as the Project and sensitive land uses should be planned to ensure that they are appropriately designed, buffered or separated from each other to prevent or mitigate adverse effects from odour, noise and other contaminants, minimize risk to public health and safety, and to ensure the long-term viability of major facilities. Halton Municipalities stated that according to the Province of Ontario's *Guideline D-6 Compatibility Between Industrial Facilities, July 1995* (D-6 Guidelines), a facility like the Project is considered to have an area of influence extending 1,000 metres from its boundary and the minimum separation distance is 300 metres from sensitive land

uses. They noted that the effects of the Project would not just be limited to the terminal's operational footprint or to immediately adjacent lands, but would be far more extensive and pervasive. Halton Municipalities noted that there are currently over 10,000 people residing within 300 metres of the Project and that about 34,000 residents would be living within 1 kilometre of the Project. Additional residential and mixed-use developments would also be located along the potential haul routes.

Milton Says No were concerned about the potential decrease in local property values due to the Project. They examined examples of neighbourhoods near intermodal terminals in the United States and in Brampton, and indicated that local real estate agents estimated that the construction of the Project would cause an initial five percent drop across the Town of Milton and a drop of five to ten percent for properties closer to the Project, along Louis Saint Laurent Avenue and Britannia Road, depending on proximity. Some participants mentioned that when they had bought their properties, CN had withdrawn its original proposal and they were therefore unaware that a railway-related development might happen near their home.

Milton Says No indicated that residents had chosen Milton for the high quality of life and that studies conducted in the United States had shown that the location of a heavy industrial facility in an area can lead to serious economic consequences. They considered that those type of facilities are dangerous, ugly, polluting, noisy, produce light pollution and increase traffic and congestion, and that a facility like the Project should be nowhere near a residential community. According to Milton Says No, the arrival of the Project would trigger an initial reaction whereby people would sell their homes. This would be followed by a secondary response where there would be degradation of the recreational and green space potential of the area. They stated that there would be a long-term decrease in quality of life, property values, loss of important employment opportunities and that overall the culture of the town would change. They noted that facilities such as CN's Brampton Intermodal Terminal are surrounded by intermodal-oriented businesses and the area of the Project was not planned for those kind of businesses. Other participants had similar concerns about the value of their properties and the overall quality of life if the Project were developed.

Milton Residents Affected by Intermodal Lines were concerned that the Project was not aligned with the vision of the community. They stated that dozens of homeowners adjacent to the Project would see their quality of life suffer, and they were worried that if future issues arose, the process to address them with CN would be arduous.

The Brampton Board of Trade stated that the value of properties around the Project could increase, given the housing supply restrictions in the Greater Toronto Area, the premium in home prices in the west end of the Greater Toronto Area, and proximity to jobs provided by ancillary businesses that would surround the terminal.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on the quality of recreational experience, the Panel considered the following factors to be particularly relevant:

- Most of the concerns the Panel heard related to cycling. Road cycling is a popular recreational activity in the Milton area and a training component of the Mattamy National Cycling Centre. The Panel was not given an estimate of the numbers of cyclists affected.

- The existing identified cycling routes coincide in part with likely haul routes to and from the Project.
- Local residents are concerned about the effects of adding more large trucks on air quality for cyclists, safety, enjoyment of the cycling experience, and the ability of athletes at the Mattamy National Cycling Centre to train on road bikes.
- The Project would result in an increase in diesel particulate emissions, noise and light in the area surrounding the Project Development Area.
- Some of the roads that would be used by cyclists and terminal-generated trucks are currently or planned to be arterial roads, already used by trucks, on which Halton Municipalities expects truck use to increase with or without the Project.
- Halton Municipalities are planning to include separate cycling infrastructure (multi-use paths for cyclists and pedestrians, and separate on-road bike lanes) when Britannia Road is expanded to six lanes.
- In addition to the mitigation measures CN proposes to minimize changes to the environment, including air and noise emissions, CN committed to consult with cyclists to reduce the Project's effects on cycling. It is not clear how this mitigation measure would reduce effects.
- The Panel did not hear specific concerns about other recreational uses in the area, with the exception of stargazing, which was mentioned as a pastime for some residents and likely to be affected by development-related changes to the light environment, with or without the Project.

The Panel understands and appreciates the concerns expressed by residents regarding effects on cycling and other outdoor users. Given that the Project would put more trucks on the roads that make up portions of two cycle routes, the Panel acknowledges that there would be increased adverse effects on the cyclists using those roads. Those effects would include greater exposure to air contaminants, noise, safety hazards, and a general reduction of the quality of the cycling experience. When Britannia Road is expanded to six lanes, Halton proposes to provide separate multi-use paths which would provide a much safer cycling environment. Separate on-road bike lanes will also be built, which would more likely be used by road cyclists travelling at higher speeds. However, whether using multi-use paths or on-road bike lines, cyclists would still be exposed to increased emissions from terminal-generated trucks.

Terminal-generated trucks would use arterial roads that Halton Municipalities has designated for truck use. Halton Municipalities has predicted that truck numbers would increase even without the Project, and are planning to expand the capacity of most of these roads. This would appear to be a direct consequence of the rapid population and employment growth in the Milton area. The Panel understands that this may mean that these arterial roads would be less suitable as cycling routes for road cyclists, including athletes training from the Mattamy National Cycling Centre, but does not conclude that this should be seen as a direct effect of the Project.

The Panel concludes that CN's obligation in the situation would be to ensure that the facility access on Britannia Road is designed in consultation with cycling organizations and experts to ensure cyclist safety, and to educate drivers using the facility on responsible driving around cyclists. Other initiatives to improve the designated cycling routes and the safety of all users in the vicinity of the Mattamy National Cycling Centre would be the responsibility of Halton Region and the Town of Milton.

With respect to the effects on cycling and other outdoor activities caused by environmental changes as a result of the Project, the Panel observes that recommendations made in Sections 5, 6 and 11 to mitigate the Project's air emissions, noise and light and their related health effects also relate to the mitigation of effects on cyclists and outdoor users.

The Panel concludes that the changing transportation environment in the Milton area, the increase in trucks and other traffic, and the planned expansion of arterial roads would have an adverse effect on the safety and enjoyment of the area for road cyclists and other outdoor users with or without the Project and anticipates that this will need to be addressed by Halton Region and the cycling community.

As described in Section 5.3 (Light), the Panel concludes that the Town of Milton's continued rapid growth would result in an increase in sky glow in the area, which would also have an adverse effect on the safety and enjoyment of the area by outdoor users, including activities like astronomy, whether or not the Project proceeds. The Project's contribution to sky glow is anticipated to be less than 1% of sky glow in 2021, and approximately 10% of the anticipated increase in sky glow that is likely to occur between 2014 and 2031.

CEAA Recommendation 11.4 — CN should implement the mitigation it has committed to undertake for quality of outdoor recreation

The Panel finds that CN's commitments to implement mitigation measures for effects on outdoor recreation are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- implement a communication protocol to keep the local community informed of different construction phases and the work that would be happening on-site during each of the three construction phases (for example, a website would be set up, newspapers ads would be placed, nearby residents would be notified by mail, and there would be dedicated information lines including an information centre, phone line, and email address); and
- construct berms and vegetate them (to reduce effects on viewsapes) in key locations around the Project Development Area, as per the Project design.

CEAA Recommendation 11.5 — Additional mitigation measures for outdoor recreation

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- ensure that the design and function of facility entrances on Britannia and Tremaine Roads are safe for all users including all types of cyclists, including commuters, those travelling at speed on road bikes, and recreational users. In doing so, CN should consult with Halton Municipalities, local cycling organizations, the Mattamy National Cycling Centre and others as appropriate and implement suggestions that improve cyclist safety at those access points; and
- develop a cycling awareness program for truck drivers accessing the facility to educate them on safely sharing the roadway, intersections and roundabouts with cyclists. This program should be developed in consultation with local cycling organizations.

In reaching its conclusions on the effects of the Project on property values and enjoyment of property the Panel considered the following factors to be particularly relevant:

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

- Much of the concern about reductions in property values expressed by residents appeared to be based on a perception that the Project would be a source of environmental effects such as increases in noise, air emissions and light as well as changes to the landscape.
- Provincial guidelines refer to a 1,000-metre zone of influence for major industrial projects. CN and participants differed in their interpretation of the significance of the guidelines in the context of an intermodal terminal, such as the Project.
- The Town of Milton was planned to be a complete community — a place where home, work, services and amenities are close at hand within walking and cycling range.
- The Panel heard that new residential development can be found in close proximity to other railway facilities elsewhere in Canada and the United States.
- The Town of Milton is growing at a rapid rate as the population of the Greater Toronto Area expands, indicating strong demand for residential land and housing west of Toronto.
- Milton Says No reported that it had contacted various local real estate professionals and examined examples of neighbourhoods near intermodal terminals in the United States and in Brampton, and suggested that property values in Milton could show an initial drop depending on the proximity to the Project.
- Britannia Road, which separates the Boyne Survey Secondary Plan Area from the Project, is an arterial road that will be expanded to six lanes to accommodate existing and anticipated increases to traffic along Britannia Road, whether or not the Project proceeds.
- Development plans show that some of the residential properties in the Boyne Survey Secondary Plan Area will be buffered from Britannia Road by stormwater management facilities and local commercial development.
- The distance from the nearest residential property in the Boyne Survey Secondary Plan Area to the operational footprint of the terminal would be greater than 300 metres.
- Halton Municipalities identified train building activities (additional movements of trains, idling locomotives, railcar coupling) on the mainline north of Britannia Road as an additional source of noise and annoyance.
- The Panel's findings and recommendations in Section 5.3 (Light) and 6 (Noise) are expected to be sufficient to mitigate any light or noise effects of the Project to acceptable levels.
- The Panel did not hear evidence that exceedances of ambient air quality standards were currently affecting property values in Milton. The Project would exacerbate those exceedances, but CN would implement mitigation measures.

As discussed in other sections of this report (Noise, Accidents and Malfunctions) the Panel does not consider that the provincial 1,000-metre zone of influence around a Class III industrial project means that significant adverse effects or indeed any adverse effects at all, would inevitably occur within the zone. The Panel agrees with CN that the guideline means that effects should be assessed within this zone and the results evaluated after mitigation has been applied, which is the process the Panel followed.

The Panel observes that the Milton area is undergoing rapid change. Residents who formerly lived in a rural setting are beginning to find themselves surrounded by new suburban development. The Panel did not receive detailed evidence about existing land and residential property values but assumes that

strong demand in a community designated for growth by the Province will maintain upward pressure on these values. The Panel can accept that property values in close proximity to the Project may decrease, or increase but more slowly than general market rates, especially during the construction period. Construction already appears to be very much part of the landscape in the local area. But even if this happens, the Panel did not hear evidence, other than conjecture, that the Project would cause a widespread, severe or permanent decline in property values.

The Panel did not hear quantitative evidence that environmental changes would affect property values or reduce property enjoyment due to the increase in train movements.

The Panel is not convinced that the increase in train movements north of Britannia Road represents a large enough change from the current situation to cause a change in property values. As discussed in the noise section (Section 6.1), movements north of Britannia Road are expected to be similar to existing mainline operations, which have already been mitigated by existing noise berms and fences, and the incremental change is an additional two trains per day.

Panel recommendations regarding mitigation for air emissions (Section 5.1), noise (Section 6), light pollution (Section 5.3), and views (subsection 11.2.1) contained throughout this report will be important to avoid substantive effects on homes, and hence property values, in the area.

The Panel concludes that, if the recommended mitigation measures for air, light and noise emissions are carried out, the Project is not likely to cause a significant adverse environmental effect on socio-economic conditions related to the compatibility of the Project with residential communities.

The Panel finds that as existing and planned homes would be more than 300 metres from the terminal operational footprint, the mitigation measures it has proposed for air, light, and noise emissions would reduce the effects of Project-related changes in the environment on outdoor recreation, property values and the general enjoyment of property to a low magnitude.

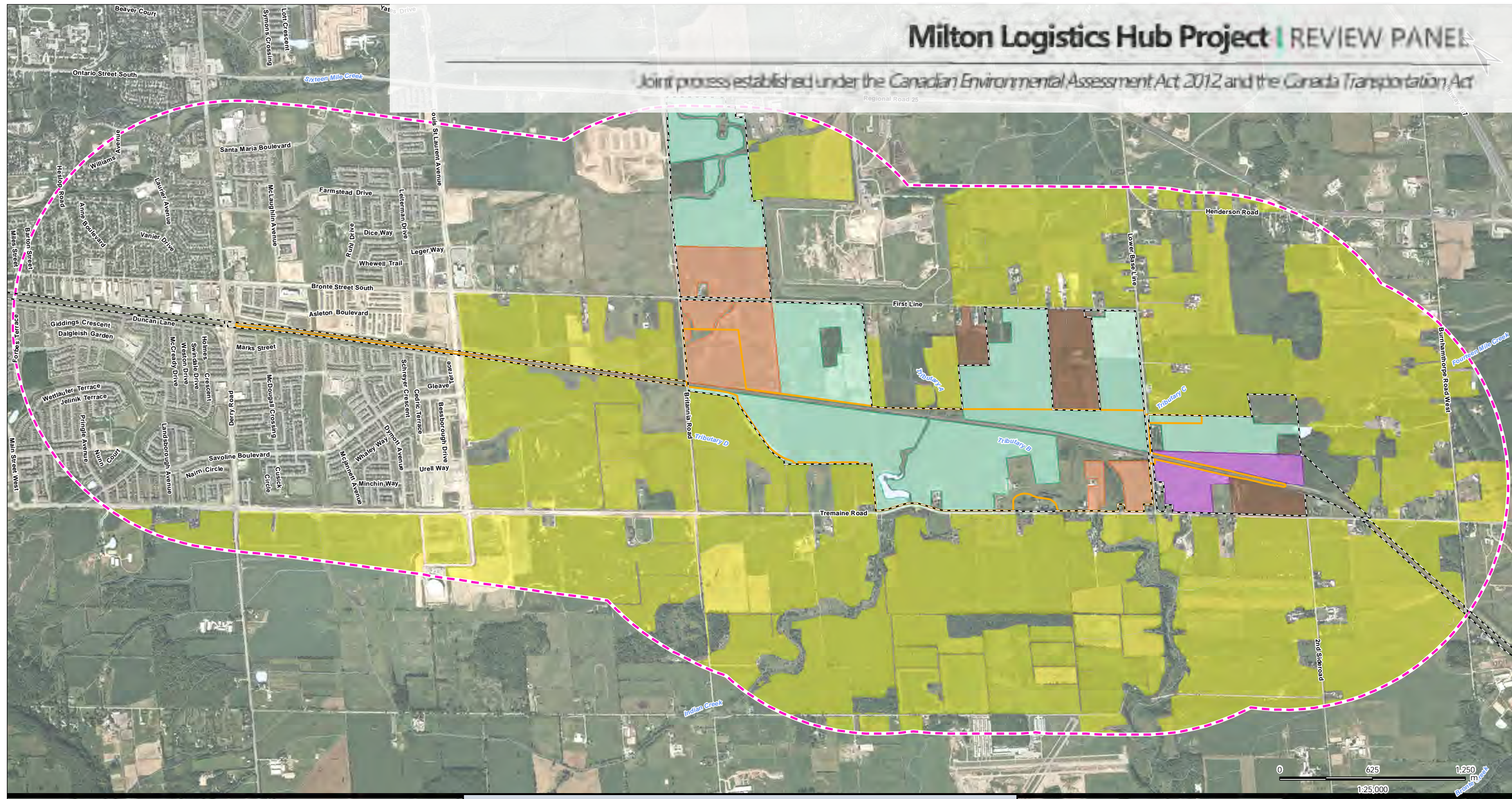
11.2.2. Agriculture

CN's Views

CN indicated that most of the lands in the Project Development Area consisted primarily of active agricultural lands (147 hectares), the majority of which were used in the cultivation of row crops, such as soybeans, corn, and wheat, with some of the fields also used to grow hay. Three riding stables were also located on CN property. Properties owned by CN in and outside the Project Development Area are currently leased to five local farmers and tenants in nine single-family residences. All of the Project Development Area is leased to a single farmer. Figure 11-1 shows the agricultural land use types in the Local Assessment Area.

CN stated that all areas within the Project Development Area would be converted from agricultural use for the development of the terminal and associated infrastructure. CN noted that areas owned by CN outside the Project Development Area would be leased to farmers for agricultural purposes. For the lands within the Local Assessment Area that would remain in agricultural use, CN predicted that light, noise and air emissions from the Project would not affect agricultural activities since all potential effects

Joint process established under the Canadian Environmental Assessment Act 2012 and the Canada Transportation Act



Panel Figure 11-1: Agricultural Land Use Types
 Source: CN Information Request Package 4.1 Response, Figure IR4.21-1 CEAR # 656

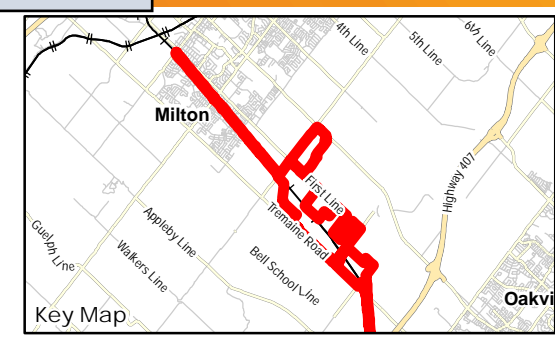
\\Cd1220-f02\01609\active\60960844\drawing\MXD\Socio_Economic_Report_Figures\CEAA_IR4_Response\160960844_IR4_FigIR4.21-1_Ag_Land_Use_Types.mxd
 Revised: 2017-12-11 By: pwoisell

Stantec

Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017. Site layout: July 10, 2015.
- Orthoimagery © First Base Solutions, 2017. Imagery from 2014.

- Legend**
- Project Development Area
 - Land and Resource Use Local Assessment Area
 - CN Owned Land
 - Watercourse
 - Waterbody
- Agricultural Land Use Types**
- Corn
 - Hay
 - Soy Bean
 - Horse Farm
 - Agricultural Land Use/Practices outside CN Owned Lands within LAA (Unknown Crop Type)



Client/Project
 Canadian National Railway
 Milton Logistics Hub

Figure No.
 IR 4.21-1

Title
 Agricultural Land Use Types

would be below the respective light, noise or air quality guidelines. CN did not anticipate any adverse effects on water supply or quality for adjacent agricultural operations. Aside from the loss of 147 hectares of agricultural lands in the Project Development Area, including 30 hectares of Prime Agricultural lands, CN anticipated no change to farm operations or agricultural land use as a result of the Project. The area designated by Halton Region as Prime Agricultural land (30 hectares) that would be removed by the Project is 0.1% of the total amount of prime agricultural land in the region and 2.6% of the prime agricultural land in the Local Assessment Area.

As for socio-economic effects due to the removal of agricultural lands within the Project Development Area, CN stated that the current leaseholder would lose income or revenue generated from agricultural activities. However, CN noted that the current leaseholder was aware of the upcoming change in land availability and had expanded his business to other services. Current lease agreements between CN and tenant farmers recognize the temporary nature of the arrangements. CN would work with Halton Region and agricultural operators leasing farmland on CN property to mitigate the loss of agricultural areas. Mitigation measures might include rehabilitation or improvement of adjacent lands or providing a contribution to agricultural research in the area.

CN stated that Halton Region's designation of CN-owned lands as Employment Lands or Future Strategic Employment lands suggested that it anticipated achieving its sustainability goals, including the protection of agricultural lands, even with the conversion of these lands to employment uses in the future. CN noted that all of the affected lands have also been designated by the Province as a Provincially Significant Employment Zone. CN also reported that the designation of these lands as Employment Lands and Future Strategic Employment Lands in Halton's Regional Official Plan had been guided by Halton Region's own Sustainable Halton: Agricultural Countryside Vision (2007), which addressed how it would balance growth in the Region along with the protection of agricultural lands. CN stated that given the municipalities' explicit plan to convert these lands in the future to non-agricultural employment uses, it was reasonable to conclude that they considered that conversion to be acceptable.

Cumulatively, CN stated that since the 1950s the Town of Milton has expanded greatly from its developed extent of 145 hectares at that time. Figure 11-2 depicts that the Town of Milton's developed area has increased rapidly over between 1991 and 2017. Planned development in the Boyne Survey Secondary Plan Area, the Milton Education Village and Derry Green Corporate Business Park, in combination with the Project, is anticipated to result in the conversion of 1,732 hectares of agricultural land. Currently, Halton's Regional Official Plan includes 36,011 hectares of land designated as Prime Agricultural Areas or Agricultural System Outside Prime Agricultural Areas. CN stated that the Sustainable Halton process estimated that an additional 3,000 to 4,200 hectares of land in the region of Halton would be required to accommodate urban land needs to 2031, which would leave 7,000 to 10,000 hectares of land available for agriculture. CN noted that Halton Municipalities had approved these future conversions of agricultural land, and through its own planning had indicated that the conversion of this amount of land should not affect the viability of agriculture within the Regional Assessment Area.

Participants' Views

The Ontario Ministry of Agriculture, Food and Rural Affairs was of the view that CN's mitigation measures would help alleviate some of the potential effects from the Project on agriculture. The

Joint process established under the *Canadian Environmental Assessment Act, 2012* and the *Canada Transportation Act*



Panel Figure 11-2: Built Up Areas in Milton 1991 and 2017
 Source: CN Information Request Package 7 Response, Figures IR7.10-1 and IR7.10-4. CEAR #680

Ministry recommended that CN work with the farming community, including local organizations such as the Halton Region Federation of Agriculture, to ensure that appropriate mitigation measures are implemented in ways that are responsive to the needs of the local farming community. It also stated that policies are in place in order to ensure that conversion of agricultural land is not done in a random way, but by following a process that ensures that a demonstration of need and other criteria are taken into account.

Halton Municipalities reported that in addition to the conversion of prime agricultural land and active agricultural lands, the Project would also have off-site effects including increased disturbance to agriculture and agricultural practices. Effects caused, for example, by increased traffic, would have the potential to affect agricultural practices ranging from the movement of agricultural equipment to the feasibility of a roadside stand. They explained that once the land was converted to another use it was unlikely that it would be converted back to agriculture and hence could be lost to that use. They also explained that while potential effects such as increase in dust and noise would be felt most strongly on neighbouring farms, other effects such as traffic and effects on the agricultural system might be regional in scope. Halton Municipalities disagrees that the mitigation measures proposed by CN would reduce the effects on agriculture, but did not propose additional mitigation measures.

With respect to effects on agriculture, Halton Municipalities determined that the Project would not comply with six standards drawn from the Halton Regional Official Plan, the Province of Ontario Greenbelt Plan, and the Provincial Policy Statement, 2014. One example was the policy of the Region to Recognize and protect lands within the Agricultural System as an important natural resource to the economic viability of agriculture and, to this end, direct non-farm uses to the Urban Area, Hamlets and Rural Clusters unless specifically permitted by policies of this Plan.

Halton Municipalities also stated that CN had not submitted an Agriculture Impact Assessment as required by the Regional Official Plan and Greenbelt Plan. It also said that non-agricultural development on lands outside the urban boundary, such as the Project, would require compliance with the rural land policies or an expansion of the urban boundary. Those policies would include minimum setback distances and other potential measures.

Halton Municipalities agreed that regardless of the Project, the Region designated the land as employment lands and it could therefore be converted over time. However, they explained that when converting agricultural land, they would want to realize the greatest extent of benefits possible. In their view, the Project would not create a job density high enough to compensate for the loss of land. They also stated that denser and more contained communities were better in terms of planning for agriculture over the long-term.

Halton Municipalities stated that while the total area of Prime Agricultural Land converted by the Project would be limited, it would represent an incremental loss of farmland coincident with urbanizing pressures. They stated that the majority of the other projects and activities that will be carried out identified by CN would also involve the loss of agricultural land.

Milton Says No explained that the region of Halton and the Town of Milton were close to their agricultural roots and still held community agricultural fairs.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on agricultural land, the Panel considered the following factors to be particularly relevant:

- The Project would permanently convert 147 hectares of land currently being used for agricultural purposes, 30 hectares of which are currently designated as Prime Agricultural lands, to construct the Project.
- The agricultural land is currently leased to a farmer who was aware of the temporary nature of their leasehold and therefore able to plan for the eventual end of their use of this land.
- The Ontario Ministry of Agriculture, Food and Rural Affairs recommended that CN work with the farming community, including local organizations such as the Halton Region Federation of Agriculture, to ensure that appropriate mitigation measures are implemented in ways that are responsive to the needs of the local farming community.
- CN has put forward potential mitigation measures, to be finalized in consultation with Halton Region and agriculture operators leasing CN's land.
- If the Project does not proceed, the current official plans for both Halton Region and the Town of Milton show the eventual conversion of this land to employment uses. The desired end use of these lands, from Halton Municipalities' perspective, is prestige industrial use (if CN either sold the land to a developer or developed their property for other uses).
- The Project would cause the loss of agricultural land sooner than might otherwise be expected, but the conversion would likely happen eventually regardless of whether or not the Project proceeds.
- Increased truck traffic on haul routes leading to and from the Project could impede farming operations on nearby agricultural land, however, as noted in subsection 11.2.4 (Transportation Networks) heavy traffic growth is expected whether or not the Project proceeds.

The Panel observes that the Project would negatively affect the availability of agricultural land. However, it is Halton Region's intention that this land be converted to employment uses at some point in the future in any case. CN intends to continue using the land for agriculture in their ownership for an unspecified length of time. There is no indication whether the alternative future envisaged by Halton Region would maintain any part of the agricultural land. Halton Municipalities' argument is that the Project would not deliver enough direct employment benefits to justify the loss of agricultural lands. CN's argument is that the Project's benefits in delivering effective logistics would benefit development, businesses and employment over a wider area. The Panel does not have a mandate to arbitrate between these differing views.

The Panel notes that CN suggested collaborating with Halton Region and farmers currently leasing CN's land to identify suitable mitigation. CN identified rehabilitating or improving adjacent agricultural lands (the location of these lands was not specified), as possible mitigation options. The Panel observes that, while the Project would cause the loss of 147 hectares of agricultural land, including 30 hectares of Prime Agricultural land, one mitigation approach would be for CN to commit to keeping a portion of the remaining agricultural land on their property in operation unless or until Halton Region decides that it should be converted to employment uses.

The Panel concludes that the Project would cause a permanent loss of agricultural land that would, by itself, be an effect of low magnitude given other losses in the geographic area. The Panel does understand that, as suggested by Halton Municipalities, for these losses to be justified, they should be considered in the context of associated local and regional benefits; however, the Panel is not the body to make that specific analysis or decision.

The Panel did not hear persuasive evidence that the Project would adversely affect other agricultural operations in the area, in particular given the recommended mitigation measures for air quality, water, and noise. Nonetheless, the Panel concludes that CN should implement the mitigation measures it committed to, and in addition, consult with farming organizations to address any problems that may arise.

CEAA Recommendation 11.6 — CN should implement the mitigation it has committed to undertake regarding agricultural lands

The Panel finds that CN's commitments to implement mitigation measures for effects on agricultural lands are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- work with local farmers for agricultural lease opportunities where they may exist, to mitigate the loss of agricultural land as a result of the Project.
- rehabilitate or improve adjacent agricultural lands or provide a contribution to agricultural research in the area.

CEAA Recommendation 11.7 — Additional mitigation for CN to consult with the local farming community

The Panel considers that an additional mitigation measure beyond CN's commitments is necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- Consult with the local farming community, including local organizations such as the Halton Region Federation of Agriculture, to ensure that appropriate mitigation measures are implemented in ways that are responsive to the needs of the local farming community, and reduce or avoid adverse effects on agricultural operations, particularly with respect to increased truck traffic.

The Panel concludes that, if the proposed mitigation measures are implemented, the Project is not likely to cause a significant adverse environmental effect on the use of land for agricultural purposes, or to the viability of neighbouring agricultural operations.

The Panel finds the conversion of 147 hectares of agricultural land would be a permanent effect of low magnitude. The Panel notes that the loss of this use of land for agricultural purposes is likely to occur whether or not the Project proceeds, as Halton Municipalities intends to use this land for employment uses if the Project does not proceed.

Cumulative Effects

The Panel has concluded that the Project would cause a residual effect on agricultural land by removing 147 hectares of agricultural land within the Project Development Area. The amount of area designated by Halton Region as Prime Agricultural land (30 hectares) that would be removed by the Project is 0.1%

of the total amount of prime agricultural land in the region and 2.6% of the prime agricultural land in the Local Assessment Area. CN noted that Halton Municipalities had approved these future conversions of agricultural land, and through its own planning had indicated that the conversion of this amount of land should not affect the viability of agriculture within the Regional Assessment Area.

In recent years, the area of agricultural land in the region of Halton has been greatly diminished due to urban growth, including development of the Town of Milton. Planned future conversion of agricultural land for future projects and activities would result in thousands of additional hectares of agricultural land conversion.

The Panel finds that these combined losses of agricultural lands would be a high magnitude effect, as conversion of farmland in the region of Halton continues. These effects are adverse and permanent. However, the Panel observes that these effects would likely occur with or without the Project, because the current CN lands have been designated for future employment and not for ongoing agricultural use. It is clear to the Panel that Halton Region does not intend to preserve agricultural lands in the Local Assessment Area or, to a large degree, in the Regional Assessment Area in the long term. The Panel heard that, in essence, agricultural lands are available for conversion, if the alternate use is deemed to be of suitable value and benefit. The Panel observes that, with or without the Project, there would be a cumulative effect on the availability of agricultural land in the region, though this loss is sanctioned through official planning processes. Conceivably, if CN were to leave the remaining land in its ownership in agricultural use over the long term, the cumulative effect on agricultural lands could in fact be less with the Project than without the Project.

The Panel concludes that the Project, in combination with other projects and physical activities that have been and will be carried out, is likely to cause a significant adverse cumulative environmental effect on the availability of land for agricultural use in the Regional Assessment Area.

The Panel finds that, although the Project effect is low in magnitude, when combined with the effects of past conversions of agricultural lands, and the future effects of continuing rapid residential, commercial, industrial and transportation development, the cumulative effects of the Project would be high in magnitude over an extensive geographic extent within the Regional Assessment Area. The Panel considers the loss of this land to be permanent and irreversible.

11.2.3. Land use planning

Planning

CN's Views

CN reported that the *Planning Act* provides for the establishment of provincial policies and the Provincial Policy Statement, and plans, including the Growth Plan and the Greenbelt Plan. The municipal official plans — the Halton Regional Official Plan and the Town of Milton Official Plan — must be consistent with the Provincial Policy Statement and conform to the provincial plans. These official plans establish policies to manage and direct physical change in a community, and must be updated every five years in recognition that communities change. In CN's view, the official plans were not intended to be static documents. When future land use has been designated in the official plan, a secondary plan is prepared to establish specific land uses, urban form and design, transportation including road networks,

servicing and other development policies for a specific area. CN pointed out that such a plan had not been initiated for the lands in Milton owned by CN, which were currently designated for a wide range of employment uses.

CN reported that Halton Region, in the Halton Regional Official Plan, had designated the Project lands as either employment lands within the current urban boundary, or as future strategic lands for employment uses. The entire Project Development Area was identified as a Provincially Significant Employment Zone under the Growth Plan for the Greater Golden Horseshoe (2019). CN also noted that Halton Region planned to substantially upgrade the regional road network to accommodate the changes in residential and employment uses. CN considered that development of the Project would not preclude other employment use on remaining lands in the future.

CN clarified that the only portion of the Project located within the Greenbelt Plan would be the existing mainline right-of-way and that the Project would not change that.

CN explained that Halton Region's 2019 Regional Official Plan has a target of 58 residents and jobs combined per hectare of new development within the urban area. CN stated that this target applied an average over the entire previously undeveloped or greenfield area in Milton, rather than a minimum threshold per hectare. In calculating the target, the greenfield area would include residential, employment, and park lands together with roads and would only exclude natural features. CN stated that individual sites within the greenfield area are not required to meet the target, and that the greenfield area as a whole was intended to accommodate a broad range of uses, including high and low densities. CN noted that the Project Development Area itself only made up 1.7% of the total greenfield area, and that Halton Region's Official Plan did not contain specific employment density targets for designated employment lands.

CN stated that under the new Growth Plan for the Greater Golden Horseshoe (2019), employment areas for the designated greenfield areas do not count toward the density targets. That is, the employment density targets referred to by Halton Municipalities would no longer apply to the Project Development Area as of 2022. According to CN, the municipal plans must be updated by 2022 to reflect this policy change. The Province made this change recognizing that employment areas often have low densities.

CN stated that Halton Municipalities appeared to be inconsistent in its planning assumptions about the use of the CN-owned lands. On the one hand, Halton Municipalities argued they had assumed a certain number of jobs and a certain amount of development charges would accrue from these lands, yet on the other hand, they argued they had not taken truck traffic from these lands into account in their transportation planning. CN argued that it is not credible to suggest that development could generate 1,500 jobs and tens of millions of dollars in development charges, and yet generate no traffic.

Participants' Views

Halton Municipalities stated that they considered the Project to be an enclave, removed from municipal planning, objectives and accountability. They were concerned that CN would not participate in municipal infrastructure planning, and would not financially support municipal infrastructure and services despite the heavy use CN would make of municipal roads. They stated that the Project would use old technology and provide a small number of low-skill jobs, and thereby engender limited innovation or training.

Additionally, the Project would act as a magnet for new warehouses nearby generating the same type of limited employment, training and innovation. Halton Municipalities believed that the 2008 concept proposed by CN for a rail-serviced industrial development was more compatible with the Milton's community vision and urban structure than is the Project.

Halton Municipalities explained that the Regional Official Plan provides a framework to define how new growth areas must develop. The plan includes the requirement to undertake area-specific plans or secondary plans to refine the vision for an area, while ensuring all requirements of the regional official plan are met. These requirements included the need to achieve growth projections and meet density targets, and to ensure that new residents and jobs were supported by comprehensive infrastructure plans and community services, which in turn are supported by an approved financial plan. If the Project was required to follow the Halton Regional Official Plan, Halton Municipalities contended that the Project would cause adverse impacts to employment growth, jobs and the Region's fiscal sustainability.

Halton Municipalities stated that Milton was the fastest expanding municipality in Canada. The population of Milton grew from 54,000 to 110,000 residents in 2016 and is planning to grow to a population of 228,000 by the year 2031. Halton Municipalities said that this kind of growth requires a long-term and rigorous planning process, with decisions made well in advance, to ensure a complete community that provided a balance of housing and employment.

Halton Municipalities stated that the planning exercise considers factors beyond property ownership. Halton Municipalities explained that in light of the town's demographic profile and the high number of residents with post-secondary education, the Milton Council had established a goal to focus on new employment development and attracting knowledge-based industries and innovation employment, including small businesses and incubators in multiple sectors.

Halton Municipalities indicated that the Project's location would not fit with their plans for a complete community and that it would instead have a significant and continuous negative effect on the region's environment, residents, businesses, and visitors. The Project would be detrimental and undermine many years of careful, thoughtful, community building by Milton and Halton Region.

Halton Municipalities also stated that employment lands on CN property adjacent to residential neighbourhoods were planned to accommodate knowledge-based and technology-oriented research and development employment uses, in a variety of built forms, that would transition well to the more sensitive residential and community uses. Warehousing and logistics centers were directed to locations close to the 400-series highways where they would not conflict with established sensitive uses and where they would not disrupt existing carefully planned neighbourhoods. Halton Municipalities considered the proposed location for the Project to be too far from the 400-series highways. All truck traffic accessing the Project would necessarily access the facility through, or adjacent to, established residential areas.

Halton Municipalities explained that the majority of the Project falls within an area planned through Halton Region's planning process to help achieve employment objectives by the region by providing 1,500 jobs, while the Project is only proposing 130 direct jobs. This would mean that Halton Region

would need to look at other opportunities and lands to achieve the targets, which in turn would have effects that were not assessed by CN.

Demand for community services and infrastructure

CN's Views

CN indicated that the only Project activity that would affect the demand for community services and infrastructure was the grade separation planned for Lower Base Line. CN stated that lane closures or detours required would cause traffic delays during the construction of the underpass. CN anticipated those would be short-term and lead to a positive upgrade to the road.

CN explained that it planned to rely on licenced contractors to collect and dispose of waste at licensed facilities and therefore would not need to use municipal waste management services for the Project. CN also stated that it is not intending to connect to the municipal water system, but would instead have on-site water recycling and capture and contract with licensed wastewater and water service providers. However, CN stated that it would consider connecting to the municipal network if services became available during the Project's detailed design stage.

CN noted that most of the Project labour would come from within the Town of Milton or the Greater Golden Horseshoe and therefore Project-related in-migration would not place additional demand on community services and infrastructure.

CN did not anticipate that there would be additional costs to public services such as maintenance of roads affected by terminal-generated truck traffic, fire-fighting services or snow removal. CN explained that in case of a fire, staff would be trained and equipment would be on site for basic fire suppression. CN would provide courtesy notifications to the local Police and Fire Departments or have them respond as the incident demands, but provincial or municipal authorities would not need to increase their capacity as a result of the Project. CN also anticipated that terminal-generated truck traffic would be handled in the same capacity as other truck traffic currently travelling within the region of Halton using Regional arterial roads. CN stated that new infrastructure would not be needed and traffic operating conditions would not be required to change because there would be no need for new turn lanes, extended turn lane length, extra through lanes or other geometric design modifications. The only exception would be the two terminal entrances: the truck entrance on Britannia Road and the employee entrance on Tremaine Road. CN proposes conventional improvements to the already planned intersection on Britannia Road and the new intersection on Tremaine Road to safely and efficiently accommodate both the type and volume of traffic accessing the site and the type of turning movements that would be required. CN committed to pay for the intersection improvements and work with the municipal road authority to address their interests during the Project's detailed stage. (CN closing remarks) CN noted that the movement of trucks to and from the Project would not result in specific snow removal requirements on public roads beyond those currently provided by the Town of Milton.

Participants' Views

Halton Municipalities expressed concern that CN did not plan to connect to the municipal water and wastewater system and explained that the existing and future infrastructure for this area was sized to accommodate CN's 2008 proposal rather than the Project. Consequently, the infrastructure was probably oversized for the Project, although this was uncertain given that CN had not indicated what the site would require or confirmed whether they would connect. Halton Municipalities was also concerned

that the proposed on-site water supply would not be sufficient for fire protection, which would put the Project and neighbouring communities at unacceptable risk of effects from a fire.

Halton Municipalities believed that the Project would result in impacts on roadways throughout the regional network. In particular, the Project would cause increased wear and tear on several main thoroughfares, increased need for congestion relief measures and upgrades to intersections, increased maintenance and costs to eventually replace the Lower Base Line underpass, and increased traffic monitoring in the vicinity of the Project due to the added traffic. Halton Municipalities provided cost estimates for resurfacing or replacing road infrastructure, and adding lanes. They stated that they would need to set aside funds annually to cover the eventual replacement of the Base Line underpass. CN's Project would therefore create substantial effects on Halton Region's responsibility to provide adequate roadway infrastructure.

Municipal revenues

CN's Views

CN explained that municipalities rely on revenue sources such as property taxes, development charges, and user fees for water and wastewater services to cover municipal expenditures including the delivery of services, provision of infrastructure and building maintenance.

CN stated that it paid over \$339,000 in property taxes to the Town of Milton, Halton Region and school boards in 2018. CN estimated that it had contributed about \$6.5 million in property tax revenue over the past 20 years, while making minimal use of municipal services. Based on analysis of comparable intermodal terminals, CN expected that the Project would contribute approximately \$1 million annually in property taxes, and that this would continue as an ongoing stream of revenue for the municipality. Though CN indicated that it would not pay development charges because it is a federally regulated railway, it stated that if CN were to pay development charges, this would be a one time payment of around \$380,000. CN explained that it would invest more than this amount in improving the Project entrance and the underpass at Lower Base Line.

CN reported that municipal budgets included a plan for a ten-year horizon, but are updated annually. In CN's view, this approach recognizes that the near-term requirements are more certain and the longer-term needs more speculative. Budgets are guided by the Ontario *Municipal Act* and are informed by growth forecasts, infrastructure master plans, and other inputs that evolve over time.

In CN's opinion, the Project is likely to attract from three to five million square feet of intermodal-oriented development to the community over the next ten years, generating 1,500 to 2,500 jobs in the Town of Milton. CN stated that this induced development could generate between \$130 and \$213 million in property taxes, over a 30-year period. The associated development charges would be between \$36 and \$74 million.

CN expects that, overall, the Project would not result in any unmitigated burden on municipal services or infrastructure and would result in substantial economic benefits to the region of Halton, including direct and indirect revenues and the induced development on employment lands in the area.

Participants' Views

Halton Municipalities stated that their planning and budget development had been based on CN's original 2008 concept plan for a railway-based industrial development, and included a reasonable expectation that such development would generate considerable revenues. Halton Region planned the area for prestige industrial development (knowledge-based and technological enterprises) which they anticipated would have generated \$49 million in development charges and \$7 million annually in property taxes. If the Project proceeds, Halton Municipalities believed that it would be adversely affected from lost opportunity costs equal to these amounts.

Halton Municipalities also believed that the Project would result in substantial costs for municipal infrastructure and services. Those costs include the cost of over-sizing or under-sizing municipal and wastewater infrastructure, the cost of emergency services and preparedness, the cost of accelerated road deterioration and related maintenance, the cost of increased roadway asset management (for example, maintenance of the Lower Base Line Underpass) and the cost of increased monitoring of traffic movement and roadway functioning due to added truck activity.

Milton Says No stated that the cost of roads wear and tear, accidents and clean up from accidents, emergency responses linked to the Project would fall directly on regional taxpayers rather than CN.

Panel Observations and Recommendations

The Panel notes that CN was required to provide information on the Project's effects on existing municipal and regional land use planning, including present and approved land uses based on predicted changes to the environment due to the Project. During the course of its assessment, the Panel did not find evidence that changes to the biophysical environment, or its interacting natural systems would result in a change to a land use plan. Therefore, the Panel did not make findings on the significance of this effect under the *Canadian Environmental Assessment Act, 2012*. However, the Panel has chosen to make the following observations and recommendations to provide context for the relevant decision makers.

In making its observations on the effects of the Project on municipal and regional land use planning the Panel considered the following factors to be particularly relevant:

- An extensive, logical and integrated tiered planning structure is in place in the Milton area, intended to implement provincial-level policies and guidance, develop sustainable and liveable communities that are not primarily bedroom suburbs for Toronto, and deliver fiscal responsibility.
- It is the Panel's understanding that, as a federally regulated railway, CN is not subject to the Halton Regional Official Plan, and that CN is not required to pay development charges levied under municipal bylaws.
- The population of Milton is growing at a very rapid rate and is expected to double by 2031.
- Since the late 1990s Halton Region has been aware that CN owned a large parcel of land in Milton.
- In 2008, CN put forward and subsequently withdrew a proposal to develop its land for rail-based industry.

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

- In 2009, Halton Region designated that land for employment uses and future strategic lands for employment uses.
- The Halton Regional Official Plan envisages that future employment development in the Milton area will be prestige industrial development, defined as knowledge-based and technology industrial growth.
- CN has predicted that the Project would induce further intermodal-oriented development, mainly warehousing and distribution centres. Milton has stated that this type of development should be located on the north side of the town, closer to Highway 401.
- The Project would have low on-site employment density, and concerns were raised that this was incompatible with provincial density targets. As a result of recent changes in provincial policy, CN is of the opinion that these targets no longer apply to the Project lands. However, Halton Region still has a goal to secure 1, 500 local jobs to help Milton become a complete community — a place where all things, home, work, services and amenities, are close at hand within walking and cycling range.
- Halton Municipalities emphasized that financial commitments to build infrastructure are made based on expected future development scenarios, and asserted that their fiscal situation would be adversely affected by lost opportunity costs if planned prestige industrial development were to be replaced by the Project.
- The Halton Municipalities explained that water and wastewater infrastructure adjacent to the CN lands had been developed on the assumption that it would be used by more intensive development (that is, CN's 2008 proposal) than is currently proposed.
- CN has stated that the Project would be self-sufficient in terms of water, wastewater, solid waste, firefighting and police services, and would therefore not place a burden on municipal services.

The Panel understands that, fundamentally, the development of the Project on the lands south of Britannia Road is not part of the vision Halton Region and the Town of Milton have for their community. While the Panel heard extensive testimony about the importance and success of the logistics industry in southern Ontario and the need for more infrastructure, Milton, which already has a significant area of logistics-based development within its boundaries, wishes to foster a more diverse employment base for its rapidly growing, and highly educated population. Therefore CN's promise that the Project would encourage the development of more distribution centres does not provide much consolation to a community that wishes to move in a different direction.

However, presumably Halton Region was aware that CN still owned this land and was not bound by the Regional Official Plan's designations, and that therefore the Region's wish to see prestige industry developed on this land might well not be realized. Therefore, while the Project, if developed, would require the Region to alter its plans in order to identify additional areas for higher density employment uses, which in turn could remove additional lands from other uses such as agriculture, the Panel understands that this eventuality could have been foreseen.

Halton Municipalities may have assumed that CN had no further plans for the lands it owned in Milton, but the Panel heard no evidence that this assumption was based on a firm commitment by CN to that effect, or that CN had any intention to sell the lands for other development opportunities. With respect

to the Project's effect on municipal services, the Panel accepts CN's argument that it would be essentially self-sufficient and therefore place no stress on local services. However, the Panel also recognizes that Halton Municipalities has planned and built water and wastewater infrastructure on the assumption that it would be required by development on the CN lands, and observes that a reasonable course of action, should the Project proceed, would be for CN and Halton Municipalities to negotiate an agreement for Halton to service the Project with water and wastewater services. This would also mitigate the risks, however small, of transporting sewage wastes by truck, and would ensure a more than adequate supply of water for firefighting.

Halton also raised concern that the increase in truck traffic from the Project would place an undue burden on Halton Region with respect to road maintenance. CN's position was that road maintenance is paid for by property taxes, that CN would be paying property taxes and would furthermore not be using other municipal services such as police protection and firefighting. The Panel accepts CN's position with the reservation that, while Halton Municipalities provided unit costs of road maintenance and replacement, the Panel did not hear evidence as to the likely extent and cost to the Region of the wear and tear likely to be caused specifically by terminal-generated truck traffic. That traffic is expected to be a relatively small incremental increase to planned future traffic levels (See subsection 11.2.4).

The Panel's overall observation with respect to the effects of the Project on municipal and regional land use planning is that the implications of development of the CN-owned lands for the regional plan were reasonably foreseeable by the Town of Milton, and as such should not be seen as excessively disruptive.

The Panel is not able to draw conclusions about the extent to which the Town of Milton's plans for the rest of the town would be altered by the Project. At one extreme perhaps Milton's future shape would be dominated by the logistics industry, warehousing, distribution centres and trucking, and as such would be unable to attract the knowledge-based and innovation employment uses it aspires to. On the other hand, perhaps the Region would adjust its land use planning, successfully contain future logistics development, and attract a more diverse employment base clustered around the Milton Education Village. Should the Project proceed, the Panel believes that the development of an appropriate and collaborative relationship between CN, Halton Region and the Town of Milton could help to tilt the balance of probabilities closer to the second scenario.

To this end, possibilities might include partnership around the development of the remaining CN lands, CN support for high-tech innovations in the logistics field, and CN support for advanced education and research in the Milton area.

The Panel makes two recommendations with respect to municipal and regional land use planning and services.

Additional Recommendation 11.8 — Use of municipal water and wastewater services

The Panel recommends that CN reconsider its decision, outlined in subsection 4.3.1, to contract privately for water and wastewater services, and enter into discussions with Halton Region regarding connection to municipal services as soon as possible, in order to provide the Project with a safe and reliable source of water and wastewater management, without recourse to more trucking, while at the same time mitigating the cost to the Region of unused infrastructure.

Additional Recommendation 11.9 — Planning collaboration between CN, Halton Region and the Town of Milton

The Panel recommends that CN, the Region of Halton and the Town of Milton hold discussions to identify ways in which CN might contribute to Milton’s vision of developing the ‘complete community’ with a diverse employment base that includes but is not limited to an expanded logistics industry. Discussions would address future use of remaining CN lands, together with opportunities for CN and the region and Town to collaborate on knowledge-based and innovative development opportunities.

11.2.4. Transportation networks

Effects on road transportation networks

Section 2.2 of the Guidelines for the Preparation of an Environmental Impact Statement required CN to assess the effects of alternative means of carrying out the Project that are technically and economically feasible. CN was instructed to address, at a minimum, the approved transportation corridors and routes for truck traffic for vehicles owned and operated by CN. Beyond being an issue of alternatives, truck transportation and routes for truck traffic were a primary theme throughout the review process.

Existing and predicted future traffic baseline

CN’s Views

Existing baseline

CN used data from Halton Region to develop baseline information about traffic volumes, including passenger, medium and heavy vehicles. CN provided baseline data for peak hour traffic and pedestrian activity at a number of intersections within the study area, encompassing downtown Milton to more rural areas, based on traffic counts carried out at various times in 2014 to 2016.

CN found that the lowest peak hour activity occurred at Tremaine Road and Steeles Avenue in the afternoon and consisted of 1,022 vehicles, of which 34 were heavy trucks. The highest count was recorded at Trafalgar Road and Derry Road in the morning and consisted of 4,733 vehicles, of which 73 were heavy trucks.

To predict the impact of the Project on traffic patterns and volumes, CN first had to predict future baseline traffic volumes. CN did this using Halton Region’s Transportation Demand and Forecasting Model, which uses population and employment forecasts to predict the number of trips in the weekday afternoon peak hour and assign them to the transportation network. Halton Municipalities had previously calibrated the model to information from the Transportation Tomorrow Survey, which captured travel patterns both within the region and the Greater Toronto Area.

CN developed forecasts of 2021 traffic volumes on Britannia Road and Tremaine Road at the proposed terminal access road locations but without the Project being present. These future baseline condition forecasts were based on:

- measurements of 2015 existing traffic volumes; and
- corridor growth traffic volumes calculated by applying Halton Region’s model-based corridor growth rates to the model-based 2011 volumes for the years between 2015–2021.

CN used traffic volumes forecast in the 2014 environmental assessment for Britannia Road for its predicted traffic volumes along that corridor for the 2021 horizon year. In CN’s view, that study provided

the most recent publicly available forecasts for Britannia Road that had been reviewed and approved by Halton Region. CN assumed that future baseline development traffic would include a heavy vehicle percentage of 3%. CN considered this would be made up of medium trucks such as cube and step vans, small single unit trucks, and small buses) and heavy trucks including large single unit trucks, tractor trailer trucks, large buses, refuse trucks.

Participants' Views

Halton Municipalities submitted background traffic volumes across the regional arterial road network for the 2021 and 2031 future horizons extracted from Halton Region's latest Equilibre Multimodal/Multimodal Equilibrium model.

Halton Municipalities noted that the annual traffic growth rates were calculated by comparing the total traffic volumes forecasted for 2021 and 2031. Between year 2021 and 2031, the annual growth rates were estimated to be 2.2% for east–west movements and 1.3% and 3.9% for north–south movements at the west and east sides of Bronte Road/First Line, respectively.

Halton Municipalities also provided tables summarizing the estimated traffic volumes at key intersections during morning and evening peak hours, predicting that in 2021 the traffic volumes would range between 46 and 1,551 vehicles while in 2031, the background traffic would range between 77 and 1,455 vehicles during peak hours.

Truck routes

CN's Views

CN cited the Halton Transportation Master Plan as stating that the region of Halton does not have a specifically designated truck route network as the purpose of a major arterial is to carry truck traffic and accommodate goods movement. CN identified a number of potential routes that truck traffic could use to travel between 400-series highways and the terminal's truck entrance on Britannia Road:

- east to Highway 407;
- east to Regional Road 25, James Snow Parkway, Trafalgar Road and north to Highway 401;
- east to Regional Road 25 and south to Highway 407 and Queen Elizabeth Way; and
- west to Tremaine Road and north to Highway 401.

CN noted that the Halton Transportation Master Plan indicated that all arterial roads would be upgraded to accommodate truck traffic, which is the current standard of the region. CN indicated that Halton Region planned to undertake improvements to the regional arterial road network in the near term. These improvements included widening Britannia Road and Martin Street to six lanes and extending the existing six-lane portion of Tremaine Road northward to Highway 401.

CN observed that in the longer term, Halton Region plans to widen Tremaine Road south of Britannia Road to four lanes and widen sections of Tremaine Road north of Derry Road, Regional Road 25, James Snow Parkway, Trafalgar Road, and Steeles Avenue to six lanes, as outlined in the Halton Region Transportation Master Plan.

CN stated that Town of Milton does not allow truck traffic on town-managed roads unless specifically designated.

CN used trip origin and destination-based surveys completed by the Ontario Ministry of Transportation to estimate the proportion of trucks likely to follow each of the identified truck routes. CN considered factors such as route length, speed limits, travel time, possible congestion, number of signalized intersections, number of roundabouts, number of required right/left turns, presence of bike lanes, and the degree of potential friction caused by uncontrolled intersections and driveways. CN weighted these factors using its engineering judgement and experience, and used that information to estimate the proportion of trips made by terminal-generated heavy-trucks that would likely employ each route.

CN concluded that the primary truck routes would be toward the northeast, serving Brampton, Mississauga and other destinations north of the City of Toronto. CN anticipated 70% of trucks destined for the Milton Logistics Hub would originate from that direction, and 74% of truck trips departing from the Project would travel in that direction. CN stated that numerous routes were available for trucks travelling between those destinations.

With the growing number and capacity of distribution centres and warehousing/logistics facilities located in Milton and Halton Hills, CN predicted that some of the traffic currently predicted to move to and from the north-east would eventually shift to destinations located to the west of the terminal.

Participants' Views

The Ontario Ministry of Transportation stated it had reviewed the information provided by CN and concluded that CN's assumptions and estimates of truck routings were reasonable. It also stated that there are sufficient alternate routes to accommodate predicted truck traffic, both inbound and outbound. In its view the distribution and hourly volume of trucks to and from the Project at provincial interchanges would have minimal impact on the provincial highway network.

Halton Municipalities stated that the haul routes appeared to have been selected based on their accessibility to truck traffic and without consideration of the adjoining land uses (existing and future), future roadway function, critical movement performance at critical intersections, existing roadway physical condition, or throughput capacity for each respective corridor. They indicated that the existing and planned land uses along these potential haul routes would send trucks through sensitive land uses in the Town of Milton, including through areas not yet built, but which would be constructed by 2031. Halton Municipalities clarified at the hearing that these sensitive land uses would include residential and community uses, and could include schools, parks and other community facilities.

Halton Municipalities noted that, should the Project proceed with its intended 2020 start, the route options with the least impact would be:

- Britannia Road – James Snow Parkway – Highway 401; and
- Britannia Road – Trafalgar Road – Highway 401.

Halton Municipalities noted these would not be long-term routes, as both corridors are within Halton Municipalities' urban growth areas to 2031. Both of these corridors are designated for development with land uses sensitive to truck traffic, such as residential uses and a future mobility hub at Trafalgar Road and Main Street.

Halton Municipalities also argued that CN's analysis did not consider anticipated market shifts between now and 2041. It provided analysis that while market share to the northwest and southeast would

remain relatively unchanged, a major shift in the market was expected to result in a 12% reduction in trucks travelling to the northeast, and an increase in approximately 11% of trucks travelling to the southwest.

Halton Municipalities suggested this future shift would have consequences for the regional and provincial roadway network, which were not analysed by CN, including adding additional trucks to areas such as the Queen Elizabeth Way, the Freeman Interchange and the Burlington Skyway, which are all heavily congested for many hours of a typical weekday.

At the regional level, the only routes that would service intermodal traffic heading to the southwest would be Tremaine Road south to Dundas Street and then across to Highway 407; and Regional Road 25 to Highway 407. Both of these routes have limitations. The Tremaine Road option would not be suitable for heavy trucks due to adjacent land uses and the capacity of the road, including the possibility of being delayed by trains blocking the at-grade crossing of Tremaine Road south of Lower Base Line.

Some participants commented on the routes that trucks would take, questioning the willingness of drivers to pay for the transponder and tolls necessary to access Highway 407. Several speakers noted the likelihood that independent drivers would tend to choose the shortest routes to minimize the trip time, especially if they considered they were driving a low-paid route.

Several participants observed that, under current conditions, accidents on Highway 401 cause severe backups on the James Snow Parkway or other arterial roads, causing local residents delays and inconvenience. They questioned how the town was supposed to accommodate additional trucks along those routes in instances where there are accidents on Highway 401, when the current volume already exceeds capacity.

A participant suggested that eventually a solution could be the construction of a dedicated route from the Project to Highways 401 or 407.

Project-related changes in truck traffic

CN's Views

CN projected that approximately 60–65% of the 450,000 containers to move annually through the Project would be for the local market and therefore move by truck into or out of the terminal. The remaining 35–40% would enter and depart the terminal by train.

CN explained that decisions about how a container would be dropped off or picked up would depend on how the customer organized their contracted truck drivers and container flows, and the efficiency of the contracted drayage company. Depending on these factors, the ratio of tractors entering and exiting compared to the number of containers handled would vary. CN noted that this is called the carter ratio, relating the number of carters (truckers) moving in and out of the terminal to the number of containers handled by the terminal. A carter ratio of one means that every container moving in and out of the terminal would have one truck to pick it up or drop it off. It would be most efficient and cost effective for a truck to both enter and exit the terminal with a container — in other words, a single truck would handle two containers, improving the carter ratio. CN indicated that carter ratios observed at the Brampton Intermodal Terminal were 0.75–0.81, and predicted that carter ratios at the Project would be similar.

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

CN predicted that, based on operating 365 days a year, the Project would handle approximately 1,233 containers per day, with up to 979 of those containers handled by truck. CN assumed a carter ratio of 0.81, which resulted in its estimate of 800 trucks in and out per day, for a total of about 1,600 truck trips per day.

CN determined that the pattern of hourly truck movements at the Brampton Intermodal Terminal was a reasonable proxy to estimate future heavy-truck movements at the terminal because the Project would accommodate container traffic diverted from Brampton. CN analysed the inbound and outbound gate movements at the Brampton Intermodal Terminal over the course of a year ending in September 2015 to determine the hourly average gate volumes, expressed as a percentage of the total daily volumes.

CN stated that the terminal would operate 24 hours per day and therefore truck movements would be dispersed over a 24-hour period. CN predicted that it would schedule its trains so that the busiest time for trucks entering and exiting the terminal would be between 10 am and 3 pm. This timing would differ from peak traffic periods on the regional road network, which were considered to be 8 am to 9 am, and 4 pm to 5 pm. Table 11-1 (Forecast terminal-generated heavy-truck trips) shows CN's anticipated hourly distribution of terminal-generated truck trips.

Table 11-1 – Forecast Terminal-Generated Heavy Truck Trips

Hour (starting)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
Hourly Truck Trips Inbound and Outbound (per BIT volume averages)																									
% of total daily trucks at inbound gate	1.7	1.5	1.6	2.1	3.8	5.6	5.9	4.1	4.7	5.4	5.8	6.2	6.4	6.2	5.6	5.5	5.4	5.3	5.4	3.6	2.8	2.1	1.5	1.8	100%
Inbound trucks	13	12	13	17	30	45	47	33	38	43	47	50	51	49	45	45	43	43	43	29	22	17	12	14	800
% of total daily trucks at outbound gate	1.5	1.5	1.5	1.6	2.3	3.8	5.6	5.4	5.0	5.0	5.5	5.9	6.1	6.0	6.0	5.6	5.8	5.7	5.4	4.8	3.7	2.7	2.0	1.8	100%
Outbound trucks	12	12	12	13	18	30	45	43	40	40	44	47	49	48	48	45	46	45	43	38	30	22	16	14	800

Source: CN's Environmental Impact Statement, Appendix E.17 (CEAR document #57)

CN stated that it had used conservative assumptions in its traffic predictions. CN noted that not all tractors arriving at and departing from the terminal would be hauling a full container. Some tractors may be hauling an empty container, or a chassis without a container, or may be bob-tail (not hauling any container at all). It is possible that in such cases, some of these vehicles might not meet the strict definition of heavy truck. Nevertheless, for the purposes of its study, CN assumed that all trucks entering and exiting the terminal through the main truck gate were heavy trucks.

CN assessed the potential effects of Project-associated traffic on the regional arterial road network beyond the entrance gates to local 400-series highways. As noted previously, truck trips to and from the terminal will be distributed throughout the day and all 800 trucks would not be present on the road network at the same time, on the same route, or at the same location. CN estimated that fewer than 45

trucks would arrive and depart the terminal during the morning and afternoon peak hours (less than 90 truck movements per hour per hour, or 1.5 trucks per minute).

CN predicted that terminal-generated truck traffic would use a very small proportion (2% or less) of the future capacity at signalized intersections on regional arterial roads, with the exception of the proposed intersection at the terminal access road on Britannia Road. CN stated that, in the 2021 future background scenario, the study area signalized intersections would operate at good-to-busy overall volume-to-capacity ratios of 0.45 to 1.00 in the morning and afternoon peak hours. CN predicted that these ratios would be virtually unchanged with the addition of terminal-generated site traffic volumes. The impact of terminal-generated site traffic at study area signalized intersections would be in the order of 0% to 2% in the morning and afternoon peak hours, with the exception of at the signalized intersection closest to the terminal (First Line/Bronte Street/Britannia Road) where the impact would be in the order of 1% to 5%.

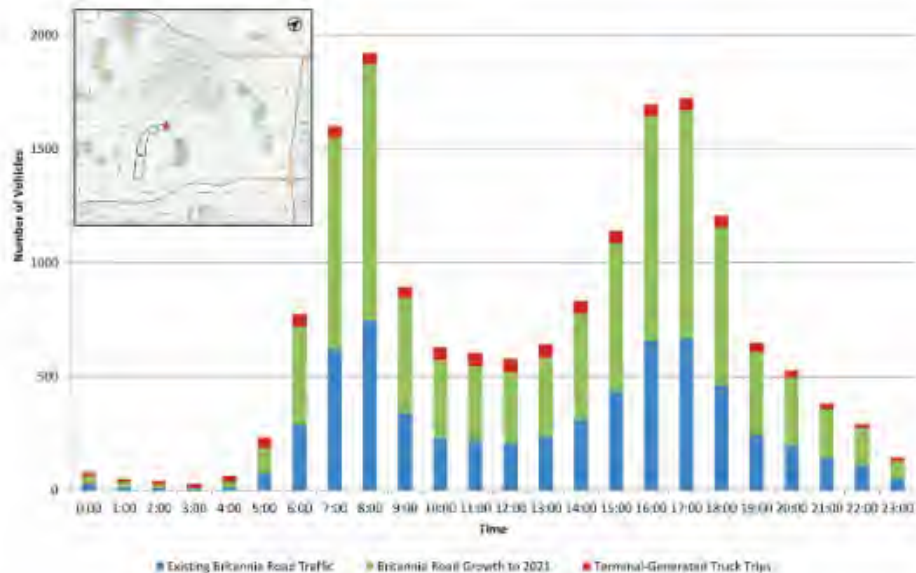
CN illustrated predicted 2021 total traffic composition along Britannia Road and Tremaine Road, including the current baseline traffic, projected 2021 baseline traffic, and the terminal-generated truck traffic that would be utilizing these routes in Figure 11-3 (2021 future total road composition):

CN did not conduct a detailed analysis of critical intersection movements for the most likely haul routes. Instead, CN identified the arterial road segments where terminal-generated heavy-truck traffic would result in a meaningful increase in the frequency of heavy-vehicle movement.

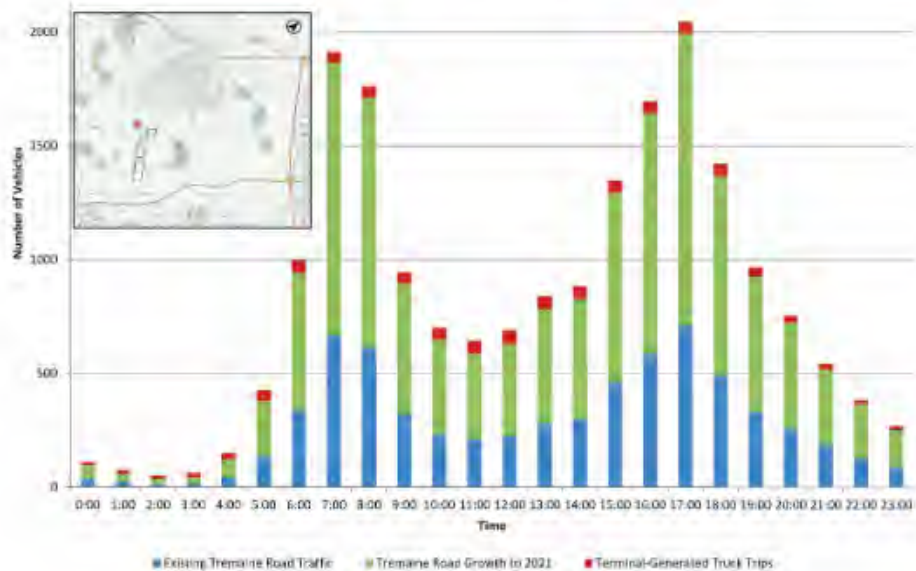
CN concluded that certain region of Halton arterial road segments and intersections, such as those along Britannia Road at First Line Road, Regional Road 25, and the James Snow Parkway, were anticipated to experience a noticeable or considerable change during either or both of the weekday morning or afternoon peak periods. CN considered a noticeable change to mean 10 to 20 additional heavy-truck movements per direction per hour, or greater than 0.75 and less than 1.5% increase in the proportion of heavy vehicles.

CN noted that it expected Britannia Road would be widened in stages, beginning with the section between Tremaine Road and Regional Road 25. Based on publicly available information, CN anticipated the widening to six lanes would be fully completed by 2021. CN clarified that there would be a short period during which only three lanes along Britannia Road would be in use, while the other three lanes were being constructed, but that a portion of Britannia Road would always be available for use throughout the construction period.

Based on this analysis, CN concluded that the impact of terminal-generated truck traffic in 2021 would be minor and could be accommodated during morning and afternoon peak hours.



Britannia Road East Of First Line



Tremaine Road North Of Britannia Road

Figure 21-3: 2021 Future Total Traffic Composition for Britannia Road East of First Line and Tremaine Road North of Britannia Road

Source: CN Response to Information Request 4.61 (CEAR document #654)

Participants' Views

The Ontario Ministry of Transportation stated its expectation that the Project would have net positive impacts for the goods movement system and would have minor congestion impacts.

Halton Municipalities generally agreed with CN's estimated container volume, in the Project design as proposed. Their own estimate of 461,618 containers per year is roughly equivalent to CN's estimate of 450,000 containers per year. However, Halton Municipalities expressed concern that the truck volumes CN predicted might not represent the maximum truck volumes the Project, based on the results of a capacity analysis they had undertaken for the terminal. That analysis concluded that the Project could accommodate up to 1,753 trucks per day, based on a scenario where the estimated container traffic volumes would increase to 995,904 containers per year. The issue of the potential ultimate capacity of the Project is discussed in Section 16.2.

Halton Municipalities undertook a detailed analysis of critical intersection movements for the most likely haul routes and predicted there would likely be impacts on the public road network; this was described as a deterioration in intersection performance. The critical movements — those that the trucks were most likely to make and where additional delay would most likely be experienced — included:

- Westbound (left/through/right) Roundabout at Britannia Road and Tremaine Road, and;
- Eastbound Britannia Road left hand turns at First Line, Regional Road 25, James Snow Parkway and Trafalgar Road.

Halton Municipalities concluded that the addition of terminal-generated traffic could increase delays at key intersections by up to 219.1 seconds beyond baseline conditions in 2021, 357.2 seconds in 2031, and 410.8 seconds in 2041. In all three years, Halton Municipalities predicted that traffic impacts would be greatest at the intersection of Britannia Road and Trafalgar Road.

Halton Municipalities therefore concluded that the additional truck trips generated by the Project would impact traffic operations, causing additional congestion, queuing and delay, and that the haul routes specifically Britannia Road at all intersections including Tremaine Road, First Line, Regional Road 25, James Snow Parkway and Trafalgar Road, would impact sensitive residential and institutional land uses in the Halton communities.

Halton Municipalities also predicted that the adverse traffic effects would worsen over time, even if planned road improvements were in place, but noted that those effects could be mitigated by CN.

Many local residents spoke or made written submissions about their fears that trucks from the Project would cause congestion and safety issues. Milton Residents Affected by Intermodal Lines stated that it was rare to see large transport trucks on Tremaine Road because the road was not a direct route to Highway 401. Milton Residents Affected by Intermodal Lines was concerned about the volume of traffic that would be generated by the Project, particularly on Tremaine Road.

Milton Says No stated that the organization supported intermodal transportation in general as a means to remove trucks from national roads and supply growing markets across the country. However, the organization's greatest concern was that the environmental impact of adding up to 1,600 or more truck trips per day could include pollution, congestion on local roads and the potential for accidents involving transport trucks. Milton Says No stated that the potential for negative interactions between trucks and

cyclists was a huge concern for their organization and that special precautions must be taken when both cyclists and truck drivers are together negotiating roundabouts.

A local resident stated that the use of railway to transport goods and reduce greenhouse gases in the long-term is in the broader public interest. They noted Milton's limited availability of public transit and its low use. They also stated that the local and regional roads are already congested at peak periods and that Britannia Road would be widened to six lanes, noting that the associated environmental assessment had started a few weeks earlier. In that resident's understanding, the Britannia Road widening would be done in sections, the westerly section first, then the easterly section, and finally the middle section. They also expressed concern that trucks using routes with roundabouts would not slow down, but could instead drive straight through the traffic circle.

A local resident raised several concerns regarding the traffic data CN used, the Project timing as it relates to road works necessary to upgrade local roads from their current condition, and the risk of increased traffic congestion affecting the quality of life for Milton residents and endangering the safety of cyclists and pedestrians. The resident stated that Britannia and Tremaine Roads had not yet been widened, and trucks might not observe speed restrictions, particularly at traffic circles.

[Project-related changes at crossings](#)

CN's Views

In response to concerns raised by Transport Canada that trains visiting the Project could block the existing level crossing on Tremaine Road for upwards of 10 minutes, CN indicated that, because of the current track configuration, slow moving trains currently occupy the Tremaine Road level crossing when they meet other trains going the opposite direction. CN noted that of the four trains expected to visit the Project daily, only two were expected to arrive from the south, potentially resulting in slow moving trains crossing Tremaine Road. CN noted that Transport Canada had likely assumed a 14,000-foot train in its analysis, whereas the trains that would visit the terminal would likely be shorter, therefore reducing the time it should take to cross Tremaine Road. CN further noted that extending the mainline track north of the Project, up to Derry Road, would allow non-terminal trains to clear the area without stopping across Tremaine Road.

Participants' Views

Transport Canada identified potential vulnerabilities at level crossings where the mainline crosses adjacent to the Project, namely at Tremaine Road and Side Road 2. Transport Canada stated the *Grade Crossings Regulations* prohibit trains from standing at a crossing more than five minutes, but do not apply if the trains continue to move at slow speed. With intermodal trains measuring 12,000 to 14,000 feet, trains would take approximately ten minutes to clear a grade crossing. Transport Canada recommended that CN and the road authority consider measures to mitigate traffic impacts associated with these conditions.

Halton Municipalities indicated that there could be blockages at Tremaine Road four times a day, with blockages between 7.95 to 15.91 minutes.

Proposed mitigation and follow-up program

CN's Views

CN's proposed mitigation measures and monitoring related to truck traffic included the following:

- building of a new two-lane private roadway, approximately 1.7-kilometre long, to accommodate truck queuing on CN property and off of local roads;
- directing CN Transportation Ltd. (CNTL) trucks (approximately 20% of the total terminal-generated truck trips) to use Highway 407 whenever practical and feasible through:
 - specific routing requirements in protocols for any pick-up or delivery;
 - monitoring of compliance with these routing protocols through spot checks of on-board GPS units by CN driver managers;
 - appropriate disciplinary action if routing protocols were not respected.
- seeking collaboration with Halton Region to install a signalized intersection, as necessary, on Britannia Road with a turning lane for trucks entering the terminal from the east to manage vehicle movements and the safety of other road users, including motor vehicle operators, cyclists and pedestrians;
- continuing to work with Halton Municipalities to identify and mitigate the impacts of the change in truck traffic on the region's arterial road network;
- directing trucks within their care and control (that is, those operated by CNTL), to utilize Highway 407 when its use would be practical and feasible; and
- building of a new two-lane private roadway in the Project site to accommodate truck queuing on CN property.

In addition CN anticipated that Halton Municipalities would implement standard mitigation to manage traffic at busy intersections on all sections of Britannia Road and Tremaine Road. Such measures would include adjustment to traffic signal control timing and phasing plans, provision of advisory or regulatory signage, adjustments to the lengths of left turn lanes for added vehicular queue storage length, and addition of auxiliary right turn lanes or left turn lanes.

CN committed to verify the effectiveness of its mitigation measures through discussions with Halton Municipalities, and stated that it would seek to confirm that Halton Municipalities had also implemented mitigation measures within its care and control, as identified by CN.

Participants' Views

Halton Municipalities stated that CN's proposal to install various traffic control measures, such as signage, would not fully address serious congestion, which could only be mitigated through major capital improvements involving additional infrastructure and land acquisition, which could cause additional impacts.

A resident suggested that a number of conditions be imposed on CN, including monitoring of congestion and accidents for at least five years; completion of the widening of Britannia Road and Tremaine Road to Highway 401 before the Project starts operations; ensuring that CN pay for any infrastructure improvements required as a result of the Project; establishment of a Traffic Committee with CN, local, regional, provincial and community representation and access to monitoring data; and a contribution by CN to the costs of a pedestrian overpass on Tremaine Road should the Education Village proceed.

Panel Observations and Recommendations

In making its observations on the effects of terminal generated truck traffic on the regional arterial road network within the Town of Milton, the Panel considers the following factors to be particularly relevant:

- Halton Municipalities and CN agreed that the Project, as designed, would handle approximately 450,000 containers per year which would, at full operation, generate a maximum of 800 trucks per day entering and leaving the Project in a 24-hour period (1,600 truck movements per day).
- Halton Municipalities raised the concern that CN could, in the future, modify the Project to handle more containers and generate a greater number of trucks.
- Halton Municipalities and CN agreed that the Project is surrounded by a regional arterial road network that currently accommodates heavy truck traffic. Halton Region is planning to expand sections of this network to six lanes, whether or not the Project proceeds.
- CN's analysis indicated that the existing road system has capacity to accommodate the predicted traffic volumes in 2031, including terminal-generated truck traffic and traffic from new residential development in Milton.
- Halton Municipalities stated that the increased traffic volumes would cause unacceptable delays at certain key intersections on arterial roads.
- CN indicated that the terminal-generated truck traffic would constitute, at any given time, approximately 5% or less of the total number of vehicles travelling on the regional arterial road network.
- On average, less than 6% of total daily terminal-generated truck traffic would enter or exit the Project in any given hour, including at peak traffic hours; in other words, terminal-generated truck traffic would be distributed throughout the day.
- The regional arterial road network would provide a number of routes for terminal-generated truck traffic to travel between the Project entry gate, proposed for Britannia Road, and the various interchanges with Highway 401 and Highway 407. For the foreseeable future, most of the terminal-generated truck traffic (more than 70%) would likely travel to the existing interchanges with the Highway 401.
- Halton Municipalities stated that all of these routes would be unacceptable but characterized Britannia Road to James Snow Parkway to Highway 401 and Britannia Road to Trafalgar Road to Highway 401 as having the least impact on the social and natural environment.
- Approximately 20% of the terminal-generated truck traffic would be transported in trucks owned and controlled by CN, through its ownership of CNTL. CN has committed to direct these trucks to use Highway 407 where practical and feasible as a mitigation measure.
- The Ontario Ministry of Transportation advised the Panel that the assumptions and estimates of truck routings in CN's studies seemed reasonable and that the Project would result in minimal adverse impacts to local traffic. The Ontario Ministry of Transportation also stated that there are sufficient alternate routes for truck traffic, both inbound and outbound, and that the distribution and hourly volume of trucks to and from the Project at provincial interchanges should have minimal impact on the provincial highway network.
- Local residents are concerned about safety, congestion, the local traffic consequences of upset conditions on Highway 401, the timing of the Project with respect to arterial widening proposals, and interactions between trucks and other road users at roundabouts.

The Panel notes that two aspects relating to terminal-generated traffic are covered in other sections. Cycling and safety is addressed in Section 11.2. The Panel has also addressed, in Section 16.2, concerns raised by Halton Municipalities over any future increase in annual container throughput at the Project.

The Panel observes that the principal parties presenting evidence on traffic related issues used different analytical approaches to traffic modelling. CN's traffic experts focused on present and future traffic volumes and present and future arterial road capacity. Halton Municipalities did not specifically address these issues and did not, therefore, seriously dispute CN's evidence on traffic volumes and road capacity. By contrast, Halton Municipalities' traffic experts focused on the performance of certain key intersections in the arterial road network in the Town of Milton, to demonstrate that performance could deteriorate to unacceptable levels in the future as a result of terminal-related truck traffic. CN did not specifically address these issues and did not, therefore, seriously dispute Halton Municipalities' evidence on intersection performance.

The Panel finds that these approaches are not directly comparable to each other and therefore observes that the truck traffic modelling conducted by CN, focused primarily on the current and future capacity of the regional arterial road network in the Town of Milton, is reasonable. The Panel also observes, as Halton Municipalities did, that the addition of terminal-generated truck traffic to the regional arterial road network in the Town of Milton, despite the overall sufficient capacity of that network, may result in delays or other performance issues at certain intersections. The Panel's recommendations, below, address Halton Municipalities' concerns about intersection performance.

The Panel notes that the population of the Town of Milton has grown considerably since CN filed its EIS in 2015; indeed, Milton is now one of the most rapidly growing areas of the Greater Toronto and Hamilton Area. Population growth has resulted in more homes and, in turn, more vehicles using the arterial road network and will continue to do so as growth proceeds. Halton Region has responded to this by widening the arterial roads; when this road work is completed many of the arterial roads in Milton will be six lanes wide. The widening of relevant portions of Britannia Road to six lanes and the construction of the new interchange on Highway 401 at Tremaine Road are already in progress and are likely to be completed before the Project, if approved, could commence operation. These enhancements to the arterial road network are required and will be completed whether the Project is built or not.

CN's estimate of a maximum of 800 terminal-generated trucks per day is not materially different from Halton Municipalities' estimate of 812 trucks per day, based on its assessment of approximately 461,618 containers per year at the Project. While Halton Municipalities remains concerned that CN may subsequently modify or expand the terminal to handle a greater number of containers (which CN disputes), if the terminal were constructed and operated as proposed, then the Panel observes that there is a consensus around the maximum number of terminal-generated trucks.

While 800 trucks entering and exiting the Project per day seems to be a large and daunting number, it represents a small percentage of the total number of vehicles, including trucks, currently operating on the arterial roads in Milton every day. The evidence submitted by both CN and Halton Municipalities indicates that the number of vehicles currently operating on the arterial roads in Milton is several thousand vehicles per hour. CN also provided evidence that other approved uses of the same land by other parties could generate even greater levels of traffic. Some of those approved uses would generate

fewer trucks; some would generate either more trucks or a greater number of trucks per hour. If, as Halton Municipalities prefers, the land in the Project Development Area were to be developed as prestige industrial, as many as 1,500 vehicles could potentially enter and exit the subject lands in a 24-hour period (approximately 3,000 vehicles per day). Most of those 1,500 vehicles would operate during the morning and afternoon peak traffic hours.

The Panel has considered the number of routes over which the terminal-generated truck traffic might travel between the Project and the 400-series highways. CN predicted that terminal-generated truck traffic would disperse over a number of different routes and over a 24-hour period. While all routes will see some level of terminal-generated truck traffic travelling to and from the 400-series highways, the greatest number of those trucks would be likely to use existing truck routes between the Project and the Highway 401 interchanges at Trafalgar Road, James Snow Parkway and Winston Churchill Blvd (adjacent to Milton). While Halton Municipalities told the Panel that none of the routes between the Project and the Highway 401 interchanges are acceptable for terminal-generated truck traffic, its expert identified two of the existing truck routes (those using the Highway 401 interchanges at Trafalgar Road and James Snow Parkway) as having the least impact on the social and natural environment. A Highway 401 interchange at Tremaine Road is currently under construction; once it opens it would also attract a significant percentage of terminal-generated trucks. It is the shortest route between the Project and the Highway 401. Trucks using this new Highway 401 interchange would occupy those arterial roads for the shortest distance and therefore consume the least arterial road capacity.

The Panel observes, therefore, that the regional arterial road network in Milton has sufficient capacity, including at peak traffic hours, to accommodate the terminal-generated truck traffic.

Given the extent of the regional arterial road network, the Panel observes that there are a number of existing truck routes on the regional arterial road network over which the terminal-generated traffic may travel between the Project and the various interchanges with the Highway 401 and the Highway 407. Most of those trucks would likely use any one of the existing Highway 401 interchanges; fewer than 2% would likely use one of the two Highway 407 interchanges located south of the Project.

Finally, the Panel understands that approximately 20% of terminal-generated truck traffic would be transported in CNTL trucks, owned and operated by CN and that therefore CN would have care and control over 20% of the terminal-generated truck traffic and would be able to direct these trucks to take routes that would have the least impact.

Certain Milton residents expressed concern that terminal-generated truck traffic may be traveling on Britannia Road before the Region has completed the widening of the relevant portions of that road (which work is currently ongoing). The Region's stated goal is to complete the road widening by Fall 2022. Residents are concerned that, during construction, Britannia Road may be reduced at times, to three lanes.

Additional Recommendation 11.10 — Ongoing work to widen Britannia Road

The Panel recommends that, if the Project is approved, built and operating before Halton Region has completed the widening of Britannia Road, then CN and the Region should jointly monitor traffic levels on Britannia Road to determine whether there is undue traffic congestion during peak traffic hours

along Britannia Road attributable to lane reductions during road construction. If this monitoring reveals evidence of traffic congestion partially attributable to terminal-generated trucks, the Panel recommends:

- CN should reduce the number of trucks entering and exiting the Project during the morning and afternoon peak traffic hours in a manner proportionate to the number of lanes in operation. For example, if only three of the intended six lanes of Britannia Road were in operation (50% capacity) then CN should reduce the number of trucks exiting the Project, at the relevant times, by a corresponding 50% during the morning and afternoon peak traffic hours.
- Such a restriction, if warranted, would be in effect only during the morning and afternoon peak traffic hours until the widening of the relevant portions of Britannia Road is completed or for a period of six months, whichever comes first, assuming Halton Region completes the ongoing road widening in a timely manner.
- Halton Region should, at the same time, take all reasonable and appropriate measures within its control to reduce undue traffic congestion, if any, at peak hours, including such measures as detours to reduce the volume of non-terminal traffic traveling on the portion of Britannia Road between Tremaine Road and Regional Road 25.

Additional Recommendation 11.11 — Monitor intersection performance

Given Halton Municipalities' concerns that the addition of terminal-generated truck traffic to the regional arterial road network may result in unsatisfactory levels of performance at certain key intersections within the Town of Milton, the Panel recommends that CN and Halton Municipalities jointly monitor the performance of key intersections within the Town of Milton. More specifically:

- This monitoring should begin once Halton Region has completed the widening of the relevant portions of Britannia Road and the Project has reached the stage of maximum operations where, in a 24-hour period, up to 800 trucks will be both entering and exiting the Project through the entrance gate on Britannia Road.
- The monitoring should focus on intersection performance during the 7 am to 9 am and 4 pm to 6 pm peak traffic hours for the intersections on Britannia Road at Regional Road 25, Trafalgar Road and James Snow Parkway. Once the Province and the Region have completed the proposed interchange at Tremaine Road and Highway 401, the monitoring should be expanded to include the intersection of Britannia Road and Tremaine Road.
- Should the monitoring indicate unsatisfactory levels, a performance rating of F, at these intersections, then Halton Municipalities and CN should collaborate to determine the respective impact on the level of performance of truck traffic generally and terminal-generated truck traffic specifically. That determination will assist the parties to determine what measures each may implement to improve intersection performance. For CN, this may result in temporarily restricting the number of trucks permitted to enter and to exit the Project during morning and afternoon peak traffic hours.
- The monitoring should continue for a minimum period of 24 consecutive months. If performance of the key intersections remains a problem following the addition of the terminal-generated truck traffic, then the joint monitoring should continue for an additional 24-month period and additional mitigation measures considered as appropriate.

Effects on passenger, commuter and freight railway services

CN's Views

CN noted that there are no passenger train movements along the portion of the Halton Subdivision where the Project is located, and concluded movements associated with the Project would not affect passenger train service. However, CN did not assess the potential effects of the Project on passenger, commuter and freight railway service (for example scheduling of trains) for lines that intersect the Halton Subdivision in the Local Assessment Area for economic and community services or the Regional Assessment Area.

The Project would be served by four intermodal trains per day. Two of the trains to be handled by the Project are part of the existing 25 to 30 freight trains per day along the Halton Subdivision. Currently, these two trains stop at the Brampton Intermodal Terminal to drop off and pick up railcars and then continue to the United States using the Halton Subdivision. Once the Project is operational, these two trains would stop in Milton instead. For these two trains, there are no expected scheduling effects on passenger, commuter and freight service or on neighbouring communities because these trains are currently moving over this portion of the track.

CN noted that the two new trains per day will represent an increase to the 25 to 30 trains per day along the Brampton–Georgetown corridor, but that increase falls within the expected variability for this segment of the Halton Subdivision.

CN noted that when it schedules railway traffic, the commuter service is given fixed time slots, as defined in an existing agreement between Metrolinx and CN, as well as an agreement between VIA Rail and CN. Once these timeslots are established, freight movements are scheduled around the fixed commuter and passenger time slots so as to not interfere with passenger movements. These fixed time slots will remain in place after the Project is operational; therefore, there will be no effect on commuter and passenger traffic from adding two additional trains per day on the portion of the Halton Subdivision between the Brampton Intermodal Terminal and the Project.

Participants' Views

Halton Municipalities commented that CN's assessment on the effects on passenger, commuter and freight railway services had not considered the anticipated increased demand for commuter and passenger traffic as Halton Region and the Town of Milton continue to grow. Halton Municipalities stated that increased demand will impact the capacity of the railway activity in the area and ought to have been considered in the analysis of how the Project might impact passenger and commuter train service and scheduling.

Panel Observations and Recommendations

The Panel observes that the Project would have no material impact on passenger, commuter or freight railway services. The Project is only expected to add two new trains per day onto the Halton Subdivision, which already accommodates 25 to 30 trains per day. The Panel notes that the doubling of the mainline within the Project Development Area is designed to ensure that railway traffic can easily be accommodated without a blockage of the mainline while trains are entering or exiting the terminal.

11.3. Cultural heritage and archaeology

Subsection 6.3.5 of the EIS Guidelines required CN to describe any changes the Project would cause to physical and cultural heritage, and structures, sites or things of historical, archaeological, paleontological or architectural significance to local heritage. This section of the report deals with Project effects relating to cultural heritage and archaeology, and summarizes the views of CN, participants and the Panel.

11.3.1. Cultural heritage

CN's Views

CN determined that 17 properties met one or more of the Ontario Ministry of Tourism, Culture and Sport's criteria for cultural heritage value or interest within the Project Local Assessment Area. Sixteen of the properties were included on the Town of Milton's Heritage list, and one property was designated under Part IV of the *Ontario Heritage Act*. There are two heritage properties on the Town's Heritage List within the Project Development Area.

CN identified that the Project would result in the removal of one heritage building, and could potentially cause vibration effects on heritage properties within 50 metres of construction activities. The heritage properties within the Project Development Area would be vacated.

The 5269 Tremaine Road property is a farmstead comprised of a residence, barn, and a shed. The farmstead was considered to have cultural heritage value because it is representative of 19th century residential and agricultural building design and supports the rural character of the study area. CN proposes to remove the shed in order to locate one of the stormwater management ponds. CN indicated that the location of the pond could not be changed because of floodplain and meander belt constraints.

CN stated that the shed's cultural heritage value was based solely on its contextual association with the house and barn, and its relationship to fields and the road rather than its architectural character. CN noted that relocating the shed would be an option but the community had not expressed interest in this, and furthermore moving the shed would disrupt its contextual relationship with the house and barn on which its heritage value was based. Instead, CN would mitigate the loss of the shed by documenting the land use history and construction details, making a photographic record of the building that would be accessible to the public, and salvaging any components of the building in which there was public or private interest. CN indicated that by salvaging the materials, some of the cultural heritage value or interest of the shed would be retained in a different context. CN would implement a follow-up program for the documentation and salvaging of the shed and submit a report on the mitigation strategy to the Impact Assessment Agency of Canada.

CN indicated that several cultural heritage properties could be vulnerable to vibration effects during construction, including 5269 Tremaine Road, and also a property at 4393 Tremaine Road, which is a farmstead comprised of a residence, a barn, and three modern outbuildings surrounded by agricultural fields under cultivation. The house and older barn date from the 19th century. The residence and barn at 5269 Tremaine Road would be approximately 20 metres and 35 metres from construction activity respectively, and 4393 Tremaine Road approximately 10 metres from construction activity. CN indicated

that three additional properties: 5005 Tremaine Road, 5193 Tremaine Road and 5381 Tremaine Road, although located more than 50 metres from Project construction, would be close enough to the Project Development Area that they could also be affected by vibration effects should construction areas change during the detailed design stage.

To avoid vibration damage to cultural heritage properties, CN would maintain a 50-metre buffer that would be fenced. CN explained that 50 metres was chosen as a highly conservative separation distance based on geotechnical work that determined vibration propagation in the soils across the site. While CN would usually avoid construction activities within the 50-metre buffer, if this were not possible, a qualified expert would determine maximum vibration levels that could be tolerated without causing damage to the adjacent heritage property. Continuous monitoring during the construction activity would then ensure that the maximum vibration levels were not exceeded.

During operation the only source of vibration would be train movement on the mainline and there would be no cultural heritage properties within 50 metres of the mainline, therefore follow-up monitoring would not be required.

CN would protect the vacant properties from weather and vandalism by boarding up the windows and doors, and inspect them as part of property maintenance. CN would allocate funds (amount unspecified) to ensure the vacated properties stay in working order. This mitigation would continue until such time as an adaptive re-use had been identified. At the time of the hearing, no adaptive re-use options had been suggested. CN clarified that, due to Project operation, the vacated properties could no longer be used as homes. CN stated that it would be interested in the Town of Milton's input into possible re-use opportunities.

Participants' Views

Ontario Ministry of Tourism, Culture and Sport indicated that municipalities have the power to designate a property through a bylaw that specifies the heritage attributes of a property. After designation, any alterations to those attributes would require a heritage permit from the municipality. Municipalities can also add properties that are of potential historic or architectural value or interest to a Heritage List, but these properties are not designated. An owner wishing to demolish a property on the list must give the Municipal Council a 60-day notice before receiving a demolition permit.

Halton Municipalities stated that the Milton Council has approved a Heritage List of more than 1,000 properties that are of potential historic or architectural value or interest. The Heritage List allows staff to easily identify potential heritage properties that could be affected by development proposals. Halton Municipalities indicated that a Heritage Impact Assessment is required to determine the value of the property and the most appropriate conservation method and said that CN should have carried out such a study. The Assessment report would typically be prepared by a qualified heritage consultant and would have included a description of exactly how conservation and mitigation measures would be implemented, monitored and reported. The Ontario Ministry of Tourism, Culture and Sport responded that property-specific Heritage Impact Assessments could be part of a mitigation strategy during the implementation and detailed design stage of the Project.

Halton Municipalities were satisfied that CN's proposed documentation and salvage approach would effectively mitigate the Project effects on the shed. They agreed with CN that the heritage value for this property is associated with the house and the barn; not the shed. The Ontario Ministry of Tourism, Culture and Sport stated that the demolition of the shed would affect the property's cultural heritage value or interest because the relationship of the residence to the other buildings on the property, including the shed, is a cultural heritage attribute.

Halton Municipalities questioned whether 50 metres would give sufficient protection from vibration effects, pointing out that the studies CN relied on to substantiate the 50-metre buffer zone demonstrated that there were vibration effects at 40 metres. Halton Municipalities recommended that CN follow an approved conservation plan for heritage resources, including a pre-construction survey of the current quality of the cultural heritage property, continuous monitoring during Project activities, and a remedial plan in case damage was identified. Ontario Ministry of Tourism, Culture and Sport indicated that a 50-metre buffer is consistent with best practice and would likely avoid vibration-related effects.

Ontario Ministry of Tourism, Culture and Sport observed that all buildings require maintenance. If they are not being used, typically they are not maintained. A neglected property could become a safety hazard, fall apart or need to be demolished which would reduce or eliminate the property's cultural heritage value.

Halton Municipalities stated their concern with the practice of mothballing — the process whereby vacant buildings are boarded up for a period of time. They indicated that mothballing would cause listed heritage properties in the Project Development Area to deteriorate. The cumulative effect would adversely affect the municipalities' conservation efforts for heritage resources, unless proper conservation methods were identified through a Heritage Impact Assessment. Halton Municipalities also reported that, in their experience, mothballing is not an effective conservation method for heritage properties. Halton Municipalities indicated that the Town of Milton receives many inquiries requesting the demolition of heritage properties.

Halton Municipalities explained that, in their experience, they often have to use their Property Standard Bylaw to address the upkeep of vacant buildings, to avoid the heritage property facing demolition by neglect. In their opinion mothballing would only be effective if CN were required to submit a conservation plan to the Municipality for approval including details of inspection, maintenance, costing and phases of the rehabilitation or restoration work. These commitments would then be enforced through the Town's property standards. Halton Municipalities indicated that three alternative mitigation measures would be more successful in conserving the properties' heritage value when compared to mothballing. The best approach is to find an alternate use for the property. The second is to relocate the property. The third is to conduct a Heritage Impact Assessment for the vacant properties to identify the properties' heritage value or interest and, in the case that the properties are deemed not significant, to proceed to demolition.

A resident told the Panel that CN left a vacant property on their lands for a number of years without securing it properly, and had only boarded it up after complaints by residents about vandalism. This experience causes residents to question CN's commitment to protecting and maintaining vacant heritage properties.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on cultural heritage properties, the Panel considered the following factors to be particularly relevant:

- Most of the cultural heritage properties identified within or adjacent to the Project Development Area draw their significance from historical farming uses and landscapes in the area.
- The only heritage building to be removed is a single shed that has contextual heritage value as part of a farmstead grouping but no particular intrinsic architectural value. Halton Municipalities agreed that the proposed mitigation measures, documentation and salvage, were appropriate.
- CN stated that the nature of the soils and subsurface conditions on the site would reduce vibration effects on heritage properties.
- CN proposes to avoid vibration damage during construction by establishing a 50-metre buffer, or alternatively by carrying out continuous vibration monitoring to ensure damage is not caused.
- Two or three cultural heritage properties would be vacated and mothballed by being boarded up and periodically inspected, unless a viable adaptive and non-residential re-use could be identified. CN has indicated, while it would support such re-use, the onus of determining just what re-use would be feasible rests with local communities. Residential use would not be permitted.
- A property is placed on the municipal Heritage List when it is considered to have potential cultural value, which is only confirmed through a formal Heritage Impact Assessment. Such an assessment has not been carried out for any of the designated properties affected by the Project, although CN did assess the cultural attributes in some detail.
- Halton Municipalities indicated that the Town of Milton receives many inquiries requesting the demolition of heritage properties and that demolition by neglect is a common phenomenon for properties that are vacated and mothballed.

The construction of the Project would require the removal of the shed at 5269 Tremaine Road, a designated heritage building. The Panel concludes that the inherent architectural value of the shed is limited, that the cultural value of the remaining cluster of buildings (which gives the shed its contextual value) would not be greatly diminished, and that CN has proposed a satisfactory and feasible mitigation approach to reduce the effect of its removal through documentation and partial salvage. Halton Municipalities have concurred. Therefore the Panel concludes that the effect on cultural heritage in the area where the shed would be removed, while adverse and permanent, would be of low magnitude.

CN acknowledged that vibration effects caused by construction activity could cause damage to designated heritage buildings unless mitigated. The Panel is satisfied that the proposed mitigation — the creation of a 50-metre buffer around heritage buildings and the use of continuous vibration monitoring when a 50-metre buffer cannot be maintained — would be satisfactory and would likely protect these buildings from adverse vibration effects, such that there would be no residual effect. To ensure that mitigation has indeed been effective, CN should inspect the buildings before and after adjacent construction activity is complete and, if required, should repair any aesthetic or structural damage that occurs. The Panel agrees with CN that train operation on the mainline would be the only source of vibration during operation. As there are no cultural heritage properties within 50 metres of the mainline tracks, the Panel concludes there would be no vibration effects on heritage buildings during operation and therefore no residual effect.

Before the construction of the Project, two or possibly three heritage properties located within the Project Development Area would be vacated. CN proposes to protect these properties by boarding them up, inspecting them regularly and carrying out required maintenance until such time as an adaptive re-use were identified. The Panel is not confident that feasible adaptive re-use options would be found for these vacant properties. No ideas were put forward during the hearing, and the properties' close proximity to an intermodal terminal operating 24 hours per day would not make the task of identifying opportunities easy.

Therefore, the Panel finds the most likely scenario to be that no adaptive re-use would be found and that the vacated cultural heritage properties would be permanently mothballed. The Panel acknowledges Halton Municipalities' concern that mothballing could lead to demolition by neglect. The Panel does not believe that this would inevitably occur in this instance because CN would have the resources to inspect and maintain the boarded-up buildings and committed in the hearing to do this.

However, the Panel questions the ongoing heritage value of empty farmhouses and barns (except where the barns provide Barn Swallow habitat) against a largely industrial background, if no other use can be found. The Panel notes that, other than Halton Municipalities, no other participants spoke to the importance of preserving these buildings in the long term. Therefore, the Panel envisages a situation in future years where removal of these properties would be deemed a necessary if unfortunate eventuality.

The Panel therefore concludes that CN's commitment to maintain the vacated heritage properties, while seeking viable re-use opportunities, would provide satisfactory mitigation to avoid a significant adverse environmental effect in the short to medium term.

With respect to longer term effects, the Panel recommends that after a fixed time has elapsed, if no re-use options have emerged, CN carry out a Heritage Impact Assessment to determine appropriate actions (for example, continued preservation, re-location, or demolition with documentation and salvage). If the results of this assessment demonstrate that the preferred course of action is to remove the building(s), the Panel concludes that while this would constitute an adverse environmental effect on cultural heritage, the effect would be mitigated by carrying out this process with appropriate input by local and regional heritage experts, and allowing for documentation and salvage; as a result, the magnitude of the residual effect would be low.

If continued preservation of the properties is considered to be the most appropriate action, CN would need to maintain the buildings to ensure their physical integrity.

In summary, the Panel concludes that the Project would cause residual effects on cultural heritage after mitigation through the removal of the shed, and through mothballing the vacated heritage properties, but that the effect would not be significant as the cultural heritage value of the remaining cluster of buildings would be largely intact.

CEAA Recommendation 11.12 — CN should implement the mitigation it has committed to undertake for cultural heritage

The Panel finds that CN's commitments to implement mitigation measures for cultural heritage are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- document the land use history and construction details of the shed at 5269 Tremaine Road, before removing it;
- make a photographic record of the shed at 5269 Tremaine Road, and salvage any components of the building in which there is public or private interest;
- secure CN-owned properties within the Project Development Area until an adaptive re-use is identified; and
- maintain a 50-metre buffer during construction around all cultural heritage properties where construction activities may occur within 50 metres including any properties that are located outside of the Project Development Area. Ensure no construction activities take place within the buffer. If it is not feasible to maintain this buffer, CN must carry out a property-specific vibration effect study to determine maximum acceptable vibration levels to protect the property and carry out continuous monitoring during construction activities to ensure the values are not exceeded.

CEAA Recommendation 11.13 — Additional mitigation to reduce vibration effects

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN further reduce vibration effects on properties by:

- assessing each cultural heritage property's condition before Project construction with a photographic record. After completing construction activities in the vicinity of cultural heritage properties, CN should inspect all properties and compare the property's condition after construction to its condition before construction to determine whether any vibration-related damage has occurred. If so, CN should make the necessary repairs. The identification of any vibration-related damage and how CN repaired the damage should be submitted to Impact Assessment Agency of Canada, and the Community Liaison Group.

CEAA Recommendation 11.14 — Additional mitigation to reduce effects on cultural heritage

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN take the following steps to further reduce effects on cultural heritage:

- develop a Cultural Heritage Property Maintenance and Re-use Plan in consultation with the Ontario Ministry of Tourism, Culture and Sport and heritage personnel at the Town of Milton. The Plan should ensure the cultural heritage value of buildings is preserved by addressing how vacated properties would be secured, inspected and maintained. The Plan should also specify criteria that would be used to determine the terms of any adaptive re-use. CN should make this plan available to all interested communities and organizations to see if anyone wishes to make a proposal;
- if, three years after operations have commenced, CN has not identified feasible adaptive re-use for a given property, carry out a Heritage Impact Assessment process in consultation with the Ontario Ministry of Tourism, Culture and Sport, the Town of Milton and other bodies as

appropriate, to determine whether the vacated properties should be mothballed for a longer period, relocated, or demolished with appropriate mitigation;

- submit the report containing the land use history and construction details of the shed at 5269 Tremaine Road to the Impact Assessment Agency of Canada, the Community Liaison Group and place it in a local library or museum; and
- submit the reports containing the inspection results, any maintenance actions that CN has undertaken to protect the cultural heritage properties and the Heritage Impact Assessment and results regarding whether vacated properties should be mothballed for a longer period, relocated, or demolished with appropriate mitigation to the Impact Assessment Agency of Canada, and the Community Liaison Group.
- If this monitoring demonstrates that vibration levels exceed targets, CN should implement additional mitigation such as alternative construction techniques that are identified in Section 6.2.

The Panel concludes that if the recommended mitigation is carried out, the Project would not cause a significant adverse environmental effect on cultural heritage properties.

The Panel finds that the effects on the cultural heritage buildings on CN's property would be of low magnitude, and if removal of the buildings is eventually required, the Panel's recommendation that CN carry out a Heritage Impact Assessment would identify further mitigation to reduce effects to a moderate magnitude.

Cumulative Effects

With respect to cumulative effects, the Panel heard that the Town of Milton receives many requests for demolition permits but did not receive information about the scale or rate of loss of cultural heritage properties in the region. The Panel notes that the rate of urbanization in the Milton area and more broadly in southern Ontario, as well as the difficulty and expense of maintaining heritage buildings, will exacerbate these effects. The Panel concludes that cultural heritage has already been affected by past projects and that if the vacated properties are eventually demolished, the Project, together with other projects and activities that will be carried out, would likely cause additional cumulative effects on cultural heritage.

The Panel heard no evidence to indicate that the cumulative loss of cultural heritage properties has reached proportions considered to be unacceptable. The Province did not indicate that policies had been developed to address this issue, land continues to be developed, and the Panel was not informed that any funding programs were available to assist individual heritage property owners to maintain their property. The Project contribution to this cumulative effect (one or more properties) would be limited. Furthermore, greater value would likely result from preserving properties located within an active farming landscape as opposed to maintaining empty buildings in an industrial landscape. For these reasons, the Panel concludes that the cumulative effects of the Project together with other projects and activities that will be carried out are not likely to be significant.

The Panel concludes that the cumulative effects of the Project together with other projects and activities that have been or will be carried out would not constitute a significant adverse cumulative environmental effect on cultural heritage resources.

11.3.2. Archaeology

CN's Views

According to the registered archaeological site records kept by Ontario Ministry of Tourism, Culture and Sport, no archaeological sites were previously registered within the Project Development Area, though 30 archaeological sites had been registered within a one-kilometre radius of the Local Assessment Area. CN carried out the four-stage archaeological assessment required by Ontario Ministry of Tourism, Culture and Sport prior to land development. The stage 1 assessment concluded that the Local Assessment Area exhibited moderate to high potential to contain archaeological resources. During the stage 2 assessment, CN identified 60 archaeological locations; 34 of which met Ontario Ministry of Tourism, Culture and Sport criteria for registration as an archaeological site, and 17 of which met criteria for a stage 3 assessment. As part of its stage 3 assessment, CN further assessed the heritage value and interest of 14 Aboriginal sites and three 19th century Euro-Canadian sites.

As a result of its stage 4 assessment, CN conducted controlled salvage excavations, processed, catalogued and analysed artifacts at ten Aboriginal sites and three 19th century Euro-Canadian sites.

CN indicated that the artifacts found on the Project site demonstrated that there was Aboriginal occupation of the area as early as 10,000 years ago up to about 1,000 years ago. These were not permanent settlements but contemporary campsites occupied for short durations. CN stated that 85% of the artifacts found were flakes of stone which were a by-product of making stone tools. CN also found non-Indigenous items likely originating from the 19th century. Stantec, the company hired by CN to conduct the archaeological work, has stored the artifacts in a climate-controlled facility operated by a third party. Stantec said it would provide access to the collections upon request.

CN indicated that the stage 3 and 4 archaeological reports were reviewed and accepted by the three Aboriginal communities that participated in the assessment — the Mississaugas of the Credit First Nation, the Six Nations of the Grand River, and the Huron-Wendat Nation — prior to submission to the Ontario Ministry of Tourism, Culture and Sport.

CN indicated that land disturbance during the construction phase would be the most likely cause of displacement or destruction of any archeological resource (other than those identified during the archaeological assessments). CN stated that given the archaeological assessment already completed, the likelihood of encountering additional artifacts would be low but not impossible. CN indicated that it agreed with the Huron-Wendat Nation's concerns that ossuaries, because of their depth, are difficult to detect using the Ontario Ministry of Tourism, Culture and Sport standards.

CN indicated that it had already completed the required mitigation for the archaeological resources in accordance with the Ontario Ministry of Tourism, Culture and Sport's four-step archaeological assessment process, and it would be open to discuss with the Huron-Wendat and others as appropriate how artifacts found on the Project site, currently stored at Stantec's third party climate-controlled

facility, could be returned to them in a proper and respectful manner to store and display in their communities.

CN would develop and implement an archaeological resources protection plan in collaboration with Indigenous communities that will include worker awareness training regarding basic artifact identification and appropriate protocols in case of accidental recoveries and required next steps. CN was also committed to the participation of Aboriginal monitors during construction, their participation in the archaeological resources protection plan and addressing any potential concerns regarding Huron-Wendat Nation ossuaries.

CN explained that if an archaeological resource was discovered during the construction phase, the contractor would cease all construction immediately within a 20-metre radius of the resource and inform Ontario Ministry of Tourism, Culture and Sport prior to the implementation of procedures and mitigation. A stage 2 assessment would be conducted by a licensed archaeologist with participation of Indigenous communities. If any human remains were encountered, CN would cease all construction around the area immediately, remains would be treated with respect and the police or the coroner would be called. Work would not resume until the site had been cleared.

CN indicated it would conduct archaeological monitoring as a component of construction monitoring to monitor for the presence of undocumented archaeological resources during ground disturbance activities. This monitoring would be continuous and would last as long as ground disturbance activities were occurring. CN would send the monitoring report to the Impact Assessment Agency of Canada.

Participants' Views

The Huron-Wendat Nation explained that the site of the Project is located in Wendake South (Southern Ontario) where Huron-Wendat Nation archaeological sites have been documented. The Huron-Wendat explained that historically, 30,000 Huron-Wendat Nation people lived in Wendake South. Burial sites are typically ossuaries, a unique form of burial amongst Canada's First Nations, and of inestimable spiritual and cultural value to the Huron-Wendat Nation. They indicated that it is imperative that such sites not be disturbed because the Huron believe that one of their ancestor's souls remains with its deceased bones and their ancestors not be disturbed while they rest in peace.

The Huron-Wendat Nation also explained that burials and ossuaries would be difficult to detect using the usual methods for archaeological assessments because test pits only go down to 25 cm below the surface and ossuaries would normally be deeply buried deposits. The presence of bones, the visible sign of an ossuary, could start from 40 cm below the surface to about two metres below the surface. Because of the difficulty in detecting ossuaries, the Huron-Wendat Nation actively participates in many development projects in Ontario by sending monitors during all Project phases that involve ground disturbance to ensure the protection of its archaeological sites. Huron-Wendat Nation monitors were present at the site during the stage 3 and 4 archaeological work and CN has agreed to the ongoing presence and funding of their monitors throughout the construction phase of the Project. No signs of an ossuary had been seen as yet in the Project Development Area, but if one were to be discovered, protection would need to be a top priority. Ossuaries are discussed in more detail in Section 12.1 Indigenous Matters.

The Huron-Wendat recommended that artifacts found at the site be returned to First Nations communities as part of the mitigation, and indicated that they have a museum where artifacts could be displayed.

The Huron-Wendat Nation indicated that it has been estimated that more than 2,000 Huron-Wendat Nation archaeological and burial sites had been destroyed by development in southern Ontario, including the Greater Toronto area, without the knowledge of the Huron-Wendat Nation and without its consent. The destruction of archaeological sites is the reason they are involved in field work today for projects like the proposed Project.

The Huron-Wendat Nation indicated that protection in situ would always be the preferred option for archaeological sites and that excavation of archaeological resources would be considered an adverse effect. The Huron-Wendat Nation indicated that there would be ways to mitigate and accommodate those effects and that they have been in conversation with CN regarding possible ways to accommodate the effects that have already been experienced.

The Mississaugas of the Credit indicated that they had collaborated with CN to ensure that CN carried out archaeological work in a respectful way and that any archaeological resources found had been dealt with properly, including ceremonies required by Anishinaabe law. They stated that consultation with CN with respect to concerns about archaeological effects has been thorough and positive. They recommended that a condition be placed on the Project requiring that Mississaugas of the Credit monitors to be present during fieldwork, and that they be given an opportunity to review draft monitoring plans.

The Mississaugas of the Credit indicated that much of their archaeological resources, including human burials and cultural materials, had been destroyed or irretrievably lost, which was why having monitors participating in field work was of utmost importance to them.

The Mississaugas of the Credit stated that excavation always results in the destruction of a site, even if documented, and as such precludes its continued existence as part of the cultural heritage landscape.

The Six Nations of the Grand River indicated that they are actively involved in archaeological monitoring throughout their area.

The Ontario Ministry of Tourism, Culture and Sport indicated that it is involved in overseeing all archaeological assessments and would be involved in determining if archaeological assessments are required for provincial and federal environmental assessments. In the case of a planning process where the municipality is the approval authority, the Provincial Policy Statement requires that any land with archaeological potential needs to be assessed before development or alteration is approved. In that case, the Municipality would look to see if the development would affect any of the registered archaeological sites in the Ontario Ministry of Tourism, Culture and Sport's database. If so, archaeological assessments would be conducted, sent to the Ontario Ministry of Tourism, Culture and Sport for review and entered into the register as compliant. The Ontario Ministry of Tourism, Culture and Sport stated that all required excavation of archaeological resources has been completed and entered into their register as compliant. The Ontario Ministry of Tourism, Culture and Sport stated that

CN has committed to take appropriate action in the case of unexpectedly encountering archaeological resources.

Halton Municipalities also commented that the removal of archaeological resources is an inherently destructive process and that this has caused the loss of cultural heritage value and interest.

No participant commented on CN's analysis of 19th century non-Indigenous archaeological materials.

Panel Conclusions and Recommendations

In reaching its conclusions on the effects of the Project on archaeological resources the Panel considered the following factors to be particularly relevant:

- Indigenous peoples have lived on the land where CN proposes to build the Project for many thousands of years as evidenced by their knowledge and the artifacts discovered during archaeological site investigations.
- Following protocols established by Ontario Ministry of Tourism, Culture and Sport and aided by monitors from the Huron-Wendat Nation, Six Nations and the Mississaugas of the Credit First Nation, CN carried out controlled salvage excavations at ten Aboriginal and three 19th century sites.
- CN would develop an archaeological resources protection plan to address any chance finds during construction, with a special process to respectfully address the discovery of any human remains. CN committed to involve First Nations monitors during construction.
- The Huron-Wendat Nation had identified the possibility that ossuaries may be located on the site at depths that mean they would not have been discovered during the archaeological assessment to date. CN concurred.
- Protection of archaeological resources in situ is the preference of the Huron-Wendat and the Mississaugas. However carefully carried out, excavation would involve a negative effect.
- There have been countless instances of damage to Indigenous archaeological resources in southern Ontario over hundreds of years with no consultation, acknowledgement, participation or compensation.
- The Panel was told that CN had established a respectful and constructive relationship with First Nations partners.
- Ontario Ministry of Tourism, Culture and Sport also told the Panel that other developments in the Regional Assessment Area would be required to use the provincial four-stage process to protect archaeological resources.

The Panel did not hear evidence that Project effects on the three 19th century sites would be adverse. The Panel assumes that excavation and preservation of non-Indigenous resources is generally not considered to be adverse.

The Panel recognizes the dilemma that development of any type requiring disturbance of the ground in this part of Ontario may well involve the discovery of Indigenous archaeological resources, and that excavation, however carefully and respectfully carried out, would represent a loss for Indigenous groups. The Panel recognizes that excavation has already occurred as part of the provincial four-stage process.

However, the Panel believes that CN has worked diligently to build a very different relationship with respect to this Project. CN had consulted and collaborated with the potentially affected Indigenous

groups and there appears to be a high degree of acceptance for the Project providing Indigenous monitors remain involved throughout the construction phase and all appropriate mitigation is carried out. The Panel agrees that CN's commitments to ensure the involvement of Indigenous monitors, worker awareness training and procedures in the event of new archaeological discoveries would reduce Project-related effects on archaeological resources.

In order to protect potential Huron-Wendat Nation ossuaries that could have been missed during the archaeological work, the Panel concludes that, in the event that an ossuary is discovered, it must remain permanently undisturbed unless an agreement is reached with the Huron-Wendat Nation to take an alternative action. Were an ossuary to be disturbed without reaching an agreement with the Huron-Wendat Nation, it would constitute a significant adverse environmental effect (See Section 12.1 Indigenous Matters).

The Panel agrees with the Huron-Wendat Nation that, where possible and appropriate, artifacts should be returned to the Indigenous groups, for study and display within the community.

The Panel believes that if all of these mitigation measures were implemented, the effects of the Project to the archaeological resource would be reduced to an adverse effect of low magnitude.

CEAA Recommendation 11.15 — CN should implement the mitigation it has committed to undertake for archaeology

The Panel finds that CN's commitments to implement mitigation measures for archaeology are necessary to avoiding a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- Conduct controlled salvage excavations (Stage 4) in accordance with industry standards, as confirmed by Ministry of Tourism, Culture and Sport.
- Avoid disturbance of Archaeological and Heritage Resources wherever practicable. Avoidance options would also require the installation of a protective barrier around the site and a buffer zone. If avoidance and protection of archaeological resources is not feasible then controlled salvage excavations of the archaeological resources, or parts thereof as applicable, will be implemented.
- Implement an Archaeological Resources Protection Plan (EIS subsection 6.5.6.9.2, page 260), which will include worker awareness training regarding basic artifact identification and required next steps.
- Cease all construction within a 20-metre radius of the archaeological resource if an archaeological resource is discovered during the construction phase. In the event of a discovery, CN will stop work immediately and inform the Ministry of Tourism, Culture and Sport prior to the implementation of procedures and mitigation. A licensed archaeologist will be retained by CN and a stage 2 Archaeological Assessment will be conducted with the participation of any interested Aboriginal communities.
- Cease all construction around the area immediately in the event any human remains encountered during construction and will treat those remains with respect; the police or coroner, Registrar or Deputy Registrar of the Cemeteries Regulations Section of the Ontario Ministry of Government and Consumer Services, and the Archaeology Programs Unit will be contacted. Work will not resume until they have cleared the site.

- Implement a worker education program about appropriate protocols in case of accidental discoveries.
- Train key construction staff in the recognition of basic archaeological artifacts such as Aboriginal material culture, including clay ceramics, lithic artifacts, and faunal remains, and Euro-Canadian material culture such as refined ceramics, glassware, construction debris, and personal effects.

CEAA Recommendation 11.16 — Additional mitigation to reduce effects on archaeological resources

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effects on archaeological resources. Therefore, the Panel recommends that CN by:

- leaving any ossuary, in the event that one is discovered, permanently undisturbed unless an agreement is reached with the Huron-Wendat Nation to take an alternative action;
- entering into discussions with the relevant First Nations to determine how artifacts that have already been excavated may be safely returned to communities for best use as defined by those communities, including study, display, or other culturally appropriate actions. CN should provide financial resources to support the process;
- developing and implementing a protocol, in consultation with the relevant First Nations and the Ontario Ministry of Tourism, Culture and Sport to manage chance archaeological finds that may occur during excavation and construction; and
- ensuring agreed mitigation measures are established and shared with relevant First Nations and the Ontario Ministry of Tourism, Culture and Sport through creation and implementation of an Archaeological Resources Protection Plan.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to have a significant adverse environmental effect on archaeological resources.

The Panel understands that excavation of artifacts, however carefully and respectfully done, still represents a loss for Indigenous groups; however, the Panel concludes that CN's effective engagement with Indigenous groups, including agreements regarding field monitors, access to artifacts and ongoing consultation will mitigate the loss.

Cumulative Effects

The Panel understands that cumulative effects have already been experienced by Indigenous groups through the indiscriminate development of their traditional lands without consultation. The Panel heard from Indigenous groups that they were not consulted or involved in mitigation of the effects on archaeological resources of past projects in the region. The Panel is of the opinion that Ontario Ministry of Tourism, Culture and Sport's four-stage process to protect archaeological resources may in the future effectively mitigate effects on archaeological resources when relevant Indigenous groups are involved. The Panel believes that the lack of involvement of Indigenous groups in archaeological assessment for past projects has resulted in a lost opportunity for mitigation and has caused significant adverse environmental effects on archaeological resources of significance to Indigenous groups (See Section 12.1 Indigenous Matters for more on this). However the Indigenous groups who appeared before the Panel indicated that they were generally satisfied with the consultation and mitigation measures proposed by

CN and did not tell the Panel that the Project effects, together with the effects of past, present and future projects, would cause the cumulative effect on physical heritage to be unacceptable to them.

The Panel concludes that the Project, in combination with other projects that have been or will be carried out, would not result in a significant adverse cumulative effect on archaeological resources.

The Panel understands that excavation of artifacts, however carefully and respectfully done, still represents a loss for Indigenous groups; however, the Panel concludes that CN's effective engagement with Indigenous groups, including agreements regarding field monitors, access to artifacts and ongoing consultation will mitigate the loss. The Panel considers that there would be no residual effect on archaeological resources.

12. Aboriginal and Treaty Rights and Indigenous Communities

This section addresses the potential environmental effects of the Project on Indigenous communities, as well as information the Panel heard with respect to the possible impacts of the Project on potential or established Aboriginal or Treaty rights. The Panel considers, with respect to Aboriginal peoples, the current use of lands and resources for traditional purposes to be an environmental effect under subsection 5(1)(c) of the *Canadian Environmental Assessment Act, 2012*. Section 3 of the Review Panel Terms of Reference requires it to take into account the environmental effects of the Project.

Section 4.2 of the Review Panel Terms of Reference requires the Panel to accept as part of its record of proceedings information presented regarding potential or established Aboriginal or Treaty rights. The Panel did not have a mandate to make any conclusions or recommendations with respect to rights.

For discussion on the environmental effects of changes to archaeology on Indigenous peoples, see Section 11.3.

12.1. Indigenous Matters

The Panel must take into account the environmental effects listed under 5(1)(c) of the *Canadian Environmental Assessment Act, 2012* and subsection 3.1.a of its Terms of Reference. The *Canadian Environmental Assessment Act, 2012* requires the Panel to address whether the Project would cause changes to the environment that would in turn affect the current use of lands and resources for traditional purposes by Aboriginal peoples; health and socio-economic conditions; physical and cultural heritage and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance. Health and socio-economic conditions are discussed in Sections 11.2 and 11.1, respectively. Physical and cultural heritage is discussed in subsection 11.3.1. Archaeology is discussed in subsection 11.3.2 and archaeology as it relates to Aboriginal peoples is discussed in this section.

Additionally, the Panel is required, under subsection 4.2.b of its Terms of Reference, to accept as part of its record of proceedings information about any potential effects or alterations to access into areas used by Indigenous peoples for traditional purposes; any potential effects on the ability of future generations to pursue traditional activities or lifestyle or to transmit their traditional knowledge; and any potential effects on heritage and archaeological resources.

The Canadian Environmental Assessment Agency identified the Mississaugas of the Credit First Nation, the Six Nations of the Grand River, the Huron-Wendat Nation, and the Métis Nation of Ontario as the Indigenous groups that would likely have an interest in the Project or could be affected by the Project.

CN consulted with these Indigenous groups and reported that the Mississaugas of the Credit First Nation were interested in the Project generally on issues of environment, archaeology, potential business opportunities, and employment; the Six Nations of the Grand River were interested in participating in the archaeology component and matters related to their reserve, such as tree planting, procurement opportunities, and employment; and the Huron-Wendat expressed interest in archaeology, procurement, and contracting opportunities. The Métis Nation of Ontario did not express a specific interest in the Project, but CN provided them with information and continued to engage with them throughout the process.

CN analysed how changes to the environment caused by the Project would affect Indigenous peoples regarding current use of land and resources for traditional purposes, effects on human health, effects on socio-economic conditions, and effects on physical and cultural heritage, and structures, sites or things of historical, archaeological, paleontological or architectural significance. No current use of land and resources for traditional purposes by Indigenous peoples was identified near the Project. CN considered other potential effects that relevant to issues raised by Indigenous communities in their assessments of potential effects on fish and fish habitat, migratory birds, species at risk, human health, socio-economic conditions, and archaeological and heritage resources.

12.1.1. Huron-Wendat

The Huron-Wendat Nation is a First Nation that now inhabits the area of Wendake, Quebec. It is composed of almost 4,000 members, with approximately 2,000 members living in Wendake. From time immemorial, the Huron-Wendat Nation occupied and used a vast territory in southern Ontario and Quebec. The Huron-Wendat Nation's traditional lands in Ontario, called Wendake South, border the Great Lakes and span from Lake Nipissing in the north to Lake Ontario in the south, and from Owen Sound in the west to the Quebec border in the east. Historically, these lands were occupied by more than 30,000 members of the Huron-Wendat Nation, and the imprints of these lives and the Nation's culture, traditions and heritage are found across this territory. To date, over 800 archaeological sites associated with the Huron-Wendat Nation have been documented in Wendake South, and the number of sites grows every year. The site of the proposed Milton Logistics Hub is within Wendake South. The Huron-Wendat Nation indicated that their interest in the Project was primarily related to their archaeological sites, discussed in subsection 11.3.2, and not the current use of lands and resources for traditional purposes.

Rights

The Huron-Wendat Nation is a signatory to the Anglo Huron treaty with the Crown concluded in 1760. This treaty has been recognized by the Supreme Court of Canada (see *R. v Sioui*, [1990] 1SCR 1025). This treaty recognizes and protects the Huron-Wendat Nation's cultural and spiritual practices and grants Huron Wendat members the freedom to practice their religious customs and trade with the British.

The Huron-Wendat Nation also has inherent rights protected by Section 35 of the *Constitution Act, 1982*. These rights include, but are not limited to, the right to the integrity of the Nation's archaeological and burial sites.

The Huron-Wendat Nation stated that the Crown in right of Canada and Ontario has a duty to consult and accommodate the Huron-Wendat Nation when there is a possibility that the Nation's right to the integrity of its archaeological and burial sites may be impacted. The Huron-Wendat Nation stated that the duty reflects the need to avoid the impairment of asserted or recognized rights caused by the implementation of a specific project.

The Huron-Wendat Nation's Council adopted a resolution on June 15, 2015 describing the inherent rights of the Nation in Ontario and Nation's sacred obligation to protect its archaeological and burial sites in Ontario, which they also stated is a protected right under Section 35 of the Constitution. The resolution states and recognizes that only the Huron-Wendat Nation is able to assume this responsibility, and further states that all necessary measures must be taken to ensure the respect and the protection of Huron-Wendat cultural and archaeological sites. The Huron-Wendat Nation has a duty to ensure the respect of this resolution.

The Huron-Wendat Nation's beliefs and spiritual practices, including the Feast of the Dead and the belief that people have at least two souls, one of which remains with a person's buried remains even after the Feast of the Dead, have been well-documented, including by European sources from the time of contact. These sources also contain observations of the importance of non-disturbance of burials to the Huron-Wendat Nation. These sources confirm in a written, European format the practices and beliefs that the Huron-Wendat Nation know have been integral to their society and culture since time long past.

The Project is located in the Huron-Wendat Nation's traditional territory and it would occupy 160 hectares (400 acres) of land surrounding an existing mainline railway in Milton. The Huron-Wendat Nation indicated that the Project components, including doubling the existing mainline, new railyard tracks, and container and truck movements, have the potential to affect Huron-Wendat Nation archaeological and burial sites.

As a result of the Huron-Wendat Nation's right to the integrity of its archaeological and burial sites, and the potential for this to be impacted by the Milton Hub Project, the Huron-Wendat Nation have been involved in the Project review for several years, and worked closely with CN to identify and protect their interests in the Project area. This included having Huron-Wendat Nation monitors present at the Milton Project site for stage 3 and 4 archaeological work. As part of building a respectful bilateral relationship, CN and the Huron-Wendat Nation have come to an agreement outlining the parties' obligations and responsibilities in relation to the Project.

The Huron-Wendat Nation did not object to the carrying out of the Project, but indicated that their support would be contingent on certain conditions relating to the protection of their rights and interests being included, should the Project be approved. The Huron-Wendat Nation expects that economic opportunities associated with the Project will be made available to them as these can help address the Project's cumulative impact on the Huron-Wendat Nation's cultural heritage.

The Huron-Wendat Nation stated that the continued protection and recognition of its rights and interests would require ongoing consultation and accommodation, and identified mitigation measures necessary to address the Project's effects on archaeology and burial sites. The Huron-Wendat recommended measures to mitigate Project impacts to its right to the integrity of its archaeological and burial sites, including avoiding impacts on archaeological and heritage resources, continued presence and funding of a Huron-Wendat Nation monitor on site during construction, ongoing consultation and reporting regarding the Project, and economic opportunities to mitigate impacts on the Huron-Wendat Nation's cultural heritage.

The Huron-Wendat indicated that they were most concerned with cultural and archaeological heritage and they would be satisfied to let other First Nations conduct monitoring during Project operation. The Huron-Wendat mentioned that one way to mitigate effects on archaeology would be to return artifacts that have been removed and give them back to First Nations.

CN indicated that it would be open to discussing the proper return of archaeological heritage. CN committed to working with the Huron-Wendat and other Indigenous groups during construction to ensure that issues related to ossuaries are meaningfully and respectfully addressed.

CN anticipated that First Nation communities would be involved in monitoring during construction of archaeological matters. CN would continue to engage on all environmental matters related to the Project including water sampling. CN indicated that follow-up and monitoring programs developed for emissions related to air quality, acoustic environment and surface water would apply to help manage Project effects on land and resource use.

CN indicated that candidates from the Huron-Wendat would be made aware of and encouraged to apply for available employment opportunities. CN indicated that it has agreements with the Huron-Wendat Nation that considers contracting opportunities.

12.1.2. Mississaugas of the Credit First Nation

Mississaugas of the Credit (Band No. 120) is a Mississauga Nation, part of the larger Anishinaabe (Ojibwa) Nation, and one of seven Nations affiliated with the Association of Iroquois and Allied Indians. Mississaugas of the New Credit has one reserve: New Credit 40a (2,392 hectares), located 16 kilometres south east of Brantford Ontario, near Hagersville, Ontario.

The Mississaugas of the Credit First Nation stated that they are the descendants of the River Credit Mississaugas. At the public hearing, Mississaugas of the Credit First Nation stated that their territory spans from Long Point on Lake Erie to the Niagara River, along the Niagara River to Lake Ontario, northward along the shore of the lake to the River Rouge east of Toronto, then up the river to the headwater of the River Thames and then southward back to Long Point. The Mississaugas of the Credit First Nation stated that their territory encompasses about four million acres.

Rights

The Mississaugas of the Credit First Nation are signatories of multiple treaties in southern Ontario, including Treaty 13, the Toronto Purchase in 1787, Treaty 13-A, known as the First Purchase (Heritage Mississauga) in 1805, Treaty 19 in 1818, and Treaty 22 and 23 in 1820. The Mississaugas of the Credit

First Nation indicated that they possess, assert and exercise constitutionally protected Aboriginal and treaty rights over the lands, waters and resources within its territory, and stated that they have a duty to protect the integrity of the territory. The Mississaugas of the Credit First Nation stated that they have occupied their territory since time immemorial and have a stewardship responsibility to protect the lands and resources within their territory. They have not surrendered their Aboriginal title to the waters within their territory as their treaties only dealt with lands. The Mississaugas of the Credit First Nation currently have legal claims related to these waters.

The Mississaugas of the Credit First Nation stated that community members were not consulted prior to much of the urban development that has taken place in their treaty lands and adversely affected their land and resources. The Mississaugas of the Credit First Nation indicated that intense development in their territory has contributed to significant environmental degradation, which has severely impacted the ability of the Mississaugas of the Credit First Nation members to exercise their Aboriginal and treaty rights.

The Mississaugas of the Credit First Nation indicated that its obligation to protect the integrity of their territory includes protecting archaeological resources such as cultural materials and human burials. The Mississaugas of the Credit First Nation noted that the United Nations Declaration on the Rights of Indigenous Peoples provides for the rights of Indigenous peoples to maintain, protect and develop the past, present and future manifestations of their cultures such as archaeological and historical sites and artifacts. The Mississaugas of the Credit First Nation stated that it also recognizes the rights of Indigenous peoples to the use and control of their ceremonial objects and the right to the repatriation of their human remains. Additional discussion on archaeology can be found in subsection 11.3.2.

Current Use of lands and resources for traditional purposes

CN predicted that the Project could result in potential changes to plant species and plant harvesting sites and activities; fish species and fishing areas and activities; cultural or spiritual practices, sites or areas, including archaeology; and, hunting and trapping practices.

The Mississaugas of the Credit First Nation stated that they have relied on, and continue to rely on their lands, waters and ecosystems for a variety of livelihood, harvesting, ceremonial and spiritual purposes. The Mississaugas of the Credit First Nation conducted a traditional land and resource use study and provided a summary to the Panel. The summary contained information from interviews with 14 Mississaugas of the Credit First Nation members conducted between August 2015 and March 2016. Through the study, participants mapped 61 locations of land use, including 30 fishing locations, 21 hunting locations, and ten plant harvesting locations. The Mississaugas of the Credit First Nation indicated that the Project would not interact or overlap with any of these locations.

The Mississaugas of the Credit First Nation indicated that members practice fishing for consumptive, traditional and recreational purposes on reserve lands, throughout their Treaty Territory, and outside of their Treaty Territory. Members actively hunt on the Mississaugas of the Credit First Nation reserve lands and on public lands within and outside the Mississaugas of the Credit First Nation Treaty Territory. The Mississaugas of the Credit First Nation stated that wetlands are of great cultural importance to the Nation due to ongoing and current land use by members as well as their contribution to activities such

as fishing, plant gathering, medicine gathering, and hunting. The Mississaugas of the Credit First Nation stressed the importance of wetlands at the headwaters of Bronte Creek and Sixteen Mile Creek.

The Mississaugas of the Credit First Nation indicated that members harvest plants for food, medicinal and cultural purposes within their traditional territory, including gathering cedar near Bronte Creek. Members also use Bronte Creek for fishing including harvesting lake salmon and trout in the spring and fall and gathering roe from spawning salmon to use as fishing bait. Bronte Creek is also a spiritual area used to commemorate the passing of a deceased relative.

The Mississaugas of the Credit First Nation participants highlighted the importance of cultural identity and cultural transmission. The Mississaugas of the Credit First Nation identified the Project and the relationship between CN and the Nation as an opportunity for CN to support the Nation's ability to access more areas for land and resource use activities to ensure that cultural identity and transmission to members, especially youth, can continue for generations.

The Mississaugas of the Credit First Nation noted that an absence of land use on or overlapping with the Project site does not indicate a lack of importance, value or concern regarding the environment of the Project site. The Mississaugas of the Credit First Nation use and occupancy of the lands and waters of their Territory have become isolated over time through the legacy of colonization, but the Nation remains committed to their relationship with Mother Earth and to being stewards of the environment of their Territory.

The Mississaugas of the Credit First Nation participants expressed concerns regarding accidents and malfunctions that could occur, including spills from train derailments into Indian Creek.

The Mississaugas of the Credit First Nation practice harvesting activities on the reserve and throughout Treaty Territory, despite the heavily industrialized and agricultural nature of the land within the territory. The Mississaugas of the Credit First Nation indicated that their traditional land and resource use activities have been affected over time due to a diminished land base and limited access to private and public land for hunting, fishing, and gathering. Where these activities are possible, the area is shared with other users.

The Mississaugas of the Credit First Nation indicated that intense development within its territory has significantly impacted the extent to which the Nation can exercise Aboriginal and Treaty Rights within their territory, including hunting, fishing, trapping, and gathering plants for food, social and ceremonial purposes. The Mississaugas of the Credit First Nation stated that due to the magnitude of the Project, there would be cumulative effects, and mitigation measures may need to be considered and implemented.

The Mississaugas of the Credit First Nation indicated that, due to existing impacts from intense historical and current development within Mississaugas of the Credit First Nation territory, and the potential for cumulative impacts to Mississaugas of the Credit First Nation rights and resources from the Project, it would be critical that the Nation be aware of what is occurring within its territory throughout the life of the Project. The Mississaugas of the Credit First Nation requested to be directly involved with monitoring when fieldwork occurs and to review any draft monitoring plans in order to have adequate time to receive technical advice. The Mississaugas of the Credit First Nation requested that CN provide

biannual written updates with details of upcoming monitoring and a report of monitoring results from the previous six months. The monitoring should include noise, air quality, fish and fish habitat, surface water quality and quantity, stormwater effluent, and species at risk.

The Mississaugas of the Credit First Nation recommended that CN fund a spiritual ceremony on the CN site, commit to a reciprocal relationship built on educational exchange with the Mississaugas of the Credit First Nation community, and fund a community harvest with a youth education component. In addition, CN should provide information about the Project to Mississaugas of the Credit First Nation community members, involve Mississaugas of the Credit First Nation in the Indian Creek mitigation planning, provide Mississaugas of the Credit First Nation with information regarding topography, water quality and quantity, current land use and other watercourse information, and should provide employment opportunities to the Mississaugas of the Credit First Nation for the lifetime of the Project.

Mississaugas of the Credit First Nation participants indicated that they would like to see more public lands opened up to the Nation for traditional land and resource use activities, such as hunting.

CN stated that First Nation communities would be involved in monitoring for the presence archaeological sites during the construction phase, and that CN would continue to engage on all environmental matters related to the Project including water sampling.

CN indicated that mitigation measures and follow-up programs identified for fish and fish habitat, migratory birds, and species at risk would address potential effects on the species and locations identified by the Mississaugas of the Credit First Nation. Follow-up and monitoring programs developed for emissions related to air quality, acoustic environment and surface water would also be applied to help manage Project effects on land and resource use.

CN indicated that candidates from the Mississaugas of the Credit First Nation would be made aware of and encouraged to apply for available employment opportunities, and that CN has an agreement with the Nation regarding contracting opportunities.

12.1.3. Six Nations of the Grand River

The Six Nations of the Grand River (Six Nations) have a registered population of over 28,000 people with 13,000 of those living on Six Nations territory. Six Nations territory is mainly located between Brantford and Caledonia along the Grand River. The Six Nations indicated that there were an estimated 60 to 80 million Indigenous people in North America, including members of the Six Nations. The population was devastated by European diseases, and 60–80% of the Six Nations population was killed.

The Six Nations stated that they once had all of the Haldimand Proclamation lands, but over the years, they have been dispossessed of those lands. Only three quarters of the land was surveyed and transferred because a new governor decided that it was never intended for the Six Nations to receive all of the lands along the Grand River from its source to its mouth. Six Nations indicated that by 1845, the lands were reduced to 46,000 acres.

Rights

The Six Nations is a signatory of the Nanfan Treaty and Jay Treaty. They stated that the Nanfan Treaty or Fort Albany Treaty of 1701 guarantees their right to hunt and have economic interests in those lands. The Nanfan Treaty Area includes a portion of southern Ontario where members presently enjoy hunting and fishing rights.

The Six Nations indicated that the Project is proposed on lands within their Treaty lands which are subject to litigations against Canada and Ontario. Six Nations has claims against Canada and Ontario in a Court action that started in 1995 for the unlawful taking of their lands and money. CN stated that none of Six Nations claims are related to lands in the vicinity of the Project. The Six Nations indicated that their use of the land has been limited because the hunting and fishing and trapping and trade that were promised in Treaties have been nearly eliminated through years and years of development.

The Six Nations noted that they have been working with CN on a Memorandum of Understanding, and that they wanted to be involved with air quality monitoring around the area.

CN anticipates that First Nation communities would be involved in monitoring during construction of archaeological matters. CN would continue to engage on all environmental matters related to the Project including water sampling. Follow-up and monitoring programs developed for emissions related to air quality, acoustic environment and surface water will be applied to help manage Project effects on land and resource use.

CN indicated that the Six Nations of the Grand River participated in CN's archaeological program, which included approximately 200 days of fieldwork.

CN indicated that candidates from Six Nations would be made aware of and encouraged to apply for available employment opportunities. CN indicated that it has an agreement with Six Nations that considers contracting opportunities.

12.2. Panel Conclusions, Observations and Recommendations

The Panel's Terms of Reference make it clear that the Panel does not have a mandate to make conclusions or recommendations regarding the validity or strength of Aboriginal or Treaty rights, or regarding the Crown's duty to consult. The Panel is, however, empowered to make conclusions on the significance of environmental effects under subsection 5(1)(c) of the *Canadian Environmental Assessment Act, 2012*, and recommendations with respect to avoiding or mitigating environmental effects that might adversely affect potential or established Aboriginal or Treaty rights.

The Panel found that the health and socio-economic conditions of the Mississaugas of the New Credit First Nation, the Six Nations of the Grand River, and the Huron-Wendat Nation were not likely to be adversely affected by the Project, as those groups were located sufficiently far away from the Project to avoid the changes to air, noise and aquatic environments (see Sections 5–7 of this report).

The Panel does note that changes to the terrestrial environment could affect items of archaeological significance to those groups (see subsection 11.3.2), and that the current use of lands and resources outside the Project area might be affected by Project activities.

In reaching its conclusions on the effects of the Project on the current use of lands and resources for traditional purposes by Aboriginal peoples the Panel considered the following factors to be particularly relevant:

- The Mississaugas of the Credit First Nation, the Huron-Wendat Nation and the Six Nations of the Grand River all provided information regarding the extent of their treaty lands and the length of time they have occupied them.
- The Mississaugas of the Credit First Nation and the Huron-Wendat Nation both emphasized the crucial importance of protecting archaeological resources, particularly given the widespread destruction of these resources in southern Ontario to date, without consent, consultation or accommodation.
- Both the Mississaugas of the Credit First Nation and the Huron-Wendat Nation had participated in the archaeological site investigations, but indicated that if a site is excavated, even though artifacts may be catalogued and preserved, this disturbance and removal still constitutes an adverse impact to Aboriginal rights.
- The Panel has reached conclusions and made recommendations regarding the protection of archaeological resources and the involvement of Indigenous communities in subsection 11.3.2.
- The Mississaugas of the Credit First Nation have identified the importance of protecting wetlands, streams and rivers, and other areas in the Bronte Creek watershed where they harvest plants and animals for food, medicinal and cultural purposes. While these areas are downstream from the Project Development Area, they receive flows and materials from upstream reaches, underlining the importance of avoiding adverse effects on surface water quantity and quality leaving the site. Additional discussion on the effects of the Project on surface water flows and wetlands can be found in Section 7.
- CN has been working to develop respectful and appropriate relationships with the First Nations in the area. It has reached an agreement with the Huron-Wendat Nation, and are in consultation with the Six Nations of the Grand River and the Mississaugas of the Credit First Nation.
- The main effects of the Project with respect to Aboriginal and Treaty rights would be the potential interference with and removal of archaeological resources, continued loss of access to treaty lands and waters for hunting and cultural purposes, and any environmental damage caused to habitats and waterways.
- Suggested recommendations included measures to address ongoing consultation, provision of information about the Project, First Nations' involvement in monitoring activities, support for cultural activities, and provision of economic opportunities through employment and contracting.
- The Panel observes that CN has clearly worked closely and respectfully with Indigenous communities to build lasting relationships and provide a variety of partnership and engagement opportunities.

The Panel acknowledges that the excavation of archaeological sites and removal of artifacts on the Project Development Area by CN, as required under provincial policy, has already caused an adverse effect on archaeological resources from the perspective of the Indigenous peoples on whose Treaty lands the Project is proposed. The Panel has made recommendations regarding the ongoing involvement of First Nations monitors, the protection of any ossuaries that may be located in the future, and the appropriate return of archaeological and cultural items to Indigenous communities in subsection 11.3.2. Panel is satisfied that, in combination with the agreements CN is seeking with the Indigenous

groups, the recommended mitigation measures will be sufficient to mitigate the environmental effects of the Project to sites and items of archaeological significance to these groups.

With respect to the protection of the Bronte Creek watershed downstream of the Project Development Area, the Panel believes that the recommendations it has made to mitigate adverse effects on surface water, air quality and habitat connectivity, if properly carried out, should ensure that the Project will not contribute to a deterioration of environmental quality in this area. As a result, the Project is not likely to affect the current use of lands and resources for traditional purposes by members of the Mississaugas of the Credit First Nation who use that area.

The Panel recognizes that the Project's development of this portion of Treaty lands would negatively affect the ability of Indigenous peoples to freely access the land to hunt, fish, and gather plants for food, medicinal or ceremonial purposes. Furthermore, the development of the Project would continue a lengthy process over hundreds of years whereby lands in this area of southern Ontario have been converted to residential, commercial, industrial or transportation purposes. The Panel was advised by the Mississaugas of the Credit First Nation that in most cases this conversion of land has been done without consultation and without consent.

The Panel acknowledges that CN has actively sought to engage with the Indigenous communities likely to be affected by the Project. If the Project were to proceed, effects on access could not be directly avoided or mitigated given the presence of a large intermodal terminal, and that measures to control and limit access on the lands would preclude access as well as other uses such as hunting, gathering or fishing. The Panel therefore recognizes that the appropriate response is for CN to provide other opportunities that can help strengthen the land base, the economies and cultural capacity of the affected Indigenous groups. Each Indigenous group would wish to identify which opportunities they prefer and therefore the Panel believes that CN's approach of reaching separate agreements with each group is appropriate.

CEAA Recommendation 12.1 — CN should implement the mitigation it has committed to undertake for current use of lands and resources for traditional purposes

The Panel finds that CN's commitments to implement mitigation measures for archaeological resources, identified in Section 11.3.2, are necessary to avoiding a significant adverse environmental effect. The Panel has considered CN's commitments and recommends that CN provide Indigenous communities with regular updates on activities and progress of the Project.

CEAA Recommendation 12.2 — Additional mitigation to protect the current use of lands and resources for traditional purposes

The Panel considers that an additional mitigation measure beyond CN's commitments is necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- engage with affected Indigenous groups to develop agreements that consider and mitigate the loss of access, for traditional purposes, to Treaty lands affected by the development and operation of the Project. These could include some or all of the following issues:
 - ongoing provision of information about the Project to the community;
 - involvement by community members in environmental monitoring activities and reporting of monitoring results to the community;

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

- specific measures to address the protection of archaeological resources not covered by Recommendation 11.16;
- support for environmental protection activities on other lands, including wetlands of importance that may be affected by the Project;
- support for cultural activities; and
- access to employment and contracting opportunities.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to have a significant adverse effect on the current use of lands and resources for traditional purposes of the Huron-Wendat Nation.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to have a significant adverse effect on the current use of lands and resources for traditional purposes of the Mississaugas of the Credit First Nation.

The Panel concludes that if the recommended mitigation is carried out, the Project is not likely to have a significant adverse effect on the current use of lands and resources for traditional purposes of the Six Nations of the Grand River.

Cumulative Effects

The Panel concludes that CN's excavation of archaeological resources, although carried out in accordance with Ontario's legislated approach with participation by Indigenous monitors, represents a residual environmental effect on archaeology. The Panel did not receive information that identified to which Indigenous group these resources belonged, and therefore cannot be more specific as to whose Aboriginal rights have been affected.

The Panel heard that ongoing land acquisition and development in this area of southern Ontario over hundreds of years have already caused significant adverse cumulative environmental effects that would affect the ability of each of the Indigenous groups that appeared before the Panel to exercise their respective Aboriginal rights. The Panel is nevertheless persuaded that, if CN carries out the recommended mitigation in this section and Section 11.3 (Cultural Heritage and Archaeology) the Project would not exacerbate the existing significant adverse cumulative environmental effect in any meaningful way.

Part 5 – Other Matters

13. Accidents and Malfunctions

This section addresses the potential environmental effects of malfunctions or accidents, that may occur in connection with the Project, which is a factor to be considered as per subsection 19(1)(a) of the *Canadian Environmental Assessment Act, 2012* and found in Section 3 of the Review Panel Terms of Reference. The EIS Guidelines, at subsection 6.6.1, directed CN to conduct an analysis of the risks of accidents and malfunctions, determine their effects and present preliminary emergency measures.

13.1. CN's views

Throughout the environmental assessment CN identified six potential accidents and malfunctions scenarios as part of its effects assessment. These were:

- hazardous materials spill (including fuel oil, glycol, lubricants and hydraulic fluid) on land or water;
- intermodal container spill on land, including within the terminal and along roads between the Project and 400-series highways;
- traffic accidents in relation to the entry points of the terminal;
- derailment or train accident within the terminal;
- accidental fire within the terminal; and
- potential multiple incidents occurring simultaneously.

CN stated that it had addressed worst-case situation with its analysis of the effects for each scenario. For example, CN found that the worst-case scenario from a traffic accident would be a traffic accident involving the public at the entry/exit gate, while the worst case for a derailment would be a locomotive derailment that accidentally punctures the fuel tank, resulting in a spill of diesel fuel. These worst case scenarios are described in more detail in the subsections below.

CN indicated that only 2.7% of containers moving through the intermodal site would be expected to carry dangerous goods and these goods would primarily include consumer products such as household cleaning supplies, batteries, automotive parts, or paints. The terminal would not handle dangerous goods in bulk and in the cases where dangerous goods would move through the site, the containers would be placarded and handled in accordance with the *Transportation of Dangerous Goods Act*. CN has stated that the majority of goods moving through the site would not be dangerous goods and would instead be classified as general household items such as furniture, clothing, food products and electronics.

13.1.1. Summary of CN's accidents and malfunctions scenarios

Hazardous material spill — including fuel, oil, glycol, lubricant and hydraulic fluid or ignition of spilled fuel

CN stated that the worst case hazardous material spill scenario would occur as a result of a spill from on-site vehicle use.

CN determined that the potential sources of a hazardous material discharge on site could include fuel, oil, glycol, lubricants or hydraulic fluid. These discharges could occur as a result of abnormal operation due to extreme weather events, equipment failure, work procedure changes or human error. Many of

these liquids are readily flammable or explosive and could pose a threat to the environment through uncontrolled release, resulting in contamination of soil, water, vegetation, riparian habitat, groundwater, wetland, wildlife and wildlife habitat, and human health. Further damage could also result to soils and vegetation during clean-up or remediation of spills.

CN found that these types of spills are more likely to occur during construction based on the number of equipment, vehicles and workers present on the site, but they would be small in volume, localized and reasonably easy to clean up. The likelihood of a large spill is low as large volumes of these materials would not be stored or moved on-site.

CN identified specific spill prevention and mitigation measures, including emergency response plans for the construction and operation phases, spill response kits, the stormwater management system, including shut-off valves in the stormwater management ponds, and separation distances between the container storage area and natural areas.

CN has committed to having a Hazardous Materials Action Plan and an Emergency Response Plan in place during construction and operation. These plans would include the location of spill equipment on site, and methods to prevent containerized material spills from spreading and for recovering the materials in the water. The plans would also identify any sensitive habitats to best direct response efforts. In addition to a Spill Response and Contingency Plan, CN listed mitigation measures or Project design features to minimize the potential effects from a hazardous material spill, including several measures also intended for erosion control; see Section 7.1. CN's proposed mitigation measures include:

- establishing and clearly identifying a riparian buffer;
- restricting disturbance around realignment, restoration and naturalization;
- installing erosion and sediment control at appropriate locations;
- restricting grubbing, stripping and grading;
- delaying grading of the primary banks of watercourses and water bodies;
- all construction and operation equipment will be properly maintained and free of fluid leaks;
- spill containment will be in place, as appropriate;
- designated refueling areas (30-metre setback minimum distance from top of bank) from fish habitat and ignition sources;
- inspection and maintenance of equipment to avoid potential malfunctions, and regular maintenance of infrastructure as per Transport Canada requirements;
- construction management plans including hazardous materials storage and handling procedures;
- equip the stormwater management system with oil grit separators and shut off valves at outlets;
- storage of hazardous materials restricted to designated areas with proper containment;
- safe and proper handling and storage of hazardous materials, and implementation of spill contingency procedures, will follow CN standards in place; and
- spill response kits.

CN indicated that the Project design measures will reduce the likelihood of a spill occurring and Contingency Plan(s) will help to reduce the spill volume and extent, should a spill occur. CN does not expect that a spill would result in subsequent ignition or fire. Monitoring and follow-up activities would take place to return the environment to its previous state. CN stated that implementing a Spill Response

Plan usually involves engaging a contractor specializing in spills on-site as soon as possible. CN indicated that its staff would provide support as required, and would follow steps in the response plan to properly contain and limit the effects of the spill until professionals can respond. CN stated that typical employee training relates to stopping leaks, eliminating the sources of fires, evacuation, containment of spills, prevention of seepage, protocols for advising supervisors, and site clean-up.

In its effects assessment, CN found that the magnitude of potential effects from hazardous spills is expected to be low because of the limited quantity of fuel that is likely to be released; CN did not estimate the magnitude of potential effects from spills of other kinds of hazardous materials. CN stated that with the implementation of mitigation, response, and clean-up measures, the volume of spilled materials is expected to be minimal and contained to the immediate site of the spill. Any potential spill events are expected to be short term in duration and could occur sporadically at irregular intervals.

CN identified four valued components that could be affected by potential interactions with a spill of hazardous material: fish and fish habitat; migratory birds; human health, and other socio-economic conditions.

CN stated that deleterious substances with the potential for introduction during construction activities include sediment and hydrocarbons (via spills from construction equipment). A spill of such materials might result in a wide range of biological and ecological effects, including direct mortality to fish or other aquatic biota; reduced productivity of the fishery; or persistent and progressive accumulation of hydrocarbons in sediments or biological tissues, which could in turn impair health, vigour or productive capacity. Hazardous material spills resulting from construction activities, including equipment fueling or faulty components, could lead to direct or indirect mortality of birds through contamination of water, soil, or food resources. Many chemicals could be directly absorbed by animals through dermal contact with contaminated soils or water or ingested by way of contaminated prey, soil, or water.

CN predicted that during construction, effects on wildlife (migratory birds or species at risk) would be limited to equipment or vehicle fires or ignition of a spilled hazardous material.

During construction, CN stated that land and vegetation clearing would occur outside of restricted activity periods for migratory birds and species at risk, limiting interactions between wildlife and construction activities. Any fire suppression chemicals would be cleaned immediately following such an incident, limiting the opportunity for wildlife to contact or ingest such materials. As noted previously, CN stated that the design of the stormwater management system and emergency response procedures would prevent migration of spilled contaminants off-site to areas where wildlife habitat may be present. CN stated that, by implementing its Environmental Protection Plan, the residual effects of a spill to wildlife would be limited within the Project Development Area, magnitude would be negligible, duration would be limited, and effects would only occur as a sporadic irregular event. CN therefore concluded that the residual environmental effect of a spill on wildlife would not be significant.

CN indicated that hazardous materials spills can also affect public health and safety if they occur in the immediate vicinity of the public or if the spilled material comes into contact with environmental resources used by the public.

Finally, CN found that hazardous materials spills could also have the potential to lower the interpretive value of archaeological and heritage resources.

CN concluded that after prevention and mitigation measures, the environmental effects on fish and fish habitat, migratory birds, human health and archaeological and heritage resources resulting from spill, including deleterious materials such as sediment and hazardous materials, would not be significant.

Intermodal container spill on land

CN concluded that the worst case scenario for an intermodal container spill on land would be a spill of containerized material that results in a release of a hazardous material that has the potential to affect public health and safety.

According to CN, an intermodal container spill on land could include a container overturning during transportation to or from the yard, due to the potential malfunction of reach stackers, or as the result of a trucking accident causing release of all or part of its load. As noted previously, containers are likely to carry mainly household goods such as food, household appliances, furniture and cleaning products, with only 2.7% of containers carrying dangerous goods. The release of goods from a container is highly unlikely and therefore a release of a dangerous material would be rare. Furthermore, goods within containers would usually be in small packages (intended for household use) and not carried in bulk. CN concluded that in the unlikely event of an intermodal container spill, the release would be localized and of minimal volume.

CN has listed the following mitigation measures as means to deal with an intermodal container spill on land:

- regular maintenance of all transfer equipment (reach stackers, rail transfer equipment) to avoid potential equipment malfunction;
- proper construction and maintenance of access roads and establishment of speed limits;
- emergency response equipment on-site to limit the consequence of intermodal container spills by prompt containment and clean-up actions; and
- intermodal containers properly handled within the terminal.

CN would initiate an emergency response for a spill of intermodal container by:

- notifying all CN responders as required in the CN Emergency Response Plan Activation of spill handling procedures including assessing feasibility of containment and clean-up based on environmental terrain and conditions; and
- performing reporting and disposal procedures.

Furthermore, CN listed the following prevention and mitigation measures:

- ensuring containerized goods are well braced and blocked to prevent shifting or movement;
- working jointly with shippers on bracing/blocking techniques;
- performing regular inspection and maintenance of containers;
- Emergency Response Plan, spill kits, training and 24/7 oversight; and
- stormwater management including shut-off valves.

In the case of an intermodal container spill on land, CN indicated that fish and fish habitat, migratory birds and species at risk are the valued components most likely to be affected. For instance, an intermodal container spill could result from container loading, unloading and transferring activities,

including from faulty equipment components. Land-based vehicle accidents could result in the release of intermodal containers into the adjacent water environment and could result in contamination of water, causing an effect on fish habitat, migratory birds and species at risk, depending on whether floating material is carried into shallow sections of the watercourse and the type of material spilled. Factors such as the nature of the substance, location of the accident, timing of the accident, such as during peak migration, and environmental conditions, such as large rain events, would affect the extent of the effects.

Based on CN's experience with other similar terminal projects, CN found that the probability of intermodal container spills is low and as a result, it is likely that the effects of intermodal container spills to fish and fish habitat, migratory birds and species at risk would not be significant. CN also predicted that the magnitude of a residual effect on public health and safety resulting from a traffic accident could range from low to high, depending on the severity of the accident and whether serious injury or damage to property occurs.

In response to the Panel's information requests, CN noted that the anticipated pathway of effects due to a spill occurring from a container while it is transiting by truck between the Project entrance/exit and a 400-series highway would be similar to those assessed for a container spill within the terminal for the Project. CN noted that a potential additional effect would be the temporary disruption of public infrastructure.

CN stated that local emergency responders would manage environmental effects from a container spill outside of the Project and along regional arterial roads, in the same way as for other accidents on public roadways. CN noted that cleanup of any resulting spill would be the responsibility of the owner or operator of the trucks involved. Through implementation of such measures, it is anticipated that potential effects of a spill of containerized goods would be mitigated.

As part of a safety assessment of terminal-generated truck traffic, CN stated that the additional truck traffic generated by the Project would result in an annual expected net collision increase on all truck routes of approximately 1.87 collisions, which is within the yearly fluctuations in collision frequency currently experienced at any single major intersection in the study area. CN specified that that number considered all of the terminal-generated truck traffic, and not only those carrying dangerous goods. The probability of a collision involving trucks transporting dangerous goods would be further reduced given that only 2.7% of containers are expected to be carrying dangerous goods.

Traffic accidents at the entry point to the terminal

CN concluded that the worst case scenario for a traffic accident would be a traffic accident located at a terminal entrance involving the public.

CN stated that the public access to the terminal and CN right of way is restricted and, as a result, there will be limited interaction between the Project and the public; however, the potential for traffic accidents between vehicles and equipment entering and exiting the terminal site exists.

Project construction and operation activities may affect safety for road users, including motor vehicle operators, cyclists and pedestrians, at one or two entrances to the terminal by generating increased

vehicle volumes entering and exiting the Project Development Area. CN nevertheless found that the likelihood of an accident involving trucks at the entrance would be low.

CN listed the following mitigation measures in order to minimize the potential for traffic accidents at the entrance to the terminal:

- proper construction and maintenance of access roads and observation and enforcement of speed limits for all roads;
- following national and international engineering codes and standards, including the American Railway Engineering and Maintenance-of-Way Association (AREMA) manual;
- building a new two-lane private roadway in the Project Development Area to accommodate truck queuing entirely on CN property;
- collaboration with Halton Region to install a signalized intersection, as necessary, on Britannia Road with a turning lane for trucks entering the terminal from the east to manage vehicle movements and the safety of other road users, including motor vehicle operators, cyclists and pedestrians;
- restriction of public access to the terminal and CN right of way; and
- expected implementation of standard traffic safety measures along Britannia Road and Tremaine Road where access to the terminal would be constructed. All traffic along these roads would be expected to conform to the *Highway Traffic Act* of Ontario. CN anticipated that the new *Making Ontario's Roads Safer Act* would also be enforced by local authorities where appropriate to reduce potential accidents. To further reduce the potential interactions between truck traffic entering the terminal, six queuing lanes to accommodate approximately 140 trucks would be built at the terminal gate. This would limit the risk of queuing of traffic on Britannia Road.

CN stated that it would work in cooperation with all contractors and subcontractors in the implementation of mitigation measures. CN's proposed prevention and mitigation measures would include:

- signalized intersection at Britannia Road truck entrance to include turning lanes;
- monitoring arrival and departure of drivers through SpeedGate;
- low speed limits and enforcement of the rules of the road;
- proper design of terminal access points and roadways; and
- an Emergency Response Plan, spill kits, and trained employees.

Although traffic will increase at the entry points to the terminal as a result of the Project, CN found that the residual effect on road safety for road users will be largely managed through Project-specific and standard mitigation, including ongoing communication with local and regional service providers, including emergency services. Therefore, CN expected that the risk of traffic accidents at the entry points to the terminal would not be significant.

Derailment or train accident within the terminal

CN concluded that the worst case scenario for a derailment was an incident causing a locomotive to derail that accidentally punctures the fuel tank of the locomotive, resulting in a spill of diesel fuel.

CN found that there will be no increase in the risk of a derailment with the addition of two trains per day being added to the 25 to 30 trains per day that currently travel on the mainline. The proposed Lower

Base Line underpass would also remove the risk of a vehicle collision during train operation, which decreases the likelihood of derailment. Despite there being no increase in risk of derailments outside the terminal, CN concluded that there could be increased potential for a derailment to occur within the terminal.

CN found that the potential for derailments within the terminal is expected to be minor with limited consequences, because locomotives will be travelling at low speeds, with a maximum of 19 kilometres per hour (15 miles per hour) or less, and typical speeds between eight and 13 kilometres per hour (five to eight miles per hour). If a wheel of a railcar leaves the track, the railcar may need to be adjusted with specific equipment to re-rail the car. Little damage would be expected to occur to either the infrastructure or the rolling stock with a derailment of this nature.

CN indicated that shippers are responsible to ensure that any loads within the containers are properly secured prior to shipment. In the unlikely event of a derailment, the release of containerized goods or hazardous materials could occur, in which case the effects pathways would be the same as described in the other spill scenarios, for example an intermodal container spill. Therefore, CN concluded that there are no other effect pathways associated with the derailment scenario.

CN has committed to the following measures to minimize the potential for a derailment and any associated spills:

- inspection and proper maintenance of track infrastructure and equipment to avoid potential malfunction;
- regular maintenance of infrastructure as per Transport Canada requirements and compliance;
- compliance with Transport Canada Operating Rules, and Transport Canada audits and CN audits;
- observation of speed limits within the terminal (maximum of 15 mph); and
- following national and international engineering codes and standards, including the *Manual for Railway Engineering*.

If a spill occurred due to a derailment, an emergency response protocol would be initiated immediately. Upon completion of a detailed terminal design, a risk assessment will be prepared, as required by Transport Canada, to address the risk of potential incidents, including derailments.

CN listed the following mitigation measures for derailments:

- an Emergency Response Plan, spill kits and trained staff; and
- stormwater management with shut-off valves.

CN found that in the unlikely event of a release of containerized goods or hazardous materials, the potential effects and valued components affected would be the same as those described for a hazardous material spill and spill of a containerized material.

Accidental fire within the terminal

CN concluded that the worst case scenario for accidental fire within the terminal was a crane engine fire, whereby the whole crane is engulfed in flames.

During construction, CN found that there would be the potential for accidents and malfunctions that could result in a fire at the terminal but that such incidents would be limited to an engine fire or ignition

of a hazardous material, such as fuel or hydraulic fluid, from on-site vehicles and equipment, caused for instance by rupture or puncture of a hydraulic line.

During operation, CN stated that accidents and malfunctions that would result in a fire at the terminal are anticipated to be limited to an engine fire (including a crane fire) or ignition of a hydrocarbon spill (as discussed above during construction), or a container fire. CN stated that container fires would likely be limited to those containers that have refrigeration units or heater units and the potential for container fire to spread would be low, based on safeguards for storage and access to stacked containers.

CN indicated that in some cases, minor fires may also occur during routine maintenance activities, such as during regular maintenance activities on machinery or containers, either by CN personnel or contractors.

CN predicted that the risk of an equipment engine fire during construction or operation would be low. Emergency response would be immediate and targeted to prevent fire spread and address leaked materials as necessary.

CN indicated that suppressants used for management of all fire scenarios would have limited opportunity to cause adverse effects on downstream watercourses that contain fish and fish habitat. CN based this conclusion on its proposed construction practices, terminal design, emergency response procedures (including booms and absorbent materials), use of water-based or water-soluble suppressants and use of shutoff valves for the stormwater management system. These measures would independently and together prevent the migration of contaminants off site to areas where fish or fish habitat may be present.

CN's proposed mitigation measures for the prevention of fires include the following:

- regular maintenance and inspection of all transfer equipment, including reach stacker cranes, to avoid potential equipment malfunction;
- inspection of all containers for suitability of shipping and to ensure good, working order, including the heater and refrigeration units;
- safe and proper handling and storage of hazardous materials, and implementation of spill contingency procedures;
- access to all containers within the terminal to be maintained;
- limited container stack heights (three high for loaded containers, four high for empty containers);
- installation of fire suppression tools and equipment for the administration building, reach stacker cranes and fire hydrants located along the terminal; and
- safe distances between ignition sources and areas of high spill potential to be maintained within the terminal.

CN has also conducted joint training sessions with local authorities across Canada. As described in the Orientation Session presentation by CN Police, a joint training exercise was completed in the region of Halton in 2016 to review roles and responsibilities in emergency response, including for fire.

CN would also apply mitigation measures to minimize potential effects, which include the following:

- emergency response protocol to be immediately initiated, including notification of CN responders, as required in the Emergency Response Plan, the implementation of appropriate fire procedures, including the need for evacuation, assessing feasibility of containment and clean-up based on environmental terrain and conditions; and completion of reporting and disposal procedures;
- CN Police to work with emergency responders to address public safety in any areas surrounding the terminal as needed;
- terminal to be equipped with windsocks to determine wind direction and identify potential areas where smoke and airborne contaminants may cause residual effects and used to address public safety;
- design of the terminal such that drainage within the terminal (including workpads and track areas) is conveyed to the stormwater management system;
- application of an absorbent material around the fire to prevent the spread of hydrocarbons as the first line of defence to limit the spread of potential contaminants to the stormwater management system and any surrounding watercourses or vegetation; and
- use of water or water-soluble suppressants for extinguishing fires; all fire extinguishers on-site and used by emergency personnel, such as the fire department, are environmentally friendly and approved for use in the natural environment.

Mitigation measures related to hazardous materials spills would also be applicable and reduce the potential for fires. These mitigation measures are:

- implementation of the Hazardous Materials Action Plan and Emergency Response Plan during construction and operation (including Material Safety Data Sheets); these plans would include the location of spill equipment, methods to prevent containerized material spills from spreading and for recovering the materials in water. The Emergency Response Plan would also identify any sensitive habitats that would need specialized response efforts; and
- implementation of a Spill Response and Contingency Plan.

CN indicated that management procedures to clean up after a fire would be the same manner as for spill management. Responsible parties would implement a spill response plan, which CN stated would usually involve engaging a contractor specializing in managing the fire suppressant/fire residue on-site as soon as possible. CN staff would provide support as required, as well as follow steps in the response plan to properly contain and limit the effects of the fire until spill response professionals can respond.

In CN's view, regardless of the fire source or whether a fire occurred during the construction or operation phase of the Project, the effects of a fire would be the same and would include direct effects on worker and public health and safety and direct and indirect effects on fish and wildlife (including migratory birds and species at risk). Direct or indirect mortality of fish and wildlife could occur through contamination of water, soil, or food resources. CN indicated that effects on wildlife of a fire during operation of the terminal would be limited as the Project Development Area would not have wildlife habitat within which a fire could occur. CN also noted that wildlife will naturally move away from smoke and fire, which would reduce their exposure to smoke or airborne contaminants.

CN found that an accident or malfunction incident resulting in fire could result in release of criteria air contaminants, hazardous air pollutants or greenhouse gases to the atmospheric environment,

potentially reducing air quality in the air quality Local Assessment Area. Such releases would have the potential to affect worker or public health. The extent of such effects would depend on factors such as the nature of the substance that was ignited, amount of the substance, location of the accident, timing of the accident, duration and intensity of fire, and environmental conditions, such as rain events.

Multiple Incidents

CN found that each individual scenario described above generally had a low probability of occurrence, and therefore there would be even lower probability or likelihood of the various scenarios occurring together; in other words, CN considered that their combination was not plausible, and unlikely to occur.

In the unlikely event that multiple scenarios occur at the same time, or in sequence, either separately or one being the cause of another, CN concluded that the effects would be the same as if they were to occur in isolation. CN stated that its responses would be the same because its Emergency Response Plan would allow for appropriate response to any level of emergency. Once initiated, the Emergency Response Plan would be employed accordingly, regardless of whether contaminants were discharged to soil, water or air.

13.1.1. CN's emergency management and response plans

CN emphasized that safety is one of its core values, with the corporate vision of being the safest and most respected railroad in North America. CN characterized its safety management system as mitigating risk through people, process, technology and investment. CN stated that it strives for continuous risk reduction through its robust risk management framework and in the site-specific design, preventative measures, response plans, and mitigation measures proposed for the Project. CN asserted that its existing safety programs, such as safe container loading, compliance with regulations or standards, and safety management systems, combined with a safety culture, are all part of its systematic approach to risk reduction. CN also noted that continuous technical improvements such as infrastructure upgrades and emergency response are important elements in avoiding and managing accidents and malfunctions. For example, as part of CN's collaborative approach to safe container loading, CN's Damage Prevention Officers provide expertise on the development and review of load plans that meet or exceed industry requirements. CN also supports the training of shippers on safe loading practices to reduce mishandling and on-road damage, and CN audits shipments for compliance with safe loading practices.

CN has committed to providing a site-specific Emergency Response Plan framework and procedures for operations to safely and effectively respond to emergencies. CN stated that it also has a Network Operations Emergency Response Plan that is reviewed and updated every two to three years as required. The terminal-specific Emergency Response Plan would be updated in line with the Network Operations Emergency Response Plan or as necessary to reflect regulatory changes, personnel changes or other process changes. CN stated that its Emergency Response Plan would ensure that adequate response equipment is available at key locations. CN proposes to use local emergency responders as appropriate given the type and severity of incident. These resources can include local contractors, vacuum truck operators, environmental consultants, specialized emergency responders, and similar professionals.

CN stated that it currently has the following response plans in place for emergency response and management and that these would be updated as necessary to reflect the Project:

- Hazardous Materials Action Plan (component of Emergency Plan; 2003, Revised August 2008);
- CN Emergency Response Plan (CN 2008); and
- Evacuation Procedures (component of Emergency Preparedness Plan, August 2014).

In summary, CN stated that it will prepare four environmental management plans related to accidents and malfunctions:

- Construction Emergency Response Plan;
- Spill Response and Contingency Plan;
- Hazardous Materials Action Plan; and
- Operational Emergency Response Plan.

CN provided an example of an Emergency Response Plan in response to an information request by the Panel. CN noted that in the event of an emergency, protection of life and health is its first concern. CN stated that it has the authority to evacuate personnel on CN property and may assist in simultaneously notifying nearby businesses and the community; however, it is the decision and responsibility of local authorities, including the police and fire departments, to initiate protective actions, such as evacuations, for the community outside the intermodal terminal or the mainline right-of-way.

13.1.2. Participants' Views

Transport Canada stated that the department has programs related to railway safety, transportation of dangerous goods, and intermodal surface security oversight as well as has regional inspectors responsible for monitoring the compliance of railway companies with the requirements of the *Railway Safety Act*. Transport Canada's railway safety program includes monitoring activities, such as audits and inspections, and follow-ups to complaint handling.

Transport Canada found that CN's proposed mitigation measures were consistent with the requirements in the *Transportation of Dangerous Goods Act* with respect to emergency response. The Transportation of Dangerous Goods Program administers and oversees policies and regulations in a manner intended to harmonize with international standards and provide expertise and emergency response in the event of a release of dangerous goods. The *Transportation of Dangerous Goods Regulations* establish safety requirements, which include classification, documentation, packaging, safety marks, training, emergency response assistance plans, and incident reporting. Transport Canada's regional inspectors also monitor compliance with the *Transportation of Dangerous Goods Regulations*.

Transport Canada stated at the hearing that, in the last five years, there were 20 Transportation Safety Board reportable incidents at Brampton intermodal, with 17 of those being derailments. Of those derailments, one involved dangerous goods, and that incident did not result in dangerous goods releases or injuries. Transport Canada also provided additional data, as part of Undertaking #10, on railway transport occurrences at the Brampton and Vaughan Intermodal terminal. The data indicated that at those two facilities, over a ten-year period, there was a combined total of 14 incidents reported that involved dangerous goods. Transport Canada agreed with CN that, because of the low speeds of the railway cars in the terminal, the consequences of derailments are likely to be relatively minor.

Halton Municipalities stated that there is potential for significant adverse environmental effects related to human safety from derailments, intermodal transfer mishaps, spills/release of hazardous material and fire on the Project site. Halton Municipalities suggested that there would be residual effects due to accidents and malfunctions because the measures proposed by CN are not all federally enforceable nor entirely effective to mitigate potential effects on all aspects of human safety.

Halton Municipalities felt that all of the scenarios CN considered have serious consequences for human safety, since most can result in serious injuries and fatalities. In their view, the residual effects of potential accidents and malfunctions would be of high magnitude; may affect large geographic areas, including off-site; and the duration of effects on human safety could be permanent, because of ongoing terminal operations, and because injuries and fatalities cannot be reversed.

Halton Municipalities stated that CN treated all human safety effects as unlikely accidents, but an increased rate of operations is always directly or exponentially proportional to the frequency of occurrences of human safety effects. Specifically, Halton Municipalities estimated the number and frequency of potential accidental events that could likely occur over 40 years of Project operation, concluding that the multiple irregular events at the site could include ten derailments; 87 dangerous goods accidents, three of them potentially causing fatalities; and 57 on-site and 17 off-site fires. Halton Municipalities also indicated that CN had not provided a cumulative environmental effects assessment on safety. CN responded that Halton had based its estimates on the operation of the entire railway industry, and not intermodal terminals alone. CN also stated that Halton Municipalities had assumed that all reportable accidents are serious, while many reportable incidents may result in minimal or no consequences.

Halton Municipalities observed that the mitigation measures proposed by CN may be partially effective at reducing risk. However, Halton Municipalities stated that CN did not consider the principal mitigation for human safety effects from derailments used in modern land use controls, which is to maintain adequate risk-based separation distances between the risk source and the designated land use.

Halton Municipalities also found that CN did not specify a minimum separation distance between containers and the property line or buildings. They recommended that a separation distance of at least six metres be imposed between the storage of containers with flammable/combustible liquids and a property line or building, in order to mitigate potential effects of a fire.

Halton Municipalities recommended that, to mitigate the potential effects of derailments and hazardous materials spills/release, CN should secure grade separations of railways and arterial roads where warranted; undertake monitoring and necessary actions to improve the safety of the movement of dangerous goods by rail; and ensure, where possible, that compatible uses are located adjacent or in proximity to railway corridors and terminal facilities, including railway yards and intermodal terminals.

Halton Municipalities stated that CN's plans are too generic and not Project-specific. In order to mitigate the potential effects from derailments, intermodal transfer mishaps and spills or releases of dangerous goods, Halton Municipalities recommended that transportation of dangerous goods through the Project Development Area be restricted unless there is an Emergency Response Assistance Plan in place. They also recommended a Fire Preparedness Plan, a Fire Hazard Reduction Plan and regular maintenance of

fire suppression equipment to ensure that it is in good working order. During the hearing, Milton Residents Affected by Intermodal Lines referred to a 2013 news article that identified over 1,800 derailments that had occurred over a six-year period, including 44 mainline track derailments that were not reported to the Transportation Safety Board of Canada. Milton Residents Affected by Intermodal Lines, given its understanding that 80% of derailments occur in railway yards, questioned what specific measures would be taken to monitor derailments and ensure public safety and environmental protection.

CN responded by noting that the article reflected a difference in interpretation between CN and the Transportation Safety Board of Canada with respect to minor accident reporting by CN between 2001 and 2006. CN stated that at the time, railways had discretion to determine whether a minor accident should be reported, and the Transportation Safety Board of Canada had taken the position that some of the minor accidents that CN determined did not meet the reporting criteria, should have been reported. CN stated that the matter was resolved in 2006, when CN and the Transportation Safety Board agreed on an interpretation that would be used going forward.

13.2. Panel Conclusions and Recommendations

In reaching its conclusions on the environmental effects of potential accidents and malfunctions at the Project, the Panel considered the following factors to be particularly relevant:

- CN predicted that 2.7% of the containers that transit through the terminal would contain dangerous goods. The entire contents of these containers would not necessarily be classified as dangerous goods.
- CN indicated that most of the dangerous goods moving through or transferred at the terminal would be household goods that are routinely transported in containers by truck or by train. Most would be finished products in small packages, such as household cleaning products.
- The operation of the Project would not involve the handling or transfer of dangerous commodities in bulk.
- Any containers containing dangerous goods must be placarded and handled in accordance with the *Transportation of Dangerous Goods Act* and regulations.
- Trains approaching and within the terminal would operate at low speeds.
- All trains must comply with Transport Canada Operating Rules, subject to the ongoing regulatory oversight of Transport Canada.
- Transport Canada submitted that there were 14 reported incidents involving dangerous goods at the two existing intermodal yards in Ontario between 2009 and 2019. Transport Canada reported that there were no injuries or environmental damage from these incidents.

As noted in Section 11.2 (Socio-Economic Effects), the Panel does not consider that the provincial 1,000-metre zone of influence around a Class III industrial project means that significant or even adverse effect would inevitably result within the zone, should an accident occur. However, the Panel agrees with Halton Municipalities that there is a need for caution in siting container storage near buildings or adjacent lands, if those containers are likely to contain dangerous goods. While the Panel understands CN's argument that the separation zones suggested by Halton Municipalities are more pertinent to a heavy industrial facility rather than a transportation facility, the Panel concludes that separation distance should be based on caution. Storage of dangerous goods, including those used by CN itself as part of regular equipment and infrastructure maintenance, should be separated from sensitive habitats,

residences, and other sensitive uses by multiple barriers, not just distance. CN has specified some preventive measures to this end, but the Panel concludes that additional measures may be necessary, such as concrete containment berms around fuel handling areas and storing containers with flammable or combustible materials a minimum of six metres from buildings or the property line.

The Panel concludes, based on evidence presented by Transport Canada, that CN has appropriately identified and assessed potential accidents and malfunctions associated with the Project and has described preventive, mitigation and emergency response measures that will form part of the Project design and plans to minimize the environmental risks of accidents and malfunctions. The Panel concludes the environmental effects on human health and the environment would likely be minor in the event of more common types of accidents.

The Panel concludes that an effective communication strategy will be essential for CN's management of accidents and malfunctions. The Panel has recommended that CN establish its proposed Community Liaison Group (see Section 15) before construction begins, and work with that group to understand and resolve their concerns about potential accidents and malfunctions. In the Panel's view, it is not enough for CN to communicate with the community following an incident. Communication between CN and the community must be proactive, ongoing, and meaningful, if trust is to be built.

The Panel recognizes that even a small release of certain dangerous goods, caused by a derailment, could have serious consequences for human health, wildlife, fish, or fish habitat. However, the Panel finds that a major derailment resulting in a significant adverse environmental effect on human health or the environment would be unlikely because trains would be travelling at very low speeds through the terminal on level terrain. Furthermore, only small quantities of dangerous goods would pass through the terminal. In the unlikely event that a dangerous good was released, the Panel concludes that the effects on human health and the environment could be further mitigated through the implementation of multiple barriers to prevent the substance leaving the immediate area, as well as with the effective implementation of communication with appropriate response agencies and the community.

CEAA Recommendation 13.1 — CN should implement the mitigation it has committed to undertake for accidents and malfunctions

The Panel finds that CN's commitments to implement mitigation measures for accidents and malfunctions are necessary to avoiding a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- develop and implement the following Emergency Response Plans:
 - Construction Emergency Response Plan – to establish an organizational structure and procedures for response to emergency during construction;
 - Spill Response and Contingency Plan – to outline the procedures, processes and management practices to handle and respond to spills;
 - Hazardous Materials Action Plan – to identify specific measures to address the risks and responses to a potential spill of a hazardous material; and
 - Operational Emergency Response Plan – to establish an organization structure and procedures for response to emergencies during operation.

- identify location of spill equipment on-site, methods to prevent containerized material spills from spreading and for recovering the materials in the water as well as identify any sensitive habitats to best direct response efforts;
- restrict the storage of hazardous materials to designated areas with proper containment and in accordance with appropriate safety procedures and requirements;
- audit shipments for compliance with safe loading practices; and
- use its authority, when necessary, to evacuate the personnel from CN property, and assist in simultaneously notifying nearby businesses and the community, recognizing that it is the decision and responsibility of local authorities, including police and fire departments, to initiate protective action, such as evacuations, for the community outside the facility or mainline right of way.

CEAA Recommendation 13.2 — Additional mitigation for potential accidents and malfunctions

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN further reduce the potential environmental effects of accidents and malfunctions by:

- ensuring that spill prevention measures and mechanisms incorporate multiple barriers, including physical barriers such as concrete berms, to contain the movement of dangerous chemicals over the land surface and prevent entry into watercourses, in consultation with Transport Canada, emergency response professionals, and others as appropriate;
- locating storage areas for containers with combustible or flammable materials a minimum of six metres away from the property line or buildings;
- regularly updating emergency response plans to align with the Network Operations Emergency Response Plan, or in response to regulatory changes, personnel changes or other process changes;
- ensuring that any relevant emergency response plans include provisions for fire preparedness and fire hazard reduction;
- working closely with local authorities to develop and implement CN's Emergency Response Plans, including evacuation and emergency communication procedures and staff training, in order to properly coordinate protective actions; and
- working closely with the Community Liaison Group to update the community on any known or emerging issues, or where the effects of an accidents and malfunctions may be felt outside the Project Development Area.

The Panel concludes that if the recommended mitigation measures are carried out, the Project is not likely to result in significant adverse environmental effects as a result of accidents and malfunctions.

The Panel finds that, while the consequences of a small release of dangerous goods have the potential to be high magnitude, this type of high-magnitude event would be unlikely to occur, given the slow speeds at which trains and other vehicles would move within the terminal and the relatively small quantities of dangerous goods involved. The Panel finds that the likelihood of fire within the terminal is low and any such fire would be quickly suppressed, and the potential for traffic accidents at the entry point of the terminal would be successfully mitigated through Project-specific and standard measures, including on-going communication with local and regional service providers.

14. Effects of the Environment on the Project

This section addresses the potential effects of the environment on the Project, which is a factor to be considered as per subsection 19(1)(h) of the *Canadian Environmental Assessment Act, 2012* and found in Section 3 of the Review Panel Terms of Reference. The EIS Guidelines, at subsection 6.6.2, directed CN to take into account how local conditions and natural hazards could adversely affect the Project and how this in turn could result in effects on the environment. Section 3 of the Review Panel Terms of Reference requires it to take into account any change to the Project that may be caused by the environment.

CN's Views

CN considered how the Project could be affected by local environmental conditions and natural hazards including extreme weather conditions such as winds, extreme temperatures, severe precipitation, ice storms, tornadoes and lightning; climate change and its potential effects on future average and extreme climate conditions; and regional geotechnical and geophysical hazards, including ground instability, erosion and earthquakes.

CN's assessment of effects of the environment on the Project included discussion of potential Project interactions and details regarding planning, design and construction strategies for reducing the likelihood of potential effects on the Project, thereby also reducing the likelihood of any potential environmental effects.

Existing conditions

CN reported that the Project is within the Mixedwood Plains Ecozone, which is characterized by cool winters and warm summers, and subject to highly variable weather. The region is within a significant North American Storm Belt; southern cities within this region receive considerable amounts of snow. Based on data from Hamilton, Toronto and Georgetown, extreme cold temperatures can exceed -33°C and extreme hot temperatures can exceed +37°C. Extreme daily precipitation historically occurs between July and October, with extreme daily ranges between 80.8 millimetres and 121.8 millimetres between 1981 and 2010. Maximum wind gust observations ranged from 124 kph at Toronto to 133 kph at Hamilton.

CN stated that southwestern Ontario experiences some of the highest lightning flash densities in Canada, and Ontario experiences up to 20 short-lived severe thunderstorms per year.

CN indicated that over the next 100 years, Canada will likely experience warmer temperatures, greater frequency of storm events, increased storm intensity, and increased flooding. CN stated that, due to climate change, annual precipitation in southern Ontario is expected to decline by 10%, while extreme weather events would increase in rainfall intensity and frequency, and winter storms would become less frequent. Southern Ontario could experience 10% fewer freezing rain events during November, April and May by 2050 and 15% fewer during those months by 2080. Freezing rain events could increase by 40% during December, January, and February by 2050 and 45% by 2080.

Potential effects of the environment on the Project

CN indicated that the Project could be affected by extreme weather and climate conditions.

CN conducted its climate change assessment through a review of Ontario climate change literature, climate change scenarios recommended by regulators and future climate predictive tools.

CN used the CanESM2 (Canadian Centre for Climate Modelling and Analysis) model and the Representative Concentration Pathway 8.5 scenario to represent a worst case climate change scenario based on input climate data from the Toronto Pearson station. CN acknowledged that uncertainties exist in climate models, but stated that the climatological community generally agrees on the anticipated effects of climate change.

Based on modelling, CN predicted annual precipitation would increase by 4.02% to 4.65%. Winter precipitation was projected to increase by 7.88% to 10.35% while summer precipitation was projected to increase by up to 0.86% or decrease by 1.39%.

CN predicted that increases in 24-hour storm duration could increase precipitation by 28.6%. For stormwater management Ponds 1 and 2, this would equate to an increase in the 100-year flood control volumes for the extended detention scenario to 37,290 and 38,359 m³, respectively. The increased 100-year flood control volumes are greater than the Regional Flood control volumes for stormwater management Ponds 1 and 2 and would have less than 0.25 metres and 0.3 metres of freeboard to the top of the embankment, respectively. CN stated that both stormwater management ponds are designed with sufficient capacity to accommodate projected increases in precipitation for storm events with return period equal to or less than 100 years. For additional discussion on stormwater management, see subsection 7.1.1.

CN stated that during construction, runoff from extreme precipitation events could cause damage to erosion and sediment control measures or shut down Project activities until conditions return to normal. Extreme events could cause unsafe working conditions, which could create work stoppages or delays. This could increase the potential for accidents or malfunctions, including spills, which could affect the environment. For additional discussion on accidents and malfunctions, see Section 13.

During operation, severe thunderstorms may also result in work stoppages and workers taking shelter within buildings; however CN predicted that the existing storm warning systems in place for the area would eliminate effects from the environment.

CN indicated that Project infrastructure could be damaged by tornadoes, lightning or hail. Lightning strikes can result in flashovers, whereby electricity jumps across an air gap to create a conductive path. Flashovers can occur from utility lines (transmission lines) to other metal infrastructure or to the ground and can be potentially life-threatening to people nearby or within the vicinity, and can damage nearby equipment or power lines and cause power outages.

During construction, tornadoes, lightning and precipitation may cause unsafe working conditions, increasing the occurrence of an effect on the environment from an accident or malfunction involving spills. While extreme weather conditions do increase the chance of this occurring, CN stated that it has procedures and policies in place to encourage safe working conditions, including speed limits,

designated driving directions throughout the site, and temporary shutdowns during adverse weather conditions. Spill prevention procedures are also in place at the site and would apply through the construction phase; see Section 13 (Accidents and Malfunctions).

During operation, tornadoes, hail, or wind could cause damage to equipment or temporary disruption to intermodal transport or the movement of trains along the railway line. This could increase safety concerns related to derailment or increase the risks of spills from equipment or containerized goods.

CN stated that the Project is located within Zone 1 of the seven potential seismic zones in Canada (zones are numbered 0 to 6, where seismic hazards increase with each zone from 0 to 6). Based on a search of the National Earthquake Database (Natural Resources Canada 2015), there have been no recorded earthquakes within the Project Development Area, Local Assessment Area or Regional Assessment Area for the Project.

CN indicated that the regional geology and topography does not support the potential for debris flow and debris slides. Sediment stability was assessed locally with instability and potential long-term creep observed in an area of Indian Creek, which would be addressed during construction of the channel realignment. Any other sediment stability concerns at the site would be mitigated through appropriate construction procedures. CN therefore predicted no adverse effects caused by sediment instability.

Mitigation

CN stated that planning is the primary tool for mitigation and the terminal will be designed to resist normal and extreme conditions based on historical records. Project planning, design and operation procedures would consider both normal and extreme physical environmental conditions for the operational setting. Outdoor work would be stopped at the discretion of the Project Manager or Site Supervisor when extreme weather events create unsafe working conditions.

CN stated that climate variability was considered in the design of the stormwater management system and terminal to accommodate increased precipitation and increased frequency and intensity of storm events and flooding, as discussed below.

During operation, extreme weather including precipitation and temperatures would be mitigated through changes to maintenance or inspection schedules, design and facility engineering.

During extreme temperature events, changes to railway operation would occur, including increased track inspection, reduced speeds, and reduced train length. Extreme rain events would result in increased track inspections. Extreme weather events would be monitored on an ongoing basis and notification delivered to field crews. Backup power would be available for communication systems and railway traffic control in the event of power outages. CN indicated that a serious weather event such as a tornado would result in a shutdown of the terminal and train operation.

CN stated that mitigation measures, including regular inspection and maintenance programs by CN and inspections following extreme weather, would identify areas of concern or deficiencies to be addressed. Any noticeable erosion or excess backflow of water during (or following) extreme weather events would result in the implementation of appropriate maintenance or remediation to provide necessary changes on an as needed basis.

CN stated that the potential effects of the environment on the Project would not be significant.

Climate change resiliency

CN stated that it has an emergency management system with response procedures to address extreme weather and climate conditions. CN stated that the effects of climate change were accommodated in the design of the terminal. Potential hazards along Indian Creek would be addressed through channel realignment and restoration using natural channel design, and other sediment stability concerns would be mitigated through appropriate construction procedures.

CN acknowledged that there is a high level of uncertainty associated with rainfall intensity, duration and frequency predictions. CN stated that it has designed the proposed stormwater management system based on a reasonable worst case climate change scenario. This scenario was developed using predicted changes to the intensity, duration and frequency plots for Toronto Pearson International Airport for a 2015 to 2080 timeline, the CanESM2 climate model and a Representative Concentration Pathway of 8.5 where radiative forcing continues past 2100. CN stated that its stormwater management system design incorporated a resiliency approach with respect to accounting for climate change and extreme events, including the following elements:

- consideration of consecutive extreme events in the design of the stormwater management ponds;
- conservative modelling approaches, which CN believes lead to overestimation of the overland flow rate to the stormwater management ponds, creating a factor of safety in the design volume and flow rates. These include not accounting for infiltration from permeable pavers in low-load parking lots; rainwater harvesting; surface storage due to grading; or storage in conveyance swales;
- consideration of extreme events for design storms, such that the stormwater management ponds are designed for detention of a Regional Storm and a 1:100-year, 24-hour event; and
- 0.25 metres of freeboard provided in the stormwater management ponds from the highest water elevation during the regional event to the top of the embankment, corresponding to additional active storage volume available in the stormwater management ponds (14% and 17% increase in storage volume capacity from the regional active storage elevation in Ponds 1 and 2, respectively).

CN stated that its climate change analysis determined that the stormwater management ponds would have sufficient capacity to handle the predicted 28.6% increase in precipitation for the 100-year, 24-hour return period storm event and accommodate what is reasonable to expect from potential climate change and extreme weather events.

CN stated that its channel design approach of inherent resiliency will also account for potential climate change increases in flows and velocities. CN predicted that the Indian Creek realignment would provide approximately 9% more local floodplain storage capacity within the Project Development Area for the regional event than the existing Indian Creek channel, noting that this expanded floodplain storage capacity is predicted to decrease the highest channel velocities for the Regional Storm event compared to the existing condition. The reduced channel velocity would mitigate the potential for channel bed and bank scour and erosion.

CN stated that the Indian Creek realignment has been designed to provide increased local floodplain storage capacity within the Project Development Area of approximately 9% more for the regional event than the existing Indian Creek channel. CN stated that, as a conservative assumption, existing floodwater storage was not taken into account in the floodplain assessment. The existing Indian Creek alignment creates additional floodwater storage where the Indian Creek channel realignment rejoins the existing channel upstream of the Tremaine Road bridge crossing, allowing flood flows to backwater up the existing channel alignment.

CN stated that the channel design approach of inherent resiliency will account for potential climate change increases in flows and velocities.

CN stated that the following design features would also contribute to climate change resiliency:

- The proposed Indian Creek channel realignment would reduce floodline elevations and velocities for the 1:100-year return period storm flows.
- The relatively low slopes of the proposed Tributary A and Indian Creek channel realignments would allow for establishment of grasses and herbaceous vegetation on the channel banks, providing additional stability during potentially increased storm flows.
- The regional flow diversion channel is designed to accommodate flows exceeding the 1:100-year event and up to and including the Regional Storm event.
- The design of culverts 2A and 2B incorporates the potential for additional depth that would increase conveyance capacity;
- The regional flow diversion channel depth also incorporates provision for additional capacity: the depth is designed to a freeboard of 0.3 metres; and the channel top width buffer is designed to 0.3 metres on each side (0.6 metres total).

CN defined a significant adverse environmental effect of the environment on the Project to be one that resulted in damage to the Project infrastructure resulting in harm to Project workers or the public; a substantial effect on the Project schedule delaying ongoing Project activities resulting in a shutdown of terminal operations for 72 hours or more; or, damage to the Project infrastructure resulting in repairs that could not be technically or economically implemented.

CN stated that the potential effects of climate change would be addressed through the design of the terminal. Extreme weather events may result in a disruption to operations, but CN predicted that the frequency of such events would be low and the effects to the Project were considered to be not significant.

CN concluded that the proposed channel realignments have capacity to accommodate what is reasonable to expect from potential climate change and extreme events. CN predicted that Project-related modifications to drainage patterns within the Project Development Area would result in a relatively small localized change to regional flood event elevations in Indian Creek.

Participants' Views

Some participants disagreed with CN's climate change analysis and concluded that CN's stormwater management system and associated infrastructure may not have sufficient capacity to store and convey the Regional Storm in a changing climate; see Section 7.1.

Halton Municipalities challenged CN's assertion that it had conducted a climate change assessment in designing the Project, stating that while it is apparent that a climate change assessment was considered, it is unclear as to how it has been applied in the assessment of the proposed mitigation. Halton Municipalities noted that a typical approach would use climate change data to predict precipitation changes, which would in turn be used as the basis for a stress test of the proposed design. The results of that test would determine whether there is a need for enhanced system resiliency. In Halton Municipalities' view, CN's proposed stormwater strategy does not appear to have considered these potential effects.

Both Halton Municipalities and Conservation Halton expressed concern about CN's hydrologic modelling as a basis for assessment of future flood potential. Halton Municipalities observed that CN applied an event-based methodology for its hydrologic modelling, which involves analysis of a single theoretical event, termed a design storm, to generate peak flows and runoff volume for various recurrence intervals. They stated that this event-based approach does not account for seasonality or other antecedent conditions but rather relies on gross summaries and surrogates that are not well-supported for watershed planning and impact assessments. They noted that the standard methodology used for watershed planning is continuous simulation using historical data. They cited the example of the Town of Milton and Conservation Halton's modelling approach, which has been used since 1998 and incorporates over 40 years of meteorological data for the local area. In Halton Municipalities' view, CN's event-based approach is less robust for projections of water budget, runoff characteristics and flood management.

Conservation Halton expressed similar concern that CN's modelling results are uncertain, and as a result the Project may be susceptible to flooding or may exacerbate flooding upstream or downstream. In their view, it is unlikely that CN's hydrologic model can accurately predict flows, and therefore planned infrastructure, such as culverts, that is based on predicted flows has a high potential to be undersized, leading to an increased risk of flooding. Conservation Halton also stated that Hurricane Hazel is an historical event so there is a need for some buffering in design. Hurricane Hazel is considered to be approximately a 250- to 300-year Storm event, but Conservation Halton stated that it is waiting for direction from the Ontario Ministry of Natural Resources and Forestry as to how climate change should be incorporated in their future work.

No participant disagreed with CN's characterization of seismic potential or the potential for soil creep, debris flow, or debris slide.

Panel Conclusions and Recommendations

In reaching its conclusions on the environmental effects of potential accidents and malfunctions at the Project, the Panel considered the following factors to be particularly relevant:

- A variety of local environmental conditions and natural hazards have the potential to affect the Project. These include unusual weather conditions such as high winds, extreme temperatures, severe precipitation, ice storms, tornadoes and lightning; and regional geotechnical and geophysical hazards, including ground instability, erosion and earthquakes.
- There is considerable uncertainty about the potential effects of climate change on future average and extreme climate conditions. The Province's current regional design standard, the

Regional Storm, is based on Hurricane Hazel (1954), but that standard may need to change with a warming climate.

- No participant disagreed with CN's characterization of seismic potential or the potential for soil creep, debris flow, or debris slide.
- While CN has incorporated climate change in its analysis, it is not clear how those results have been applied in the design of Project infrastructure.

The Panel is satisfied that the risks to the Project of seismic activity, soil creep, debris flow or debris slide are negligible.

As discussed in subsection 7.1.2, the Panel concludes that there is considerable uncertainty about the capacity of the Project, as currently designed, to store and convey the Regional Storm or larger flood events, and therefore to protect against catastrophic flooding both on-site and downstream. The Panel observes that even CN's own rainfall predictions demonstrate this uncertainty, predicting an increase of 4.02% to 4.65% in annual rainfall under climate change, as compared to the Ontario Ministry of Natural Resources and Forestry's predicted 10% decrease.

The Panel emphasizes that the consequences of a design error are potentially very serious and could include structural failure of Project culverts, stormwater ponds, roadways and tracks, and damage to vehicles and locomotives within the Project Development Area.

In light of the uncertainty associated with a changing climate, and the potential for this to cause effects on Project infrastructure, the Panel concludes that it is necessary to proceed with an abundance of caution in the design of water conveyance and storage infrastructure; see Section 7.1.

The Panel concludes that climate change is likely to increase the frequency, intensity and duration of major rainfall events affecting the Project, and that this in turn will increase the risk of damage to Project infrastructure and equipment from associated flooding and erosion.

CN has also stated that freezing rain events could increase by 40% during the winter months by 2050, and by 45% by 2080. The Panel concludes that increased incidence of freezing rain and ice storms also has the potential to increase the risk of damage to Project infrastructure.

The Panel has made a number of recommendations regarding the design of the Project to ensure there is sufficient capacity on site to manage the Regional Storm in order to avoid or minimize a significant adverse environmental effect. The Panel reiterates here that it considers those measures essential to avoid such effects, and to minimize the effects of the environment on the Project. Throughout this report, the Panel has emphasized the importance of adaptive management, and that approach will be especially valuable in adjusting management plans and mitigation measures as climate change proceeds.

CEAA Recommendation 14.1 — CN should implement the mitigation it has committed to undertake for effects of the environment on the Project

The Panel finds that CN's commitments to implement mitigation measures for effects of the environment on the Project, with some modifications from the Panel, are necessary to avoiding a significant adverse effect of the environment on the Project. The Panel has considered CN's commitments and recommends that CN create an Infrastructure Protection Plan which, at a minimum, must contain the following:

- a subscription to a meteorological alert service, ensuring that there is advance warning of flood-producing severe rainfall events. The warning area should be focused on the upstream portion of the Indian Creek Watershed;
- controls to ensure all erosion and sediment control devices are secure and in good working order through regular inspection;
- backfill any open excavations where feasible;
- monitor erosion control measures during rainfall event; and
- provide a post-event inspection and recovery plan. Inspect all erosion control measures, re-establish if damaged, and provide a repair or restoration plan outline.

CEAA Recommendation 14.2 — Additional mitigation to reduce effects of the environment on the Project

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN further reduce the potential for effects of the environment on the Project by:

- Ensuring that CN's Emergency Response Plan includes provisions to safeguard and restore Project infrastructure in the event of an extreme weather event, including catastrophic flooding, an extended freezing rain event or a major ice storm, and for implementation of technically and economically feasible measures to prevent future damage caused by such events.

15. Environmental Management

For the purpose of the environmental assessment, the Panel understands that environmental management is generally considered to include the following:

- measures to mitigate adverse Project effects and enhance beneficial effects;
- monitoring of Project effects and regulatory compliance (including any pre-construction baseline monitoring needed to enable Project effects monitoring);
- follow-up programs to verify the accuracy of predictions and effectiveness of mitigation measures; and
- adaptive management measures to mitigate and monitor unanticipated effects.
- organizational measures to ensure that environmental management is valued highly within the corporate culture and structure, and that effective relationship-building take place.

Throughout this report the Panel has identified mitigation measures to avoid or minimize significant adverse environmental effects. CN has committed to some of these, and the Panel has recommended additional measures it feels are necessary, and technically and economically feasible.

The Panel has also identified the requirements of follow-up programs to verify the conclusions of the environmental assessment and the effectiveness of mitigation measures.

In this section of the report, the Panel attempts to provide a framework in which CN can link the many recommendations within this report with a broader approach to minimizing the Project's effects on the environment, and adaptively managing any unanticipated environmental effects that may arise.

The Panel recognizes that the Project does not have a defined lifespan and could operate for decades into the future. The Panel therefore emphasizes, as CN has done, the importance of adaptive management as Project effects become apparent and mitigation and monitoring programs may require adjustments over time.

Throughout this report, the Panel has made reference to the wealth of expertise of federal regulators such as the Canadian Transportation Agency, Fisheries and Oceans Canada, Environment and Climate Change Canada, and the Canadian Environmental Assessment Agency, and the expertise and place-based knowledge and experience of others such as Halton Region and Conservation Halton. Collaboration with these agencies will allow CN to benefit from specialized knowledge in developing a stronger and more protective suite of mitigation measures, verifying the effectiveness of those measures through follow-up and monitoring programs, and supporting effective adaptive management. Other groups and individuals, especially Indigenous groups, local stakeholders and the broader community also have much to contribute to CN's environmental management plans. The Panel stresses the importance of meaningful and ongoing engagement with these groups, including periodic reporting of monitoring results and adaptive management decisions.

CN has made commitments to a range of mitigation measures, follow-up programs and management plans, but the Panel notes that CN will not finalize the details of many of those activities until the Project is farther advanced in design. While the Panel understands that this may sometimes be necessary, the lack of detail about such important elements of the Project's environmental management systems underscores the importance of effective follow-up and monitoring programs, to confirm the effectiveness of mitigation measures.

An overarching environmental strategy

The Panel believes that robust and effective environmental management and response plans, fully implemented, will be central to CN's ability to mitigate the environmental effects of the Project. At present, CN's environmental management programs are fragmented. Given the wide range of issues raised by regulatory authorities, stakeholder groups and the public, the Panel concludes that there is a need for CN to consolidate its many environmental management activities in an overarching, coherent strategy that is easily understood by others.

Additional Recommendation 15.1 — Environmental management strategy

The Panel recommends that, if the Project is approved, CN should create an overarching, integrated Environmental Management Strategy that provides a framework for planning and delivering its various mitigation measures, follow-up and monitoring programs, and response plans. This strategy should:

- be guided by four key principles: accessibility, transparency, adaptive management and continuous improvement of environmental conditions;
- identify internal governance structures to ensure the strategy is designed in a manner that can be effectively implemented. These governance structures should have, as the central point of responsibility, a senior executive, such as a Vice President, who is responsible and accountable for effective implementation of the strategy;
- clearly describe roles and responsibilities;
- define clear lines for reporting and responsibility to ensure accountability throughout the organization;
- include a commitment to meaningful and ongoing engagement with the community;
- include a commitment to ongoing cooperation and information sharing with regulatory authorities and others with specialized expertise; and

- be incorporated into and consistent with CN's overall corporate environmental management policies.

Adaptive management

The Panel agrees with CN that adaptive management is an ongoing process that allows adjustment of management strategies over time, as knowledge of the managed system gradually improves. It is not a one-time effort, but rather an iterative, long-term process that supports management decision making in the context of environmental uncertainty. In the Panel's view, adaptive management will be an important tool for CN to manage the environmental effects of the Project over its lifetime.

The Project is part of a larger dynamic system, and its activities will affect, and be affected by, the broader landscape. During the public hearing, and in a variety of written submissions, the Panel heard abundant evidence that the population of the region of Halton is growing rapidly, bringing with it growth in industrial and commercial development and vehicular traffic. This growth can be expected to continue well into the foreseeable future, causing changes in regional air and water quality, wildlife, fish and fish habitat, and other environmental components. At the same time, a warming climate is bringing shifts in weather patterns, including the potential for more frequent and more severe storm and flood events. Mitigation measures that once worked well may lose their effectiveness over time in this changing environmental context or may fail entirely if not properly maintained, or they may be superseded by other approaches and technologies better suited to future conditions. Regulatory requirements may also change, both for the ambient environment and with respect to protections for individual species and their habitats. CN will need to manage adaptively to keep pace.

The Panel observes that many of CN's proposed monitoring programs extend through construction but only for a short period into operation, if at all. While the Panel agrees that comprehensive and intensive monitoring is probably not necessary for most environmental effects on an ongoing basis, the Panel concludes that it will be important for CN to conduct confirmatory monitoring on a regular cycle, perhaps every five years, as a basis for its proposed adaptive management. The results of that monitoring should be reviewed with regulatory authorities, those with specialized expertise, and the Community Liaison Group, and used to adjust management approaches for the next adaptive management cycle.

The Panel also notes a point made by several participants, including Health Canada and Conservation Halton, that effective adaptive management requires the development of specific indicators and threshold values that would trigger management action, and an intentional process to review results and adjust management action over time. CN has been vague on these points, possibly because of the early stage of Project development.

The Panel urges CN to take this commitment seriously and work closely with regulators and others to implement a comprehensive suite of adaptive management indicators and management action triggers, and to implement them in an appropriate adaptive management cycle over the life of the Project.

Additional Recommendation 15.2 — Adaptive management

The Panel recommends that, if the Project is approved, CN's adaptive management for Project-specific or cumulative effects should include the following components:

- establishment of a formal adaptive management process that CN would undertake with regulators, including a specified cycle for adaptive management, with an internal oversight group to guide decisions associated with adaptive management;
- clear, measurable indicators linking Project activities to environmental outcomes and objectives described throughout this report, and threshold or reference levels to identify Project effects and indicate where and when adaptive responses would be necessary;
- provisions for interim reporting, review, and adjustment where predictions are uncertain and where predictive errors may have serious consequences;
- annual reporting of monitoring results to regulatory agencies as appropriate, and to the Community Liaison Group; and
- reporting of confirmatory (audit) monitoring and any associated revision of management plans on a longer cycle, perhaps every five years, to ensure continued progress toward environmental goals for the life of the Project.

Community Liaison Group

CN committed to establish a community working group, which throughout this report the Panel has referred to as a Community Liaison Group. CN would work with that group to share monitoring results and hear and resolve concerns. The Panel suggests that the role of such a group in building good community relationships and partnerships would be particularly vital, given that the Panel heard many concerns from community residents and representatives that the Project is not consistent with Milton's vision for its future, and its development under federal rather than provincial and municipal jurisdiction could diminish local oversight and influence.

The Panel heard evidence that residents support the idea of a Community Liaison Group but also that they were uncertain about how the group would work and who would be involved. If the Project is approved, the Panel encourages CN to establish such a group early in the process, ensure that it does indeed reflect a broad range of skills and interests (including those that run counter to CN's own views), and commit to retaining the group over the long term. The Panel notes that a Community Liaison Group that has credibility with the wider community will be more effective for all parties than one that might be stigmatized (fairly or unfairly) as being hand-picked by CN. At the same time, it would be important to establish the principle that all members of the Community Liaison Group would be expected to participate in good faith — in other words, be willing to work on the objectives of minimizing adverse environmental and socio-economic effects and enhancing benefits, rather than trying to undermine the existence of the Project. In the Panel's view, meaningful engagement with the community should be a cornerstone of CN's ongoing environmental management approach.

Additional Recommendation 15.3 — Establish a community liaison group

The Panel recommends that, if the Project is approved, CN establish a Community Liaison Group prior to construction. The purpose of the group would be to provide ongoing information about the Project, its activities and the monitoring of its effects on the community; to identify and discuss issues of concern to the community; and to work toward mutually satisfactory resolution of problems and complaints. This group should:

- identify and discuss potential issues that may arise during construction and initial operation of the terminal;

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

- provide community feedback and advice to CN on relevant issues including Project-specific environmental effects, mitigation, effect monitoring and adaptive management committed to by CN and as recommended by the Panel;
- provide a forum for CN to share monitoring and follow-up program results, in a manner that is accessible to the general public;
- be guided by terms of reference that would be established to identify the purpose, make-up and logistics of the group, such as the frequency and duration of meetings and the roles and responsibilities of the group members;
- have an independent facilitator to run meetings, as well as administrative support to take minutes and circulate information to all committee members;
- through a transparent community-based nomination process, seek representatives with diverse skills and experience drawn from a variety of sectors and backgrounds, including CN representatives, municipal and agency staff, nearby residents, relevant community and business organizations, and any Indigenous groups who wish to participate;
- produce an annual report to the community on its activities;
- meet at least quarterly and operate throughout the construction period and for the first five years of the operating period. At the end of that period, CN and the Community Liaison Group should evaluate the group's role and effectiveness and determine how to proceed in the future; and
- be provided with sufficient resources from CN to conduct its work, including communication with community residents and occasional public forums.

Collaboration with Local and Regional Governments and Agencies

CN's proposed Project is under the jurisdiction of the *Canadian Environmental Assessment Act, 2012*, the Canadian Transportation Agency and other federal regulators. Local and regional disquiet about jurisdictional considerations was a prominent theme during the hearing. The Panel recognizes that CN is a national entity needing to provide service over a national and cross border network. On the other hand, the Panel believes that, from an environmental and related socio-economic perspective, local knowledge, experience and motivation would be beneficial to address the complex challenge of making the Project environmentally sustainable in all senses.

The Panel heard comments and concerns about how best to balance national and local concerns and interests throughout the joint review process, but mostly within a context where local and regional voices were expressing their opposition to the Project, as was indubitably their right. The Panel observes, however, that if the Project proceeds the environment and the community would be best served by CN and the other parties concerned turning their minds to building more collaborative relationships.

During the hearing, one opportunity emerged and is therefore acknowledged here. Conservation Halton played a consistent and constructive role throughout the process in not only critiquing the EIS but in providing practical suggestions related to environmental design and management. Conservation Halton clearly stated that it believed it had regulatory responsibilities with respect to the Project, but when asked by the Panel at the hearing whether it would be willing to work with CN in a non-regulatory capacity, it agreed that it would do so. In turn, when the Panel asked CN if it would be willing to enter into a formal agreement with Conservation Halton, CN said yes, and included a commitment to do so in

its final commitments table, submitted to the Panel at the close of the public hearing. In its closing submission, CN qualified this by saying that such an agreement should not be used as a means to block the Project from proceeding.

The Panel has no illusions that developing and implementing such an agreement would be easy, but nonetheless commends both Conservation Halton and CN on their willingness to contemplate this initiative. The Panel also hopes that it could provide a model or signpost for similar collaborative relationship-building with other parties. The Panel envisions that both the Project and the local and regional environment would benefit from the application of Conservation Halton's place-specific knowledge and experience regarding watershed management, natural systems and wildlife conservation, which would ordinarily be applied through local review and approval processes.

Additional Recommendation 15.4 — Formal agreement between CN and Conservation Halton

The Panel recommends that CN and Conservation Halton enter into a formal agreement to collaborate on pertinent matters relating to environmental design and management for the life of the Project. The purpose of the agreement would be to ensure ongoing dialogue between Conservation Halton and CN to understand and address technical concerns regarding the management of flood and erosion risks, including natural channel designs and stormwater management, particularly during the detailed design stage of the Project.

The Panel recommends that the agreement address communications, and to what degree parties would review and have input on designs, plans, mitigation and analysis of monitoring results. The working of the agreement should be as simple and efficient as possible. Collaboration should work in both directions, with CN sharing information about its Project design plans and mitigation, and Conservation Halton sharing information about activities or developments in the broader watershed area that may affect the Project. The agreement would make it clear that parties participate in good faith and not with the intent of stopping the Project.

Role of the Impact Assessment Agency of Canada

During the course of the Panel's public hearing there was discussion by interested parties regarding the enforceability of mitigation measures under federal legislation. Halton Municipalities took the position that, without viable enforcement, mitigation measures should not be considered when determining significance under the *Canadian Environmental Assessment Act, 2012*. The Panel invited representatives of the Canadian Environmental Assessment Agency to make a presentation at the public hearing, to discuss enforcement of mitigation measures in the context the environmental assessment.

If the Minister's decision statement allows the Project to proceed, the Minister must establish the conditions in relation to the environmental effects, with which CN must comply, and which would be enforced by the Impact Assessment Agency of Canada. As part of its presentation, the Canadian Environmental Assessment Agency indicated that, in almost all circumstances, it coordinates with other federal departments and agencies, as well as other jurisdictions with respect to the enforcement of mitigation measures. For most projects, other federal or provincial, or sometimes municipal level regulators have distinct roles and responsibilities for project regulation. To reduce duplication across various agencies, the Canadian Environmental Assessment Agency stated that it notifies other organizations of planned site inspections or other activities, to identify opportunities to coordinate visits

with those other agencies who may require site inspections under their own jurisdiction. That Agency also investigates to see whether there is the possibility to coordinate the timing or frequency of proponent reporting requirements.

The Canadian Environmental Assessment Agency indicated that, while no authority exists under *Canadian Environmental Assessment Act, 2012* to delegate compliance activities and responsibilities to other parties, the Minister has the authority, under Section 89(1), to designate persons or classes of persons for the purposes of administration and enforcement, including verifying compliance under *Canadian Environmental Assessment Act, 2012*.

The Agency indicated that provincial authorities or other bodies could be so designated by the Minister, as long as those individuals meet the standards that the Agency puts in place for enforcement officers. As an example, the Canadian Environmental Assessment Agency indicated that the Minister had previously designated three people on the Newfoundland and Labrador Offshore Petroleum Board to verify compliance under *Canadian Environmental Assessment Act, 2012* respecting certain offshore projects.

The Panel notes that Conservation Halton and the Town of Milton have specialist local knowledge and understanding of various environmental and socioeconomic systems in and around the Project area. Both are organizations with their own inspection and compliance verification regimes as well. The Panel recognizes that CN has already agreed to work with Conservation Halton to establish a Memorandum of Understanding regarding cooperation. In addition, the Panel recommends that, to the degree possible, and if the Project were to be approved, that the Impact Assessment Agency of Canada coordinate with Conservation Halton, and the Town of Milton to access and benefit from the expertise of those organizations. This coordination would be especially important during the detailed design phase of the Project where the Panel has made recommendations in that regard, but also in supporting the Agency's compliance and enforcement activities through analysis of data, particularly with regard to surface water flows and quality matters, as well as wildlife and habitat matters.

Additional Recommendation 15.5 — Interagency coordination between the Impact Assessment Agency of Canada and Conservation Halton and the Town of Milton or Halton Region, for the purposes of compliance and enforcement.

The Panel recommends that the Impact Assessment Agency of Canada consult with Conservation Halton and the Town of Milton or Halton Region as appropriate to support the Agency's review of Project elements during the detailed design stage, and to interpret relevant monitoring and follow-up program information for the purposes of assessing compliance.

16. Other Important Information to Assist Decision Makers

The Panel's Terms of Reference require the Panel to receive and report on two additional types of information to be used by decision makers:

- information provided by participants with respect to whether any significant adverse environmental effects may be justified in the circumstances; and

- matters that are relevant to Section 98 of the *Canada Transportation Act* regarding requirements for railway operations and services; and the interests of the localities that will be affected by the line.

The Panel, as a whole, is not the decision maker under the *Canadian Environmental Assessment Act, 2012*. The Panel's role is to draw conclusions and make recommendations on the matters within its mandate, but the decisions regarding whether any significant adverse environmental effects may be justified in the circumstances rests with the Governor in Council (federal Cabinet). Member McMurray was appointed by the Chair of the Canadian Transportation Agency for the purpose of making that Agency's determination under Section 98 of the *Canada Transportation Act*. This decision would take place after the environmental assessment decision, should the Minister's decision allow the Project to proceed. Nevertheless, the information provided in this section, together with observations by the Panel, could assist will potentially play an important role in the decision-making process, and reflects the wide range of information provided to the Panel by interested parties.

16.1. Need for the Project

The *Canadian Environmental Assessment Act, 2012* does not require the Panel to address the need for the Project as one of the specific factors to be considered under Sections 19 (1) and 19(2). The Panel was required to address the purpose of the Project and this can be found in Section 4.1. Nevertheless, the Panel heard a substantial volume of information on need which is summarized here, together with some Panel observations, included in case there is a requirement to decide whether any significant adverse environmental effects may be justified in the circumstances.

CN's Views

Insufficient capacity in the Greater Toronto and Hamilton Area

The Greater Toronto and Hamilton Area represents Canada's largest population centre and has been experiencing rapid growth in recent decades. As the population grows, so does the demand for household goods coming in and out of the region. Containers are the primary transportation mode for common household goods and therefore the growth in intermodal volume tends to follow the growth in population centres.

Population growth in the Greater Toronto and Hamilton Area has been particularly rapid in areas surrounding Toronto, particularly toward the west. CN stated that locating an intermodal terminal near customers would reduce truck movements, especially on 400-series highways. Indeed, this was a key reason CN chose to locate the Project in the western Greater Toronto and Hamilton Area.

CN stated that additional inland terminal container capacity was needed in the Greater Toronto and Hamilton Area in part because it is geographically located at a critical junction point between CN's lines going to the east coast, the west coast, and to the Midwest United States.

CN indicated that it currently serves all of its intermodal traffic in the Greater Toronto and Hamilton Area through its Brampton Intermodal Terminal. The Brampton Intermodal Terminal is Canada's largest terminal by volume, handling approximately 1 million containers annually. CN observed that recent expansion projects and productivity initiatives at the Brampton Intermodal Terminal, requiring an investment of more than \$50 million, deferred the immediate requirement for the Milton Logistics Hub

Project. However, CN stated that the Brampton Intermodal Terminal is now approaching capacity, with limited opportunities for significant expansion. CN conducted a land review and confirmed that sufficient suitable land could not be acquired around the Brampton Intermodal Terminal, and that a site for a new terminal, the Project, needed to be found. CN stated that the Project would alleviate pressure and create room at the Brampton Intermodal Terminal to make it more efficient, including reorganizing to increase the overall capacity.

CN indicated that the need for additional capacity in the region would continue to increase along with the population of the Greater Toronto and Hamilton Area, which is expected to grow from 6.6 million to 10 million by 2041. CN estimated that this population and employment growth would double the demand for goods and associated intermodal activities. CN predicted that by 2040, there would be between 1.6 and 1.8 million containers using CN's network in Southern Ontario. After assessing the capacity constraints in the Greater Toronto and Hamilton Area, CN determined that an additional capacity of 450,000 containers per year in Ontario would be sufficient for the foreseeable future.

Necessity for quick container turn around

CN identified its major intermodal customers as including retailers such as grocery stores, Canadian Tire, Lowe's, Walmart, and Amazon. It explained that when goods were moved by rail and stored in warehouses, products used to take over a week to be shipped across Canada. Over time, customer demand changed and CN's customers now ask for a variety of products to be delivered quickly and at low cost, requiring a more flexible, efficient, and reliable supply chain.

CN indicated that it was to their advantage to move containers in and out of the terminal quickly. CN specified that some containers destined for grocery stores, for example, would be transferred directly from a train to a truck because a quick turnaround is needed for products such as fresh produce. Similarly, CN transports goods for e-commerce retailers and shipping companies such as Amazon, UPS, FedEx or Canada Post. These customers demand and expect quick delivery. CN must also meet cut-off times at ports.

In light of these pressures, CN is eager to avoid delays. To ensure efficient container pick up, trains must arrive on time and truck arrival and departure times must be synchronized with train schedules to turn containers around quickly.

Consequences of congestion and delays in intermodal transportation

CN stated that the components of the national supply chain are interconnected, which means that congestion at CN's operation in the Greater Toronto and Hamilton Area would affect the operational efficiency of the entire supply chain. As an example, if containers cannot be received at the Brampton Intermodal Terminal because it is congested, they must stay longer at the port terminals.

CN expects the Project to generate new supply chain efficiencies within Canada, Ontario and the Greater Toronto and Hamilton Area and improve Canada and the Greater Toronto and Hamilton Area's access to key domestic and trans-border markets. The lack of this additional intermodal capacity in the Greater Toronto and Hamilton Area would create a bottleneck that, if not addressed, could slow Canada's supply chain and result in a drag on economic growth.

Participants' Views

Insufficient capacity in the Greater Toronto and Hamilton Area

The Ontario Ministry of Transportation indicated that intermodal transportation has been one of the higher growth areas in the goods movement sector over the last ten years, and is expected to continue with high levels of growth into the future.

Halton Municipalities argued that the Project is not needed until the total number of containers passing through the Greater Toronto and Hamilton Area reaches 1,350,000 containers annually, and that according to CN's projections, a total container capacity of that magnitude does not appear likely to happen before the year 2029.

Halton Municipalities suggested that recent intermodal technologies have the potential to increase capacity at the Brampton Intermodal Terminal, and that if that facility was converted to a full container yard layout using rail-mounted gantry cranes with a high throughput and small footprint, CN could effectively double the intermodal railway terminal practical storage and throughput capacity there.

Hapag-Lloyd noted that currently delays within the Brampton Intermodal Terminal sometimes approach three to four hours or even longer.

Other interested parties including the Toronto Region Board of Trade noted that it is important to look at a long horizon when planning for intermodal projects, because it can take 15–20 years to get an intermodal terminal in place.

Effects of congestion and delays on supply chains and Canada's competitiveness in international markets

Numerous presenters at the public hearing emphasized the importance of a fluid supply chain, including Schneider, Canadian International Freight Forwarders Association, Retail Council of Canada, Canadian Manufacturers and Exporters, Port of Montreal, Vancouver Fraser Port Authority, Port of Halifax, ZIM International and Cosco shipping lines, and the Chambers of Commerce and Boards of Trade.

The Canadian Chamber of Commerce observed that delays at any link in the network affect others in the network. For instance, congestion in Toronto can affect ports such as Prince Rupert, British Columbia. When containers remain longer in a facility such as the Brampton Intermodal Terminal, steamship lines and terminal operators need to manage the flow in and out of their facilities as well, which results in containers staying longer at those ports.

The Brampton Board of Trade drew attention to the interdependency of industrial sectors in the supply chain. As an example, some large manufacturers rely on just-in-time delivery as a critical aspect of their operations, as they may face significant penalties if they fail to deliver on time. Similarly, materials and goods must arrive in a particular sequence at a construction site if a new building is to be completed on time.

J. B. Hunt noted that productivity inside the terminal is key to maximizing the number of containers a trucking company pulls. Consistent service in the terminal is important to ensure that a trucking company can plan efficient use of its drivers, and minimize the percentage of time trucks are not pulling containers.

Panel Observations

The Panel makes the following observations with respect to the need for the Project:

- The Panel believes that CN, port authorities, transport companies and other parties involved in supply chain management made a convincing case that, as long as current rates of growth continue, there is a need for additional intermodal terminal capacity in the Greater Toronto and Hamilton Area.
- The Panel also understands the requirements for smooth and connected logistics management across the entire network.
- The Panel observes that many of the presentations were predicated on a continuing growth scenario involving an expanding population, increased affluence, and increased consumption. This assumption may be called into question by the climate change emergency, and the need to do business and consume differently. This imperative was not reflected in the presentations from CN and other industry organizations.
- The Panel notes that many participants from the Milton area clarified that they were not opposed to intermodal transportation as such, but rather opposed the choice of location for the Project.
- The Panel was not convinced by Halton Municipalities' arguments that the Brampton Intermodal Terminal had sufficient capacity to accommodate foreseeable growth in intermodal trade. The Panel notes that Halton had also expressed concern that the capacity of the Project would soon be exceeded by increased demand (discussed below in Section 16.2 – Ultimate Capacity of the Project).
- The Panel heard from the Toronto Board of Trade that it can take 15–20 years to bring a new intermodal terminal into operation.

16.2. Ultimate Capacity of the Project

In the EIS, CN indicated that the planned capacity of the Project at full operation would handle approximately 450,000 containers per year. The Panel's mandate was to assess the Project as proposed and so the Panel has drawn its conclusions based on CN's Project description. Other participants, particularly Halton Municipalities, questioned whether the figure of 450,000 containers accurately represented what they termed to be the ultimate capacity of the Project. That evidence is summarized here with observations by the Panel.

CN's Views

In response to questions regarding the potential for the Project to expand in the future, CN indicated that the goal for the Project was not to maximize the number of containers in the terminal because this would start to slow down its ability to move goods quickly through the terminal. CN indicated that this was the situation at the Brampton Intermodal Terminal, where operating over capacity had caused delays.

CN stated that it had developed a robust forecast of future demand, which had been independently validated, and the Project had been designed for the expected demand of 450,000 containers per year. The Project, in combination with CN's existing facilities, would have sufficient capacity to accommodate the expected container volumes on CN's network in southern Ontario for the foreseeable future.

CN critiqued the conclusions reached by Halton Municipalities, stating that Halton Municipalities' expert report used inaccurate assumptions about the size of the operational footprints at both the Brampton

Intermodal Terminal and the Project's, and other aspects of intermodal terminal operation. CN also stated that the model used in the report was inadequate and did not use actual CN operation data.

In response to Halton Municipalities' position that CN could double the capacity of the Milton Logistics Hub by using gantry cranes, CN indicated that gantry cranes permit a more condensed footprint because they can stack containers higher than reach stackers. CN argued that gantry cranes are useful in ports where longer container dwell times are expected and where there is a high throughput volume or in terminals with railway operations where there is significant sorting of containers. CN indicated that due to the geographic nature of CN's network, this type of train-to-train sorting is less frequent in their operations and as such gantry cranes are seldom implemented across CN's network. In addition, CN explained that gantry cranes are not preferred in intermodal terminals where there is a major trucking component because it takes longer to retrieve containers when they are stacked higher and deeper. A gantry crane operation would therefore slow flow-through at the terminal, lead to longer wait times, and reduce CN's ability to serve its customers.

CN stated that the Project must consistently operate in a manner that provides a high level of customer service, otherwise customers would use other shipping options. Operating the new terminal beyond the design capacity would have a negative impact on critical customer service metrics, which would undermine the Project's very purpose.

Participants' Views

Halton Municipalities expressed concern that the Project did not reflect the ultimate design capacity. Halton Municipalities stated that the Project could run at a much higher capacity than 450,000 containers a year and suggested the Panel should therefore assess the potential environmental effects of the Project as if it were constructed and operated at that much higher capacity.

Halton Municipalities' expert concluded that the capacity of the terminal as proposed by CN is approximately 461,618 containers, a value similar to CN's peak operational estimate. However, Halton Municipalities suggested that with design enhancements and removal of limiting components, the terminal could be operated at a capacity of nearly 1 million containers per year. Halton Municipalities noted that the Brampton intermodal terminal handles twice as many containers annually compared to the proposed Project, and on fewer hectares.

In its analysis, Halton Municipalities considered the potential for increased throughput if CN made changes to its planned container storage capacity, including increasing the heights of container stacks and stacking empty containers up to five high. Halton Municipalities suggested that there is ample potential acreage to expand the grounded container storage area as well, which would increase the storage capacity of container slots. Other enhancements could include increasing the number of incoming truck lanes at the entrance gate from 10 to 14.

Halton Municipalities noted the difficulty in understanding the ultimate capacity without knowledge of future market demands. They stated that removing some of the identified constraints would involve factors that are typically controlled by the intermodal railway marketplace, based on customer logistical and supply chain requirements, and all beyond the control of CN. Halton Municipalities also suggested that, since CN is a for-profit entity, it would want to optimize the throughput of their investment.

Halton Municipalities assumed that a redesign of the Project would allow for an annual capacity of more than one million containers based on a terminal size of 160 hectares (400 acres). At the public hearing, CN clarified that, although the Project Development Area would be 160 hectares, the operational footprint of the terminal itself would be 59 hectares, not 160 hectares, and Halton Municipalities' expert indicated that he was not aware of the 59 hectare terminal operational footprint. Halton Municipalities later suggested that their model input was based on a 59 hectare footprint. Halton Municipalities' presentation at the public hearing referred to a value of over 160 hectares (400 acres).

Panel Observations

The Panel makes the following observations with respect to the Project's ultimate capacity:

- The Panel found that CN's explanation and justification of the current planned sizing of the Project and the predicted container throughput were reasonable.
- The Panel recognizes the concerns expressed by Halton Municipalities and other participants that the ultimate size of the Project and the environmental effects associated with this could eventually be bigger than currently presented by CN.
- The Panel accepts that this is not CN's stated intent at this time, but notes that the Project does not have a specific lifespan and that any number of factors could change the demand for container movement (either up or down) in the future.
- CN has described how, with current design of the terminal, increasing the throughput of containers would likely decrease operating efficiencies and increase customer dissatisfaction. The Panel finds this argument to be persuasive but suggests that this situation may not be static, as technological and operational advances are made.
- The Panel notes that CN currently owns additional land which it could use to expand the operational footprint of the terminal if warranted by increased market demand.
- CN stated that it would expect that some form of environmental assessment would be required if it proposed to expand the Project, however the Panel did not hear confirmation of this, and notes that, under federal legislative provisions, consideration of Project expansions is limited.
- The Panel presumes that Halton Municipalities' underlying concern is that local and regional government would have no control or influence over future throughput expansion, which would put more trucks on local and regional roads, with associated effects on the environment and residents' quality of life.
- The Panel notes that CN, without making any categorical commitment, suggested that the Project's terminal would operate at its design capacity of 450,000 containers for the foreseeable future. Nevertheless, should demand increase, the Panel acknowledges that three possible future scenarios might apply: an increase in throughput without expanding the operational footprint of the terminal; an increase in throughput including an expansion of the operational footprint of the terminal; or development of new facilities in a different location.

The Panel's conclusions and recommendations throughout this report have been based on an assessment of the environmental effects of the Project as currently defined by CN — that is a project with an annual container throughput of 450,000 containers per year. The Panel has found significant adverse environmental effects relating to existing air quality and human health concerns, which would be exacerbated by the numbers of diesel vehicles operating at and travelling to and from the Project. If

the Project as currently designed were to proceed, and predicted air emission levels were higher than predicted, the Panel has recommended that additional mitigation should be required. This extra mitigation requirement might in part be met by use of Tier 4 equipment, electrification of some or all of the CN Transportation Limited fleet, or effective incentives to promote the use of electric trucks to access the terminal. If the Project were to be expanded in the future, the Panel's expectation is that it would not result in higher air emissions than CN has already predicted. CN would be required to continue to meet, or be below, the original emissions estimates. If the Project were to be expanded in the future, the Panel recommends that CN would still be required to restrict their total air emissions to the level originally predicted in the EIS, upon which the Panel has made its findings. The Panel also believes that CN should also be required to maintain the predicted levels of noise, light, and losses to habitat and agriculture.

The Panel did not make a finding of significant adverse environmental effects with respect to water management but established some stringent requirements (in line with CN's own predictions) regarding management of extreme weather events and maintenance or improvement of the existing water quality. The Panel notes that an expansion of the operational footprint could be expected to have an impact on how these requirements would continue to be met.

Finally, should the Project proceed, the Panel has made recommendations and observations with respect to the need for CN, the Town of Milton and Halton Region to establish a more collaborative relationship to address future environmental and socio-economic issues. The Panel expects that any future expansion plans should first be addressed through this medium.

16.3. Project Benefits

The Panel was not required to conclude on the significance of the benefits of the Project. However, understandably, the Panel heard a wide range of views about this aspect, summarized here with Panel observations. CN identified three categories of benefits from the Project: environmental, economic, and social and community benefits, and the Panel reports in this section on what it heard from CN and the other participants.

Environmental benefits

CN's Views

CN stated that environmental benefits as a result of the Project would be apparent at a larger national scale, across the Greater Toronto and Hamilton Area as well as at the regional and local levels. As the demand for goods continues to grow, CN noted that the environmental benefit of moving goods by railway versus long haul trucks would be substantial. CN asserted that one intermodal train could remove as many as 280 heavy long distance trucks from the highway, reducing potential greenhouse gas emissions by 75% (see additional information in Section 5.2, Greenhouse Gases), and other air quality contaminants. An air quality expert for CN did note that if the local effect can be mitigated, there is a regional benefit that accrues as a result of an intermodal terminal.

CN anticipated the Project would produce a variety of other regional and local environmental benefits. CN explained that environmental features had been taken into account when designing the terminal components and deciding on the location of key components. CN cited as Project benefits, locating the underpass at Lower Base Line to avoid a road re-alignment to the south toward the Greenbelt Plan Area,

Trafalgar Moraine Candidate Earth Science Area of Natural and Scientific Interest and wetlands; developing swales to maintain surface water conveyance and improve flood control for stormwater management; and identifying opportunities for environmental restoration and enhancement along Indian Creek and Tributary A.

CN also stated that the Project would benefit the local natural environment by increasing the knowledge base of the area for planning purposes. CN has committed to work with a non-profit organization, Ducks Unlimited Canada, to identify opportunities for the creation, securement and long-term management of grassland habitat for species potentially affected by the Project, such as Eastern Meadowlark and Bobolink.

Participants' Views

Participants generally acknowledged that transportation of goods through rail-based intermodal networks was a relatively efficient way to move goods, and would result in reduced greenhouse gas emissions as compared to trucks moving the same goods over the same distances. In their critiques of the Project as designed, Conservation Halton and Halton Municipalities did not agree with some of CN's predicted benefits regarding surface water systems. These views are discussed further in Section 7 of this report.

Economic benefits

CN's Views

CN stated that the economic benefits of the Project would occur at a national, regional and local level. An additional intermodal terminal within the Greater Toronto and Hamilton Area would increase the fluidity of the logistics system across North America. CN indicated it would spend \$250 million to construct the Project, which would result in local and regional benefits, as well as create between 150 and 200 jobs during construction and 130 direct jobs during operation.

In CN's opinion, the Town of Milton and Halton Region could benefit from the expected growth in gross domestic product in the Greater Toronto and Hamilton Area by becoming a key logistics hub. CN saw the Project as a driver for economic growth, supporting a wide range of industries requiring logistics capabilities. CN anticipated that over the next 20 years, the Project could generate up to \$230 million over 20 years in municipal revenues to Halton Region and the Town of Milton through intermodal-oriented development. CN stated that the potential benefits of induced intermodal-oriented development include employment opportunities (up to 1,000 direct and indirect jobs); property taxes (\$291 to \$485 million estimated land value would produce \$7.7 to \$12.9 million in annual property tax); and development charges (\$42.2 to \$85.9 million). Project expenditures on labour, goods and services during construction and operation would also result in a positive effect on the economy by supporting local and regional businesses and allowing them to build capacity and experience in the intermodal services sector.

Participants' Views

At the public hearing, the Panel heard from a large number of organizations including port authorities, private companies in the intermodal logistics industry, and local and regional chambers of commerce. Many of these organizations came to speak in support of the Project with respect to the economic benefits that might be realized if the Project is approved and built. These benefits included

accommodating expected growth within the Greater Toronto and Hamilton Area, supporting interprovincial trade, and relieving pressure across the supply chain to reduce costs for customers.

Social and community benefits

CN's Views

CN stated that the Project would result in reduced regional traffic congestion. The use of trains to transport goods would reduce highway congestion by removing up to 280 heavy, long-distance trucks with every intermodal train. CN explained that, compared to moving container goods only with trucks, the Project's rail transportation would provide a reduction of 459 truck kilometres per container. When applied to the 450,000 containers anticipated at the terminal, this is a reduction of just over 200 million truck kilometres annually on the 400-series highways. CN also anticipated that local benefits would include reduced congestion at the Lower Base Line railway crossing, and increased flood control along Tremaine Road. CN noted the Project would purchase goods and services from local businesses, and create development opportunities for supporting services such as warehouses, truck stops and food services.

In addition, CN considered providing one or several of the following benefits to the community: a partnership or contribution to the proposed university campus in Milton; a financial contribution to the Milton Education Village; sponsorship of community and non-profit initiatives; additional investment in local transportation infrastructure that might help regional traffic flow; and investment in recreation infrastructure such as a cycling path, walking trail, or athletic fields. Other potential community benefits mentioned include recreational areas like playgrounds, bike paths, soccer and softball fields and sport centers, and public transportation access to the Project.

Participants' Views

Milton Says No expressed concern that CN continued to promote the national-level benefits of the Project while ignoring the concerns of community members. Milton Says No acknowledged the link between consumer demand for goods and the need for intermodal transportation. However, in that organization's view, this must happen in cooperation with host communities and in locations that are mutually agreed upon. Milton Says No did not believe that CN had done its due diligence in identifying an appropriate location. Milton Says No suggested that CN's push to have the terminal at the South Milton location would not support the overall Canadian transportation network and CN's own distribution partners. In their view, that push has led to years of delay, bureaucracy, cost and distress in the local community, as well as further avoidable delays in bolstering the Canadian intermodal network. Milton Says No indicated that these delays and distress were avoidable because CN knew that Halton Region and its respective municipalities did not approve of this location, yet moved forward despite collective opposition.

During the course of its review, the Panel received letters from several community organizations in Halton Region or surrounding municipalities to which CN had provided financial support for various initiatives. The Panel notes that while these letters point to some level of contributions CN makes for philanthropic or other purposes, it did not consider these as social or community benefits that have occurred or would occur because of the Project.

Panel Observations

- The Panel observes that the main environmental benefits of the Project relate to the modal shift of long haul transportation of intermodal goods from road to railway, with the potential to reduce greenhouse gases and other air pollutants at a regional or greater level.
- The Panel observes that mitigation of adverse environmental effects for the Project cannot fairly be claimed as environmental benefits of the Project. However, excellence and innovation in mitigation (for example in the creation of offset habitat, new wetlands, and successful ecopassage design) could serve as a helpful example to other industry and land developers in the area.
- The Panel agrees that, on a regional and national scale, an intermodal terminal in the Greater Toronto and Hamilton Area would likely provide needed logistics infrastructure that would support economic development through the timely movement of goods.
- The Panel notes that CN's arguments about local economic benefits, through direct employment, induced intermodal-oriented development, procurement of goods and services, and contribution to municipal revenues, should be assessed in context. As discussed in Section 11.2 (Socio-Economic), Milton is a growth area, strategically placed between Toronto and Hamilton, well serviced by rail and highways, and therefore likely to be able to easily attract businesses and employment. Halton Municipalities told the Panel they were confident that, without CN's Project, they could attract development that would provide more jobs, potentially catering better to a highly educated local population, and generating higher municipal revenues. In addition, they made it clear that Milton, already home for many logistics-based businesses, was looking to diversify its employment base.
- With respect to social and community benefits, CN has indicated that they will make local contributions, as yet unspecified, to support community recreation, education or other sectors. While supporting these initiatives, the Panel does not consider that these should play a role in determining justification.

17. Panel Concluding Remarks

Throughout this review the Panel received information and views pertaining to three perspectives about the future.

CN and related industry representatives saw the Project in the context of a national and international logistics network that would enable goods to flow smoothly along the supply chain to serve businesses and consumers in a timely fashion. Potentially the benefits would extend beyond the immediate location, Milton, to all parts of North America served by CN, and the strengthening of the intermodal network would reduce greenhouse gas emissions and other air pollutants by shifting the long-haul movement of goods from trucks to the more fuel efficient railway. The overall validity of this perspective was not seriously disputed by any participant in the process. Locating the Project in Milton was, however.

The second perspective was mainly presented by the Town of Milton and Halton Region. The local area has been earmarked for rapid growth to accommodate the burgeoning population in the Greater Toronto and Hamilton Area. This brings enormous pressures. The Panel heard that local government and residents have engaged in a lengthy and consultative planning process, focusing on a future perspective of a 'complete community' which would balance housing with employment opportunities for a well-

educated populace so that Milton would not become a large bedroom community. A key part of this perspective was the notion of prestige industrial development and other advanced technology businesses on and adjacent to the lands currently owned by CN.

The Panel heard very differing views as to whether these two perspectives could be successfully adapted to mesh with each other. Under our mandate, and the *Canadian Environmental Assessment Act, 2012*, we were not asked to and do not have the power to adjudicate between or choose one of these two views; this is something that the main parties would need to address together. The Panel has, therefore, made some recommendations and observations that look to the building of constructive future relationships.

The third perspective relates to the need to develop the land, whether for residential, commercial, transportation or industrial purposes, with insight and caution to preserve the functioning of natural atmospheric, terrestrial and aquatic systems and to maintain wildlife habitat and habitat connectivity. The Panel recognizes that this has been a fundamental principle in Halton Municipalities' regional planning, particularly through the identification and protection of Natural Heritage Systems. The Panel also acknowledges that CN has demonstrated its intention to minimize adverse environmental effects through careful design and extensive mitigation. With the assistance of all participants, the Panel has reviewed CN's plans and made numerous recommendations, including an emphasis on collaboration, to further this objective.

The Panel's mandate, under the *Canadian Environmental Assessment Act, 2012*, and its Terms of Reference was to determine if the Project would have any environmental effects, and if so, whether those would be adverse and significant and likely to occur. The Panel was also required to recommend appropriate mitigation measures and follow-up programs. The Panel's recommendations are presented throughout this report, and presented entirely in Appendix J. We did not find significant adverse environmental effects for most of the environmental components covered by the *Canadian Environmental Assessment Act, 2012* except in the case of air quality, and human health related to air quality.

The Panel found in these cases that the environmental condition of the existing baseline was a key part of its significance determination. The Panel found that those existing conditions, which are already significantly affected, will occur and remain regardless of whether or not the Project is approved and built, because of other existing projects but also because of the scale of other planned developments in the area. While these significant adverse environmental effects may not necessarily bring the Project to a halt, they will require careful consideration. In particular, the Panel observes that reviewing this Project has highlighted a serious environmental challenge that faces all of us — namely the urgent need to reduce the deleterious effects of a diesel-based transportation system. While this shift is urgently needed, we must also consider that there are as yet no clear and easy alternatives to these transportation systems, especially if we maintain trade growth and consumption of goods at current rates. For the same reasons, the Panel also found that there would be significant adverse cumulative environmental effects on air quality and human health.

The Panel also found that the Project would contribute to existing adverse cumulative environmental effects on agricultural land use, wildlife and wildlife habitat. Although the Project's own contributions

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*

were relatively small, the cumulative environmental effects, in combination with other projects and activities that have been or will be carried out, were substantial in an area that is undergoing such rapid and widespread development. The Panel was challenged throughout its environmental assessment to balance the Project's relatively minor contributions to the loss of agricultural lands and wildlife habitat, with the broader land conversion that has occurred and reflected in official plans for the Town of Milton and the region of Halton. Consistent with the Panel's observation in the preceding paragraph, these cumulative environmental conditions will occur and remain, regardless of whether or not the Project is approved and built.

The Panel is grateful to everyone who participated in this process for taking the time to review the extensive documentation, prepare comments and submissions, and share their knowledge, experience and ideas. An environmental assessment by a panel review is a collective endeavour and not something any panel can do by itself. As Panel members we came to this task with open minds and have done our best to listen carefully to all views and to make this report a fair representation of the process.

The three Panel members alone take responsibility for our conclusions and observations, but wish to thank the members of the Secretariat, identified in Appendix B, for their unfailing support during the three years the Panel has been in existence. Your thoroughness, reliability and good humour have been essential in ensuring both that the Panel can be effective in its work, and that the process itself has been transparent and inclusive.

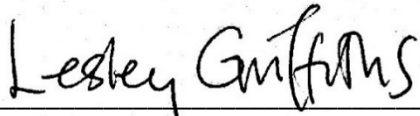
The Panel particularly wants to acknowledge the participation of members of the public who took time away from their families, work, and other community interests to give their opinions and share their local knowledge. We heard how deeply you care about your community and the environment and how concerned you are about the effects of the proposed Project. We want to assure you that we heard these concerns and have endeavoured to respond to them.

Finally, to all who participated in the hearing — CN, the Indigenous groups on whose traditional lands the hearing was held, provincial and federal government representatives, the Town of Milton, Halton Municipalities, Conservation Halton, Milton Says No, Milton Residents Affected by Intermodal Lines, other business and organization representatives, and individual citizens — thank you for your respectful and constructive interactions with the Panel and other participants. We were addressing serious issues and there were understandably strong feelings in the hearing room, but the ensuing discussions were civil and constructive, and fundamentally helpful to the Panel. The Panel also thanks Elder Garry Sault of the Mississaugas of the Credit First Nation for leading a closing ceremony that reminded us of our mutual interdependence.

The Panel now respectfully submits its recommendations in this report to the Minister of Environment and Climate Change. The full decision-making process, including the subsequent review of information in this report by the Canadian Transportation Agency if required, is described in detail in Section 3.4. The Panel's findings and recommendations are based on a lengthy involvement with the Project over the past three years, a thorough process of inquiry, and dialogue with a wide range of participants. We trust this report will therefore provide helpful guidance to the decision-makers.

Milton Logistics Hub Project | REVIEW PANEL

Joint process established under the *Canadian Environmental Assessment Act, 2012*, and the *Canada Transportation Act*



Ms. Lesley Griffiths (Chair) – January 27, 2020



Dr. Isobel Heathcote – January 27, 2020



Mr. William G. McMurray – January 27, 2020

Appendix A -

Key Submissions Received at Various Stages of the Environmental Assessment Process

Appendix A – Key submissions

The following is a list of key submissions, at various stages of the environmental assessment process, made by the CN as well as other participants. The full environmental assessment record for the Milton Logistic Hub Project can be found on the Impact Assessment Agency of Canada’s website:

<https://ceaa.gc.ca/050/evaluations/proj/80100?culture=en-CA>

Environmental Impact Statement

Document Title	CEAR # and Date
Environmental Impact Statement	57 December 7, 2015
Environmental Impact Statement Summary	58 December 7, 2015

Project Application to the Canadian Transportation Agency

Document Title	CEAR # and Date
Application to the Canadian Transportation Agency (CTA)	395 December 16, 2016

Pre-Panel Additional Information Requirements from the Canadian Environmental Assessment Agency and Responses of the Canadian National Railway Company

Additional Information Requirements from the Canadian Environmental Assessment Agency and Main Topics and CEAR # and Date	CN Response CEAR # and Date
Additional Information Requirements #1 71 March 15, 2016	<ul style="list-style-type: none"> - Presentation of the EIS - Clarifications - Project Description - Alternative Means - Aboriginal Interests - Physical and Cultural Heritage - Atmospheric Environment - Groundwater and Surface Water - Terrestrial Landscape - Wildlife Species and Habitat - Fish and Fish Habitat - Mitigation Measures, Follow-up and Reporting - Cumulative Effects
Additional Information Requirements #2 357 July 14, 2016	<ul style="list-style-type: none"> - Alternative Means - Physical and Cultural Heritage - Atmospheric Environment - Groundwater and Surface Water - Terrestrial Landscape - Wildlife Species and Habitat - Fish and Fish Habitat - Cumulative Effects

Appendix A – Key Submissions

Review Panel Information Requests and Responses from the Canadian National Railway Company

Information Requests (IR) from the Review Panel and Main Topics		CN Response CEAR # and Date
Panel IR Package 1 555 April 5, 2017	- Fish and Fish Habitat - Wildlife Species and Habitat	561 April 21, 2017 (Part 1) 574 June 19, 2017 (Part 2)
Panel IR Package 2 563 May 5, 2017	- Regulatory Framework - Purpose - Alternative Means - Project Description	592 August 31, 2017 (all topics)
Panel IR Package 3 593 September 6, 2017	- Air Quality - Water - Terrestrial - Wildlife Species and Habitat	613 January 24, 2018 (all topics) 643 May 14, 2018 (Response to Health Canada on Diesel Particulate Matter)
Panel IR Package 4.1 600 October 11, 2017	- Project Components - Light - Socio-economic - Human Health - Physical and Cultural Heritage - Indigenous Matters - Fish and Fish Habitat - Wildlife Species and Habitat	632 March 21, 2018 (Group 1) – All other package 4.1 topics 646 May 18, 2018 (Group 2) - Light 656 June 15, 2018 (Group 3) – Socio Economic
Panel IR Package 4.2 602 October 31, 2017	- Truck Traffic - Noise - Vibration	652 June 1, 2018 (Group 1) - Noise 654 June 12, 2018 (Group 2) – Truck Traffic
Panel IR Package 5 602 October 31, 2017	- Mitigation Measures - Cumulative Effects - Follow-up Programs and Reporting - Environmental Management - Accidents and Malfunctions	647 May 18, 2018 (Group 1) – Cumulative effects, Follow-up programs, Reporting, Environmental Management 655 June 12, 2018 (Group 2) – Mitigation Measures and Commitments, Accidents and Malfunctions
Panel IR Package 6 615 February 6, 2018	- Regulatory Framework	714 February 15, 2019 (all topics)
Panel IR Package 7 644 May 17, 2018	- Air Quality - Water - Physical and Cultural Heritage - Socio-economic	680 August 20, 2018 (all topics)
Panel IR Package 8 685 September 25, 2018	- Referenced Documents - Air Quality - Human Health - Truck Traffic - Light - Noise & Vibration - Socio-economic - Wildlife	705 December 19, 2018 (Group 1) – Referenced documents, Light, Noise and Vibration, Socio-economic 714 February 15, 2019 (Group 2) – Human Health, Noise & Vibration, Wildlife 722 March 1, 2019 (Group 3) – Air quality, Truck traffic 732 March 22, 2019 (Group 4) – Air Quality, Truck traffic, Noise and Vibration

Appendix A – Key Submissions

Other CN Submissions to the Review Panel

Document Title	CEAR # and Date
CN Report on Stage 2 Archaeological Assessment	452 January 18, 2017 (Correspondence to Indigenous Groups) 453 January 18, 2017 (Archaeological Report)
Results of CN's additional public consultation from Fall 2017	620 February 9, 2018
CN Amendment to the EIS following Engagement with Aboriginal Communities	684 September 21, 2018

Pre-hearing Written Submissions

Document Title	CEAR # and Date
Halton Municipalities	800 May 29, 2019 816 June 12, 2019
Conservation Halton	790 May 29, 2019
Canadian International Freight Forwarders Association	782 May 27, 2019
Milton Says no	795 May 27, 2019
Prince Rupert Port Authority	783 May 24, 2019
Transport Canada	793 May 29, 2019
Ontario Ministry of Agriculture, Food and Rural Affairs	792 May 29, 2019
Ontario Ministry of Municipal Affairs and Housing	787 May 29, 2019
Ontario Ministry of Transportation	788 May 29, 2019
Environment and Climate Change Canada	797 May 29, 2019
Natural Resources Canada	794 May 29, 2019
Fisheries and Oceans Canada	784 May 29, 2019
Ontario Ministry of Environment, Conservation and Parks	791 May 29, 2019
Health Canada	786 May 29, 2019
Huron-Wendat Nation	785 May 29, 2019
Ontario Ministry of Tourism, Culture and Sport	789 May 29, 2019
Six Nations of the Grand River	775 May 9, 2019
Canadian Tire	774 May 9, 2019
Western Canada Express	776 May 9, 2019
Portside Warehousing and Distribution	777 May 9, 2019
Ducks Unlimited Canada	798 May 29, 2019
Town of Halton Hills	856 June 11, 2019
City of Burlington	859 June 18, 2019
Milton RAIL	864 June 21, 2019
Michelle B.	896 July 2, 2019
Town of Oakville	916 July 2, 2019
Johnson Yuon	952 July 11, 2019
Federation of Canadian Municipalities	961 July 12, 2019

Appendix A – Key Submissions

Hearing Presentations and Submissions

The following list includes only the presentations that were submitted to the Panel prior to the hearings. Some parties may have presented during the hearings, based only on a written submission. For a full listing of all presenters at the hearings, please consult CEAR #808 <https://ceaa-acee.gc.ca/050/documents/p80100/129973E.pdf>

Review Panel Hearings	Presenter	CEAR # of Presentation
Opening Session - June 19, 2019	CN	841
General Session - June 20, 2019	Halton Municipalities	830
	Conservation Halton	852
	Schneider National, Inc	805
	Canadian International Freight Forwarders Association	819
	Milton Says No	840
	Nancy Mott	822
General Session - June 21, 2019	Vancouver Fraser Port Authority	820
	Prince Rupert Port Authority	821
	Halifax Port Authority	823
	ZIM Integrated Shipping Services (Canada) Co. Ltd.	824
	COSCO Shipping Lines (Canada) Inc	812
Review Panel Hearings	Presenter	CEAR # of Presentation
Project, design, capacity, operations and alternatives means Session - June 25, 2019	CN	843
	Halton Municipalities	837
Accidents and malfunctions/risk management and preparedness Session - June 25, 2019	CN	844
	Transport Canada	829
	Halton Municipalities	839
Socio-Economic general session - June 25, 2019	CN	842
	Halton Municipalities	835
Socio-economic - Land use, planning and economic issues - June 26, 2019	CN	845
	Halton Municipalities	836
Socio-economic – Traffic and road safety - June 26, 2019	CN	846
	Halton Municipalities	838
Geology, soils and geochemistry session - June 27, 2019	CN	848
Hydrology and water quality session - June 27, 2019	CN	847
	Conservation Halton	853
	Environment and Climate Change Canada	825
	Halton Municipalities	834
Fish and fish habitat session - June 28, 2019	CN	850
	Conservation Halton	855
	Fisheries and Oceans Canada	828

Appendix A – Key Submissions

Terrestrial environment session - June 28, 2019	CN	849
	Halton Municipalities	831 (migratory birds) 832 (species at risk) 833 (natural heritage)
	Conservation Halton	854
	Environment and Climate Change Canada	826
Air quality, including greenhouse gases and human health session - July 8, 2019	CN	910
	Environment and Climate Change Canada	827
	Health Canada	817
	Halton Municipalities	903
Noise, vibration and human health session - July 9, 2019	CN	912
	Halton Municipalities	905
	Health Canada	818
Light session - July 9, 2019	CN	911
	Halton Municipalities	904
Archaeological and heritage resources (including built heritage) session - July 10, 2019	CN	913
	Huron-Wendat Nation	901
	Ontario Ministry of Tourism, Culture and Sport	906
	Halton Municipalities	907
Community services and infrastructure session - July 10, 2019	CN	914
	Halton Municipalities	908
General Session - July 11, 2019	CN	915
	Huron-Wendat Nation	902
General Session - July 12, 2019	Wendy Roberts	897
	Canadian Chamber of Commerce	819
	Mediterranean Shipping Company	900
	Brampton Board of Trade	898
	Toronto Region Board of Trade	871
	Vaughan Chamber of Commerce	909
	JB Hunt Transport, Inc	611
	Hapag-Lloyd Canada Ltd	899

Hearing Transcripts

Document Title	CEAR #
Hearing Transcript Volume 1 – June 19th, 2019 - Opening Session	860
Hearing Transcript Volume 2 – June 20th, 2019 - General Session	862
Hearing Transcript Volume 3 – June 21st, 2019 - General Session	867
Hearing Transcript Volume 4 – June 25th, 2019 - Project description, alternative means and railway operations and services	873
Hearing Transcript Volume 5 – June 26th, 2019 - Socio-economic conditions	879
Hearing Transcript Volume 6 – June 27th, 2019 - Geology, soils and geochemistry	887

Appendix A – Key Submissions

Hydrology and water quality	
Hearing Transcript Volume 7 – June 28th, 2019 - Fish and Fish habitat and Terrestrial environment	889
Hearing Transcript Volume 8 – July 8th, 2019 - Air quality, noise, vibration, light and human health	930
Hearing Transcript Volume 9 – July 9th, 2019 - Air quality, noise, vibration, light and human health	933
Hearing Transcript Volume 10 – July 10th, 2019 - Archaeological and heritage resources	944
Hearing Transcript Volume 11 – July 11th, 2019 - General Session	953
Hearing Transcript Volume 12 – July 12th, 2019 - General Session	966
Hearing Transcript Volume 13 – July 19th, 2019 - Closing Remarks	980

Hearing Undertakings

Document Title	CEAR #
Undertaking 1 – From CN – Sustainability report	861
Undertaking 2 – From Halton Municipalities – Comments on enforceability of conditions	870
Undertaking 3 – From CN – CN police services	876
Undertaking 4 – From CN – News coverage of unreported derailments	877
Undertaking 5 – From CN – Options and factors that may influence train diversions between the Brampton Intermodal Terminal and Project	873
Undertaking 6 – From CN – Truck operator contract	878
Undertaking 7 – From the Vancouver Fraser Port Authority – Truck licensing system	888
Undertaking 8 – From CN – Summary of the Martin report on demand forecast	921
Undertaking 9 – From CN – Percentage of isotainers CN carried in 2019 containing dangerous goods and types of non-dangerous material	879
Undertaking 10 – From Transport Canada – History of incidents involving dangerous goods	917
Undertaking 11 – From CN – Information on when the CN tariff 6800, item 6000 first came into existence and by whom it was prescribed	890
Undertaking 12 – From CN – List of substantive material in its presentations that is not located in the technical submissions	884
Undertaking 13 – From CN – Map of the Brampton Intermodal Terminal, including the operating area and additional information	885
Undertaking 13-B – From CN – Milton terminal characteristics	922

Appendix A – Key Submissions

Undertaking 14 – From CN – Description of the extent of the socio-economic valued components CN considered in its environmental assessment	886
Undertaking 15 – From CN – Summary of Traffic Generation Report in 2008 by BA	891
Undertaking 16 – From CN – Copy of Ministry of Natural Resources protocol for erosion control	892
Undertaking 17 – From CN – Slope suitability analysis	938
Undertaking 18 – From CN – Stormwater management planning and design manual, 2003	893
Undertaking 19 – From Conservation Halton – Hydraulic modelling for Tributary A provided to CN	894
Undertaking 20 – From CN – Floodplain mapping	928
Undertaking 21 – From Environment and Climate Change Canada – Recommended frequency of monitoring for suspended solids	918
Undertaking 22 – From CN – Examples of valley wall/floodplain berm use method	923
Undertaking 23 – Wetland assessment	929
Undertaking 24 – From CN – Barn swallow presence with the Project Development Area	939
Undertaking 25 – From Environment and Climate Change Canada – State of Canada’s birds	919
Undertaking 26 – From CN – Information on 20 dangerous goods	932
Undertaking 27 – From Health Canada – Examples of mitigation measures for diesel exhaust emissions	958
Undertaking 28 – From Health Canada – Examples of recommendations or conditions related to Canadian Ambient Air Quality Standards	959
Undertaking 29 – From Halton Municipalities – Excerpt from guideline of the implementation of air standards in Ontario	946
Undertaking 30 – From Halton Municipalities – Use of section 14 of the <i>Ontario Environmental Protection Act</i>	962
Undertaking 31 – From CN – Information on speech interference at points of reception	954
Undertaking 32 – From Halton Municipalities – Municipal approval process for mitigation measures	957
Undertaking 33 – From Ministry of Tourism, Culture and Sport – 50-meter buffer as a protective measure for cultural heritage resources	960
Undertaking 34 – From CN – Pros and cons of using an independent system or connecting to municipal services	966
Undertaking 35 – From CN – Standards for noise in outdoor recreation areas and if so, noise standards for cycling and other outdoor activities	966
Undertaking 36 – From Milton Says No – Top research submissions regarding health and economics	955

Appendix A – Key Submissions

Hearing Exhibits

Document Title	CEAR #
Exhibit 1 – From Lisa Raitt – Port of Montreal road infrastructure improvement	865
Exhibit 2 – From Ontario Chamber of Commerce – Moving forward	866
Exhibit 3 – From Milton Says No – Studies on effects of various US intermodal facilities	880
Exhibit 4 – From Halton Municipalities – List of dangerous goods at the Brampton Intermodal Terminal	874
Exhibit 5 – From Halton Municipalities – Proximity guidelines and best practices	875
Exhibit 6 – From Halton Municipalities – Defining major transit requirements in Halton	881
Exhibit 7 – From Halton Municipalities – Pyramid of effects for estimated impacts of PM10 due to human activities in Ontario	924
Exhibit 8 – From Mohamed Amer – News articles	931
Exhibit 9 – From Milton Says No – Various documents related to health	927
Exhibit 10 – From CN – Memo on the summary of “CN South Milton Industrial Precinct – Transportation Considerations”	937
Exhibit 11 – From Halton Municipalities – Heritage resources in the Land Use Planning Process	940
Exhibit 12 – From Halton Municipalities – Britannia Road widening from Tremaine road to Highway 407	941
Exhibit 13 – From Six Nations of the Grand River – Memorandum of understanding between the Six Nations of the Grand River and CN	948
Exhibit 14 – From Six Nations of the Grand River – Land rights a global solution for the Six Nations of the Grand River	949
Exhibit 15 – From Great Gulf – Maps of the CN area and adjacent developments	951
Exhibit 16 – From Wendy Roberts – Milton Meadows Properties Inc. appeal to Ontario Municipal Board	956

Closing Remarks and final CN filings to the Review Panel

CN's Document Title	CEAR # and Date
Jon Mendoza Closing Remarks	969 July 16, 2019
Conservation Halton Closing Remarks	970 July 17, 2019
CN Closing Remarks	972 July 17, 2019

Appendix A – Key Submissions

Halton Municipalities Closing Remarks	973 July 17, 2019
Pony Pines Development Inc., Stevenson Land Development Inc. and Shadybrook Development Inc. Closing Remarks	974 July 17, 2019
Huron-Wendat Nation Closing Remarks	975 July 17, 2019
CN Updated Commitments Tables Summarizing proposed mitigation measures, plans and follow-up monitoring programs	981 July 19, 2019
CN Response to Appendix A and B of Halton Municipalities Closing Remarks	982 July 22, 2019

Appendix B -

List of Participants at the Hearing and Members of the Review Panel Secretariat

Appendix B – List of participants at the hearing

Name	Affiliation
Achten, Adam	Schneider National
Ali Khan, Khurshid	
Allen, Andrew	Hapag-Lloyd Canada
Almuina, Dr. Alvaro	Halton municipalities
Amer, Mohamed	
Babic, Frank	Stantec Consulting
Beekman, Mitch	Canadian National Railway Company
Benson, Curt	Planning Official for Halton Region
Bercha, Dr Frank	Halton municipalities
Bernstein, Andrew	Legal counsel for CN
Bissett, Michael	Bousfields Inc
Bomberry, Lonny	Six Nations elected council
Boudreau, Julie	Health Canada
Brett, John	Canadian Wildlife Service
Brown, Julia	
Brown, Robin	Rubidium Environmental
Brownlee, Russel	True North Safety group
But, Aftab	
Butt, Brad	Mississauga Board of Trade
Cadman, Mike	Canadian Wildlife Service
Cairns, Andrew	Mott McDonald
Caldwell, Dr Wayne	Halton Municipalities
Canzona, Sev	Milton Says No
Chapman, Steve	Impact Assessment Agency of Canada
Clarke, John	Natural Resources Canada
Corsie, Tom	Vancouver Fraser Port Authority
Côté, Anna	Halton Municipalities
Coulson, Benjamin	RWDI Group
De Angelis, Lisa	Infrastructure, Planning and Policy for Halton
De Silva, Jan	Toronto Region Board of Trade
DeGasperis, Adrian	Great Gulf
Devlin, Doug	Canadian National Railway Company
Dickson, Parker	Stantec Consulting
DiGiovanni, Franco	Hemmera Enviro Chem Inc
Dougan, Jim	Dougan & Associates

Name	Affiliation
Faszer, Andrew	Golder Associates
Field, Darren	J.B. Hunt Transport Inc
Finn, Sean	Canadian National Railway Company
Fischer-Patterson, Sabrina	Conservation Halton
Fisher, Dana	
Fournier, Chris	MSC Canada
Friesen, Brian	Prince Rupert Port Authority
Forte, James	
Geddes, Sean	Stantec Consulting
Gent, Gwen	
Gillezeau, Jeannette	Altus Group
Gormick, Greg	On Track Strategies
Graydon, Michael	Food & Consumer Products of Canada
Greer, Ryan	Canadian Chamber of Commerce
Gross, Peter	Legal counsel for Halton Municipalities
Hamel, Chris	Halton Municipalities
Hadayeghi, Dr.Ali	CIMA+
Hanet, Josh	Halton Municipalities
Harris, Nadine	Ontario Ministry of the Environment
Hatzopoulou, Dr. Marianne	University of Toronto
Heeney, Paul	Ministry of Environment, Conservation and Parks
Howieson, Ron	Stantec Consulting
Iacono, Rosetta	Montreal Port Authority
Jacob, Audrey	IBI Group
Janowicz, Marek	Fisheries and Oceans Canada
Jeans, Brian	Transport Canada
Jessiman, Barry	Health Canada
Jocko, Matt	Six Nations elected council
Johnston, Paul E.	Johnston Litavski Ltd
Keith, Stephen	Consumer and Clinical Radiation Protection Bureau
Kim, Selena	Legal counsel for the Halton Municipalities
King, Jennifer	Legal counsel for the Halton Municipalities

Appendix B – List of participants at the hearing

Name	Affiliation
Kluge, Volker	ZIM Integrated Shipping Services
Knopper, Dr. Loren	Stantec Consulting
Konze, Karl	Dougan & Associates
Koopmans, Barb	Planning and Development for the Town of Milton
Krantz, Gordon	Mayor of Milton
LaForme, Mark	Mississaugas of the Credit First Nation
Leonardelli, Sandro	Environment and Climate Change Canada
Lerner, Mark	Canadian National Railway Company
Letts, Todd	Brampton Board of Trade
Linn, Robin	Six Nations elected council
Luginbuhl, Christian	Dark Sky Partners
Lusk, Sheryl	Environment and Climate Change Canada
Lyons, Darryl	Ontario Ministry of Municipal Affairs and Housing
Ma, Kitty	Health Canada
Mainguy, Sarah	North-South Environmental
Martin, John	Martin Associates
Mathew, Russell	Hemson Consulting
McAllister, Aurora	Ministry of Environment, Conservation and Parks
McBride, Robert	BA group
McCammon, Scott	Milton Chamber of Commerce
Mccormack, Tom	Metroeconomics
McDonald, Brian	Shipping Federation of Canada
Meyer, John	
Meyer, Jenn	
Michajluk, Shawn	Environment and Climate Change Canada
Michaud, David	Consumer and Clinical Radiation Protection Bureau
Minkin, Dan	Ontario Ministry of Tourism, Culture and Sport
Montare, Phil	Six Nations elected council
Mott, Nancy	
Mr. Casey	Ontario Ministry of Transportation
Myer, Jenn	Milton Says No

Name	Affiliation
Naghdianei, Hossein	Environment Canada and Climate Change
Newman, Stacey	Milton Says No
Northey, Rod	Legal counsel for Halton Municipalities
Oldfield, Karen	Halifax Port Authority
Paquette, Gilles	
Patterson, Luanne	Canadian National Railway Company
Pelletier, Renee	Legal counsel for Huron-Wendat Nation
Penton, Scott	SLR Consulting Canada Limited
Petrovic, Sanya	Health Canada
Picard, Maxime	Project coordinator with Hurdon-Wendat Nation
Pickfield, Peter	Legal counsel for Conservation Halton
Piegsa, Christina	
Pounder, Jonathan	Conservation Halton
Prins, Sebastian	Retail Council of Canada
Prits, Allan	Stantec Consulting
Prowse, Shari	Ontario Ministry of Tourism, Culture and Sport
Radisic, Brenko	
Raitt, Lisa	Member of Parliament for Milton
Redden, Drew	Oakville Chamber of Commerce
Reizenne, Dr. Mark	University of Ottawa
Reynolds, Darren	Canadian National Railway Company
Rivard, Meaghan	Stantec Consulting
Rizkalla-Kamel, Natalie	Halton Municipalities
Roberge, Chantal	Health Canada
Roberts, Wendy	
Rodgers, Bruce	Canadian International Freight Forwarders Association
Rossi, Rocco	Ontario Chamber of Commerce
Sault, Garry	Mississaugas of the Credit First Nation
Scandlan, Gary	Watson and Associates
Scheckenberger, Ron	Wood consulting firm
Schofield, Kathleen	Great Gulf

Appendix B – List of participants at the hearing

Name	Affiliation
Scholten, Yves	Conservation Halton
Schweitzer, Tara	Fisheries and Oceans Canada
Shachter, Irvin	Legal counsel for Ontario Ministry of Municipal Affairs and Housing
Sharp, Mirek	North-South Environmental
Shifman, Brian	Vaughan Chamber of Commerce
Smith, Sheldon	Stantec Consulting
Snowdy, Derrick	
Solomon, Hart	CIMA+
Soltysik, George	Milton Says No
Taylor, Andrew	Stantec Consulting
Thurston, George	NYU School of Medicine
Turvey, John	Ontario Ministry of Agricultural, Food, and Rural Affairs

Name	Affiliation
Valika, Mithu	
Van Koeverden, Adam	Member of parliament for Milton
Veale, Dr. Barbara	Conservation Halton
Vickerman, John	Vickerman and Associates
Vogel Post, Rita	Milton Residents Affected by Intermodal Lines
Watton, Paul	Canadian Wildlife Service
Whitehead, Grant	Stantec Consulting
Wilson, Mathew	Canadian Manufacturers and Exporters
Wojcik, David	Mississauga Board of Trade
Wong, Anthony	Town of Milton
Yim, Victor	COSCO Shipping Lines

Members of the Review Panel Secretariat

Catherine Bailey-Jourdain – Analyst
 Charles Birchall – Legal Counsel
 Monica Losier – Registry and Logistics Coordinator
 Élyse Maisonneuve-Campbell – Analyst
 Sarah Olivier – Analyst
 André Paquette – Analyst
 Jason Patchell – Analyst
 Sophie Regimbald – Registry and Logistics Coordinator
 Shelley Rolland-Poruks – Communications Advisor
 Joseph Ronzio – Panel Manager
 Jason Tsang – Analyst
 John Woodward – Analyst

Appendix C -

Review Panel Biographical Notes

Appendix C – Review Panel Biographical Notes

Ms. Lesley Griffiths—Panel Chair

Ms. Lesley Griffiths is a retired environmental and community planner. For over 30 years she was Co-principal of Griffiths Muecke, a consulting firm providing services in the areas of consultation and consensus-building processes, environmental impact assessment, resource management and community development. Ms. Griffiths has extensive experience relating to coastal and offshore planning, stakeholder involvement and facilitation, resource developments, waste management, watershed management, recreation and tourism planning, and community development.

Ms. Griffiths has developed and implemented information and consultation strategies for community and social planning, community economic development, resource developments and various types of waste management planning.

Ms. Griffiths has substantive experience chairing environmental assessment panels in Atlantic Canada. She chaired the federal-provincial joint review panels examining the Voisey's Bay Mine and Mill Project in northern Labrador, the Sydney Tar Ponds remediation in Cape Breton, and the Marathon Platinum Group Metals and Copper Mine Project in Ontario, and co-chaired the joint review panel for the Lower Churchill Hydroelectric Project. She also served as a joint panel member for the review of the Halifax Harbour wastewater treatment facility. Ms. Griffiths was appointed as Process Lead for the Fundy Tidal Energy Strategic Environmental Assessment, and co-chaired the Nova Scotia Minister of Environment's Task Force on Clean Air, producing the province's first air quality management strategy.

Dr. Isobel Heathcote—Panel Member

Dr. Isobel Heathcote holds a B.Sc. from the University of Toronto and a M.S. and Ph.D. in biology from Yale University. Her work experience is diverse, encompassing employment in both the public and private sectors. She has worked as a consultant with Acres Consulting Services Ltd. and her own company, Wyndham Research Inc. She was also previously employed by the Ontario Ministry of the Environment in the Water Resources Branch, where she worked on water management issues in most of the major lake and river systems in Ontario. She and her staff conducted investigations throughout the Great Lakes, especially in the Areas of Concern, and contributed to the development of Remedial Action Plans for those areas.

Dr. Heathcote has directed and taught in the Environmental Studies and Environmental Sciences programs at the University of Toronto and at the University of Guelph, where she was cross-appointed in Environmental Engineering and Environmental Sciences. She was also the University of Guelph's Dean of Graduate Studies from 1999 to 2008, where she retired in 2010.

Dr. Heathcote's research interests focus on environmental management policy, integrated water management and watershed restoration, and environmental conflict resolution. Her consulting clients include agencies at all levels of government, Indigenous groups, non-governmental organizations and private sector organizations.

Dr. Heathcote was Chair of the provincial Municipal-Industrial Strategy for Abatement Advisory Committee and has served on numerous other advisory boards and committees, including the Multi-

Appendix C – Review Panel Biographical Notes

stakeholder Advisory Committee for Ontario's Environmental Commissioner. She was the Canadian Co-Chair of the Canada-United States International Joint Commission's Science Advisory Board (2001-2006) and a member of that Board from 1992 to 2006. She has served on the Boards of Directors of the Canadian Environmental Law Association, the Canadian Institute for Environmental Law and Policy, and the Canadian Pollution Prevention Centre. She has also chaired the Ontario Minister of the Environment's Industrial Pollution Action Team and has written several academic textbooks on environmental and watershed management.

Mr. William McMurray—Panel Member and Canadian Transportation Agency Member

A seasoned adjudicator and mediator in transportation matters, Mr. William McMurray has been a Member of the Canadian Transportation Agency since 2014 and a member of the Law Society of Upper Canada since 1986. Prior to his appointment to the Agency, he practiced administrative law and litigation in the private sector for over 20 years, where he specialized in transportation matters. Mr. McMurray also provided adjudication services from 2009 to 2014, when he was Vice-Chairperson of the Canada Industrial Relations Board.

As a Member of the Canadian Transportation Agency, Mr. McMurray has decided many transportation related cases, including applications requesting authorities to construct railway lines. In these applications, he considered the potential impacts of projects on the interests of the localities, including the environmental effects associated with the construction and operation of railway infrastructure, Indigenous interests, and interests of local residents.

Over the course of his legal career, Mr. McMurray has argued numerous cases before the civil courts, the Federal Court, and the Federal Court of Appeal. He has successfully pleaded complex cases before a number of federal administrative tribunals, including the Canadian Transportation Agency and its predecessors. Mr. McMurray previously acted as senior counsel for some of Canada's largest employers in the transportation industry, including as counsel for the Canadian National Railway Company and Canadian Pacific Limited. While continuing to practice law, he also taught "transportation law and regulation" at McGill University in Montréal for over ten years.

Mr. McMurray studied common law and civil law at the University of Ottawa, and political economy at Université Laval in Québec City and at the University of Toronto. He completed his articles of clerkship while working in the Law Department of the Canadian Transport Commission, a predecessor of the Canadian Transportation Agency.

Appendix D -

Agreement to Establish a Joint Process for the Review of the Milton Logistics Hub Project between the Minister of Environment and Climate Change and the Chair of the Canadian Transportation Agency and Terms of Reference

December 6, 2016

Appendix E -

CN Commitments:

**Appendix E1 - Final Consolidated Table
of Mitigation Measures and CN Commitments;**

**Appendix E2 - Final Follow-up and Monitoring
Programs committed to by CN;**

**Appendix E3 - Final Environmental Management Plan and
Detailed Design Plan Commitments**

Appendix E – CN Commitments

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

July 17, 2019

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
Fish and Fish Habitat – Change in Fish Habitat				
	✓	✓	<ul style="list-style-type: none"> Alteration or removal of habitat or riparian vegetation (including critical habitat of SAR) during construction of water management facilities/buildings/ infrastructure and watercourse realignments. Temporary or longer-term degradation of habitat quality from increased sediment input (and sediment load). Reduction of cover through removal of riparian vegetation may, increase water temperature and negatively affect invertebrate populations. 	<ul style="list-style-type: none"> CN will implement a Habitat Compensation Plan to compensate for the loss of freshwater fish habitat as part of the process of obtaining the authorization of a harmful alteration, disruption or destruction of fish habitat under section 35(2) of the <i>Fisheries Act</i> (Appendix E.2, page 51).
	✓			<ul style="list-style-type: none"> Before the commencement of in-water activity, the Contractor will ensure that all necessary equipment and materials are available and are on-site, including contingency equipment and materials (App G, page G.4).
✓				<ul style="list-style-type: none"> CN will apply natural channel design principles to the design and dimension of the realigned channels, including incorporating natural bed morphology (pools, riffles) and planform geometry (Appendix E.2, page 3).
✓				<ul style="list-style-type: none"> CN will design the channel realignments such that they do not excessively aggrade or degrade, convey existing flows so that flood elevations are not increased and bankfull frequency is maintained, downstream channel morphology is not altered and to limit barriers to fish migration (Appendix E.2, page 3).
✓				<ul style="list-style-type: none"> CN will design the Project so that it provides aquatic and riparian habitat that is functional over a range of flows with an increase in diversity of habitat types (Appendix E.2, page 3).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
	✓			<ul style="list-style-type: none"> When clearing vegetation to accommodate channel realignment, the Contractor will fell trees away from watercourses and water bodies. The contractor will immediately remove trees, debris or soil inadvertently deposited below the high watermark of a watercourse (App G, page G.5).
	✓			<ul style="list-style-type: none"> The Contractor shall develop a detailed site-specific mitigation plan that meets all applicable requirements and submit the plan to CN prior to initiating any watercourse or water body crossing activities not already approved as part of channel realignments (App G, page G.6).
	✓			<ul style="list-style-type: none"> CN will not permit fording of watercourses or water bodies unless approved by the applicable regulatory authority (App G, page G.6).
	✓			<ul style="list-style-type: none"> CN will re-establish vegetation on disturbed areas as soon as practicable (i.e., following construction; in areas not subject to further construction activity / disturbance) (App G, page G.3).
	✓			<ul style="list-style-type: none"> CN will buffer wetland and riparian areas by up to 30 m (final buffer size subject to final design) (App G, page G.3).
	✓			<ul style="list-style-type: none"> CN will construct the channel realignment predominantly outside of the existing channels and will be commissioned upon completion of all works to minimize the time period for diversion of flows within the existing channel. (Appendix E.15, page 75).
	✓			<ul style="list-style-type: none"> CN will plan the landscape and culvert installation to maintain drainage to and from wetlands (App G, page G.3).
Fish and Fish Habitat – Change in Fish Movement, Migration and Fish Passage				

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
	✓		<ul style="list-style-type: none"> Fish migration and movement passages may temporarily be partially or completely blocked during removal of earthen plugs to change flow of realignments Acoustic emissions associated with construction may alter fish behaviour, affecting movement patterns by causing fish to temporarily avoid or move out of the PDA and LAA. 	<ul style="list-style-type: none"> CN will construct the new channel associated with Indian Creek and Tributary A in the dry, while leaving earthen plugs in the connection points. Any in-water work associated with channel realignment activities will be conducted outside the RAP (EIS Section 3.4.1.6, page 58).
	✓			<ul style="list-style-type: none"> CN will conduct stream diversions and culvert installation in isolation of stream flows (e.g., dam and pump, flume, diversion) (App G, page G.5).
	✓			<ul style="list-style-type: none"> CN will maintain downstream flow at all times when conducting in-water construction activities. (EIS, Table 7.1, page 311)
Fish and Fish Habitat – Change in Fish Mortality				
	✓		<ul style="list-style-type: none"> Potential increased mortality during construction and channel realignment, restoration, and naturalization from direct in-water Potential for fish mortality by the introduction of a deleterious substance 	<ul style="list-style-type: none"> CN will carry out construction activities near water following DFO Measures to Avoid Causing Harm to Fish and Fish Habitat [DFO 2013b] (EIS Section 6.5.1.9.2, page 177).
	✓			<ul style="list-style-type: none"> The Contractor shall notify CN 72 hours before construction of any watercourse or water body crossing or diversions to ensure any necessary fish salvage operations are conducted (i.e., all culvert installations, channel diversions or in-water work) (EIS Section 6.5.1.9.4, page 183).
	✓			<ul style="list-style-type: none"> Under the supervision of CN, a qualified aquatic biologist will conduct fish salvages prior to dewatering areas for in-stream work (EIS Section 6.5.1.9.4, page 183).
	✓			<ul style="list-style-type: none"> Before the commencement of in-water activity, the Contractor will ensure that all necessary equipment and materials are

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				available and are on-site, including contingency equipment and materials (Appendix G, p. G.4).
	✓			<ul style="list-style-type: none"> • CN will ensure water and pump intakes reduce or avoid disturbance of the watercourse bed and are screened in accordance with DFO’s Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO 1995) (EIS Section 6.5.1.9.3, page 182).
	✓			<ul style="list-style-type: none"> • When clearing vegetation to accommodate channel realignment, the Contractor will attempt to avoid fell trees from watercourses and water bodies. The Contractor will immediately remove trees, debris or soil inadvertently deposited below the high watermark of a watercourse (Appendix G, p. G.5).
	✓	✓		<ul style="list-style-type: none"> • CN will not permit Project personnel to fish on the work site (EIS Section 6.5.1.9.4, page 183).
	✓			<ul style="list-style-type: none"> • CN will plan construction activities to avoid or minimize the extent and duration of watercourse diversions required during the realignment of Indian Creek and Tributary A (Appendix G, p. G.3).
Fish and Fish Habitat – Change in Water Quality				
	✓		<ul style="list-style-type: none"> • Potential to induce a wide range of biological effects, including behavioural changes in fish, sub-lethal effects, and fish mortality. 	<ul style="list-style-type: none"> • CN will remove the on-line agricultural pond, which, combined with the construction and implementation of a stormwater management system, will improve water quality (EIS section 3.3.12, page 51).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
✓			<ul style="list-style-type: none"> Reduce overall fish production in a watercourse or water body due to turbidity-related reductions in algae and in benthic and aquatic invertebrate production. Smothering of benthic invertebrate communities or fish eggs and larvae from suspended sediment settling when water velocities slow. 	<ul style="list-style-type: none"> To mitigate thermal impacts, CN will consider a combination of various measures during the detailed design stage including but not limited to: <ul style="list-style-type: none"> Plantation along the wet ponds and outlet channel to provide dense shading; Reverse bottom draw outlet pipe with installation of cooling towers/cooling trenches; Vegetated berms. (Appendix E.15, Appendix B, page 10)
✓	✓			<ul style="list-style-type: none"> CN will develop and implement a Stormwater Management (SWM) Strategy that collects and treats all stormwater run-off from the Terminal prior to release to Indian Creek or Tributary A, which includes the following key design features (Appendix E.15, page 74-75): <ul style="list-style-type: none"> diversion of Tributary A for the Regional event around the PDA and into Indian Creek via interception with a perimeter ditch; two SWM ponds that contain and attenuate flows up to 1:100 year storm event; a minimum of 0.6 m of pond freeboard during the 1:100 year storm event; low flow orifice outlets in the ponds for the 25 mm return period storm event that release the detention volumes over an approximately 12-day period in order to mitigate against receiving water erosion; oil grit separators proposed for the administration and maintenance buildings, gate area and work pad areas to capture sediments, oil and grease before discharge to the wet ponds;

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				<ul style="list-style-type: none"> – shut off valves will be installed on the SWM pond outlets; – channel realignment plantings and live stakes within the banks and riparian areas and instream features (i.e., woody debris toe protection) to provide shading for watercourse channels; – surface water quality controls to provide Enhanced Level 1 Protection; and, – winter road salt mitigation measures to be implemented to reduce salt run-off
	✓			<ul style="list-style-type: none"> • CN will build permanent SWM during the first stage of the construction phase to manage construction site surface run-off and drainage (Appendix E.15, page 75).
	✓			<ul style="list-style-type: none"> • A rainwater collection and distribution system will be installed to collect rainwater from administration and maintenance buildings and distribute it for the irrigation of landscaped areas and washing of equipment (Appendix E.15, Appendix B, p. 22).
	✓			<ul style="list-style-type: none"> • CN will establish and clearly identify a riparian buffer before the start of clearing activities. Disturbance in this area will be restricted to activities associated with realignment, restoration and naturalization (EIS section 6.5.1.9.5, page 185).
	✓			<ul style="list-style-type: none"> • The Contractor will install erosion and sediment control measures at appropriate locations adjacent to all watercourses and/or water bodies, or as directed by the Environmental Monitor(s). Appropriate temporary erosion and sediment control structures shall be installed, maintained and monitored

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				through all phases of construction (EIS section 6.5.1.9.5, page 185).
				<ul style="list-style-type: none"> • CN will implement stabilized construction access and roadways to reduce the tracking of construction sediment (mud and dirt) onto public roads by construction equipment (Appendix E.1, page 91).
	✓			<ul style="list-style-type: none"> • CN will ensure water from flumes, dam and pumps, diversion or other methods do not cause erosion or introduce sediment into the channel (EIS section 6.5.1.9.5, page 185).
	✓			<ul style="list-style-type: none"> • CN will restrict grubbing, stripping and grading on approach slopes to watercourses and water bodies to the amount required to allow safe passage of equipment and completion of the relevant work (EIS section 6.5.1.9.5, page 186).
	✓			<ul style="list-style-type: none"> • CN will delay grading of the primary banks of watercourses and water bodies until immediately before construction of temporary crossings and watercourse realignment, where practicable (EIS section 6.5.1.9.5, page 186).
	✓			<ul style="list-style-type: none"> • CN will complete dewatering in a manner that does not cause erosion or allow sediment to re-enter a watercourse or water body through the use of appropriate sediment control devices (EIS section 6.5.1.9.5, page 186).
		✓		<ul style="list-style-type: none"> • CN will establish designated refueling areas for yard equipment at a safe distance (30 m setback minimum distance from top of bank) from fish habitat (EIS section 6.6.2.4.3, page 294).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
	✓			<ul style="list-style-type: none"> The Contractor will protect concrete pours from rainfall with an impermeable cover for a minimum of 48 hours, or until the concrete cures, in order to prevent high pH run-off (Appendix G, page G.6).
	✓			<ul style="list-style-type: none"> The Contractor will isolate in-stream cast-in-place concrete from fish-bearing waters until the concrete has properly cured (minimum of 48 hours). Alternatively, pre-fabricated concrete will be used for culverts (Appendix G, page G.6).
	✓			<ul style="list-style-type: none"> The Contractor will use accelerants as appropriate to shorten curing times (Appendix G, page G.6).
	✓			<ul style="list-style-type: none"> The Contractor will store open bags of concrete mix in a protected dry area (Appendix G, page G.6).
	✓			<ul style="list-style-type: none"> The Contractor will have a CO₂ tank with regulator, hose, and diffuser available onsite during concrete work to neutralize pH levels (Appendix G, page G.6).
	✓			<ul style="list-style-type: none"> The Contractor will treat wastewater and wash waters to PAL criteria (between pH 6.5 and 9.0) and the turbidity will be less than 25 NTU above background when it is discharged (Appendix G, page G.6).
	✓			<ul style="list-style-type: none"> The Contractor/CN will have spill containment kits present on site in designated locations where there is a significant risk of spill (e.g., refueling areas) (EIS section 6.5.3.9.3, page 216).
	✓			<ul style="list-style-type: none"> When implementing erosion and sediment control mitigation is not practicable (e.g., due to weather conditions), CN will

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				reduce the number of vehicles on access roads or cleared work areas to limit erosion risks (EIS, Table 7.1, page 312).
	✓			<ul style="list-style-type: none"> Should dewatering of excavated area be required (due to rain or minor amounts of groundwater), any water pumped from the excavated area will be pumped through a filter bag or into an area of undisturbed vegetation at least 30 meters from the watercourse or an alternate area approved by the engineer and fisheries biologist (Appendix E.2, page 52).
	✓			<ul style="list-style-type: none"> CN will reduce grubbing near watercourses and water bodies, and other wet areas to facilitate the restoration of shrub communities (Appendix G, page G.3).
	✓			<ul style="list-style-type: none"> CN will construct the channel realignment predominantly outside of the existing channels and will be commissioned upon completion of all works to minimize the time period for diversion of flows within the existing channel. (Appendix E.15, page 75).
	✓			<ul style="list-style-type: none"> As part of the erosion and sediment control measures, the following specific erosion and sediment control measures will be implemented (Response to IR3.31, page 109): <ul style="list-style-type: none"> Vegetation seeding and planting would be stabilized, where necessary, by erosion control matting and blankets. Erosion and sediment control measures around channel realignments will remain in place, at least until vegetation has established.
				<ul style="list-style-type: none"> Prior to construction, the following agricultural row crop management activities will be implemented:

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				<ul style="list-style-type: none"> - Prior to the fallow period, the crops would be harvested from the fields. The agricultural crop fields would be left in an untilled condition with a cover crop for this fallow period. - Prior to ground disturbance as part of construction activities for the Terminal, the agricultural fields within the PDA will be harvested and planted with an erosion protection and nitrogen scavenging cover crop (e.g., winter wheat, cereal rye, barley) and remain fallow with no active agricultural or construction activities for a minimum six-month fall/winter period. (Response to IR7.3, page 14)
✓				<ul style="list-style-type: none"> • At final design, CN will apply specific measures in the context of final grading plans and sequences, and incorporated into the EPP (Erosion and Sediment Control Plan), based on the Erosion and Sediment Control Guideline for Urban Construction” (Greater Golden Horseshoe Area Conservation Authorities 2006) (Response to IR3.41, page 173).
Migratory Birds – Change in Migratory Bird Mortality				
	✓		<ul style="list-style-type: none"> • Bird mortality could occur during the site preparation and watercourse realignment, including removing vegetation, clearing trees, grubbing, and blasting (e.g., bird fatalities through nest destruction). • Bird mortality from vehicular collisions due to increased construction equipment and operation activities in and around the Project. 	<ul style="list-style-type: none"> • CN will avoid construction activities with the potential to remove migratory bird habitat during the breeding season (end of March to end of August). Should vegetation clearing activities be unavoidable during this window, a program will be implemented to avoid effects on migratory birds and their nests (EIS, section 6.5.2.9.1, page 199).
	✓			<ul style="list-style-type: none"> • Should vegetation clearing activities be unavoidable during the breeding season, CN will conduct nest sweeps and avoid

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
			<ul style="list-style-type: none"> Mortality of migratory birds during operations from SWM facilities, in the event they encounter floating hydrocarbons. Site buildings and associated infrastructure pose the potential risk of migratory bird collisions. 	clearing during key sensitive periods and in key locations (EIS, Table 7.1, page 313).
		✓		<ul style="list-style-type: none"> CN will implement speed limits for vehicles on internal roads (EIS, section 6.5.2.9.1, page 199).
		✓		<ul style="list-style-type: none"> CN will implement a Spill Response Plan to contain contamination, including shut-off valves on SWM ponds in the event of an accidental spill to protect the downstream environment. In the event a SWM pond becomes contaminated with a spill, bird deterrents will be implemented to prevent use of the pond by birds until cleanup measures have been completed (EIS, section 6.5.2.9.1, page 199).
	✓			<ul style="list-style-type: none"> CN will retain natural habitat features such as wildlife trees; vegetation will be retained wherever practicable to provide nesting opportunities for cavity-dependent birds (EIS, section 6.5.2.9.2, page 202).
		✓		<ul style="list-style-type: none"> CN will provide employees with sensitivity education for on-site wildlife encounters (EIS, section 6.5.2.9.1, page 199).
	✓			<ul style="list-style-type: none"> CN will implement BMPs, including locating vegetation or greenery away from glass to minimize risk of avian collision with windows, (refer to the Bird Friendly Development Guidelines, City of Toronto 2007) (EIS, Table 7.1, page 314).
Migratory Birds – Change in Migratory Birds Use of Area				
	✓		<ul style="list-style-type: none"> Loss or alteration of terrestrial habitat. Displacement of some migratory bird residences. 	<ul style="list-style-type: none"> Wherever practicable, CN will avoid unnecessary vegetation clearing around the Terminal, access roads and rail (EIS, section 6.5.2.9.2, page 201).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
	✓		<ul style="list-style-type: none"> No changes in use of migratory bird habitat are anticipated due to fragmentation. Construction noise may cause a change in migratory bird use within the LAA. Birds nesting near construction areas may abandon their nests. Acoustic emissions during operation may result in changes to habitat use. Disturbance from human presence may result in indirect disturbance to adjacent migratory bird habitat use during operation. 	<ul style="list-style-type: none"> CN will enhance wetlands or create new ones to improve breeding opportunities for wetland birds (EIS, section 6.5.2.9.2, page 201).
	✓	✓		<ul style="list-style-type: none"> CN will create or protect off-site grassland habitat as an offset for loss of grassland habitat (EIS, section 6.5.2.9.2, page 201).
	✓			<ul style="list-style-type: none"> CN will demarcate construction work area to avoid incidental encroachment into adjacent areas (EIS, section 6.5.2.9.2, page 202).
	✓			<ul style="list-style-type: none"> CN will retain natural vegetation along the boundaries of the Project to act as a buffer from the Project (EIS, section 6.5.2.9.2, page 202).
	✓	✓		<ul style="list-style-type: none"> The Contractor will maintain construction equipment in good working order (e.g., mufflers on vehicles) (EIS, section 6.5.2.9.2, page 202).
	✓			<ul style="list-style-type: none"> CN will maintain Terminal equipment in good working order (e.g., mufflers on vehicles) (EIS, section 6.5.2.9.2, page 202).
✓				<ul style="list-style-type: none"> CN will design Project layout to avoid effects on natural features, including (EIS, section 6.5.2.9.2, page 202): <ul style="list-style-type: none"> Trafalgar Moraine Earth Science ANSI; North Oakville-Milton West Wetland Complex; and, Protected Countryside land use designation under the Greenbelt Plan.
		✓		<ul style="list-style-type: none"> CN will provide employees with sensitivity education for on-site wildlife encounters (EIS, section 6.5.2.9.1, page 199).
	✓			<ul style="list-style-type: none"> During construction, CN will ensure all equipment brought on site is thoroughly cleaned (e.g., remove dirt from other work

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				sites that has accumulated on the tracks, undercarriage, tires) prior to arrival (Appendix G, page G.3).
	✓			<ul style="list-style-type: none"> • CN will avoid using imported fill from known sites of invasive plant infestation (Appendix G, page G.3).
	✓			<ul style="list-style-type: none"> • CN will minimize the size and extent of disturbed soil and vegetation during construction, including brushing, pruning and clearing activities, and preserve existing habitat conditions wherever and whenever possible (Appendix G, page G.3).
Migratory Birds – Sensory Disturbance				
	✓		<ul style="list-style-type: none"> • Artificial lighting may create sensory disturbance to migratory landbirds by influencing bird behaviour. • Within the PDA, any project components that are lit at night have the potential to attract birds, including buildings, light standards or other external lights. 	<ul style="list-style-type: none"> • CN will schedule construction activities during daylight hours whenever practicable to minimize the need for staging lights (Appendix G, page G.4).
	✓			<ul style="list-style-type: none"> • During construction, CN will limit the use of site flood lighting during the migration periods (i.e., April to May and late August through October) (EIS, Table 7.1, page 315).
	✓			<ul style="list-style-type: none"> • If nighttime construction is required, lighting will be directed at the specific construction location (Appendix G, page G.2).
	✓			<ul style="list-style-type: none"> • CN will complete paving operations after the berms are constructed, which will mitigate off-property light effects. (Appendix E.8, page 2 and 15)
		✓		<ul style="list-style-type: none"> • CN will direct perimeter lighting inward towards the Terminal to minimize light trespass to the environment and surrounding areas (Appendix G, page G.2).
		✓		<ul style="list-style-type: none"> • CN will shield outdoor lights (i.e., Terminal light standards) where appropriate to minimize light spillage beyond the required areas (Appendix G, page G.2).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
	✓			<ul style="list-style-type: none"> The Contractor will maintain construction equipment in good working order (e.g., mufflers on vehicles) (EIS, section 6.5.2.9.2, page 202).
		✓		<ul style="list-style-type: none"> CN will maintain Terminal equipment in good working order (e.g., mufflers on vehicles) (EIS, section 6.5.2.9.2, page 202).
Species at Risk – Change in Species at Risk Mortality				
	✓		<ul style="list-style-type: none"> No mortality to Western Chorus Frog is anticipated during construction of the Project. Low risk of mortality to Western Chorus Frog in the event of future occupation of critical habitat within the LAA. No bird, fish, amphibian, mammal or reptile Schedule 1 SAR found within the PDA. 	<ul style="list-style-type: none"> CN will restrict the clearing of vegetation within habitat of Bobolink, Eastern Meadowlark or Barn Swallow to periods outside of the breeding season (end of March to end of August) (Environment Canada 2014) (EIS, section 6.5.3.9.2, page 213).
		✓	<ul style="list-style-type: none"> Potential for mortality of bird SAR during the site preparation, including removing vegetation, clearing trees, and grubbing (e.g., fatalities through nest destruction). 	<ul style="list-style-type: none"> CN will provide employees with sensitivity education for on-site wildlife encounters (EIS, section 6.5.2.9.2, page 213).
		✓	<ul style="list-style-type: none"> Low risk of grassland breeding bird mortality during operation due to collisions with vehicular traffic. 	<ul style="list-style-type: none"> CN will implement speed limits on internal roads (EIS, section 6.5.2.9.2, page 213).
	✓		<ul style="list-style-type: none"> During construction, potential for Snapping Turtle mortality during in-water works. Increased risk of mortality to Snapping Turtle during construction and operation from vehicular traffic. 	<ul style="list-style-type: none"> Under direction from CN, a qualified biologists / ecologist will conduct turtle rescues to relocate Snapping Turtles before in-water works occur in their habitat. Exclusionary fencing will be installed to prevent individuals from re-entering until construction is complete (EIS, section 6.5.2.9.2, page 214).
		✓	<ul style="list-style-type: none"> No anticipated risk of mortality to the Eastern Wood-Pewee or Little Brown Myotis. 	<ul style="list-style-type: none"> CN will place permanent exclusionary fencing between retained/enhanced turtle habitat and the Terminal to avoid interactions with turtles and Project vehicular traffic (EIS, section 6.5.2.9.2, page 214).
	✓			<ul style="list-style-type: none"> CN will avoid construction in-water during Snapping Turtles overwintering period from October to April (EIS, Table 7.1, page 315).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
	✓			<ul style="list-style-type: none"> • CN will employ a snake capture and relocation program using the coverboards already in place, prior to construction, to remove Eastern Milksnakes from the PDA, if present. Snakes will be relocated in accordance with wildlife care protocols to suitable habitat within the LAA (Response to IR1.6, page 8 (CEAR#574)).
	✓			<ul style="list-style-type: none"> • CN will place exclusionary fencing between Western Chorus Frog habitat and the mainline to avoid interactions with frogs during construction (Response to IR8.20, page 8).
Species at Risk – Change in Species at Risk Critical Habitat and Residences				
✓	✓		<ul style="list-style-type: none"> • Occurrence of Western Chorus Frogs critical habitat in the LAA and indirect acoustic emissions from Project operations may occur. • Removal of Bobolink and Eastern Meadowlark habitat during construction and displacement of the residence of these species within the PDA. • Removals of any barns within the PDA will displace Barn Swallow residence. • Changes in water levels or water quality may affect the overwintering or summer life cycles of Snapping Turtle. • During construction, human activity will occur in Snapping Turtle habitat, which is anticipated to result in temporary disturbance in portions of the habitat within the PDA. 	<ul style="list-style-type: none"> • Wherever practicable, CN will minimize the project footprint and avoid unnecessary vegetation clearing around the Terminal, access roads and rail (EIS, section 6.5.3.9.3, page 216).
	✓			<ul style="list-style-type: none"> • CN will demarcate construction work areas to avoid incidental encroachment into adjacent areas (EIS, section 6.5.3.9.3, page 216).
		✓		<ul style="list-style-type: none"> • CN will implement turtle habitat enhancements in Indian Creek and on-site ponds (EIS, Table 7.1, page 316).
		✓		<ul style="list-style-type: none"> • CN will create/protect off-site grassland habitat as offsets for loss of Bobolink and Eastern Meadowlark residences, as well as Monarch habitat (EIS, section 6.5.3.9.3, page 216).
	✓			<ul style="list-style-type: none"> • CN will avoid replacement of the culvert adjacent to Western Chorus Frog habitat during the breeding season for Western Chorus Frogs from March to June (temperature dependent).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
	✓			<ul style="list-style-type: none"> • CN will retain natural vegetation along the boundaries of the Project to provide noise buffers and to limit noise associated with clearing (EIS, section 6.5.3.9.3, page 216).
		✓		<ul style="list-style-type: none"> • CN will create/enhance 18.8 ha of Monarch habitat to offset the loss of 10.8 ha of Monarch habitat within the PDA, considering both breeding and nectaring components of the habitat (Response to IR4.56, page 112).
		✓		<ul style="list-style-type: none"> • CN will shield outdoor lights (i.e., Terminal light standards) where appropriate to minimize light spillage beyond the required areas (Appendix G, page G.2).
		✓		<ul style="list-style-type: none"> • CN will provide employees with sensitivity education for on-site wildlife encounters (EIS, section 6.5.2.9.2, page 213).
Human Health – Change in Human Health				
	✓		<ul style="list-style-type: none"> • Change in human health from short-term and long-term exposure via inhalation of chemicals from air emission sources during construction and operation phases. Primary Air emissions sources are expected to be from mobile or stationary equipment discharging emissions from combustion of fuel (e.g., gasoline, etc.). Mobile emission sources include locomotives, trucks, non-road equipment. Stationary emissions sources include the three future powerpack generators and one clip-on generator. • Change in human health from exposure to fugitive dust emissions from road traffic during movement of mobile equipment (e.g., trucks). • Noise resulting in annoyance/sensitivity. 	<ul style="list-style-type: none"> • CN will control dust and implement dust control measures, including the use of dust suppressants (i.e., water or other approved materials), minimizing activities that generate large quantities of dust during high winds, covering truck-loads of materials which could generate dust (as necessary), and paving areas as required, to control fugitive dust emissions (Appendix E.1, page 52).
	✓			<ul style="list-style-type: none"> • CN will cover or wet materials stored on-site to prevent blowing dust, where practicable (Appendix E.1, page 91).
	✓			<ul style="list-style-type: none"> • CN will construct temporary access routes (i.e., gravel) and parking lots within the site to reduce PM emissions (Appendix E.1, page 91).
		✓		<ul style="list-style-type: none"> • CN will apply vacuum sweeping and water flushing of the on-site roads when necessary to remove the loose material present

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				on the surface of roads that could be re-suspended by road traffic (Appendix E.1, page 92).
	✓			<ul style="list-style-type: none"> • CN will implement dust mitigation for the temporary portable concrete plant, including: <ul style="list-style-type: none"> – Proper planning, design and construction of the portable concrete plant. The plant should be located away from residential areas. Excess material storage areas should be avoided. – Installation of temporary berms/barriers where appropriate around the concrete plant equipment (mixing, silos, transferring and storage areas) to prevent dust emissions. – Dust control equipment (e.g., fabric filter or suitable dust collector systems) for dry material transferring and handling. – Material transfer points, conveyors and mixing equipment will be adequately covered or enclosed to eliminate fugitive dust emission. – Movable and telescoping chutes will be used as appropriate for truck loading activities. The drop height of the cement/ aggregate mixture into the truck shall be minimized to minimize the visible emissions. (Appendix E.1, page 91-92)
		✓		<ul style="list-style-type: none"> • CN will incorporate BMPs to reduce CAC, HAP and GHG emissions into Project design wherever possible (Appendix E.1, page 91).
	✓			<ul style="list-style-type: none"> • During construction, CN will implement a no idling policy to control mobile equipment and other vehicle emissions where

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				applicable (i.e., construction equipment will be turned off when not in use) (Appendix E.1, page 91).
	✓			<ul style="list-style-type: none"> Outdoor work will be stopped by the Project manager or Site Supervisor when extreme weather events create unsafe working conditions (Appendix G, page G.8).
		✓		<ul style="list-style-type: none"> CN will use SmartStart® equipped locomotives as much as possible to reduce excessive idling during warm months. (Appendix E.1, page 92)
		✓		<ul style="list-style-type: none"> CN will use non-road mobile and stationary equipment equipped with low emissions and high fuel combustion efficiency engines (EIS section 1.5.2, page 13), specifically Tier 4 reach stackers.
		✓		<ul style="list-style-type: none"> CN will streamline and further improve the operation process so that the out-going trucks could travel less distance on-site and expedite the container handling turnaround time (Appendix E.1, page 92).
	✓			<ul style="list-style-type: none"> The Contractor and CN will maintain construction and Terminal equipment in good working order, and will use ultra-low sulphur fuel when available (Appendix E.1, page 91).
	✓	✓		<ul style="list-style-type: none"> CN will construct vegetated berms/barriers with a required minimum height of 5 m to mitigate noise effects during operation. These berms will be created during on-site grading activities (Appendix E.10, page 38)
		✓		<ul style="list-style-type: none"> If noise complaints occur, CN will log and investigate complaints to assess whether they are linked with Project activities, and take appropriate action to ensure that the issue is managed (Appendix E.10, page 63).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
		✓		<ul style="list-style-type: none"> • CN will enforce speed limits (for truck traffic) within the Terminal area to reduce the intensity of impulsive noise. (Appendix E.10, page 39)
		✓		<ul style="list-style-type: none"> • CN employees that operate container handling machines (e.g., reach stacker operators) will be trained/instructed to avoid excessive impulsive noise during their loading and unloading operations (Appendix E.10, page 39).
	✓			<ul style="list-style-type: none"> • CN will implement a temporary sound barrier around the concrete batch plant for Phase 3 paving operations. (Appendix E.10, page 63)
	✓			<ul style="list-style-type: none"> • CN will implement a temporary sound barrier (hoarding) as needed for the construction of the Lower Base Line grade separation. (response to IR8.13, page 25)
		✓		<ul style="list-style-type: none"> • Generators, including back-up generators or compressors, to be installed on-site during operation will be housed in-doors (i.e., inside a building or structure) to reduce noise
	✓			<ul style="list-style-type: none"> • CN will limit the overall sound power level of generators used for construction activity to 107 dBA for each individual unit. (Appendix E.10, page 63)
Socio-Economic Conditions – Change in Demand for Community Services and Infrastructure				
	✓		<ul style="list-style-type: none"> • Temporary lane closures or detours during construction may affect road users (e.g., motor vehicle operators, cyclists and others). 	<ul style="list-style-type: none"> • CN has committed to a communication protocol where the local community will be kept informed of planned construction activity (i.e., website, newspapers ads, mail) with dedicated ways to contact CN (i.e., CN Information Centre, 1-800 phone line, email address and website). Prior to initiating

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				<p>construction activities, CN will communicate the location and schedule of construction activities to the community and stakeholders (Appendix E.10, page 63).</p>
	✓			<ul style="list-style-type: none"> • During construction, CN will advise nearby residents of significant noise-causing activities, and these will be scheduled to create the least disruption to receptors (Appendix G, page G.2).
	✓			<ul style="list-style-type: none"> • CN will work with the Town of Milton towards the construction of the underpass at Lower Base Line (EIS section 6.5.5.9.2, page 241).
	✓			<ul style="list-style-type: none"> • CN will build a new two-lane private roadway in the PDA to accommodate truck queuing on CN property (EIS section 6.6.2.6.4, page 299).
Socio-Economic Conditions – Change in the Quantity and Quality of Land and Resource Use				
		✓	<ul style="list-style-type: none"> • Loss of agricultural land 30 ha or 0.1% of the total agricultural land within the RAA). • Presence of the Project, including associated acoustic and atmospheric emissions may: <ul style="list-style-type: none"> - reduce the quality of land use for users within the LAA; - change the views of the landscape; and, - reduce the quality of experience for cyclists in the region. 	<ul style="list-style-type: none"> • CN will work with local farmers for agricultural lease opportunities where they may exist, to mitigate the loss of agricultural land as a result of Terminal activities (EIS section 6.5.5.9.3, page 243). • CN may include rehabilitation or improvement of adjacent lands or providing a contribution to agricultural research in the area (EIS Table 7.1, page 317).
	✓			<ul style="list-style-type: none"> • As per Project design, CN will construct berms in key locations around the PDA and will be vegetated for aesthetics (EIS section 6.5.5.9.3, page 243).
Archaeological and Heritage Resources – Unauthorized Disturbance or Destruction of Part or All of an Archaeological Site or Sites				

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
✓			<ul style="list-style-type: none"> • Site preparation and grading activities of trees, brush and other ground cover may cause disturbances to archaeological resources as the roots pull up soil and can cause displacement of artifacts and destroy features in archaeological sites • Removal of vegetation can result in unstable soil conditions and could result in movement of artifacts and the soil matrix. • Root disturbance during watercourse realignment, restoration and naturalization could displace artifacts or destroy features in archaeological sites • Grading, excavation and removal of soils associated with the construction of roads, berms, yard tracks, storm water management facilities and buildings could cause disturbance and/ or removal of archaeological resources. • Disturbance to soil from grade separation construction (involves temporary relocation of tracks) and utility installation/relocation could lead to unstable soil conditions and movement of artifacts and/or destruction of archaeological resources. 	<ul style="list-style-type: none"> • A careful archeological investigation / assessment has been carried out. A Stage 3 and Stage 4 Archaeological Assessment has been completed prior to construction to ensure all archaeological artifacts have been carefully logged and removed (Appendix G, page G.7). • Controlled salvage excavations (Stage 4) conducted in accordance with industry standards, as confirmed by MTCS.
✓				<ul style="list-style-type: none"> • CN will conduct further assessment of changes to the PDA (EIS section 6.5.6.9.2, page 260).
	✓			<ul style="list-style-type: none"> • CN will avoid disturbance of Archaeological and Heritage Resources wherever practicable. Avoidance options would also require the installation of a protective barrier around the site and a buffer zone. If avoidance and protection of archaeological resources is not feasible then controlled salvage excavations of the archaeological resources, or parts thereof as applicable, will be implemented (EIS section 6.5.6.9.2, page 259-260).
	✓			<ul style="list-style-type: none"> • CN will implement an Archaeological Resources Protection Plan (EIS section 6.5.6.9.2, page 260), which will include worker awareness training regarding basic artifact identification and required next steps.

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
	✓			<ul style="list-style-type: none"> If an archaeological resource is discovered during the construction phase, the Contractor/CN will cease all construction within a 20 m radius of the archaeological resource. In the event of a discovery, CN will stop work immediately and inform MTCS prior to the implementation of procedures and mitigation. A licensed archaeologist will be retained by CN and a Stage 2 Archaeological Assessment will be conducted with the participation of any interested Aboriginal communities (EIS section 6.5.6.9.2, page 260).
	✓			<ul style="list-style-type: none"> Any human remains encountered during construction will be treated with respect and CN will cease all construction around the area immediately; the police or coroner, Registrar or Deputy Registrar of the Cemeteries Regulations Section of the Ontario Ministry of Government and Consumer Services, and the Archaeology Programs Unit will be contacted. Work will not resume until they have cleared the site (EIS section 6.5.6.9.2, page 261).
	✓			<ul style="list-style-type: none"> CN will implement a worker education program about appropriate protocols in case of accidental discoveries (EIS section 6.5.6.9.2, page 260).
	✓			<ul style="list-style-type: none"> CN will train key construction staff in the recognition of basic archaeological artifacts such as Aboriginal material culture (e.g., clay ceramics, lithic artifacts, and faunal remains), and Euro-Canadian material culture (e.g., refined ceramics, glassware, construction debris, and personal effects) (EIS section 6.5.6.9.2, page 260).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
Archaeological and Heritage Resources – Unauthorized Disturbance or Destruction of Part or All of a Heritage Resource				
	✓		<ul style="list-style-type: none"> Land disturbances during the construction phase of the project (site preparation and grading activities, grade separations, utilities, watercourse realignment, restoration and naturalization, and construction equipment and operation) may result in the removal of resources of cultural heritage value and interest. Construction activities may cause vibration effects on cultural heritage resources within 50 m of the construction activities in the PDA. 	<ul style="list-style-type: none"> During construction, CN will maintain 50 m setbacks from cultural heritage structures (Appendix E.3, page 31). In order to reduce the potential for indirect effects as a result of vibration from Project activities, the Contractor/CN will avoid construction activities within 50 m of the barn structure contained within CHR-1 and the residence and barn structures contained within CHR-4. A buffer zone of 50 m will be used to isolate the resources from Project construction activities. Where Project activities must occur within the 50 m buffer, maximum acceptable vibration, or PPV, levels will be determined by a qualified engineer prior to Project activities (Appendix E.3, page 31). CN-owned properties within the PDA with heritage value that are or will be vacated prior to construction (i.e., CHR-3, the house and barn at CHR-4 and CHR-5), will be secured until such time as an adaptive re-use is identified for the structures (Response to IR7.9, page 39).
	✓			<ul style="list-style-type: none"> CN will avoid disturbance of Archaeological and Heritage Resources wherever practicable. Avoidance options would also require the installation of a protective barrier around the site and a buffer zone. If avoidance and protection of archaeological resources is not feasible then controlled salvage excavations of the archaeological resources, or parts thereof as applicable, will be required (EIS section 6.5.6.9.2, page 259-260).
	✓			<ul style="list-style-type: none"> CHR-2, CHR-3 and CHR-5 are located less than 50 m from the PDA where potential grading, staging or other construction

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				activities may occur (subject to confirmation during detailed design). If it is determined through detailed design that a 50 m construction buffer cannot be maintained from these cultural heritage resources, CN will implement construction vibration monitoring (Response to IR4.35, page 46).
	✓			<ul style="list-style-type: none"> Given the determination of indirect effects related to potential vibration effects, CN will use fencing around protective buffer-zones. For the direct effects to the shed, mitigation in the form of relocation or documentation and salvage has been recommended (Appendix G, page G.8).
Light – Change in Light				
✓			<ul style="list-style-type: none"> Increase in light emissions 	<ul style="list-style-type: none"> Terminal lighting design will be as efficient as possible, while providing enough light for on site safety. Any perimeter lighting will be directed inward towards the Terminal to minimize potential light trespass (EIS Appendix G). Lighting equipment selection and design will use down-cast, full cut-off fixtures that are ‘dark sky friendly’ and minimize horizontal component of light (EIS Appendix E.8).
	✓			<ul style="list-style-type: none"> Construction lighting will be directed at the specific construction location (nighttime construction) (EIS Appendix G). Lighting will be reduced in areas not being used for construction activities (EIS Appendix G).
		✓		<ul style="list-style-type: none"> Individual fixtures will be fitted with specific glare mitigation (i.e., side shields), as required (EIS Appendix E.8).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
		✓		<ul style="list-style-type: none"> To supplement mitigation through lighting design, strategic shading elements (berms, barriers and vegetation) (EIS Appendix E.8).
	✓		<ul style="list-style-type: none"> Increased truck traffic on areas roadways 	<ul style="list-style-type: none"> CN will seek collaboration with Halton Region to install a signalized intersection, as necessary, on Britannia Road with a turning lane for trucks entering the terminal from the east to manage vehicle movements and the safety of other road users, including motor vehicle operators, cyclists and pedestrians (EIS section 6.6.2.6.4, page 299). CN is committed to continuing to work with the Region and the Town to identify and mitigate the impacts of the change in truck traffic on the Region’s arterial road network (EIS section 2.2.2, page 28).
		✓		<ul style="list-style-type: none"> On all sections of Britannia Road and Tremaine Road, it is anticipated that standard conventional measures can be implemented by Halton Region. Such measures may include (Appendix E.17, page 24): <ul style="list-style-type: none"> Adjustment to traffic signal control timing and phasing plans; Provision of advisory and/or regulatory signage; Adjustments to the lengths of left turn lanes for added vehicular queue storage length; and Addition of auxiliary right turn lanes or left turn lanes.
		✓		<ul style="list-style-type: none"> In order to reduce potential impact of project-generated truck traffic on the Town of Milton, CN will direct trucks within their care and control (i.e., those operated by CNTL), to utilize Highway 407 when its use would be practical and feasible (EIS section 2.2.2, page 27)

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
	✓			<ul style="list-style-type: none"> • CN will build a new two-lane private roadway in the PDA to accommodate truck queuing on CN property (EIS section 6.6.2.6.4, page 299).
Groundwater – Change in Groundwater				
	✓	✓	<ul style="list-style-type: none"> • Private wells affected by dewatering 	<ul style="list-style-type: none"> • CN will install anti-seepage collars in trenches to prevent the preferential movement of groundwater along the servicing alignments and, subsequently, maintain pre-construction groundwater flow patterns. (Appendix E.6, page 24)
✓	✓			<ul style="list-style-type: none"> • CN will complete a groundwater dewatering assessment following preliminary design, to estimate project dewatering needs (Appendix E.6, page 25). • In the event of dewatering, CN will monitor private wells expected to be located within the dewatering cone of depression, if any (as estimated from the dewatering assessment) for drawdown interference, which could potentially affect the operation of private wells with regards to water quantities (Appendix E.6, page 25).
	✓			<ul style="list-style-type: none"> • Should construction dewatering volumes be projected in excess of 50,000 L/day, a Groundwater Discharge Management Plan will be prepared (Appendix E.6, page 25). • CN will establish an appropriate dewatering system that will dissipate the energy and reduce the sediment content of discharging water for the purpose of limiting potential erosion effects (Appendix E.6, page 25).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
Waste Management				
		✓		<ul style="list-style-type: none"> • CN will implement on-site water recycling and capture where possible (EIS section 6.5.5.8, page 240).
		✓		<ul style="list-style-type: none"> • CN will collect and store sanitary wastewater in a holding tank onsite. The contents of the tank will be pumped out and taken to a licensed disposal facility offsite (Appendix G, page G.9).
		✓		<ul style="list-style-type: none"> • CN will collect, store and dispose all solid waste produced at the Terminal according to all applicable regulations (Appendix G, page G.9).
		✓		<ul style="list-style-type: none"> • CN will track the amount of solid waste and an emphasis will be placed on reduction, reusing and recycling of all solid waste materials (Appendix G, page G.10).
	✓	✓		<ul style="list-style-type: none"> • CN will not burn waste materials on site (Appendix G, page G.10).
		✓		<ul style="list-style-type: none"> • CN will collect, transport, store and dispose hazardous wastes produced during the operation of the Terminal according to all applicable legislation (Appendix G, page G.10).
		✓		<ul style="list-style-type: none"> • CN will dispose all waste at an approved disposal facility (Appendix G, page G.10).
Equipment Maintenance				

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
		✓		<ul style="list-style-type: none"> Regular maintenance of all transfer equipment (reach stackers, rail transfer equipment) will be conducted to avoid potential equipment malfunction (EIS section 6.6.2.5.3, page 297). Equipment will be inspected and properly maintained to avoid potential malfunction. Infrastructure will be regularly maintained as per Transport Canada requirements (EIS section 6.6.2.4.3, page 294).
Effects of the Environment on the Project - Severe Weather				
	✓			<ul style="list-style-type: none"> When severe weather is anticipated for the construction area, the contractor shall complete the following (under the supervision of CN), which will be incorporated into the EPP (Response to IR3.41): <ul style="list-style-type: none"> Contractor must subscribe to a meteorological alert service, ensuring that there is advance warning of flood-producing severe rainfall events; those producing more than 25mm of rainfall precipitation in a 6-hour period, for example. Warning area to be focused upon areas upstream of the site, to the limits of the Indian Creek Watershed; Regularly ensure all erosion and sediment control devices are secure and in good working order;

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
				<ul style="list-style-type: none"> - Backfill any open excavations where feasible; - Contractor shall provide a plan to the owner of working areas within flood prone areas, including but not limited to proposed stormwater ponds, existing and proposed channels of Indian Creek, and swales; - Monitor erosion control measures during rainfall event; - Provide a post-event inspection and recovery plan. Inspect all erosion control measures, re-establish if damaged, and provide a repair or restoration plan outline. Planned erosion control measures are effective when applied (i.e., installed and maintained) appropriately, but may be damaged by severe rainfall events, and so need to be identified (i.e., monitored regularly and following rainfall events during all phases of construction); and, - All prevention, monitoring, and mitigation plans along with corresponding inspection results will be communicated to CN (Response to IR3.41).
Soil Management				
	✓			<ul style="list-style-type: none"> • CN will follow the proper screening and disposal requirements for excess soils if any is deemed to require off-site disposal. (Appendix E.13, page 13)

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
	✓			<ul style="list-style-type: none"> When soils suspected of being potentially contaminated are observed during construction, additional testing should be conducted to further characterize these types of soils to determine suitability for re-use on-site. (Appendix E.13, page 13)
Emergency Response, Accidents and Malfunctions				
		✓		<ul style="list-style-type: none"> CN will create and implement a Hazardous Materials Action Plan to be implemented during operation (EIS section 6.6.2.4.3, page 293).
		✓		<ul style="list-style-type: none"> CN will update the CN Emergency Response Plan to include the Milton Logistics Hub, which will include the location of spill equipment on site, methods to prevent containerized material spills from spreading and for recovering the materials in the water. The plan will also identify any sensitive habitats to best direct response efforts (EIS section 6.6.2.4.3, page 293).
	✓			<ul style="list-style-type: none"> The Contractor will create and implement an Emergency Response Plan during construction, which will include hazardous materials storage and handling procedures (EIS section 6.6.2.4.3, page 294).

Appendix E1 – Final Consolidated Table of Mitigation Measures and CN Commitments

Project Phase			Potential Effects	Proposed Mitigation Measures
Design	Construction	Operation		
		✓		<ul style="list-style-type: none"> Storage of hazardous materials will be restricted to designated areas with proper containment and in accordance with appropriate safety procedures and requirements (EIS section 6.6.2.4.3, page 294).
	✓			<ul style="list-style-type: none"> The Contractor will develop and implement a Spill Response & Contingency Plan during the construction phase, which will require spill containment kits to be present on site in designated locations where the risk of spill is deemed the greatest (e.g., refueling areas) (EIS section 6.6.2.4.4, page 296).

Appendix E2 – Final Follow-up and Monitoring Programs committed to by CN

July 17, 2019

Project Phase			Follow-up / Monitoring to be Conducted	Purpose	Frequency of Monitoring	Duration of Monitoring
Design	Construction	Operation				
Follow-up Programs						
	✓		Air Quality (construction)	To monitor dust (PM _{2.5} and PM ₁₀) levels and meteorological conditions (wind speed, wind direction, temperature, relative humidity) at two locations (one upwind / one downwind of PDA) at or near the property line based on prevailing winds. This will confirm the effectiveness of mitigation measures. If complaints are submitted, adaptive management review may be initiated.	24hr samples, once every 6 days following NAPs schedule Visual observations continuous	Duration of construction
		✓	Air Quality (operation)	Ambient concentrations of NO ₂ , PM _{2.5} , PM ₁₀ , benzene, B(a)P and meteorological conditions (wind speed, wind direction, temperature, relative humidity). This will confirm the effectiveness of mitigation measures. If complaints are submitted, adaptive management review may be initiated.	Continuous sampling on a 5-minute basis, 24 hours per day, with initial daily review of data, once proven, move to less frequent review timing	First year of Operation

Appendix E2 – Final Follow-up and Monitoring Programs committed to by CN

Project Phase			Follow-up / Monitoring to be Conducted	Purpose	Frequency of Monitoring	Duration of Monitoring
Design	Construction	Operation				
	✓		Acoustics (construction)	Sound levels (Ldn dBA) will be measured at locations identified in the Noise TDR after noise barriers / berms are constructed. To verify compliance with predicted noise effects of the project and effectiveness of mitigation measures.	Single event following construction of noise barriers / berms	Continuous for 4 weeks
		✓	Acoustics (operation)	Sound levels (Ldn dBA) will be measured at locations identified in the Noise TDR after noise barriers / berms are constructed. To verify compliance with predicted noise effects of the project and effectiveness of mitigation measures.	Single event following commencement of operations	Continuous for 1 week
		✓	Low Frequency Noise	To ensure concerns regarding low frequency noise are addressed if they arise in the future, CN proposes to implement confirmatory noise monitoring for low frequency noise from idling locomotives at the locomotive idling location.	Single Event (as required)	1 hour
	✓	✓	Surface Water Quantity and Quality	To monitor water levels and water quality within Tributary	Continuous using datalogging instrumentation	3 years

Appendix E2 – Final Follow-up and Monitoring Programs committed to by CN

Project Phase			Follow-up / Monitoring to be Conducted	Purpose	Frequency of Monitoring	Duration of Monitoring
Design	Construction	Operation				
				A and Indian Creek during construction and operation.	Quarterly for in-situ channel depth, velocity and flow measurements (when ice free)	
		✓	SWM Pond Effluent	To monitor stormwater effluent to determine water quality draining from the Terminal into Tributary A and Indian Creek.	Quarterly (when ice free)	3 years
		✓	Geomorphic Assessment (Channel Stabilization and Restoration)	To confirm that installed channel features are stable and that no excessive erosion is occurring throughout the Project reach based on stream characteristics within the realigned channels, including profile, pattern, dimensions and pebble count at established monitoring locations and photo points, as follows: <ul style="list-style-type: none"> • Spring Assessment – visual assessment, including photo documentation of instream structures for geomorphic conditions • Fall Assessment – geomorphic assessment of stream characteristics 	Bi-Annually (spring and fall)	Years 0, 1, 2, and 3 after construction of the realigned channels

Appendix E2 – Final Follow-up and Monitoring Programs committed to by CN

Project Phase			Follow-up / Monitoring to be Conducted	Purpose	Frequency of Monitoring	Duration of Monitoring
Design	Construction	Operation				
				(profile, pattern, dimensions, pebble counts)		
		✓	Fisheries and fish habitat monitoring (Fisheries Assessment)	To confirm that fisheries offsetting measures have been implemented and meet their intended objectives: <ul style="list-style-type: none"> • Compliance monitoring to confirm that planned habitat offsets are constructed according to approved plans; and, • Habitat effectiveness monitoring to confirm habitat offsets are functioning as intended after construction. 	Annually (spring)	Years 0, 1, 2, and 3 after construction of the realigned channels
		✓	Vegetation Assessment (Channel Stabilization and Restoration)	To verify the installation of plant materials as per planting plan and successful propagation of native plant species.	Annually	Years 0, 1, 2, and 3 after construction
		✓	Migratory Birds and Species at Risk	Off-site monitoring will include verifying the establishment and use of grassland habitat by Bobolink and Eastern Meadowlark through an agreement with Ducks Unlimited.	Off-site: Annually (3 surveys / year)	5 years

Appendix E2 – Final Follow-up and Monitoring Programs committed to by CN

Project Phase			Follow-up / Monitoring to be Conducted	Purpose	Frequency of Monitoring	Duration of Monitoring
Design	Construction	Operation				
				On-site monitoring will include verifying the establishment of wetlands and Monarch habitat.	On-site: To be determined through consultation with ECCC	3 years
	✓		Cultural Heritage – Salvage	A documentation and salvage report for the removal of the shed at 5269 Tremaine Road will be completed to provide a record of activities completed in compliance with recommended mitigation strategy.	Single Event	Duration of salvage of the shed
	✓		Confirmatory Light Measurements	Site observations / measurements will be conducted at the time of installing the light standards by the contractor (under the direction of CN) to ensure that the lighting of the Terminal is properly installed, adjusted and commissioned to minimize light spill (e.g., adjustments to glare shields on specific luminaires).	Single Event	1 day
Monitoring Programs						
	✓	✓	Compliance monitoring	To monitor for compliance with project commitments, approvals and corresponding conditions.	Weekly, monthly, seasonally or annually (as appropriate)	Based on environmental approvals, permits and authorizations.

Appendix E2 – Final Follow-up and Monitoring Programs committed to by CN

Project Phase			Follow-up / Monitoring to be Conducted	Purpose	Frequency of Monitoring	Duration of Monitoring
Design	Construction	Operation				
	✓		Construction / environmental monitoring	To verify whether mitigation measures implemented during the construction of the project are functional and whether any of these measures were revised during construction (i.e., monitoring of construction activities by a qualified Environmental Monitor(s)).	2 to 3 days per week, and during key construction activities	Duration of construction (18 to 24 months)
	✓		Cultural Heritage - Vibration	As a component of construction monitoring, to monitoring vibration levels if construction occurs within 50 m of CHR-1, CHR-2, CHR-4, CHR-5, or CHR-6.	Continuous	Duration of construction activity if within 50 m of identified cultural heritage resources
	✓		Archaeological Monitoring	As a component of construction monitoring, to monitoring for the presence of undocumented archaeological resources during ground disturbance activities.	Continuous	Duration of ground disturbance activities

Project Phase			Proposed Plan	Purpose / Description
Design	Construction	Operation		
Environmental Management Plans				
✓			Environmental Protection Plan	To finalize the proposed environmental protection measures and commitments to be carried out by CN, their contractor and subcontractors, during construction to avoid or reduce potential effects. The measures and commitments identified in Table A form the basis of the EPP, which will be documented following the outline provided as Attachment IR5.17-1 (CEAR#647).
✓			Detailed Construction Sequencing Plan	As a component of the EPP, to confirm the overall construction schedule for the Terminal, including timing of proposed culvert installation and channel realignment activities with reference to fisheries timing windows.
✓			Soil Management Plan	As a component of the EPP, to retain and preserve suitable soil for use in Project reclamation/restoration, and to identify and manage soil impacted by existing or historical anthropogenic activities that require removal to allow development of the Project, which will be documented following the outline provided as Attachment IR5.17-3 (CEAR#647).
✓			Planting Plan	As a component of the EPP, to outline the revegetation efforts for the long-term establishment of vegetation within the Project, specifically for restoration and naturalization areas, SWM ponds and other areas to be naturally vegetated. Species selected will include native Ontario species and non-invasive grass species for the seed mixes.
✓			Erosion and Sediment Control Plan	As a component of the EPP, to provide details regarding the implementation of site specific measures to minimize site erosion

Appendix E3 – Final Environmental Management Plan and Detailed Design Plan Commitments

Project Phase			Proposed Plan	Purpose / Description
Design	Construction	Operation		
				and protect watercourses and other sensitive receptors from sedimentation during construction of the Project which will be documented following the outline provided as Attachment IR5.17-4 (CEAR#647).
✓			Archaeological Resources Protection Plan	As a component of the EPP, to identify monitoring and applicable protocols should additional archaeological artifacts and/or human remains be encountered during construction.
✓			Habitat Compensation / Offsetting Plan	To provide confirmation of the proposed measures to compensate for the loss of freshwater fish habitat to obtain Authorization under section 35(2) of the <i>Fisheries Act</i> .
✓			Channel Design Drawings	To provide final channel realignment plans (i.e., updates to those included in EIS Appendix E.2) to obtain Authorization under section 35(2) of the <i>Fisheries Act</i> , including confirmation of the alignment of the channels and in-stream habitat components / structures.
✓			Isolation and Dewatering Plan	As a component of the overall construction schedule, to provide details for the sequencing of events for the realignment of Indian Creek, Tributary A and Tributary C, including mitigation measures to isolate and dewater work areas.
✓			Final Restoration and Enhancement Plans	To describe the proposed on-site wildlife habitat restoration and enhancement measures for: <ul style="list-style-type: none"> • Wetland migratory birds • Grassland migratory birds, including species at risk • Snapping Turtle • Monarch

Appendix E3 – Final Environmental Management Plan and Detailed Design Plan Commitments

Project Phase			Proposed Plan	Purpose / Description
Design	Construction	Operation		
✓			Snapping Turtle Management Plan	As a component of the Restoration and Enhancement Plans, to describe the proposed habitat restoration and enhancement plans as well as measures to mitigate risk of Snapping Turtle mortality through in-water works (watercourse crossings and realignments) during construction, and from vehicular collisions during construction and operation. To mitigate risk of change in residences due to habitat disturbance / alteration.
✓			Salt Management Plan	To describe measures that will mitigate salt loading into the SWM system, which will identify snow storage areas and measures to manage salt application within the Terminal.
✓			Stormwater Management Plan	To provide the detailed design of proposed stormwater management measures, including lot-level, conveyance and end-of-pipe (SWM Ponds) controls for water quality and quantity.
Emergency Response Plans				
✓			Construction Emergency Response Plan (Construction ERP)	To establish an organizational structure and procedures for response to emergencies during construction, which will be documented following the outline provided as Attachment IR5.17-2 (CEAR#647).
✓			Spill Response & Contingency Plan	As a component of the Construction ERP, this plan outlines the procedures, processes and management practices to handle and respond to spills.
✓			Hazardous Materials Action Plan	As a component of the Construction ERP, this plan identifies specific measures to address the risks and response to the potential spill of hazard materials.

Appendix E3 – Final Environmental Management Plan and Detailed Design Plan Commitments

Project Phase			Proposed Plan	Purpose / Description
Design	Construction	Operation		
✓			Operational Emergency Response Plan (Operational ERP)	To establish an organizational structure and procedures for response to emergencies during operation of the CN Milton Logistics Hub.
✓			Hazardous Materials Action Plan	As a component of the Operational ERP, this plan identifies specific measures to address the risks and response to the potential spill of hazard materials.
Other Terminal Design Plans				
✓			Final Terminal Design Plans	Final design drawings confirming the location and design of terminal infrastructure / project components.
✓			Culvert Design Drawings	As a component of the terminal design, to provide details of the proposed culverts conveying Tributary A and C beneath the terminal / access roads, including location, dimensions, and protection measures.
✓			Lighting Design Plans	As a component of the terminal design, to provide detailed design plans confirming the location and fixtures for the Terminal, including light mitigation measures.
✓			Lower Base Line Design Drawings	As a component of the terminal design, to provide detailed design of the proposed underpass beneath the Terminal at Lower base Line Road, including details on roadway and rail line diversions during construction.
✓			Entrance / Intersection Design Plans	To provide detailed design plans for the proposed intersection upgrades on Britannia Road and Tremaine Road to provide access to the Terminal and employee parking area.
✓			SunCanadian Pipeline Design and Construction Drawings	To provide detailed design plans for the construction and operation of the realigned pipelines, including location, depth, footprint of construction and mitigation measures.

Appendix E3 – Final Environmental Management Plan and Detailed Design Plan Commitments

Note: ‘-’ identify the plans and drawings that are a sub-set of the above described plans / drawings, identified based on specific commitments made in the EIS and responses to IRs.

**Appendix F -
Glossary**

Appendix F – Glossary

“**Application**” means the Canadian National Railway Company's application made pursuant to section 98 of the *Canada Transportation Act* for approval to construct railway lines as part of the Milton Logistics Hub Project;

“**B(a)P**” means benzo(a)pyrene;

“**Brampton Intermodal Terminal**” is CN's largest intermodal terminal by volume, located within the City of Brampton, Ontario;

“**Canada Transportation Act**” is a federal Act administered and enforced by the Canadian Transportation Agency. It applies in respect of transportation matters under the legislative authority of Parliament;

“**Canadian Environmental Assessment Act, 2012 (CEAA 2012)**” and its regulations establish the legislative basis for the federal practice of environmental assessment in most regions of Canada. It is administered and enforced by the Canadian Environmental Assessment Agency;

“**Canadian Environmental Assessment Agency**” means the Agency established under the *Canadian Environmental Assessment Act, 2012*;

“**Canadian Transportation Agency**” means the Agency established under the *Canada Transportation Act*;

“**Candela (cd)**” is a measure of luminous intensity that radiates through a physical direction, and incorporates a specific colour weighting to the human eye. The scientific definition of candela is: the luminous intensity, in a given direction, of a source that emits monochromatic radiation of frequency 540×10^{12} hertz and that has a radiant intensity in that direction of $1/683$ watt per steradian;

“**CEAR**” is an acronym for the Canadian Environmental Assessment Registry (see Public Registry)

“**CN**” means the Canadian National Railway Company;

“**Critical habitat**” means the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.

“**Decibel (dB, dBA, dBC, dBZ)**” is a logarithmic unit of measurement that expresses the magnitude of a physical quantity (pressure, power or intensity) relative to a specified or implied reference level. Since it expresses a ratio of two quantities with the same unit, it is a dimensionless unit. The decibel is useful for acoustics and confers a number of advantages, such as the ability to conveniently represent very large or small numbers, and a logarithmic scaling that roughly corresponds to the human perception of sound.

“**EIS Guidelines**” refers to the *Guidelines for the Preparation of an Environmental Impact Statement for the Milton Logistics Hub Project*. The EIS Guidelines were released on July 20, 2015;

Appendix F – Glossary

“Environment” means the components of the Earth as defined in the *Canadian Environmental Assessment Act, 2012*, and includes:

- (a) land, water and air, including all layers of the atmosphere,
- (b) all organic and inorganic matter and living organisms, and
- (c) the interacting natural systems that include components referred to in (a) and (b);

“Environmental Assessment” means, in respect of a project, an assessment of the environmental effects of the project that is conducted in accordance with the *Canadian Environmental Assessment Act, 2012* and its regulations;

“Environmental Effects” means, for the purposes of the review, those effects described in section 5 of the *Canadian Environmental Assessment Act, 2012*;

“Environmental Impact Statement (EIS)” refers to CN's detailed technical document that identifies the potential adverse environmental effects of the project, measures to mitigate those effects, and an evaluation of whether the project is likely to cause any significant adverse environmental effects. The EIS was received by the Canadian Environmental Assessment Agency on December 7, 2015;

“Equivalent continuous sound level [Leq (t)]” refers to a sound level obtained from energy averaging over a specified time interval (t). This level is obtained using an integrating averaging sound level meter, which determines the mean of the square of the sound pressure over a specified time interval (t), and expresses the result in decibels;

“Day-night sound level (L_{DN})” refers to an equivalent continuous sound level taken over 24 hours, with the nighttime (10 pm to 7 am) contributions adjusted by +10 dB. (This is a type of rating level because of the nighttime adjustments.) The nighttime adjustment (or addition of 10 dB to the nighttime period) is used to account for the expected increased annoyance due to noise-induced sleep disturbance and the increased residential population at night relative to daytime, by a factor of 2–3. U.S. Environmental Protection Agency suggests that in quiet areas, the nighttime levels naturally drop by about 10 dB and this level of adjustment has been used with success in the U.S.;

“Exposure ratio” refers to a human health-based ratio calculated by dividing the predicted maximum ground level concentration of a contaminant of potential concern by the applicable federal or provincial air quality criterion;

“Follow-up program” means a program for:

- (a) verifying the accuracy of the environmental assessment of the project, and
- (b) determining the effectiveness of any mitigation measures;

“Greater Toronto and Hamilton Area (GTHA)” is the contiguous urban region consisting of the Regions of Halton, Peel, York and Durham and Cities of Hamilton and Toronto;

“ha” means hectare;

“Halton Municipalities” refers to the Regional Municipality of Halton and the four lower tier municipalities within the region of Halton, namely, the Corporation of the City of Burlington, the

Appendix F – Glossary

Corporation of the Town of Halton Hills, the Corporation of the Town of Milton, and the Corporation of the Town of Oakville.

“Halton Region” refers to the Regional Municipality of Halton

“Interested Party” means any person who the Review Panel determines, with respect to the project, is directly affected by the carrying out of the project or has relevant information or expertise;

“kph” means kilometres per hour;

“Local Assessment Area” is the maximum area within which environmental effects from project activities and components can be predicted or measured with a reasonable degree of accuracy and confidence. It consists of the Project Development Area and adjacent areas where project-related environmental effects are reasonably expected to occur based on available information and professional judgment;

“lux” is a unit of illuminance, equal to one lumen per square metre;

“m” means metre(s);

“Maximum Point of Impingement” is the point where the concentration of an air quality contaminant is predicted to be highest;

“Minister” means the Minister of Environment and Climate Change;

“Mitigation measures” means, in respect of the project, the elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means;

“NO₂” means nitrogen dioxide;

“PAHs” means polycyclic aromatic hydrocarbons;

“the Panel” refers to the Review Panel established for the joint process for the review of the Milton Logistics Hub Project;

“PM_{2.5}”, “PM₁₀” means particulate matter less than 2.5 µm in diameter, and less than 10 µm in diameter;

“the Project” means the Canadian National Railway Company's proposed Milton Logistics Hub, a designated project pursuant to the *Canadian Environmental Assessment Act, 2012*, and components of which are reviewable pursuant to the *Canada Transportation Act*;

“Project Development Area” encompasses the immediate area in which project activities and components may occur and as such represents the area within which direct physical disturbance may occur as a result of the Project, temporary or permanent;

Appendix F – Glossary

“Proponent” means the Canadian National Railway Company;

“Public Registry (the Registry)” refers to the Canadian Environmental Assessment Registry Internet site established under Section 78 of *Canadian Environmental Assessment Act, 2012*;

“region of Halton” refers to the geographic area that falls under the jurisdiction of the Regional Municipality of Halton (Halton Region) and its four lower tier municipalities

“Regional Assessment Area” is the area within which residual environmental effects from project activities and components may interact cumulatively with the residual environmental effects of other past, present, and future (i.e., certain or reasonably foreseeable) physical activities. The Regional Assessment Area is based on the potential for interactions between the Project and other existing or future potential projects;

“Regional Storm Event” refers to a precipitation event that defines the extent of a riverine flood hazard in this area of Ontario;

“Review Panel” has the same meaning as the Panel;

“Stormwater management pond” is a storage facility that temporarily detains stormwater and releases it gradually to manage the quality and quantity of stormwater run-off;

“Stormwater management system” is a surface drainage collection system consisting of storm sewers, culverts, drainage ditches and stormwater management ponds;

“Subwatershed” is an area drained by an individual tributary to the main watercourse. The Project is in the Indian Creek subwatershed;

“Terminal operational footprint” is the area bounded by Britannia Road to the north, First Line to the east, Tremaine Road to the west, and Lower Base Line to the south upon which the majority of container movements and other main activities associated with the operation of the intermodal terminal would occur. This area is approximately 146 acres in size;

“VOCs” means volatile organic compounds;

“Watershed” is defined as the entire area, both water and land, that is drained by a watercourse and its tributaries. The Project is proposed within the Bronte Creek watershed.

Appendix G -

Notice of Sufficiency of Information

April 15, 2019

**Appendix H -
Regulatory Framework**

Appendix H – Regulatory Framework

Introduction

The Project would be subject to a number of regulatory requirements if approved and built. This section discusses the main regulatory approvals that CN would require prior to construction, and notes some of the regulatory requirements with which the Project must comply, but do not require a specific approval to be issued prior to construction.

During the course of the joint process for the review of the Project, the Panel heard information regarding constitutional matters and whether various provincial or municipal approvals and standards would also apply to the Project. The positions of the various interested parties are reported in Appendix I (Constitutional matters heard by the Panel) of this report for the consideration of the relevant decision-makers.

Constitution Act, 1867, 1982

Division of Powers

The *Constitution Act, 1867*, at Sections 91 and 92 respectively, defines the legislative powers assigned to the federal and provincial legislatures in Canada. Since the time of Confederation, and today, railway companies operating in Canada are subject either to federal or to provincial jurisdiction. In either case, the Act states that those legislative powers are exclusive: federally regulated railway companies are subject to the exclusive legislative jurisdiction of Parliament; provincially regulated railway companies are subject to the exclusive legislative jurisdiction of the province in which those companies operate. The key provision of the *Constitution Act, 1982* is Section 92.10:

92. In each Province the Legislature may exclusively make Laws in relation to Matters coming within the Classes of Subjects next hereinafter enumerated; that is to say,

10.

Local Works and Undertakings other than such as are of the following Classes:

(a) Lines of Steam or other Ships, Railways, Canals, Telegraphs, and other Works and Undertakings connecting the Province with any other or others of the Provinces, or extending beyond the Limits of the Province:

(b) Lines of Steam Ships between the Province and any British or Foreign Country:

(c) Such Works as, although wholly situate within the Province, are before or after their Execution declared by the Parliament of Canada to be for the general advantage of Canada or for the advantage of Two or more of the Provinces.

According to the language of Section 92.10, a railway company which operates entirely within a given Province is considered a "local work" and is thereby subject to provincial legislative authority. Also according to the language of Section 92.10, when read in conjunction with Section 91.29, a railway company whose operations extend beyond a provincial or national boundary is subject to federal legislative authority. As mentioned, Section 91 of the *Constitution Act, 1867* sets out the matters that are subject to exclusive federal legislative jurisdiction.

Appendix H – Regulatory Framework

For completeness, subsection 92.10 (c) empowers Parliament to declare a local work to be a work for the general advantage of Canada and therefore subject to federal jurisdiction. In the *CN Commercialization Act, 1995*, Parliament, among other things, declared CN to be a work for the general advantage of Canada.

CN is an inter-provincial railway company operating in most provinces of Canada and across many provincial boundaries and across the border into the United States. It is not disputed, therefore, that CN is subject to the exclusive legislative jurisdiction of Parliament. There is no such consensus, however, on the meaning and scope of exclusive federal jurisdiction. Some parties, including the Halton Municipalities, believe that CN, for the purpose of this environmental assessment, is also subject to a number of provincial laws and related municipal bylaws. Several participants provided the Panel with their perspectives on these legal matters, including case law relevant to the constitutional division of powers. The Panel has summarized these views below in Appendix I (Constitutional matters heard by the Panel) of this report.

Aboriginal Consultation

Section 35(1) of the *Constitution Act, 1982* recognizes and affirms Aboriginal and Treaty rights of Aboriginal peoples of Canada. The courts have found that the Crown has a duty to consult and, where appropriate, accommodate Indigenous groups whose Aboriginal or Treaty rights may be potentially impacted by projects. For legal and policy reasons, the Crown consults with and, where appropriate, accommodates Indigenous groups regarding the potential adverse impacts of its decisions on potential or established Aboriginal or Treaty rights. Crown consultation is integrated into the environmental assessment and regulatory processes to the extent possible and the Canadian Environmental Assessment Agency coordinates the Crown's consultation activities for the duration of the environmental assessment.

Federal Legislation and Regulation

Regulatory approvals required for the Project

Canadian Environmental Assessment Act, 2012

The Project is subject to an environmental assessment under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). Section 25 (b) of the Regulations Designating Physical Activities identifies the construction, operation, decommissioning and abandonment of a new railway yard with seven or more yard tracks or a total track length of 20 kilometres or more as projects that may require a federal environmental assessment. As described in Section 2.1 above, on May 22, 2015 the Canadian Environmental Assessment Agency determined that an environmental assessment of the Project was required.

The environmental assessment has the purpose of examining the environmental effects of the Project, and whether, after considering any technically and economically feasible mitigation measures, those effects would be adverse, significant, and likely. Environmental effects are identified in Section 5 of the *Canadian Environmental Assessment Act, 2012*.

If the Minister of Environment and Climate Change determines, after consideration of the report of the Panel, that the Project is not likely to result in significant adverse environmental effects, he may issue a decision statement that would allow the Project to proceed. If the Minister determines that the Project

Appendix H – Regulatory Framework

is likely to result in significant adverse environmental effects, then the Governor in Council (i.e. federal Cabinet) must decide whether those significant effects are justified in the circumstances.

In the case that, after mitigation, there are no significant adverse environmental effects, or the Governor in Council decides those effects are justified in the circumstances, the Minister is required to issue a decision statement outlining the legally enforceable conditions that would apply to the Project, should it proceed.

Should the decision statement allow the Project to proceed, the Canadian Environmental Assessment Agency would be responsible for the enforcement of any conditions that are included in a decision statement for the Project. The conditions that the Minister includes within a decision statement are then enforced by the Compliance Promotion and Enforcement unit of the Canadian Environmental Assessment Agency.

Canada Transportation Act

The *Canada Transportation Act* (CTA) is a federal statute.

Section 5 of the *Canada Transportation Act* sets out the National Transportation Policy of Canada which mentions that the national transportation system should, among other objectives, contribute to a sustainable environment:

It is hereby declared that a competitive, economic and efficient national transportation system that meets the highest practicable safety and security standards and contributes to a sustainable environment and makes the best use of all modes of transportation at the lowest total cost is essential to serve the needs of its users, advance the well-being of Canadians and enable competitiveness and economic growth in both urban and rural areas throughout Canada.

Part I of the *Canada Transportation Act* creates the Canadian Transportation Agency, an independent, quasi-judicial tribunal and regulator that makes decisions and determinations on a wide range of railway transportation matters. It is the most current version of a federal transportation tribunal, which has been in existence for over 100 years. The proponent is subject to the *Canada Transportation Act* and thereby to the regulatory jurisdiction of the Canadian Transportation Agency.

Part III of the *Canada Transportation Act* is entitled “Railway Transportation”. The provision of Part III of the *Canada Transportation Act* most immediately relevant to this Project is Section 98, which prohibits a federally regulated railway company from constructing certain lines of railway without Agency approval.

On January 22, 2016, CN applied under Section 98 to the Canadian Transportation Agency for approval to construct those parts of the Project requiring such approval. According to Section 98, the Agency may grant the approval if it considers that the location of the railway line is reasonable after taking into consideration the requirements for railway operations and services as well as the interests of the localities that will be affected by the railway line.

Appendix H – Regulatory Framework

Section 98 of the *Canada Transportation Act* is subject to Section 7 of the *Canadian Environmental Assessment Act, 2012*. Where, as here, a federal environmental assessment is undertaken in relation to a project that includes the construction of a new railway line, in accordance with Section 7 of the *Canadian Environmental Assessment Act, 2012*, the Canadian Transportation Agency can only proceed to determine whether or not it will approve an application, under to Section 98 of the *Canada Transportation Act*, once the Minister has determined that the Project is not likely to cause significant adverse environmental effects after taking into account the implementation of any mitigation measures or the Governor in Council finds that those significant adverse environmental effects are justified in the circumstances.

Other provisions of Part III of the *Canada Transportation Act* are also potentially relevant in the context of a federal environmental assessment. Section 95 of the *Canada Transportation Act* lists some of the general corporate powers a railway company may exercise in the construction or operation of its railway. Section 95 (1) of the *Canada Transportation Act* gives railway companies the power to do things that most corporations cannot do. A railway company may:

- (a) make or construct tunnels, embankments, aqueducts, bridges, roads, conduits, drains, piers, arches, cuttings and fences across or along a railway, watercourse, canal or road that adjoins or intersects the railway;
- (b) divert or alter the course of a watercourse or road, or raise or lower it, in order to carry it more conveniently across or along the railway;
- (c) make drains or conduits into, through or under land adjoining the railway for the purpose of conveying water from or to the railway;
- (d) divert or alter the position of a water pipe, gas pipe, sewer or drain, or telegraph, telephone or electric line, wire or pole across or along the railway; and
- (e) do anything else necessary for the construction or operation of the railway.

These powers must be exercised in accordance with the other provisions of the *Canada Transportation Act* and all other federal laws. Moreover, Sections 95(2) and 95(3) state, generally, that a railway company shall do as little damage as possible in the exercise of these powers and, specifically, that if a railway company does divert something like a watercourse or a road that it shall restore it as nearly as possible to its former condition or shall put it in a condition that does not substantially impair its usefulness.

Section 95.1 of Part III of the *Canada Transportation Act* addresses the noise and vibration that necessarily results from the construction and operation of a railway. Parliament added this section to the *Canada Transportation Act* in 2007. Section 95.1 obliges a railway company to cause only such noise and vibration as is reasonable. Section 95.3 empowers the Canadian Transportation Agency to receive and to investigate and to resolve complaints over railway noise and vibration that someone considers

Appendix H – Regulatory Framework

not to be reasonable. These powers are more fully discussed in Chapter 6 (Noise and Vibration) of this report.

Part VI of the *Canada Transportation Act* addresses enforcement of the provisions of the Canadian Transportation Agency through, among other things, administrative monetary penalties. The Canada Transportation Agency monitors compliance with its orders. Non-compliance with conditions imposed by the Canadian Transportation Agency to an approval of a railway project under Section 98 of the *Canada Transportation Act* may result in enforcement proceedings by the Canadian Transportation Agency. Further, as more fully described at Sections 177 and 178 of the *Canada Transportation Act*, a designated enforcement officer may issue a notice of violation imposing an administrative monetary penalty of up to \$25,000 per violation.

In the EIS, CN noted that the Project also requires an approval under Section 98 of the *Canada Transportation Act*, which stipulates that a railway company shall not construct a railway line without the approval of the Canadian Transportation Agency. CN further indicated that it may require Canadian Transportation Agency approval for certain road and utility crossings under Section 101 of the *Canada Transportation Act*.

Other Regulatory requirements for aspects of the Project

CN would also require a number of other federal regulatory approvals, including an authorization under the *Fisheries Act*, the *Railway Safety Act*, and the *Radiocommunications Act*. CN would also be required to comply with a number of other legislative requirements, including the federal *Species at Risk Act*, the *Migratory Birds Convention Act*, *Canadian Environmental Protection Act*, pollution prevention provisions of the *Fisheries Act*, and the Transportation of Dangerous Goods regulations. These matters are discussed in the relevant sections of the report, as appropriate.

Fisheries Act

The Panel was guided by the *Fisheries Act, 2012-2013* and provides the description of this Act below. The *Fisheries Act*, specifically the fish and fish habitat protection provisions, establishes authorities for the protection of commercial, recreational and Aboriginal fisheries. This includes the prohibition against serious harm to fish, which applies to fish and fish habitat that are part of, or support, a commercial, recreational or Aboriginal fishery. Serious harm is defined in the Act as the “death of fish or any permanent alteration to, or destruction of, fish habitat”. The goal of Fisheries and Oceans Canada in applying this policy is to provide for the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries and to achieve this in a consistent manner through regulations, standards and directives. After efforts have been made to avoid and mitigate project impacts, any residual serious harm to fish must be addressed through offsetting. Proponents are responsible for requesting a paragraph 35 (2)(b) authorization under the *Fisheries Act*. In its EIS under the table of key permits/approvals required, CN indicated that the Minister of Fisheries and Oceans may review any work, undertaking or activity that may result in serious harm to fish, under Section 37(1) of the *Fisheries Act*.

During the environmental assessment the Panel heard from Fisheries and Oceans Canada that Bill C-68 proposed a number of amendments to the Fisheries Act. Fisheries and Oceans Canada submitted a summary of the changes in that bill to the Panel and indicated that the Fisheries Act would continue to

Appendix H – Regulatory Framework

apply until any changes came into force. Fisheries and Oceans Canada stated the proposed amendments would not affect the Milton Logistics Hub project, so long as it had received a s35(2)(b) authorization prior to the coming into force of the amended Fisheries Act. If the Project requires an authorization following the coming into force of the amended Fisheries Act, the proposed authorization would be assessed under the new amended Fisheries Act. The Panel understands that changes to the Fisheries Act came into force on August 28, 2019, after the Panel record had closed.

Railway Safety Act

CN indicated that if the Project was to proceed it would be required to give notice of the work in accordance with the Section 8(1) of the Railway Safety Act. Transport Canada stated it is responsible for regulating the safety of rail operations, pursuant to the Railway Safety Act. The department's role is to monitor all federally regulated railway companies throughout Canada for compliance with rules, regulations and standards through audits and safety inspections. Under the Act, railway companies are responsible for the safety of their rail line infrastructure, railway equipment and operations, and for compliance with all applicable regulatory requirements.

Transport Canada stated that the following legislation and regulations relate to the Project:

- *Railway Safety Act*: Section 8 Notice of Certain Proposed Railway Works;
- Notice of Railway Works Regulations;
- *Railway Safety Act*: Section 11 - Sound Engineering Principles;
- Grade Crossings Regulations and Grade Crossings Standards;
- The Rules Respecting Track Safety.

Transport Canada noted that depending on the nature of the final Project details, other elements of the *Railway Safety Act* may also apply.

Radiocommunication Act

CN indicated that it may require approval of a communication system under subsection 5(1)(f) of the *Radiocommunication Act* which allows for the relevant Minister to approve each site on which radio apparatus is located.

Regulatory matters with which the proponent must comply, but no specific approvals required

The Project would be subject to a number of other federal laws and regulations governing its activities. In response to concerns the Panel heard from a number of participants during its review, the Panel provides the following information in relation to the Constitution, federal environmental laws of general application, the transportation of dangerous goods, intermodal surface security, and the role of CN Police.

Migratory Birds Convention Act, 1994

Environment and Climate Change Canada stated that it administers and enforces the *Migratory Birds Convention Act, 1994*. The purpose of the Act is to implement the Migratory Birds Convention between Canada and the United States by protecting and conserving migratory birds, both as populations and as individual birds. The *Migratory Birds Regulations* provide for the conservation of migratory birds and for the protection of their nests and eggs.

Appendix H – Regulatory Framework

Section 5.1 of the *Migratory Birds Convention Act, 1994* prohibits the deposit of a substance that is harmful to migratory birds in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area. The Act also prohibits the possession of a migratory bird, nest or egg without lawful excuse.

The *Migratory Birds Convention Act, 1994* prohibits the harming of migratory birds, the nests of migratory birds and/or their eggs. There is potential for these to be inadvertently harmed or disturbed as a result of many activities, including but not limited to clearing trees and other vegetation, draining or flooding land, or using fishing gear. Environment and Climate Change Canada stated that harming individual birds, nests or eggs can have long-term consequences for migratory bird populations in Canada, especially through the cumulative effects of many different activities.

Species at Risk Act, 2002

Environment and Climate Change Canada reported that it is responsible for the overall administration and enforcement of the *Species at Risk Act, 2002*. The federal Minister of Environment and Climate Change and the Parks Canada Agency are responsible for species at risk found in national parks, national historic sites or other protected heritage areas, as well as for all other non-aquatic species at risk. The federal Minister of Fisheries and Oceans is responsible for aquatic species at risk.

The purpose of the *Species at Risk Act, 2002* is to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity, and to manage species of special concern to prevent them from becoming endangered or threatened. Schedule 1 of the Act provides a list of wildlife species at risk in Canada that are considered extirpated, endangered, threatened, or of special concern.

The *Species at Risk Act, 2002* provides measures for the protection of listed threatened, endangered or extirpated species and their residences. Section 32(1) of the Act states that no person shall kill, harm, harass, capture or take an individual of a wildlife species listed as extirpated, endangered or threatened. Section 33 states that no person shall damage or destroy the residence of one or more individuals of a wildlife species listed as endangered or threatened or as an extirpated species if a recovery strategy recommends the reintroduction of the species into the wild in Canada.

Canadian Environmental Protection Act, 1999

Environment and Climate Change Canada stated that it is responsible for the administration and enforcement of the *Canadian Environmental Protection Act, 1999*. The Act is aimed at preventing pollution and protecting the environment and human health. One of the Act's major thrusts is the prevention and management of risks posed by harmful substances.

Authority to require emergency plans for toxic or other hazardous substances set out in Schedule 1 to the Environmental Emergency Regulations is provided in Part 8 of the *Canadian Environmental Protection Act, 1999*. The Environmental Emergency Regulations are aimed at enhancing the protection of the environment and human life and health by the preparedness for response to and recovery from environmental emergencies. The Environmental Emergency Regulations require those who own, have charge, management or control of toxic and hazardous substances set out in Schedule 1 to the Regulations at or above the specified thresholds to provide required information on the substance(s), their quantities and to prepare and implement environmental emergency plans. Although neither

Appendix H – Regulatory Framework

Environment and Climate Change Canada nor CN identified specific instances where it would be required for the Project, Environment and Climate Change Canada indicated an Environmental Emergency Plan would be required if regulated substances at or above the specified threshold quantity were stored on the Project site for more than 72 consecutive hours.

Additionally, under the *Canadian Environmental Protection Act, 1999*, the Canadian Ambient Air Quality Standards have been established for fine particulate matter (PM_{2.5}), ground-level promoting ozone, nitrogen dioxide and sulphur dioxide. Although the Canadian Ambient Air Quality Standards are not legally-binding, federal, provincial, and territorial governments have agreed to work collaboratively to implement actions to improve air quality and to report on the achievement of the Canadian Ambient Air Quality Standards on a regular basis. The Canadian Ambient Air Quality Standards are underpinned by air quality management levels which call for progressively more rigorous actions by jurisdictions as air quality approaches or exceeds the Canadian Ambient Air Quality Standards.

Fisheries Act – Pollution prevention provisions

The federal Minister of Environment and Climate Change is responsible for the administration (including the enforcement) of the pollution prevention provisions of the *Fisheries Act*, Section 36(3).

Section 36(3) of the *Fisheries Act* states that, unless otherwise authorized by regulations meeting specific criteria, no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substances or any deleterious substance that results from the deposit of the deleterious substance may enter any such water.

In the definition of deleterious, the *Fisheries Act* includes: any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water. Section 36(3) makes no allowance for a mixing or dilution zone.

In the absence of a regulation authorizing their release, and to the extent that the substance is a prescribed substance or that it can be demonstrated that the substance is a "deleterious substance" as defined in paragraph Section 34(1) of the *Fisheries Act*, any release from the construction, operation, reclamation or decommissioning stages of the Project, to any waters frequented by fish, may constitute a violation of the *Fisheries Act*.

Transportation of Dangerous Goods Act

Transport Canada develops, administers and oversees the policies, regulations and standards necessary for the safe transportation of dangerous goods in Canada. The *Transportation of Dangerous Goods Act* and the related regulations establish safety requirements, which include classification, documentation, packaging, safety marks, training, emergency response assistance plans and incident reporting. Transport Canada's regional inspectors monitor for compliance of companies with these regulations.

Transport Canada indicated that the federal requirements regarding the transportation of dangerous goods would apply to all modes of transportation (including trains and trucks), both within and outside

Appendix H – Regulatory Framework

of the Project. Transport Canada stated that each province also has its own provincial requirements, which are harmonized with the federal requirements.

Intermodal Surface Security and Safety

Transport Canada, through a Memorandum of Understanding with the Railway Association of Canada and its members as well as the Transportation of Dangerous Goods by Rail Security Regulations, requires railway companies to take a number of steps to ensure the security of dangerous goods shipped by rail. These include inspections and security risk assessments, development of security plans and awareness training, and reporting requirements for security incidents. CN is a member of the Railway Association of Canada and is subject to the Memorandum of Understanding.

Authority of CN Police

CN, like other federally regulated railway companies in Canada, operates its own police force. CN Police Service derives its authority from the *Railway Safety Act* and is responsible for enforcing all provincial and federal laws, including the *Canada Transportation Act* and the *Railway Safety Act* as they relate to the protection of property and the safety of people on, or within 500 metres of, any property that CN owns or administers across CN's network of track and terminals in Canada. In the presentation at the Panel's Orientation Session, the Chief of CN Police indicated that some officers also receive basic dangerous goods training. CN stated that its officers are the first line of response to any emergency that happens on CN property and that they monitor and coordinate responses to emergencies and reported threats, including trespassing, theft and any other activity that could affect the safety and security of the railway and persons on or near CN property.

CN Police indicated that it will help to enforce the relevant laws and regulations through spot checks to ensure that vehicles entering and exiting the terminal meet safety standards, and that this activity already occurs on CN rail lines within Halton Region with Halton Regional Police Service and the Ministry of Transportation of Ontario.

Provincial and Municipal Standards

CN's consideration of relevant non-federal standards

Early in the environmental assessment process, CN stated that it holds a federal certificate of fitness issued by the Canadian Transportation Agency under Section 92 of the *Canada Transportation Act*. Section 95 of the *Canada Transportation Act* confers onto CN powers to construct and operate a railway. Additionally, CN stated that Section 16 of the *CN Commercialization Act* declares the Railway as a work for the general advantage of Canada. As a federally regulated railway, CN declared that it is subject to applicable federal legislation, but that provincial and local legislation that encroaches on CN's core activities is not applicable to CN. Similarly, provincial or local legislation inconsistent with federal legislation governing CN's activities does not apply to CN.

Provincial

Although CN stated it was not subject to provincial and local legislation, it also noted that, under the *Ontario Environmental Protection Act*, it would apply to the Ontario Ministry of the Environment and Climate Change for an Environmental Compliance Approval for all points of discharge from the Project. After the Panel sought clarification from CN on this apparent discrepancy, CN stated that its consideration of the Environmental Compliance Approval reflected its regular practice of considering, on

Appendix H – Regulatory Framework

a case-by-case, facts-specific basis, whether there are one or more aspects of a particular project that may warrant seeking a provincial environmental approval at the appropriate stage of development. CN further stated its position that its status as a federal undertaking whose works have been declared to be for the general advantage of Canada resulted in no additional provincial permits or municipal approvals or permits being required for the Project.

A number of participants opposed CN's view that it was not subject to provincial or local legislation. The Panel heard primarily from the Halton Municipalities, but other participants including Milton Says No, Conservation Halton and the Federation of Canadian Municipalities discussed these matters. The Panel found that the discussion on whether provincial or local laws applied to CN was outside of its mandate to opine on. A summary of views on these matters of jurisdiction is provided in Appendix I (Constitutional Matters Heard by the Panel) of this report.

Appendix I -

Constitutional Matters Heard by the Panel

Appendix I – Constitutional Matters Heard by the Panel

During the course of the joint process for the review of the Project, the Panel heard information regarding constitutional matters and whether or the extent to which various provincial or municipal approvals and standards would also apply to the Project.

During the course of the Panel’s review of the Project, the Halton Municipalities initiated an application before the Ontario Superior Court of Justice for which Conservation Halton was a co-applicant. The applicants sought court declarations as to the applicability of various approvals under provincial and municipal laws, regulations and by-laws to CN, in relation to the Project. As part of that court case, CN filed a motion for the Court to stay Halton Municipalities’ application, and on October 29, 2018, the Court released its decision that the application would be stayed, “pending the decision by the Minister of the Environment and/or cabinet regarding approval of the proposed intermodal rail hub project under Sections 52-54 of the *Canadian Environmental Assessment Act, 2012*”¹.

The Panel would not typically write or opine on matters of constitutional Law in an environmental assessment report, however, given the level of interest in jurisdictional matters with respect to the regulation of the proposed Project, the Panel would like to clearly state its position that it is not the body that will decide on the matters of constitutional debate concerning this Project. Those decisions are for others to make. However, the information in this Appendix is only intended to fulfill the Panel’s mandate to set out a summary of any comments received from the public, including interested parties at the hearing. The Panel does this as a means to reflect the concerns and debate it heard during the course of its review so that the relevant decision makers have this information. For full context, the Panel recommends that anyone who wishes to see the complete arguments of the parties visit the Registry and the relevant documents.

For a discussion of the main regulatory approvals that CN would require prior to construction, and some of the regulatory requirements with which the Project must comply, but do not require a specific approval to be issued prior to construction, refer to Appendix H (Regulatory Framework) of this report.

CN’s Views

In subsection 6.2.2.1 of the EIS, CN stated that the Project is federally regulated, and as such is subject to relevant federal legislation. However, it noted that it had taken certain provincial laws into consideration where appropriate. Specifically, CN sometimes used the regulatory setting to define the scope of the assessment for individual valued components, to provide relevant definitions under legislation, or defining measureable parameters or significance thresholds².

In response to an Information Request from the Panel, CN clarified its position that it had provided information about the provincial and municipal planning framework and key documents for context, but did not intend to imply applicability of those documents to the Project³. CN further elaborated that its

¹ CEAR# 697, pdf p. 2

² CEAR# 57, EIS, pdf p. 154

³ CEAR# 592, Responses to Information Request package 2, pdf p. 1

Appendix I – Constitutional matters heard by the Panel

typical practice, and intention for this Project, is to consider the interests of provincial and local authorities⁴.

CN stated that subsection 92(10)(a) of the *Constitution Act, 1867*, together with Section 91(29), assigns to the federal Parliament exclusive legislative authority in relation to, among other things, transportation and communications undertakings, interprovincial railways. CN's perspective was that exclusive federal authority extends to all works and undertakings that are integrated in operation with an interprovincial railway addition, and that Parliament had declared that CN's railway and other transportation works in Canada are works for the general advantage of Canada within the *CN Commercialization Act*. This declaration engages Parliament's exclusive jurisdiction under subsection 92(10)(c) of the *Constitution Act, 1867*⁵.

CN suggested that there were two legal doctrines that applied to protect the exclusivity of federal jurisdiction over its activities: interjurisdictional immunity and paramountcy.

CN reported that the interjurisdictional immunity doctrine protects the exclusivity of the legislative powers conferred by the Constitution on each level of government. It protects that exclusivity whether the legislative power has actually been exercised through the enactment of legislation. CN argued that this provides, in essence, that if otherwise valid legislation intrudes on important elements of the powers of another level of government, the legislation will be constitutionally inapplicable. CN stated that the doctrine of interjurisdictional immunity protects federal authority to determine the location of transportation and communications undertakings and infrastructure from the application of provincial and municipal land use planning legislation and bylaws, and provided several court decisions to support this position⁶.

CN further noted that the paramountcy doctrine addresses conflicts between a valid federal law and a valid provincial (or municipal) law. Unlike interjurisdictional immunity, the focus of the paramountcy doctrine is on conflicts between legislation rather than between legislation and a legislative power. The doctrine provides that in the event of a conflict, the federal law prevails, and the provincial law is inoperative, to the extent of the conflict. The paramountcy doctrine has two branches, or recognizes two types of conflicts: operational conflicts and conflicts of purpose. An operational conflict arises where there is an actual conflict in operation between valid federal and valid provincial legislation so that compliance with both is impossible. A conflict of purpose arises where, even though it is possible to comply with both laws, applying the local law would frustrate the purpose of the federal law⁷.

Specifically, with respect to the Project, CN stated that the federal decision-making authority regarding whether and where to construct core infrastructure had long been held by the courts to be worthy of protection through the doctrine of interjurisdictional immunity. CN argued that municipal land use

⁴ CEAR# 592, Responses to Information Request package 2, pdf p. 3

⁵ CEAR# 592, Responses to Information Request package 2, pdf p. 3-4

⁶ CEAR# 592, Responses to Information Request package 2, pdf p. 4

⁷ CEAR# 592, Responses to Information Request package 2, pdf p. 4-5

Appendix I – Constitutional matters heard by the Panel

planning legislation had been repeatedly held to be inapplicable to the core infrastructure projects of federally regulated undertakings in similar circumstances⁸.

CN suggested that the doctrine of paramountcy applied with respect to whether and where to build a railway terminal would also produce the same result. The federal legislation that applies to the Project vests decision-making authority in that regard with a number of federal authorities. The main approval is in the hands of the Canadian Transportation Agency, which is specifically vested through Section 98 of the *Canada Transportation Act* with the authority to determine whether the proposed location of the Project is reasonable by taking into account, among other things, the interests of affected localities⁹.

Participants' Views

The majority of opposing views were put forward by the Halton Municipalities, although Milton Says No, Conservation Halton and the Federation of Canadian Municipalities also discussed these matters. However, the Federation of Canadian Municipalities stated clearly that its submissions were limited to responding to specific CN submissions on constitutional issues, and it did not comment on any aspect of federal environmental assessment¹⁰.

Halton Municipalities took exception to CN's position and submitted that constitutional principles with respect to the Project arise from Canadian federalism and that Canada's constitutional division of powers requires that provincial powers, including those that the provinces delegate to municipalities and other regional and local bodies such as conservation authorities, be respected alongside federal powers¹¹.

Halton Municipalities urged the Panel to accept that, in their view, the *Canadian Environmental Assessment Act, 2012* is, at heart, a planning statute. Halton Municipalities submitted that environmental assessment is a planning tool that is now generally regarded as an integral component of sound decision-making. They stated that the EIS Guidelines for this Project recognize this reality as a guiding principle. In its view, the Act, as the Supreme Court recently held, provides a process for integrating environmental considerations into planning and decision making¹².

According to the Halton Municipalities, planning under the *Canadian Environmental Assessment Act, 2012* considers the long-term impacts of development from a multitude of perspectives, with two central goals: (i) the promotion of sustainable development, and (ii) the protection of the environment and human health¹³. Halton Municipalities noted that these goals are also central to Ontario land use planning under the *Planning Act*. Under Ontario law and policy, all five Halton municipalities are

⁸ CEAR# 592, Responses to Information Request package 2, pdf p. 5

⁹ CEAR# 592, Responses to Information Request package 2, pdf p. 6

¹⁰ CEAR# 961, Responses to Information Request package 2, pdf p. 1

¹¹ CEAR# 405 Halton Municipalities Brief (Main document) pdf p.18

¹² CEAR# 973, pdf p. 15

¹³ CEAR# 973, pdf p. 15-16

Appendix I – Constitutional matters heard by the Panel

planning authorities tasked with advancing sustainable development and implementing planning broadly and cooperatively for all projects and development within their boundaries¹⁴.

Halton Municipalities submitted that the proposed railway yard will change the environment as defined by the *Canadian Environmental Assessment Act, 2012*, and that its construction would permanently change land and water features. Its operation would change air quality, ambient noise levels, and nighttime lighting. These changes will have effects on human health and safety, and socio-economic conditions in the town and region. The Canadian Environmental Assessment Agency seeks to prevent significant adverse environmental effects. In Halton Municipalities' view, prevention of significant effects requires a broad range of effects to be considered¹⁵.

Throughout the federal joint process for the review of the Project, Halton Municipalities provided the Panel with a detailed review of the *Canadian Environmental Assessment Act, 2012*'s specific provisions on environmental effects, showing what Halton Municipalities considered to be the legal basis for applying a broad view of the relevant environmental effects¹⁶. Section 1.2 of this report (Panel approach to the Assessment) describes how the Panel approached Halton Municipalities' suggestions within the context of its mandate.

Halton Municipalities suggested that there are two particularly important constitutional developments with respect to the Project. The first was that CN's railway ownership change from a federal Crown entity to a private company meant that the Project lands are no longer considered federal lands; Halton Municipalities suggested these are therefore subject to constitutionally appropriate provincial and municipal regulation. Halton Municipalities further suggested the courts' have narrowed consideration of federal paramountcy over provincial and municipal laws to respect the legislative mandates and operational sophistication of local governments, particularly municipalities in Canada's urban areas¹⁷.

Halton Municipalities raised concern that CN's response to information request package #2 might affect the Panel's view of the proper constitutional landscape for the Project in reaching conclusions and recommendations for the Minister. A second concern was that CN would continue to carry out preparatory work for the Project without regard to applicable provincial and municipal laws¹⁸.

In light of its constitutional concerns, Halton Municipalities initiated an application before the Ontario Superior Court of Justice for which Conservation Halton was a co-applicant. The applicants sought court declarations as to the applicability of various approvals under provincial and municipal laws, regulations and bylaws to CN, in relation to the Project¹⁹. As part of that court case, CN filed a motion for the Court to stay Halton Municipalities' application, and on October 29, 2018, the Court released its decision that the application would be stayed, pending the decision by the Minister of the Environment and/or

¹⁴ CEAR# 973, pdf p. 15-16

¹⁵ CEAR# 973, pdf p. 16-17

¹⁶ CEAR# 973, pdf p. 17

¹⁷ CEAR# 405, Halton Municipalities Brief (Main document) pdf p.18

¹⁸ CEAR# 697, pdf p.2

¹⁹ CEAR# 697, pdf p.2

Appendix I – Constitutional matters heard by the Panel

cabinet regarding approval of the proposed intermodal rail hub project under Sections 52-54 of the *Canadian Environmental Assessment Act, 2012*²⁰.

Halton Municipalities wrote to the Panel to express its perception that statements by the Ontario Superior Court, in its decision to stay Halton Municipalities' proceeding, reinforce the position of Halton Municipalities that the Panel should consider the laws, regulations and bylaws listed in paragraph 2 of the Notice of Application, and the local concerns of and impacts on the Halton Municipalities, in the course of its review and in determining the recommendations that it ultimately will make to the Minister²¹.

CN's Response

CN replied to Halton Municipalities' submission on the Ontario Superior Court application by noting the excerpts that Halton Municipalities chose to highlight from the Court decision did not fairly capture the Court's point in those passages, nor did they reflect the significance of the Court exercising its discretion to put a stop to the attempted use of its process for the inappropriate purpose of interfering in the federal administrative process²².

CN suggested that the decision read in its entirety demonstrates that the Court was concerned by Halton Municipalities' tactical motivation in seeking a ruling it could use to try to interfere with the federal process. CN was of the perspective that the Court felt the Panel was well equipped to consider the local issues within the four corners of its mandate without any advance direction, guidance or influence from the Ontario court²³. CN drew attention to the following excerpt from that decision:

The assessment of how a court deciding a particular matter at a particular time would impact on an administrative proceeding is a very fact-specific exercise. Halton's argument is not without merit; however, in this case, I find that as a practical matter, CNR's characterization is more appropriate. Although I would not go so far as to say that this court hearing Halton's application now would "circumvent" the federal environmental review process, I am concerned that allowing Halton's application to proceed at this time is not appropriate in terms of the relationship between the courts and administrative bodies. In effect, Halton is seeking a ruling from the court that it can use within the federal environmental review process. In my view, for the court to hear and decide Halton's application now would undesirably interfere in the federal environmental review process. It would involve this court injecting itself into the ongoing federal environmental review process before it is completed. And it would do so in a context where the record supports that the federal review panel is alive to and will consider the local issues Halton is raising about the development.

²⁰ CEAR# 697, pdf p.2

²¹ CEAR# 697, pdf p.4

²² CEAR# 704, pdf p.1

²³ CEAR# 704, pdf p.1

Appendix I – Constitutional matters heard by the Panel

CN concluded that in light of the spirit and obvious intent of the ruling, the assertion by Halton Municipalities that Justice Copeland's reasons constitute advice from the Court to the Panel should be wholly disregarded²⁴.

²⁴ CEAR# 704, pdf p.2

**Appendix J -
Panel Recommendations**

Appendix J – Panel Recommendations

Atmospheric Environment

Air Quality

CEAA Recommendation 5.1 — CN should implement the mitigation it has committed to undertake for air quality

The Panel finds that CN's commitments to implement mitigation measures for air quality are necessary to minimize a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- control dust and implement dust control measures, including the use of dust suppressants such as water or other approved materials, minimizing activities that generate large quantities of dust during high winds, covering truck-loads (as necessary) of materials which could generate dust, and paving areas as required, to control fugitive dust emissions;
- cover or wet materials stored on-site to prevent blowing dust, where practicable;
- construct temporary access routes and parking lots within the site using material such as gravel to reduce particulate matter emissions from dirt surfaces;
- apply vacuum sweeping and water flushing of the on-site roads when necessary to remove the loose material present on the surface of roads that could be re-suspended by road traffic;
- implement dust mitigation for the temporary portable concrete plant, including:
 - proper planning, design and construction of the portable concrete plant. The plant should be located away from residential areas. Excess material storage areas should be avoided;
 - installation of temporary berms/barriers where appropriate around the concrete plant equipment (mixing, silos, transferring and storage areas) to prevent dust emissions;
 - dust control equipment, such as fabric filter or suitable dust collector systems, for dry material transferring and handling;
 - material transfer points, conveyors and mixing equipment to be adequately covered or enclosed to eliminate fugitive dust emission;
 - movable and telescoping chutes to be used as appropriate for truck loading activities. The drop height of the cement/ aggregate mixture into the truck shall be minimized to minimize the visible emissions.
- incorporate good management practices into Project design to reduce criteria air contaminants, hazardous air pollutants and greenhouse gas emissions;
- during construction, implement a no-idling policy to control mobile equipment and other vehicle emissions where applicable, for example construction equipment will be turned off when not in use;
- use SmartStart equipped locomotives as much as possible to reduce excessive idling during warm months;
- use non-road mobile and stationary equipment equipped with low emissions and high fuel combustion efficiency engines, specifically Tier 4 reach stackers;

Appendix J – Panel Recommendations

- improve the operation process so that the out-going trucks can travel less distance on-site and expedite the container handling turnaround time; and
- maintain construction and terminal equipment in good working order and use ultra-low sulphur fuel when available.

CEAA Recommendation 5.2 — Additional mitigation for continuous improvement of air quality emissions

The Panel considers that additional mitigation measures, beyond CN's commitments, are necessary to minimize a significant adverse environmental effect. The Panel recommends that CN, in the spirit of the Canadian Ambient Air Quality Standards and continuous improvement, demonstrate continuous improvement to reduce air quality emissions over the life of the Project for all contaminants but in particular for non-threshold contaminants associated with diesel exhaust (NO₂, and diesel particulate matter). This continuous improvement should include implementation of Tier 4 equipment, or better, at such time as it becomes economically and technically feasible. CN should also share the results of the electric truck pilot project with relevant regulatory agencies and the Community Liaison Committee described in Section 14; and periodically report on progress made in electrifying the CN Transportation Limited truck fleet that will use the terminal.

CEAA Recommendation 5.3 — Follow-up program for air quality

The Panel recommends that CN, in consultation with Environment and Climate Change Canada, develop and implement a follow-up program for air quality. The follow-up program should involve air quality monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that CN's air quality predictions prove to be exceeded or mitigation measures are not functioning as expected. The requirements should be set out in an Air Quality Monitoring and Adaptive Mitigation Plan that should include the following components:

- Prior to construction, update the local air quality baseline information by way of a new local monitoring survey to reflect any changes since the baseline was supplemented in 2016.
- Develop a monitoring protocol to be followed during the construction phase and for the first five years of operation, and compare estimated emissions and measured air quality levels against the predictions made in CN's environmental assessment.
- During construction, monitor dust (PM_{2.5} and PM₁₀) levels and meteorological conditions (wind speed, wind direction, temperature, relative humidity) at two locations (one upwind and one downwind of the Project Development Area) at or near the property line based on prevailing winds with 24-hour samples, once every six days (following National Air Pollutant Surveillance schedule), with continuous visual observations. This will confirm the effectiveness of mitigation measures. If complaints are submitted, an adaptive management review should be initiated.
- During the first year of operation, at the locations described above, monitor ambient concentrations of NO₂, PM_{2.5}, PM₁₀, benzene, benzo(a)pyrene and meteorological conditions (wind speed, wind direction, temperature, relative humidity) with continuous sampling on a five minute basis, 24 hours per day. This monitoring should be repeated for the first year the Project operates at its full capacity, after which time, if results of the follow-up program indicate that CN's air quality predictions were accurate or overestimated, less frequent monitoring may be conducted to confirm no changes, on a timescale that is satisfactory to Environment and Climate Change Canada and Health Canada. This will confirm the assessment predictions and the

Appendix J – Panel Recommendations

effectiveness of mitigation measures. If complaints are submitted, an adaptive management review should be initiated.

- Compare the monitoring results to (a) the federal National Ambient Air Quality Objectives, Canadian Ambient Air Quality Standards, or, where federal criteria are not available, the Ontario Ambient Air Quality Criteria or (b) if the baseline already exceeds these standards, to the predicted levels.
- If the monitored results exceed the applicable standard on more than one day per month or if, in the case of (b) above, the results exceed the predicted level on more than one day per month, CN must work with Environment and Climate Change Canada to investigate the source(s) of the problem. If the exceedance(s) have occurred as a result of terminal operations, the Plan will specify the range of additional mitigation measures that should be considered to bring the results within the acceptable range, up to and including operational changes such as a temporary reduction in terminal operations.

Air quality monitoring results should be shared annually with the Impact Assessment Agency of Canada, Environment and Climate Change Canada, Ontario Ministry of Environment, Conservation and Parks, Halton Region, the Town of Milton, the Community Liaison Committee and made public through the CN website.

Additional Recommendation 5.4 — Incentivise use of electric or other zero-emission trucks using the intermodal terminal

The Panel recommends that in order to reduce levels of contaminants of potential concern emitted by vehicles using diesel fuels, CN should identify and implement incentive procedures that would encourage other truck operators using the intermodal terminal to convert to electric vehicles or the use of other zero-emission technology. These procedures could include priority reservation access or contractual incentives.

Additional Recommendation 5.5 — Management of regional air quality, particularly with respect to diesel emissions

In recognition of the fact that there are already exceedances of a number of air quality objectives in the region around Milton and evidence of downward air quality trends, the Panel recommends that the Province of Ontario and Halton Region jointly investigate how best to achieve and maintain appropriate ambient air quality objectives in the regional airshed, particularly with respect to the increasing generation of diesel emissions in the Region.

Light

CEAA Recommendation 5.6 — Light objective to be achieved

The Panel recommends that CN ensure that light trespass and glare from the Project do not exceed 1 lux and 500 cd respectively at neighbouring properties. The Panel further recommends that CN measure the ambient lighting before the Project is built and submit the measurement methodology and results to the Impact Assessment Agency of Canada for verification. If ambient light levels in the Project area exceed the International Commission on Illumination E2 rural guideline for light trespass or glare, CN should instead mitigate the Project's obtrusive lighting to the International Commission on Illumination E3 suburban guidelines (2 lux for light trespass and 1,000 cd for glare) instead of the E2 rural guidelines.

Appendix J – Panel Recommendations

CEAA Recommendation 5.7 — CN should implement the mitigation it has committed to undertake for light

The Panel finds that CN’s commitments to implement mitigation measures for light are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- ensure terminal lighting design will be as efficient as possible, while providing enough light for on-site safety;
- direct any perimeter lighting inward toward the terminal to minimize potential light trespass.
- Use down-cast, full cut-off lighting equipment fixtures that are dark sky friendly and minimize horizontal component of light;
- direct construction lighting at the specific construction location (nighttime construction);
- reduce lighting in areas not being used for construction activities;
- fit individual fixtures with specific glare mitigation, such as side shields, as required; and
- supplement mitigation through lighting design, strategic shading elements (berms, barriers and vegetation).

CEAA Recommendation 5.8 — Additional mitigation to reduce obtrusive lighting

The Panel considers that additional mitigation measures beyond CN’s commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following additional mitigation measures:

- retain an environmental consultant with relevant lighting experience to direct lighting decisions during the detailed design stage; and
- within operational safety limits, require truck drivers to dim headlights when inside the facility, and monitor compliance.

CEAA Recommendation 5.9 — Use of amber lighting to reduce sky glow and glare

The Panel recommends that CN employ amber lighting technologies in outdoor lighting fixtures, wherever feasible, to reduce sky glow and glare. In order to determine feasibility, CN should conduct a technical analysis of the effectiveness of amber lights, possibly through a demonstration project. The results of this investigation should be shared publicly with the Impact Assessment Agency of Canada, Environment and Climate Change Canada, and the Community Liaison Group. If this investigation demonstrates that significant further reductions in the Project’s contribution to sky glow and glare can be achieved at a reasonable cost, while meeting operational requirements, through the use of amber lighting, the Panel believes this information would benefit CN in its operations at other intermodal terminals, and also assist other proponents in managing the effects of obtrusive lighting.

CEAA Recommendation 5.10 — Follow-up program for light

The Panel recommends that CN develop and implement a follow-up program for light. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should:

Appendix J – Panel Recommendations

- monitor light trespass and glare during the construction phase and during the first year of operation and ensure results meet or surpass the E2 rural zone guidelines; and
- report the results of the light trespass and glare monitoring to the Impact Assessment Agency of Canada and the Community Liaison Group.

As part of the follow-up program, CN should consult with both the Town of Milton and with the residents living in the four houses where light trespass guidelines could be exceeded, when considering projects that have been or will be carried out, to ensure that appropriate mitigation is installed and that cumulative light effects do not exceed the International Commission on Illumination E2 rural guideline.

Noise and Vibration

Noise

CEAA Recommendation 6.1 — Achieve minimum noise performance objectives

The Panel recommends that CN ensure that noise from the Project changes by less than the U.S. Federal Transportation Administration’s guideline of one to five decibel allowable change, and less than Health Canada’s criterion of an increase of 6.5% Highly Annoyed.

CEAA Recommendation 6.2 — CN should implement the mitigation it has committed to undertake for noise

The Panel finds that CN’s commitment to implement mitigation measures for noise are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- construct vegetated berms or barriers with a required minimum height of five metres to mitigate noise effects during operation. These berms will be created during on-site grading activities;
- if noise complaints occur, log and investigate complaints to assess whether they are linked with Project activities, and take appropriate action to ensure that the issues are managed;
- enforce speed limits (for truck traffic) within the terminal area to reduce the intensity of impulsive noise;
- train or instruct reach stacker operators to avoid excessive impulsive noise during loading and unloading operations;
- implement a temporary sound barrier around the concrete batch plant for Phase 3 paving operations;
- implement a temporary sound barrier (hoarding) as needed for the construction of the Lower Base Line grade separation;
- house generators inside a building or structure to reduce noise;
- limit the overall sound power level of generators used for construction activity to 107 dBA for each individual unit; and
- implement a communication protocol to keep the local community informed of different construction phases and the work that would be happening on-site during all three construction phases (for example, a website would be set up, newspapers ads would be placed, nearby residents would be notified by mail, and there would be dedicated information lines including an information centre, phone line, and email address).

Appendix J – Panel Recommendations

CEAA Recommendation 6.3 — Additional mitigation to ensure the Project meets acceptable noise levels

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following additional mitigation measures:

- implement a schedule for construction activities that avoids noise producing activities after 9 pm. If CN considers that overnight activity is unavoidable, nearby residents should be alerted ahead of time and provided with information regarding the complaints resolution process. CN should also monitor the overnight noise levels;
- ensure all construction vehicles are equipped with mufflers that must be properly maintained;
- ensure all vehicles are routinely maintained and serviced to ensure proper operation;
- design and rigorously apply a no-idling policy so that, where feasible, construction equipment would be turned off when not in use;
- identify preferred access routes to and from the Project site for construction related vehicle traffic, and require staff and contractors to use these routes;
- avoid annoyance from back up alarms, including consideration of installing broadband backup alarms on CN equipment, such as reach stackers;
- require all contractors to minimize tailgate slams. CN should monitor and enforce this requirement with appropriate consequences;
- enforce speed limits for truck traffic within the terminal area to reduce the need for and intensity of engine-braking noise;
- ensure compliance with its anti-engine braking policy by installing signage around the terminal and using site monitors to identify offenders;
- ensure that contractors comply with noise abatement requirements, and employ site monitors with appropriate powers to educate, warn and enforce;
- locate idling trains to locations with fewer receptors, or where receptors are the greatest distance from the railway line to avoid potential low frequency noise effects; and
- ensure that all residents likely to be affected by Project-related noise know how to record a complaint. When a complaint is received, CN should respond in a timely fashion and take appropriate action to resolve the problem. All communications and subsequent actions should be recorded and reported to the Town of Milton and to the Community Liaison Group.

CEAA Recommendation 6.4 — Additional mitigation if noise exceeds acceptable levels north of Britannia Road

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. In the case that monitoring data shows that noise from the Project exceeds the allowable 1-5 decibel change, or an increase of greater than 6.5% Highly Annoyed, the Panel recommends that CN implement the following additional mitigation measures:

- Install additional noise mitigation, potentially including noise barriers at the north end of the terminal operational footprint. Those noise barriers should run generally in an east-west direction with a minimum height of five metres and be located north of the truck access road, but south of Britannia Road, so as to mitigate Project noise north of Britannia Road to acceptable levels.

Appendix J – Panel Recommendations

- To support this, during the detailed design phase, CN should identify and protect the areas where it could potentially place such a noise barrier or berm, until such time as it has confirmed, through the follow-up program, that noise levels do not exceed the acceptable levels of less than 1-5 decibel increase in noise, or an increase in 6.5% Highly Annoyed.
- Review noise monitoring results in response to noise complaints and provide information on the complaint investigation process to potentially affected residents and communities. In the event that deviations from baseline result in a calculated change in %Highly Annoyed of 6.5% or more, implement additional mitigation measures.

CEAA Recommendation 6.5 — Follow-up program for noise

The Panel recommends that CN develop and implement a follow-up program for noise. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected. The follow-up program should ensure that:

- During construction, sound levels (L_{DN} dBA) are measured at locations acceptable to Health Canada and the Canadian Transportation Agency continuously for four weeks during each of the three phases of construction. CN should verify compliance with predicted noise effects of the Project to confirm the effectiveness of mitigation measures.
- At the start of operation, CN measure sound levels (L_{DN} dBA) at locations acceptable to Health Canada and the Canadian Transportation Agency continuously for four weeks at the start of operation, and again for an additional four weeks when the terminal reaches its full operational scenario. CN should compare the measured results to verify compliance with predicted noise effects of the Project and effectiveness of mitigation measures.

That, as part of the case-by-case noise complaints resolution process, CN compare low frequency noise monitoring results, including for 16 Hz, to the American National Standards Institute 2005 standards.

Aquatic Environment

Surface Water

CEAA Recommendation 7.1 — CN ensure that there are no changes to flow off-site

The Panel recommends that CN ensure floodplain storage and flood conveyance within the Project Development Area function in a manner that, in accordance with its EIS conclusions and June 27, 2019 presentation to the Panel, the Project has no effect on streamflows, flood line elevations, or the Indian Creek watershed as demonstrated by matching the hydrographs in the area for maximum and minimum flows, as well as the timing of those.

The Panel further recommends CN should ensure that flows leaving the Project Development Area into any tributary or Indian Creek match existing hydrographs and floodlines and that CN use the stormwater management ponds, balanced with appropriate conveyance, to reduce peak discharge rates and so as not to exacerbate or worsen floodlines.

Appendix J – Panel Recommendations

CEAA Recommendation 7.2 — CN should implement the mitigation it has committed to undertake for surface water flows

The Panel finds that CN's commitments to implement mitigation measures for surface water flows are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- apply natural channel design principles to the design and dimension of the realigned channels, including incorporating natural bed morphology (pools, riffles) and planform geometry:
 - design the channel realignments such that they do not excessively aggrade or degrade, convey existing flows so that flood elevations are not increased and bankfull frequency is maintained, downstream channel morphology is not altered and to limit barriers to fish migration;
 - not permit fording of watercourses or water bodies unless approved by the applicable regulatory authority;
 - re-establish vegetation on disturbed areas as soon as practicable following construction and in areas not subject to further construction activity / disturbance;
 - buffer wetland and riparian areas by up to 30 metres (final buffer size subject to final design);
 - plan the landscape and culvert installation to maintain drainage to and from wetlands;
 - maintain downstream flow at all times when conducting in-water construction activities;
 - ensure water and pump intakes reduce or avoid disturbance of the watercourse bed and are screened in accordance with Fisheries and Ocean Canada's *Freshwater Intake End-of-Pipe Fish Screen Guideline* (Fisheries and Oceans Canada, 1995); and
 - remove the online agricultural pond, which, combined with the construction and implementation of a stormwater management system, will improve water quality.
- to mitigate thermal effects, consider a combination of various measures during the detailed design stage including but not limited to:
 - plantation along the wet ponds and outlet channel to provide dense shading;
 - reverse bottom draw outlet pipe with installation of cooling towers/cooling trenches; and
 - vegetated berms.
- develop and implement a Stormwater Management Strategy that incorporates collection and treatment of all stormwater runoff from the terminal prior to release to Indian Creek or Tributary A, and which includes the following key design features:
 - diversion of Tributary A for the Regional Storm event around the Project Development Area and into Indian Creek via interception with a perimeter ditch;
 - two stormwater management ponds that contain and attenuate flows up to 1:100-year Storm event;
 - a minimum of 0.6 metres of pond freeboard during the 1:100-year Storm event;
 - low flow orifice outlets in the ponds for the 25 millimetres return period storm event that release the detention volumes over an approximately 12-day period in order to mitigate against receiving water erosion;
 - oil grit separators proposed for the administration and maintenance buildings and gate area to capture sediments, oil and grease before discharge to the wet ponds;
 - shut off valves to be installed on the stormwater management pond outlets;

Appendix J – Panel Recommendations

- channel realignment plantings and live stakes within the banks and riparian areas and in-stream features, such as woody debris toe protection, to provide shading for watercourse channels;
 - surface water quality controls to provide Enhanced Level 1 Protection; and,
 - winter road salt mitigation measures to be implemented to reduce salt runoff.
- build permanent stormwater management during the first stage of the construction phase to manage construction site surface runoff and drainage;
- establish and clearly identify a riparian buffer to the satisfaction of Fisheries and Oceans Canada before the start of clearing activities. Disturbance in this area will be restricted to activities associated with realignment, restoration and naturalization;
- install erosion and sediment control measures at appropriate locations adjacent to all watercourses and water bodies, or as directed by the Environmental Monitor(s). Appropriate temporary erosion and sediment control structures shall be installed, maintained and monitored through all phases of construction;
- implement stabilized construction access and roadways to reduce the tracking of construction sediment (mud and dirt) onto public roads by construction equipment;
- ensure water from flumes, dam and pumps, diversion or other methods do not cause erosion or introduce sediment into the channel;
- restrict grubbing, stripping and grading on approach slopes to watercourses and water bodies to the amount required to allow safe passage of equipment and completion of the relevant work, in order to facilitate the restoration of shrub communities;
- delay grading of the primary banks of watercourses and water bodies until immediately before construction of temporary crossings and watercourse realignment, where practicable;
- complete dewatering in a manner that does not cause erosion or allow sediment to re-enter a watercourse or water body through the use of appropriate sediment control devices;
- establish designated refueling areas for yard equipment at a safe distance (30-metre setback minimum distance from top of bank) from fish habitat;
- protect concrete pours from rainfall with an impermeable cover for a minimum of 48 hours, or until the concrete cures, in order to prevent high pH runoff;
- isolate in-stream cast-in-place concrete from fish-bearing waters until the concrete has properly cured (minimum of 48 hours). Alternatively, pre-fabricated concrete will be used for culverts;
- use accelerants as appropriate to shorten curing times;
- store open bags of concrete mix in a protected dry area;
- have a CO₂ tank with regulator, hose, and diffuser available on-site during concrete work to neutralize pH levels;
- treat wastewater and wash waters to CCME CWQG criteria for the protection of aquatic life (between pH 6.5 and 9.0) and the turbidity will be less than 25 NTU above background when it is discharged;
- have spill containment kits present on-site in designated locations where there is a higher risk of spills, such as refueling areas);
- Should dewatering of excavated area be required (due to rain or minor amounts of groundwater), any water pumped from the excavated area will be pumped through a filter bag or into an area of undisturbed vegetation at least 30 metres from the watercourse or an alternate area approved by the engineer and fisheries biologist;
- implement the following specific erosion and sediment control measures:

Appendix J – Panel Recommendations

- vegetation seeding and planting would be stabilized, where necessary, by erosion control matting and blankets; and
- erosion and sediment control measures around channel realignments will remain in place, at least until vegetation has established.
- prior to construction, implement the following agricultural row crop management activities:
 - prior to the fallow period, the crops would be harvested from the fields. The agricultural crop fields would be left in an untilled condition with a cover crop for this fallow period; and
 - prior to ground disturbance as part of construction activities for the terminal, the agricultural fields within the Project Development Area will be harvested and planted with an erosion protection and nitrogen scavenging cover crop, for example winter wheat, cereal rye or barley, and remain fallow with no active agricultural or construction activities for a minimum six-month fall and winter period.
- conduct biannual (spring and fall) geomorphic assessment to confirm that installed channel features are stable and that no excessive erosion is occurring throughout the Project reach based on stream characteristics within the realigned channels, including profile, pattern, dimensions and pebble count at established monitoring stations and photo points, as follows:
 - spring assessment: visual assessment, including photo documentation of in-stream structures for geomorphic conditions; and
 - fall assessment: geomorphic assessment of stream characteristics (profile, pattern, dimensions, pebble counts).

CEAA Recommendation 7.3 — Additional mitigation to accommodate extreme weather events through water conveyance and storage infrastructure

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following additional mitigation measures and ensure that:

- the Project's water conveyance and storage infrastructure has sufficient capacity to adequately manage the range of climate conditions that could reasonably be expected during the Project's lifetime. In doing so, CN should work with Conservation Halton, the Town of Milton, Environment and Climate Change Canada, and Fisheries and Oceans Canada during the detailed design stage to determine appropriate design specifications;
- the Project Development Area and surrounding CN-owned lands, if necessary, have sufficient capacity to safely accommodate and convey at least the Regional Storm into the foreseeable future in a manner that ensures no downstream effects on neighbouring properties, downstream fish habitat, or downstream wetlands. In doing so, CN should work with Environment and Climate Change Canada, Fisheries and Oceans Canada, Conservation Halton, Halton Municipalities and others as appropriate to modify the design of the stormwater management system and other aspects such as cut-fill strategies; and
- every five years following construction, CN should meet with Conservation Halton, the Town of Milton, Environment and Climate Change Canada and Fisheries and Oceans Canada to review the performance of Project stormwater conveyance and storage infrastructure in light of the most current climate change projections, and determine whether additional mitigation is required to maintain downstream hydrographs and floodlines.

Appendix J – Panel Recommendations

CEAA Recommendation 7.4 – Confirm erosion and sediment transport regime analysis

The Panel recommends that CN consult with Conservation Halton, Halton Municipalities and others as appropriate to confirm the results of its evaluation of the erosion and sediment transport regime of Indian Creek, Tributary A and Tributary B, especially with respect to potential erosion hazard.

CEAA Recommendation 7.5 – Maintain surface water flows and water quality

The Panel recommends that:

- CN ensure that downstream hydrographs and floodlines are unaltered unless otherwise directed or advised by Environment and Climate Change Canada in consultation with Conservation Halton;
- CN ensure that, at the point water leaves the Project Development Area via Indian Creek or any of its tributaries, the annual average concentrations of water quality parameters be equivalent to annual average concentrations measured at the point where water flows onto the site from those same water bodies; and
- these conditions should be confirmed during each stage of construction and for a period of at least five years of full operation, and periodically reviewed in consideration of the Panel's recommendations on adaptive management in Section 15.

CEAA Recommendation 7.6 – Follow-up program for surface water

The Panel recommends that CN, in addition to the monitoring programs CN has already committed to, in consultation with Conservation Halton, Environment and Climate Change Canada, and others, develop and implement a follow-up program for surface water. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program requirements should be set out in a Surface Water Monitoring and Adaptive Management Plan that includes the following components:

- continuous water level monitoring during construction and for a period of at least five years post-construction, to confirm CN's prediction that downstream hydrology will be unchanged once the Project is built;
- a water quality monitoring program that extends throughout the construction period and for a minimum of five years post-construction. This program should incorporate monthly routine monitoring supplemented by continuous monitoring of selected parameters during high flow or upset conditions, to support comparison of measured parameters to the levels predicted in the EIS;
- this monitoring should include locations where water flows into the Project Development Area from surrounding areas, and at the point of outflow from the Project Development Area, to confirm the absence of any adverse effects from the Project;
- monitoring of the temperature of stormwater management pond effluent to provide an adequate foundation for adaptive management of thermal effects on fish; and
- every year, monitoring results and monitoring approaches should be reviewed with Environment and Climate Change Canada, Conservation Halton and the Community Liaison

Appendix J – Panel Recommendations

Group to ensure monitoring is sufficient to respond to changing streamflow and water quality conditions, in support of adaptive management.

Groundwater

CEAA Recommendation 7.7 — CN should implement the mitigation it has committed to undertake for groundwater

The Panel finds that CN's commitments to implement mitigation measures for groundwater are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- install anti-seepage collars in trenches to prevent the preferential movement of groundwater along the servicing alignments and, subsequently, maintain pre-construction groundwater flow patterns;
- complete a groundwater dewatering assessment following preliminary design, to estimate Project dewatering needs;
- in the event of dewatering, monitor private wells expected to be located within the dewatering cone of depression for drawdown interference, which could potentially affect the operation of private wells with regard to water quantities;
- should construction dewatering volumes be projected in excess of 50,000 L/day, prepare a Groundwater Discharge Management Plan; and
- establish an appropriate dewatering system to dissipate the energy and reduce the sediment content of discharging water for the purpose of limiting potential erosion effects.

CEAA Recommendation 7.8 — Follow-up program for groundwater

The Panel recommends that CN, in consultation with Natural Resources Canada, Environment and Climate Change Canada, Conservation Halton and others as appropriate, develop and implement a follow-up program for groundwater monitoring to verify the accuracy of the environmental assessment predictions.

The follow-up program should:

- CN should work with Natural Resources Canada, Environment and Climate Change Canada, Conservation Halton, and others as appropriate to develop a monitoring program for groundwater levels and quality, both within the Project Development Area and at nearby private wells.
- This monitoring of groundwater levels and quality should continue for a minimum of one year after construction in the geological units used for water supply in the area.
- If monitoring data shows that groundwater conditions are not as predicted, the Panel recommends that CN work with Natural Resources Canada and others as appropriate to diagnose the cause and develop and implement appropriate mitigation measures.

Appendix J – Panel Recommendations

Wetlands

CEAA Recommendation 7.9 — CN should implement the mitigation it has committed to undertake for wetlands

The Panel finds that CN’s commitments to implement mitigation measures for wetlands are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- construct and maintain a minimum of 7.1 hectares of online and offline wetland, to replace the 3.7 hectares of wetland removed in Project construction;
- implement mitigation measures in other sections of this report, in particular for surface water, fish and fish habitat, the terrestrial environment and species at risk, as those measures are important to maintaining wetland area and functionality; and
- plan the landscape and culvert installation to maintain drainage to and from wetlands:
 - Design drainage features around the Project and culverts beneath the mainline to accommodate existing flows; and
 - Ensure hydrologic regime of riparian wetlands along proposed channels in Tributary A and Indian Creek will support wetland vegetation.

CEAA Recommendation 7.10 — Additional mitigation for wetlands

The Panel considers that additional mitigation measures beyond CN’s commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that, in order to replace wetland habitat losses and provide environmental enhancements to offset disruption and future uncertainty, CN implement the following mitigation measures:

- maintain a feature-based water balance for all retained wetlands with drainage areas that may be affected by the Project. These wetlands must be considered when CN makes changes to its stormwater management system design to ensure long-term viability of the identified wetlands; and
- consult with Conservation Halton regarding the design and construction of the replacement wetland features so that they support the maintenance of ecological function in the wider Bronte Creek watershed.

CEAA Recommendation 7.11 — Follow-up program for wetlands

The Panel recommends that CN, in consultation with Conservation Halton, Environment and Climate Change Canada, and others as appropriate, develop and implement a follow-up program for wetlands. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should:

- monitor the extent (area) of wetlands within the Project Development Area. CN should also monitor to determine whether invasive species have encroached on the wetlands, and if so to remove those, and conduct ongoing monitoring to confirm that such removal has been effective over time. This monitoring should continue for a minimum of five years post-construction;

Appendix J – Panel Recommendations

- measure the areal extent of existing and constructed wetlands, such that wetland area is maintained or increased over time;
- ensure that wetland water level fluctuations remain as similar as possible to the pre-construction condition;
- evaluate the success of native vegetation planting and replace any failed plantings;
- include regular engagement with Conservation Halton to ensure that constructed wetlands retain their planned function over time and provide high quality wildlife habitat with protection against invasive species through ongoing maintenance; and
- include development of an adaptive management program, in consultation with Environment and Climate Change Canada and Conservation Halton, to identify when and how additional mitigation would be carried out if these objectives are not being met.

Terrestrial Environment

CEAA Recommendation 8.1 — CN should implement the mitigation it has committed to undertake for soils

The Panel finds CN's commitments to implement mitigation measures for soils are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- follow the proper screening and disposal requirements for excess soils if any are deemed to require off-site disposal;
- conduct additional testing when soils suspected of contamination are observed during construction, to characterize these types of soils to determine suitability for re-use on-site;
- develop and implement a soils management plan for the proper handling and storage of soils to protect soil quality for re-use and
- ensure stable slope conditions are achieved and monitor the channel realignments and related works for a period of three years after construction.

CEAA Recommendation 8.2 — Follow-up program for geology, soils and topographical features

The Panel recommends that CN develop and implement a follow-up program for geology, soils and topographical features. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should verify the installation of plant materials as per CN's planting plan and verify successful propagation of native plant species with periodic audit monitoring during operation.

Fish and Fish Habitat

CEAA Recommendation 9.1 — CN should implement the mitigation it has committed to undertake for fish habitat and compensation

The Panel finds that CN's commitments to implement mitigation measures for fish habitat and compensation are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

Appendix J – Panel Recommendations

- implement a Habitat Compensation Plan to compensate for the loss of freshwater fish habitat as part of the process of obtaining the authorization of a harmful alteration, disruption or destruction of fish habitat under Section 35(2) of the *Fisheries Act*. Though CN has committed to implement such a Plan, the Panel specifically recommends that the Plan should:
 - delineate existing and future fish habitat, including riparian buffers;
 - describe how created habitat will meet the requirements of life stages for the fish species likely to be affected by Project activities;
 - set out monitoring requirements for channel stability including channel cross-sections, bed substrate, bed morphology and detailed longitudinal profiles to track channel migration; and
 - establish triggers for implementing adaptive management measures.
- before the commencement of in-water activity, ensure that all equipment and materials are available and are on-site, including contingency equipment and materials;
- apply natural channel design principles to the design and dimension of the realigned channels, including incorporating natural bed morphology (pools, riffles) and planform geometry;
- design the channel realignments such that they do not excessively aggrade or degrade, convey existing flows so that flood elevations are not increased and bankfull frequency is maintained, downstream channel morphology is not altered and to limit barriers to fish migration;
- design the Project so that it provides aquatic and riparian habitat that is functional over a range of flows with an increase in diversity of habitat types;
- when clearing vegetation to accommodate channel realignment, fell trees away from watercourses and water bodies. Immediately remove trees, debris or soil inadvertently deposited below the high watermark of a watercourse;
- develop a detailed site-specific mitigation plan that meets all applicable requirements prior to initiating any watercourse or water body crossing activities not already approved as part of channel realignments;
- not permit fording of watercourses or water bodies unless approved by the applicable regulatory authority;
- re-establish vegetation on disturbed areas as soon as practicable, including following construction; in areas not subject to further construction activity / disturbance;
- buffer wetland and riparian areas by up to 30 m (final buffer size subject to final design);
- construct the channel realignment predominantly outside of the existing channels and commission such new channels upon completion of all works to minimize the time period for diversion of flows within the existing channel; and
- plan the landscape and culvert installation to maintain drainage to and from wetlands.

CEAA Recommendation 9.2 — CN should implement the mitigation it has committed to undertake for fish movement, migration and fish passage

The Panel finds that CN's commitments to implement mitigation measures for fish movement, migration and passage are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- construct the new channel associated with Indian Creek and Tributary A in the dry, while leaving earthen plugs in the connection points. Any in-water work associated with channel realignment

Appendix J – Panel Recommendations

activities should be conducted outside the Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat for warmwater fish species:

- construct the new channel offline prior to receiving flows minimizes the need for in-water work to avoid disruption to the movement of fish and habitat and allow the new channel to be vegetated (stabilized) prior to receiving flows in order to reduce erosion and degradation of water quality;
 - comply with established Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat to avoid work in waters frequented by fish during periods when they are most sensitive to disturbance and disruption including migration and spawning; and
 - based on the warmwater characteristics of the channel through the Project site, only permit in-stream construction between July 1 and March 14 unless otherwise negotiated with Fisheries and Oceans Canada. Offline channel construction is not restricted by this timing window.
- conduct stream diversions and culvert installation in isolation of stream flows, through, for example, using dam and pump, flume, and diversion;
 - isolate work areas during periods of in-water work to prevent direct effects on fish, including harm and mortality, and reduce potential release of sediments to downstream areas; and
 - maintain downstream flow at all times when conducting in-water construction activities.

CEAA Recommendation 9.3 — CN should implement the mitigation it has committed to undertake for fish mortality

The Panel finds that CN's commitments to implement mitigation measures for fish mortality are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- carry out construction activities near water following Fisheries and Oceans Canada's *Measures to Avoid Causing Harm to Fish and Fish Habitat*;
- require any contractors to notify CN 72 hours before construction of any watercourse or water body crossing or diversions to ensure any necessary fish salvage operations are conducted, including all culvert installations, channel diversions or in-water work;
- require contractors to use a qualified aquatic biologist to conduct fish salvages prior to dewatering areas for in-stream work:
 - fish salvages or fish rescues allow for the capture and release of fish in areas to be dewatered;
 - fish salvages are standard practice prior to in-water work and supported by regulatory authorities including Fisheries and Oceans Canada; and
 - captured fish will be released to areas within the same watercourse, outside of the work, where suitable habitat exists.
- before the commencement of in-water activity, ensure that all necessary equipment and materials are available and are on-site, including contingency equipment and materials
- ensure water and pump intakes reduce or avoid disturbance of the watercourse bed and are screened in accordance with Fisheries and Oceans Canada's *Freshwater Intake End-of-Pipe Fish Screen Guideline*;

Appendix J – Panel Recommendations

- when clearing vegetation to accommodate channel realignment, avoid felling trees so that they end up in watercourses and water bodies. Any trees, debris or soil inadvertently deposited below the high watermark of a watercourse must be immediately removed; and
- plan construction activities to avoid or minimize the extent and duration of watercourse diversions required during the realignment of Indian Creek and Tributary A.

CEAA Recommendation 9.4 — CN should implement the mitigation it has committed to undertake for thermal effects on fish

The Panel finds that CN’s commitments to implement mitigation measures for thermal effects on fish are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- implement a combination of various measures during the detailed design stage including but not limited to:
 - plantation along the wet ponds and outlet channel to provide dense shading;
 - reverse bottom draw outlet pipe with installation of cooling towers/cooling trenches; and
 - vegetated berms.
- implement other measures to mitigate increases in water temperature in the stormwater management system, including permeable pavement, below-grade pipes, grassed swales, pond configuration considerations, riparian planting with shade-providing vegetation, and nighttime release of water from the stormwater management ponds.

CEAA Recommendation 9.5 — Additional mitigation to reduce effects on fish and fish habitat

The Panel’s recommended mitigation measures regarding streamflows, erosion and sediment transport are discussed in Section 7.1. However, the Panel considers that additional mitigation measures beyond CN’s commitments are necessary to avoid a significant adverse environmental effect on fish and fish habitat. Therefore, the Panel recommends that CN implement the following additional mitigation measures:

- incorporate enhanced thermal mitigation measures into the detailed design of the stormwater management ponds and develop these enhanced measures in consultation with Fisheries and Oceans Canada and Conservation Halton;
- maintain streamflows as necessary to avoid effects on fish and eliminate obstacles to the movement of desired species as identified by Fisheries and Oceans Canada. In doing so CN should consult with Fisheries and Oceans Canada, Conservation Halton, and others as appropriate; and
- work with Fisheries and Oceans Canada to develop contingency measures and relevant contingency plans to deal with unexpected situations or occurrences that may arise throughout construction and offsetting that could potentially affect fish and fish habitat in downstream watercourses that are outside of the Local Assessment Area.

Appendix J – Panel Recommendations

CEAA Recommendation 9.6 — Follow-up program for fish and fish habitat

The Panel recommends that CN develop and implement a follow-up program for fish habitat and offsetting measures. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should include:

- monitoring and reporting requirements to demonstrate to the satisfaction of the Impact Assessment Agency of Canada and Fisheries and Oceans Canada that the offsetting measures have been effective in counterbalancing the environmental effects on fish and fish habitat over a timeframe of five years;
- reporting on mitigation measures applied, on the effectiveness of those measures and on any changes to the mitigation measures that are required if the original measures prove ineffective;
- development and implementation, if necessary, of an adaptive management strategy to ensure fish habitat compensation is functioning as expected, to be updated at least every five years during the operation phase, and implementation of corrective actions or contingency measures, if required; and
- a description of how feedback received during Indigenous consultation and consultation with other stakeholders regarding the Plan has been considered or incorporated, as appropriate.

Additional Recommendation 9.7 — Collaboration between CN and Conservation Halton for headwater drainage features identification and protection

The Panel recommends that CN should work with Conservation Halton to conduct an assessment of Tributary B as a headwater drainage feature, including identification of its hydraulic and ecologic functions, and consult with Conservation Halton and Fisheries and Oceans Canada to develop any necessary mitigation measures which replicate those functions.

Wildlife Habitat and Wildlife

Species at Risk

CEAA Recommendation 10.1 — CN should implement the mitigation it has committed to undertake for Western Chorus Frog

The Panel finds CN's commitments to implement mitigation measures for Western Chorus Frog are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- place exclusion fencing between Western Chorus Frog habitat and the mainline to avoid interactions with frogs during construction and operation; and
- avoid replacement of the culvert adjacent to Western Chorus Frog habitat during the breeding season for Western Chorus Frogs from March to June (temperature dependent).

Appendix J – Panel Recommendations

CEAA Recommendation 10.2 — Additional mitigation to protect Western Chorus Frog

The Panel considers that additional mitigation measures, beyond CN's commitments, are necessary to avoid a significant adverse environmental effect on the Western Chorus Frog. Therefore the Panel recommends that CN implement the following mitigation measures:

- Ensure that sensitive areas are not disturbed during construction of the Project and are maintained throughout operation. To achieve this prior to Project construction, CN should carry out additional targeted surveys during the spring for Western Chorus Frog to identify breeding and hibernating habitat within the Project Development Area and nearby areas. These surveys should be carried out in consultation with Environment and Climate Change Canada and should also identify connections between these areas. CN should develop survey methodologies in consultation with Environment and Climate Change Canada.
- If the presence of the species is confirmed as a result of surveys, CN should consult with Environment and Climate Change Canada and Conservation Halton to develop additional mitigation measures to ensure no net loss of habitat and no mortality to the species. Where necessary, these measures should include physical avoidance, changes to the site layout or changes to the timing of certain Project activities.
- If any hibernation sites are temporarily or permanently affected by the Project, CN should replace these at a one-to-one ratio at a minimum. Restored sites should be connected to the track right-of-way and within 300 metres of the 2014 and 2016 observations that were noted by the Town of Milton.
- When individual frogs are actively calling, exclusion fencing should be used to keep Western Chorus Frogs out of construction areas and confined to breeding ponds for the period of breeding (typically March 20th to June 11th, but weather-dependent). CN should determine dates annually in consultation with Environment and Climate Change Canada.
- CN should ensure that construction areas do not contain any Western Chorus Frog breeding habitat prior to commencing work in those areas.
- CN, in consultation with Environment and Climate Change Canada and Conservation Halton, should construct ecopassages under the railway line to ensure habitat connectivity for Western Chorus Frog.

CEAA Recommendation 10.3 — Follow-up program for Western Chorus Frog

The Panel recommends that CN develop and implement a follow-up program for the Western Chorus Frog. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the predictions prove to be incorrect or mitigation measures are not functioning as expected. The follow-up program should monitor restored Western Chorus Frog habitat and installed ecopassages to evaluate use and success and the results should be shared with Environment and Climate Change Canada and Conservation Halton to help inform future habitat creation and restoration efforts.

Appendix J – Panel Recommendations

CEAA Recommendation 10.4 — CN should implement the mitigation it has committed to undertake for Eastern Meadowlark and Bobolink

The Panel finds that CN's commitments to implement mitigation measures for Eastern Meadowlark and Bobolink are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- ensure land clearance activities do not destroy nests during the breeding season by means such as restricting the clearing of vegetation within habitat of Eastern Meadowlark or Bobolink to periods outside of the breeding season (which occurs from the end of March to the end of August); and
- create and protect off-site grassland habitat in the Luther Marsh Wildlife Management Area to offset loss of Eastern Meadowlark and Bobolink residences within the Project Development Area.

CEAA Recommendation 10.5 — Follow-up program for Eastern Meadowlark and Bobolink

The Panel recommends that CN develop and implement a follow-up program for Eastern Meadowlark and Bobolink. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should include:

- monitoring surveys within Luther Marsh Wildlife Management Area for a period of 20 years following the start of Project construction and analysis to verify whether there is adequate breeding success in the new habitat, and thus ensure it is functioning as CN predicted and is an effective mitigation measure. The results of these surveys should be made available to Environment and Climate Change Canada and other parties with relevant knowledge or expertise;
- identification of remedial actions, including improvement of the new habitat at Luther Marsh Wildlife Management Area or creation of additional habitat there or closer to the Project, if the monitoring shows that breeding success is not adequate, and therefore mitigation measures are not proving to be successful, to offset habitat losses caused by the Project; and
- an evaluation of the stability of the new habitat before the 20-year funding agreement elapses. If the evaluation shows that ongoing maintenance is required to sustain the habitat after 20 years, and no other resources are assured, CN should extend the funding agreement to ensure the mitigation remains effective in the long term.

CEAA Recommendation 10.6 — CN should implement the mitigation it has committed to undertake for Snapping Turtle and Midland Painted Turtle

The Panel finds that CN's commitments to implement mitigation measures for Snapping Turtle and Midland Painted Turtle are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- implement turtle habitat enhancements in Indian Creek and on-site ponds;

Appendix J – Panel Recommendations

- avoid construction in-water during the Snapping Turtle overwintering period from October to April;
- place permanent exclusion fencing between retained/enhanced turtle habitat and the terminal to avoid interactions with turtles and Project vehicular traffic; and
- under direction from CN, a qualified biologist/ecologist should conduct turtle rescues to relocate Snapping Turtles before in-water works occur in their habitat. Exclusion fencing will be installed to prevent individuals from re-entering until construction is complete.

CEAA Recommendation 10.7 — Additional mitigation to protect Snapping Turtle

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following additional mitigation measures:

- In order to determine the appropriate placement of permanent exclusion fencing, before construction begins, CN, in consultation with Environment and Climate Change Canada and others as appropriate, should identify Snapping Turtle foraging, nesting and overwintering habitat within the Project Development Area and the Local Assessment Area.
- To prevent mortality and reduce the risk of individuals entering the construction area, CN should erect exclusion fencing prior to the active season for Snapping Turtles and conduct visual sweeps of construction areas within and outside the exclusion area during the active season to identify areas where individuals are active. Visual sweeps should be conducted by a qualified expert. In addition, some personnel on the site during construction and operation should be trained to safely handle and relocate turtles.
- All exclusion fencing, temporary and permanent, should be designed to a high standard and correctly installed to ensure that it remains intact and can withstand seasonal variations. The fencing should be inspected at least monthly, and maintained or replaced as necessary to ensure that turtles are not able to breach the fencing. Results of the monitoring of the effectiveness of the fencing should be made available to relevant authorities, including Environment and Climate Change Canada, Conservation Halton, Halton Municipalities, and the Community Liaison Group.
- To avoid attracting predators and providing colonization opportunities for invasive species, CN should not locate constructed nesting mounds in areas where adequate nesting habitat is already present.
- To minimize the risk of collisions, CN should identify areas where Snapping Turtles have potential to cross, and should monitor roads during Project construction and operation phases. In these higher risk areas, CN should make drivers aware through signage, posted speed limits and other appropriate measures.
- CN should consult the following reference document to identify and implement additional mitigation measures: *Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species at Risk in Ontario*, Ontario Ministry of Natural Resources and Forestry, April 2016.
- CN should submit turtle sightings to the Ontario Herptofaunal Atlas. Details are available at www.ontarioturtle.ca.

Appendix J – Panel Recommendations

The Panel has identified requirements for a follow-up program for many of the species considered in the environmental assessment, including Snapping Turtle and Midland Painted Turtle, in Section 10.4.

CEAA Recommendation 10.8 — Mitigation to Protect Bank Swallow and Barn Swallow

The Panel finds that CN's commitments to implement mitigation measures with respect to Bank Swallow and Barn Swallow are necessary to avoid a significant adverse environmental effect. The Panel recommends that CN:

- ensure the continued and ongoing availability of the barn as nesting habitat for Barn Swallow and retain and maintain the existing barn within the Project Development Area over the life of the Project;
- avoid displacement of nesting Barn Swallows by constructing the replacement habitat structures before removing the shed;
- avoid Bank Swallows nesting in soil piles during the construction phase by ensuring that soil piles are suitably graded or covered;
- contact Environment and Climate Change Canada if a nest is encountered during the removal of a culvert, as the *Migratory Birds Convention Act* prohibits the destruction of nests; and
- explore opportunities to provide further nesting habitat for Barn Swallows when designing culverts or other structures within the Project Development Area.

The Panel has identified requirements for a follow-up program for many of the species considered in the environmental assessment, including Barn Swallow and Bank Swallow, in Section 10.4.

CEAA Recommendation 10.9 — CN should implement the mitigation it has committed to undertake for Monarch Butterfly

The Panel finds that CN's commitments to implement mitigation measures for Monarch Butterfly are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- create and enhance 18.8 hectares of Monarch habitat to offset the loss of 10.8 hectares of Monarch habitat within the Project Development Area, considering both breeding and nectaring components of the habitat; and
- create and protect off-site grassland habitat in the Luther Marsh as offsets for loss of Monarch habitat.

CEAA Recommendation 10.10 – Additional mitigation to protect Monarch Butterfly

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN consult with Environment and Climate Change Canada to ensure that mitigation measures for Monarch butterfly, both on-site and off-site, are consistent with the new Recovery Strategy for Monarch butterfly under the *Species at Risk Act*.

Appendix J – Panel Recommendations

CEAA Recommendation 10.11 — Follow-up program for Monarch Butterfly

The Panel recommends that CN develop and implement a follow-up program for Monarch butterfly. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should ensure that replacement Monarch butterfly habitat successfully mitigates the effects of the Project. CN should monitor and evaluate Monarch butterfly use of the on-site compensation habitat, as well as the enhanced habitat in Luther Marsh, and share results with Environment and Climate Change Canada.

CEAA Recommendation 10.12 — CN should implement the mitigation it has committed to undertake for Eastern Milksnake

The Panel finds that CN's commitments to implement mitigation measures with respect to Eastern Milksnake are necessary to avoid a significant adverse environmental effect. The Panel recommends that CN employ a snake capture and relocation program using the coverboards already in place, prior to construction, to remove Eastern Milksnake individuals from the Project Development Area, if present. Snakes will be relocated in accordance with wildlife care protocols to suitable habitat within the Local Assessment Area.

CEAA Recommendation 10.13 — Additional mitigation to protect Eastern Milksnake

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following additional mitigation measures:

- to prevent mortality to Eastern Milksnake, consult with Environment and Climate Change Canada and other parties as appropriate to develop and implement an Eastern Snake Mitigation Management Plan;
- identify and conduct any additional survey work required in the area of Tributary A or wooded areas near Indian Creek prior to construction, to the satisfaction of Environment and Climate Change Canada. If the survey indicates the presence of snakes, CN should consult with Environment and Climate Change Canada to effectively implement required mitigation measures;
- identify how exclusion fencing for other wildlife species can be appropriately adapted to the requirements of Eastern Milksnake; and
- identify contingency measures in the plan to address any snake sightings during both construction and operation.

The Panel has identified requirements for a follow-up program for many of the species considered in the environmental assessment, including Eastern Milksnake, in Section 10.4.

Appendix J – Panel Recommendations

CEAA Recommendation 10.14 — Additional mitigation to protect Little Brown Myotis

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect on Little Brown Myotis. Therefore, the Panel recommends that CN implement the following mitigation measure:

- Before construction work begins in the area of Indian Creek, CN should survey thicket communities along Indian Creek and the coniferous plantation and deciduous woodland fragment west of the railway tracks. If the presence of Little Brown Myotis habitat is confirmed, CN should consult with Environment and Climate Change Canada to determine appropriate mitigation to permanently protect or adequately replace this habitat.

Migratory Birds

CEAA Recommendation 10.15 — CN should implement the mitigation it has committed to undertake for Migratory Birds

The Panel finds that CN's commitments to implement mitigation measures for migratory birds are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- ensure, in consultation with Environment and Climate Change Canada, that detailed mitigation proposals for migratory birds, both on-site and off-site, are consistent with advice from Environment and Climate Change Canada;
- ensure that construction activities do not impinge on migratory birds' use of different areas of habitat within the Project Development Area by developing and implementing timing windows. For example, construction activities with the potential to remove migratory bird habitat should not be permitted during the breeding season (March to August);
- avoid harm to migratory birds, CN should not carry out nest sweeps except in exceptional circumstances and only after consultation with Environment and Climate Change Canada.
- construct replacement wetland habitat before removing existing wetlands, where possible, to reduce displacement of migratory birds;
- design the administration and maintenance buildings in such a way as to minimize the risk of bird collisions (for example, by avoiding large expanses of glass or confusing reflections); and
- limit the use of site flood lighting during bird migration periods.

The Panel has identified requirements for a follow-up program for many of the species considered in the environmental assessment, including migratory birds, in Section 10.4.

Additional Recommendation 10.16 — Grassland bird habitat creation

CN should explore with Conservation Halton and other appropriate bodies the possibility of returning a portion of the land in the Local Assessment Area now under cover crop to grassland habitat, to offset at least a part of the habitat removed in the Project Development Area and reduce pressure on habitat in the Regional Assessment Area. This restored grassland habitat would also provide habitat for other terrestrial species and potentially improve habitat connectivity. It should be periodically maintained so as to ensure continued habitat availability for grassland birds and other species. While the Panel

Appendix J – Panel Recommendations

recognizes that this would remove more land from agricultural use, the effect would not be permanent – the land returned to grassland could still be available for agricultural purposes in the future if required.

Habitat Connectivity

CEAA Recommendation 10.17 — Additional mitigation to maintain habitat connectivity

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that, in order to maintain important ecosystem connections within the Project Development Area and between the area and the wider region, and to reduce adverse interactions between animals and project equipment and activities, CN should:

- ensure habitat connectivity is maintained for terrestrial species. CN should consider and accommodate the context of wildlife corridors and travel patterns across the regional area, including habitat connections to adjacent lands within Halton Municipalities' Natural Heritage System, and use that information in its detailed design of Project components;
- map terrestrial and wildlife habitat in the regional area and the essential movement corridors;
- ensure adequate habitat corridor widths and buffering where required. In determining what width of corridor is adequate, CN should consider the species expected to use the corridor and refer to expertise of Environment and Climate Change Canada and Conservation Halton;
- maintain a system of culverts and ecopassages through the mainline embankment, pad tracks, the pad, and associated roadways that ensures habitat connectivity for terrestrial and aquatic species, while meeting all engineering requirements for safe railway and facility operation;
- ensure, where possible, culverts and ecopassages address the need for light penetration; and
- work with Conservation Halton to identify and maintain wildlife corridors and connectivity both within the Project Development Area and with other habitat on adjacent properties and, to the degree possible, minimize the effects of the terminal truck entrance on the Natural Heritage System.

CEAA Recommendation 10.18 — Follow-up program for habitat connectivity

The Panel recommends that CN develop and implement a follow-up program for habitat connectivity. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the mitigation measures are not functioning as expected.

The follow-up program should:

- monitor to verify the effectiveness of the mitigation measures for habitat connectivity, including reporting on the use and success of these measures. CN should share these results with Environment and Climate Change Canada, Conservation Halton and the Community Liaison Group; and
- if monitoring results demonstrate that mitigation measures are not having the intended effect, CN should work with Environment and Climate Change Canada and Conservation Halton to develop and implement additional mitigation measures to improve habitat connectivity.

Appendix J – Panel Recommendations

CEAA Recommendation 10.19 — CN should implement the mitigation it has committed to undertake for various wildlife species, including species at risk and migratory birds

The Panel finds that many of CN's commitments to implement mitigation measures with respect to migratory birds and species at risk would benefit multiple species and are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- avoid construction activities with the potential to remove migratory bird habitat during the breeding season (end of March to end of August). Should vegetation clearing activities be unavoidable during the breeding season, implement a program to avoid effects on migratory birds and their nests;
- implement speed limits for vehicles on internal roads;
- implement a Spill Response Plan to contain contamination, including shut-off valves on stormwater management ponds in the event of an accidental spill to protect the downstream environment. In the event a stormwater management pond becomes contaminated with a spill, implement bird deterrents to prevent use of the pond by birds until cleanup measures have been completed;
- retain natural habitat features such as wildlife trees; retain vegetation wherever practicable to provide nesting opportunities for cavity-dependent birds;
- provide employees with sensitivity education for on-site wildlife encounters;
- implement best management practices, including locating vegetation or greenery away from glass to minimize risk of avian collision with windows (refer to the *Bird Friendly Development Guidelines*, City of Toronto, 2007);
- wherever practicable, avoid unnecessary vegetation clearing around the Project, access roads and railway lines;
- enhance wetlands or create new ones to improve breeding opportunities for wetland birds;
- create or protect off-site grassland habitat as an offset for loss of grassland habitat;
- demarcate construction work area to avoid incidental encroachment into adjacent areas;
- retain natural vegetation along the boundaries of the Project to act as a buffer from the Project;
- maintain construction and terminal operational equipment in good working order, for example effective mufflers on vehicles;
- design Project layout to avoid effects on natural features, including:
 - Trafalgar Moraine Earth Science Area of Natural and Scientific Interest (ANSI);
 - North Oakville-Milton West Wetland Complex; and,
 - Protected Countryside land use designation under the Greenbelt Plan.
- during construction, ensure all equipment brought on-site is thoroughly cleaned (for example, remove dirt from other work sites that has accumulated on the tracks, undercarriage, tires) prior to arrival, to avoid the introduction of invasive species seeds or plant parts, or other contaminants;
- avoid using imported fill from known sites of invasive plant infestation;
- minimize the size and extent of disturbed soil and vegetation during construction, including brushing, pruning and clearing activities, and preserve existing habitat conditions wherever and whenever possible;
- schedule construction activities during daylight hours whenever practicable to minimize the need for staging lights;

Appendix J – Panel Recommendations

- during construction, limit the use of site flood lighting during the migration periods, generally occurring in April to May and late August through October;
- if nighttime construction is required, direct lighting at the specific construction location.
- complete paving operations after the berms are constructed to mitigate off-property light effects;
- direct perimeter lighting inward toward the terminal to minimize light trespass to the environment and surrounding areas; and
- shield outdoor lights to minimize light spillage beyond the required areas.

CEAA Recommendation 10.20 — CN to design and implement a Wildlife Management Plan

The Panel recommends that, to coordinate mitigation measures and follow-up programs related to wildlife and migratory birds, CN should develop and implement a Wildlife Management Plan that:

- incorporates all of the specific sub-species plans recommended by Environment and Climate Change Canada during the environmental assessment;
- identifies all mitigation measures CN has identified for all wildlife, including migratory birds, but with a particular focus on Western Chorus Frog; habitat compensation for Bobolink and Eastern Meadowlark, Snapping Turtle and Midland Painted Turtle; Eastern Milksnake; and general habitat connectivity both within CN's property and connecting to wildlife corridors and networks that are existing or planned on neighbouring properties within the Regional Assessment Area;
- identifies reporting intervals for the results of follow-up programs in relation to wildlife, including migratory birds; and
- makes the reports on the accuracy of the environmental assessment predictions and the effectiveness of mitigation measures publicly available through its website and through distribution to the Community Liaison Group, and submits these to the Impact Assessment Agency of Canada for publication on the public registry internet site for the Milton Logistics Hub Project.

In developing and implementing the Wildlife Management Plan, CN should consult with Environment and Climate Change Canada and Conservation Halton. Where appropriate, CN is encouraged to develop and implement plans with input and partnership from other organizations such as Ducks Unlimited Canada and interested Indigenous groups that CN has worked with throughout the environmental assessment.

Human Environment

Human Health

CEAA Recommendation 11.1 — Follow-up program for country foods

The Panel recommends that CN develop and implement a follow-up program for human health and country foods. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected. The follow-up program should:

Appendix J – Panel Recommendations

- develop a food and soil monitoring program in consultation with Health Canada and others as appropriate, to validate model predictions and ensure concentrations are below the Canadian Council of Ministers of the Environment Soil Quality Guidelines for the Protection of Environmental and Human Health. This monitoring program should continue through construction and for a minimum of five years of Project operation; and
- include a means of communicating the findings of the follow-up program to local residents through the Community Liaison Group.

CEAA Recommendation 11.2 — CN should implement the mitigation it has committed to undertake for health effects from noise

The Panel finds that CN's commitments to implement mitigation measures for noise are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends:

- CN should conduct further sleep disturbance analysis in consultation with Health Canada, during the detailed design phase of the Project, to evaluate individual nighttime impulsive noise events. If the results of this analysis demonstrate the potential for Project-related effects on sleep disturbance, CN should identify and implement additional mitigation measures, including additional noise barriers or operational changes to ensure the individual noise events experienced at receptors remain under the target of 10 to 15 noises of 60 dBA L_{max} outdoor per night.
- CN should work with the Community Liaison Group described in Section 15 to receive complaints related to noise and sleep disturbance and ensure that they are reported to residents on a regular basis to promote transparency and accountability.
- CN should communicate its complaint investigation process clearly to neighbouring residents and businesses and provide prompt and transparent resolution for any complaints. If the complainant is still dissatisfied with CN's response, they would have the option to forward their complaint to the Canadian Transportation Agency.
- CN should make its noise resolution process available for the duration of the Project.

CEAA Recommendation 11.3 — Follow-up program for health effects from noise

The Panel recommends that CN develop and implement a follow-up program for human health effects from noise. The follow-up program should involve monitoring and identify appropriate adaptive management steps to provide additional mitigation in the event that the environmental assessment predictions prove to be incorrect or mitigation measures are not functioning as expected.

The follow-up program should undertake noise monitoring during all three phases of construction and for a period of at least two years after the start of operations to determine the accuracy of the environmental assessment predictions, and effectiveness of mitigation measures, and specifically to ensure CN is in compliance with relevant standards for sleep disturbance, meaning fewer than ten to 15 impulsive noise events of 60 dBA L_{max} outdoors per night at receptors. If required, CN should implement additional noise mitigation measures to address noise issues as they arise. CN should submit noise monitoring results to the Impact Assessment Agency of Canada on a monthly basis.

Appendix J – Panel Recommendations

Socio-economic – Outdoor Recreation/Compatibility with residential communities

CEAA Recommendation 11.4 — CN should implement the mitigation it has committed to undertake for quality of outdoor recreation

The Panel finds that CN’s commitments to implement mitigation measures for effects to outdoor recreation are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- implement a communication protocol to keep the local community informed of different construction phases and the work that would be happening on-site during each of the three construction phases (for example, a website would be set up, newspapers ads would be placed, nearby residents would be notified by mail, and there would be dedicated information lines including an information centre, phone line, and email address); and
- construct berms and vegetate them (to reduce effects on viewsapes) in key locations around the Project Development Area, as per the Project design.

CEAA Recommendation 11.5 — Additional mitigation measures for outdoor recreation

The Panel considers that additional mitigation measures beyond CN’s commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- ensure that the design and function of facility entrances on Britannia and Tremaine Roads are safe for all users including all types of cyclists, including commuters, those travelling at speed on road bikes, and recreational users. In doing so, CN should consult with Halton Municipalities, local cycling organizations, the Mattamy National Cycling Centre and others as appropriate and implement suggestions that improve cyclist safety at those access points; and
- develop a cycling awareness program for truck drivers accessing the facility to educate them on safely sharing the roadway, intersections and roundabouts with cyclists. This program should be developed in consultation with local cycling organizations.

CEAA Recommendation 11.6 — CN should implement the mitigation it has committed to undertake regarding agricultural lands

The Panel finds that CN’s commitments to implement mitigation measures for effects to agricultural lands are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- work with local farmers for agricultural lease opportunities where they may exist, to mitigate the loss of agricultural land as a result of the Project.
- rehabilitate or improve adjacent agricultural lands or provide a contribution to agricultural research in the area.

CEAA Recommendation 11.7 — Additional mitigation for CN to consult with the local farming community

The Panel considers that an additional mitigation measure beyond CN’s commitments is necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

Appendix J – Panel Recommendations

- consult with the local farming community, including local organizations such as the Halton Region Federation of Agriculture, to ensure that appropriate mitigation measures are implemented in ways that are responsive to the needs of the local farming community, and reduce or avoid adverse effects on agricultural operations, particularly with respect to increased truck traffic.

Socio-economic – Municipal planning

Additional Recommendation 11.8 – Use of municipal water and wastewater services

The Panel recommends that CN reconsider its decision, outlined in subsection 4.3.1, to contract privately for water and wastewater services, and enter into discussions with Halton Region regarding connection to municipal services as soon as possible, in order to provide the Project with a safe and reliable source of water and wastewater management, without recourse to more trucking, while at the same time mitigating the cost to the Region of unused infrastructure.

Additional Recommendation 11.9 – Planning collaboration between CN, Halton Region and the Town of Milton

The Panel recommends that CN, Halton Region and the Town of Milton hold discussions to identify ways in which CN might contribute to Milton's vision of developing the 'complete community' with a diverse employment base that includes but is not limited to an expanded logistics industry. Discussions would address future use of remaining CN lands, together with opportunities for CN and the region and Town to collaborate on knowledge-based and innovative development opportunities.

Socio-economic – Effects to Transportation Networks

Additional Recommendation 11.10 – Ongoing work to widen Britannia Road

The Panel recommends that, if the Project is approved, built and operating before Halton Region has completed the widening of Britannia Road, then CN and the Region should jointly monitor traffic levels on Britannia Road to determine whether there is undue traffic congestion during peak traffic hours along Britannia Road attributable to lane reductions during road construction. If this monitoring reveals evidence of traffic congestion partially attributable to terminal-generated trucks, the Panel recommends:

- CN should reduce the number of trucks entering and exiting the Project during the morning and afternoon peak traffic hours in a manner proportionate to the number of lanes in operation. For example, if only three of the intended six lanes of Britannia Road were in operation (50% capacity) then CN should reduce the number of trucks exiting the Project, at the relevant times, by a corresponding 50% during the morning and afternoon peak traffic hours.
- Such a restriction, if warranted, would be in effect only during the morning and afternoon peak traffic hours until the widening of the relevant portions of Britannia Road is completed or for a period of six months, whichever comes first, assuming Halton Region completes the ongoing road widening in a timely manner.
- Halton Region should, at the same time, take all reasonable and appropriate measures within its control to reduce undue traffic congestion, if any, at peak hours, including such measures as

Appendix J – Panel Recommendations

detours to reduce the volume of non-terminal traffic traveling on the portion of Britannia Road between Tremaine Road and Regional Road 25.

Additional Recommendation 11.11 — Monitor intersection performance

Given Halton Municipalities' concerns that the addition of terminal-generated truck traffic to the regional arterial road network may result in unsatisfactory levels of performance at certain key intersections within the Town of Milton, the Panel recommends that CN and Halton Municipalities jointly monitor the performance of key intersections within the Town of Milton. More specifically:

- This monitoring should begin once Halton Region has completed the widening of the relevant portions of Britannia Road and the Project has reached the stage of maximum operations where, in a 24-hour period, up to 800 trucks will be both entering and exiting the Project through the entrance gate on Britannia Road.
- The monitoring should focus on intersection performance during the 7 am to 9 am and 4 pm to 6 pm peak traffic hours for the intersections on Britannia Road at Regional Road 25, Trafalgar Road and James Snow Parkway. Once the Province and the Region have completed the proposed interchange at Tremaine Road and Highway 401, the monitoring should be expanded to include the intersection of Britannia Road and Tremaine Road.
- Should the monitoring indicate unsatisfactory levels, a performance rating of F, at these intersections, then Halton Municipalities and CN should collaborate to determine the respective impact on the level of performance of truck traffic generally and terminal-generated truck traffic specifically. That determination will assist the parties to determine what measures each may implement to improve intersection performance. For CN, this may result in temporarily restricting the number of trucks permitted to enter and to exit the Project during morning and afternoon peak traffic hours.
- The monitoring should continue for a minimum period of 24 consecutive months. If performance of the key intersections remains a problem following the addition of the terminal-generated truck traffic, then the joint monitoring should continue for an additional 24-month period and additional mitigation measures considered as appropriate.

Physical and Cultural Heritage

CEAA Recommendation 11.12 — CN should implement the mitigation it has committed to undertake for cultural heritage

The Panel finds that CN's commitments to implement mitigation measures for cultural heritage are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- document the land use history and construction details of the shed at 5269 Tremaine Road, before removing it;
- make a photographic record of the shed at 5269 Tremaine Road, and salvage any components of the building in which there is public or private interest;
- secure CN-owned properties within the Project Development Area until an adaptive re-use is identified; and

Appendix J – Panel Recommendations

- maintain a 50-metre buffer during construction around all cultural heritage properties where construction activities may occur within 50 metres including any properties that are located outside of the Project Development Area. Ensure no construction activities take place within the buffer. If it is not feasible to maintain this buffer, CN must carry out a property-specific vibration effect study to determine maximum acceptable vibration levels to protect the property and carry out continuous monitoring during construction activities to ensure the values are not exceeded.

CEAA Recommendation 11.13 — Additional mitigation to reduce vibration effects

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN further reduce vibration effects on properties by:

- assessing each cultural heritage property's condition before Project construction with a photographic record. After completing construction activities in the vicinity of cultural heritage properties, CN should inspect all properties and compare the property's condition after construction to its condition before construction to determine whether any vibration-related damage has occurred. If so, CN should make the necessary repairs. The identification of any vibration-related damage and how CN repaired the damage should be submitted to Impact Assessment Agency of Canada, and the Community Liaison Group.

CEAA Recommendation 11.14 — Additional mitigation to reduce effects on cultural heritage

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN take the following steps to further reduce effects on cultural heritage:

- develop a Cultural Heritage Property Maintenance and Re-use Plan in consultation with the Ontario Ministry of Tourism, Culture and Sport and heritage personnel at the Town of Milton. The Plan should ensure the cultural heritage value of buildings is preserved by addressing how vacated properties would be secured, inspected and maintained. The Plan should also specify criteria that would be used to determine the terms of any adaptive re-use. CN should make this plan available to all interested communities and organizations to see if anyone wishes to make a proposal;
- if, three years after operations have commenced, CN has not identified feasible adaptive re-use for a given property, carry out a Heritage Impact Assessment process in consultation with the Ontario Ministry of Tourism, Culture and Sport, the Town of Milton and other bodies as appropriate, to determine whether the vacated properties should be mothballed for a longer period, relocated, or demolished with appropriate mitigation;
- submit the report containing the land use history and construction details of the shed at 5269 Tremaine Road to the Impact Assessment Agency of Canada, the Community Liaison Group and place it in a local library or museum; and
- submit the reports containing the inspection results, any maintenance actions that CN has undertaken to protect the cultural heritage properties and the Heritage Impact Assessment and results regarding whether vacated properties should be mothballed for a longer period,

Appendix J – Panel Recommendations

relocated, or demolished with appropriate mitigation to the Impact Assessment Agency of Canada, and the Community Liaison Group.

- If this monitoring demonstrates that vibration levels exceed targets, CN should implement additional mitigation such as alternative construction techniques that are identified in Section 6.2.

CEAA Recommendation 11.15 — CN should implement the mitigation it has committed to undertake for archaeology

The Panel finds that CN's commitments to implement mitigation measures for archaeology are necessary to avoiding a significant adverse environmental effect. Therefore, the Panel recommends that CN implement the following mitigation measures:

- conduct controlled salvage excavations (Stage 4) in accordance with industry standards, as confirmed by Ministry of Tourism, Culture and Sport;
- avoid disturbance of Archaeological and Heritage Resources wherever practicable. Avoidance options would also require the installation of a protective barrier around the site and a buffer zone. If avoidance and protection of archaeological resources is not feasible then controlled salvage excavations of the archaeological resources, or parts thereof as applicable, will be implemented;
- implement an Archaeological Resources Protection Plan, which will include worker awareness training regarding basic artifact identification and required next steps;
- cease all construction within a 20-metre radius of the archaeological resource if an archaeological resource is discovered during the construction phase. In the event of a discovery, CN will stop work immediately and inform the Ministry of Tourism, Culture and Sport prior to the implementation of procedures and mitigation. A licensed archaeologist will be retained by CN and a stage 2 Archaeological Assessment will be conducted with the participation of any interested Aboriginal communities;
- cease all construction around the area immediately in the event any human remains encountered during construction and will treat those remains with respect; the police or coroner, Registrar or Deputy Registrar of the Cemeteries Regulations Section of the Ontario Ministry of Government and Consumer Services, and the Archaeology Programs Unit will be contacted. Work will not resume until they have cleared the site;
- implement a worker education program about appropriate protocols in case of accidental discoveries; and
- train key construction staff in the recognition of basic archaeological artifacts such as Aboriginal material culture, including clay ceramics, lithic artifacts, and faunal remains, and Euro-Canadian material culture such as refined ceramics, glassware, construction debris, and personal effects.

CEAA Recommendation 11.16 — Additional mitigation to reduce effects on archaeological resources

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effects on archaeological resources. Therefore, the Panel recommends that CN by:

Appendix J – Panel Recommendations

- leaving any ossuary, in the event that one is discovered, permanently undisturbed unless an agreement is reached with the Huron-Wendat Nation to take an alternative action;
- entering into discussions with the relevant First Nations to determine how artifacts that have already been excavated may be safely returned to communities for best use as defined by those communities, including study, display, or other culturally appropriate actions. CN should provide financial resources to support the process;
- developing and implementing a protocol, in consultation with the relevant First Nations and the Ontario Ministry of Tourism, Culture and Sport to manage chance archaeological finds that may occur during excavation and construction; and
- ensuring agreed mitigation measures are established and shared with relevant First Nations and the Ontario Ministry of Tourism, Culture and Sport through creation and implementation of an Archaeological Resources Protection Plan.

Current use of lands and resources for traditional purposes

CEAA Recommendation 12.1 — CN should implement the mitigation it has committed to undertake for current use of lands and resources for traditional purposes

The Panel finds that CN's commitments to implement mitigation measures for archaeological resources, identified in subsection 11.3.2, are necessary to avoiding a significant adverse environmental effect. The Panel has considered CN's commitments and recommends that CN provide Indigenous communities with regular updates on activities and progress of the Project.

CEAA Recommendation 12.2 — Additional mitigation to protect the current use of lands and resources for traditional purposes

The Panel considers that an additional mitigation measure beyond CN's commitments is necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- engage with affected Indigenous groups to develop agreements that consider and mitigate the loss of access, for traditional purposes, to Treaty lands affected by the development and operation of the Project. These could include some or all of the following issues:
 - ongoing provision of information about the Project to the community;
 - involvement by community members in environmental monitoring activities and reporting of monitoring results to the community;
 - specific measures to address the protection of archaeological resources not covered by Recommendation 11.16;
 - support for environmental protection activities on other lands, including wetlands of importance that may be affected by the Project;
 - support for cultural activities; and
 - access to employment and contracting opportunities.

Appendix J – Panel Recommendations

Other Matters

Accidents and Malfunctions

CEAA Recommendation 13.1 — CN should implement the mitigation it has committed to undertake for accidents and malfunctions

The Panel finds that CN's commitments to implement mitigation measures for accidents and malfunctions are necessary to avoiding a significant adverse environmental effect. Therefore, the Panel recommends that CN:

- develop and implement the following Emergency Response Plans:
 - Construction Emergency Response Plan – to establish an organizational structure and procedures for response to emergency during construction;
 - Spill Response and Contingency Plan – to outline the procedures, processes and management practices to handle and respond to spills;
 - Hazardous Materials Action Plan – to identify specific measures to address the risks and responses to a potential spill of a hazardous material; and
 - Operational Emergency Response Plan – to establish an organization structure and procedures for response to emergencies during operation.
- identify location of spill equipment on-site, methods to prevent containerized material spills from spreading and for recovering the materials in the water as well as identify any sensitive habitats to best direct response efforts;
- restrict the storage of hazardous materials to designated areas with proper containment and in accordance with appropriate safety procedures and requirements;
- audit shipments for compliance with safe loading practices; and
- use its authority, when necessary, to evacuate the personnel from CN property, and assist in simultaneously notifying nearby businesses and the community, recognizing that it is the decision and responsibility of local authorities, including police and fire departments, to initiate protective action, such as evacuations, for the community outside the facility or mainline right of way.

CEAA Recommendation 13.2 — Additional mitigation for potential accidents and malfunctions

The Panel considers that additional mitigation measures beyond CN's commitments are necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN further reduce the potential environmental effects of accidents and malfunctions by:

- ensuring that spill prevention measures and mechanisms incorporate multiple barriers, including physical barriers such as concrete berms, to contain the movement of dangerous chemicals over the land surface and prevent entry into watercourses, in consultation with Transport Canada, emergency response professionals, and others as appropriate;
- locating storage areas for containers with combustible or flammable materials a minimum of six metres away from the property line or buildings;
- regularly updating emergency response plans to align with the Network Operations Emergency Response Plan, or in response to regulatory changes, personnel changes or other process changes;

Appendix J – Panel Recommendations

- ensuring that any relevant emergency response plans include provisions for fire preparedness and fire hazard reduction;
- working closely with local authorities to develop and implement CN's Emergency Response Plans, including evacuation and emergency communication procedures and staff training, in order to properly coordinate protective actions; and
- working closely with the Community Liaison Group to update the community on any known or emerging issues, or where the effects of an accident and malfunctions may be felt outside the Project Development Area.

Effects of the Environment on the Project

CEAA Recommendation 14.1 — CN should implement the mitigation it has committed to undertake for effects of the environment on the Project

The Panel finds that CN's commitments to implement mitigation measures for effects of the environment on the Project, with some modifications from the Panel, are necessary to avoid a significant adverse effect of the environment on the Project. The Panel has considered CN's commitments and recommends that CN create an Infrastructure Protection Plan which, at a minimum, must contain the following:

- a subscription to a meteorological alert service, ensuring that there is advance warning of flood-producing severe rainfall events. The warning area should be focused on the upstream portion of the Indian Creek Watershed;
- controls to ensure all erosion and sediment control devices are secure and in good working order through regular inspection;
- backfill any open excavations where feasible;
- monitor erosion control measures during rainfall event; and
- provide a post-event inspection and recovery plan. Inspect all erosion control measures, re-establish if damaged, and provide a repair or restoration plan outline.

CEAA Recommendation 14.2 — Additional mitigation to reduce effects of the environment on the Project

The Panel considers that additional mitigation measures beyond CN's commitments is necessary to avoid a significant adverse environmental effect. Therefore, the Panel recommends that CN further reduce the potential for effects of the environment on the Project by:

- ensuring that CN's Emergency Response Plan includes provisions to safeguard and restore Project infrastructure in the event of an extreme weather event, including catastrophic flooding, an extended freezing rain event or a major ice storm, and for implementation of technically and economically feasible measures to prevent future damage caused by such events.

Appendix J – Panel Recommendations

Environmental Management

Additional Recommendation 15.1 — Environmental management strategy

The Panel recommends that, if the Project is approved, CN should create an overarching, integrated Environmental Management Strategy that provides a framework for planning and delivering its various mitigation measures, follow-up and monitoring programs, and response plans. This strategy should:

- be guided by four key principles: accessibility, transparency, adaptive management and continuous improvement of environmental conditions;
- identify internal governance structures to ensure the strategy is designed in a manner that can be effectively implemented. These governance structures should have, as the central point of responsibility, a senior executive, such as a Vice President, who is responsible and accountable for effective implementation of the strategy;
- clearly describe roles and responsibilities;
- define clear lines for reporting and responsibility to ensure accountability throughout the organization;
- include a commitment to meaningful and ongoing engagement with the community;
- include a commitment to ongoing cooperation and information sharing with regulatory authorities and others with specialized expertise; and
- be incorporated into and consistent with CN's overall corporate environmental management policies.

Additional Recommendation 15.2 — Adaptive management

The Panel recommends that, if the Project is approved, CN's adaptive management for Project-specific or cumulative effects should include the following components:

- establishment of a formal adaptive management process that CN would undertake with regulators, including a specified cycle for adaptive management, with an internal oversight group to guide decisions associated with adaptive management;
- clear, measurable indicators linking Project activities to environmental outcomes and objectives described throughout this report, and threshold or reference levels to identify Project effects and indicate where and when adaptive responses would be necessary;
- provisions for interim reporting, review, and adjustment where predictions are uncertain and where predictive errors may have serious consequences;
- annual reporting of monitoring results to regulatory agencies as appropriate, and to the Community Liaison Group; and
- reporting of confirmatory (audit) monitoring and any associated revision of management plans on a longer cycle, perhaps every five years, to ensure continued progress toward environmental goals for the life of the Project.

Additional Recommendation 15.3 — Establish a community liaison group

The Panel recommends that, if the Project is approved, CN establish a Community Liaison Group prior to construction. The purpose of the group would be to provide ongoing information about the Project, its activities and the monitoring of its effects on the community; to identify and discuss issues of concern to

Appendix J – Panel Recommendations

the community; and to work towards mutually satisfactory resolution of problems and complaints. This group should:

- identify and discuss potential issues that may arise during construction and initial operation of the terminal;
- provide community feedback and advice to CN on relevant issues including Project-specific environmental effects, mitigation, effect monitoring and adaptive management committed to by CN and as recommended by the Panel;
- provide a forum for CN to share monitoring and follow-up program results, in a manner that is accessible to the general public;
- be guided by terms of reference that would be established to identify the purpose, make-up and logistics of the group, such as the frequency and duration of meetings and the roles and responsibilities of the group members;
- have an independent facilitator to run meetings, as well as administrative support to take minutes and circulate information to all committee members;
- through a transparent community-based nomination process, seek representatives with diverse skills and experience drawn from a variety of sectors and backgrounds, including CN representatives, municipal and agency staff, nearby residents, relevant community and business organizations, and any Indigenous groups who wish to participate;
- produce an annual report to the community on its activities;
- meet at least quarterly and operate throughout the construction period and for the first five years of the operating period. At the end of that period, CN and the Community Liaison Group should evaluate the group's role and effectiveness and determine how to proceed in the future; and
- be provided with sufficient resources from CN to conduct its work, including communication with community residents and occasional public forums.

Additional Recommendation 15.4 — Formal agreement between CN and Conservation Halton

The Panel recommends that CN and Conservation Halton enter into a formal agreement to collaborate on pertinent matters relating to environmental design and management for the life of the Project. The purpose of the agreement would be to ensure ongoing dialogue between Conservation Halton and CN to understand and address technical concerns regarding the management of flood and erosion risks, including natural channel designs and stormwater management, particularly during the detailed design stage of the Project.

The Panel recommends that the agreement address communications, and to what degree parties would review and have input on designs, plans, mitigation and analysis of monitoring results. The working of the agreement should be as simple and efficient as possible. Collaboration should work in both directions, with CN sharing information about its Project design plans and mitigation, and Conservation Halton sharing information about activities or developments in the broader watershed area that may affect the Project. The agreement would make it clear that parties participate in good faith and not with the intent of stopping the Project.

Appendix J – Panel Recommendations

Additional Recommendation 15.5 — Interagency coordination between the Impact Assessment Agency of Canada and Conservation Halton and the Town of Milton or Halton Region, for the purposes of compliance and enforcement.

The Panel recommends that the Impact Assessment Agency of Canada consult with Conservation Halton and the Town of Milton or Halton Region as appropriate to support the Agency's review of Project elements during the detailed design stage, and to interpret relevant monitoring and follow-up program information for the purposes of assessing compliance.