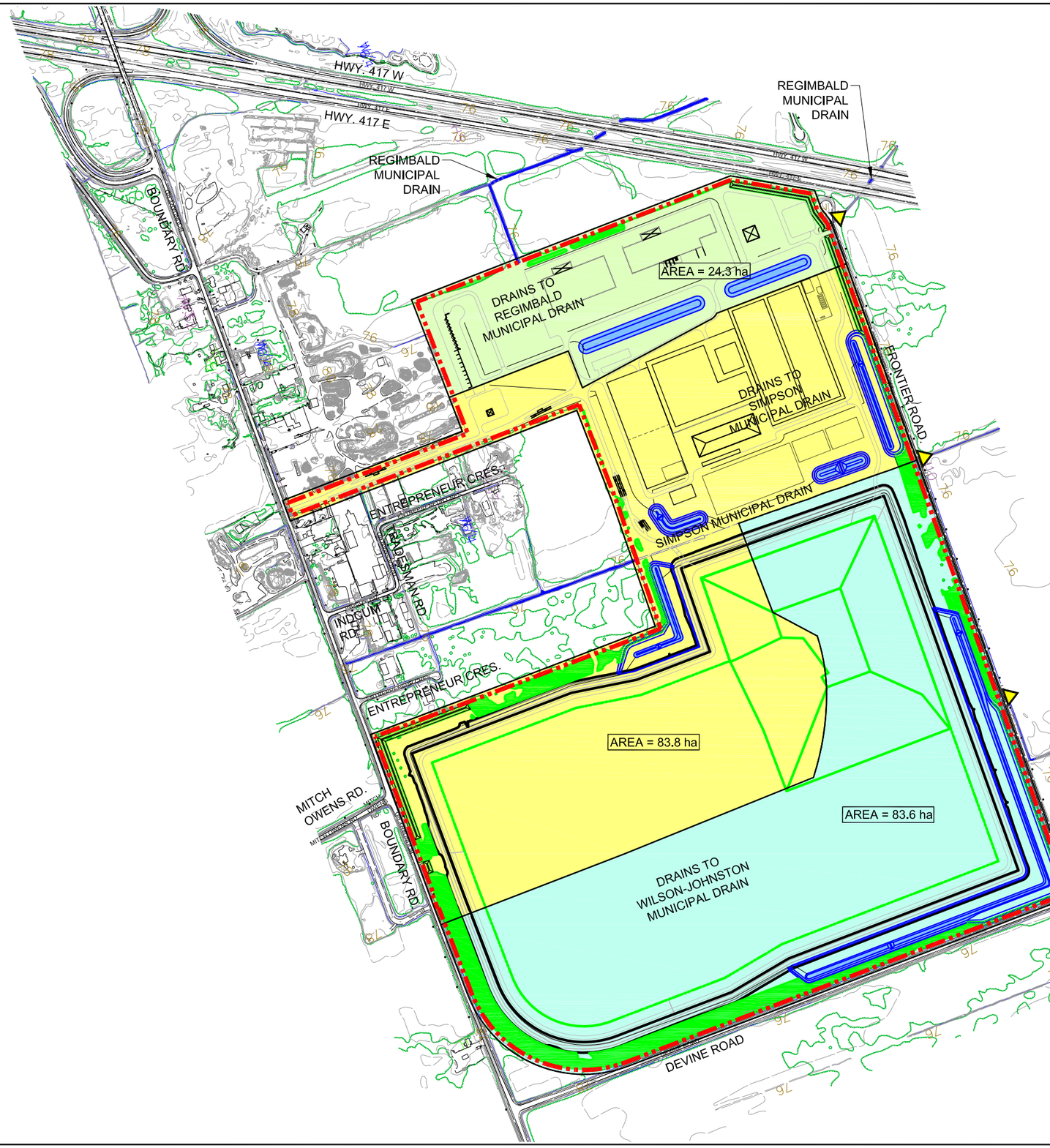

N
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LEGEND:

- PROPERTY BOUNDARY
- SURFACE WATER
- OUTLET
- DRAINAGE AREA BOUNDARY

NOTE

1. THIS FIGURE SHOULD BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.

REFERENCES:

1. BASE DRAWING PROVIDED IN A DIGITAL FORMAT BY BASE MAPPING CO. LTD., CONTRACT No. 2517-12, PHOTO DATE: NOVEMBER 7, 2012, DATE RECEIVED: JANUARY 9, 2013.
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

200 0 200 400
SCALE 1:10,000 METRES

REV	DATE	DES	REVISION DESCRIPTION	CAD	CHK	RVW

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE
CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE

POST-DEVELOPMENT DRAINAGE AREAS

Golder Associates
Ottawa, Ontario, Canada

PROJECT No.		12-1125-0045	FILE No.	1211250045-V1-EAr-11.4-1.dwg	
DESIGN	D.H.	22 Jan. 2013	SCALE	AS SHOWN	REV. 0
CAD	M.L.F.	23 Jan. 2013	FIGURE No.		
CHECK	D.V.K.	Aug. 2014		11.4-1	
REVIEW	P.A.S.	Aug. 2014			

PLOT DATE: October 9, 2014
FILENAME: N:\Active\Spatial_IM\Miller_Paving_Ltd\CRRRC\ACAD\Vol 1 (Report Figures)\Chapter 11\1211250045-V1-EAr-11.4-1.dwg

Wilson-Johnston Municipal Drain: The post-development, final build-out sub-catchment area draining to the Wilson-Johnston Drain will decrease by approximately 11.5 hectares, from 95.1 hectares to 83.6 hectares. This area will include approximately two-thirds of the landfill area and will include one long pond located along the southern and eastern sides of the Site.

A summary of existing and proposed post-development drainage areas is presented in Table 11.4-2.

Table 11.4-2: Existing and Proposed Drainage Areas

Site Municipal Drain Sub-catchment	Area (hectares)	
	Existing	Proposed
Regimbald	21.0	24.3
Simpson	75.6	83.8
Wilson-Johnston	95.1	83.6
Total Site	***191.7***	***191.7***

The total Site drainage area is not expected to change. The Regimbald Municipal Drain still has the smallest drainage area and the Simpson and Wilson-Johnston Municipal Drains will have identically sized drainage areas. Drainage leaving the Site to these three outlets will be managed by the on-Site SWM facilities.

Predicted Effects on off-Site Flows: The ditches within the Site are designed to convey stormwater to the SWM ponds, or eastern Site boundary culverts directly. Three types of channels (ditch, SWM pond inlet, or outfall channels and spillways) have been designed considering the slope along with the peak flow and corresponding velocity computed for a 1 in 25 year design storm. Based on the functionality of the channels, with consideration of peak velocity results, these conveyance features have been designed with two types of surface treatment: rip-rap lined, or vegetated ditches.

Post-closure conditions were used for the surface water quantity assessment as the entire Site will be contributing to Site runoff when the landfill component has been capped. In order to minimize potential for nuisance flooding during minor storm events and property damage during major events, the ponds have been designed for the 1:100 year storm event.

Under the post-development scenario, the increase in impervious land use and average slopes for the sub-catchment areas are expected to generate increased runoff conditions.

Considering the proposed SWM ponds (storage reservoirs), Table 11.4-3 compares the pre-development and controlled, post-development peak flows for each Site sub-catchment area. As shown, the post-development peak flows are less than the pre-development flows and the CRRRC will not lead to increased peak off-Site surface water flows.

Table 11.4-3: Pre- and Post-Development Peak Flow Rates Comparison

Municipal Drain Sub-Catchment		Drainage Areas (hectares)		Peak Discharge to Municipal Drains (Litres per second)							
				1:2 year		1:5 year		1:25 year		1:100 year	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Regimbald	21	24.3	86	38	298	195	471	336	538	455
2	Simpson	75.6	83.8	35	13	284	251	585	549	732	617
3	Wilson-Johnston	95.1	83.6	40	25	345	338	715	580	898	675

These peak flows are conservative for the purposes of determining the approximate SWM pond sizes to meet storage volume requirements to manage peak flows without flooding.

Predicted Effects on On-Site Runoff Flow Volumes: Environment Canada (1940-2011) climate normals were used to estimate annual average water budget comparisons for the existing and post-development Site conditions (Environment Canada, 2012). Results for the existing Site condition water budget are provided in Table 11.4-4. Results for the post-development Site condition water budget are provided in Table 11.4-5.

Table 11.4-4: Existing Conditions Water Budget

Municipal Drain Sub-catchment	Average Annual Volumes			
	Area (hectares)	Surplus (m^3/yr)	Runoff (m^3/yr)	Infiltration (m^3/yr)
Regimbald	21.0	81,340	63,000	18,340
Simpson	75.6	270,430	196,790	73,640
Wilson-Johnston	95.1	334,850	245,940	88,910
Total	***191.7***	***686,620***	***505,730***	***180,890***

Table 11.4-5: Proposed Conditions Water Budget

Municipal Drain Sub-catchment	Average Annual Volumes			
	Area (hectares)	Surplus (m^3/yr)	Runoff (m^3/yr)	Infiltration (m^3/yr)
Regimbald	24.3	100,510	94,660	5,850
Simpson	83.8	308,170	254,030	54,140
Wilson-Johnston	83.6	273,450	194,470	78,980
Total	***191.7***	***682,130***	***543,160***	***138,970***

Due to the proposed development of the CRRRC, the overall Site is expected to see a decrease in annual infiltration and a corresponding increase in annual runoff. Also, shifting of drainage area boundaries at the sub-catchment levels is expected to result in larger changes when compared to pre-development conditions. The Regimbald sub-catchment area is increased, which results in an increase in runoff and a decrease in

infiltration. A similar scenario is expected for the Simpson sub-catchment area with an expected increase of approximately 30%. Since the Wilson-Johnson sub-catchment is proposed to be reduced in area, the runoff is expected to decrease by approximately 20%; the expected annual infiltration will also decrease. As described above, the off-Site flows associated with the runoff volumes will however be controlled by the on-Site SWM facilities.

The existing Site drainage is poor and discharge in the outlet ditches downstream of the Site is highly variable. The proposed SWM facilities will regulate and provide more regular flows compared to the current condition. Since all drainage originating from the CRRRC Site areas combine at Shaw's Creek, any potential impacts associated with changes in post-development drainage will be primarily limited to the sections of ditches immediately downstream of the Site. These potential impacts were considered as part of the biology assessment.

Surface Water Quality: Stormwater quality control will be provided for the Site to remove a minimum of 80% TSS loading (Enhanced Level Treatment (MOE, 2003b)) for each of the three sub-catchment systems. The extended detention drawdown time for proposed SWM Ponds 1 to 5 is approximately 24 hours, considering the 25 millimetre City of Ottawa design storm event.

To improve the settling of TSS within the permanent pool, SWM Ponds 1, 2, 3 and 4b will be constructed with a forebay equal to approximately 1/5 of the width and length of the pond bottom. Due to the long, linear nature of most of the SWM ponds, some of the runoff entering the ponds will bypass the forebays. To assist with removal of TSS, it is proposed that much of the runoff for these areas be promoted to enter the ponds as sheet flow across vegetated buffer areas adjacent to the ponds. To avoid re-suspension of accumulated sediments and flushing of the ponds during major storm events exceeding the 1 in 100 year event, a pond bypass/overflow would convey excess flow to the outlet.

During the operational/construction phase of the project, ditches and swales at the perimeter of unvegetated portions of the Site will be protected from potential runoff containing suspended solids through the use of temporary berms and silt fences. Perimeter ditches along the completed and capped areas will divert runoff through grass lined swales to the SWM ponds.

The ponds and the swales will serve to remove suspended sediment from the runoff and prevent significant outflows that could potentially impair the water quality in downstream watercourses in extreme events.

In the post-closure phase of the Site, finalized perimeter ditches along the outer berm of the landfill footprint will capture and direct runoff from the landfill surface and will continue to direct the water via grass lined swales or ditches to the SWM ponds that have been designed for Enhanced protection levels (MOE, 2003b).

During operational phases of the diversion facilities or the landfill, drainage features will be implemented to keep potentially contaminated runoff separate. Drainage around the active face of the landfill will be directed to the landfill leachate collection system. Pond 4a will be a two celled storage pond dedicated to receive runoff from the proposed compost pad area. One cell will be dedicated to receive runoff from final curing areas of the pad while the other will be for runoff from the remainder. This pond is sized to contain runoff equivalent to 110% of a 1:25 year, 24 hour event for the pad area, without discharge to off-Site surface water. The stored water within the pond cells will be managed to maintain adequate capacity by re-using the water from the appropriate cell for compost pile spraying and Site irrigation. To ensure Site irrigation is a viable option, water quality samples from both cells of Pond 4a will be collected for analysis during the demonstration phase of the organics processing

facility. Should water quality be such that Site irrigation is not possible, it is contemplated that surplus water from Pond 4a would be taken to the City of Ottawa wastewater treatment plant with the pre-treated wastewater from the Site.

The proposed works are predicted to result in surface water quality conditions that are comparable to existing conditions. Post-closure, the SWM ponds will continue to operate, to ensure surface water quality downstream of the Site remains protected.

11.5 Biology

The assessment of effects on the aquatic and terrestrial biology environment is provided in TSD #4. Potential adverse effects of the project were identified considering linkages between project components or activities and natural environmental features. The assessment follows a source-pathway-receptor approach. Effects from the CRRRC project may occur either directly or indirectly.

11.5.1 Potential Direct Effects

Vegetation Communities: The construction of the project will result in the removal of all vegetation from the Site, with the exception of a 15 to 20 metre wide vegetated screen around the perimeter of the Site.

There will be permanent loss of approximately 65.7 hectares of forest vegetation on the Site. This vegetation is largely immature with more than half dominated by non-native invasive species, including European white birch and common buckthorn. Common buckthorn thrives in a variety of habitats and forms dense thickets that crowd and shade out native plants. It can alter nitrogen levels in the soil, creating better conditions for its own growth and discouraging the growth of native species. Common buckthorn also produces large numbers of seeds that germinate quickly and prevent the natural growth of native trees and shrubs (Ontario Federation of Anglers and Hunters, 2013). A white spruce plantation comprises 15% of the forested area on the Site and the remainder is immature deciduous swamps.

The remainder of the Site is vegetated in primarily thicket and thicket swamp, representing low-diversity, early successional communities. These vegetation communities have a high proportion of glossy buckthorn (*Frangula alnus*). Glossy buckthorn has the same invasive characteristics as common buckthorn, as described above, but is found in more moist conditions. Based on existing conditions and the prevalence of glossy buckthorn in the seeding layer observed during the field surveys, it is likely that glossy buckthorn would increase in dominance in the non-forest vegetation communities on the Site if left undisturbed. Thickets and thicket swamps are not uncommon in the Site-vicinity or in the City of Ottawa.

All vegetation species to be removed on the Site are common to the Site-vicinity and widespread in the area. There will be no removal outside of the Site.

The loss of the non-native dominated vegetation communities on the Site is not considered to be ecologically important from a vegetation perspective.

Wildlife Habitat: The Site provides disturbed, fragmented habitat for a number of common and widespread species. The construction of the project will result in the removal of this habitat, including barn swallow habitat (designated threatened under the ESA) in some old barns on the Site.

The habitat on the Site does not meet the criteria for significant wildlife habitat under the Significant Wildlife Habitat Technical Guide (MNR, 2000). There are similar available habitats in the Site-vicinity that can be used by the species currently using the Site. It is likely that during the construction of the project, the species on the Site will relocate nearby.

It is not anticipated that there will any direct effects on the wildlife habitat outside the Site.

Barn swallow, listed as Threatened under the Ontario ESA, was observed nesting on the Site. In order to remove the on-Site habitat, authorization will be sought from the MNRF through a notice of activity under O. Reg.323/13 (MNR, 2013b). A mitigation and restoration record will be prepared and new barn swallow habitat will be created within approximately 1 kilometre of the Site and monitored for three years. Following the creation of the new habitat, it is expected that there will be no net residual impact on barn swallow or barn swallow habitat as a result of CRRRC.

Little brown myotis and small-footed myotis, listed as Endangered under the ESA, were detected flying over the Site. The field surveys indicated that the bats were only flying over the Site. There is no maternity roosting habitat on the Site. The MNRF has concurred that there was no habitat on the Site that required protection. It is expected that there will be no impact on little brown myotis, small-footed myotis, or their habitat, as a result of CRRRC.

Although milksnake, listed as Special Concern under the ESA, was not observed on the Site, there is suitable habitat and low to moderate potential for this species to be found on the Site or in the Site-vicinity. Because milksnake is listed as a species of concern, its habitat is not protected. During construction and operation, it is likely that any milksnake in the Site-vicinity will avoid the Site and will use the available adjacent habitats. A worker awareness program to avoid harm to individuals, if they are in the Site-vicinity, is recommended.

Three bird species were identified during breeding bird surveys on the Site that are area sensitive and require a certain amount of mature or immature forest habitat on the landscape - ovenbird (*Seiurus aurocapilla*), yellow-bellied sapsucker (*Sphyrapicus varius*) and veery (*Catharus fuscenscens*). There is sufficient contiguous forest habitat for all of these species within the Site-vicinity, particularly to the west and the south of the Site. There is also suitable habitat to the north of the Site, north of Highway 417. The construction and operation of the project is not expected to adversely affect local populations of any bird species.

Because the wildlife habitat on the Site is considered disturbed and fragmented, and there will be no material effects to local populations of species, the loss of wildlife habitat on the Site is not considered to be ecologically important.

Migratory Bird Nests: The *Migratory Birds Convention Act* prohibits the destruction of migratory bird nests (passerine, waterfowl and raptor) during the breeding season. In Ontario, the migratory bird breeding season extends from approximately May 1 to July 31. Where possible, vegetation removal will be scheduled outside the migratory bird breeding season. If it is not possible to complete the clearing outside this window, a biologist will conduct nest searches no more than 24 hours prior to the construction activities to avoid destruction of migratory bird nests. These mitigation measures will ensure minimal impact to the nest success of migratory birds relative to baseline conditions.

Fish Habitat: The Simpson Drain on the Site will be improved from its existing condition (with removal of the existing beaver dam to avoid obstruction of flow through the Drain) throughout the construction and operation of the project. There will be no direct loss of fish habitat in this surface water feature.

Construction of the diversion facilities in the northern part of the CRRRC will require complete removal of DD1. During the 2012 survey, DD1 was dry along its entire length; during the 2013 survey, there was an approximately five metre section with pooled water in which three fish were caught. The fish habitat in DD1 is marginal and poor quality and typical of other drainage ditches in the area. Removal of this feature is not considered to have a negative impact on fish and fish habitat as it does not support critical life functions (i.e., reproduction) and there is similar suitable habitat in the immediate area, including downstream of the Site.

Construction of the CRRRC will require the complete removal of DD2 across the Site. DD2 originates in a roadside ditch along Boundary Road and collects surface runoff from the south part of the Site. There was no flow and no fish were observed in DD2 during any of the field surveys. Furthermore, dissolved oxygen levels in the pooled water were low enough to exclude most aquatic species, including fish, from using this habitat. On this basis, DD2 is not considered direct fish habitat and removal of this feature will not result in a direct loss of fish habitat on the Site.

DD3 is a constructed feature that is isolated from all other surface water features in the Site-vicinity, although it appears that there may be a tenuous overland connection with DD2 during periods of high flow such as following storm events or spring freshet. DD3 is also subject to stress associated with winter low temperatures, summer extremes and is characterized by poor quality aquatic habitat. DD3 contains a small fish community and is considered direct fish habitat. Because DD3 will be removed during the construction of the project, the CRRRC project will have an adverse effect on the fish habitat in this feature.

Prior to any work associated with DD3 a fish collection permit will be obtained from the MNRF. The fish will be salvaged and relocated to a nearby surface water feature. Any non-native species encountered during the fish salvage will be euthanized and disposed of using appropriate methods.

The loss of habitat from the isolated DD3 surface water feature is not ecologically important given its poor quality. By removing and relocating the fish to a nearby feature with a similar fish community and habitat structure, it is expected that there will be no adverse impacts to the fish community.

Wildlife Vehicle Collisions: The construction and operation of the CRRRC will result in an increase in the volume of vehicle traffic in the Site-vicinity, with the majority of Site-related traffic along the 800 metre long section of Boundary Road (an arterial road) between Highway 417 and the Site entrance location. The potential for vehicle collisions with wildlife may marginally increase, however Boundary Road is already heavily travelled. Traffic speed and volume are generally the primary factors that contribute to road-related wildlife mortality. The incremental increase in the number of wildlife-vehicle collisions associated with the CRRRC is expected to be minor or negligible relative to baseline conditions. The Site is isolated from other wildlife habitats by active roads, including Boundary Road, Frontier Road, Devine Road and Highway 417.

Mitigation measures will be implemented to reduce the number of on-Site wildlife-vehicle collisions, in particular establishing and enforcing speed limits on the Site. Material increase in wildlife mortalities on the Site from vehicle strikes associated with the CRRRC is not anticipated.

11.5.2 Potential Indirect Effects

Habitat Fragmentation/Changes to Wildlife Movement Corridors: The lands to the east are in open agricultural use (crops) and the Site is bounded by a 400 series divided highway (Highway 417) to the north and an industrial park and Boundary Road to the west. The NCC has hypothesized the existence of a wildlife movement corridor from the Cumberland Forest through the Vars Forest, across Highway 417 and through an area including the Site and then to the west of Boundary Road based on their high level assessment (NCC, 2013b). This hypothesized corridor is fragmented by Highway 417 in its northeast portion and Boundary Road to the west/northwest, which would significantly limit wildlife movement between the Vars and Cumberland Forests and anything to the south of that four lane divided highway. To the extent there may be wildlife movement across Highway 417, the vegetation to the south of Devine Road would provide a continued movement corridor to the area west of Boundary Road. Based on the data collected during the field surveys on the Site, there were no signs of an existing wildlife movement corridor on the Site such as heavily used game trails or high numbers of wildlife. Further, the NCC also identifies a wildlife corridor north of both the Site and Highway 417 from the Vars Forest, directly across Boundary Road to a natural area connected to the Mer Bleue further to the west/northwest; this corridor, which provides direct linkage from the Forests to natural areas further northwest without having to cross Highway 417, remains available to allow wildlife movement in the area.

The wildlife habitat in the Site-vicinity is patchy, disturbed and fragmented. Although fragmentation can accompany habitat loss, it is a different phenomenon (McGarigal and Cushman, 2002; Fahrig, 2003). Habitat fragmentation effects are generally lesser in magnitude than direct habitat loss (Andrén, 1999; Fahrig, 2003) and species with very specific habitat requirements and low dispersal abilities are more likely to be affected by habitat fragmentation or associated changes to wildlife movement corridors.

All of the wildlife species identified on the Site are habitat generalists, habituated to the disturbed, fragmented landscape and are mobile species. It is expected that because of the current fragmented landscape, the construction and operation of the project will not affect the overall movement of wildlife between habitats to any material degree.

The fragmentation of habitats or any changes to wildlife movement corridors in the Site-vicinity are not considered to be ecologically important adverse effects.

Air Emissions: Wildlife in the Site-vicinity may potentially be exposed to airborne contaminants from the CRRRC. Direct exposure includes inhalation of air emissions, or ingestion of water, soil or vegetation impacted by air emissions. Mitigation measures to limit the amount of airborne constituents from the Site in compliance with MOECC requirements will be implemented, such as air emission controls in buildings and processing operations, minimizing idling in on-Site vehicles, use of equipment with industry-standard emission control systems and developing operating procedures that reduce air emissions (e.g., regular maintenance of equipment to meet emission standards).

All air constituents generated by the CRRRC will meet MOECC guidelines/standards, which generally consider both human and ecological risk (TSD #2). Air standards in Ontario are based on the best scientific information available and are set at levels intended to safeguard the natural environment and protect sensitive populations (MOE, 2009a). In addition, volatile and semi-volatile constituents generally degrade in air and will not likely deposit onto surface water or soil and will not persist in the environment. Contaminants that are gaseous at room temperature are also not expected to deposit onto surface water or soil. Although metals and ions such as

chloride, sulfate, sulphides and nitrate may be deposited on surface water or soil via wet (adhered to precipitation) and dry deposition (adhered to particulate matter), the levels will be in such low amounts that there will be no adverse effects on the off-Site natural environment, including wildlife.

Dust Deposition: Accumulation of total suspended particulate deposition (i.e., dust) can result in a local indirect change on the quality of habitat on the Site and in the Site-vicinity. Dust deposition in surface water has the potential to alter surface water chemistry and increase the sediment load in receiving surface water features. Dust can also affect vegetation by smothering the leaf surface of plants, blocking the stomata and by changing the soil pH and ionic composition. The physical smothering of the leaf surface reduces light transmission causing reduced photosynthesis, growth (vegetative and reproductive) and plant vigour. It may also inhibit pollen germination. Physical blocking on the stomata has been shown to reduce stomatal resistance, causing higher uptake of toxic metals and phytotoxic pollutant gases. Dust deposition may also increase pH in acidic soils, alter soil nutrient availability and cause greater bulk density. Dust can also exacerbate secondary stresses such as drought, insects and pathogens (Farmer, 1993).

Mitigation measures will be implemented to minimize the amount of airborne dust such as enforcing on-Site speed limits and paving almost all of the roads in the north part of the Site, and applying Site fugitive dust best management practices, as necessary and appropriate, such as the use of a truck tire washing station and watering or applying dust suppressant to on-Site road surfaces to minimize track in and track out of dust.

The major sources of dust on the Site will be the internal road system (mainly the unpaved roads in the south part of the Site) and disturbed exposed soil areas during construction and during operation of the landfill portion of the CRRRC. The results of the air quality modelling predicted that the total suspended particulate air concentrations within the Site-vicinity, as a result of the project, will be below provincial guidelines (120 $\mu g/m^3$) (TSD #2). It is anticipated that any effects of dust on off-Site vegetation or wildlife will be at worst occasional and of low magnitude considering the low concentrations.

In summary, it is not expected that vegetation or wildlife habitat will be adversely affected as a result of dust emissions from the CRRRC project.

Noise: Increased noise as a result of CRRRC could cause avoidance of the Site-vicinity by wildlife and possibly, reduced reproductive success.

Sound is comprised of energy at various frequencies, which give each sound we hear its unique character. The frequencies are measured in Hertz (Hz) and are typically grouped into octave or 1/3 octave bands. It is common practice to sum sound levels over the entire audible spectrum to give an overall sound level. However, the human ear does not respond to each frequency equally. To approximate the hearing response of humans, “A-weighted” sound levels apply an adjustment to each octave band. In general, a larger adjustment is applied to low frequencies, as human hearing is less sensitive to low frequency sound. Although it is possible to develop adjustments to represent how human perceive sounds of different frequencies, it is not possible to develop comparable adjustments for the perception of non-humans to noise. Literature suggests that livestock have a fairly similar hearing range to that of humans, with the lower end of their range of hearing starting at the same, or slightly higher, frequencies than humans (Strain, 2013). This literature also suggests that livestock can hear sounds at frequencies that extend beyond the range of human hearing. Noise effects from the project on wildlife were assessed using dB(Lin), which best describes the full range of frequencies at which wildlife species hear and vocalize.

The noise model predictions were based on the assumption that the processing facilities and landfill component are operating at maximum capacity, with the landfill activity elevated at the closest point to the Site boundary. Based on the models, within the Site-vicinity, noise from CRRRC to the north, south and west is not expected to exceed baseline conditions. The existing noise levels from the traffic along Boundary Road, Devine Road and Highway 417, which contribute to the baseline conditions, are at least 8 dB(Lin) higher than those predicted due to the operation of CRRRC. To the east of the Site, the predicted elevated noise levels are lower than baseline by the boundary of the agricultural fields at Highway 417, but elevated above baseline further away from the influence of Highway 417. The lands to the east of the Site are in active agricultural (crop) use.

Although little is known about the effects of noise on individual species, no particularly sensitive wildlife species have been identified in the Site-vicinity. Because the lands to the east are not being used by livestock, and the existing natural wildlife habitats are limited to hedgerows and small patches of isolated woodland, with common mobile species, wildlife habitat utilization patterns outside of the Site are not predicted to be altered as a result of project noise.

In summary, predicted noise levels from the CRRRC are not considered to be ecologically important.

Increased Erosion: Increased erosion on the Site can cause a disturbance and change in aquatic communities through sediment loading, or a decrease in available aquatic habitat.

A minimum setback of 20 metres will be maintained, during both construction and operation of the project, from the Simpson Drain on the Site. It is proposed to use standard mitigation measures such as implementing a sediment and erosion control plan prior to construction, where appropriate (to mitigate erosion potential and promote Site stabilization), controlling access and movement of equipment, and scheduling construction activities to minimize areas and duration of soil exposure to the extent practical. All areas of disturbed/exposed soil during construction and the SWM structures during operation, will be stabilized and re-vegetated as soon as possible. Through the implementation of these mitigation measures, it is anticipated that there will not be any material increase in erosion and associated transported sediment effects on the Site or in the Site-vicinity.

Alteration of Surface Water Regime: Alteration of the surface water regime has the potential to affect streamflow in downstream sections of aquatic systems associated with watercourses and ditches within the Site. Changes in flow downstream could affect fish habitat by reducing the amount of habitat, increasing the deposition of fines in habitats and decreasing the amount of in-stream vegetation for cover.

The area of the municipal drain sub-catchments is anticipated to change as a result of CRRRC, with an increase of approximately 17% of the Regimbald sub-catchment (DD1), an increase of approximately 11% of the Simpson sub-catchment and a decrease of approximately 12% of the Wilson-Johnston sub-catchment (DD2). Due to the increase in imperviousness and the change in contributing drainage areas, the annual runoff from the Site to each sub-catchment will also change. There will be an increase of approximately 50% and 29% in the amount of annual runoff to the Regimbald and Simpson sub-catchments, respectively, and a decrease of approximately 20% annual runoff to the Wilson-Johnston sub-catchment.

While the annual runoff amounts are anticipated to change, the post-construction peak flows will be controlled through the SWM ponds to equal or less than pre-development conditions. The SWM ponds will be designed such that the surface water leaving the Site will be controlled and the hydrologic regime post-construction will meet the pre-construction conditions, through the design of the hydraulic outlet controls for post development

flow to meet peak flow conditions for the 1 in 2, 5, 25 and 100 year design storms. As set out in the surface water assessment (Appendix A to the Volume IV D&O Report), it is anticipated that because under existing conditions the Site is prone to flooding and the groundwater levels are close to the surface, by meeting the pre- and post-construction peak flows at the outlets of DD1 and DD2, the post-development base flow will be similar to pre-development conditions. As described in Section 8.6.2 and shown on Figure 8.6.2-1, there are three surface water discharge points from the Site. The three on-Site surface water discharge points meet and become Shaw's Creek, north of Highway 417. The runoff from the Site discharged to the Regimbald and Simpson sub-catchments will have an overall annual increase, but will be controlled to meet the pre-construction peak flow conditions. The alteration in the flow regime of these sub-catchments is not expected to adversely affect downstream aquatic habitat or biology. The runoff from the Site discharged to the Wilson-Johnston sub-catchment will have an overall annual decrease, but again will be controlled to meet the pre-construction peak flow conditions. DD2 (the discharge point that drains to the Wilson-Johnston Municipal Drain), from the Site to Highway 417, is an intermittent channelized farm drain characterized by terrestrial grasses. There is no direct fish habitat in the reach of DD2 from Frontier Road to Highway 417. Because there is no fish habitat in DD2 downstream from the Site and all surface water runoff from the Site will contribute to Shaw's Creek, a small potential change in the streamflow in DD2 is not expected to affect downstream fish habitat.

A surface water monitoring program will be implemented to confirm predictions re the surface water regime post-development and to make adjustments to the operation of the stormwater control system, as necessary (see Stormwater Management Design report in Appendix A to the D&O Report for details).Overall, it is not predicted that changes in the surface water flow regime will be ecologically important.

Alteration of Groundwater Quantity Regime: Alteration of the groundwater regime (i.e., a change in the direction of flow of groundwater, or a groundwater drawdown zone of influence) can result in a reduction of baseflow in predominantly groundwater-fed surface water features or wetlands, or affect shallow-rooted vegetation. The direction of groundwater flow is not expected to change as a result of the CRRRC.

Seasonal variation in groundwater elevation is indicated to be currently on the order of 0.5 metres in the Site-vicinity. It is predicted that the groundwater zone of influence from the CRRRC will not extend beyond the Site boundary. As such, off-Site groundwater levels should not be affected by the CRRRC.

On-Site, there is currently limited infiltration of surface runoff into the groundwater system. What infiltration occurs would be into the surficial silty sand layer and generally not deeper into the subsurface because of the underlying low permeability silty clay deposit. As such, surface water features on the Site, including the Simpson Drain, are fed primarily by surface flows.

The surface water features and the vegetation communities on-Site and in the Site-vicinity should not be affected by any changes in the groundwater regime.

Surface Water Quality: Surface water runoff from CRRRC could potentially affect vegetation and wildlife habitat. Contamination of surface water could include nutrient loading and/or input of sediments or other contaminants from the Site.

Surface water on-Site will be managed through stormwater ponds. The stormwater ponds will incorporate erosion and flow control measures and the stormwater ponds will be regularly monitored and maintained. Stormwater discharge will also be monitored. The Site will have sufficient storage capacity to store both operating flows and design storm events.

The facility incorporates several environmental design features to prevent release of untreated Site water into the receiving environment, including separation of leachate and potentially contaminated runoff from processing areas from clean runoff and design of the stormwater ponds to achieve an Enhanced Level of TSS removal (MOE, 2003b).Off-Site surface water quality should therefore not be adversely impacted as a result of the CRRRC project.

Groundwater Quality: The engineered containment and leachate collection and management system for the CRRRC has been designed to safeguard off-Site groundwater resources. The performance of the containment systems will be monitored and the leachate collection system will be monitored and regularly maintained. Based on the results of the groundwater modelling (as described in Volume III Geology, Hydrogeology and Geotechnical Report), groundwater quality is predicted to meet the Reasonable Use Criteria (MOE, 1994b) at the downgradient edge of landfill footprint and there will be no adverse off-Site groundwater impacts as a result of the CRRRC.

Pests: Increased use of the active landfill area by pests including nuisance birds, insects and rodents could result in avoidance of the area by some wildlife and reduced reproductive success. Mitigation measures, such as managing waste effectively to avoid attracting nuisance wildlife and pests, controlling the nuisance wildlife populations as permitted and required, and conducting periodic inspections to monitor effectiveness of the pest control, will be implemented to reduce the potential for adverse effects to the current local wildlife populations.

With the implementation of the above mentioned mitigation measures, use of the Site by nuisance wildlife and pests is not anticipated to be a concern.

11.5.3 Mer Bleue

As described in Section 8.7.1, the Mer Bleue (an Earth Science Provincially significant ANSI and considered a Core Natural Area by the NCC) is located to the northwest of the Site; at its closest point, the southernmost limit of the Mer Bleue is approximately 3.5 kilometres from the northwest-most boundary of the CRRRC Site. This 3,500 hectare conservation area contains the second largest bog in southern Ontario, providing habitat to many species of regionally rare and significant plants, birds and other wildlife (NCC, 2013a). Considering its separation distance from the CRRRC Site, the direction of groundwater flow and the results of assessments of potential direct and indirect effects of the CRRRC on the natural environment as described above in Sections 11.5.1and 11.5.2, there are no anticipated adverse effects from the CRRRC on the Mer Bleue. This is further discussed in Section 11.6.1 below in relation to the NCC.

11.6 Land Use & Socio-economic

The assessment of effects on the land use and socio-economic environment is provided in TSD #5. The assessment is broken down into three sub-components: land use, socio-economic and visual. Potential adverse effects of the project were identified considering linkages between potential impacts from project components or activities and other land uses in the Site-vicinity.

11.6.1 Land Use

The potential effects on existing and proposed future land use in the area as a result of the preferred Site Development Plan were assessed taking into account current relevant planning policy to determine the potential for future development in the area, as well as the impact assessment work of other disciplines as summarized in the Biology section immediately above.

The land use planning policy for this area is determined by the City of Ottawa's Official Plan (City of Ottawa, 2013g) and Zoning By-law (City of Ottawa, 2008), which has been approved in accordance with the Province's Land Use Planning Policy Statement and the *Planning Act*. The land is within the National Capital Region; therefore a review of the NCC's relevant planning policy has also been undertaken.

MOECC Guideline D-4: The MOECC D-4 Guideline (MOE, 1994c) is used by Ministry staff during review of land use approvals in the vicinity of landfills. This guideline indicates that the greatest likelihood of effects from landfill sites will occur within 500 metres of the site and recommends that in the absence of site-specific studies municipalities should establish within their Official Plan a 500 metre holding or buffer zone (called the influence area of the site in the City Official Plan (City of Ottawa, 2013g) Section 3.8.5) around landfills as related to potential development. In order to develop within this 500 metre zone an applicant must carry out site-specific studies. It should be noted that through this process the 500 metre buffer can be reduced to as little as zero.

In the case of the CRRRC, the EA and EPA/OWRA studies that Taggart Miller have undertaken as part of this EA demonstrate that the CRRRC can be designed and operated to not have adverse effects on adjacent land uses. These evaluations include a review of the sensitive land uses within the 500 metre area around the Site and an assessment of the potential impacts on these uses and any need for mitigation measures.

Should the EA be approved, the CRRRC will have to be identified in the Official Plan as it is a new proposed land use. Based upon the conclusions of the Taggart Miller studies, there would appear to be no need for a buffer zone around the Site from an impact perspective. The City of Ottawa may consider this matter as a part of any Official Plan Amendment process that arises from this project, or in a general review of its policies.

MMAH PPS, 2014: Planning policies for rural lands within municipalities are addressed in Section 1.1.5 of the PPS (MMAH, 2014). In rural lands located in municipalities, permitted uses and activities should relate to the management or use of resources, resource-based recreational activities, limited residential development, home occupations and home industries, cemeteries, and other rural land uses. Recreational, tourism and other economic opportunities should also be promoted.

The City has identified its Settlement Areas. There are no Settlement Areas identified immediately around the Site. The City has also included a policy in the Official Plan where rural subdivisions are not permitted (Section 3.7.2.8); therefore no new residential development is anticipated in the area.

Development of rural lands under the PPS is to be appropriate to the infrastructure that is planned or available, and avoid the need for the unjustified and/or uneconomical expansion of this infrastructure. Development that is compatible with the rural landscape and can be sustained by rural service levels should also be promoted. The results of the various studies have confirmed that the existing infrastructure, with minor modification along Boundary Road at the Site access location (as described in TSD #9 Traffic), is easily able to support this development.

Agricultural uses, agriculture-related uses, on-farm diversified uses and normal farm practices should be promoted and protected in accordance with provincial standards [Section 1.1.5.8]. Policy 2.3 speaks to the protection of Prime Agricultural Areas. The implementation of this Policy is reflected in the City's Official Plan, wherein the City did not identify the lands proposed for the CRRRC as an agricultural area. There has been a detailed review of agricultural impacts as a part of the EA (refer to TSD #8), which confirms that there are no negative impacts predicted on agricultural lands or operations.

Waste Management Systems are defined by the PPS as sites and facilities to accommodate solid waste from one or more municipalities and includes landfill sites, recycling facilities, transfer stations, processing sites and hazardous waste depots. Section 1.6.8 of the PPS lays out policies for Waste Management Systems. It states that "*Waste management systems* need to be provided that are of an appropriate size and type to accommodate present and future requirements, and facilitate, encourage and promote reduction, reuse and recycling objectives. Planning authorities should consider the implications of development and land use patterns on waste generation, management and diversion. Waste management systems shall be located and designed in accordance with provincial legislation and standards." In particular the recycling emphasis of the PPS aligns well with the objectives of the CRRRC.

MMAH Shape the Future: Eastern Ontario Smart Growth Panel, 2003: In 2002, the government appointed a Smart Growth panel for eastern Ontario to develop recommendations for bringing growth and prosperity to Eastern Ontario (MMAH, 2003). When the eastern panel was established, the Minister of Municipal Affairs and Housing challenged panel members to think creatively and to come up with a bold new strategy to guide eastern Ontario's growth over the next 30 years.

In Section 2 of the Panel's final report, recommendations were made for enhancing environmental stewardship (MMAH, 2003). Section 2.3 dealt with waste management: "The panel has recognized that waste management is a significant issue now and will continue to be in the future. Disposing of waste has become a costly exercise, financially and environmentally. Co-operation among provincial and municipal governments and stakeholders must exist in order to develop a more comprehensive, integrated waste management plan for the zone. Eastern Ontario must strive to embrace alternative technologies, and the re-use and reduction of waste when considering waste disposal."

The CRRRC reflects the intent to provide a more comprehensive and integrated approach to the re-use and reduction of IC&I waste.

City of Ottawa Official Plan, By-law 2003-203: The City completed a five-year review in 2013 of its Official Plan (City of Ottawa, 2013g). As a result of this review, Official Plan Amendment #150 was adopted by Council in December 2013 and is currently under appeal to the Ontario Municipal Board. The subject lands are designated as General Rural Area on Schedule A of the City of Ottawa's Official Plan. The lands immediately to the west and south of the Site are also designated General Rural Area, while the lands to the north, separated from the Site by Highway 417, are designated Natural Features Area. The lands to the southeast of the Site are designated Agricultural Resource Area.

The five-year review of the Official Plan in 2013 included a Land Evaluation and Area Review for Agriculture areas. A draft report of the Lands Evaluation and Area Review was issued in 2012, which identified various calculation options for mapping agriculture parcels and areas throughout rural Ottawa, and did not include the Site as an Agricultural area. The Land Evaluation and Area Review report currently has no status.

Section 3.7.2 of the City's Official Plan (City of Ottawa, 2013g) outlines the development policies for lands designated General Rural Area. The intent of this designation is to accommodate a variety of land uses that are appropriate for a rural location and a limited amount of residential development where such development will not preclude continued agricultural and non-residential uses.

General Rural Areas are designated on Schedule A with the intent to provide a location for agriculture uses and for those non-agricultural uses that, due to their land requirements or the nature of their operation would not be more appropriately located within urban or Village locations.

Policy 5 of Section 3.7.2 states that: A zoning by-law amendment will be required where any of the following uses are proposed in General Rural Areas:

a) New industrial and commercial uses, such as farm equipment and supply centres, machine and truck repair shops, building products yards, landscape contractors and nurseries; and

b) Uses that are noxious by virtue of their noise, odour, dust or other emissions or that have potential for impact on air quality or surface water or groundwater, such as salvage or recycling yards, composting or transfer facilities; concrete plants; the treatment of aggregate products; and abattoirs.

The evaluation criteria for rezoning identified in Policy 5 are as follows:

a) The use would not be better located in a village or the urban area;

b) If the use is to be located on a local road, it must be demonstrated that the volume and pattern of traffic flow anticipated from the development will not interfere with the proper functioning of the local road network;

c) The privacy of adjacent landowners or the amelioration of potential adverse impacts from lighting, noise, odour, dust or traffic can be achieved by separating the land uses, buffering or other measures as part of the development;

d) The potential for reducing possible impacts on neighbouring agricultural uses or nearby rural residential uses or village communities, where relevant;

e) The development is in keeping with the surrounding rural character and landscape;

f) All those requirements of Sections 2 and 4 related to transportation, servicing, design and compatibility and environmental protection;

g) Noxious uses will only be considered where suitable screening and buffering can be provided and generally these uses will not be considered in locations within groundwater recharge areas or immediately adjacent to residential areas, Scenic-Entry Routes, or waterfront areas; and

h) The impact that the development will have on the protection of tree cover and local wildlife movement, as result of proposed site clearing and grading, fencing, security lighting and other similar site plan matters.

The various studies done in support of this EA generally support the rezoning of the site taking into account the above considerations.

The City also has policies that deal with *Mineral-Aggregate Resources* throughout the City. There are no Aggregate Resources identified for these lands. The City undertook a comprehensive review of the Aggregate Resources as a part of the review of the Official Plan (City of Ottawa, 2013g). The draft was released during the summer of 2013. This report has not identified the Site as having any such resource. The recommendations from the study were included within the amendment that was adopted by Council in December 2013 and there was no recommendation for any designation of the subject lands.

Operating and non-operating *Solid Waste Disposal Sites* are landfills, dumps, incinerators and any other facilities providing for the long-term storage or destruction of municipal solid waste. Composting, recycling and transfer facilities are considered processing operations.

The City of Ottawa will require an Official Plan Amendment for the establishment of any new Solid Waste Disposal Site to show the location of the Site. The City will evaluate applications based on the following:

a) The proponent has completed an EA or an Environmental Screening Report under the EAA;

b) Compliance with a TOR for the EA, as approved by the Minister of the Environment under the EAA; or in the case of a project using the Environmental Screening Process, the submission of a Notice of Completion to the MOECC; and

c) Does not duplicate the requirements of the EAA.

In terms of *Transportation*, Schedule G of the Official Plan (City of Ottawa, 2013g) identifies Boundary Road, Devine Road and the 8th Line as Arterial Roads. Section 2.3.1 (48) outlines policy related to the movement of goods throughout the City. It notes that "The City will minimize the impact of truck traffic on residential neighbourhoods caused by the presence of these vehicles and their noise, vibration and emissions by ensuring the availability of a comprehensive truck route network based on the arterial road system". The City of Ottawa has also identified both Boundary Road and Devine Road as full load Truck Routes.

The City's Transportation Master Plan (City of Ottawa, 2013d) further details the City's objectives for Transportation. Section 6.10 Goods Movements notes that: "While efficient goods movement by truck, rail and air supports Ottawa's economic livelihood and competitiveness, trucks remain the primary mode of local freight transportation. Ottawa's truck route system is generally represented by arterial roads that can withstand use by

heavy trucks, the sizes of which are legislated by the Province of Ontario. The City will encourage industry to explore goods movement technologies and practices that can reduce community impacts, improve efficiency and enhance regional competitiveness, such as the development of intermodal terminals that enable a transfer of tonnage from road to rail."

The main Site access along Boundary Road follows the intent of the Official Plan (City of Ottawa, 2013g) policies related to arterial roads as reflected in Schedule G and the Transportation Master Plan (City of Ottawa, 2013d).

Section 2.4.4 of the City's Official Plan (City of Ottawa, 2013g) outlines policy for *Groundwater Management*. The City has responsibility for the regulation of land use and development that impacts groundwater resources; and for the operation of public drinking water systems including public communal wells and the delivery of public health programs and educational materials.

The following policies shall apply:

1) Where monitoring and characterization of the groundwater resource has indicated degradation of the resource function, the Zoning By-law will restrict uses to prevent further impacts on that function; and

2) Where monitoring and characterization of the groundwater resource has indicated that a significant resource function exists, the Zoning By-law will restrict uses to protect that function.

Volume III of the EA supporting documents presents the results of the hydrogeology impact assessment. The Site is in an area that is constrained in its ability to yield meaningful groundwater resources. The predicted results indicate that the required groundwater quality will be easily maintained at the CRRRC property boundary.

In terms of *Additional Aspects of the Official Plan Policies:* no archaeological potential has been identified by the City of Ottawa E-Maps system, and the Site is located more than one kilometre from the Village Boundary of Carlsbad Springs and the City's Boundary. Edwards is no longer identified as a Village in the Official Plan (City of Ottawa, 2013g). Also, the City does not identify any Environmental Constraints or Natural Features on the Site lands as shown on Schedule K and Schedule L1 of the Official Plan.

The City has identified Scenic Entry Routes throughout the City. Highway 417 starting at the Boundary Road interchange (i.e. to the west of the Site of the proposed CRRRC) is identified as a Scenic Entry Route. (City of Ottawa, 2013g).

Section 3.7.2 (6) (g) of the Official Plan (City of Ottawa, 2013g) states that: "Noxious uses will only be considered where suitable screening and buffering can be provided and generally these uses will not be considered in locations within groundwater recharge areas or immediately adjacent to residential areas, Scenic-Entry Routes, or waterfront areas."

The CRRRC would be east of this interchange but in any event can be readily screened from view from Highway 417. The proposed CRRRC has been designed to include constructed screening features (earth berms 2 to 3 metres high with trees transplanted on them). They are to be constructed where the screening could not be otherwise provided by leaving an adequate width (15 to 20 metres) of existing tree cover around the perimeter of the property. The constructed screening will be required at the northeast and southeast corner areas and along a portion of the west central Site boundary. It is noted that a portion of the constructed screening proposed at the

northeast corner to specifically screen the view of the Site from Highway 417 could be replaced by transplanting trees in the gap in the existing tree line at the north end of the Frontier Road cul-de-sac.

The proposed CRRRC will provide for rural employment, which requires the proximity to the interchange for transportation needs, but as a result of its industrial nature should not be located within a rural village. The CRRRC proposal reinforces the current zoning for the lands, where the lands along Boundary Road, including a part of the Site, are zoned for Heavy Rural Industrial development.

As part of the City's 5-year review of the Official Plan (City of Ottawa, 2013g), updates were made to the Infrastructure Master Plan (City of Ottawa, 2013c) and to the Transportation Master Plan (City of Ottawa, 2013d). The Master Plan updates are being conducted in accordance with Master Planning process including Phases 1 and 2 of the Municipal Class Environmental Assessment process, an approved process under the Ontario Environmental Assessment Act. All of the Plans were approved by City Council in December 2013. The Notice of Commencement for the updates was issued on January 18, 2013 and the City will be issuing the Notice of Completion in the Spring of 2014.

No significant changes that affect this Site have been identified in the updated reports. The Infrastructure Master Plan and Transportation Master Plan have both been reviewed by City Committee and have yet to be adopted by City Council.

Zoning: The majority of the subject lands are currently zoned Rural (RU) in the City of Ottawa's Zoning By-law (City of Ottawa, 2008); however a not insignificant portion is zoned Rural Heavy Industrial (RH). Permitted uses in the Rural Heavy Industrial Zone include waste processing and transfer, and leaf and yard waste composting. While the proposed development of these lands for the CRRRC will require an amendment to this By-law, the Rural Heavy Industrial zoning already attached to a portion of the Site indicates that the CRRRC is generally not inconsistent with existing zoning for the Site.

Aggregate Resources: Previous subsurface investigation on and in the area of the Site, as well as current on-Site investigations show that the Site is underlain by a surficial sand layer followed by an extensive and thick deposit of silty clay. The surficial sand layer generally consists of silty sand having a thickness generally ranging from about 0.6 to 1.2 metres.

As a result of its fine grained nature, this surficial sand layer is not of high quality as a potential aggregate material. Also, the layer is relatively thin compared to what would typically be considered for an aggregate resource operation, i.e., Aggregate Resource Industry Reports consider 6 metres as a minimum thickness for identification as an aggregate resource and there are already sand resources within the City that are known and reasonably plentiful, even within the existing licensed pits.

From review of the 1995 study regarding aggregate supply in the Region of Ottawa-Carleton, which includes sand, gravel, crushed stone, shale and clay, there are no aggregate resources at or within 500 metres of the Site (MHBC, 1995). Additionally the MNDM prepared an Aggregate Resource Inventory Paper for the Ottawa Region in 2013 and it does not show any aggregate resource at or within 500 metres of the Site (MNDM, 2013).

City of Ottawa Published data of Public Recreational Facilities and Activities: No public or recreational facilities as mapped by the City of Ottawa exist within 500 metres of the Site.

NCC's Plan for Canada's Capital, 1999: This report was written as the federal government's lead policy statement on the physical planning and development of the National Capital Region (or the Capital) over the next fifty years. This report identified scenic entries as complementary routes, found mostly in the built-up areas that offer a scenic and alternative access to the core of the Capital. These scenic routes are generally under the jurisdiction of regional governments and can also connect to the Capital Parkway network.

The City of Ottawa Official Plan (City of Ottawa, 2013g) identifies Highway 417 starting at the Boundary Road interchange and proceeding westward a Scenic Entry Route. The proposed CRRRC is east of that interchange but in any event has been designed to include screening at the northeast corner, intended to screen the CRRRC from view of the Highway 417, as shown in Figure 11.6.3-2.

In August 2011, the NCC released a draft discussion paper for a 50 year planning framework for matters under its jurisdiction - *Horizon 2067*. Eight challenges and suggestions to respond were identified by the NCC. The challenges and suggestions are not directly relevant to the CRRRC. At this time *Horizons 2067* has not progressed beyond a discussion paper.

NCC's Greenbelt Master Plan, 2013: A new Greenbelt Master Plan (GMP) was released by the National Capital Commission in November 2013 (NCC, 2013b). This replaced the 1996 predecessor.

The Greenbelt is an area of 206 square kilometres largely owned by the federal government. The NCC envisions the Greenbelt as an integrated and recognizable feature that among other things:

- Provides a gateway to the Capital;
- Preserves and connects natural ecosystems; and
- Buffers and connects human activities.

The updated GMP provides for augmented protection for natural environment features through stricter policies for permitted activities in certain areas. Seven "sectors" are defined in the new GMP (fewer than its 1996 predecessor). One of these sectors is the Mer Bleue Bog.

The Core Natural Area on which the Mer Bleue Bog sector centers is of course the bog itself. The Mer Bleue Bog sector is removed from the Site by over 3 kilometres and a 400 series highway and is hydrogeologically upgradient from the Site. A "natural link" has been identified as part of the Mer Bleue sector extending to the northwest corner of the Boundary Road/Highway 417 interchange. The Site is separated from this area by the four lane 400 series highway as well as approximately 1 kilometre of industrial/commercial land.

The new GMP notes that the quality of arrivals by road in the Capital is dependent on the visual quality of the landscape. The GMP also notes that while the vistas of the Greenbelt along the western arrival route on Highway 417 are very attractive, views from Highway 417 along the eastern approach to Ottawa "are not as impressive as those from the west because of the area's more level topography." The Mer Bleue sector plan proposes a "Highway 417 Capital Arrival" sign near the northwest corner of the Boundary Road/Highway 417 interchange, enhancing the landscape west of Anderson Road, as well as working with the City to improve the visual aesthetic of industrial uses further west of the Greenbelt edge along Highway 417. As noted elsewhere, the Site is east of this interchange but in any event can be readily screened from Highway 417. The majority of the Site is already well screened from the highway by existing trees.

During public consultation on the proposed new GMP, the CRRRC was raised by some opponents of the project as a concern in terms of "contamination and potential impact on the Mer Bleue Bog". The NCC responded that it "has no jurisdiction over this site or decision since the Site is outside of the federal government's jurisdiction." In any event, as noted above, the Mer Bleue is over 3 kilometres away from the Site at its closest point is on the other side of a 400 series highway and is hydrogeologically up gradient. Further none of the multidisciplinary impact assessment work carried out with respect to the proposed CRRRC has identified the potential for any adverse impacts on the Mer Bleue.

It was concluded that the proposed CRRRC is a compatible land use with existing and future land uses in the vicinity of the Site from a planning perspective.

11.6.2 Socio-economic

The following data were developed/collected as indicators to assess the potential socio-economic effects of the proposed CRRRC in accordance with the approved TOR:

- Estimated person hours of employment for the construction and operation of the CRRRC;
- An estimate of the tax revenue generated by the CRRRC for the municipality;
- Estimated value of goods and services required for construction and operation of the CRRRC; and
- Estimated business impacts (positive or negative) from the CRRRC on nearby commercial activities.

During the construction phase, the CRRRC is expected to generate approximately 400,000 person-hours of employment, which represents approximately 160 to 200 full-time equivalent positions over one year. Gross income paid to the construction phase workers will total approximately $16.3 million that translates to approximately $80,000 - $100,000 per year gross income, which is much higher than the median individual or household income in the Site-vicinity. During the operation phase, the CRRRC is expected to generate approximately 198,000 person-hours of employment per year, which represents approximately 80 to 100 full-time equivalent positions over the thirty year life of the CRRRC at a gross income totalling approximately $7.2 million per year. This translates to approximately $70,000 per year gross income, which is expected to exceed the median individual annual income in the Site-vicinity. It can also be assumed that there will be spin-off benefits to the local economy as a result of increased direct CRRRC-related income. Direct effects of the CRRRC on employment are expected to be beneficial in the Site-vicinity.

The proposed CRRRC will provide for rural employment in accordance with the Employment Lands Study (City of Ottawa, 2013e) completed by the City. The proposed CRRRC reinforces the current Heavy Rural Industrial zoning for a portion of the lands where the Site is located. Employment opportunities will be available for skilled and non-skilled workers. There will be opportunities for local employees to fill both skilled and non-skilled positions. Direct effects of the CRRRC on employment are expected to be beneficial in the Site-vicinity.

In addition to one-time building permit revenue for the City estimated at approximately $300,000, the CRRRC is expected to directly increase annual municipal property revenue for the City of Ottawa by $1.6 to 3.7 million annually over the thirty year planning period. There will also be spin-off effects of this increased revenue to the City that, although not calculated, could create opportunities for further economic development and growth within the Site-vicinity. Direct effects of the CRRRC on municipal tax revenue are expected to be beneficial in the Site-vicinity.

Construction costs for goods and services (excluding labour) are estimated at $58 million for initial construction works and activities, followed by an average of approximately $700,000 per year over the 30 year planning period. Operational costs for goods and services (excluding labour) over the 30 year planning period are estimated at $3.2 million per year in capital expenditures and $16.2 million per year in operating expenditures. Much of this spending on goods and services will occur within the Site-vicinity (City of Ottawa), representing opportunities for local businesses to capitalize on this spending. Direct effects of the CRRRC on spending and businesses are expected to be beneficial in the Site-vicinity.

Based on the impact analysis as described in Section 11.0, as well as the traffic and visual assessments, no indirect adverse effects on local businesses due to air quality and odour, noise, visual or traffic associated with the CRRRC project are expected.

11.6.3 Visual

The potential for the proposed CRRRC to affect the visual appeal of a landscape was assessed. The proposed impact of the CRRRC impact from the five selected viewpoints is shown in Figures 11.6.3-1 to 11.6.3-5 and each viewpoint is described below.

VIEWPOINT 1: From Devine Road, Figure 11.6.3-1

This is a long view of the Site from the east along Devine Road across existing farm fields that are bisected by existing hedgerows of deciduous trees and shrubs. This view is oblique from the road and partially seasonally obscured by row crops in the fields and by trees along the Site perimeter. A screening berm with trees on top is proposed along the south part of the east Site boundary, however because of the flat terrain the CRRRC will be partly visible from this vantage point. With the proposed flat landfill sideslopes, the landfill component will be visible from this vantage point and appear as a gradual rise.

VIEWPOINT 2: From Highway 417, Figure 11.6.3-2

This view is taken through a break in a hedgerow of coniferous trees along Highway 417 at the northeast corner of the Site and is looking across the existing cleared fields where the proposed diversion buildings and ancillary facilities will be located, with the future landfill further to the south. Looking through an opening in the coniferous hedgerow, in the absence of mitigation, some of the proposed diversion buildings and ancillary facilities would be visible with the north end of landfill mound visible in the distance to the left to the secondary digester. The proposed screening berm with trees planted on top will provide effective visual mitigation. There will be a small gap in the berm at the secondary Site access location that will allow the secondary digester to be visible. If mature coniferous trees are planted to infill the existing opening in the hedgerow, this view into the Site will be effectively obscured.

VIEWPOINT 3: From Boundary Road, Figure 11.6.3-3

This view looks over what will be the demolished former auto parts building and yard and into the Site from southbound Boundary Road. An existing berm on-Site will likely remain in place and will provide some visual mitigation. The proposed screening berm with trees on top will be constructed along the property boundary and will provide effective visual mitigation.

VIEWPOINT 4: From Mitch Owens Road, Figure 11.6.3-4

This view looks directly east from Mitch Owens Road towards the Site. With the existing auto parts building removed, the landfill component of the CRRRC would become visible. As shown, the proposed perimeter screening berm with trees on top will effectively provide visual mitigation from this viewpoint, similar to what is described above for Viewpoint 1.

VIEWPOINT 5: From Boundary Road, opposite future entrance to CRRRC, Figure 11.6.3-5

This view is east from Boundary Road, looking at the Site from the proposed entrance to the CRRRC. Existing piles of granular material and vehicles in the foreground will no longer be there and the new paved access road will be constructed. It should be noted that this view has been presented conservatively by removing more of the neighbouring activity to the north of the Site entrance than may actually occur. Some future buildings such as the scale house, office building and C&D processing facility could be visible in the distance from this viewpoint, consistent with other existing Industrial Park development in this area.

Due to the presence of vegetation in the area surrounding the Site and the design of the Site, including the perimeter berms and tree planting, there will be little visual impact from off-Site nearby viewpoints.

EXISTING CONDITIONS

SITE DEVELOPMENT PLAN

MITIGATED VIEW

TECHNICAL DATA:

PHOTOGRAPH: VIEWPOINT 1
COORDINATES (UTM NAD 83): 467646.49 E 5020117.96 N
GROUND ELEVATION ABOVE SEA LEVEL: 76.345 m
ALTITUDE OF PHOTOGRAPH RELATIVE TO GROUND ELEVATION: 1.41 m
CAMERA: NIKON D80 DIGITAL SLR
DATE PHOTOGRAPH TAKEN: NOVEMBER 16, 2012
FOCAL LENGTH: 34 MM
HORIZONTAL FIELD OF VIEW: 38.12°
DIRECTION: 287.72° TN

REFERENCES:

BASE DATA SUPPLIED BY THE BASE MAPPING Co. LTD.

NOTES:

1. THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.
2. ALL LOCATIONS ON THIS FIGURE ARE FOR ILLUSTRATION PURPOSES ONLY.
3. SEE FIGURE 8.8.3-1 FOR VIEWPOINT LOCATION.

Golder Associates
Ottawa, Ontario, Canada

SCALE	NA
DATE	DEC. 2013
DESIGN	PJM
CAD	PJM/BR
CHECK	PLE
REVIEW	PAS
FILE No.	1211250045-4000-Vol1-11.6.3-1.dwg
PROJECT No.	12-1125-0045
REV.	

TITLE
VIEWPOINT 1
PROJECTION FROM DEVINE ROAD

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

FIGURE
11.6.3-1

PLOT DATE: June 26, 2014
FILENAME: N:\Active\Special_IM\Miller_Paving_Ltd\CRRRC\GIS\Visual\VCAD\1211250045-4000-Vol1-11.6.3-1.dwg

EXISTING CONDITIONS

SITE DEVELOPMENT PLAN

MITIGATED VIEW

TECHNICAL DATA:

PHOTOGRAPH: VIEWPOINT 2
COORDINATES (UTM NAD 83): 466716.42 E 5021599.16 N
GROUND ELEVATION ABOVE SEA LEVEL: 77.265 m
ALTITUDE OF PHOTOGRAPH RELATIVE TO GROUND ELEVATION: 1.43 m
CAMERA: NIKON D80 DIGITAL SLR
DATE PHOTOGRAPH TAKEN: NOVEMBER 16, 2012
FOCAL LENGTH: 18 MM
HORIZONTAL FIELD OF VIEW: 66.0°
DIRECTION: 195.0° TN

REFERENCES:

BASE DATA SUPPLIED BY THE BASE MAPPING Co. LTD.

NOTES:

1. THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.
2. ALL LOCATIONS ON THIS FIGURE ARE FOR ILLUSTRATION PURPOSES ONLY.
3. SEE FIGURE 8.8.3-1 FOR VIEWPOINT LOCATION.

Golder Associates
Ottawa, Ontario, Canada

SCALE	NA
DATE	DEC. 2013
DESIGN	PJM
CAD	PJM/BR
CHECK	PLE
REVIEW	PAS
FILE No.	121125045-4000-Vol1-11.6.3-2.dwg
PROJECT No.	12-1125-0045
REV.	

TITLE
VIEWPOINT 2
PROJECTION FROM HWY 417

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

FIGURE
11.6.3-2

PLOT DATE: June 26, 2014
FILENAME: N:\Active\Sector_MV\Miller_Paving_Ltd\CRRRC\GIS\Visual\VCAD\121125045-4000-Vol1-11.6.3-2.dwg

EXISTING CONDITIONS

SITE DEVELOPMENT PLAN

MITIGATED VIEW

TECHNICAL DATA:

PHOTOGRAPH: VIEWPOINT 3
COORDINATES (UTM NAD 83): 465666.31 E 5020309.25 N
GROUND ELEVATION ABOVE SEA LEVEL: 77.612 m
ALTITUDE OF PHOTOGRAPH RELATIVE TO GROUND ELEVATION: 1.435 m
CAMERA: NIKON D80 DIGITAL SLR

DATE PHOTOGRAPH TAKEN: NOVEMBER 16, 2012
FOCAL LENGTH: 18 mm
HORIZONTAL FIELD OF VIEW: 66.0°
DIRECTION: 104.4° TN

REFERENCES:

BASE DATA SUPPLIED BY THE BASE MAPPING Co. LTD.

NOTES:

1. THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.
2. ALL LOCATIONS ON THIS FIGURE ARE FOR ILLUSTRATION PURPOSES ONLY.
3. SEE FIGURE 8.8.3-1 FOR VIEWPOINT LOCATION.

Golder Associates
Ottawa, Ontario, Canada

FILE No.	1211250045-4000-Vol1-11.6.3-3.dwg
PROJECT No.	12-1125-0045
REV.	
SCALE	NA
DATE	DEC. 2013
DESIGN	PJM
CAD	PJM/BR
CHECK	PLE
REVIEW	PAS

TITLE: **VIEWPOINT 3 PROJECTION FROM BOUNDARY ROAD**

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

FIGURE **11.6.3-3**

PLOT DATE: June 26, 2014
FILENAME: N:\Active\Ottawa\1211250045_MVWater_Paving_Ltd\CRRRC\GIS\Visual\ACAD\1211250045-4000-Vol1-11.6.3-3.dwg

EXISTING CONDITIONS

SITE DEVELOPMENT PLAN

MITIGATED VIEW

TECHNICAL DATA:

PHOTOGRAPH: VIEWPOINT 4
COORDINATES (MTM NAD 83): 465175.87 E 5019893.62 N
GROUND ELEVATION ABOVE SEA LEVEL: 77.743 m
ALTITUDE OF PHOTOGRAPH RELATIVE TO GROUND ELEVATION: 1.425 m
CAMERA: NIKON D80 DIGITAL SLR

DATE PHOTOGRAPH TAKEN: NOVEMBER 16, 2012
FOCAL LENGTH: 18 mm
HORIZONTAL FIELD OF VIEW: 66.0°
DIRECTION: 70.0° TN

REFERENCES:

BASE DATA SUPPLIED BY THE BASE MAPPING Co. LTD.

NOTES:

1. THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.
2. ALL LOCATIONS ON THIS FIGURE ARE FOR ILLUSTRATION PURPOSES ONLY.
3. SEE FIGURE 8.8.3-1 FOR VIEWPOINT LOCATION.

Golder Associates
Ottawa, Ontario, Canada

SCALE	NA
DATE	DEC. 2013
DESIGN	PJM
CAD	PJM/BR
CHECK	PLE
REVIEW	PAS
FILE No.	1211250045-4000-Vol1-11.6.3-4.dwg
PROJECT No.	12-1125-0045
REV.	

TITLE: **VIEWPOINT 4 PROJECTION FROM MITCH OWENS ROAD**

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

FIGURE: **11.6.3-4**

PLOT DATE: June 26, 2014
FILENAME: N:\Active\Spatial_MVMiller_Paving_Ltd\VDRRC\GIS\Visual\VCAA\1211250045-4000-Vol1-11.6.3-4.dwg

EXISTING CONDITIONS

SITE DEVELOPMENT PLAN

TECHNICAL DATA:

PHOTOGRAPH: VIEWPOINT 5
COORDINATES (UTM NAD 83): 467298.71 E 5019927.05 N
GROUND ELEVATION ABOVE SEA LEVEL: 76.405 m
ALTITUDE OF PHOTOGRAPH RELATIVE TO GROUND ELEVATION: 1.425 m
CAMERA: NIKON D80 DIGITAL SLR

DATE PHOTOGRAPH TAKEN: NOVEMBER 16, 2012
FOCAL LENGTH: 22 mm
HORIZONTAL FIELD OF VIEW: 56.35°
DIRECTION: 70.0° TN

REFERENCES:

BASE DATA SUPPLIED BY THE BASE MAPPING Co. LTD.

NOTES:

1. THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.
2. ALL LOCATIONS ON THIS FIGURE ARE FOR ILLUSTRATION PURPOSES ONLY.
3. SEE FIGURE 8.8.3-1 FOR VIEWPOINT LOCATION.

Golder Associates
Ottawa, Ontario, Canada

FILE No.	121125045-4000-Vol1-11.6.3-5.dwg
PROJECT No.	12-1125-0045
REV.	
SCALE	NA
DATE	DEC. 2013
DESIGN	PJM
CAD	PJM/BR
CHECK	PLE
REVIEW	PAS

TITLE: **VIEWPOINT 5**
PROJECTION FROM BOUNDARY ROAD, PROPOSED MAIN ENTRANCE

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

FIGURE **11.6.3-5**

PLOT DATE: June 26, 2014
FILENAME: N:\Active\Special_IM\Miller_Paving_Ltd\CRRRC\GIS\Visual\VIZ\AD\121125045-4000-Vol1-11.6.3-5.dwg

11.7 Cultural Heritage & Archaeology

The assessment is divided into the two components of archaeology and cultural (built) heritage, the results of which are provided in TSD #6 and #7, respectively.

The results of an Archaeological study concluded that: there are no registered archaeological sites in proximity to the study area; the Site and study area have very limited potential for aboriginal resources as it is poorly drained, low lying and a significant distance from any permanent or ancient source of water; the potential for historic archaeological resources within the study area is very low; and the City of Ottawa Archaeological Master Plan (Archaeological Services Inc. and Geomatics International Inc., 1999) does not indicate any archaeological potential within the study area. As such, in summary, no registered archaeological sites and no areas of archaeological potential were identified by the Archaeological Assessment, and no further archeological investigations of the Site are required.

Five properties in the study area were identified as requiring cultural heritage assessment to determine if any of the properties had cultural heritage value or interest (in accordance with *Ontario Heritage Act* Regulation 9/06). They were identified for study because they are structures older than 40 years, i.e., pre-1973. Each of the five properties was evaluated for cultural heritage value or interest. Using the *Ontario Heritage Act Regulation* 9/06 (MTCS, 2006) "Criteria for Determining Cultural Heritage Value or Interest," and using the City of Ottawa's Heritage Survey and Evaluation Form, it was found that none of the five potential cultural heritage resources demonstrate cultural heritage value or interest and are therefore not eligible for designation under the *Ontario Heritage Act*.

In conclusion, the assessment showed that the development of the Site will not have an adverse effect on archaeological or cultural heritage resources. The archaeological report provides standard recommendations relevant to the development of the proposed CRRRC that:

1) Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*;

2) The *Cemeteries Act*, R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services; and

3) If during the process of development any archaeological resources or human remains of potential Aboriginal interest are encountered, the Algonquins of Ontario Consultation Office will be contacted.

11.8 Agriculture

The agricultural assessment, which is provided in TSD #8, considered potential effects of the CRRRC on on-Site and off-Site agricultural land and land uses.

11.8.1 On-Site Agricultural Use

Type and Intensity of Existing Agricultural Production: The Site Development Plan will remove a small area of land on which agricultural production (grain) is being or has in the past been attempted. This area of land has significant constraints to productive agricultural use. In particular, the land is poorly drained and would only be capable of production in relatively dry years. It is Class 4 land or lower. Removal of these lands from agricultural use will not have a significant impact on farm management for any other lands. These lands do not have significant investment in agricultural production. Despite the presence of the Simpson Municipal Drain, no agricultural tile drainage has been installed and no farm assessment parcel has been identified on the Site. The removal of the limited extent of lands currently under production will not impact the viability of other farming operations and the existing production is quite marginal. It was therefore concluded that the impact of the CRRRC on on-Site agricultural production would not be significant.

11.8.2 Off Site Agricultural Use

Livestock Compatibility: The OMAFRA provides MDS Formulae and Guidelines to evaluate the compatibility of non-farm uses with livestock operations (OMAFRA, 2006). The MDS calculation provides a measurement of the minimum distance recommended to limit the impact of the non-farm use on the livestock operation. The measurement includes consideration of the type of livestock, the housing capacity of the livestock facility, the type of manure handling employed and the tillable area available for both feed production and manure disposal. MDS calculations were prepared for all livestock facilities within 1 kilometre of the Site, as per the Guidelines, and the results are shown on Figure 11.8.2-1. The calculations illustrated that there is sufficient distance between existing livestock operations and the Site to ensure compatibility of the proposed CRRRC with these facilities. The actual setback distance between the existing barns and the CRRRC exceeds that required by the MDS calculations, generally by a factor of two to five times. During the land use survey conducted for this EA, farmers were contacted to confirm the information to be used in the MDS calculation. This discussion also included a review of farming operations in the area. Livestock facilities between 1 and 2 kilometres of the Site were also reviewed visually to ensure that there were no large livestock facilities in the area.

It was concluded that the proposed CRRRC would be compatible with the existing livestock facilities in the Site-vicinity.

Impact on Agricultural Production: Agricultural production in the Site-vicinity is predominantly field crops. The potential impacts of the proposed CRRRC on field crop production include the following:

1) Loss of productive lands: The proposed CRRRC does not involve any loss of off-Site agricultural lands due to infrastructure improvements, increased runoff or other direct action resulting in the removal of productive lands; and

2) Changes to productive characteristics of the adjacent lands: The design and operational objectives for the CRRRC includes the control of air, surface water and groundwater impacts resulting from the operation to MOECC standards at the Site boundary. The potential emissions from the CRRRC have been predicted by the impact assessments of other technical disciplines as described elsewhere in the EASR and TSDs. On this basis, it can be concluded that there will be no material changes to the agricultural productive potential of the lands in the Site-vicinity.

Impact on Farming Practices: The normal farming practices on the lands in the Site-vicinity relate to crop production. As outlined above, no impacts on these uses are anticipated. Farming practices also include the movement of farm equipment for cultivation, seeding and harvesting. There are no farm access points off Boundary Road between the location of the Site access and Highway 417. This should limit conflicts between road traffic and the movement of farm equipment on these roads to existing levels.

In summary, the proposed CRRRC development is compatible with and should not adversely impact off-Site agricultural land uses and farming practices.

Legend

Dwelling		Barn Label	Land Use - Treed:
Barn		2,000 metre boundary	Land Use - Crop:
Property Boundary			Land Use - Hay-Pasture:
Road			Land Use - Commercial:
MDS Setback Arc			Land Use - Recreational:

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT

REFERENCE

FIGURE PROVIDED BY CLARK CONSULTING SERVICES

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE

MDS AND LAND USE

Golder Associates

PROJECT No. 12-1125-0045			PHASE No. 4500	
DESIGN	LB	NOV. 2013	NOT TO SCALE	REV.0
GIS	--	--	FIGURE 11.8.2-1	
CHECK	PLE	AUG 2014		
REVIEW	PAS	AUG 2014		

11.9 Traffic

As a result of the comparative evaluation of the two Sites as described in Section 7.0, the Boundary Road Site has been identified as the preferred Site and the North Russell Road Site is no longer under consideration. As such, and in accordance with the approved TOR, the Traffic discipline conducted an assessment of the only haul route to the Boundary Road Site. The complete assessment of the impacts of CRRRC Site-related traffic is provided in TSD #9. This corresponds to Task 4 of the methodology described in Section 2.3.

The number of expected Site generated trips was determined by considering the amount and types of recyclable material/waste expected to be received at the Site, the anticipated diversion and other Site activities. The Site generated trips would consist of loaded trucks entering the Site hauling waste material and surplus and contaminated soils, and loaded trucks exiting the Site hauling pre-processed and composted organics and other diverted materials. The analysis examined the impact of the Site trips during the peak AM and PM hours of traffic along the adjacent roads. The calculations have assumed that the facility is operating at a maximum annual capacity of 450,000 tonnes per year of incoming material/waste. Assuming the Site operates about 300 days per year, on a typical day the Site would receive an average of 1,500 tonnes per day of various materials/waste.

It was however recognized that on some days there could be receipt of surplus or contaminated soil from excavation and/or remediation projects in addition to typical IC&I and C&D materials/waste received, as such projects are by definition episodic and event-driven. In order to account for this event-related soil traffic, for purposes of traffic analysis it was assumed that the Site might on a peak day receive 1,300 tonnes of IC&I and C&D wastes, and in addition 1,700 tonnes of soil. Therefore, to ensure traffic impacts were fully considered, the traffic analysis assumed a maximum 3,000 tonnes per day of materials at the CRRRC (but within the overall assumed maximum of 450,000 tonnes per year of incoming material).

The estimated maximum daily truck trips corresponding to the 3,000 tonnes per day scenario described above is 271 trucks entering and exiting the Site. Assuming a 10 hour day, and applying a 1.45 peaking factor to all trips entering and exiting the Site to account for random arrivals, the total assumed number of peak hour trips are 40 trips per hour entering and exiting. In addition the Site will generate landfill leachate that will require treatment, with the preferred option being off-site treatment at the City of Ottawa ROPEC facility. The estimated maximum quantity of leachate and digested organics processing liquor is 265,000 cubic metres per year. Assuming it is transported about 250 days per year and would enter and leave the Site at regular intervals, this corresponds to an additional maximum when the Site is fully developed of 26 trucks per day, or 3 trucks per hour. The maximum peak AM and PM hour number of trucks used in the assessment was 43 truck trips per hour entering and exiting the Site.

It is anticipated that the queuing capacity of the primary Site entrance road and in-bound separate queuing lane will allow all vehicles waiting to be processed over the in-bound scale to be accommodated on-Site. The primary Site entrance road is approximately 450 metres in length between Boundary Road and the scales, with an additional 400 metre long separate in-bound queuing lane, giving a total of approximately 850 metres of on-Site queuing capacity. It is expected that Site-related trucks may range in length between about 6 metres and 25 metres, though the majority of the vehicles expected to transport waste to the Site are waste disposal trucks that are approximately 10 metres in length. Assuming that the majority of these 43 vehicles entering the Site during the peak hour are approximately 10 metres in length, there is enough queuing capacity on the primary

Site entrance road alone to accommodate all vehicles entering during the peak hour, and the separate queuing lane is also available. It is also noted that as the trucks are arriving during the peak hour, they will be entering the Site through the in-bound scale, thereby decreasing the queue length.

The distribution of Site generated trips was assigned to the adjacent roads by examination of the most convenient and efficient route(s) to and from major developed and populated areas. The vast majority of the trips will utilize the Highway 417 interchange and Boundary Road, which is the direct route to/from Highway 417.

The study allocated the trips as per the following distribution:

1) To/From the North (along Boundary Road) 2%

2) To/From the West (along Highway 417) 83%

3) To/From the East (along Highway 417) 5%

4) To/From the West (along Mitch Owens Road) 7%

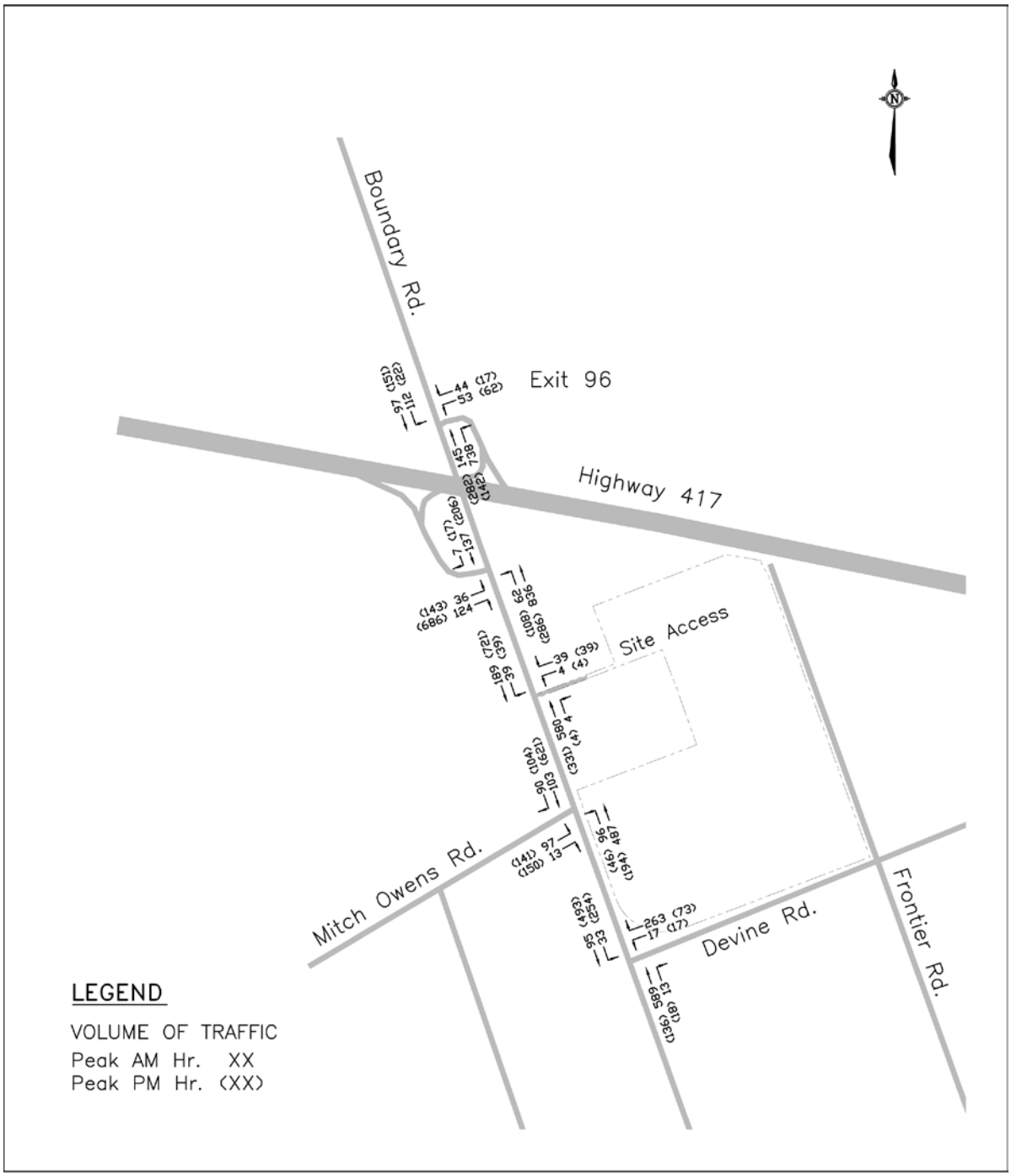
5) To/From the South (along Boundary Road) 3%

Highway 417 is a major provincial highway and Boundary Road is an arterial road, both of which have pavement structures designed to carry large volumes of traffic and heavy vehicles. Because of their function, their pavement structures are expected to be appropriate to carry CRRRC Site-related traffic. As described previously, Frontier Road will only provide a secondary access to the Site, and Devine Road will also only receive limited Site-related traffic (and not heavy vehicles on a routine basis). As such, a determination and evaluation of the expected performance of the pavement structure on Frontier and Devine Roads was not deemed necessary as part of this traffic assessment.

The background traffic volumes consist of the expected increase in traffic that does not include traffic associated with the development of the CRRRC. The increase in background traffic would be the result of new traffic generated by future development within and outside the study area. To determine the expected increase in traffic volumes, historical and current traffic counts at the intersection of Boundary Road and Mitch Owens Road were examined. Counts taken showed that the traffic volumes remained essentially constant with slight increases and decreases in traffic when comparing the approaches at various years. Typically in rural areas the annual growth rate in traffic is approximately 1 to 2%. The study therefore conservatively assumed an annual compounded growth rate of 2%, which was applied to all lane movements shown in the traffic counts presented in Figure 8.11-1 for the weekday peak AM and PM hour. This growth rate was applied to the 2011 and 2012 traffic counts to derive the expected year 2022 background traffic volumes for the weekday peak AM and PM hours. Assuming that the CRRRC would be operational in 2017 and that it would ramp up to its maximum annual waste receipt in five years, 2022 was selected as the year for traffic analysis.

The expected total traffic volumes at the year 2022 were determined by the addition of the expected background traffic and the expected Site generated trips. Figure 11.9-1 shows the expected 2022 weekday total peak AM and PM hour traffic volumes. Given the total volume of traffic along Boundary Road adjacent to the CRRRC, the truck traffic from the CRRRC at maximum daily receipts would represent approximately 8% of the peak hour traffic along Boundary Road.

The assessment examined the operation of the Site access point onto Boundary Road and the intersections of Devine/Boundary, Boundary/Mitch Owens, the eastbound Highway 417 on/off ramps and the westbound Highway 417 on/off ramps. The analysis used the Highway Capacity Software (University of Florida, N.D.), which utilizes the intersection capacity analysis procedure as documented in the Highway Capacity Manual (Transportation Research Board, 2010).



NOT TO SCALE

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT

REFERENCE

FIGURE PROVIDED BY D.J. HALPENNY & ASSOCIATES LTD.

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE

2022 WEEKDAY PEAK AM AND PM HOUR TOTAL TRAFFIC

Golder Associates

PROJECT No. 12-1125-0045			PHASE No. 4500	
DESIGN	LB	NOV. 2013	NOT TO SCALE	REV.0
GIS	--	--	FIGURE 11.9-1	
CHECK	PLE	AUG 2014		
REVIEW	PAS	AUG 2014		

For unsignalized intersections, the level of service of each lane movement is determined as a function of the delay of vehicles at the approach. The following relates the level of service of each lane movement with the expected delay at the approach, which was utilized in the analysis of the operation of the Site access point and intersections within the study area:

LEVEL OF SERVICE	DELAY (seconds per vehicle)	
Level of Service A	0 – 10	Little or No Delay
Level of Service B	>10 – 15	Short Traffic Delays
Level of Service C	>15 – 25	Average Traffic Delays
Level of Service D	>25 – 35	Long Traffic Delays
Level of Service E	>35 – 50	Very Long Traffic Delays
Level of Service F	>50	Extreme Delays – Demand exceeds Capacity

The expected length of queue at the critical lane movements for an unsignalized intersection was determined by the calculation of the 95th percentile queue at the lane approach. The 95th percentile queue length is the calculated 95th greatest queue length out of 100 occurrences at a movement during a 15-minute peak period. The 95th percentile queue length is a function of the capacity of a movement and the total expected traffic, with the calculated value determining the magnitude of the queue by representing the queue length as fractions of vehicle lengths (where a vehicle length is taken as 7 metres).

The traffic analysis evaluated the operation of the intersections in the area of the CRRRC Site under the peak AM and peak PM traffic scenarios in terms of level of service and expected length of queue. The analysis showed that there would be no requirement for modifications to any of the four existing intersections analysed due to the truck traffic associated with the proposed CRRRC.

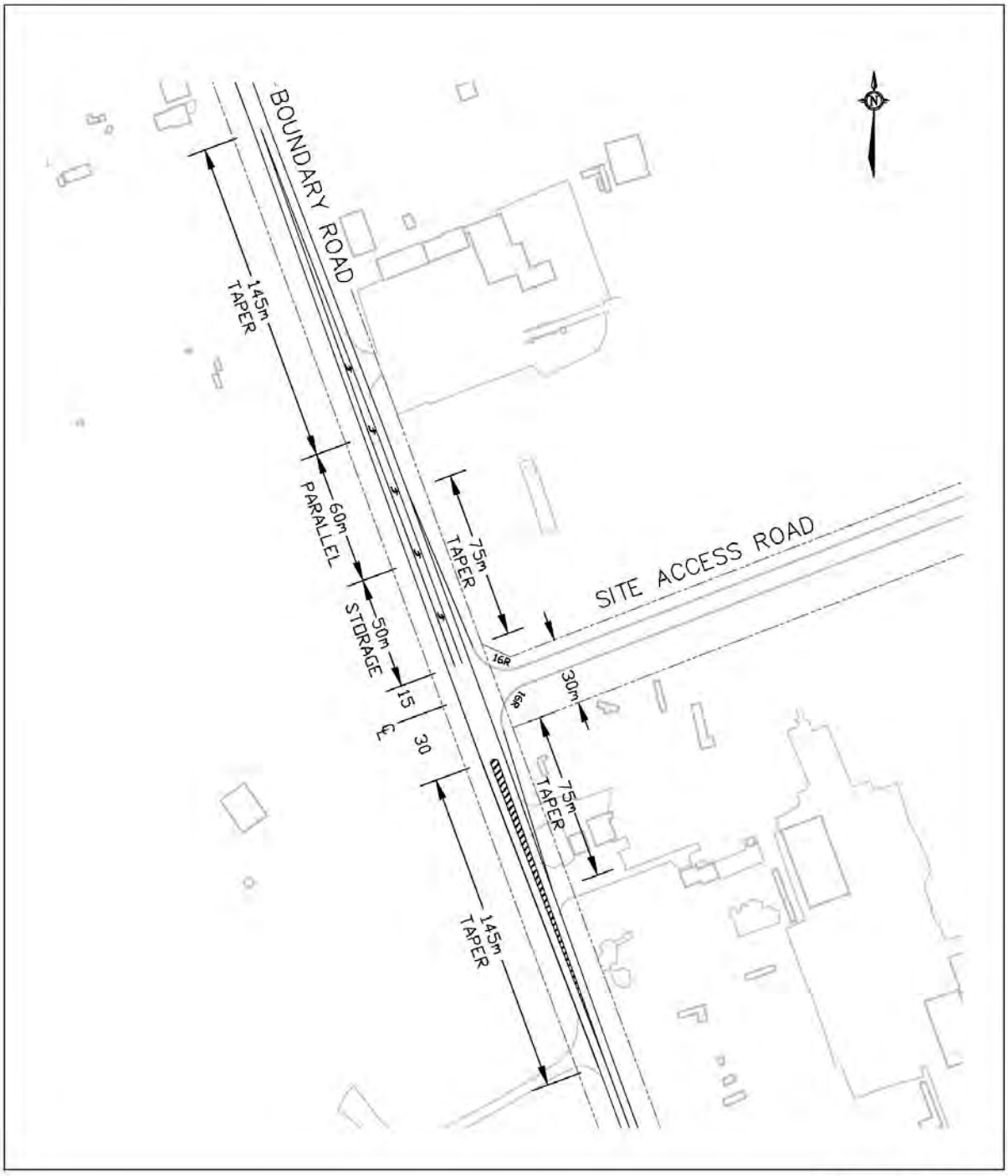
Analysis of the proposed Site access location along Boundary Road determined that a dedicated southbound left turn lane was warranted, together with the associated lengths of tapers, vehicular storage and parallel lanes. The proposed Site access/Boundary Road intersection geometry is shown on Figure 11.9-2.

The access road itself would provide a driveway length of approximately 450 metres between Boundary Road and the gate to the CRRRC Site. In addition to the proposed separate truck queuing lane area, the clear throat length of the access road would provide adequate space for trucks to park prior to the opening of the Site so that traffic would not back up onto Boundary Road.

There are no agricultural land uses along Boundary Road between Highway 417 and the Site access location. As such, the CRRRC Site-related traffic along this section of Boundary Road will not affect the use of agricultural Site entrances or farm vehicle movements. The low usage of Frontier Road associated with the proposed secondary Site access onto the north end of Frontier Road is unlikely to adversely affect the usage of this road or Devine Road by agricultural traffic.

11.10 Net Effects and Effects Monitoring

Table 11.10-1 summarizes the in-design mitigation measures and best practices proposed for the CRRRC, together with the predicted net effects for each environmental component assessed as well as the monitoring proposed to confirm the effects predictions.



NOT TO SCALE

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT

REFERENCE

FIGURE PROVIDED BY D.J. HALPENNY & ASSOCIATES LTD.

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE

PROPOSED BOUNDARY ROAD/SITE ACCESS GEOMETRY

Golder Associates

PROJECT No. 12-1125-0045			PHASE No. 4500	
DESIGN	LB	NOV. 2013	NOT TO SCALE	REV.0
GIS	--	--	FIGURE 11.9-2	
CHECK	PLE	AUG 2014		
REVIEW	PAS	AUG 2014		

Table 11.10-1: Mitigation Measures, Net Effects and Monitoring

Environmental Component	In-Design Mitigation Measures	Best Management Practices	Net Effects	Effects Monitoring
Atmosphere	▪ Minimize need for use of back-up alarms ▪ Paved roads in the northern part of the Site ▪ Berms to attenuate noise as required and verification of vacant land use annually ▪ Use of equipment that complies with appropriate emission standards ▪ Truck waiting area inside the Site ▪ Maintain existing vegetation in buffer around Site perimeter or, where required construct perimeter screening berms with plantings on top ▪ Receipt of organics and materials at the MRF and C&D facilities within buildings ▪ Biofilters on the exhaust of air from within the organics processing and PHC contaminated soil treatment facilities ▪ Dust collection system from the MRF and C&D processing buildings ▪ Low permeability cover of organics primary reactor cells and PHC contaminated soil treatment cells ▪ Flare ▪ LFG collection system ▪ Truck tire wash	<u>Air Quality</u> ▪ Place compacted granular materials, and, if required, surface sealing on regularly used Site construction roads ▪ Use of typical best management practices for dust suppression ▪ Minimize idling of vehicles on-Site <u>Noise</u> ▪ Restrict the use of heavy equipment to daytime hours as best possible ▪ Maintain vehicles and equipment and ensure they have noise suppression equipment ▪ Control speed limit for traffic on-Site <u>Odour</u> ▪ Time the frequency of turning of compost piles ▪ Introduction of oxygen into the anaerobically digested organics reactors prior to uncovering them ▪ Manage the working face of the landfill effectively ▪ Apply appropriate daily cover on landfill ▪ Minimize the area of uncovered waste ▪ Placement of final cover progressively on completed landfill areas ▪ Implement odour control measures for leachate holding and treated effluent ponds, if required, i.e., aeration system, cover, misting system, chemical addition	<u>Air Quality and Odour</u> Predicted air quality at property boundary and off-Site sensitive receptors meets MOECC criteria. <u>Noise</u> Noise from the landfill and diversion facilities meets MOECC criteria. While predicted noise increases from Site-related traffic along the approximate 800 metres of Boundary Road from Highway 417 to the Site would be noticeable, the assessment of noise effects has not identified the need for additional mitigation measures.	<u>Noise and dust monitoring is proposed as described in Section 14.1.1.</u> The proposed noise monitoring program includes initially monitoring noise levels once per year during operations. The noise monitors, placed at or near POR02 and POR03, as defined in Section 8.4.1, will log acoustic data every hour for the duration of the monitoring period. The proposed dust monitoring program is annual property line dust monitoring after operational start up during the summer season for two summer seasons.

Environmental Component	In-Design Mitigation Measures	Best Management Practices	Net Effects	Effects Monitoring
Geology and Hydrogeology (Groundwater and Geotechnical)	▪ Engineered leachate/liquid containment for the landfill, leachate ponds and organics processing and PHC treatment ▪ Perimeter liner system cut-off for the landfill, together with leachate collection system ▪ Buffer between landfill component and property boundary	▪ Provide construction quality control on all liner and collection system installations ▪ Provide monitoring and maintenance of leachate collection system components ▪ Inspect construction and operating equipment regularly and repair promptly if found to be leaking ▪ Geotechnical monitoring of landfill settlement	The natural clay deposit and the proposed engineered leachate collection system and management systems will contain and control landfill leachate at the Site. The landfill will not adversely affect off-Site groundwater quality. Other sources such as leachate management ponds or organics primary reactor and soil treatment cells are lined and always accessible for repair. The Site is predicted to remain in compliance with groundwater protection requirements in both the short term and long term. In addition, the CRRRC is not predicted to adversely affect the quantity of groundwater available to any shallow dug wells in the vicinity of the Site.	<u>Groundwater and geotechnical monitoring are proposed as described in Section 14.1.2.</u> The existing and proposed groundwater monitoring locations for the processing and treatment facilities north of the Simpson Drain and for the landfill south of the Simpson drain are shown on Figure 14.1.2-1. Leachate samples are proposed to be collected from the connection to the leachate pre-treatment facility and at three locations within the landfill, while leachate levels will be measured in each leachate sump in the landfill (as they are constructed). The groundwater and leachate monitoring will occur three times per year with groundwater analysis for parameters outlined in O.Reg. 232/98 (MOE, 1998a) with some additions. In addition, water wells within 500 metres of the Site will be sampled, with consent from the owner, one time prior to operations starting at the facility. The proposed geotechnical monitoring includes subgrade settlement

Environmental Component	In-Design Mitigation Measures	Best Management Practices	Net Effects	Effects Monitoring
				monitoring, unit weight of the as-placed waste, inclinometers and surface survey points/monuments to monitor lateral displacements of the silty clay beneath the perimeter berm of the landfill, and vibrating wire piezometers to monitor the porewater pressure dissipation below the landfill
Surface Water	▪ Design surface water management systems to separate leachate and liquids from processing from clean surface water runoff ▪ Divert clean runoff to swales, ditches and ponds ▪ Design ditch systems to convey design storm flows ▪ Control post-development discharge flows to match pre-development conditions as close as possible ▪ Enhanced sediment removal in SWM system design ▪ Sedimentation and erosion control measures ▪ Design and construct the component liners and leachate/liquid collection systems to safeguard surface water resources	<u>Surface Water Quality</u> ▪ Implementation of a sediment and erosion control plan during construction and operations ▪ Re-vegetate final landfill cover ▪ Provide monitoring and maintenance of stormwater ponds; provide valve(s) on ponds, where necessary depending on ongoing water quality monitoring ▪ Provide monitoring and maintenance of leachate /liquid collection systems ▪ Use standard best management practices for erosion control until vegetation cover is established <u>Surface Water Quantity</u> ▪ Manage surface water on-Site; control off-Site stormwater discharge	The CRRRC has been designed to not adversely affect surface water quality on-Site or surface water quantity off-Site. .	<u>Surface water monitoring is proposed as described in Section 14.1.3.</u> The proposed surface water sampling locations, as shown on Figure 14.1.2-1, are the three discharge points from the Site at the eastern property boundary as well as Simpson Drain as it enters the Site at the western property boundary. Surface water samples and estimates of flow will be collected four times per year. Samples will be analyzed for the list of parameters as outlined in O. Reg. 232/98 (MOE, 1998a).

Environmental Component	In-Design Mitigation Measures	Best Management Practices	Net Effects	Effects Monitoring
		Accidental Spills ▪ Operate, store and maintain all equipment and associated materials in an area away from surface water features in a manner that minimizes the potential for the entry of any deleterious substance into water bodies ▪ Inspect construction and operating equipment regularly and repair promptly if found to be leaking ▪ Develop a spill response plan		
Biology	▪ Maintain existing perimeter vegetative buffers where possible	▪ Remove vegetative cover progressively in sequence with Site development ▪ Stabilize and re-vegetate areas of soil disturbed/exposed during construction ▪ Apply best management practices in applying chemical dust suppressants, fertilizers, pesticides and herbicides and minimize their use to the extent possible ▪ Conduct all vegetation clearing activities outside the breeding bird season where possible ▪ To the extent practical, limit the extent of disturbed areas and soil stockpiles, control their orientation , and for piles to be left in place for a prolonged period of time seed to establish vegetation ▪ Schedule construction activities to minimize area and duration of soil exposure, to the extent practical	No ecologically significant effects predicted as a result of construction and operation of the CRRRC.	Benthic monitoring is proposed as described in Section 14.1.4. Benthic and sediment monitoring will occur on a bi-annual basis at sampling stations B5, B6, B8, B9 and downstream of B5 and B7 as shown on Figure 8.7-1. Monitoring for barn swallow will be conducted for a period of three years. Ongoing review of conditions of revegetation and maintenance is proposed. Surface water monitoring is also proposed as set out in this table .

Environmental Component	In-Design Mitigation Measures	Best Management Practices	Net Effects	Effects Monitoring
		▪ Worker awareness program to avoid harm to milksnake (a species of concern), if they are in the Site-vicinity ▪ Manage waste effectively to avoid attracting nuisance wildlife and pests, control the nuisance wildlife populations as permitted and required, and conduct periodic inspections to monitor effectiveness of the pest control		
Land Use & Socio-economic **and** **Agriculture**	▪ Maintain appropriate buffer between proposed on-Site activities and off-Site land uses ▪ Maintain perimeter vegetative buffers where possible; construct screening features where there is not already a significant stand of trees ▪ Provide Property Value Protection Plan	▪ Control off-Site nuisance emissions ▪ Purchase goods and services locally as best possible ▪ Prevent the on-Site generation and accumulation of litter ▪ Use litter fencing to control windborne trash from leaving Site ▪ Regularly clean up litter both on-Site and in the Site-vicinity ▪ Establish procedure to register and address complaints ▪ Use best efforts to establish a community liaison committee	<u>Land use & Socio-economic</u> No material adverse effects identified. Several positive economic effects. <u>Agriculture</u> Limited on-Site agricultural use will be eliminated. No impacts on off-Site agricultural use or production identified.	To help mitigate and monitor potential nuisance or perception-related effects, a communication plan, including a telephone number and email address, will be prepared to allow and encourage farmers in the Site-vicinity to report any concerns, and to pose questions related to Site operations. In addition, a Community Liaison Committee will be established assuming there are interested volunteers in the community, to assist in the community monitoring CRRRC operations. Environmental monitoring for other components set out in this table.

Environmental Component	In-Design Mitigation Measures	Best Management Practices	Net Effects	Effects Monitoring
Culture and Heritage Resources	▪ N/A since low potential for on-Site archaeological resources	▪ Should any archaeological resources be discovered, cease all alteration of the Site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork ▪ Should any human remains be discovered, the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services must be notified ▪ If during the process of development any archaeological resources or human remains of potential Aboriginal interest are encountered, the Algonquins of Ontario Consultation Office will be contacted	No registered archaeological sites within the Site and Site-vicinity. The on-Site lands contain no or low archaeological potential; no Stage 2 assessment required. Five pre-1973 properties within 250 metres of the Site identified as potential cultural resources did not demonstrate cultural heritage value or interest, and are therefore not eligible for designation under the *Ontario Heritage Act*.	No monitoring proposed.
Traffic	▪ Provide required intersection improvements at the Site access location off Boundary Road ▪ Provide on-Site queuing area of sufficient capacity to avoid truck queuing on Boundary Road		All of the intersections evaluated would operate at an acceptable Level of Service during the weekday peak AM and PM hours of Site operations, with no intersections requiring modifications due to the CRRRC truck trips. The proposed lane configuration at the Site access includes an exclusive left turn lane on southbound Boundary Road.	No monitoring proposed.