

7.0 COMPARATIVE EVALUATION OF ALTERNATIVE SITES AND IDENTIFICATION OF PREFERRED SITE

As an initial step during the EA, Taggart Miller undertook a comparative Site selection assessment to identify a preferred Site for the CRRRC. The results of the comparative assessment are presented in TSD #1 to this EASR and summarized in this section.

7.1 Site Alternatives and Comparative Methodology

Taggart Miller identified and secured two potential Sites for development of the proposed CRRRC, as described in Section 1.4 and shown in Figure 1.4-1.

The first step in the EA was a comparative evaluation of the two alternative Sites to identify the preferred Site for the CRRRC. The evaluation was carried out using the methodology set out in the approved TOR and summarized in Section 2.2. The comparison considered nine environmental components, each having indicators and a set of data sources.

7.2 Description of Existing Environmental Conditions

Table 7.2-1 presents an overview of existing environmental conditions based on published information and preliminary investigations/assessments at the two alternative Sites that were considered for each of the environmental components. The work completed to describe the existing conditions followed the work plans for each environmental component presented in Appendix C-2 of the approved TOR. Further details are provided in TSD #1.

7.3 Comparative Evaluation of Sites

Table 7.3-1 presents an overview of the comparative evaluation of the two alternative Sites, compiled from the individual component assessments within TSD #1. The comparison was undertaken using the framework in the approved TOR and on the basis that the potential for impacts from the proposed CRRRC at each Site is net of standard in-design mitigation measures. The table lists the approved criteria and indicators for each of the nine environmental components considered in the assessment and discusses the advantages and disadvantages of each alternative. The preferred Site for each component is illustrated in the table by green highlights.

Table 7.2-1: Existing Conditions of the Alternative Sites

	North Russell Road Site	Boundary Road Site
Location & Description	North Russell Road Site - is located in the northwest part of the Township of Russell, about five kilometres south of Provincial Highway 417 between the Boundary Road and Vars exits.	Boundary Road Site - is in the east part of the City of Ottawa just southeast of the Highway 417/Boundary Road interchange.
Overview of Existing Environment Conditions		
Atmosphere	The air quality in the North Russell Road Site-vicinity is typical of air quality of rural eastern Ontario and background air quality levels are below current Ambient Air Quality Criteria (AAQC) limits. Agricultural activities on the Site and in the Site-vicinity, as well as road traffic, contribute to baseline air quality/odour levels and occurrences, and noise levels. During operations, quarry activities on the Site also contributed to the background air (i.e., dust) and noise levels in the Site- vicinity. The existing noise levels are consistent with a Class 3 area as defined by the MOECC in NPC-232 (i.e., 45 decibels (dBA) daytime and 40 dBA nighttime) (MOE, 1995a) ¹ .	The air quality in the Boundary Road Site-vicinity is typical of air quality in rural eastern Ontario and background air quality levels are below current AAQC limits. The baseline air quality, noise and odours are primarily the result of a combination of the adjacent Highway 417 and Boundary Road traffic, the activities in the industrial park immediately to the west, and agricultural operations located in the area of the Site. The existing noise levels are expected to be consistent with Class 2 (closer to Highway 417) and Class 3 areas as defined by the MOECC in NPC-205 and NPC-232, respectively (i.e., 50 dBA daytime / 45 dBA nighttime and 45 dBA daytime/40 dBA nighttime) (MOE, 1995b and MOE, 1995a) (Subsequently determined to be Class 1 by field monitoring as described in Section 8.4.1) ¹ .
Geology & Hydrogeology	<p>The North Russell Road Site is located on a local bedrock high with the bedrock surface declining in elevation and the overburden thickness overlying the bedrock increasing in all directions away from the Site. The overburden is typically less than 2 metres thick consisting mainly of completely weathered shale overlying the shale bedrock or glacial till. On the eastern half of the Concession IV portion of the property, the bedrock surface is deeper resulting in significant thicknesses of overlying silty clay and glacial till. The majority of the North Russell Road Site is underlain by a variable thickness of Queenston Formation shale bedrock followed by the Carlsbad Formation limestone and shale. Overall, the majority of the Queenston Formation and the Carlsbad Formation at the North Russell Road Site have a low hydraulic conductivity (low ability to transmit water) (i.e., less than 2.5×10^{-8} metres per second, m/s); however, at some locations there is enhanced permeability in the upper portion of the Queenston Formation (10^{-8} m/s to 10^{-2} m/s). Bedrock groundwater flow direction is predominantly easterly.</p> <p>Off-Site groundwater users mainly use drilled wells completed in the bedrock. The on-Site shallow bedrock groundwater is indicated to be relatively fresh; with depth, in both the Queenston and Carlsbad Formations, the groundwater quality deteriorates with elevated concentrations of chloride, sodium, iron and manganese. The results of a limited residential water supply sampling program indicate that all parameters analyzed met the respective health based and aesthetic MOECC standards, except for total dissolved solids (TDS), nitrate and sodium at specific water supply wells sampled. Groundwater quality at the private well locations is generally consistent with the groundwater quality observed at on-Site monitoring wells at the North Russell Road Site.</p>	<p>The Boundary Road Site has a variable thickness of surficial silty sand up to 1.5 metres thick overlying about 30 metres of silty clay, followed by glacial till and Carlsbad Formation bedrock. Silty sand and silt seams are variably present within the upper portion of the silty clay, encountered at depths between about 1.8 and 6.6 metres and interpreted to vary in thickness from about 0.1 to 0.3 metres. The groundwater flow direction in all units is interpreted to be towards the east (i.e., away from nearby off-Site groundwater users).</p> <p>Off-Site groundwater users typically obtain water from dug wells completed in the upper 3 to 7 metres of overburden. Groundwater quality at the Boundary Road Site varies from fresh to brackish and deteriorates with depth, where elevated concentrations of barium, chloride, sodium and TDS are observed in the shallow bedrock and glacial till. Groundwater from the shallow bedrock also contains dissolved methane. The results of the limited well water supply sampling program indicate that water met the MOECC standards with exceptions of dissolved organic carbon (DOC), manganese, TDS and iron.</p> <p>In the surficial sand layer, the moderate horizontal hydraulic conductivity and low hydraulic gradient result in a relatively slow groundwater flow velocity through this unit. The presence of the thick silty clay unit restricts the downward migration of leachate-impacted groundwater regardless of the vertical gradients.</p>
Surface Water	<p>The North Russell Road Site lies within the Castor River watershed, which is managed by South Nation Conservation (SNC). Drainage in the area is mainly by a network of agricultural ditches, municipal drains and small creeks. The Fournier Municipal Drain runs through and along the north side and through the east portion of the Concession IV part of the Site. On-Site there are three lower lying areas where intermittent watercourses originate on the property and provide the current drainage. There is also standing water present within the existing quarry and there is no drainage outlet for the quarry. The local drainage networks in the area eventually flow south to the Castor River, located about 4.5 kilometres south of the Site. The Castor River enters the South Nation River about 20 kilometres downstream of Russell, which in turn eventually discharges to the Ottawa River. The Castor River is a relatively small river with quite low flows during the summer period and at other times of year.</p> <p>The Castor River meets water quality targets for phosphorus in 0% to 44% of samples, Escherichia coli (<i>E.coli</i>) in 45% to 64% of samples, copper and zinc in 80% to 100% of samples. The average flow is 5.48 cubic metres per second (m^3/s). Three communities discharge wastewater into the Castor River, one community draws surface water from the confluence of the Castor and South Nation Rivers. Water in ditches at or near the North Russell Road Site exhibit exceedances of Provincial Water Quality Objectives (PWQO) for pH, total phosphorus, boron and iron.</p>	<p>The Boundary Road Site drains northward into the Bear Brook Subwatershed, which is managed by SNC. Drains that cross the Site, consisting of old farm field drainage that has not been maintained and a municipal drain, flow to the east and eventually combine and discharge to Shaw's Creek just to the west of Vars. Shaw's Creek flows northward about 5 kilometres and enters Bear Brook, which flows east about 30 kilometres to eventually enter the South Nation River. At present, drainage on the Site is not well established and the land is poorly drained.</p> <p>The water quality in Bear Brook meets water quality targets for phosphorus in 0% to 44% of samples, <i>E.coli</i> in 45% to 64% of samples, copper and zinc in 45% to 94% of samples. The average flow is $7.42 m^3/s$. Water in ditches or municipal drains at or near the Boundary Road Site exhibit exceedances of PWQOs for total phosphorus, copper and iron and were below the PWQO limit for dissolved oxygen.</p>



	North Russell Road Site	Boundary Road Site
Biology ²	<p>The North Russell Road Site contains a mosaic of agricultural croplands and pasture, interspersed with cultural meadows (e.g., fallow fields) treed and shrubby hedgerows, scattered small woodlots and low-lying swamp areas. The plant communities on the Site are primarily those that are typical of an agricultural landscape and are common in the Ottawa area. A good proportion of the plants found on the Site are early succession species that thrive in recently disturbed sites such as old gravel lots, roadside, etc. The habitats and species observed on the Site are typical of agricultural landscapes in the region.</p> <p>There are no Provincially Significant Wetlands (PSW) (Class 1-3 Wetlands) on the North Russell Road Site, or in the Site-vicinity. There are no Life Science Areas of Natural and Scientific Interest (ANSIs) on the North Russell Road Site, or in the Site-vicinity. Although not officially designated, there is a woodlot on the east corner of the North Russell Road Site that meets the Natural Heritage Reference Manual criteria for a significant woodland. The North Russell Road Site contains deciduous and swamp wooded areas.</p> <p>There are five seasonal surface water features and two drainage ditches on the North Russell Road Site and in the Site-vicinity. Two dug agricultural ponds and a flooded quarry exist on the North Russell Road Site. The surface water features on the North Russell Road Site and in the Site-vicinity are not coldwater, so not as sensitive as coldwater systems. No fish were observed in any of the on-Site watercourses for the investigations completed.</p> <p>The potential for nine SAR and/or habitat was identified at the North Russell Road Site.</p>	<p>The Boundary Road Site consists of a mosaic of immature forest re-establishing on land previously used for farming and deciduous thickets. There is also an area of naturalized white spruce plantation. In the northwest corner is a woodlot dominated by immature white birch, with agricultural crop fields in much of the remainder of the northern portion of the Site. Former agricultural drainage ditches are heavily vegetated with thickets and are functioning poorly, resulting in wet conditions across much of the Site.</p> <p>There are no PSWs (Class 1-3 Wetlands) on the Boundary Road Site, or in the Site-vicinity. There are no Life Science ANSIs on the Boundary Road Site, or in the Site-vicinity. There is a potentially significant woodland in the Site-vicinity, to the south of the Boundary Road Site, south of Devine Road. The Boundary Road Site contains deciduous and swamp wooded areas.</p> <p>At the time of the comparison there were three surface features on the Boundary Road Site – a Municipal Drain and two drainage ditches. A large proportion of the Boundary Road Site is mineral thicket swamp. The surface water features on the Boundary Road Site and in the Site-vicinity are not coldwater, so not as sensitive as coldwater systems.</p> <p>The potential for six SAR and/or habitat was identified at the Boundary Road Site.</p>
Land Use & Socio-economic	<p>The North Russell Road Site is located within the Township of Russell, which has a significant rural agricultural community and some rural residential development, with local commercial and institutional development within the Villages of Russell and Embrun. Land use for the area is subject to the United Counties of Prescott-Russell Official Plan. The portion of the Site licensed for quarry operations is designated as Aggregate Extraction; the remainder of the Site is designated as Agricultural Resource. The surrounding lands are also designated as Agricultural Resource. A single institutional land use exists within 1,000 metres of the North Russell Road Site. From a visual perspective, the Site is situated on a local rise in what is otherwise fairly flat terrain. Much of the area has been historically cleared for agricultural purposes, with some natural features remaining in the form of local woodlots and treed fence lines.</p> <p>The United Counties of Prescott and Russell indicate no significant designation changes expected surrounding the North Russell Road Site during the Official Plan five-year review commencing in 2013. No zoning or site plan applications had been applied for, or were active in January of 2013, with the Township in the Site-vicinity of the North Russell Road Site.</p>	<p>The Boundary Road Site is located within the east end of the City of Ottawa. There is a provincial highway corridor, a partially developed rural industrial park and a combination of general rural and agricultural uses in the Site-vicinity. The closest developed area is the hamlet of Edwards about 2 kilometres to the west; separated from the Site by the Highway 417 corridor are the Village of Vars about 5.5 kilometres to the east and the Village of Carlsbad Springs about 3 kilometres to the north. A 43 rural lot subdivision is located within the Township of Russell along Route 100 about 4 kilometres to the south of the Boundary Road Site. A golf course is located north of the Site across the Highway 417 corridor. The land use and zoning to the west of the Site fronting on Boundary Road is Rural Heavy Industrial (RH), as is a limited portion of the Site. The Site itself is otherwise zoned General Rural, as is the land to the south and west. Lands to the east are mainly zoned Agricultural Resource and are used for this purpose. From a visual perspective, the Site is situated in flat terrain and is generally well screened from Boundary Road by trees.</p> <p>As of January 2013, there were no Official Plan Amendments applied for with the City of Ottawa in the Site-vicinity of the Boundary Road Site.</p>
Cultural & Heritage Resources	<p>There are no registered heritage buildings or archaeological Sites in the Site-vicinity or within a three kilometre radius of the North Russell Road Site. Based on preliminary work and guidance provided by the MTCS, due to the presence of wet low lying lands in the Site-Vicinity, the lands are categorized as having a moderate potential for pre-contact archaeological resources. There is historical data that indicates that the properties were used for agriculture as early as the beginning of the nineteenth century.</p> <p>The North Russell Road Site-vicinity was found to have 29 identified and potential cultural heritage resources, including 20 potential cultural heritage landscapes, a potential industrial heritage site (the quarry), a cemetery, a former school and a former church.</p>	<p>There are no registered archaeological sites on the Boundary Road Site or within a three kilometre radius. Due to the flat topography and poorly drained soils, guidance provided by the MTCS and regional assessment carried out by the City of Ottawa, the majority of the Site is indicated to have low archaeological potential.</p> <p>The Boundary Road Site-vicinity was found to have four potential cultural heritage resources (identified as pre-1973 structures as per MTCS guidelines).</p>



	North Russell Road Site	Boundary Road Site
Agricultural Environment	The majority of the land area in the North Russell Road Site-vicinity is agricultural croplands and pasture, interspersed with cultural meadows (e.g., fallow fields), treed and shrubby hedgerows, scattered small woodlots and some low lying poorly drained areas. The County Official Plan identifies the western portion of the North Russell Road Site as having a Class 1 agricultural capability and the eastern portion as Class 2; this is based on the Canada Land Inventory for Soils mapping. Only a small area is indicated to be Class 3 and the remainder is considered to be Class 4. Based on Site investigation, 20.9% of the land zoned agriculture between North Russell Road and Eadie Road is Class 1-3 agriculture lands. At present, the on-Site lands are not cultivated except for a few fields in the south part of the property that represent 12.6% of the North Russell Road Site lands. The remainder are used for a variety of uses including pasture/hay, forested areas and the shale quarry. The presence of agricultural improvements such as tile drainage in the fields is not apparent.	The majority of the Boundary Road Site was historically cleared for farming, however those efforts were discontinued and the Site has been allowed to re-vegetate. Site investigation indicated 0% of the Site is Class 1-3 agricultural land. There have been no on-Site agricultural improvements. Only the very northern part of the Site is now used for row crops, which represents 16.3% of the Site. The Site lands are zoned General Rural or Rural Industrial, rather than Agricultural.
Traffic	The closest major provincial highway to the North Russell Road Site is provincial Highway 417, located approximately 5 kilometres north of the Site. Highway 417 interchanges are located at Boundary Road (exit 96) and Vars/St. Guillaume Road (exit 88), some 9 kilometres northwest and 5 kilometres northeast, respectively, of the Site. Based on the proposed service area for the proposed CRRRC, it is expected that the majority of Site-related traffic would use the Vars and/or the Boundary Road exits should the North Russell Road Site be preferred. The road network between the interchanges and the Site consists of rural collector and rural arterial roads owned by the City of Ottawa or the Township of Russell. On the west side of the Site is North Russell Road, a two lane rural road that runs north-south from Burton Road to the Village of Russell approximately 3 kilometres to the south of the south boundary of the Site. Eadie Road, a secondary rural road, divides the western and eastern portions of the Site lands.	The closest major provincial highway to the Boundary Road Site is provincial Highway 417, located along the north boundary of the Site. The closest Highway 417 interchange is just northwest of the Site at Boundary Road (exit 96), with the Vars/St. Guillaume Road (exit 88) some 6 kilometres to the east. Based on the proposed service area for the proposed CRRRC, it is expected that the most of Site-related traffic would use the Boundary Road exit. The road network between this interchange and the Site consists of an arterial road - Boundary Road, Devine Road (Regional Road 8) to the south of the Site is also an arterial road.

Notes:

¹ The Alternative Site Comparison presented in Table 7.2-1 was performed in January 2013, prior to MOECC Publication NPC-300, “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning” (MOE, 2013b), taking effect. As such, earlier MOECC Publications NPC-205 and NPC-232 (MOE, 1995b and MOE, 1995a), which have since been replaced by MOECC Publication NPC-300, were consulted at the time of the Site comparison. The subsequent impact assessment presented in Section 11.2 referenced MOECC Publication NPC-300.

² The Alternative Site Comparison for Biology considered potential for SAR on or within 120 metres of the Site boundary.

Table 7.3-1: Comparative Evaluation of Alternative Sites

Component	Criterion and Indicators	North Russell Road Site	Boundary Road Site
Atmosphere	<p><u>Criterion:</u> Which Site is preferred regarding potential effects due to air quality and noise? <u>Indicator:</u> The number, type and location of off-Site receptors in the Site-vicinity (within 500 metres of the Site boundary).</p>	<p>Twenty-five (25) sensitive receptors were identified within the North Russell Road Site-vicinity. Of these, 13 are located adjacent to the property line. A single institutional land use exists within 500 metres of the North Russell Road Site.</p> <p><u>Disadvantages:</u> The North Russell Road Site has more sensitive receptors in total and more sensitive receptors closer to the Site boundary, including one institutional land use.</p>	<p>Four sensitive receptors were identified within the Boundary Road Site-vicinity based on the property limits at the time of the assessment.</p> <p><u>Advantages:</u> The Boundary Road Site has far fewer sensitive receptors in total and less sensitive receptors closer to the Site boundary.</p>
Geology, Hydrogeology & Geotechnical	<p><u>Criterion:</u> Which Site is preferred for protection of groundwater? <u>Indicators:</u> geologic setting, type and thickness of any natural on-Site attenuation layer; and interpreted direction of vertical groundwater flow on-Site and in Site-vicinity.</p>	<p>The portion of the North Russell Road Site west of Eadie Road is located on a local bedrock high with a soil cover of completely weathered shale or glacial till typically less than 2 metres thick, underlain by a variable thickness of Queenston Formation shale bedrock. To the east of Eadie Road, the bedrock surface declines and the soil cover increases to a significant thickness of silty clay and glacial till soil. Also, about half way across the part of the Site east of Eadie Road the shale was not encountered and the bedrock consists of Carlsbad Formation limestone and shale. The vertical groundwater gradients are indicated to be generally downward or absent; the North Russell Road Site is located within a large regional groundwater recharge area. The on-Site natural attenuation (or containment) layer for vertical groundwater flow is the shallow portion of the Queenston shale bedrock. The shale is indicated to have an overall low hydraulic conductivity; however there are higher permeability zones in some areas of the upper shale due to fracturing and weathering. In the unlikely event of an unmitigated leachate release from the CRRRC's landfill component, the leachate-impacted groundwater would enter the bedrock and migrate downward and then easterly.</p> <p><u>Disadvantages:</u> The North Russell Road Site has a less favourable natural containment mechanism. It has favourable groundwater quality on-Site and in the Site-vicinity in the hydrogeological zones where drinking water is obtained that could be impacted in the unlikely event of an unmitigated leachate release from the CRRRC's landfill component. The North Russell Road Site is interpreted to be located within a large regional groundwater recharge area, however only forms a small part of the recharge area.</p>	<p>The Boundary Site is underlain by a variable thickness of silty sand up to about 1.5 metres thick, followed by an extensive, about 30 metres thick deposit of silty clay soil. A variable presence of silty sand and silt seams have been noted within the upper 5 metres of the clay deposit. The clay is underlain by glacial till and then shale and limestone bedrock of the Carlsbad Formation. The direction of horizontal groundwater flow in all soil types and the upper bedrock is towards the east. The vertical groundwater gradients are weakly downward to absent; the silty clay deposit restricts downward water movement. The Boundary Road Site is not part of a regional groundwater recharge system to the basal glacial till and bedrock. The on-Site natural attenuation layer for vertical groundwater movement is the thick, low permeability silty clay deposit. In the unlikely event of an unmitigated leachate release from the CRRRC's landfill component, the leachate-impacted groundwater would migrate primarily through the surficial silty sand layer towards the east.</p> <p><u>Advantages:</u> The Boundary Road Site and its associated natural silty clay attenuation layer offers more favourable natural containment properties compared to the North Russell Road Site.</p>
Surface Water	<p><u>Criterion:</u> Which Site is preferred for protection of surface water quality? <u>Indicators:</u> Number of existing surface water outlet points, distance to nearest continuously flowing watercourse; and characteristics of downstream surface water system and usage.</p>	<p>The North Russell Road Site is located within the Castor River subwatershed. Existing drainage on the Site is conveyed by ditches to four intermittently flowing Municipal Drains via six drainage outlet points from the Site. The closest continuously flowing watercourse that receives drainage from the North Russell Road Site is the Marshall Seguin Municipal Drain to the east; it is located 2 kilometres map distance from the Site, but actually a streamflow distance of 4.9 kilometres from the Site via the Fournier Municipal Drain. The water quality in the Castor River and in ditches in the area of the Site is typical of eastern Ontario, with elevated phosphorus and several metals. Three communities discharge treated wastewater into the Castor River and one community, Casselman, draws surface water for water supply just downstream of the confluence of the Castor and South Nation Rivers.</p> <p><u>Advantages:</u> Greater distance to continuously flowing watercourse that receives drainage from the North Russell Road Site.</p> <p><u>Disadvantages:</u> The North Russell Road Site has more surface water outlets and the pre-existing receiver surface water quality is better.</p>	<p>The Boundary Road Site is located in the Bear Brook subwatershed. Existing drainage on the Site is conveyed by ditches from three outlet points to three intermittently flowing Municipal Drains that combine east of the Site at the start of Shaw's Creek. The closest continuously flowing watercourse that receives drainage from the Boundary Road Site is Shaw's Creek to the east; it is located 1.6 kilometres map distance from the Site and streamflow distances of 2.1 and 2.2 kilometres from the Site via the Frank Johnston Municipal Drain and the Simpson Municipal Drain, respectively. The water quality in Bear Brook and in ditches in the area of the Site, is typical of eastern Ontario, with elevated phosphorus and several metals. There are no communities that discharge treated wastewater to the Bear Brook.</p> <p><u>Advantages:</u> The Boundary Road Site has less surface water outlets and characteristics of downstream surface water system are naturally poorer.</p> <p><u>Disadvantages:</u> Less distance from the Site to a continuously flowing water course that would receive drainage from the CRRRC.</p>



Component	Criterion and Indicators	North Russell Road Site	Boundary Road Site
Biology	<p><u>Criterion:</u> Which Site is preferred for protection of terrestrial and aquatic biological systems?</p> <p><u>Indicator:</u> Amount of, quality of and impact on biological systems on-Site, including protected biological systems. Specifically including the total impact on: Class 1 to 3 wetlands; Life science ANSIs; Wooded areas; SAR and endangered species and associated habitat; and water bodies and water courses.</p>	<p>There are no PSWs or ANSIs on the North Russell Road Site. Vegetation communities on the North Russell Road Site include meadows, pasture and hayfields, forest, swamp and thicket areas. A total of 155 species of plants were observed on the North Russell Road Site during field surveys completed before this Site comparison; all vegetation communities observed on the North Russell Road Site are common and widespread in the region. Seven insect, four herpetile, 34 bird and 10 mammal species were observed during the field surveys; all species observed on the North Russell Road Site up to the time of this comparison are common and widespread in the region. SAR: Nine SAR (eight provincially listed SAR and one federally threatened species) were identified, through the desktop screening and preliminary habitat assessment, with some potential (ranging from Low-Moderate to High potential) to occur on the North Russell Road Site. None of these species were observed on the North Russell Road Site during field surveys completed to the time of this comparison. There are five seasonal surface water features and two drainage ditches (all of which have intermittent flow), two dug agricultural ponds and a flooded quarry on the Site.</p> <p><u>Advantages:</u> No Class 1-3 wetlands or ANSIs on the Site.</p> <p><u>Disadvantages:</u> The North Russell Road Site has more plant species and potential for SAR habitat, with some potential listed as High. No SAR were in fact observed at the Site. The Site has more diversity in vegetation cover.</p>	<p>There are no PSWs, ANSIs, or Significant Woodlots on the Boundary Road Site. Vegetation communities on the Boundary Road Site include immature deciduous forest and swamp, deciduous thickets and thicket swamp, plantation, agricultural fields and small residential properties. A total of 115 species of plants were observed on the Boundary Road Site during field surveys up to the time of this comparison. Flooding occurs throughout the Boundary Road Site during periods of high water (i.e., storm events and spring freshet) and the soil remains saturated in several areas for much of the year. A large proportion of the Boundary Road Site consists of mineral thicket swamp. Nine insect, two herpetile, 32 bird and 10 mammal species were observed during field surveys completed prior to this comparison. The wildlife community on the Boundary Road Site appears to be typical of the region and consistent with the observed habitats. SAR: Six SAR (five provincially listed SAR and one federally threatened species) were identified, through the desktop screening and preliminary habitat assessment, to have some potential (ranging from Low-Moderate to Moderate potential) to occur on the Boundary Road Site. None of these species were however observed on the Boundary Road Site during field surveys completed to the time of this comparison. There are three surface water features identified on the Boundary Road Site: an agricultural ditch in the northern portion, an old farm ditch in the southern portion and the Simpson Municipal Drain in the north-central portion.</p> <p><u>Advantages:</u> No Class 1-3 wetlands, ANSIs or Significant Woodlots on the Site. The Boundary Road Site has less potential for SAR habitat and no High potential for SAR to be present and no SAR were in fact observed at the Site. The Site has less diversity in vegetation cover.</p>
Land Use & Socio-economic	<p><u>Criteria:</u> 1 Which Site is more compatible with current and proposed future land use in the Site-vicinity?</p> <p>2 Which Site is preferred for the protection of aggregate resources?</p> <p><u>Indicators:</u> Criteria 1 - current land use within 1,000 metres of the Site and certain and probable future land use within 1,000 metres of the Site. Criteria 2 - known and probable type and quality of mineral aggregate resources on Site and within 500 metres.</p>	<p>The North Russell Road Site is currently zoned Agricultural and Aggregate Extraction. Land use in the area is mainly various forms of agriculture with some residential lots fronting on the road system and one institutional use (cemetery). The United Counties of Prescott-Russell do not anticipate any significant designation changes in the area of the Site, nor are there any active or expected zoning or Site plan applications. There is a licenced shale quarry on a portion of the Site; it is likely this shale deposit extends beyond the licensed quarry at the North Russell Road Site limits, mainly to the north, south and west. There are no other known or probable aggregate resources on the Site or within 500 metres.</p> <p><u>Disadvantages:</u> A greater number of sensitive land uses exist around the North Russell Road Site and the development of the CRRRC is less compatible with the existing and planned land uses. A portion of the North Russell Road Site is underlain by a licensed quarry.</p>	<p>The Boundary Road Site is currently zoned General Rural and Rural Heavy Industrial. Land use in the area is commercial/light industrial in the Industrial Park to the west, limited residential development, agricultural to the east and vacant lands. As of the time of the comparison, no zoning or Site plan applications had been applied for with the City in the Site-vicinity of the Boundary Road Site. There are no known or probable aggregate resources on the Site or within 500 metres.</p> <p><u>Advantages:</u> A smaller number of sensitive land uses exist around the Boundary Road Site and the development of the CRRRC is more compatible with the existing and planned land uses in the Site vicinity. There are no known or probable aggregate resources on the Boundary Road Site or within 500 metres of the Site.</p>
Cultural & Heritage Resources	<p><u>Criterion:</u> Which Site is preferred for the protection of archaeological and heritage resources, and cultural heritage landscapes?</p> <p><u>Indicators:</u> Number and significance of known archaeological and heritage features, and cultural heritage landscapes on-Site; and area of on-Site lands with moderate to high potential for undiscovered archaeological Sites.</p>	<p>There are no registered archaeological Sites within the Site-vicinity. Based on the 2011 Standards and Guidelines for Consultant Archaeologists (MTCS, 2011), approximately 90% of on-Site lands are of medium to high archaeological potential, with the remaining 10% having low or no archaeological potential; the lands having potential will require further archaeological assessment. The North Russell Road Site-vicinity was also found to have 29 identified and potential cultural heritage resources (identified as pre-1973 structures as per MTCS guidelines), including 20 potential cultural heritage landscapes (farmsteads with multiple buildings), a potential industrial heritage Site (the quarry), a cemetery, a former school and a former church. Because of these features, further assessment is required to determine if the area as a whole is potentially a larger scale cultural heritage landscape unit.</p> <p><u>Disadvantages:</u> The North Russell Road Site has medium to high archaeological potential. It also has more potential cultural heritage resources and cultural heritage landscapes.</p>	<p>There are no registered archaeological Sites within the Site-vicinity. All of the on-Site lands contain no or low archaeological potential; no additional archaeology study is required. The Boundary Road Site study area was found to have four potential cultural heritage resources (identified as pre-1973 structures as per MTCS guidelines) which includes one property on the Site.</p> <p><u>Advantages:</u> The Boundary Road Site has low archaeological potential and therefore a much smaller possibility of impacting any undiscovered archaeological resources. It also has fewer potential cultural heritage resources and cultural heritage landscapes.</p>

Component	Criterion and Indicators	North Russell Road Site	Boundary Road Site
Agriculture	<p><u>Criterion:</u> Which Site is preferred regarding potential for effects on agriculture?</p> <p><u>Indicators:</u> Percentage of on-Site lands with soil capability classes 1 to 3; Amount, type(s) and quality of on-Site improvements for agricultural purposes (i.e. structures, tile drainage); Percentage of on-Site land being used for agricultural purposes; and Type(s) and extent of agricultural operations on-Site and within 500 metres of the Site boundary, i.e. organic, cash crop, livestock.</p>	<p>20.9% of on-Site land zoned Agricultural between North Russell Road and Eadie Road is Class 1-3 agriculture lands (Class 3), while the remaining agricultural land is considered to be Class 4. The lands east of Eadie Road are zoned Aggregate Extraction. There are no on-Site agricultural improvements. 12.6% of the lands at the North Russell Road Site are in active agricultural production (croplands). Agriculture is not the predominant use on the North Russell Road Site and cropland makes up 40.5% of the lands in the immediate area (within 500 metres).</p> <p><u>Advantages:</u> The North Russell Road Site has slightly less land in actual agriculture production.</p> <p><u>Disadvantages:</u> The North Russell Road Site contains some Class 3 agricultural lands. It has a higher amount of agricultural production in the Site-vicinity.</p>	<p>None of the land area on the Boundary Road Site is Class 1-3 land. There are no on-Site agricultural improvements on the subject lands. 16.3% of the lands at the Boundary Road Site were in active agricultural production (croplands). Agriculture is not the predominant use on the Boundary Road Site and cropland makes up only 14.5% of the lands in the immediate area (within 500 metres).</p> <p><u>Advantages:</u> The Boundary Road Site has no Class 1-3 agricultural lands. It has a lower amount of agricultural production in the Site-vicinity.</p> <p><u>Disadvantages:</u> The Boundary Road Site has slightly more land in actual agriculture production.</p>
Design & Operations	<p><u>Criterion:</u> Which Site is preferred regarding the anticipated amount of engineering required to assure MOECC groundwater quality criteria are met at the property boundary?</p> <p><u>Indicator:</u> Degree of engineered containment expected to be required for on-Site systems.</p>	<p>Even though the shale bedrock underlying the North Russell Road Site is indicated to generally have a relatively low hydraulic conductivity, because the Site is underlain by bedrock, the landfill portion and any leachate treatment or holding ponds is expected to require an engineered groundwater protection system (liner, leachate collection system). It is anticipated that for the landfill, the system would be similar to the "Generic Design Option II" from the MOECC Landfill Standards (MOE, 1998b) (i.e., double composite liner with primary and secondary leachate collection systems).</p> <p><u>Disadvantages:</u> The North Russell Road Site would require a higher degree of engineered containment for the landfill and leachate treatment/holding pond components of the CRRRC.</p>	<p>The thick clay deposit that underlies the Boundary Road Site provides a natural low hydraulic conductivity barrier. The landfill portion and any leachate treatment or holding ponds are expected to require: a single hydraulic barrier (because of the surficial silty sand and/or upper weathered clay zone) on the excavated below-ground sideslopes (e.g., geomembrane, geosynthetic clay liner (GCL) or compacted clay) that is keyed into the underlying unweathered silty clay; a primary leachate collection system on the base and below-ground sideslopes of the waste disposal cells; and either a single liner or single composite liner on the base of the waste disposal cells or ponds, or a vertical cut-off feature around the landfill perimeter. A perimeter cut-off would also replace a liner on the below-ground sideslopes of the waste cells.</p> <p><u>Advantages:</u> The Boundary Road Site would require a lower degree of engineered containment for the landfill and leachate treatment/holding pond components of the CRRRC.</p>
Traffic	<p><u>Criterion:</u> Which Site is preferred regarding potential effects from Site-related truck traffic?</p> <p><u>Indicators:</u> Proximity of Site to Highway interchange; characteristics of road network between Highway interchange and Site; and Land use from Highway interchange to Site along the main haul route(s).</p>	<p>Five main haul route alternatives to the North Russell Road Site were examined. Two alternatives assumed the majority of Site-related traffic to originate from the Boundary Road/Highway 417 interchange and three alternatives from the Vars/Highway 417 interchange. Four of the alternatives use existing roadways (a combination of rural arterials, rural collectors and one secondary rural road- Eadie Road); the fifth alternative involves the Vars interchange and construction of a new road for the CRRRC along an unopened road allowance. The travel distance along the road network for the first four alternative haul routes ranges from 6 to 10 kilometres, with from 10 to 30 residences, 11 to 15 commercial uses and 11 to 21 farm accesses along the routes. For two of these routes, there could also possibly be a cemetery, depending on the location of the Site access point. For the fifth alternative, the travel distance is 4.5 kilometres and there are no residential uses, no farm accesses and 11 commercial uses along the route.</p> <p><u>Advantages:</u> The fifth alternative has the least amount of residences along the haul route.</p> <p><u>Disadvantages:</u> The haul routes for all alternatives are longer for the North Russell Road Site. The fifth alternative would require a new road.</p>	<p>The roads which would form the main haul route for the Boundary Road Site-related truck traffic from Highway 417 are classified as rural arterial roads. The Site access location from Highway 417 could correspond to a travel distance of about 1.3 to 3.5 kilometres from Boundary Road Exit 96 depending on where Site access is provided (subsequently determined to be 850 metres as described in Section 8.11). Land uses along the haul route were mainly commercial/light industrial; up to nine residences are along the haul route and 14 commercial/light industrial properties.</p> <p><u>Advantages:</u> Compared to all but one of the alternative haul routes for the North Russell Road Site the Boundary Road Site has less land uses adjacent to the haul route. The Boundary Road Site provides the shortest haul route along roads designated as arterial roads that currently carry truck traffic.</p>

7.4 Identification of Preferred Site

The comparison summarized in Table 7.3-1 indicates that the Boundary Road Site is preferred for all nine of the environmental components considered in the comparative evaluation. During the first and second Open Houses, proposed components and criteria to assess potential effects of alternative ways that the project could be implemented were presented and the public was invited to provide input and rank their relative importance.

Table 7.4-1 lists each component, grouped by their ranking of relative importance, and the results of the comparative assessment of the alternative Sites.

Table 7.4-1: Results of Comparison of Alternative Sites

Component	Preferred Site
Most Important	
Atmospheric	Boundary Road Site
Geology, Hydrogeology & Geotechnical	Boundary Road Site
Land Use & Socio-economic	Boundary Road Site
Traffic	Boundary Road Site
Important	
Surface Water	Boundary Road Site
Biology	Boundary Road Site
Agriculture	Boundary Road Site
Design & Operations	Boundary Road Site
Less Important	
Cultural & Heritage Resources	Boundary Road Site

With or without ranking of environmental components by importance, the Boundary Road Site was identified as the overall preferred Site for the CRRRC. It was preferred in every category of the evaluation.

This conclusion was presented at Open House #3 and there was virtually no feedback from the public or other stakeholders then or subsequently suggesting that the North Russell site should have been the preferred site.

The remainder of this EASR therefore describes the assessments carried out to predict and assess the net effects of the proposed CRRRC at the Boundary Road Site.