

February 2013

**COMPARATIVE EVALUATION OF ALTERNATIVE
SITES – ENVIRONMENTAL ASSESSMENT OF
THE PROPOSED CAPITAL REGION RESOURCE
RECOVERY CENTRE**

DRAFT SUMMARY

1.0 INTRODUCTION

The Capital Region Resource Recovery Centre (CRRRC) is a new integrated waste management facility proposed by Taggart Miller Environmental Services (Taggart Miller). The CRRRC, if approved, would provide facilities and capacity for recovery of resources and diversion of materials from disposal that are generated by the Industrial, Commercial and Institutional (IC&I) and Construction and Demolition (C&D) sectors in Ottawa and eastern Ontario, as well as landfill disposal capacity for material that is not diverted. The facility would primarily serve Ottawa and secondarily portions of eastern Ontario.

In order to proceed, this project first requires approval under the Ontario *Environmental Assessment Act*, followed by other provincial and municipal approvals. The first requirement of the environmental assessment (EA) process is approval of a Terms of Reference (TOR), which provides the framework under which the EA is to be completed. The TOR for this project was approved by the Minister of Environment on December 17, 2012.

Taggart Miller identified and secured two potential Sites for development of the proposed project, as shown in the figure below:



One Site - the North Russell Road (NRR) Site - is a 193 hectare (476 acre) property 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.

The second Site - the Boundary Road (BR) Site - is a 175 hectare (430 acre) property located in the east part of the City of Ottawa just southeast of the Highway 417/Boundary Road interchange.

The first step in the EA was a comparative evaluation of the two Alternative Sites to identify the preferred site for the CRRRC project. The evaluation has been carried out using the methodology in the approved TOR. The comparison considered nine environmental components, each having indicators and a set of data sources to be used to consider the potential effects of the project on the associated environment.

2.0 COMPARATIVE EVALUATIONS

2.1 Atmospheric Environment

The atmospheric component compared the Alternative Sites using the following criterion and indicator:

- Criterion: Which site is preferred regarding potential effects due to air quality and noise?
- Indicator: The number, type and location of off-Site receptors in the Site-vicinity (within 500 m of the Site boundary).

The data sources used included aerial photographic mapping and field reconnaissance, land-use and zoning maps and consultation with Russell Township and the City of Ottawa (as required).

The Ontario Ministry of the Environment (MOE) considers potential receptors to be “sensitive receptors”, where sensitive receptors are locations such as residential dwellings, childcare facilities, hospitals, hotels, campsites and places of worship.

Points of reception (PORs) located closest to the Undertaking have the greatest potential to receive air quality and noise impacts.

North Russell Road Site: Twenty-five (25) sensitive receptors have been identified within the North Russell Road Site-vicinity. Of these, 13 are located adjacent to the property line.

Boundary Road Site: Four (4) sensitive receptors have been identified within the Boundary Road Site-vicinity. Of these, only one is directly adjacent to the property line.

Preferred Site for Atmospheric Component: The Boundary Road Site is preferred for both air and noise aspects of the atmospheric environment.

2.2 Geology, Hydrogeology & Geotechnical Environment

The geology, hydrogeology & geotechnical component compared the Alternative Sites using the following criterion and indicators:

- Criterion: Which Site is preferred for protection of groundwater?
- Indicators:
 - Geological setting;

- Type and thickness of any natural on-Site attenuation layer;
- Presence and quality of groundwater resources on-Site and in Site-vicinity; and
- Interpreted direction of vertical groundwater flow on-Site and in Site-vicinity, i.e., area of groundwater recharge, transitional flow, or groundwater discharge.

The data sources used were published geological, hydrogeological and geotechnical maps and reports including applicable source water protections plans and related studies/reports; municipal Official Plans, specifically any groundwater protection zones, recharge areas, etc.; Ministry of the Environment (MOE) water well records and determination of water well users in the area (using topographic maps, aerial photos and field reconnaissance); and findings of on-Site testing completed for this project or otherwise available to confirm/compare information.

North Russell Road Site: The portion of the NRR 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 2m 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 horizontal groundwater flow direction in the bedrock is predominantly towards the east. The vertical groundwater gradients are indicated to be generally downward; the NRR 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. Groundwater quality is relatively fresh in the upper bedrock, but deteriorates with depth. Water supply in the area is mostly from drilled wells completed in bedrock. In the unlikely event of an unmitigated leachate release from the project's landfill component, the leachate-impacted groundwater would enter the bedrock and migrate downward and then easterly.

Boundary Road Site: The BR site is underlain by a variable thickness of silty sand up to about 1.5 m thick, followed by an extensive, about 30 m thick deposit of clay soil. A variable presence of silty sand seams have been noted within the upper 5 m 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 clay deposit restricts downward movement of water to the till and bedrock, and the BR Site is not within a groundwater recharge area.

The on-Site natural attenuation layer for vertical groundwater movement is the thick, low permeability clay deposit. Groundwater quality in the area is poor and deteriorates even more with depth; water supply in the area around the Site is obtained from shallow dug wells. In the unlikely event of an unmitigated leachate release from the project's landfill component, the leachate-impacted groundwater would migrate primarily through the surficial silty sand layer towards the east.

Preferred Site for Geology, Hydrogeology & Geotechnical Component: The Boundary Road Site is preferred for all aspects of this component.

2.3 Surface Water Environment

The surface water component compared the Alternative Sites using the following criterion and indicators:

- Criterion: Which site is preferred for protection of surface water quality?
- Indicators:
 - Number of existing surface water outlet points;
 - Distance to nearest continuously flowing water course; and
 - Characteristics of downstream surface water system and usage.

The data sources used were topographic maps, air photos, discussions with municipalities and conservation authorities, published water quality and flow information, site reconnaissance, and surface water flow and water quality monitoring stations.

North Russell Road Site: The NRR Site is located within the Castor River subwatershed. Existing drainage on the NRR Site is conveyed by ditches to four (4) intermittently flowing Municipal Drains via six (6) drainage outlet points from the Site. The closest continuously flowing watercourse that receives drainage from the NRR Site is the Marshall Seguin Municipal Drain to the east; it is located 2 km map distance from the Site, but actually a streamflow distance of 4.9 km 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 phosphorous 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.

Boundary Road Site: The BR Site is located in the Bear Brook subwatershed. Existing drainage on the BR Site is conveyed by ditches from three (3) outlet points to three (3) intermittently flowing Municipal Drains which combine east of the Site at the start of Shaw's Creek. The closest continuously flowing watercourse that receives drainage from the BR Site is Shaw's Creek to the east; it is located 1.6 km map distance from the Site, but actually streamflow distances of 2.1 and 2.2 km 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 phosphorous and several metals. There are no communities that discharge treated wastewater or draw surface water for water supply from Bear Brook Creek.

Preferred Site for Surface Water Component: The BR site is preferred for 2 of the 3 indicators, while the NRR Site is preferred in terms of distance to the nearest continuously flowing watercourse. Overall, the Boundary Road Site is preferred for this criterion.

2.4 Biology Environment

The biology component compared the Sites using the following criterion and indicators:

- Criterion: Which site is preferred for protection of terrestrial and aquatic biological systems?
- Indicator: 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 Areas of Natural and

Scientific Interest (ANSIs); Wooded areas; Species at risk and endangered species and associated habitat; and water bodies and water courses.

The wetlands portion of the assessment was based more on the current classification of “provincially significant” versus “not provincially significant”, which replaced the Class 1 to 7 rankings.

The data sources used were site reconnaissance and preliminary field surveys, a variety of published data sources as listed in the approved TOR, and aerial photography. A BioBlitz (Hanrahan et al. 2011), which is a 24-hour survey of the biological diversity of a selected area, was conducted in 2011 on parts of the NRR Site and the Site-vicinity; as part of the desktop assessment, the BioBlitz report was used as background information (Hanrahan et al. 2011).

North Russell Road Site: The preliminary studies provided the following:

- There are no Provincially Significant Wetlands (PSWs) Areas of Natural and Scientific Interest, or significant woodlots on the NRR Site;
- Vegetation communities on the NRR Site include meadows, pasture and hayfields, forest, swamp and thicket areas. A total of 155 species of plants have been observed on the NRR Site during field surveys completed to date; all vegetation communities observed on the NRR 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 NRR Site to date are common and widespread in the region;
- Species at Risk (SAR): Eleven SAR (eight provincially listed SAR, two that will be assessed in January 2013 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 NRR Site. None of these species were observed on the NRR Site during field surveys to date; and
- There are five (5) seasonal surface water features and two (2) drainage ditches (all of which have intermittent flow), two (2) dug agricultural ponds, and a flooded quarry on the Site. The surface water features on the NRR Site are not coldwater, so not as sensitive as coldwater systems.

Boundary Road Site:

The preliminary studies provided the following:

- There are no Provincially Significant Wetlands (PSWs) Areas of Natural and Scientific Interest, or Significant Woodlots on the NRR Site;
- Vegetation communities on the BR 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 have been observed on the BR Site during field surveys to date. Flooding occurs throughout the BR 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 BR Site consists of mineral thicket swamp;
- Nine insect, two herpetile, 32 bird, and 10 mammal species have been observed during all field surveys to date. The wildlife community on the BR Site appears, to date, to be typical of the region, and consistent with the observed habitats;

- Species at Risk (SAR): Seven SAR (five provincially listed SAR, one that will be assessed in January 2013, and one federally threatened species) were identified, through the desktop screening and preliminary habitat assessment, with some potential (ranging from Low-Moderate to Moderate potential) to occur on the BR Site. None of these species were observed on the NRR Site during field surveys in 2012; and
- Three (3) surface water features were identified on the BR 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. All of these have intermittent flow and are not coldwater, so not as sensitive as coldwater systems.

Preferred Site for Biology Component: Based primarily on consideration of the potential for Species at Risk to be present on-Site or in the Site-vicinity, the Boundary Road Site is preferred for this component.

2.5 Land Use & Socio-economic Environment

The land use & socio-economic component compared the Alternative Sites using the following criteria and indicators:

- Criteria:
 - Which Site is more compatible with current and proposed planned future land uses in the Site-vicinity?
 - Which Site is preferred for the protection of mineral aggregate resources?
- Indicators for the first criterion:
 - Current land use within 1,000 metres of the Site; and
 - Certain and probable planned future land use within 1,000 metres of the Site.
- Indicator for the second criterion: Known and probable type and quality of mineral aggregate resources on Site and within 500 metres.

The data sources used for the first criterion were aerial photographic and topographic mapping and field reconnaissance, published data on public recreational facilities/activities, provincial documents as listed in the approved TOR, discussions with municipalities and institutions, and Municipal Official Plans and Zoning. The data sources used for the second criterion were published reports as listed in the approved TOR, the existing quarry aggregate license, Municipal Official Plans and Zoning and findings of on-Site investigations completed for this project or otherwise available.

North Russell Road Site: The NRR 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 NRR Site limits, mainly to the north, south and west. There are no other known or probable aggregate resources on the Site or within 500 m.

Boundary Road Site: The BR 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. From discussion with the City, it was determined that the City is currently

undertaking a review of Agricultural lands as well as Mineral-Aggregate Resources throughout the City; also, no zoning or site plan applications have been applied for with the City in the Site-vicinity of the BR Site. There are no known or probable aggregate resources on the Site or within 500 m.

Preferred Site for the Land Use & Socio-economic Component: The Boundary Road Site is preferred for all aspects of this component.

2.6 Culture & Heritage Resources Environment

The cultural & heritage resources component compared the Alternative Sites using the following criterion and indicators:

- Criterion: Which site is preferred for the protection of archaeological and heritage resources, and cultural heritage landscapes?
- Indicators:
 - 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.

The data sources used were published data sources as listed in the approved TOR, Site reconnaissance, Stage 1 archaeological assessments, a Cultural Heritage Overview assessment including air photo analysis to determine any pre-1973 resources as per Ministry of Tourism, Culture and Sports (MTCS) requirements for the identification of any structures older than 40 years, and applicable provincial guidance documents.

North Russell Road Site: There are no registered archaeological sites within the study area. Based on the 2011 *Standards and Guidelines for Consulting Archaeologists*, 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 a Stage 2 archaeological assessment. The NRR Site study area was 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.

Boundary Road Site: There are no registered archaeological sites within study area. All of the on-Site lands contain no or low archaeological potential; no additional archaeology study is required. The BR Site study area was found to have four potential cultural heritage resources (identified as pre-1973 structures as per MTCS guidelines) were identified.

Preferred Site for Cultural & Heritage Resources Component: Based on the potential for these resources to be present, the Boundary Road Site is preferred for all aspects of this component.

2.7 Agriculture Environment

The agricultural component compared the Alternate Sites using the following criterion and indicators:

- Criterion: Which site is preferred regarding potential for effects on agriculture?
- Indicators:
 - 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 m of the Site boundary, i.e. organic, cash crop, livestock.

The data sources used were as listed in the approved TOR.

North Russell Road Site: The preliminary studies provided the following:

- Based on a preliminary agricultural assessment, 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 remainder are considered to be Class 4. The lands east of Eadie Road are zoned Aggregate Extraction;
- There are no on-Site agricultural improvements;
- Only 12.6 % of the lands at the NRR Site are in active agricultural production (croplands); and
- Agriculture is not the predominant use on the NRR Site and cropland makes up 40.5 % of the lands in the immediate area (within 500 m).

Boundary Road Site: The preliminary studies provided the following:

- None of the land area on the BR Site is Class 1-3 lands;
- There are no on-Site agricultural improvements on the subject lands;
- Only 16.3 % of the lands at the BR Site are in active agricultural production (croplands); and
- Agriculture is not the predominant use on the BR Site and cropland makes up only 14.5 % of the lands in the immediate area (within 500 m).

Preferred Site for Agricultural Component: Considering the agricultural soil classifications and the off-Site cropland uses within 500 m, the Boundary Road Site is preferred for this component.

2.8 Design & Operations Environment

The design & operations component compared the Alternative Sites using the following criterion and indicator:

- Criterion: Which site is preferred regarding the anticipated amount of engineering required to assure Ministry of the Environment (MOE) groundwater quality criteria are met at the property boundary?
- Indicator: Degree of engineered containment expected to be required for on-Site systems.

The data sources used were Ontario Regulations 232/98 and 268/11, published hydrogeological and geotechnical maps and reports, findings of on-Site testing completed for this project or otherwise available to confirm/compare information, preliminary determination of on-Site engineered leachate management system requirements and review of previous knowledge or experience for designs in similar geological settings in Ontario.

North Russell Road Site: Even though the shale bedrock underlying the NRR 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. It is anticipated that for the landfill, the system would be similar to the “Generic Design Option II” from the MOE Landfill Standards (i.e., double composite liner with primary and secondary leachate collection systems).

Boundary Road Site: The thick clay deposit that underlies the BR Site provides natural low hydraulic conductivity barrier. The landfill portion and any leachate treatment or holding ponds are expected to require:

- A single liner (because of the surface sand and/or upper weathered clay zone) on the excavated below-ground sideslopes (e.g., geomembrane, 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
- Possibly 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.

Preferred Site for Design & Operations Component: The Boundary Road Site is preferred for this component.

2.9 Traffic Environment

The traffic component compared the Alternative Sites using the following criterion and indicators:

- Criterion: Which Site is preferred regarding potential effects from Site-related truck traffic?
- Indicators:
 - 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).

The data sources used were available road and intersection characteristics, and traffic count information on potential haul routes; historical traffic and collisions, if available; aerial photographic mapping and field reconnaissance; location and nature of potential receptors; and consultation with Russell Township and the City of Ottawa, as appropriate.

North Russell Road Site: Five main haul route alternatives to the NRR 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 project along an unopened road allowance. The travel distance along the road network for the first four alternative haul routes ranges from 6 to 10 km, with from 10 to 30 residences, 11 to 15 commercial uses and 11 to 21 farm accesses along the route. 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 km, and there are no residential uses, no farm accesses, and 11 commercial uses along the route.

Boundary Road Site: The roads which would form the main haul route for the BR Site-related truck traffic from Highway 417, Boundary Road and possibly Devine Road, 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 km from Boundary Road Exit 96 depending on where site access is provided. Land uses along the haul route are mainly commercial/light industrial; approximately nine residences are along the haul route and 14 commercial/light industrial properties.

Preferred Site for Traffic Component: The Boundary Road Site is preferred.

3.0 RESULTS OF SITE COMPARISON

The Boundary Road Site is preferred for all nine of the environmental components studied in the comparative evaluation.

As such, the Boundary Road site is the overall preferred site for the CRRRC project. The next phases of the EA will continue on this Site, following the methodology in the approved TOR.