



## **Canada-United States-Ontario-Michigan Border Transportation Partnership**

# **Draft Waste and Waste Management Work Plan**

**November 2005  
Version 1**

## PREFACE

The Canada - U.S. – Ontario - Michigan Border Transportation Partnership (The Partnership) is composed of the Federal Highway Administration and Transport Canada representing the federal levels of government, and the Ontario Ministry of Transportation and the Michigan Department of Transportation representing the provincial/state level. The purpose of the Partnership is to improve the movement of people, goods, and services across the United States and Canadian border within the region of Southeast Michigan and Southwestern Ontario.

The partnership is moving forward with technical and environmental work leading to the selection of a new or expanded border crossing, to address cross-border transportation demands for a 30-year planning period.

The Ontario, Ministry of Transportation (MTO) is leading the Canadian work program in coordination with Transport Canada. The Michigan, Department of Transportation (MDOT), in coordination with the Federal Highways Administration (FHWA), is leading the U.S. work program.

This international transportation improvement project will require approvals from governments on both sides of the border. The Partnership has developed a coordinated process that will enable the joint selection of a recommended river crossing location that meets the requirements of *Ontario Environmental Assessment Act* (OEA), *Canadian Environmental Assessment Act* (CEAA), and *National Environmental Policy Act* (NEPA).

The goal of the partnership is to:

- obtain government approval for a new or expanded crossing with connections to the provincial highway system in Ontario and the interstate freeway system in Michigan, including provisions for processing plazas to improve traffic and trade movements at the Windsor-Detroit border;
- completion of comprehensive engineering to support approvals, property acquisition, design and construction; and,
- submit environmental assessment documents to request approval by December 2007.

The Partnership completed a *Planning/Need and Feasibility Study* (P/NF) in January 2004 to address cross-border transportation demands for a 30-year planning period. Included in the documentation for that study was an Environmental Overview Report which provided an inventory of the existing condition in a Focused Analysis Area. Subsequently, in accordance with the *Ontario Environmental Assessment Act*, MTO prepared and submitted in May 2004 an environmental assessment Terms of Reference to the Ontario Ministry of the Environment for review and approval. The Terms of Reference was approved by the Ontario Minister of the Environment on September 17, 2004. The Terms of Reference outlines the framework that MTO and Transport Canada will follow in completing the Detroit River International Crossing Environmental Assessment (DRIC EA).

As an initial step in the DRIC EA process and to build upon the work completed in-depth secondary source data collection has been conducted. This work has been focused within the Preliminary Analysis Area (PAA) identified in the Environmental Overview Report, (as Amended January 2005). The noted data collection effort has been documented in a series of Working Papers. Working Papers have been prepared for the following topics: social impact assessment; economic assessment; archaeological resources; cultural resources; natural heritage; acoustics and vibration; air quality; waste and waste management; and technical considerations.

The purpose of the Working Papers is to document the secondary source data collection by: describing the data collection/sources used; providing an overview of study area conditions; identifying significance/sensitivity of features in the study area; identifying gaps in study area data and developing Work Plans to fill identified data gaps.

A Work Plan for each of the topics identified above has been prepared to structure the filling of identified data gap, provide a scope for future work requirements, provide rationale for further data collection methodologies, data sources, methods of assessment, criteria, indicators and measures, consultation strategies, and the integration of each work plan with the work plans of other disciplines.

The Work Plans have been developed based on current knowledge of existing conditions within the PAA and therefore, should be considered to be living documents which will be subject to agency and public review. The partnership is aware that the assessment and evaluation of alternatives at all phases will require applying the requirements of three pieces of legislation, the OEA, CEAA, and NEPA. Therefore, in preparing the Work Plans, the partnership has sought to integrate the most rigorous requirements from each piece of legislation.

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# 1. INTRODUCTION

## 1.1 Background

Transport Canada (TC) and the Ontario Ministry of Transportation (MTO), in partnership with the U.S. Federal Highway Administration (FHWA) and the Michigan Department of Transportation (MDOT), are conducting a Route Planning, Preliminary Design and Environmental Assessment Study for the Canadian side of a new or expanded Detroit River International Crossing with a connection to a provincial freeway. The Canadian study requires the appropriate approvals under the *Ontario Environmental Assessment Act* (OEAA) and the *Canadian Environmental Assessment Act* (CEAA). The study requires close collaboration with a U.S. based consultant under contract with MDOT to ensure consistency with a simultaneous planning process to receive approvals under the *National Environmental Protection Act* (NEPA).

## 1.2. Detroit River International Crossing – Planning/Need and Feasibility Study (P/NF)

The Partnership jointly commissioned a Planning/Need and Feasibility Study (P/NF) (Canada-US-Ontario-Michigan Border Transportation Partnership 2004), which identified a long-term strategy to address the safe and efficient movement of people and goods between southeast Michigan and southwest Ontario. Although conducted in a manner consistent with the environmental study processes in both countries, the P/NF Study was not completed within the formal environmental study framework. The findings of the P/NF Study; however, serve as an important basis for governments to move forward in the development and improvement of cross border transportation services, including proceeding with the environmental study processes in the U.S. and Canada for major transportation improvements at the Detroit River International Crossing.

A consultation component was incorporated into the P/NF Study process. Canadian and U.S. government departments, ministries and agencies, local municipalities, First Nations groups, private sector stakeholders in border transportation issues, as well as the general public were engaged in the course of the study. Throughout the P/NF Study, the Partnership affirmed that the findings of the P/NF Study may be used to initiate environmental studies in accordance with the requirements of the U.S. *National Environment Policy Act* (NEPA), *Canadian Environmental Assessment Act* (CEAA) and Ontario Environmental Assessment Act (OEAA). This step would be followed by completion of the appropriate environmental impact/assessment studies, design of the approved improvements and ultimately, construction.

During preparation of the P/NF Study, background papers were prepared to establish existing conditions within the Preliminary Analysis Area (PAA). The PAA is roughly bounded by 9th Concession Road in the Town of Lakeshore, County Road 18 in the Town of Amherstburg on its southern extent and by the Detroit River on its western and northern

extent. An Environmental Overview Working Paper (Canada-US-Ontario-Michigan Border Transportation Partnership 2005) was prepared to document environmental constraints which may preclude or otherwise constrain the generation of feasible transportation alternatives. The information contained in the Environmental Overview Working Paper was gathered from readily available secondary sources. Waste and Waste Management issues identified in the Environmental Overview Working Paper included:

- Contaminated Sites,
- Underground Storage Tank Sites,
- Landfills,
- Hazardous Waste Generators,
- Oil, Gas Mineral and Disposal Wells, and
- Undiscovered Sites

## 1.2.1. Description of Existing Environmental Conditions Identified During the P/NF Study

### 1.2.1.1. Regulatory Agency Databases of Contaminated Sites

The Government of Canada introduced the Federal Contaminated Sites and Solid Waste Landfills Inventory Policy on July 1, 2000. This policy states that departments and agencies that hold property must establish and maintain a database of their contaminated sites and solid waste landfills, and that this information must be submitted to the Treasury Board Secretariat for inclusion in a central inventory.

The inventory includes all known federal contaminated sites for which departments and agencies are accountable. It also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. Suspected sites are not added to the inventory until assessments have confirmed contamination. The inventory does not include properties owned by Crown corporations.

To date the inventory lists 1,211 properties with contaminated sites (204 are located in Ontario), but at this time the inventory does not list solid waste landfill sites. Of the 204 sites in Ontario, one site was identified in the study area, located onshore near the Town of Amherstburg and eight sites were located along the Detroit River on Bois Island and Fighting Island. These eight sites were located along channels and bays in between the mainland and the islands, mostly around navigational towers, dykes and burnpits. The contamination ranges from heavy metals to petroleum hydrocarbons and polyaromatic hydrocarbons. Although these sites are offshore and do not fall within the limits of the study area, their existence may impact construction activity associated with a river crossing.

Legislation applicable to contaminated sites in Ontario is enforced at a provincial level unless the land is owned by the Federal government, a First Nations, is deemed to be of national significance, or has the potential to cross a provincial or international boundary.

Under the *Ontario Environmental Protection Act* (EPA), liability regarding contaminated sites rests with the person responsible for the contaminant. This can include previous and/or existing property owners. For this reason, Phase I and Phase II Environmental Site Assessments are normally conducted prior to property transfer. The onus is on the purchaser of the property to assess whether current or historical contamination exists prior to property transfer. The responsibility for any contamination that is discovered after the transaction generally rests with the new owner of the property, although this would not necessarily absolve previous owners from responsibilities for contamination they caused.

The Ministry of Environment has also produced a Waste Disposal Site Inventory that lists all the industrial sites that produced or used coal tar and related tars in Ontario prior to 1988. For each site, information is provided on the location, operating period, evidence of buried wastes, site conditions, site assessments conducted, resource characteristics (i.e., surface water, groundwater, wells), etc. In Ontario, 41 sites are listed on the closed municipal coal gasification plant site inventory and 44 sites are listed on the inventory of industrial sites producing and using coal tar and related tars. A review of the listings identified three sites located in the study area that produced coal tar. Sites contaminated with coal tar tend to involve expansive contamination that can involve extensive clean up of soil and groundwater prior to re-use. Alternative risk management methods for controlling movement and seepage of coal tar can be conducted to mitigate contamination migration and allow the potential re-use of these properties.

#### 1.2.1.2. **Underground Storage Tank Sites**

In Canada, underground storage tanks containing petroleum products are primarily regulated under the *Technical Standards and Safety Act* (TSSA) and the Ontario EPA. The Technical Standards and Safety Authority (TSSA) and the Ontario Ministry of the Environment (MOE) co-ordinate overseeing clean up efforts depending on the extent of contamination, whether there are off-property contaminant migration issues, and whether continued use of the property for use of dispensing of petroleum products is desired. The TSSA maintains a database of all registered tanks containing petroleum products that includes a listing of any work orders associated with the property. This database can be accessed once a more refined transportation route is chosen.

#### 1.2.1.3. **Landfills**

A Waste Disposal Site Inventory has been prepared by the former Ministry of Environment and Energy (MOEE currently the MOE), which contains a list of all known active and closed waste disposal sites in the Province of Ontario as of October 31, 1990. The inventory includes 1,358 active sites and 2,334 closed sites. For each site, information is provided on the type of wastes, site locations, and operating period. The inventory includes both sites that were previously approved and operated under an Approval for which there is adequate information regarding the types of wastes that were deposited, as well as unapproved sites where information regarding waste burial is limited. The sites are classified according to the type of waste, the type of waste it received if known, (industrial, commercial, municipal) and the adjacent land use (urban or rural). Forty-one sites were identified in the study area. Two liquid disposal dumps are located in Anderson Township near Amherstburg while the regional active landfill is located in the southeast

corner of the study area. The re-use of these sites is dependent on the setting and previous landfilling activities and could involve extensive remediation and/or waste removal. The Ontario EPA restricts the re-use of any former landfill site for any other use for a minimum of 25 years from the day of closure unless approval is obtained from the MOE.

#### 1.2.1.4. Hazardous Waste Generators

Ontario sites that generate subject wastes must register the types of waste classes that are produced under Regulation 347. Generators range from small printing shops to large automotive parts manufacturers. A database of waste generators is maintained and can be publicly accessed. However, as most of these wastes are shipped off-site for disposal a listing of a waste generator does not necessarily provide any additional information as to the relative liability associated with acquiring such a site for the purpose of transportation planning. The types of wastes generated and received at these sites can be identified once a streamlined study area has been defined.

#### 1.2.1.5. Oil, Gas, Mineral, and Disposal Wells

The type of well determines the approvals that are needed for operation. Wells used for disposal of hazardous wastes through deep well injection are regulated under the *Ontario Environmental Protection Act* by the Ministry of Environment. There are very few licenses for deep well injection of hazardous wastes. Their location can be identified through a search of Class V certificate of approvals under the *Ontario Environmental Protection Act*. These types of sites should be assessed for potential contamination prior to acquiring for transportation planning.

The Ministry of Natural Resources regulates oil and gas wells. A careful evaluation of the environmental condition of active, inactive, or closed sites will be required to make a determination of any safety, liability, or cost issues which may be involved in using them. More detailed information about the locations of these wells can be determined once the transportation route is more defined.

#### 1.2.1.6. Record of Site Conditions

In Ontario, the Brownfields Statute Law Amendment Act, 2001 provides some rules and incentives for the redevelopment of abandoned or under-used, formerly active sites, typically referred to as Brownfields. The Brownfields legislation provides property owners with general protection from future environmental cleanup orders for historic contamination after they have appropriately remediated a site. This liability protection removes a key barrier to Brownfield redevelopment; however, the owners must file a Record of Site Condition (RSC) with the MOE.

A publicly accessible database of RSC is maintained by the MOE. In order to file an RSC in the Environmental Site Registry, the property must have been properly assessed and shown to meet the soil and groundwater standards appropriate for the new use for the property. The detailed requirements for filing an RSC are set out in *Ontario Regulation*

153/04 (as amended by O.Reg. 366/05). Beginning October 1, 2005, property owners will be required to file an RSC before a property's use is changed from an industrial, commercial or community use to a more sensitive use, such as residential. Therefore, identifying the presence of RSCs allows for the management of risk associated with purchasing potentially contaminated properties.

#### 1.2.1.6. Undiscovered Sites

In Ontario the test of whether a Site is contaminated is determined by the presence of an adverse effect, which is broadly defined under the *Ontario Environmental Protection Act*. Currently contamination issues which occur on a property which do not have the potential to cause an adverse affect or known public health concern and did not occur from a spill event do not necessarily need to be reported to government agencies. As such, known contamination that exists within the boundaries of a property may not be listed in any publicly available database or government agency files. Information regarding onsite contamination within the boundaries of a property may be held by the entity which owns the property; however, this type of information is not currently readily available either for EA purposes or to the general public.

Therefore, foreign substances may be present in soil or groundwater although not classified as a contaminant and with no notification to any authority. However, modifications or redevelopment of the site could result in this substance posing a risk of an adverse affect and therefore resulting in the property being classified as contaminated. For this reason, Phase I and Phase II Environmental Site Assessments are normally conducted prior to property transfer.

### 1.3. Detroit River International Crossing – Terms of Reference

A Terms of Reference was submitted to the Ontario Ministry of the Environment for approval in May 2004. The Terms of Reference identifies the framework that the proponent must follow in completing an individual environmental assessment. The Terms of Reference received approval in September 2004.

The planning process that the Route Planning Study and Environmental Assessment Study will follow is outlined in the Terms of Reference and consists of four stages:

- Stage 1 – Define Study Area;
- Stage 2 – Illustrative Alternatives;
- Stage 3 – Practical Alternatives; and
- Stage 4 – Concept Design Alternatives.

## 1.4. Waste and Waste Management Work Plan

The work plan is structured to provide the rationale, data sources, criteria, indicators, methodology and guidelines for completing the waste and waste management assessment. The analysis and evaluation include both the illustrative and practical route alternatives, as well as the final impact assessment and concept design of the preferred alternative. Specifically, the Work Plan serves to:

- Provide a basis for comparing the alternative roadway routes in terms of their environmental impacts;
- Assess the potential impacts of pre-existing contaminants and waste on the Alternatives selection;
- Assess the potential impacts of the Alternatives on the local environment due to the pre-existing contaminants; and
- Identify any mitigation measures or on-going monitoring that may be necessary to gain regulatory and public approval for the project.

The general approach discussed herein has been developed in conjunction with input from the relevant Canadian Federal and Provincial regulatory authorities including Environment Canada (EC), Ontario Ministry of Transportation (MTO) and the Ontario MOE with respect to their requirements to satisfy CEAA and OEAA, respectively. These items are discussed in detail in the following sections.

The proposed approach to completing the Waste and Waste Management Work Plan is to increase the level of detail used to assess sites as the geographical area of study is sequentially narrowed down. The proposed level of analysis, resolution, and type of data collection at each stage of the study is designed to maximize efficiency. At each stage of the study process, similar tasks will occur. These tasks include:

### **Task 1 – Define Area of Investigation**

- Identify the study area for the purposes of investigating the potential effects of the project.

### **Task 2 – Data Collection**

- Identify the type, source, level of detail and methods to be used to obtain information.

### **Task 3 – Data Analysis**

- Identify how the information will be interpreted to determine the significance and sensitivity of Waste and Waste Management features.

### **Task 4 – Evaluate Alternatives**

- Identify the Waste and Waste Management criteria and indicators that will be used to compare alternatives.

### **Task 5 – Conduct Impact Assessment**

- Identify the range of potential environmental effects to be assessed.

### Task 6 – Recommend Environmental Protection Measures

- Identify the range of potential environmental protection measures to be assessed. Environmental protection measures typically include avoidance, minimization, mitigation, compensation, and monitoring.

These tasks are summarized for each stage of the study process in Table 1.

The analysis throughout the study process addresses that part of the OEAA; subsection 1(c) that defines “environment” to include:

- Air, land or water;
- Plant and animal life, including human life;
- The social, economic and cultural conditions that influence the life of humans or a community;
- Any building, structure, machine or other device or thing made by humans;
- Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities; or
- Any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

In Ontario, environmental matters are regulated by the Ontario Ministry of the Environment (MOE), principally under the *Environmental Protection Act* (EPA). Under the EPA, “contaminant” means “any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them resulting directly or indirectly from human activities that may cause an adverse effect” where adverse effect is further defined to mean one or more of:

- Impairment of the quality of the natural environment for any use that can be made of it;
- Injury or damage to property or to plant or animal life;
- Harm or material discomfort to any person;
- An adverse effect on the health of any person;
- Impairment of the safety of any person;
- Rendering any property or plant or animal life unfit for human use;
- Loss of enjoyment of normal use of property; and
- Interference with the normal conduct of business.

## 2.

## STAGE 1 – DEFINE STUDY AREA

A study area will be established to encompass the stated problems, opportunities and range of feasible alternatives. The study area will be generated based on a review of significant physical and environmental constraints that may preclude the development of

**TABLE 1. WASTE AND WASTE MANAGEMENT TASKS**

Study Stage <sup>1</sup>	Task 1 Define Area of Investigation	Task 2 Data Collection	Task 3 Data Analysis	Task 4 Evaluate Alternatives	Task 5 Conduct Impact Assessment	Task 6 Recommend Environmental Protection Measures
Stage 1 – Define Study Area	Preliminary Analysis Area	<ul style="list-style-type: none"> <li>• Secondary source</li> <li>• Air photo interpretation</li> </ul>	Identify designated/regulated Waste and Waste Management features to evaluate significance.	Compare relative risk and liability and ability to manage risk.	Opportunities/Constraints Analysis	<ul style="list-style-type: none"> <li>• Avoidance</li> </ul>
Stage 2 – Illustrative Alternatives	Opportunity corridors	<ul style="list-style-type: none"> <li>• Secondary source</li> <li>• Air photo interpretation</li> <li>• Windshield/ aerial surveys</li> <li>• Access publicly available contamination databases</li> </ul>	Identify Waste and Waste Management features to evaluate significance.	Compare relative risk and liability and ability to manage risk.	Opportunities/Constraints Analysis	<ul style="list-style-type: none"> <li>• Avoidance</li> </ul>
Stage 3 – Practical Alternatives	Alternative routes	<ul style="list-style-type: none"> <li>• Secondary source</li> <li>• Air photo interpretation</li> <li>• Preliminary pedestrian surveys</li> <li>• Refine database search parameters</li> </ul>	Identify Waste and Waste Management features to evaluate significance.	Compare relative risk/liability and ability to quantify and manage risk.	Generic Impacts	<ul style="list-style-type: none"> <li>• Avoidance</li> <li>• Minimization</li> <li>• Generic mitigation/management</li> </ul>
Stage 4 – Concept Design Alternatives	Alternative concept designs rights-of-way and adjacent zones of influence	<ul style="list-style-type: none"> <li>• Secondary source</li> <li>• Air photo interpretation</li> <li>• Detailed pedestrian surveys</li> <li>• Conduct environmental site assessments</li> </ul>	Identify Waste and Waste Management features to evaluate significance.	Compare relative risk/liability and ability to quantify and manage risk.	Conceptual Site-Specific Impacts	<ul style="list-style-type: none"> <li>• Avoidance</li> <li>• Minimization</li> <li>• Conceptual site-specific mitigation, management, remediation, compensation and monitoring</li> </ul>

<sup>1</sup> Preliminary Design and Detail Design are not currently included in the Detroit River International Crossing Route Planning and Environmental Assessment Study.

feasible alternatives and the ability to provide continuous corridors of sufficient area to generate a range of linear transportation facility alternatives.

## 2.1. Task 1 – Define Area of Investigation

The area of investigation is the Preliminary Analysis Area identified in the amended Environmental Overview Document. In general, this includes the City of Windsor and the Towns of LaSalle, Tecumseh and Amherstburg.

## 2.2. Task 2 – Data Collection

Waste and Waste Management information will be collected from readily available secondary sources and interpretation of aerial photographs. A list of the secondary source information to be collected and its source is presented in Table 2.

Recent aerial photography will be obtained from the County of Essex. The location, type and geographical extent of Waste and Waste Management features will be verified and updated through air photo interpretation.

## 2.3. Task 3 – Data Analysis

The federal, provincial, regional and local significance of regulated/designated Waste and Waste Management features will be determined.

## 2.4. Task 4 – Evaluate Alternatives

No evaluation of alternatives will be performed at this stage. Criteria will be used to identify opportunities/constraints located in the area of investigation. The first goal will be to identify the following potentially high-risk features, where feasible:

- Contaminated Sites,
- Underground Storage Tank Sites,
- Landfills,
- Hazardous Waste Generators,
- Oil, Gas Mineral and Disposal Wells;
- Record of Site Conditions; and
- Large industrial sites with a potential for contamination

The following secondary sources will be assessed to identify potentially significant sites.

**TABLE 2. WASTE AND WASTE MANAGEMENT INFORMATION TO BE COLLECTED FROM SECONDARY SOURCES**

<b>Secondary Source Information</b>	<b>Information Source</b>
Waste, Water and Air Certificates of Approval (Cs of A)	Ontario Ministry of the Environment (as reported on the environmental bill of rights registry)
Coal Gasification Plants	Ontario Ministry of the Environment
Closed Landfills	Ontario Ministry of the Environment
Open Landfills	Ontario Ministry of the Environment
Oil Tank farms	Technical Standards and Safety Authority (TSSA)
Parks Canada Fuel Storage Tanks	Canadian Heritage (as reported by Ecolog ERIS)
Sewage Treatment Plants	Ontario Ministry of the Environment; NTS mapping
Permit to Take Water	Ontario Ministry of the Environment (as reported on the Environmental Bill of Rights Registry)
Environmental Emergencies Database	Environment Canada (Environmental Registry)
Contaminated Sites databases	City of Windsor Town of Tecumseh Town of LaSalle Town of Amherstburg
National Pollutant Release Inventory	Environment Canada (as reported in online database)
Anderson waste disposal sites	Ontario Ministry of the Environment (as reported by Ecolog ERIS)
Occurrence Reporting Incidence System (ORIS)	Ontario Ministry of the Environment (as reported by Ecolog ERIS)
Transport Canada Fuel Storage Tanks	Transport Canada (as reported by Ecolog ERIS)
Ontario Regulation 347 Waste Generators Summary	Ontario Ministry of the Environment (as reported by Ecolog ERIS)

## 2.5. Task 5 – Conduct Impact Assessment

An impact assessment will be carried out using a geographical information system (GIS). Waste and Waste Management information will be entered into a GIS using geo-referenced polygons and/or points with an attached database. The database will be structured so that new data generated during later phases of the environmental assessment study can be easily added. Depending on the nature of the data, information can be queried and then displayed as either a graph, a chart or as a layer on the GIS.

The individual layers within the GIS will be overlaid to create a composite map. The composite map will be used as a basis for examination of environmental and technical feasibility of opportunity corridors, illustrative and practical alternatives. For mapping and analysis purposes, the boundaries of Waste and Waste Management features will be accurate to at least 1:250,000 scale.

## 2.6. Task 6 – Recommend Environmental Protection Measures

Environmental protection measures to be incorporated at this stage include avoidance of Waste and Waste Management features, where feasible, that would pose unacceptable risk and liability.

## 2.7. Results

The Preliminary Analysis Area will be refined based on a review of Waste and Waste Management opportunities and constraints to the development of a linear transportation facility. Illustrative alternatives will be generated and carried forward for further evaluation.

# 3. STAGE 2 – ILLUSTRATIVE ALTERNATIVES

Illustrative alternatives represent the full set of alternative highway alignments/crossing locations to be considered. Illustrative alternatives will be generated by identifying opportunity corridors within the study area and route alternatives within opportunity corridors.

## 3.1. Task 1 – Define Area of Investigation

The area of investigation is opportunity corridors within the Preliminary Analysis Area.

## 3.2 Task 2 – Data Collection

Waste and Waste Management information collected previously from secondary sources will be supplemented with windshield surveys to verify and augment information. Additional information for previously identified concerns or selected features will be collected through private agency database searches. Land usage will be determined for the Preliminary Analysis Area such as industrial, commercial and Residential/Parkland /agricultural. Industrial and commercial areas will be considered as the areas with the highest potential for contamination and waste management issues. Distance of routes and areas covered by plazas will be estimated. Specific environmental concerns typically associated with high liability risks such as landfills, lagoons, automobile wrecking yards, significant industrial facilities, municipal infrastructure such as sewage and water treatment plants etc. will be identified and located.

### 3.3. Task 3 – Data Analysis

The relative significance of Waste and Waste Management features will be evaluated. Pre-feasibility level remedial cost for routes and plazas will be estimated, based on land usage and proximity to high risk factors for evaluation of alternative DRIC customs plazas, river crossings, and connecting routes

The data analysis will focus on the number of sites of potential concern within a given area. The data availability at this point will not provide sufficient information to assign a relative significance or risk from contamination, but can be used to assess the number of potential waste or contamination sites within a given area. In order to select whether a data point would be considered as having a potential affect within a route segment or plaza area, the following rationale will be applied. Preliminary verification of the data point location was conducted through aerial photography. Data points directly in the selected route which would require appropriation of the land on which the data points was situated will be considered to brought forward for alternatives evaluation. This rationale will be applied regardless of whether the data point was an industrial facility, municipal infrastructure such as a sewage treatment plant or a landfill.

For those data points not directly within a route or plaza area additional rationale will be applied to determine whether the data point should be brought forward for alternatives evaluation. Landfills or waste disposal sites (including inert fill sites and some junkyards) within 500 metres of a route or plaza will be considered to have a potential affect on the route based on the nature of the undertaking. Although direct removal of waste may not be required, leachate and methane migration will be considered to be potential issues that could affect development of a route, and therefore these sites are considered to have a high priority for potential further assessment. Additionally the limits of fill for historical landfills not originally permitted are not necessarily fully mapped and therefore the 500 metre radius was considered in the event that waste had been deposited at the fringe of the landfill and would require removal should the route or plaza in the vicinity be selected.

For data points other than landfills, a 300 metre radius will be selected to determine whether the data point was considered to affect a route or plaza area. This 300 metre radius was considered appropriate at this stage of the evaluation in order to buffer those data points for which additional information was required. For example a large industrial facility within the 300 metre radius may not require appropriation, however, should a contamination issue exist at the site it would have a potential to affect a route or plaza area through possible migration of contaminants onto the route or extended plaza area. The available data at this stage of the evaluation is not comprehensive enough to determine whether contamination exists, and therefore the data points will be considered to be indicators of potential contamination for which further analysis will be required.

### 3.4. Task 4 – Evaluate Alternatives

Alternatives will be evaluated using comparative criteria. The evaluation of illustrative alternatives will be based on the potential risk/liability associated with acquiring the property and the potential environmental impact to nearby sensitive receptors, such as potential impacts from regulated/designated Waste and Waste Management features.

Secondary source information and vehicle reconnaissance will be used to determine the number, type and potential significance of designated high risk Waste and Waste Management features.

### 3.5. Task 5 – Conduct Impact Assessment

Impact assessment will be carried out using a geographical information system (GIS). For mapping and analysis purposes, the boundaries of Waste and Waste Management features will be accurate to at least 1:100,000 scale.

### 3.6. Task 6 – Recommend Environmental Protection Measures

Environmental protection measures to be incorporated at this stage include avoidance of Waste and Waste Management features.

### 3.7. Results

The illustrative alternatives will be evaluated to select a technically preferred illustrative alternative(s). Practical alternatives will be generated and carried forward for further evaluation.

## 4. STAGE 3 – PRACTICAL ALTERNATIVES

Practical alternatives represent the set of illustrative alternatives that, upon evaluation of impacts and benefits, are carried forward for further consideration. Practical alternatives are generated through more detailed design (although still at a preliminary level) to better identify property requirements, infrastructural implications, construction staging impacts and mitigation measures.

### 4.1. Task 1 – Define Area of Investigation

The area of investigation is an alternative route within illustrative alternatives.

### 4.2. Task 2 – Data Collection

Waste and Waste Management information collected previously from secondary sources and windshield surveys will be supplemented with preliminary pedestrian surveys conducted. The pedestrian surveys will be used to confirm existing data and identify new areas of concern that may not have been recorded in publicly available databases but which are identifiable based on site reconnaissance. Search of secondary sources will be refined through additional contact with more localized neighborhood environmental groups

(where applicable) and refinement of database searches to obtain additional sources of information and more detail on specific sites. As the study area becomes more focused, previously unsearched databases will be consulted to assess for the presence of sites that would be considered to potentially pose a moderate risk in terms of waste management and contamination issues. Additional moderate risk sites are expected to be identified during this stage of data collection.

#### 4.3. Task 3 – Data Analysis

Data will be analyzed to determine the extent, type, significance and sensitivity of Waste and Waste Management features. The data analysis will focus on the number of sites of potential concern within a given area. The data analysis for Task 3 will be carried forward and applied at the practical alternatives stage. However, additional data that may have been collated that allows a more detailed assessment of the potential for onsite waste or contamination issues will be considered to further assess specific data points.

#### 4.4. Task 4 – Evaluate Alternatives

Alternatives will be evaluated using comparative criteria based on secondary and preliminary primary information. The evaluation of practical alternatives will be based on type, significance and sensitivity of Waste and Waste Management features and adjacent lands, potential risk and ability to quantify risk.

#### 4.5. Task 5 – Conduct Impact Assessment

Impact assessment will be based on generic impacts typically resulting from the development of linear transportation facilities. For mapping and analysis purposes, the boundaries/locations of Waste and Waste Management features will be accurate to at least 1:10,000 scale.

#### 4.6. Task 6 – Recommend Environmental Protection Measures

Environmental protection measures to be incorporated at this stage include avoidance of Waste and Waste Management features, minimization of the impact to the environment and generic mitigation measures typically incorporated into the design of linear transportation facilities. Depending on the nature of the data point, the potential for a waste management or contamination site to be considered as a Brownfield development project will be considered.

## 4.7. Results

The practical alternatives will be evaluated to select a technically preferred practical alternative(s). Concept design alternatives will be generated and carried forward for further evaluation.

## 5. STAGE 4 – CONCEPT DESIGN ALTERNATIVES

Concept design alternatives represent the set of practical alternatives that, upon evaluation of impacts and benefits, are carried forward for further consideration. Concept design includes the consideration of specific engineering and environmental issues to further understand very particular implications of the recommended alternatives. .

### 5.1. Task 1 – Define Area of Investigation

The area of investigation is alternative concept designs rights-of-way and adjacent zones of influence within practical alternatives.

### 5.2. Task 2 – Data Collection

Waste and Waste Management information collected previously from secondary sources, windshield surveys and preliminary pedestrian surveys will be supplemented with detailed pedestrian surveys. Based on the data collected, additional activities for some selected sites may be completed to more fully understand the potential for a given site to present a waste management or contamination issue. Specifically phase I environmental site assessments to determine the potential for significant contamination may be undertaken if it is determined that there is a significant data gap that affects the reasonable assessment of a data point in terms of the relative magnitude of potential impact. The extent of phase I environmental site assessments to be performed will be based on the data that are available at this time and the level of information that is required to conduct the data analysis and alternatives evaluation.

### 5.3. Task 3 – Data Analysis

Data will be analyzed at the site-specific level to determine the potential extent, type, significance and sensitivity of Waste and Waste Management features.

### 5.4. Task 4 – Evaluate Alternatives

Alternatives will be evaluated using comparative criteria. Secondary and detailed primary information will be used to determine the extent, type, significance and sensitivity of Waste and Waste Management features. The evaluation of practical alternatives will be based on the risk associated with purchasing potentially contaminated properties.

## 5.5. Task 5 – Conduct Impact Assessment

Impact assessments will be based on conceptual site-specific impacts resulting from the proposed project. For mapping and analysis purposes, the boundaries/locations of Waste and Waste Management features will be accurate to at least 1:1,000 scale.

## 5.6. Task 6 – Recommend Environmental Protection Measures

Environmental protection measures to be incorporated at this stage include avoidance of Waste and Waste Management features, and conceptual site-specific mitigation measures for the proposed project. Conceptual site-specific environmental protection measures to be considered at this stage include:

- Stormwater drainage management practices
- Design modifications
- On site treatment of impacted soils
- Excavation or pumping and off-site treatment.
- Groundwater management
- Capping to prevent infiltration
- Remedial strategies to contain, isolate or treat contamination

## 5.7. Results

The concept design alternatives will be evaluated to select a technically preferred concept design alternative(s). Preliminary design alternatives will be generated and evaluated to select a technically preferred preliminary design alternative as part of a separate study.

Investigation of the technically preferred preliminary design alternative may include site specific work, such as Phase II Environmental Site Assessment programs, including site sampling and analysis, may be conducted, if required, to:

- Confirm presence/absence of contamination on site and off-site
- Assess the nature of contamination
- Delineate extent of contamination
- Identify remediation or management alternatives.