APPENDIX D – ENVIRONMENTAL ASSESSMENT SCREENING REPORT PURSUANT TO THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA) – JUNE 2011

Transport Canada Transports Canada

TRANSPORT CANADA

ENVIRONMENTAL ASSESSMENT SCREENING REPORT

PURSUANT TO THE *CANADIAN ENVIRONMENTAL ASSESSMENT ACT* (CEAA)

WAVERLEY WEST ARTERIAL ROADS PROJECT

RDIMS/TC No.: 6317485
CEAR No.: 10-01-59643

PRAIRIE AND NORTHERN REGION
June 2011

Canada

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1.0 PROJECT IDENTIFICATION

Project Title:	Waverley West Arterial Roads Project (hereinafter, the "Project")
Project Location:	Waverley West growth neighbourhood, Winnipeg, Manitoba
EA Starting Date:	December 13, 2010
TC File no.:	
RDIMS no.:	6317485
CEAR File no.:	10-01-59643
NOC CEAR	December 13, 2010

2.0 CONTACTS

PARTIES INVOLVED	CONTACT: Department, Name, Title, Division, Email	TELEPHONE	FAX
Lead Responsible Authority (Lead RA)	Transport Canada Jeff Tindall *Environmental Assessment Senior Advisor* Surface Infrastructure Programs Jeffrey.Tindall@tc.gc.ca	613-991-0132	613-990-9639
Lead Responsible Authority (Lead RA)	Transport Canada Elizabeth Newgard, P.Eng. Project Manager Surface Infrastructure Programs elizabeth.newgard@tc.gc.ca	613-998-5468	613-990-9639
Federal EA Coordinator (FEAC):	N/A	N/A	N/A
Other Responsible Authorities (RA):	N/A	N/A	N/A
Federal Authority (FA):	N/A	N/A	N/A
Provinces or Territories: (For coordinated EA)	N/A	N/A	N/A
Proponent:	**City of Winnipeg** Brad W. Sacher, P.Eng *Director* Public Works Department bsacher@winnipeg.ca	204-986-5285	204-986-7358

Consultant:	**Stantec Consulting Ltd.** Carmen Anseeuw, B.Env.St. *Environmental Planner* Environmental Management carmen.anseeuw@stantec.com	204-942-2505	204-942-2548

3.0 CEAA TRIGGER AND NOTIFICATION

Pursuant to CEAA Section 5.(1), Transport Canada

☐ 5.(1)(a) - Is the proponent of the Project

☒ 5.(1)(b) - Proposes to fund all or part of a Project

☐ 5.(1)(c) - Proposes to sell, lease or otherwise dispose of land for the Project

☐ 5.(1)(d) - Proposes to issue a permit, approval or authorization on the *Law List Regulations:*

☐ *NWPA* subsection 5.(2)	☐ *National Energy Board Act* subsection 108(4)
☐ *NWPA* subsection 5.(3)	☐ *National Energy Board Act* subsection 108(6)
☐ *NWPA* subsection 6.(4)	☐ *Railway Safety Act* subsection 10(1)
☐ *NWPA* section 16	☐ *Aeronautics Act* subsection 5.9(2)
☐ *NWPA* section 20	☐ *Federal Real Property Regulations* paragraph 4(2)(a)

3.1 NOTIFICATION OF FEDERAL DEPARTMENTS AND AGENCIES

The following federal departments/agencies were notified in accordance with the *Federal Coordination Regulations (FCR):*

Departments/ Agencies	Notified on (mm-dd--yyyy)	FCR response (mm-dd--yyyy)	Trigger or Federal Interest	Role (RA/ FA or N/A)
Agriculture and Agri-Food Canada	June 30, 2010	July 6, 2010	N/A	N/A
Canadian Transportation Agency	June 30, 2010	July 16, 2010	N/A	N/A
Environment Canada	June 30, 2010	July 8, 2010	N/A	N/A
Fisheries and Oceans Canada (DFO)	June 30, 2010	August 25, 2010	N/A	N/A
Health Canada	June 30, 2010	July 19, 2010	N/A	N/A
Indian and Northern Affairs Canada	June 30, 2010	July 4, 2010	N/A	N/A

Industry Canada	June 30, 2010	June 30, 2010	N/A	N/A
Natural Resources Canada	June 30, 2010	July 27, 2010	N/A	N/A
Public Works and Government Services Canada	June 30, 2010	July 5, 2010	N/A	N/A

3.2 NOTIFICATION OF OTHER JURISDICTIONS

Have other jurisdictions been notified?	Yes ☐	No ☒
Is this a coordinated EA?	Yes ☐	No ☒

Coordinated EA with the Province/Territory of:

Jurisdictions	Notified on (date)	Response (date)	Interest or comments
Province / Territory			
Municipality of			
Other			

4.0 PROJECT DESCRIPTION

4.1 Nature and Main Components of the Project

4.1.1 Nature of the Project

The City of Winnipeg proposes to undertake roadwork affiliated with the Waverley West Development, a growth neighbourhood planned for 2900 acres (1175 hectares) of land in the southwest quadrant of Winnipeg. The development area is bound by McGillivray Boulevard to the north, Waverley Street to the east, the Perimeter Highway to the south, and Brady Road to the west. Figure 4-1 provides a map identifying the Study Area Location and the study area boundaries are identified in Figure 4-2.

The Waverley West Area Structure Plan is comprised of seven neighbourhoods including a town centre neighbourhood. Collector roads within these neighbourhoods will connect to the area's arterial road network, whose right-of-ways are delineated in the Waverley West Area Structure Plan. The arterial network will include a high-speed north-south arterial road (Kenaston Boulevard Extension) and two east-west arterial roadways (Bison Drive and Waverley Street). Figure 4-3 provides an overview of the development areas and planned arterial road network.

Traffic volumes were projected for five year increments based on the Waverley West Technical Transportation Report (2005) and traffic volumes beyond 2030 were estimated to determine the anticipated configuration requirements of the future Waverley West residential development. As the Waverley West Area Structure Plan is future-oriented and depicts a broad based community land use and transportation pattern for the Waverley West plan area, no specific timeframe is applied to the Plan. It is anticipated that under existing development conditions, a full build-out of Waverley West could take between 20 and 25 years.

Subject to the acceptance of this Environmental Screening Report by Transport Canada, and approval of federal funding by Canada's Minister of Transportation, Infrastructure and Communities, the City of Winnipeg anticipates commencing with construction of the Waverley West Arterial Roads project as early as summer 2011. Work would begin with the twinning of Waverley Street and construction of the northerly portion of the Kenaston Boulevard Extension.

4.1.2 Project Components

The Waverley West Arterial Roads project involves the construction of approximately six kilometres of new two-lane roadway and four kilometres of new four-lane roadway. Approximately half of the new roadways will have a rural cross-section (i.e. gravel shoulders with ditches) and the other half of roadways will have an urban cross-section (i.e. curb and gutter with catch basins).

As the Waverley West Arterial Roads project is receiving federal funding under the Major Infrastructure Component (MIC) of the Building Canada Fund (BCF), an environmental assessment that satisfies the requirements of the Canadian Environmental Assessment Act (CEAA) is required. The various road works that are included in this project and therefore considered in the Environmental Assessment are illustrated in Figure 4-4. They include the following:

- A partial-grade separated intersection with a fly-over structure being constructed for southbound Kenaston Boulevard to eastbound Bishop Grandin Boulevard movements and an at-grade intersection for the remainder of traffic;
- A four-lane arterial roadway, the southbound extension of Kenaston Boulevard, linking the partial grade-separation of Kenaston Boulevard/Bishop Grandin Boulevard with Provincial Trunk Highway (PTH) 100, the south leg of Winnipeg's Perimeter Highway. The Kenaston Boulevard Extension will have a four-lane urban cross-section in the vicinity of the towncentre, and a rural cross-section north and south of the town centre ;
- A new at-grade intersection at the planned Kenaston Boulevard Extension and PTH 100;
- A new four-lane section of Waverley Street with urban cross-section that creates a realignment of the existing street in a westerly direction to the proposed new Kenaston Boulevard;
- The addition of two new lanes on the existing Waverley Street between Bison Drive and the Waverley realignment to provide a four-lane, divided urban cross-section, and the rehabilitation of the two existing lanes to connect with the recently completed four lane arterial roadway to the north;
- A new at-grade intersection at the new Kenaston Boulevard and the realigned Waverley Street; and
- The decommissioning of the existing at-grade signalized intersection of Waverley Street and PTH 100 involving the closing of the Waverly-PTH intersection and modification into a turn-around including the removal of portion of Waverly St. at PTH and the existing PTH exit ramp to Waverley.

The project is intended to support economic and community development in the southwest quadrant of Winnipeg and accommodates future traffic requirements by modifying and expanding the capacity of the existing transportation network. The project will improve traffic flow and road safety in the area and support the progress of the Waverley West Development.

4.1.3 Project Construction Phases

Clearing

Clearing shall consist in general of cutting, piling, removing of trees, brush, stumps, logs and roots.

- The requirements of the Migratory Birds Convention Act will be adhered to.
- No burning of materials will be allowed. Clearing debris will be disposed of by chipping and mulching with the material being used by the City of Winnipeg for future uses.
- Equipment: backhoes, loaders, bulldozers, graders, chainsaws, hydro-axe.
- Time of year: Early spring through late fall

Utilities

Existing underground and overhead utilities may require removal and/or relocation. These include pipelines, power lines, communications lines, traffic control devices, water lines, sanitary and storm sewer lines.

- Equipment: backhoes, loaders, directional drilling equipment.
- Time of year: Can occur in all seasons

Earthworks

Earthworks include stripping, excavation, fill and construction of embankments. It also includes the removal of existing roadways where required.

- Topsoil will be stripped and salvaged for use during landscaping. Surplus topsoil will be properly stock piled for use in other projects.
- Excavation will be required to accommodate pavement structure or ditch sections, depending upon the location, and for the installation of any culverts.
- Fill will be required to build up the road substructure or boulevard depending upon the location.
- Embankment construction will be required adjacent to the flyover structure.
- Equipment: backhoes, loaders, bulldozers, graders, scrapers, compactors, hauling trucks.
- Time of year: Early spring to late fall

Roadways

Roadway construction includes the following:

  - Shaping and compaction of subgrade.
  - Placement, shaping and compaction of granular base and sub-base.
  - Placement of plain-dowelled concrete pavement.
  - Placement and compaction of asphaltic concrete pavement.
  - Construction of curbs.
  - Installation of signing, pavement markings and traffic signals.
  - Installation of lighting.
  - Installation of overhead sign structures.
- Equipment: compactors, graders, loaders, hauling trucks, slip-form pavers, asphalt pavers.
- Time of year: Late spring through late fall – above freezing temperatures and no frost penetration.

Interchange

Interchange (fly-over structure) construction includes the following:

  - Installation of piles/caissons.
  - Construction of structural concrete substructure.
  - Fabrication and erection of bridge girders.
  - Fabrication and installation of miscellaneous metal and bearings.
  - Construction of structural concrete bridge deck and barriers.
- Equipment: backhoes, pile drivers, cranes, concrete pumps, heaters, drilling equipment (caissons).
- Time of year: Can occur in all seasons

Structural Culvert

The Lot 16 Drain occurs on both the south and the north side of Kenaston Boulevard connected via a concrete culvert. The Lot 16 drain must be extended to accommodate the construction of the new two-lane road to the north. The proposed culvert extension will be 20 m long using a cast-in-place culvert having an interior dimension matching the existing culvert.

Box culvert construction includes the following:

- Excavation and shoring.
- Water control (cofferdams with diversions or pumping) for up to the duration of construction.
- Structural concrete placement.
- Backfill and compaction.
- Placement of temporary and permanent erosion control.

- Equipment: excavators & earth moving equipment, compactors, heaters, concrete pumps, water pumps, pile drivers (shoring).
- The requirements of the Department of Fisheries & Oceans will be adhered and best management practices implemented for work in proximity of waterways.
- Time of year: Either in winter (preferred due to frozen ground and reduced flows) or summer excluding April 1 to June 15 of any year to protect spawning fish.

Drainage

Drainage work includes the following:

- Excavation of ditches.
- Installation of corrugated culvert piping under roadways and/or approaches.
- Installation of land-drainage system (PVC piping, manholes, catch basins, sub-drains).

- Equipment: excavators & earth moving equipment, backhoes, loaders, directional drilling equipment, hauling trucks.
- Time of year: Late spring through late fall – above freezing temperatures and no frost penetration.

Seeding & Sodding

Seed and Sod landscaping works.

- Equipment: hauling trucks, compactors, and seed sowing equipment.
- Time of year: Late spring through early fall.

4.2 Operation Phase

4.2.1 Operational Activities

Operational activities of the roadways and structures of the Project include:

- Snow-clearing (plowing operations)
- Ice-control (application of abrasives)
- Street sweeping
- Pavement maintenance
- Minor pavement repairs
- Structural inspections
- Traffic control device maintenance

- Ditch and culvert cleaning
- Delineating line painting

Scheduling

The snow clearing and ice-control operations occur throughout the winter and spring months, and street cleaning in the summer and fall months.

The structural inspections occur throughout the year. The frequency is based on the structural condition observed during the previous inspections, but is a maximum of annually.

All of the maintenance activities occur during the local construction season (May to October) with the exception being any emergency repairs.

Line and delineation painting occurs 2-3 times per year typically from March to November.

4.2.2 Project Future Modifications

Modifications to this Project could include:

- Tie-ins to the Project's roadways from any of the secondary roadways identified in the development plan.
- Future major pavement renewal works on the Project components.
- Construction of the final configuration of the grade-separated traffic structure at Kenaston Boulevard and Bishop Grandin Boulevard.
- Construction of a grade separated traffic structure at Kenaston Boulevard and PTH 100.

Activities

Modification activities would be similar to the construction activities identified for the Project itself, though smaller in scale.

- Secondary road tie-ins would only affect the Project through traffic disruptions due to localized and temporary lane-closures or rerouting;
- Major pavement renewal works would extend the life of the pavement to allow indefinite operation of the roadway. Operation of the facility would be disrupted due to temporary lane-closures.
- Construction of either of the grade-separated interchanges would interrupt operation of the Project's roadways at their immediate respective locations due to temporary lane-closures.

Scheduling

- The secondary road tie-in construction will progress as the Waverley West development builds out.
- Major pavement renewal works are not anticipated within 20 years of construction.

4.2.3 Decommissioning & Abandonment Activities

There are no plans to decommission the Project along a specified schedule. With ongoing preventative maintenance and repair or replacement of key components as required, the Waverley West Arterial Roads Project should have an indefinite life-span. For this reason, the assessment of this component is not presented in this environmental assessment.

The potential to decommission the Project at a future date can be addressed hypothetically. It is possible to remove all of the Project components and restore the environment to its pre-existing condition. The

only components that may be left on site (upon a supposed decommissioning) would be subsurface foundations for light posts / signs and components of the subsurface storm-water drainage.

If decommissioning or abandonment of proposed project components is considered in the future, applicable environmental regulations in effect at that time will be respected.

4.3 Chemicals & Hazardous Materials

4.3.1 Construction

Material Requirements

Anticipated construction related materials and supplies include the following:

- Fuel – used in the machinery for the heavy construction and trucking operations.
- Clean fill material – used to build up low areas prior to placement of structural pavement elements
- Limestone and other structural granular materials – provides the structural support for the pavement section.
- Concrete, asphalt – the paved surface components of the roadway.
- Concrete reinforcing steel – steel used within the pavement for added structural support.
- Structural steel – steel used within the bridge structure for structural support.
- PVC land-drainage piping – the piping used for the underground land-drainage system.
- Culverts – steel and/or concrete – the piping used for land-drainage under roadways, between ditches.
- Trees and other plants – landscaping materials.
- Suitable site and new topsoil – organic material used for boulevard and ditch growth of grasses.
- Sod or grass mixtures.
- Paint and other miscellaneous supplies – during construction: for survey markings, grade-stakes; immediately post-construction: lane delineation markings on the pavement.

Waste Materials

The projected waste material for the Project construction will be managed as follows:

- Excess fill – structurally suitable site excavation material will be used as fill within this project. Should excavated material exceed fill needs, the remainder would be properly stockpiled for use on other local projects. Structurally unsuitable site excavation material will be removed by the contractor and used as fill material where applicable. As the project footprint does not consist of working near areas of expected contamination (such as former landfills) there is not expected to be any contaminated fill material encountered within the limits (right-of-way) of the project. In the event that contaminated fill is encountered it will be properly disposed of and/or remediated.
- Construction waste – to be disposed of in accordance with the City of Winnipeg Standard Construction Specifications and by-laws. No burning of material will be permitted.
- Sewage – Onsite volumes to be removed weekly.
- Hazardous waste – None identified.

4.3.2 Operation

Material Requirements

Operational supplies encompass the range of materials identified for the construction period with respect to ongoing maintenance of the Project components, in addition to the following list on anticipated ongoing material needs associated with routine maintenance of the Project.

- Abrasive – The application of sand on the roadways depends on the ambient temperatures and the number of snowfall events over the course of the year. Sand is typically applied in colder temperatures (below -15°C) as salt becomes inactive.
- Salt – The application of salt on the roadways will depend on the ambient temperatures and the number of snowfall events over the course of each year. Salt is typically applied when the ambient temperature is above -15°C.
- Paint – Road surface paint lines are normally applied to major arterials approximately twice a year depending on maintenance and retention of the previous year's paint.

Waste Materials

The projected waste material for the Project operation will be managed as follows:

- Operational waste will be disposed in accordance with the City of Winnipeg Standard Construction Specifications and by-laws. No burning of material is permitted;
- Mowing operations typically mulch the grass clippings and remain on-site to act as cover (thatch);
- Cleaning operations typically involve removing and discarding material in accordance with the City of Winnipeg operations and by-laws. Currently, the City recycles the granular material from winter applications;
- Snow clearing operations typically involve storage of the snow within the boulevard as applicable. The same process applies along the flyover;
- Roadkill is removed and disposed of at an approved facility or location.

4.3.3 Modification

The material requirements and wastes generated during any modification to the Project as described in section 4.2.2 would be similar to the construction phase previously described.

4.4 Project Map

Components as described in section 4.1.2 above include approximately four kilometres of new four-lane roadway and approximately six kilometres of two-lane roadway, which equates to a total of 28 lane-kilometres (i.e. the total equivalent length of one-lane roadway, if lanes are measured end-to-end). These include 15 lane-kilometres of rural cross-section (ditch drainage), 13 lane-kilometres of urban cross-section (curbed with land-drainage sewer), and a single-lane fly-over structure of approximately 80 metres.

5.0 SCOPE

5.1 SCOPE OF PROJECT

A brief description of the activities and physical works that will be associated with each project phase and component is outlined in Table 5.1. A more detailed description of the project construction activities is outlined in Section 4.4.

Table 5.1: Scope of Project – Summary Table

PROJECT PHASES/ COMPONENTS	DESCRIPTION
Construction:	
Constructing detours	Temporary road detours will not be required.
Clearing / grubbing / scarifying / stripping	Clearing and grubbing will be completed as necessary. Clearing will involve cutting, piling, removing of trees, brush, stumps, logs and roots. Cleared debris will be chipped and mulched, no material will be burned. Scarifying will be completed during road construction to establish sub-grade compaction. Some stripping may be required on either side of the Project to provide for the required embankment slopes.
Dewatering / draining / pumping	Dewatering/draining/pumping may be required during construction of the roadways prior the establishment of ditching/drainage pathways. Drainage work includes the excavation of ditches, and installation of land-drainage sewer systems (PVC piping, manholes, catchbasins, subdrains).
Excavating / trenching / stockpiling	Excavation/trenching/stockpiling is required during construction of the road. The excavated material will be either hauled off-site or incorporated into the work depending upon the quality and quantity of material.
Backfilling / contouring / compacting	Backfilling/contouring/compacting will be completed during Project construction and conform to the City of Winnipeg Standard Construction Specifications.
Drilling / pile driving / shoring	Drilling/pile driving will be required in the construction of the fly-over structure. Shoring will be required for the box-culvert structural modifications. All structural works will be completed according to accepted construction specifications.

PROJECT PHASES/ COMPONENTS	DESCRIPTION
Construction of the roadway	Roadway construction will be completed in conformance with the City of Winnipeg Standard Construction Specifications and includes the following: Shaping and compaction of subgrade Placement, shaping and compaction of limestone granular base and sub-base Placement of plain-dowelled concrete pavement Placement and compaction of asphalt concrete pavement Installation of curbing Installation of signing, pavement markings and traffic signals Installation of lighting Installation of overhead sign structures
Culvert Construction	Box culvert construction will be completed according to accepted construction specifications and includes the following: Excavation and shoring. Water control (cofferdams with diversions or pumping). Structural concrete placement. Backfill and compaction. Placement of temporary and permanent erosion control.
Storing materials / equipment	Storage of materials and equipment will be maintained on-site within a control area (fenced) or at a location approved by the Engineer with environmental protection (e.g. silt fence) as appropriate.
Operating equipment / vehicles	Operation of equipment and vehicles will adhere to normal construction practices and methods during the course of construction and is expected to include flashing beacons and “back-up” warning devices on large equipment. Normal operational rules and proper training apply to any equipment used on-site.
Storing / dispensing fuel	Specific areas or transportable storage systems will be used in the storing or dispensing of fuels.
Transporting materials / equipment	Transporting of materials/equipment will adhere to normal construction practices and include adherence to local/Provincial/Federal standards.
Transporting solid / hazardous waste	If encountered during construction, specific methods for safe handing will be developed and implemented.
Disposing solid / hazardous waste	If encountered during construction, specific methods for the safe handing will be used.

PROJECT PHASES/ COMPONENTS	DESCRIPTION
Disposing liquid waste / sewage	A certified disposal contractor will handle and dispose of all liquid and sewage wastes generated on the site.
Installing signage / lighting / signals	Installation of temporary and permanent traffic control may be completed by the General Contractor or by the City of Winnipeg forces and will adhere to the City of Winnipeg Standard Construction Specifications, the Manual of Temporary Traffic Control Devices, and the Manual of Uniform Traffic Control Devices (MUTCD).
Landscaping – trees / shrubs / grass	Installation of trees/shrubs/grass will follow final grading of the boulevards. Details of the type and location of trees and shrubs are unknown at this time. Grass will include either sod and/or hydroseeding.
Operation:	
Applying abrasive material	The application of sand on roadways depends upon the ambient temperatures and the number of snowfall events over the course of a winter. Sand is typically applied on colder temperatures (below -15°C) when salt inactive.
Applying salt	The application of salt on the roadways will depend on the ambient temperatures and the number of snowfall events over the course of each year. Salt is typically applied when the ambient temperature is above -15°C.
Painting	Road surface paint lines are normally applied to major arterials twice a year depending on maintenance and retention of the previous year's paint.
Maintenance	Pavement maintenance activities are minor pavement spot repairs to preserve and extend pavement life without improving condition.
Modification:	Future increases in traffic or land use changes in the area may result in the replacement/upgrading of some of the Project components, at which time the modification or decommissioning of Project components would be described.
Decommissioning & Abandonment:	There are no plans to decommission the Project along a specified schedule. With ongoing preventative maintenance and repair or replacement of key components as required, the Project will have an indefinite life-span. As decommissioning and abandonment of the proposed project is not foreseeable, no further assessment of this work is required.

5.2 SCOPE OF ASSESSMENT

As required by Section 16 (1) of *CEAA* this screening includes consideration of the following factors:

(a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;

(b) the significance of the effects referred to in paragraph (a);

(c) comments from the public that are received in accordance with this Act and the regulations;

(d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project; and

(e) any other matter relevant to the screening ... such as the need for the project and alternatives to the project, that the responsible authority… may require to be considered.

It should also be noted that the definitions of environment and environmental effect under the CEAA are as follows:

"Environment" means the components of the Earth, and includes:

(a) land, water and air, including all layers of the atmosphere;

(b) all organic and inorganic matter and living organisms; and

(c) the interacting natural systems that include components referred to in paragraphs (a) and b).

"Environmental effect" means, with respect to a project:

(a) any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the Species at Risk Act,

(b) any effect of any such change referred to in paragraph (a) on

i) Health and socio-economic conditions,

ii) Physical and cultural heritage,

iii) The current use of lands and resources for traditional purposes by aboriginal persons, or

iv) Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, or

(c) any change to the project that may be caused by the environment, whether any such change or effect occurs within or outside Canada.

The scope of this screening assessment considered the potential interaction of environmental components and project components that could occur in the project area during the construction and operation of the Waverley West Arterial Roads Project.

While a broad Study Area was defined for the purposes of describing the environmental setting (McGillivray Boulevard to the north, Waverley Street to the east, Brady Avenue to the west and the Perimeter Highway to the south, see Figure 4-2), the main assessment areas for the Project vary as follows:

- Terrestrial biological effects are assessed within the Ecodistrict that encompass the Study Area.
- Aquatic effects are assessed within the drainage basin/sub-basin that occurs within the Study Area.

The assessment of potential environmental effects of the Project is organized by the following major environmental effects categories:

- Physical
- Aquatic
- Terrestrial
- Social including Historic Resources

Temporal boundaries are based on the design life of major structures, prior to requiring major rehabilitation. Focused investigations and analyses were undertaken for the physical, biophysical and heritage environmental components. Socio-economic components were analysed on a broader-scale to capture the estimated extent of anticipated effects.

The assessment of each of the above major effects categories considers the integration of specific mitigation measures and cumulative effects prior to the determination of residual effects. Residual impacts are those environmental effects that remain after the integration of mitigating measures.

In each assessment category, the Project's potential and anticipated environmental effects are evaluated for each of the following distinct activities:

Pre-construction – Includes all activities that lead up to the selection of the Study Area, all baseline wildlife and technical studies, and related public and owner/regulator liaison activities up to the submission of this environmental impact assessment document.

Construction – Includes all activities related to the physical development and assembly of the Project which are anticipated to occur after the completion of this environmental impact assessment document and regulatory approvals/sign-offs.

Operation – once construction is completed, the Project will operate for many years and will result in ongoing effects related to operations, including regular and special maintenance activities.

Decommissioning – The project is not anticipated to be decommissioned, however should the project be decommissioned at some point in the future, it is anticipated that decommissioning activities and effects would be similar to construction-related effects. A decommissioning plan would outline decommissioning activities and procedures, and focus on the components of the Project that are reversible. The decommissioning plan would be submitted to regulatory authorities for review and approval, as required, prior to any decommissioning activities. No further assessment of this work is required.

Accidents and Malfunctions – are largely mitigated through the Project design and requirements for conformance to Transportation Association of Canada standards, as well as procedures followed during construction and operation. This environmental impact assessment evaluates the potential environmental effects of a range of potential accidents or malfunctions, possible frequency of these events, and ultimately the reversibility of these events.

The approach and methodology for the determination of the significance was based on various federal and provincial guidance documents and incorporates the nature of the effect with its temporal characteristics (frequency, duration and reversibility) and spatial boundaries (footprint, local, regional or global area) to provide an objective framework to support the assessment's judgment regarding the significance of an effect.

Table 5.2: Potential Project–Environment Interaction Matrix

PROJECT PHASES / COMPONENTS	ENVIRONMENTAL COMPONENTS																							
	DIRECT ENVIRONMENTAL EFFECTS																INDIRECT ENV. EFFECTS[1]						OTHER	
	Land				Water				Air		Natural Systems						Socio-Economic			Cultural				
	Terrain and Topography	Soil Quality	Aquatic Sediments	Erosion / Slope Stability	Surface Water Quality	Surface Water Quantity	Groundwater Quality	Groundwater Quantity	Air Quality	Climate Change	Vegetation	Wetlands	Species at Risk	Migratory Birds	Wildlife and Wildlife Habitat	Fish and Fish Habitat	Human Health / Safety	Navigation Related	Land Use	Physical and Cultural heritage	Aboriginal Use [2]	Historical / Archaeological site[3]	Acoustic environment (noise)	Vibration
Pre-Construction:																								
Wildlife / recon-naissance surveys; borehole testing	X										X				X	X								
Construction & Modification:																								
Fencing / signing																	X							
Clearing / grubbing / scarifying / stripping	X			X	X						X				X							X		
Dewatering / draining / pumping	X	X	X	X	X	X			X			X				X								
Excavating / trenching / stockpiling	X			X	X		X		X		X				X							X	X	X
Constructing culverts			X	X	X				X							X								
Constructing interchanges				X					X														X	
Backfilling / con-touring / compacting	X			X	X							X												X
Drainage	X	X	X	X	X	X	X		X			X				X			X					
Drilling / pile driving / shoring															X								X	X
Application of dust inhibitors					X				X							X	X							
Stockpiling and storing materials / equipment		X			X														X					
Operating equipment / vehicles		X		X	X				X	X							X						X	X
Storing / dispensing fuel		X			X		X				X	X			X	X	X							
Transporting soil / fill / materials / equipment									X	X													X	X
Transporting solid / hazardous waste		X			X				X	X		X					X						X	X
Disposing solid / hazardous waste		X			X		X								X	X	X							
Disposing liquid waste / sewage		X			X		X										X							

PROJECT PHASES / COMPONENTS	ENVIRONMENTAL COMPONENTS																							
	DIRECT ENVIRONMENTAL EFFECTS																INDIRECT ENV. EFFECTS[1]						OTHER	
	Land				Water				Air		Natural Systems						Socio-Economic			Cultural				
	Terrain and Topography	Soil Quality	Aquatic Sediments	Erosion / Slope Stability	Surface Water Quality	Surface Water Quantity	Groundwater Quality	Groundwater Quantity	Air Quality	Climate Change	Vegetation	Wetlands	Species at Risk	Migratory Birds	Wildlife and Wildlife Habitat	Fish and Fish Habitat	Human Health / Safety	Navigation Related	Land Use	Physical and Cultural heritage	Aboriginal Use [2]	Historical / Archaeological site[3]	Acoustic environment (noise)	Vibration
Pouring concrete / paving / finishing	X			X		X																		
Installing signage / lighting / signals																	X							
Landscaping – trees / shrubs / grass									X		X		X	X	X				X					
Operation:																								
Traffic									X					X	X		X						X	
Applying abrasive material		X			X												X							
Applying salt		X			X						X						X							
Painting																	X							
Accident / Malfunctions																								
Traffic Accidents														X	X		X							
Fires and Explosions					X				X								X							
Spills / Hazardous Substance Releases		X			X		X		X		X	X	X	X	X	X	X							

[1] Only indirect environmental effects resulting from a project impact on the environment must be considered in the EA.

[2] The current use of lands and resources for traditional purposes by aboriginal persons.

[3] Include any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

6.0 DESCRIPTION OF EXISTING ENVIRONMENT

Stantec Consulting Ltd. (2009) delineates the Waverley West Arterial Roads Study Area as bounded by McGillivray Boulevard to the north, Waverley Street to the east, Brady Avenue to the west and the Perimeter Highway to the south (Figure 4-2). The footprint of the Project will be located within the bounds of those main streets. The Study Area is located within the Winnipeg Ecodistrict which occupies most of the south-eastern portion of the Lake Manitoba Plain Ecoregion.

The Environmental Assessment Study Area location and Study Area boundaries are illustrated in Figures 4-1 and 4-2, respectively.

6.1 DESCRIPTION OF PHYSICAL ENVIRONMENT

6.1.1 Climate

The Winnipeg Ecodistrict is part of the Grassland Transition Ecoclimatic Region in southern Manitoba. The mid-continental climate is characterized by short, hot summers and long, cold winters with four distinct seasons. An Environment Canada meteorological station at Winnipeg International Airport accumulates data on a variety of environmental parameters, with the following climate information summarized from the latest available Environment Canada summary period between 1971 to 2000 (Environment Canada 2009).

The daily mean annual temperature is 2.6°C with daily mean temperatures ranging from -17.8°C in January to 19.5°C in July. Daily maximum temperatures range from -12.7°C in January to 25.8°C in July, while daily minimum temperatures range from -22.8°C in January to 13.3°C in July. The extreme temperature range is from -42.2°C in January to 40.6°C in August. The average growing season is 183 days and the growing degree-days number approximately 172.

The mean annual precipitation is 513.7 mm, of which 75% falls as rain primarily from April to September. Annual rainfall and snowfall account for 415.6 mm and 110.6 cm, respectively. Extreme daily rainfall occurred during August (83.8 mm) while extreme daily snowfall occurred in March (35.6 cm). Precipitation varies greatly from year to year and is highest from late spring through summer. The average yearly moisture deficit is about 200 mm.

Prevailing winds are from the south, with an average velocity of 17 km/h. Wind speeds average between 15 and 18 km/h throughout the year. Extreme hourly wind speeds average between 70 and 89 km/h, with extreme gusts between 98 and 129 km/h.

Days with measurable rainfall, snowfall and yearly precipitation are averaged as 76.9, 54.7 and 123.5, respectively. Thunderstorm activity is at a maximum during July and hail is infrequent. Fog occurs about 2 days per month, generally from August to March. Freezing precipitation generally occurs from November to March.

6.1.2 Air Quality

Winnipeg generally has excellent air quality compared to other cities of similar size in Canada. Localized air quality concerns may include the presence of odours and other airborne pollutants primarily from sources such as industrial operations and vehicle emissions.

The nearest sources of air quality information for the City of Winnipeg are from the Ellen Street (downtown) and Scotia Street (residential) air quality monitoring locations. Based on the Canadian Annual Index of Air Quality, the air quality at the downtown and residential stations in Winnipeg was rated "Good" (the best rating) most of the time (>91%; Krawchuck and Snitowski 2008). Values for the majority of measured parameters are well below the existing guidelines and objectives for the protection

and preservation of air quality in the Province of Manitoba. Ozone concentrations are the only exception where exceedences are numerous. However, the frequency of elevated ozone levels is well below that encountered in other Canadian cities.

6.1.3 Noise and Vibration

Noise in the City of Winnipeg is regulated by the *Neighbourhood Liveability Bylaw 1/2008*. The bylaw covers construction and demolition noises within 150 m of a residential property. The bylaw prohibits the operation of any tools or equipment used in construction, drilling or demolition work within 150 m of a residential property on weekdays between the hours of 9:00 p.m. and 7:00 a.m. the following day and on Saturdays, Sundays and statutory holidays before 9:00 a.m. and after 9:00 p.m. Sounds produced in the course of constructing, maintaining, rehabilitating or otherwise working on a street or property owned by the City or Winnipeg and work performed by or through the City in respect of public services, facilities or installations are exempt, regardless mitigation measures have been developed and will be implemented to reduce noise and vibration impacts from construction and operation activities (see section 7.10).

Traffic noise in residential areas is regulated under the *City of Winnipeg "Motor Vehicle Noise Policies and Guidelines"*. These guidelines limit the ground-level outdoor sound levels for residential areas adjacent to a regional transportation facility to 65 dBA Ldn. Transportation noise levels in residential areas and construction areas are monitored by the City of Winnipeg, Public Works Department's Traffic Assessment Branch using industry-standard digital recording equipment.

Current and potential future noise producing activities in the Project area include:

- Truck and passenger vehicle noise along major roadways (i.e. Kenaston Boulevard, Bishop Grandin Boulevard, Waverley Street, Brady Road);
- Rail noise (i.e. CN and CP rail lines) at the outer boundaries of the Study Area;
- Vicinity of airplane flight path to Winnipeg International Airport, approximately 12 kilometres away from the Study Area;
- Road construction noise (e.g. construction and modification periods)
- New residential development construction noise (i.e. construction of new residential units in the two developments of the Manitoba Housing Renewal Corporation and Ladco between Kenaston Boulevard, Bishop Grandin Boulevard, Waverley Street, Brady Road and the Perimeter Highway);
- Residential noise (e.g. lawn mowers).

6.1.4 Terrain and Geology

The geological setting for the City of Winnipeg has been described by Baracos *et al.* 1983. Subsurface conditions in the Winnipeg area consist of Pleistocene drift composed of Lake Agassiz silt and clay overlying silty till, and Palaeozoic carbonate bedrock.

The City of Winnipeg is situated at the confluence of the Red and Assiniboine rivers in the broad plain of the Red River Valley. The area covers the Lake Agassiz clay plain that represents the offshore lake bottom deposits of glacial Lake Agassiz. Surface topography is relatively flat with elevations rising gently eastward and westward from the Red River. The regional stratigraphy of the Winnipeg area consists of clay and silt overlaying glacial till and resting on carbonate bedrock. The Winnipeg area sits on a stable continental craton consisting of Palaeozoic carbonate bedrock resting on an Archean basement. The Palaeozoic bedrock is part of the Upper Fort Garry Member of the Red River Formation and is overlain by Quaternary sediments.

6.1.5 Soils, Geotechnical & Contaminated Sites

Soils in the Winnipeg Ecodistrict are predominately imperfectly drained Gleyed Humic Vertisols and Gleyed Vertic Black Chernozems, and poorly drained Gleysolic Humic Vertisols which have developed on calcareous, clayey glaciolustrine sediments (Smith *et al.* 1998). These sediments range in thickness from more than 60m deep near the United States border to less than 1m locally in the northern part of the basin. Gleyed Rego Black Chernozemic and Gleysolic soils also occur on shallow, extremely to very strongly calcareous, loamy to silty sediments, some of which occur in the form of intersecting bars and spits and were formed during the latter stages of Lake Agassiz. These medium textured soils are found northwest of Winnipeg and in the southern and eastern sections of the basin.

Geotechnical soil conditions specifically in the proposed location for the Kenaston Boulevard and Bishop Grandin Boulevard intersection realignment and Kenaston Boulevard extension were investigated in July, 2009 (The National Testing Laboratories 2009). The results of twenty-six test holes drilled throughout the Project area (depths ranging from 3 to 16m) indicated that the general soil stratigraphy at the site typically consists of a thin layer of topsoil (0.1m thick) overlying clay and silt, overlying till to the depths explored. Clay fill, with traces of silt and fine gravel and water content of 21% to 44%, was encountered at the surface of several test holes. Silt layers were encountered at shallow depths in all test-holes except one. The silt was tan, soft, moist, and of low plasticity with water content ranging from 14% to 29%. Silt till was encountered below the clay layer in 15% of test holes. The silt till was tan, loose to dense, dry to moist, and of low plasticity with water content ranging from 8% to 19%.

Potential contaminated sites within the Study Area include two former landfill sites (Figure 6-1). The former Fort Garry Nuisance Grounds occupy approximately 7 ha adjacent to the Bridgwater Park Police Shooting Range off of Cadboro Road. The Fort Garry landfill located on the Northside of Cadboro Rd. began operations in 1948 and was closed in 1965. The landfill site accepted a wide range of waste materials including: agricultural waste, commercial industrial waste, domestic waste, septic waste and bulk metals. The site has been determined to have a high risk of leachate to groundwater. The shooting range adjacent to the landfill, which is slated to be closed at the end of 2011, contains 30 shooting bays and on average 400,000 rounds of ammunition containing lead are dispensed on site each year. While the majority of shells dispensed are recovered there it is very likely that lead contamination does exist within the soils. The former Fort Garry Nuisance Grounds are currently in the process of being excavated for removal and disposal of landfilled wastes under a separate project. The former nuisance grounds and shooting range are slated to be fully removed and decommissioned by the end of 2012. An additional former landfill site occupies approximately 0.8 ha located off of Brady Avenue south of Cadboro Road (Figure 6-1). The landfill site accepted a wide range of waste materials including: agricultural waste, commercial industrial waste, domestic waste, septic waste and bulk metals including vehicles. The site has been determined to have a high risk of leachate and possible leachate breakout.

The landfills found in the study area are outside of the Waverley West Arterial Roads Project footprint. The potentially contaminated lands described above may be later developed under an independent development and will be addressed by the independent developer if and when a project is proposed.

6.1.6 Surface Water

The principal surficial water-bodies in the Winnipeg Ecodistrict are the Red and Assiniboine Rivers and the creeks and streams associated with those rivers. The nearest major water body is the Red River located about 2 kilometres to the east of the Study Area at its closest point, with the Assiniboine River located 5 kilometres to the north of the Study Area. The La Salle River, a tributary of the Red River, is

1.5 kilometres to the southeast of the Study Area. A series of smaller ephemeral drainage channels, which have been largely modified as drainage ditches, occur in the vicinity of the Study Area and drain water in the area southeast towards the La Salle River and east to the Red River.

Two surface water features have been identified within the project study area, the Lot 16 Drain and the Beaujolais Coulee. The Lot 16 Drain occurs on both the south and the north side of Kenaston Boulevard with the south blind channel connected to the north drain via a concrete box culvert that runs beneath Kenaston Boulevard at the Study Area. A new two- lane road will be built to the north of and paralleling the existing lanes along Bishop Grandin Boulevard allowing east bound and north bound traffic to flow freely. The new two-lane road to the north will connect into the existing road north of the existing culvert on the Lot 16 Drain. The Lot 16 Drain must be extended to accommodate the construction of the new two-lane road to the north. The proposed culvert extension will be 20 m long using a cast-in-place culvert having an interior dimension matching the existing culvert.

The Beaujolais Coulee originates in drainage ditches in the hay fields that currently occupy the Waverley West site. The channels have seasonal, intermittent flow and discharge through a set of perched culverts under Waverley Street. The coulee continues approximately 310 m south east to a culvert under the Perimeter Highway. On average water flow in the coulee above the perimeter crossing is seasonal, occurring during the spring freshet, with surface water reduced to disconnected pools during the summer. The Waverley West Arterial Roads Project would close access to the southern portion of Waverley Street at the Perimeter Road. This intersection and access ramps to Waverley Street would be removed and a turn-around created. Preliminary designs of the turnaround do not involve work within or near the Beaujolais Coulee. Final plans will be subject to review prior to work being completed and may be submitted to Fisheries and Oceans Canada to ensure the final design does not result in the harmful alteration, disruption or destruction of fish or fish habitat.

6.1.7 Groundwater

Limited supplies of variable quality groundwater occur in the Winnipeg Ecodistrict west of the Red River and are available from small, sandy and gravelly aquifers that are associated with till underlying the surface clayey deposits *(*Smith *et al.* 1998). Well development from underlying bedrock is poor, in particular from the saline Jurassic formations. Limited supplies of variable quality groundwater under artesian pressure are available from the Ordovician and/or Silurian limestone bedrock.

Hydrogeology of the Winnipeg area has been described by Baracos (Baracos *et al.* 1983). The major aquifer underlying the City is referred to as the Upper Carbonate aquifer and is contained within the jointed and fractured upper 15 to 30m of the Palaeozoic carbonate bedrock. It is partially confined below the overlying glacial drift, and below the slightly pervious underlying carbonate rock. Recharge to this aquifer occurs primarily from uplands along the borders of the Red River Basin, the drainage basin of the Assiniboine and Red river systems that extends west into Saskatchewan and south to the southern border of North Dakota. Recharge also occurs in the Birds Hill area, approximately 20 kilometres north-east of Winnipeg.

Groundwater levels in this aquifer have varied considerably through the historic development of Winnipeg. Before extensive pumping of the aquifer, piezometric levels were 0.3 m to 1 m above ground level in northwest Winnipeg, and 3 to 6 m below ground surface in the north part of the City. Some recharge occurs through the clay and till strata, and piezometric levels within upper clay units are higher than those within the Upper Carbonate aquifer. Recharge also occurs from the rivers. High piezometric

levels within the Upper Carbonate aquifer can affect construction, with high groundwater flows into excavations within the bedrock. The construction of caissons can also be affected by the presence of crevasses and depressions in the bedrock surface in-filled with sand and gravel.

Groundwater conditions, specifically in the north portion of the Study Area, were investigated in July, 2009 (The National Testing Laboratories 2009). Within the 26 test holes drilled, minor to heavy groundwater seepage was observed in three test holes, all from the silt till layer. The groundwater level upon completion of drilling of those three test holes ranged from 4.1 m to 15.4 m. No groundwater seepage was observed in the remaining test holes. Soil sloughing was observed in two test holes to depths of 11.5 and 10.7 m. No soil sloughing was observed in the remaining test holes. It should be noted that only short-term seepage and sloughing conditions were observed and groundwater levels will normally fluctuate during the year and will be dependent upon precipitation and surface drainage.

Groundwater within the Study Area is non-potable due to brackish water quality. In addition, the two identified former landfills within the Study Area are known or suspected to contain leachate entrained in buried waste materials. The former Fort Garry Nuisance Ground and associated leachate is currently in the process of being removed and disposed under a separate project. There would be a potential to release entrained leachate if the waste materials of the remaining landfill are disturbed; the Waverley West project construction footprint does not entail the disturbance of these potentially contaminated soils.

6.2 DESCRIPTION OF BIOPHYSICAL ENVIRONMENT

Stantec Consulting Ltd. (2009) conducted field investigations of the proposed Study Area on October 19, 2009. The investigation indicated that the site contained the following features:

- Areas recently cleared in preparation for the construction of a new residential development
- Manitoba Hydro's transmission line right-of-way that runs southeast to northwest along the north Project limit. It runs parallel to Bishop Grandin Boulevard (on the south side)
- Approximately 12 small (<1 ha) semi-permanent wetlands (i.e., constructed ponds associated with the former golf course), two of which were located within the Project right-of-way in 2008 as illustrated in) Figure 6-1.
- Grass areas adjacent to Kenaston Boulevard (mostly brome and various weed species with occasional horticulture tree species planted)

Lands immediately adjacent to the area to be developed for the Project include agriculture fields growing hay or cereal grain crops and small woodlot areas. Figure 5-1 illustrates land cover types at the Study Area with representative photos of proposed development areas provided in Figures 5-2 to 5-4.

6.2.1 Fish and Fish Habitat

Fish Species

Fish sampling was conducted by the City of Winnipeg Naturalist Services Branch in July, 2006 within the Lot 16 Drain (sample site 49) northeast of and parallel to where Kenaston Boulevard curves and becomes Bishop Grandin Boulevard which is the highest quality fish habitat potentially affected by the Project (City of Winnipeg 2006a; Penner 2007). Results of sampling using a seine net indicated the presence of brook stickleback (*Culaea inconstans*), common carp (*Cyprinus carpio*) and fathead minnow (*Pimephales promelas*). With respect to the potential for the Lot 16 drain as fish habitat, the City of Winnipeg (2006a) report indicated:

"This shallow channel appears to be used by fathead minnows and brook stickleback. Young of the year carp were also found indicating that carp may be resident in nearby retention basins. The channel itself appears to have very limited value to most fish species as fish passage into the channel from any river source appears unlikely."

Other lower quality potential fish habitat in the Project area includes approximately 12 small wetlands (< 1 ha) or constructed ponds associated with the former golf course, two of which are located within the road right-of-way. Due to the lack of drain connectivity with the wetlands, shallow depth and degree of stagnation during late fall, it is likely that the dissolved oxygen level of the wetland water reaches anoxic or near anoxic conditions and the water likely freezes to the bottom during winter; conditions which would be unsuitable for the year-round survival of fish (Stantec 2009).

The Department of Fisheries and Oceans has indicated that no species at risk are believed to use the Lot 16 Drain and that an extension of the culvert is not likely to result in impacts to fish and fish habitat.

Fish Habitat

Existing aquatic habitat potentially affected by the Project as described by Stantec Consulting Ltd. (2009) includes:

- The Lot 16 Drain runs southeast to northwest just north of the north Project limit. It runs parallel to Bishop Grandin Boulevard (on the north side) and crosses Kenaston Boulevard;
- The continuation of Lot 16 Drain on the southwest side of Kenaston Boulevard where it becomes a retention pond having rip-rap on the south end with spring drainage received from a narrow (<0.5 m wide shallow ephemeral ditch) running from the west;
- Two small (<1 ha) semi-permanent wetlands associated with the former golf course located beneath the Manitoba Hydro double transmission line right-of-way within the project footprint (Figure 6-1).

The Lot 16 Drain receives water from land drainage pipes, and flows in a general easterly direction via a series of ditches and underground land drainage pipes towards the Red River, which is the nearest major water-body to the Study Area. Blind channels to this Lot 16 Drain occur on both the south and the north side of Kenaston Boulevard with the south blind channel connected to the north drain via a wide (~2.5 m) concrete culvert that runs beneath Kenaston Boulevard at the Study Area. The Lot 16 Drain is the widest (10m wide wetted area on October 19, 2009; Stantec 2009) at the Study Area. Bottom substrate of the Lot 16 Drain and blind channel areas is gravel and silt. The shorelines of the drain are bordered by 3m wide widths of cattails with occasional patches of willow. Fish sampling efforts by the City of Winnipeg (2006a) at Lot 16 Drain in July 2006 indicated the depth to be less than one meter at that time. It is likely that the drain freezes to the ground during winter and would not provide year-round habitat for fish.

6.2.2 Wetlands

Approximately 12 small (<1 ha) wetlands are located within the Study Area, with the largest being 30m x 15m, surrounded by a 1.5 m-wide periphery of cattails. Two of these wetlands are located within the proposed right-of-way. These wetlands are associated with the former golf course property, are directly underneath Manitoba Hydro's double transmission line right-of-way. A visit to these wetlands on October 19, 2009 (Stantec 2009) indicated that the wetlands were stagnant with abundant decomposing vegetation and no apparent connectivity with drains. A pump screen box was located in, and mostly exposed above, the surface of the largest wetland with a hose leading to a pump on land. Water from the wetland was likely used to irrigate an adjacent golf course that has since shut down. It is unlikely that these small wetlands are fish habitat due to the lack of connectivity to drains, likely anoxic conditions during fall decomposition of aquatic vegetation and the ponds likely freeze to the ground during winter.

6.2.3 Vegetation

Native vegetation of the Winnipeg Ecodistrict was originally dominated by tall prairie and meadow grass communities. Presently, natural vegetation is largely absent as a result of cultivation, other industrial activities and urban/suburban development which has included an extensive network of drainage ditches and added fill material (Figure 5-1). Potential remains for small local pockets of native vegetation in some poorly drained locales and some isolated small portions of land that are left relatively undisturbed due to their small size, inappropriate location for development and/ or limited access (Smith *et al.* 1998).

Within the Study Area, areas of natural vegetation are limited to small fragmented woodlots and narrow widths of mostly aquatic vegetation (primarily cattails and willows) surrounding the periphery of wetlands and drainage channels (Figures 5-2 to 5-4). Where areas have been cleared to accommodate adjacent right-of-ways for Kenaston Boulevard and Bishop Grandin Boulevard, those areas have been re-vegetated with grass mixtures and widely-spaced horticulture trees occasionally planted on the southwest side of Kenaston. Further south along the proposed extension right-of-way for Kenaston Boulevard, most of the topsoil layer has been scraped and used as berms for adjacent new residential developments. The resulting lower dryer land is sparsely vegetated with brome grasses, clover, thistle, plantain and various other weed species, while aquatic sedges dominate the wetter areas where pools of standing water occur on poorly drained clay soil.

6.2.4 Terrestrial Wildlife and Habitat

Birds

A list of bird species potentially occurring[1] within the Project regional area is provided in Appendix 2, Table A-1. Although over 200 bird species may occur in the vicinity of the Study Area, habitat in the area is largely disturbed by agriculture and industrial / residential development and therefore provides fragmented suboptimal breeding habitat for some bird species. The best quality habitat that would support the highest density of breeding birds at the Study Area would be the scattered woodlots and more naturally vegetated areas associated with the drainage ditches and the limited wetland areas along the Manitoba Hydro utility corridor.

The nearest designated Important Bird Areas (IBAs) to the Study Area are two marsh areas that are important migration stopover and breeding sites for marsh birds including waterfowl. These IBAs are the Grant's Lake Wildlife Management Area located 30 km northwest of the Study Area and Oak Hammock Marsh Wildlife Management area located 30 km north of the Study Area. Many migratory birds, particularly waterfowl, also stop-over at ponds located 1 to 3 km northwest of the Study Area at the Fort Whyte Centre, along the Red and Assiniboine rivers and at various larger retention ponds located around the city including Deacon's Reservoir. During the non-winter months, very large numbers of gulls (many thousands) frequent the Brady Road Landfill site located in the west portion of the Study Area (Figure 6-1). During the evenings, gulls may pass over the Study Area as they fly from the landfill to roost overnight on the rivers and city retention ponds. Figure 5-5 illustrates the locations of areas closest to the Study Area that are known to concentrate large numbers (i.e. thousands) of birds.

Migratory Birds

Grassy road allowances and grain fields are two habitats at the Study Area with the highest potential to attract substantial numbers of birds. Grassy road allowances along Kenaston Boulevard and Bishop Grandin Boulevard, particularly those areas near retention ponds, can concentrate Canada geese during

[1] Occurring meaning: breeding, migrating through, stopping over during migration, or over-wintering.

the breeding and migratory seasons. Additionally, grain fields can attract substantial numbers (hundreds) of foraging geese during the migration seasons.

Currently, the low wet areas with sparse vegetation characteristic of the recently cleared sections of the Study Area can attract some migrating shorebirds. Approximately 50 shorebirds were observed October 19, 2009 at the Study Area (Stantec 2009), with the potential to attract more, but likely not hundreds due to the limited total area of the Study Area suitable for foraging shorebirds. Similar numbers of ducks (primarily Mallards) were also observed foraging and loafing along the Lot 16 Drain on the north side of Kenaston Boulevard. The shallow nature of the drain and vegetation consisting primarily of cattails and willow provide cover and foraging opportunities for migrating ducks. Some ducks (e.g. Mallards) and Canada geese, which are tolerant of suburban/urban environments, may nest near the Lot 16 Drain and other wetland areas at the Study Area.

Mammals

As indicated in Appendix 2, Table A-2 44 mammal species were identified as potentially present in the regional Project area. However, due to the disturbed and fragmented nature of the Study Area and close proximity to human activity, the Study Area provides sub-optimal habitat for most mammal species that may be present.

A visit to the Study Area on October 19, 2009 by Stantec Consulting Ltd. indicated the presence of numerous rodents (e.g. mice and voles), particularly in the more densely grassed / weedy areas that have grown where the land was recently cleared and also in proximity to the adjacent recently harvested grain fields. Four white-tailed deer were also noticed in the small woodlots at the Study Area, with abundant deer tracks observed in all open areas. The combination of open fields (particularly adjacent grain fields), scattered woodlots and the retention pond on the southwest corner of the Study Area make this area particularly attractive habitat for deer.

Reptiles and Amphibians

Six reptile and seven amphibian species may potentially occur within the regional Project area (Appendix 2, Table A-3). Within the Study Area, reptile and amphibian habitat is limited due to the fragmented and disturbed nature of the habitat. Both painted turtles and snapping turtles (a Federal species of special concern), appropriate riparian habitat is lacking, therefore these reptile species are not expected to be present at the Study Area. Red-sided garter snakes, smooth green snakes and northern red belly snakes may be present in the small scattered woodlots. However, due to the lack of connectivity between larger woodlots for dispersal purposes, snakes (if present) would likely be present in low numbers.

Amphibians (frogs, toads, salamanders, mudpuppies) have the highest probability of occurring at the Study Area due to the presence of isolated small wetlands which are adjacent to small wooded areas. The larger drainage pond and channel on the south and north sides of Kenaston Boulevard are very likely fish-bearing water-bodies which would preclude their use by breeding amphibians.

6.2.5 Species at Risk

Terrestrial Species

A list of the six species at risk that have the highest probability of occurring in the general Project area is provided in Appendix 2, Table A-4. These species at risk include four bird species (Chimney Swift, Golden-winged Warbler and two sub-species of the Loggerhead Shrike) and one plant species (Riddell's goldenrod).

Species account records from the Manitoba Conservation Data Centre for the Study Area indicated no previous records for species at risk as listed by COSEWIC or Schedule 1 of SARA (Firlotte pers. comm.

2009). A field investigation of the proposed Study Area conducted by Stantec Consulting Ltd. on October 19, 2009 indicated a low potential for species at risk to occur due to much of the site having been cleared / grubbed to accommodate a future residential development and the remaining land having limited naturally vegetated areas or is currently used for agricultural purposes.

The nearest breeding species at risk to the Study Area is a record from 1991 of a nesting Eastern Loggerhead Shrike (*migrans* subspecies), listed as an endangered species by SARA and MBESA (Firlotte pers. comm. 2009). The nest record occurred near the Perimeter Hwy at the Town of Oak Bluff, which is 20 km WSW of the Study Area. Shrikes require open short-grassed habitat with occasional trees, shrubs and thorny branches or similar sharp objects (e.g. barbed wire) on which to impale prey (insects, birds, rodents; Reuven 1996). Suitable shrike habitat was found to be limited at the Study Area during field investigations in 2009, with no evidence of thorny bushes and a short length (<100m) of older barbed wire fence bordering a fragmented aspen woodlot.

There is a small potential for the threatened Golden-winged Warbler to occur at the Study Area. In Manitoba the species is found in a narrow band along the prairie-forest transition from the south-eastern-most reaches of the province near Winnipeg north-westward to the Saskatchewan-Manitoba border (COSEWIC 2006). Nests are placed on the ground within patches of herbs and low scattered shrubs and trees associated with a forested edge used for song posts and foraging. Examples of some preferred habitat areas present at the Study Area include hydro/utility right-of-ways and field edges adjacent to woodlots (COSEWIC 2006).

The Chimney Swift is a bird species listed as threatened by SARA and COSEWIC which may occasionally be present at the Study Area. Although appropriate nesting habitat does not occur at the Study Area (chimneys and tall hollow snags of old growth trees), the surrounding urban and suburban areas of Winnipeg do provide breeding structures. Therefore, the species may nest in chimneys of nearby buildings and forage over the forests, fields and wetlands at the Study Area (Calvin and Collins 2002).

In addition to the five threatened or endangered species at risk that may reproduce within the Study Area, two species listed by SARA as ‘special concern’ have a higher probability of occurring and breeding at the Study Area; the Northern leopard frog and the monarch butterfly.

The Northern leopard frog, which is listed by SARA and COSWEIC as a species of ‘special concern’, may occur and breed at the Study Area (COSEWIC 2009). The small wetlands and ephemeral drainage ditches (aquatic areas devoid of fish) may provide suitable breeding habitat for this species. However, due to the fragmented and disturbed condition of surrounding habitat, suitable foraging and dispersal habitat (moist meadows, native prairie and riparian woodlands) is either non-existent or of poor quality. This species also requires water-bodies that do not freeze to the bottom for overwintering. Therefore, it is unlikely that suitable over wintering habitat for this species occurs at the Study Area.

The monarch butterfly, which may occur at the Study Area, is a species of ‘special concern’ as listed by SARA and COSWEIC. This species requires plants of the milkweed family (*Asclepius*) on which to lay its eggs and wildflowers such as goldenrod, asters, and purple loosestrife on which to feed for nectar. Although such plants, including Riddell's goldenrod, may occur at the Study Area, the presence of undisturbed sites on which these plants can thrive is extremely limited. Riddell’s goldenrod is listed as threatened by MBESA and is a species of special concern under SARA and COSEWIC. However, the distribution of this particular goldenrod species is more within south-western Manitoba where it occasionally grows in undisturbed roadside ditches and allowances, and wet prairie habitats. Many other goldenrod species are common throughout Manitoba and very likely occur at the Study Area.

Fish Species

Due to the characteristic of the low quality fish habitat potentially affected by the Project and limited or no connectivity with major nearby water-bodies, the presence of fish species at risk are not expected

within aquatic habitat at or adjacent to the Study Area (Stantec 2009). Furthermore, Fisheries and Oceans Canada has agreed that no fish species which are currently listed as species at risk in Canada are believed to use the Lot 16 Drain area

6.3 DESCRIPTION OF SOCIO-ECONOMIC AND CULTURAL ENVIRONMENT

Stantec Consulting Ltd. (2009) describes the area of anticipated influence to local socio-economic factors as bounded spatially by McGillivray Boulevard to the north, Pembina Highway to the east, Provincial Trunk Highway (PTH) 100 to the south and Brady Road to the west (Figure 6-1). For the purposes of this description of socio-economic components, this area is termed the 'Study Area' within which the majority of the socio-economic environment is described.

6.3.1 Land Uses

The Study Area contains mixed land uses, including agricultural, residential, industrial, commercial and recreational/parkland (Figure 5-1).

Agricultural use

Agricultural land use is decreasing due to an increase in residential land use development. Typical agricultural activity includes forage / grain crop production and haying with lesser occurrences of rural residential holdings. There is also an occurrence of a small plot of agricultural land (0.3 ha) being rented for small-scale fruit and vegetable gardening by an individual lessee south of the Whyte Ridge subdivision (Stantec 2009).

Residential use

Through the incremental addition of neighbourhoods, residential land use is increasing south of Bishop Grandin Boulevard, with the first neighbourhoods being developed in the northeast and southeast corners.

Commercial use

Commercial uses, largely centered on the intersection of McGillivray and Kenaston boulevards, consist of large retailers and restaurants (Figure 6-1). The commercial area is primarily composed of three retail centres: Kenaston SmartPark, Linden Ridge Shopping Centre and Kenaston Common. These three retail centres combined include approximately 1.2 million square feet of commercial retail space.

Industrial use

Two main industrial areas exist within the Project Study Area: Fort Garry West Industrial Area and Tuxedo Industrial Area (Figure 6-1). Industrial land uses including light and general manufacturing are located primarily north of Bishop Grandin Boulevard (Fort Garry West) and west of Kenaston Boulevard north of Lindenwood Drive (Tuxedo).

Recreative use

The incidence of parkland correlates generally with the inner portions of residential land uses. An additional belt of parkland is located to the east of the connection of Kenaston and Bishop Grandin boulevards (Figure 5-1).

6.3.2 Zoning

Base zoning of Study Area lands is governed by the *City of Winnipeg Zoning By-law No. 200/06.* The Waverley West Residential Subdivision is zoned through the use of Area Structure Plans which overlay the base Winnipeg Zoning Bylaw, and govern in the case of overlap or conflict. The main Secondary Plan

for Waverley West lands is the *Waverley West Neighbourhood Secondary Plan By-law No. 10/2006*. Due to the staged nature of the development of Waverley West, Secondary Plans are being created and adopted on a neighbourhood basis. To date the following Neighbourhood Structure Plans have been adopted:

- *Waverley West Northeast Neighbourhood Area Structure Plan By-law No. 210/2006;*
- *Waverley West Southeast Neighbourhood Area Structure Plan By-law No. 140/2007.*

6.3.3 Greenspace Lands

Greenspace lands which are afforded formal and informal protection within and adjacent to the Study Area include FortWhyte Alive and Bishop Grandin Greenway (west). A number of smaller City Parks, recreational areas and other green spaces are located in the regional area.

FortWhyte Alive is an environmental education centre located approximately 2.3 km northwest of the Study Area, accessed off of McGillivray Boulevard. The approximately 240 ha naturalized area is afforded protection by city by-law.

Bishop Grandin Greenway (west) is a greenway corridor which is currently being established along the utility corridor that parallels Bishop Grandin Boulevard and the Kenaston Boulevard right-of-way. Currently a multi-use trail has been established from the Seine River to Waverley Street, and is being expanded west of Waverley Street to FortWhyte Alive on the south and west sides of Bishop Grandin and Kenaston boulevards, respectively. Bishop Grandin Greenway lands are protected by virtue of their location on, and support from, utility corridors and City of Winnipeg rights-of-way.

6.3.4 Historical Archaeological Sites

A search of the Provincial Archaeological Sites Database of the Province of Manitoba Department of Culture, Heritage, Tourism and Sport yielded three archaeological sites within the vicinity of the Study Area: DILh-22, DkLh-10 and DILh-23 (Dickson, *Pers. Comm.*). The sites are located 4 to 4.5 kilometres from the Study Area. The sites were composed of recovered artefacts including: a projectile point, historic ceramics and a fur trade pipe. The artefacts are affiliated with the Historic Periods and Precontact Period. These proximal sites identified by the database search are mainly isolated finds located on lands disturbed due to construction and prevalent cultivation of the area. Additional clearing activities that have been undertaken for the planned Waverley West residential development are considered to have further disturbed the landscape; therefore, the potential for discovery of unknown heritage resources is considered low.

Additional searches of provincial heritage site, plaques, centennial farms and City of Winnipeg Designated Heritage Buildings yielded no occurrences within the Study Area.

6.3.5 Current use of Land and resources for Traditional Purposes

There are no First Nations lands within or in the proximity of the project area. Past land use has been primarily privately-held agricultural land. With progressive adoption of the Secondary Structure plan zoning overlays for the Waverley West neighbourhoods, zoning has changed to residential and mixed-use, with conversion to such usage progressing with build-out.

Hunting and trapping are not permitted for anyone within the boundaries of the City of Winnipeg. Fishing, while technically possible during periods of high water, is not normally feasible. In addition, the study area is not known, has not been identified and is not anticipated to be used for berry picking or other traditional purposes.

7.0 ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

An environmental effects matrix was used to identify potential interaction between project activities and environmental components (Table 2). The significance of unmitigated effects was further characterized based on magnitude, geographic extent, duration, frequency, permanence and ecological context (Table 7.1). Any residual effects anticipated to remain after the successful implementation of mitigation measures were defined and characterized with respect to significance.

TABLE 7.1: SIGNIFICANCE CRITERIA DEFINITIONS

Criterion	Minor/Low	Moderate	High
Magnitude	Effect is evident only at or nominally above baseline conditions	Effect exceeds baseline conditions; however, is less than regulatory criteria or published guideline values	Effect exceeds regulatory criteria or published guidelines
Geographic Extent	Effect is limited to the project site/footprint	Effect extends into areas beyond the project site/footprint boundary	Effect is trans-boundary in nature
Duration	Effect is evident only during the construction phase of the project	Effect is evident during construction and/or the operational phase of the project	Effects will be evident beyond the operation life of the project
Frequency	Conditions or phenomena causing the effect occur infrequently (e.g. < once per year)	Conditions or phenomena causing the effect occur at regular intervals although infrequent intervals (e.g. < once per month)	Conditions or phenomena causing the effect occur at regular and frequent intervals (e.g. > once per month)
Permanence	Effect is readily reversible over a short period of time (e.g. one growing season)	Effect is not readily reversible during the life of the project	Effect is permanent
Ecological Context	Evidence of environmental effects by human activities. Effect results in minimal disruption of ecological functions and relationships in the impacted area	Relatively pristine area. Effect results in some disruption of non-critical ecological functions and relationship in the impacted area	Pristine area/not affected by human activity. Effect results in disruption of critical ecological functions and relationship in the impacted area

7.1 Air Quality & Climate Change

It is anticipated that emissions primarily carbon monoxide (CO), carbon dioxide (CO_2), nitrous oxides (NO_x), sulphur oxides (SO_x), methane (CH_4) and other volatile organic compounds (VOCs) will be produced from the use of construction vehicles and heavy and light machinery during the construction phase of the project.

To minimize construction-related emissions to the environment, construction vehicles and machinery will be kept in good working order through the use of inspection and maintenance. Emissions will further be reduced by reducing construction equipment idling and turning off machinery when feasible. Traffic flow planning will also minimize local traffic congestion reducing emissions affiliated with any lane reductions and/or closures. Ultra low sulphur diesel vehicles will be used by highway permitted trucks in line with current Canadian regulations.

Airborne dust / particulates will occur during Project construction, particularly prior to hard-toping of the road and re-vegetation of excavated/filled areas. Water and other environmentally friendly dust inhibitors will be applied to road beds during dry conditions to minimize airborne dust during construction as required. This mitigation measure will be included in the environmental protection plan for the project. Furthermore, soil piles and exposed surfaces will at a minimum be wetted down when appropriate. Should surface waters be used all intake pumps will be screened to meet DFO's Freshwater Intake End-of-Pipe Fish Screening Guidelines (1995) and water withdrawal rates will not exceed 10% of the instantaneous stream flow at the time. Trucks and earth moving machines hauling fine-grained materials over longer distances or near sensitive areas (e.g. residential areas) will use covers and/or dust suppression to reduce airborne dust and particulates. A coordinated construction schedule to reduce time that the ground is left unpaved will also reduce soil exposure and dust generation. A re-vegetation plan for exposed soils will be prepared for implementation as soon as possible after construction is completed.

Traffic using the expanded roadway during the operational phase of the project will increase vehicle emissions at the footprint area. However, with increased efficiency in traffic flow in the local area with the Project, emissions will be more dispersed in the local area and comparatively decreased overall due to improved traffic flow and less idling time on other routes.

With the implementation of the proposed mitigation measures, residual effects on air quality and climate are anticipated to be minor during the construction phases and subside to background levels after construction completion. It is expected that air quality impacts during the operational phase will not increase and may actually improve from improved traffic flow and reduced idling. It is anticipated that the residual effects are not likely to be significant.

7.2 Surface and Groundwater

Surface waters in the vicinity of the Study Area will potentially experience increased sediment loads due to construction activities, primarily due to construction (expansion) of the culvert connecting Lot 16 Drain, runoff from cleared and roughed areas (erosion) and road dust / particulates. Effects will be minimized by utilizing buffers and erosion and sedimentation measures.

In addition, lesser quality surface water or groundwater seepage (e.g., relatively elevated *E.coli* concentrations, brackish water) drained or dewatered from low areas, excavations or decommissioned isolated ponds may potentially degrade adjacent surface waterbodies or drains, if discharged. Measures will be included in the Environmental Protection Plan to ensure any water discharges are approved in advance by the site authority (i.e., Contract Administrator) to be in accordance with all applicable legislation for water protection.

The project will comply with applicable provincial and federal polices for the protection of water resources and appropriate mitigation techniques will be employed during the construction and operations

phases of the project including Provincial and federal stream-crossing guidelines, applicable Fisheries and Oceans Canada Operational Statements and provided letters of advice, best management practices and site specific erosion control methods (e.g. geotextiles / silt fences), as outlined in an Environmental Protection Plan[2] included in construction specifications will be followed to minimize sedimentation and potential contamination of surface waters.

The proponent will ensure that fuel handling and contingency plans are adhered to (described in the Spills / Hazardous Substances Release section of this document) and appropriate authorities notified in the event of a spill. During the operational phase of the project best management practices for the application of salt and sand during the winter months will be used. No impacts relating to the suspected landfill contaminated area is expected since project construction will be entirely carried out well outside of these lands.

It is projected that unmitigated impacts will be low to moderate in magnitude and are anticipated to be short-term, reversible and occur in the project footprint and local area. With the implementation of mitigation measures it is anticipated that the residual effects will be minor and likely not significant.

7.3 Hydrology

As construction proceeds, sufficient drainage ditching, land contouring and a storm drainage pipe system to contain and direct surface water runoff will be part of the Project. The Project will be designed to minimize changes to the groundwater regime, and to avoid modifications to existing drainage channels.

The hydraulic design criteria for all water crossing structures will be based on internal hydraulic design standards and applicable federal legislation and regulations including the Fisheries Act and the Navigable Waters Protection Act. Based on identified hydraulic design criteria, there is the potential to affect the existing water surface profiles both upstream and downstream of the proposed water crossing.

As a mitigation measure, design controls will be implemented to size the openings of the water crossing structure and manage effects on the hydraulic conditions. The design controls will include an analysis which demonstrates that the post-development water surface profiles of the creeks both upstream and downstream of the proposed crossing structure are essentially the same as the pre-development water surface profiles.

A net increase in surface water runoff is expected during Project operation due to the impenetrable road surface. The design of the Project will incorporate appropriate land contouring and drainage ditches to appropriately direct surface water runoff.

These projected low-to-moderate magnitude effects are anticipated to be short term (reversible) in duration and occur in the footprint and local area. Following implementation of mitigation measures, the residual effects from construction and operation are anticipated to be minor and likely not significant

[2] EPP = Environmental Protection Plan – to be developed prior to construction activities

7.4 Terrain and Soils

Construction activities related to site access, land clearing, road construction and construction traffic will result in soil compaction, surface soil removal, erosion and rutting. The proponent will limit surface disturbance to within the project footprint and the boundaries will be clearly marked prior to commencement of construction and will remain marked until completion.

The terrain will be re-contoured to allow for the road right-of-way and to accommodate sufficient land drainage and construction of sound barriers in the form of berms. Changes in topography affiliated with the construction will be minimized to the extent possible to reduce the impacts on the overall local topography. The proponent will be responsible to ensure any soil stockpiles are protected from erosion using appropriate and feasible practices. The proponent will also be responsible to ensure that appropriate actions are taken (i.e. halting or reducing construction) during wet periods and during high winds.

Soil will be retained to rehabilitate and re-vegetate disturbed areas not required for roadbed construction. Soil erosion will be monitored by the proponent and additional mitigation implemented (if required). Trees, shrubs and other vegetation will be preserved where possible.

Removal of sub-surface soils will be required to accommodate the road bed. These subsurface soils will be used as fill, where possible, in the construction of berms and re-contouring of the land adjacent to the road.

The former Fort Garry Nuisance Grounds (landfill) located on the north side of Cadboro Rd. and the former landfill located off of Brady Avenue south of Cadboro Road contain a range of waste materials including: agricultural waste, commercial industrial waste, domestic waste, and scrap metal. Additionally, the soils at the shooting range adjacent to the Fort Garry landfill is suspected to be lead contaminated. A three-phase separate project is currently underway to remove and dispose of the waste materials in the Fort Garry Landfill and confirm final soil quality in accordance with relevant soil quality guidelines, which will include removal of soils associated with the shooting range in 2012. These landfills are located outside of the project footprint and will not be disturbed from project construction.

During the operational phase, some soil compaction and disturbance is expected due to maintenance vehicles and machinery. To minimize these impacts maintenance activities will be largely restricted to the road hardtop area, thereby minimizing effects to soils and terrain adjacent to the road.

Potential adverse terrain and soil quality effects are anticipated to be high in magnitude from the removal and covering of lands and disturbance of the local topography and soil types during the construction phase. Construction impacts are anticipated to be intermediate in duration and occur in the project footprint area. Low to moderate impacts are anticipated within the project footprint related to the use of machinery for operational maintenance; these effects are anticipated to be short-term. With the implementation of the proposed mitigation proposed it is anticipated that residual effects will be minor and likely not significant.

7.5 Vegetation

The conceptual alignment of the proposed works, as illustrated in Figure 4-3 is primarily located on previously disturbed agricultural land. Land clearing activities associated with Project construction will remove a limited amount (approximately 3 ha or 0.03 km^2) of natural vegetation which includes:

- Hardwood (primarily aspen) woodlot areas;
- Narrow widths (~ 5 m) of surrounding wetland vegetation;
- Narrow widths (~5 m) of vegetation surrounding a small portion of the Lot 16 drain that will be disturbed during construction.

The remaining vegetated areas that will be disturbed during Project construction include:

- Agricultural croplands;
- Recently cleared areas (for the separate Waverley West sub-division) colonized primarily by invasive weed species
- Existing road right-of-way plantings (primarily commercial grass species)

There is a potential for loss of vegetation as a result of stripping, grading, clearing and grubbing activities (where required), and the movement of heavy equipment during the construction phase of project components. Low vegetation including grasses, herbs and low shrubs will be affected during stripping and grading activities required for site preparation for the structures and road alignments. The only natural vegetation that is expected to become re-established after construction (approximately 200 m^2 in total area) are cattails, willows and other moist soil vegetation associated with the periphery of the Lot 16 Drain culvert extension.

To reduce the potential effect on vegetation a pre-construction field survey for Provincially, Federally species at risk, as well any locally important species on all lands will be conducted prior to construction. Project footprint approved disturbance areas will be clearly identified by staking or flagging prior to the start of construction. In the event that field surveys identify vegetative species of interest, appropriate authorities will be contacted and additional mitigation measures will be developed as needed.

Additional mitigation measures that will be implemented by the proponent at a minimum to minimize the impacts on vegetation abundance and distribution within the project footprint include:

- Limit the removal of trees and snags in forested areas, where possible, as these provide wildlife habitats and windbreaks;
- Limiting the surface disturbance and vegetation clearing to the project study area
- Contain equipment storage and vehicle traffic within road right-of-ways, where possible;
- Maintain a buffer of vegetation when working along waterways, where possible, to promote bank stabilization and reduce erosion;
- Re-vegetation of affected areas including landscaped areas on either side of the road and other areas disturbed during Project construction, that are not required for Project operation. Seed areas disturbed by construction activities with native species to prevent the spread of exotic plants;
- Adhere to standard or best management environmental protection practices for road construction;
- Re-vegetation will be accomplished using topsoil retained from clearing activities that will be seeded with a mixture of commercial grass/shrub/tree species and/or natural mixed vegetation species as determined in the evolving landscaping plans.

The potential impacts of the project on vegetation is anticipated to be moderate in magnitude and short term to intermediate term (reversible) in duration and will occur at the Project footprint. With the implementation of the proposed mitigation measures, residual effects are anticipated to be minor and likely not significant.

7.6 Fish and Fish Habitat

Effects to aquatic habitat as a result of Project construction will include the potential for:

- Disruption of a small portion of the Lot 16 Drain to accommodate a culvert extension.
- Harming riparian and in-stream fish habitat (e.g. during stream crossing construction)
- Impacting fish passage (e.g. with stream crossings or rock armouring)
- Increased potential for siltation (total suspended solids) within Lot 16 Drain and adjacent drainage ditches due to land clearing and construction activities.
- Potential for introduction of hazardous substances that are deleterious to fish health or habitat (e.g. sediment from exposed ground, fuel / oil from construction vehicles and equipment), to adjacent ditches, drains and to the watercourse.

Riparian vegetation provides habitat for a variety of insects and other organisms which provide food to waterways during floods and throughout the open water season. The removal of riparian vegetation during stream crossing installation and diversion works can remove this food source as well as result in destabilization of the banks and promote erosion and sedimentation, increasing the turbidity of the aquatic environment.

Measures for the protection of fish and fish habitat will be included in a project-specific environmental protection plan (EPP) to accompany construction specification. This plan will outline mitigation measures that will be employed to minimized fish habitat disruption and comply with the “No Net Loss” guiding principle for conservation of fish habitat. The plan will outline mitigation measures that will be employed to minimize effects to aquatic habitat such as using silt fence barriers to reduce the potential for sediment runoff into adjacent ditches and drains.

Any potential for impacts to aquatic habitats will be minimized through the use of appropriate construction practices including, but not limited to, the guidelines and recommendations set out in:

- *Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat* (Fisheries and Oceans Canada and Manitoba Natural Resources 1996).
- Applicable Fisheries and Oceans Canada Operational Statements for Manitoba for temporary stream crossings, including letters of advise and other direction specified by Fisheries and Oceans Canada regarding this Project.

A culvert as a stream crossing will require infilling of the stream channel with the culvert for the length of the pipe culvert and may require channel diversions. The infilling of the channel around the culvert will effectively remove the availability of channel bed habitat to aquatic species. Channel diversions and channel straightening can result in decreases in in-stream habitat quantity and diversity by removing natural in-stream cover features like riffles, pools, undercut banks, boulders and woody debris.

Mitigation measures at a minimum to be implemented to prevent impacts to fish habitat include:

- Maintain a buffer of vegetation when working along waterways, where possible, to promote bank stabilization and reduce erosion;
- Re-vegetate disturbed riparian areas to meet the City of Winnipeg – City Naturalist specifications (City of Winnipeg Best Management Practices Handbook for Activities In and Around the City's Waterways and Watercourses);
- Minimize the amount of grubbing of existing vegetation for the installation of support structures within the floodplain; and
- For any infilling or required channel realignments and for the footprint of new culvert crossing or any other works that result in the Harmful Alteration, Disruption or Destruction (HADD) of fish habitat, a *Fisheries Act* section 35(2) Authorization will be required from DFO, and the proponent will provide appropriate fish habitat replacement (compensation) to result in No Net Loss of fish habitat productive capacity as outlined in the "Policy for the Management of Fish Habitat" (DFO 1986)". (Note: in-stream habitat enhancements on navigable watercourses must also be reviewed and approved by the Navigable Waters Protection Program).
- Mitigation measures to be implemented to prevent impacts to fish passage include:
- Incorporate clear span stream crossing structure designs where technically/economically feasible to avoid in-channel pilings, abutments or other forms of channel encroachments;
- Construct any culvert crossings to meet desired fish passage criteria by following the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (Manitoba Natural Resources, 1996) and DFO-Manitoba fish passage guidance as follows:
    - During the 1 in 10 year 3-day-delay discharge (3Q10) the average cross-sectional water velocity should not exceed:
- 1.0 m/s for a culvert less than 25 m in length;
- 0.8 m/s for a culvert longer than 25 m; or
- For a culvert longer than 50 m velocities are determined on a case-by-case basis; and
- Install riprap such that it does not negatively affect fish passage.
- Effects to aquatic resources are moderate in magnitude with low frequency, duration, permanence, geographic extent and ecological context. After implementation of mitigation measures and fulfillment of habitat replacement (if required) the residual effects to the aquatic environment and resources are anticipated to be minor in magnitude, duration, frequency, geographic extent, permanence, ecological context, and likely not significant.

Fish

As indicated in the Environmental Setting, water-bodies that will be potentially affected by the Project likely do not contain fish year-round. Field investigations of the existing culvert of Lot 16 Drain conducted at low-flow conditions in the fall of 2009 suggest that standing water exists in this culvert, likely allowing for fish passage under all but high flow conditions. The installation of multi-cell concrete box culverts can artificially increase stream velocities compared to clear-span bridge structures, potentially impeding the ability of fish and other aquatic organisms to pass the stream crossing.

Extension of the Lot 16 Drain culvert will be designed to accommodate this potential for fish movements between the drain sections on either side of Kenaston Boulevard. With adherence to mitigation measures outlined and contained in the environmental protection plan (EPP) as well guidance provided from Fisheries and Oceans, Project construction is anticipated to be able to achieve no net loss of fish habitat.

Effects to fish as a result of Project construction will include the potential for:

- Harming riparian and in-stream fish habitat (e.g. during stream crossing construction or channel realignment);
- Impacting fish passage (e.g. with stream crossings or rock armouring);
- Killing fish by means other than fishing (e.g. with diversions or isolations);

Fish, including mussels, could be harmed or killed when isolating and dewatering in-water work areas from the water for construction, or with machinery working in the water during periods of fish migrations or spawning.

Mitigation measures to be implemented to prevent killing fish during construction include:

- Implement a fish rescue program as required for any dewatered areas containing fish or mussels, and to return them unharmed to the watercourse downstream
- All intake pumps are screened to meet DFO's freshwater intake end-of-pipe fish screening guidelines (1995);
- Avoid construction during sensitive spawning periods (April 1-June 15); and
- Refuelling and maintenance of construction vehicles / equipment will occur at a distance of 30 metres from any water body to minimize the potential for hazardous substance introduction to adjacent water-bodies as per provincial and federal guidelines.

Following the disruption of the current Lot 16 Drain shoreline area as a result of the culvert extension activity, it is anticipated that the re-establishment of the aquatic emergent vegetation will occur without any artificial propagation. Effects to fish are not anticipated during Project operation, with the possible exception of adverse effects resulting from an introduction of hazardous materials to adjacent drains / ditches from accidental spills (e.g. due to a traffic accident). Accidental spills will be contained and cleaned-up in accordance with emergency response procedures to be summarized in the Environmental Protection Plan (EPP).

This projected moderate magnitude effect is anticipated to be short term (reversible) in duration and occur in the footprint and local area. With the implementation of the proposed mitigation measures, it is anticipated that the residual effects on fish from construction activities will be minor and not significant. It is anticipated that there will be no significant adverse effects on fish as a result of Project operations.

7.7 Wetlands

Effects to wetlands include the removal of 1-2 small area (approximately 0.15 ha total) of isolated semi-permanent wetlands (i.e. constructed ponds) associated with the former golf course located within the Manitoba Hydro corridor (likely not fish-bearing) to accommodate the southern extension of Route 90 (Figure 6-1). It is unlikely that these small wetlands are fish habitat due to the lack of connectivity to drains, likely anoxic conditions during fall decomposition of aquatic vegetation and the ponds likely freeze to the ground during winter.

Wetlands near the construction footprint will be clearly marked prior to the beginning of construction and remain marked until completion. In the event fish are discovered in any wetland they will be rescued and placed in a nearby suitable water-body. Should additional wetlands be encountered during construction, construction will halt and the area will be properly marked. Where feasible construction equipment will avoid the area as much as possible to limit compaction near the wetlands and minimize erosion and

sedimentation. Mitigation will be also conducted to ensure that no net loss of wetland function occurs due to the Project. To address impacts to surrounding small wetlands mitigation measures will include at a minimum, minimizing the amount of wetland required to be removed and proceeding with construction around other wetlands in a manner that limits the amount of disturbance and sediment. It is recognized that sediment control is a key component of wetland mitigation (and the protection of watercourses). Erosion and sediment control measures will include the use of straw matting and other erosion techniques described above where applicable. Monitoring of sediment around wetlands will be done regularly during construction to ensure sediment controls are effective.

Handling of fuels, oils and lubricants affiliated with construction machinery will be in accordance with proper and safe handling procedure described and not to occur within 30m of any wetland or nearby water body.

During the operational phase of the project, proper salt management and road maintenance practices will adhere to municipal best practices and limit the potential of work or salt near the wetlands.

The potential impacts of the project on wetlands within the footprint and local area are anticipated to moderate (during construction) and low (during operation) in magnitude and short-term in duration. With the implementation of mitigation is anticipated that residual effects will be minor and not significant for both construction and operational activities.

7.8 Terrestrial Wildlife and Habitat (including Migratory Birds)

Construction activities will result in the removal of some natural wildlife habitat (3 ha) and other vegetated areas which currently provide limited sub-optimal habitat for wildlife species tolerant of suburban/urban landscapes (e.g. deer, small mammals/rodents, geese, etc.). Additionally, some species of wildlife will avoid the local area to varying degrees due to the presence of construction machinery, workers and noise associated with Project construction activities.

Construction activities will consider any potential disturbances to sensitive species known to be using the area. These activities will be restricted during the breeding season to prevent stress and nest desertion of adult birds in response to increased noise levels (e.g. site clearing will take place outside of the most sensitive breeding and brood-rearing season for birds and other wildlife). If it is not practical to avoid the breeding season entirely, monitoring will be used to evaluate the reaction of sensitive species to construction activities during the breeding season to determine if shutdowns or other restriction measures are required. The proponent will follow and adhere to both the Migratory Birds Convention Act and the Species at Risk Act. Monitoring or surveys to determine the effect of clearing activities on sensitive avian species will be required if clearing occurs during the sensitive avian breeding season.

No vegetation clearing will occur in natural habitat areas within the proposed study area during sensitive nesting periods (May-July) to avoid the bird nesting season. No one will disturb, move or destroy migratory birds' nests. If a nest or birds are encountered work will cease in the immediate area, the site will be made safe for the public and the federal Responsible Authority will be notified prior to resuming work in the immediate area. All project staff working within the project footprint will be aware of their responsibilities to watch for and avoid wildlife activity in the area.

During Project operation, the potential impact to wildlife will be increased mortality from vehicle collisions. Although wildlife mortalities along roads are inconsistently reported, mortalities are known to occur within the City of Winnipeg, including major roads in the vicinity of the Project such as Kenaston Boulevard, Bishop Grandin Boulevard, McGillivray Boulevard and Waverley Street (Stantec and UMA 2005). Manitoba Conservation (2009) has listed Kenaston Boulevard between Sterling Lyon Parkway and Bishop Grandin (which includes part of the Project footprint) as one of Winnipeg's high risk areas for deer collisions. Canada Goose populations in Winnipeg are also increasing and often occur in large numbers foraging along the grassy right-of-ways (including along Kenaston Boulevard) near water retention ponds (Manitoba Conservation 2006), posing a high risk of collisions. Other landscape features adjacent to roadways associated with increased wildlife mortalities include forested areas and water-bodies with riparian / wetland vegetation (e.g. Clevenger *et al.* 2003; Grovenburg 2008; Orlowski 2008).

To minimize wildlife-vehicle collisions, the following mitigation measures will be implemented:

- Landscape features attractive to susceptible wildlife (e.g. deer, geese) shall be minimized;
- The final Project design will consider the areas of highest likelihood of wildlife collision risk (e.g. road segments closest to wooded areas and grassy areas adjacent to ponds)
- The final Project design will incorporate wildlife barriers (e.g. fencing) and/or warning signage as appropriate.
- Efforts to increase driver alertness and minimize wildlife access to roadways will be taken including proper signage indicating areas of high wildlife activity and the incorporation of wildlife barriers (e.g. fencing).
- To decrease wildlife encounters probabilities maintenance of vegetation height and topography will be optimized to increase driver visibility.

Potential adverse effects on wildlife are mortalities due to collisions with vehicles and the disruption of wildlife movement corridors and habitat. With the implementation of mitigation and monitoring it is anticipated that residual effects will be minor as the project is already located within a previously disturbed urban landscape with fragmented sub-optimal habitat for wildlife in general. The residual effects are not likely to be significant.

7.9 Species at Risk

As indicated in Table A-4, six species at risk have the potential to occur, nest and or breed in the local area. These species include four bird species (Chimney Swift, Golden-winged Warbler and two sub-species of Loggerhead Shrike), a reptile (common snapping turtle), and amphibian (Northern Leopard frog). A vegetative species at risk was also identified as potentially to occur, the Riddell's Goldenrod. However, suitable habitat for those species is very limited and sub-optimal within the local area. Additionally, as indicated in the Environmental Setting, water-bodies that will be potentially affected by the Project are not expected to contain fish species at risk.

To date, no species at risk have been identified within the project footprint or study area. A pre-construction survey by a qualified biologist will be completed to facilitate the identification of and mitigation requirements for both species at risk and migratory birds.

Project construction activities will affect a very small area of potential species at risk habitat. To minimize Project construction effects on terrestrial species at risk, clearing of the site will take place

outside the most sensitive breeding and brood-rearing season for birds and other wildlife (i.e., May, June and July).

No records of Riddell's Goldenrod have been documented within the local area. Due to the known distribution of this species in south-western Manitoba, the probability of occurrence of this species at risk is unlikely within the limited potential habitat (i.e. undisturbed roadside ditches and allowances) that will be disturbed within the Project footprint.

In the event that species at risk are encountered during the project construction all work will cease in the immediate area, the site will be made safe and the appropriate authorities including the federal RA will be notified to seek advice on appropriate steps for proceeding and any additional mitigation measures. All project staff working within the project footprint will be aware of their responsibilities to watch for species at risk.

The primary effects to wildlife, including those species at risk during the operational phase may potentially occur will be increased mortality due to vehicle collisions. Given the low probability of species at risk to occur in the immediate vicinity of the Project, effects to wildlife species at risk are considered negligible.

Potential adverse effects on species at risk and anticipated to be low in magnitude over an intermediate term within the project footprint and local area. With the implementation of mitigation is anticipated that residual effects will be minor and not significant.

7.10 Noise/Vibration

The use of heavy equipment and trucks during construction may increase noise and vibration to a level perceptible to adjacent local residents (e.g. Whyte Ridge, Waverley West). Construction activities will be timed to be in compliance with City of Winnipeg's Neighbourhood Liveability By-Law No. 1/2008 to minimize disturbance to local residents. The by-law permits work at any time within city rights-of-way, but construction activity is generally restricted within the construction contract to 7:00am through 7:00pm weekdays, with written permission of the Contract Administrator and the City for any after-hours or weekend work required for special cases (specific staging requirements). This would be held to for the pile driving for the fly-over structure and a wall at Lot 16 Drain

Additional mitigation measures to reduce noise and vibration that will be used include:

- Perform regular inspection and maintenance of construction vehicles and equipment to ensure that they have quality mufflers installed and worn parts that generate noise and vibrations are replaced;
- Restrict noise pollution by specifying and enforcing construction noise limits;
- Reduce power operations by using only necessary sized equipment and using quieter methods and equipment when possible.
- Enforcing construction vehicle speed limits and turning off equipment when not in use
- Enclose any noisy equipment and use baffles to reduce noise transmission beyond the construction site.
- Locate stationary equipment, such as compressors and generators away from sensitive noise receptors (e.g. residents and wildlife areas) to the extent practicable.
- Replace and/or repair equipment and machinery parts that generate excessive noise and/or vibrations and educate drives and equipment operators about techniques to reduce noise.

Commercial and passenger vehicle use of the roadway during the operation stage may increase transportation noise and vibration to levels which exceed City of Winnipeg guidelines for outdoor sound level limits for residential areas (e.g. Waverley West and Whyte Ridge).

As the construction of the roadway will precede the expansion of the adjacent residential development, noise attenuation along most of the length of the Project will be the responsibility of the respective developers. At the north end of the Project, an existing development will be subject to a sound study and mitigating measures may be employed (most likely extension of the earth berm and fence) depending upon the results of that study and the final configuration of the intersection of Kenaston Boulevard and Bishop Grandin Boulevard and the flyover structure.

Potential adverse noise and vibration effects are anticipated during the construction and operational phase from the frequent presence of mechanized equipment, disturbance during construction, and increased vehicle traffic during the operational phase. With the implementation of the proposed mitigation measures and anticipated noise attenuation with the development of new communities in the area the residual effects from noise and vibrations are anticipated to be minor and not likely to be significant.

7.11 Land Use

Construction of this Project will be restricted to rights-of-way previously established for these arterial roadways. Land-use designations in the surrounding areas have been made with these arterial roadways as part of all plans. Project construction is not expected to affect greenspace beyond the Project limits. As most of the surrounding area is targeted for development, but as yet undeveloped, construction activities' impacts to the neighbourhoods and recreation are expected to be negligible.

These effects are anticipated to be intermediate term, reversible, and of low magnitude within the footprint. No significant adverse effects on neighbourhoods, recreation and greenspace are anticipated as a result of construction activities.

7.12 Aboriginal Use of Lands

There are no First Nations lands within or in the proximity of the project area. Past land use has been privately-held agricultural land. With progressive adoption of the Secondary Structure plan zoning overlays for the Waverley West neighbourhoods, zoning has changed to residential and mixed-use, with conversion to such usage progressing with build-out.

Hunting and trapping are not permitted for anyone within the boundaries of the City of Winnipeg. Fishing, while technically possible during periods of high water, is not normally feasible. In addition, the study area is not known, has not been identified and is not anticipated to be used for berry picking or other traditional purposes. Therefore it is not expected that the Project causes any adverse effect on the Aboriginal use of lands.

7.13 Heritage Resources

There is a low potential for heritage resources to be present at the Study Area. It is unlikely that the Project footprint area would have been a camping area for pre-contact groups given the distance from water. Small hunting groups may have foraged in the area, but the heritage resources that would have been deposited as a result of these activities are minimal. The river parcels in the Project footprint area relate to the Outer Two Miles and were acquired as land grants by various individuals after ca. 1875.

There is no archival evidence to indicate that any farmsteads were constructed when these lots were first obtained. Most of the Project area has been disturbed as a result of land clearing and agricultural cultivation in the early 20th century. Areas of intact standing vegetation along the proposed road extension were examined on October 19, 2009, but no evidence of human cultural activity was observed.

In the event that undiscovered heritage resources are unearthed during Project construction, the work will be stopped until the resources are preserved by a qualified archaeologist under the direction of the Heritage Resources Department, as required.

No effects to historic resources are anticipated during project construction and operation.

Potential adverse heritage and historic resources are anticipated to be low in probability. It is anticipated that with the implementation of mitigation should any undiscovered heritage resources bed found that the residual effects will be minor and likely not significant.

7.14 Protected Areas

Fort Whyte Alive is the nearest 'protected' area, which is located 2.3 km northwest of the study area. Although there are no areas formally protected by regulation within the Project footprint area, there is a grove of oak trees (approximately 500 m^2 area) located 120 m east of the southern 1/3 of the proposed road (Figure 5-4) that has been temporarily fenced off and is currently planned to be protected from development activities as a component on the ongoing Waverley West planning. No construction or operation activities will take place near the grove of oak trees.

No effects on Protected Areas will occur as a result of Project construction activities. No significant adverse effects on protected areas are anticipated as a result of Project construction.

7.15 Human Health & Safety

The proposed construction activities have the potential to increase exposure to noise, dusts, and exhausts generated by construction vehicles, inflict ergonomic stress during day-to-day work activities for construction works and increase exposure to hydrocarbons during the asphalting and paving process.

Potential operational impacts are expected to be low in magnitude with the increase in traffic flow. Air quality and exposure impacts are not expected as the increasing traffic flow is anticipated to benefit air quality.

To reduce impacts due to construction mitigation measures to protect the health of people working on the project consist of standard occupation health and safety practices (e.g. the use of personal protective equipment, job safety analyses and on the job safety orientation). Additionally, mitigation measures to protect the health of people living near the project consists of standard occupational health and safety practices (e.g. signage and fencing to prevent access to site during construction), the previously described implementation of air quality and noise/vibration mitigations will also aid in reducing exposure to dust, exhaust and noise.

Signage and other key markings (speed limits) and boundaries (e.g. crosswalks, traffic control management) will be used to ensure safety of both drivers and nearby residents during the operation phase of the project.

With the implementation of mitigation described and noise and air quality mitigation measures it is anticipated that the residual effects will be minor and not likely significant.

7.16 Accidents and Malfunctions

During Project construction, operation and maintenance, there is the potential for accidents and malfunctions to occur. The potential effects of these accidents and malfunctions, proposed mitigation measures, maintenance and safety plans, environmental protection measures, and significance of effects are discussed below.

7.16.1 Spills / Hazardous substance releases

Spills of hazardous materials may potentially occur due to failure of construction and maintenance equipment components or during equipment fuelling and maintenance. Common hazardous substances used at construction sites include fuels (diesel and gasoline), heating and waste oils, lubricants, sealants and paving materials. During Project operation, a wide variety of hazardous substances including wastes are routinely transported by road along Kenaston and Bishop Grandin Boulevards.

Releases of hazardous substances can potentially impair air quality, contaminate soil, surface water and groundwater, and affect worker and public health. Spills into ditches and drains adjacent to the Study Area have the potential to contaminate receiving water-bodies and adversely affect aquatic habitat and individuals.

The magnitude and duration of the potential effects of accidental spills are dependent on the characteristics of the material spilled, the amount spilled, the location of the spill, the time of year the spill occurs and the elapsed time between the spill and remediation response. For example, spills occurring during the winter, under frozen ground conditions, will facilitate the recovery of spilled material and reduce the potential for any effects on soils, watercourses and groundwater. During Project construction and maintenance, it is anticipated that substantial quantities of hazardous materials will not be stored on site much beyond short-term needs, thereby reducing the risk of large-scale spills.

To minimize the potential for accidents or malfunctions that could cause negative impacts on the environment, the proponent will:

- direct the design of the Project in conformance to, or better than, acceptable design standards;
- construct the Project adhering to standard construction safety practices;
- operate and maintain the Project in accordance with hazardous substance handling safety procedures and environmental protection practices identified within emergency response plans developed for the Project;
- ensure that appropriate speed limits and signage warning of specific hazards (such as road construction and/or maintenance) are in place in order to minimize the potential for traffic accidents and potential release of hazardous substances resulting from traffic accidents.

The potential for contamination of groundwater quality due to hydrocarbons and other contaminants from road construction machinery / vehicles and site cleanup activities will be minimized by compliance with regulatory guidelines and contract specifications outlined in the environmental protection plan.

Immediate attention to a spill or accident will occur and is expected to minimize effects on the environment. Best management practices will be applied. The proponent will remediate any contaminated soils in accordance with applicable provincial legislation.

With adherence to design standards as well as safety protocols and procedures outlined in emergency response plans, potential environmental effects of accidental spills of hazardous materials are anticipated to have a low probability of occurrence, reversible, short to intermediate in duration and restricted to the footprint and immediately adjacent area.

7.16.2 Deleterious Substances

The use of heavy equipment for activities such as stripping, grading, excavating and infilling near a stream have the potential to destabilize bank soils making them available for transport into water bodies via wind, rain runoff or bank erosion. The introduction of sediments into a water body can cause direct and indirect effects on fish habitat by affecting fish and egg respiration, fish foraging efficiency, and habitat productivity for fish and invertebrates. Machinery, vehicles and equipment working near the site contain fuel, coolant, and other materials that if released to the water could be deleterious to fish health, water quality, and the environment. When pouring concrete in or around water, if the fresh concrete and/or concrete wash water are released to the aquatic environment, they can increase pH resulting in injury or mortality to fish and other aquatic organisms.

Mitigation measures to be implemented to prevent impacts from deleterious substances include:

- Develop and implement an Erosion and Sedimentation Control Plan in adherence with the Transportation Association of Canada National Guide to Erosion and Sediment Control on Roadway Projects (Transportation Association of Canada, 2005); and
- Maintain operating machinery to minimize fuel, coolant and other materials leakage;
- Fuel vehicles at least 100 metres from a water body;
- Maintain/implement a spill response plan with required equipment; and
- Isolate and contain fresh concrete and concrete wash water to prevent them from entering the aquatic environment.

Effects to aquatic habitat are not anticipated during Project operation, with the possible exception of the introduction of hazardous materials to adjacent drains / ditches from accidental spills (e.g. due to a traffic accident). Accidental spills will be contained and cleaned-up in accordance with emergency response procedures to be summarized in the Environmental Protection Plan.

With the implementation of the mitigation measures no significant adverse effects on the aquatic habitat are anticipated as a result of Project operations.

7.16.3 Traffic Accidents

Construction, operation and maintenance of the Project increase the risk of traffic accidents in the Project assessment area. Traffic accidents may involve construction vehicles and equipment, and passenger and commercial vehicles. Construction and operation activities, in particular, increase the risk of accidents. Traffic accidents may involve multiple vehicles and may also involve pedestrians and wildlife. With respect to the construction and operation of the highway, highway safety and environmental measures will be consistent with provincial policy for all provincially controlled highways and with federal and provincial legislation and will be designed to minimize the potential of traffic accidents. Posting of appropriate speed limits and signage warning of specific hazards (such as road construction and/or maintenance, high risk deer / goose areas) will also minimize the potential for traffic accidents. Proposed mitigation also includes periodic inspections for dangerous conditions, ensuring adherence to safe construction and maintenance procedures and plans.

With adherence to safety protocols and procedures outlined and during the more detailed construction planning, potential for traffic accidents are anticipated to be minimized and have a very low likelihood within the project footprint and immediately adjacent area.

7.16.4 Fires and Explosions

Construction, operation and maintenance of the Project increase the risk of fires and explosions at the Study Area. Fires and explosions may result from propane heaters, welding/cutting, sparks during fuelling, equipment malfunctions, improper storage of hazardous materials, and other construction, operation and maintenance activities.

Mitigation will include requirements for Safety Plans from all contractors and consultants, for all phases of the Project, which comply with applicable legislation, codes and guidelines, providing fire suppression equipment on-site, preparing and implementing emergency response procedures that include fire and explosion prevention, and notifying the local fire department immediately if a fire or explosion occurs. Safety plans proposed will include regular inspections, routine examination of fire suppression and related equipment, and periodic testing and evaluation of the emergency response plans. The chance of fire during drier periods of time also exists during the operational phase vehicle traffic (i.e. discarding cigarettes on the side of the road or generation of sparks from vehicles). Vegetation nearby the roadway will be mowed as required to minimize these fire risks and their potential to spread.

With adherence to emergency response plans, safety protocols, mitigation measures presented and other procedures, potential environmental effects of accidental spills of hazardous materials in case of fire or explosions are anticipated to be reversible, short- to intermediate-term in duration and restricted to the footprint and immediately adjacent area.

7.17 Effects of the Environment on the Project

7.17.1 Severe Weather

Southern Manitoba can experience harsh environmental conditions and temperature extremes particularly during summer and winter. The Project is designed with consideration of the extreme weather expected in the City of Winnipeg and is intended to weather extreme high and low temperatures, damaging winds, substantial precipitation events and hail with only periodic maintenance as required. Due to Project

design and appropriate materials used for the Winnipeg climate, no part of the Project is expected to catastrophically fail due to any severe weather event.

During Project construction, high wind velocities can cause greater dispersion of construction dust, and blow loose construction materials around. Mitigation measures include fencing construction activities, securing construction materials, providing protection for pedestrians, vehicles and adjacent to the construction site and suspending work during high wind conditions.

Heavy rain or abrupt snowmelt can potentially flood work areas, and create unsafe working conditions, slippery surfaces and reduced visibility. Mitigation measures include protecting construction activities, suspending work during high precipitation events and providing emergency pumps on-site.

7.17.2 Overland Flooding

There is a very slight potential for overland flooding in the Project assessment area if there is a catastrophic flood that exceeds the City of Winnipeg Flood protection capacity. The area was flooded in 1826 but was not affected in 1950 or during major floods thereafter. Reconstruction / extension of the Lot 16 Drain concrete culvert that connects land drainage ditches on either side of Kenaston Boulevard, and appropriate land contouring to direct water runoff as part of Project design, will ensure adequate water drainage and retention during spring melt and high rain events. The anticipated addition of storm-water retention ponds in association with the future adjacent Waverley West residential development will further minimize the potential for overland flooding.

7.17.3 Seismic Events

Natural Resources Canada (2009) earthquake records database (information available from 1985 to present) indicates that no earthquakes have been recorded within a 100 km radius of the City of Winnipeg. Additionally, Winnipeg is located within the lowest seismic hazard rating area of Canada. Therefore, the probability of a seismic event affecting the Project is negligible.

8.0 CUMULATIVE EFFECTS

Cumulative effects assessment assesses the effects of the proposed activity in combination with past, present and foreseeable future projects. The spatial boundary includes the southwest quadrant of the City of Winnipeg, considered for this assessment to be bounded by Grant Avenue to the north, Pembina Highway to the east, the Perimeter Highway to the south and the City of Winnipeg limits to the west (Figure 7-1). A 20 year historical and 20 year future temporal time frame was used for the identification of past, existing and foreseeable future activities which may have a cumulative effect with the Project, based on the typical planning horizons for projects.

8.1 Past/Existing Activities

The following are existing projects that may contribute additive effects to the proposed project:

- Development of the Bridgwater Park and South Pointe residential neighbourhoods, including removal of disposal of the former Fort Garry Nuisance Grounds
- Development of retail centres near Kenaston and McGillivray boulevards
- The extension of the Bishop Grandin Greenway West trail system in the northern portion of the study area.

As described in Section 4.1.1 and 4.1.2, the subject arterial roads construction project is affiliated with the Waverley West Development, a growth neighbourhood comprised of seven neighbourhoods (illustrated in Figure 4-4) including a town centre neighbourhood. In total approximately 1,110 ha of development is planned (though subject to change) over the next 20 years with supporting transportation network.

Construction of Bridgwater Park and South Pointe residential neighbourhoods respectively located in the northeast and south east quadrant of the development area has been underway since 2009. According to the land developer, of the 1103 lots planned for the Bridgwater Park neighbourhood, approximately 400 homes are complete and occupied, with another 576 building permit issued as of March 31, 2011. A total of 408 building permits have been issued as of March 31, 2011 for the South Pointe neighbourhood.

The Structure Plan depicts a broad based community land use and transportation pattern for the Waverley West plan area, but does not apply a specific timeframe to the Plan. It is anticipated that under existing development conditions, a full build-out of Waverley West could take between 20 and 25 years. The continued construction of the Waverley West Development in combination with the Project is anticipated to potentially result in a cumulative additive effect with respect to soil removal, noise associated with construction equipment, removal of low vegetation and treed vegetation (where required) and conversion of land use from primarily agricultural to residential. An additive increase in noise related to the two concurrent developments is likely. The removal and disposal of refuse deposited in the former Fort Garry Nuisance Grounds north of Cadboro Road involves the use of heavy equipment and transportation vehicles. A cumulative additive effect with respect to localized increases in noise and traffic may occur during overlapping construction seasons in the 2012 year.

Additional current developments in the area include development of retail centres, including Kenaston SmartPark, Kenaston Common and Linden Ridge Shopping Centre retail centres. These developments include a wholesale warehouse (Costco) built in 2007. As described in Section 6.3.1, these retail centres combined include approximately 1.2 million square feet of commercial retail space. The recent expansion of retail commercial space in the southwest quadrant of Winnipeg, in combination with the Project, will primarily have an additive effect on the conversion of predominant land use from agricultural or semi-rural to residential and commercial, in accordance with approved planning documents.

Bishop Grandin Greenway West, as described in Section 6.3.3, is a greenway corridor that is currently being established along the utility corridor that parallels Bishop Grandin Boulevard and the Kenaston Boulevard right-of-way. The multi-use trail will continue the connection from the Seine River, beyond Waverley Street to Fort Whyte Alive. This project, in combination with the proposed Project will have a positive, additive cumulative socio-economic benefit of increased alternative transportation opportunities and greater connectivity in the southwest quadrant.

8.2 Foreseeable Future Projects

The following are existing projects which may contribute additive effects to the proposed project:

- Multi-phase housing development in Waverley West at the north end of the project study area.
- Multi-phase housing development in Waverley West at the south end of the project study area
- Planned mixed use developments including a commercial warehouse (IKEA) as well smaller associated retail and commercial development

The multi-phase housing development in Waverley West will result in build-out of the area, extending westward to Brady Road. The Waverley West Development will reportedly provide more than 11,000 new homes, apartments and complexes, to be built over approximately the next 20 years. The development is intended to be walkable neighbourhood. In addition, the Waverley West Development design incorporates numerous greenspaces and wetlands including constructed ponds and lakes. The future development phases of Waverley West are anticipated to have a compensatory effect in combination with the proposed Project, as the number of wetlands created within Waverley West will be greater than the area of equivalent constructed wetlands being lost within the Kenaston extension right-of-way.

A new, 80 hectare commercial/retail centre is slated to be developed in the vicinity of Kenaston Boulevard and Sterling Lyon Parkway. The development, which is anticipated to take 12 years to construct, will be located on formerly industrially zoned land. A 350,000 square foot furniture warehouse (IKEA) will be the anchor tenant with an additional one million square feet of commercial and retail space. The potential increase in local to regional traffic and related traffic congestion that may occur as a result of this development is anticipated to be partially ameliorated by the increased traffic flow efficiency of the proposed Project. This development will also contribute to an additive increase in the approved conversion of land-uses in the southwest quadrant.

8.3 Cumulative Effects Assessment

Construction of the proposed project in combination with existing and future projects is anticipated to yield positive cumulative effects in relation to economic growth, job creation and transportation efficiencies. While with the implementation of mitigation described previously in this document concluded that the residual effects are anticipated to be minor and not likely significant, the additive residual effects have the potential to create an adverse cumulative effect in combination with existing and future planned projects.

8.3.1 Direct Environmental Effects – Land& Water

The Project will alter the terrain and topography within the Project footprint and immediately adjacent area. Residual effects to the physical environment during the life of the Project include; alteration of the soils / terrain to accommodate construction of the Project in the footprint area, alteration of surface water drainage and increased vehicle emissions in the immediate local area. Although the physical effects of the Project will be obvious at the Project footprint, substantive physical effects will not extend beyond the Project footprint. All Project components are reversible, meaning the Study Area could be restored to the original condition. The only components that may be left on site (upon a hypothetical decommissioning) would be the subsurface components of the storm-water line and light post/sign post foundations which are not expected to result in substantial residual effects to the physical environment. Therefore, no significant long-term residual effects of the Project on the physical environment are expected after Project decommissioning.

8.3.2 Air Quality & Climate Change

Air Quality

It is anticipated that minor residual air quality impacts may result from the construction methods and equipment during the construction phase of the project. Similarly, it is expected that increase in dust, particulate matter and emissions and other airborne materials from construction related projects in the foreseeable future. Concurrent projects currently undergoing construction are anticipated to have short-

term minor increases at the local level from construction activities and increases in traffic volumes associated with lane reductions and/or closures. It is expected that all other projects either concurrently or in the foreseeable future will implement standard construction mitigation measures to reduce potential construction impacts on air quality. Cumulative impacts on air quality are anticipated to be negligible, short-term and likely not significant.

Climate Change

Climate studies commissioned by the International Panel on Climate Change (IPCC) indicate a general warming trend for North America, including the southern Manitoba region, and particularly during winter (Christensen 2007; Bates et al. 2008). Those studies also indicate a trend towards increased annual mean precipitation in the southern Manitoba region, particularly during winter and spring. Other research predicts that precipitation is more likely to come in heavy and extreme events (Committee on Environment and Natural Resources National Science and Technology Council 2008). However, studies more specific to the central Canadian Prairies suggests no significant increases in the number of severe precipitation events (e.g. Khandekar 2002; Lawson 2003) but a general trend towards increased low to moderate precipitation events (Khandekar 2005). With respect to effects on transportation, less snowy winters are likely to reduce the frequency of delays and winter snow clearing. However, higher frequency of snowfall events and more intense winter storms could increase risks for traveler safety and require more frequent and costly snow removal, particularly for high-volume snow events. An increase in the frequency of extreme rain events may contribute to increased accident rates, exceedances of storm drain capacity, increased land erosion and increased road maintenance as a result. Decreased rain events may compromise the road foundation over time due to soil contraction. Given the inconsistencies in climate model predictions, effects of long-term trends in climate change on the Project remain uncertain.

The Project is not expected to be measurably affected by climate change over the short-term. However over the longer-term, possible effects of climate change may be manifested through some incremental increased maintenance costs to address stresses to the road structure and base. Climate change is not expected to result in significant adverse effects to the Project.

8.3.3 Greenhouse Gases

Potential increases in greenhouse gas emissions are anticipated during construction due to construction vehicles and equipment. While net local greenhouse gas emissions may increase with respect to increased vehicle use in the area, these increases are anticipated to be partly mitigated by Project operation due to improved traffic flows (i.e. less traffic congestion / idling time) into the evolving Waverley West development area.

Construction and operation of the Project is not expected to result in detectable net increases in regional or global greenhouse gases.

8.3.4 Natural Systems Vegetation

A minor residual vegetation impact may result from the project due to the overall footprint of the project and the loss of vegetation. Site specific effects from projects in the area have occurred and are anticipated to include fringe effects, removal/clearing of vegetation from urban development (roads, residential and commercial developments). Residual effects from foreseeable future projects in relation to vegetation are expected to be limited to the project footprint suggesting that the interaction of effects will be negligible.

Wildlife and Wildlife Habitats

Residual effects on wildlife and wildlife habitat are anticipated to be minor and largely restricted to the Project footprint area and adjacent local area. It is anticipated that concurrent and foreseeable future projects will be similarly limited to minor impacts within the project footprint. While the anticipated projects have the potential to disrupt wildlife corridors and generally contribute to habitat fragmentation, the magnitude is expected to low and reversible because of the potential area impacted and anticipated mitigation measures including the re-establishment of vegetation and wildlife habitat. It is anticipated that the cumulative residual effects will be negligible.

Fish and Fish Habitat

At the Project footprint, the Lot 16 Drain and associated man-made ephemeral ditches contain fish for part of the year and are considered fish habitat. A small portion of these seasonal fish-bearing waters will be temporarily altered during construction at crossing locations. Fish and fish habitat protection measures, including any guidance provided by DFO letters of advice will be included in the environmental protection plans to accompany construction specifications.

The Project is not anticipated to negatively affect the productive capacity of fish and fish habitats within the local area due to the absence of year-round fish habitat at the Project footprint area and immediate vicinity of the footprint area. Other anticipated projects within the vicinity are not anticipated to impact fish and fish habitat within the Lot 16 Drain as the fish habitat is low quality and it is expected that any future development will be subject to DFO approvals and required mitigations. Therefore, the Project is not expected to contribute to aquatic impacts associated with future developments in the watershed of the Study Area.

8.3.5 Socio-Economic, Cultural

The Project is expected to have a positive effect on traffic efficiencies for accessing new developments south of Bishop Grandin Boulevard. Potential adverse effects on the social environment relate to the change or loss of existing land uses (e.g. agriculture and greenspace), noise and vibration and traffic encumbrance during construction. These potential effects are countered by dedication of greenspace required within the development plans of the newly developing areas of Waverley West, as well as the inclusion of appropriate setbacks, landscaping and multi-use pathway system linkages.

The most substantive cumulative effects of the Project will be positive effects related to more efficient local traffic flow and increased access to newly developed areas which are expected to result in increased opportunities for business and residential development.

Adverse cumulative effects are primarily related to additional reductions in natural greenspace / wildlife habitat and increased vehicle collision risk which is cumulative with road development. Adverse cumulative effects of the Project do not exceed any regulatory threshold and are therefore not considered significant.

8.3.6 Noise and Vibration

Current and potential future noise producing activities in the Project area include:

- Truck and passenger vehicle noise along major roadways (i.e. Kenaston Boulevard, Bishop Grandin Boulevard, Waverley Street, Brady Road);
- Rail noise (i.e. CN and CP rail lines) at the outer boundaries of the Study Area;
- Vicinity of airplane flight path to Winnipeg International Airport, approximately 12 kilometres away from the Study Area;

- Road construction noise (e.g. construction and modification periods)
- New residential development construction noise (i.e. construction of new residential units in the two developments of the Manitoba Housing Renewal Corporation and Ladco between Kenaston Boulevard, Bishop Grandin Boulevard, Waverley Street, Brady Road and the Perimeter Highway);
- Residential noise (e.g. lawn mowers).

In general it is anticipated that all other projects will implement standard construction mitigation measures to reduce potential construction impacts from noise. The potential of simultaneous residual noise impacts from construction is limited based on the location of the project and the timelines affiliated with future projects. Additionally, any simultaneous noise impacts would be short-term in duration. It is anticipated that cumulative residual noise effects will likely be non-significant.

9.0 PUBLIC PARTICIPATION

9.1 PUBLIC PARTICIPATION UNDER SUBSECTION 18(3)

Is the RA of the opinion that public participation in the screening of the Project is appropriate? Yes ☐ No ☒

- Scope of the Project and factors to be assessed posted on the CEAR Yes ☐ N/A ☒
- Public Notice to request public input posted on the CEAR? Yes ☐ N/A ☒

9.2 OTHER PUBLIC PARTICIPATION

Public information sessions were initiated in 2005 by the City of Winnipeg to solicit public input into the development of a 'Waverley West Area Structure Plan' for future development in that area, including the addition / modification of roads and other infrastructure. In 2005, two public open houses and an invitational discussion session were commissioned. The structure plan, which was identified by City Council as the preferred land use policy approach for the Waverley West lands, would identify broad planning objectives related to transportation, land use, recreation and services. Furthermore, the Waverley West Area Structure Plan would serve as a framework for the future development of detailed neighbourhood-specific structure plans.

The first open house, held on June 28, 2005 at the Waverley Heights Community Centre (1885 Chancellor Drive), had 198 attendees. The open house was followed by an invitational, workshop-format discussion session with approximately 80 attendees. Open house boards reviewed general preliminary plans regarding servicing, greenspace and transportation networks, including the extensions of Kenaston Boulevard, Bison Drive and Waverley Street. Comments received in relation to the conceptual Kenaston Boulevard extension included clarification regarding its function and suggested locations (e.g. located the extension west of the current Kenaston alignment).

A follow-up open house was held on December 15, 2005 at the Holiday Inn South Winnipeg (1330 Pembina Highway; present-day Four Points Sheraton). The purpose of the follow-up meeting was to present the draft Area Structure Plan for input prior to finalization. No specific environmental concerns were raised with respect to construction of the arterial roadways at either open house.

9.3 COMMUNITY AND ABORIGINAL KNOWLEDGE

Beyond the activity associated with the Waverley West Area Structure Plan, no further Project-specific Aboriginal liaison or regulatory consultation has occurred. Because there is no crown land involved in the Project, the Province of Manitoba has determined that there is no Duty to conduct a Crown-Aboriginal consultation.

10.0 MONITORING PLAN

As per section 20.(2) of the CEAA, Transport Canada is responsible for ensuring that mitigation measures will be implemented.

- Monitoring Plan to be developed for this Project? Yes ☐ No ☒
- Other RAs/FAs will assist in monitoring? Yes ☐ No ☒
- The Proponent will be reporting on implementation of mitigation measures? Yes ☒ No ☐

The proponent is committed to providing environmental protection and due diligence as integral components of Project development and operation. An Environmental Protection Plan (EPP) will be developed and included in the construction specifications to provide the contractor with procedures and guidelines that will be required to minimize adverse effects to the environment during Project construction and operation phases.

The EPP will describe mitigation measures relevant to each Project activity with reference to procedures and guidelines that address the environmental issues specific to the activity being performed and will be reviewed by federal authorities to ensure appropriate mitigation and practices are used. The content of the EPP will reflect; the details of final design, guidance from the final design engineers, experience of the contactors involved, site-specific considerations and relevant legal/regulatory requirements.

The General Contractor, all subcontractors, and the Project Construction Manager will ensure compliance with applicable federal and provincial environmental protection legislation and City by-laws. Relevant environmental protection measures that will be applied to this Project, and summarized in the EPP, will include but not be limited to:

- Noise control regulations within the City's Neighbourhood Liveability By-law
- *City of Winnipeg Motor Vehicle Noise Policies and Guidelines*
- Specific mitigation measures to protect the aquatic environment with adherence to:
  - *Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat* (Fisheries and Oceans Canada and Manitoba Natural Resources 1996)
  - Letters of advice provided for the project from Fisheries and Oceans Canada (DFO)
  - Applicable Fisheries and Oceans Canada Operational Statements for Manitoba for temporary stream crossings
- Emergency response planning outlining procedures that will be required to mitigate environmental effects of accidental spills, explosions, collisions and other unforeseen accidents that may occur during the Project construction and operation phases.
  - The contractor will provide an on-site emergency response coordinator(s) who will have the authority to direct manpower to respond in the event of a spill or environmental emergency

The EPP will identify inspection and reporting protocols to ensure that the contractor takes timely and appropriate action to address environmental issues that arise.

The proponent will also submit status reports on the implementation of mitigation to Transport Canada on a six (6) month interval basis, or at a frequency otherwise determined by Transport Canada in writing.

11.0 FOLLOW-UP PROGRAM

- Is a CEAA Section 38 follow-up program considered appropriate for this Project? Yes ☐ No ☒
- Follow-up program posted on the CEAR? Yes ☐ N/A ☒
- Other RAs/FAs will participate in the follow-up program? Yes ☐ N/A ☒

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13.0 CEAA DECISION

On the basis on this Screening report and in accordance with subsection 20. (1) of the CEAA, Transport Canada has determined that: *(check one only)*

☒ 20. (1)(a) Taking into account the implementation of any mitigation measures that Transport Canada considers appropriate, the Project is not likely to cause significant adverse environmental effects and, as such, Transport Canada may exercise any power or perform any duty or function that would permit the Project to be carried out in whole or in part.

☐ 20. (1)(b) Taking into account the implementation of any mitigation measures that Transport Canada considers appropriate, the Project is likely to cause significant adverse environmental effects that cannot be justified and, as such, Transport Canada shall not exercise any power or perform any duty or function conferred on it by or under any Act of Parliament that would permit the Project to be carried out in whole or in part.

☐ 20. (1)(c) Transport Canada is referring the Project to the Minister of the Environment for a referral to a Mediator or a Review Panel because:

- ☐ it is uncertain whether the Project, taking into account the implementation of any mitigation measures that Transport Canada considers appropriate, is likely to cause significant adverse environmental effects;
- ☐ the Project, taking into account the implementation of any mitigation measures that Transport Canada considers appropriate, is likely to cause significant adverse environmental effects and paragraph 20.(1)(b) of the CEAA does not apply; or
- ☐ public concerns warrant a reference to a Mediator or a Review Panel.

Decision Date:

14.0 SIGN-OFF

Project Title:	Waverley West Arterial Roads Project		
TC File No.:	RDIMS # 6317485		
NWPP File No.:	N/A		
CEAA Decision:			
Posted on CEAR:	Yes ☐ No ☐	CEAR No.:	10-01-59643

CEAA decision RECOMMENDED by:

Jeff Tindall Date: June 27/11

Title: **Jeffrey Tindall**
Senior Advisor, Environmental Assessment
Surface Infrastructure Programs, Transport Canada, NCR

The above has reviewed the environmental screening report, agrees that it meets the requirements of the CEAA and recommends the CEAA decision indicated above.

CEAA decision APPROVED by:

M Baril Date: JUNE 27/11

Title: **Manon Baril**
A/Director, Western Region-Highways and Borders
Surface Infrastructure Programs, Transport Canada, NCR

The above has reviewed the environmental screening report and approves the recommended CEAA Decision.

Mitigation Measures ACCEPTED by:

D Sacher Date: June 23/11

Title: for **Brad W. Sacher, P.Eng**
Director, Public Works Department
City of Winnipeg

The above has read and understood this environmental screening report and accepts responsibility for the implementation of the mitigation measures and related follow-up programs identified in the attached Monitoring Plan. The above will provide written confirmation of such implementation to Transport Canada according to frequencies prescribed in the attached Monitoring Plan. Furthermore, the above agrees to provide Transport Canada with access to project sites for ensuring that the mitigation measures and related follow-up programs have been implemented.

APPENDIX 1: FIGURES

Figure 4-1 – Study Area Location within the City of Winnipeg

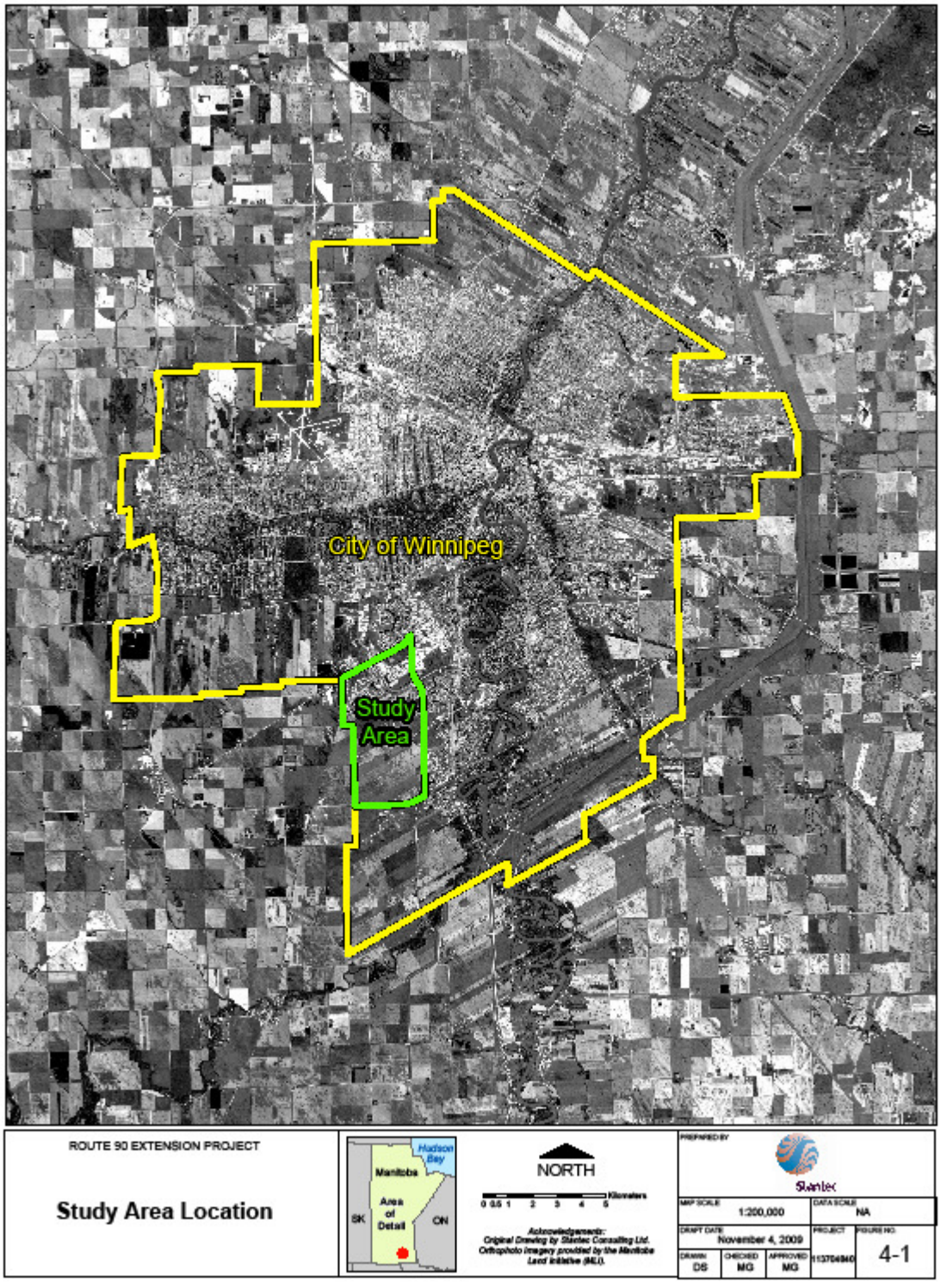


Figure 4-2 – Study Area Boundary of the Waverley West Arterial Project

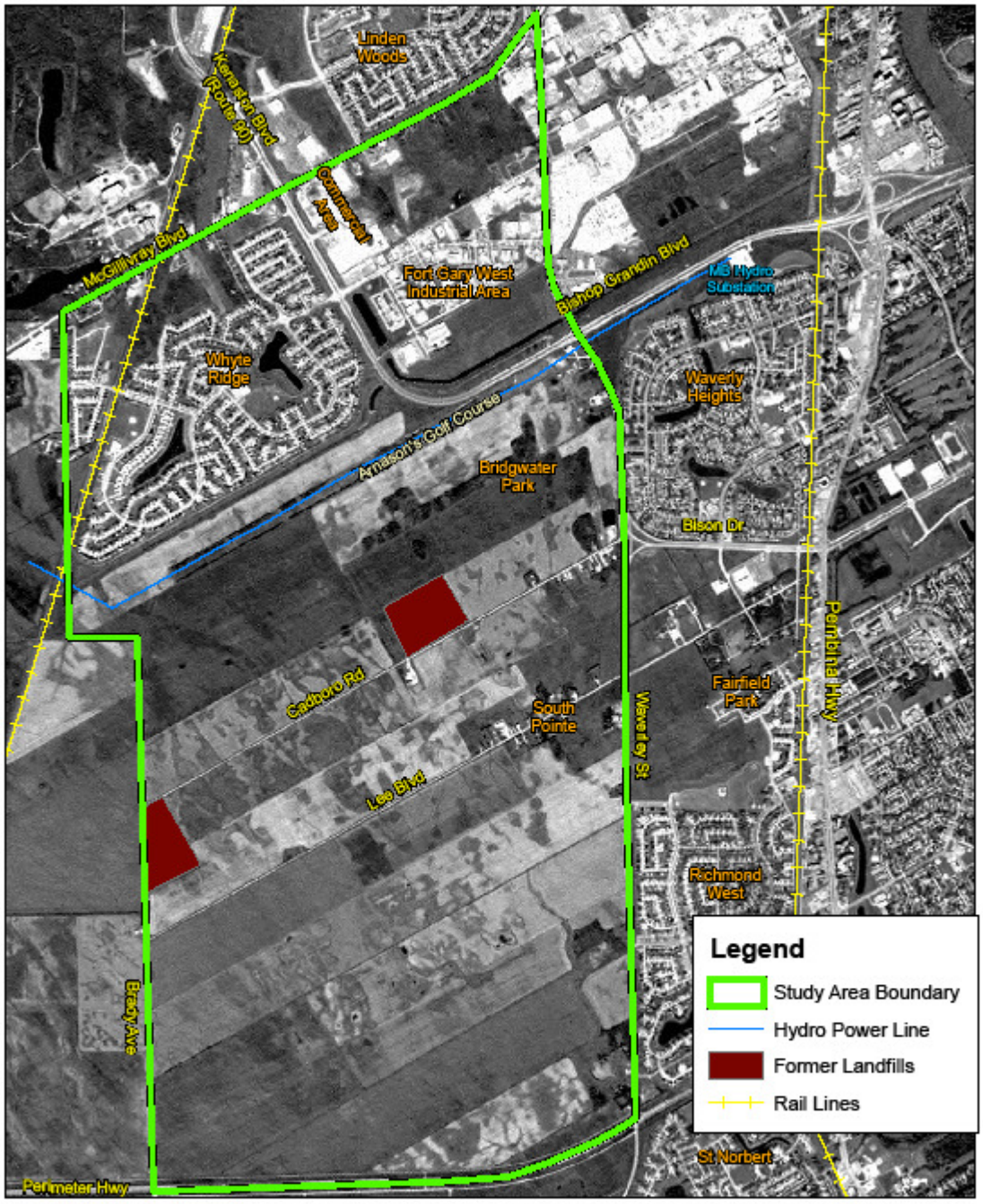


Figure 4-3 – Overview of the Future Waverley West Development Area

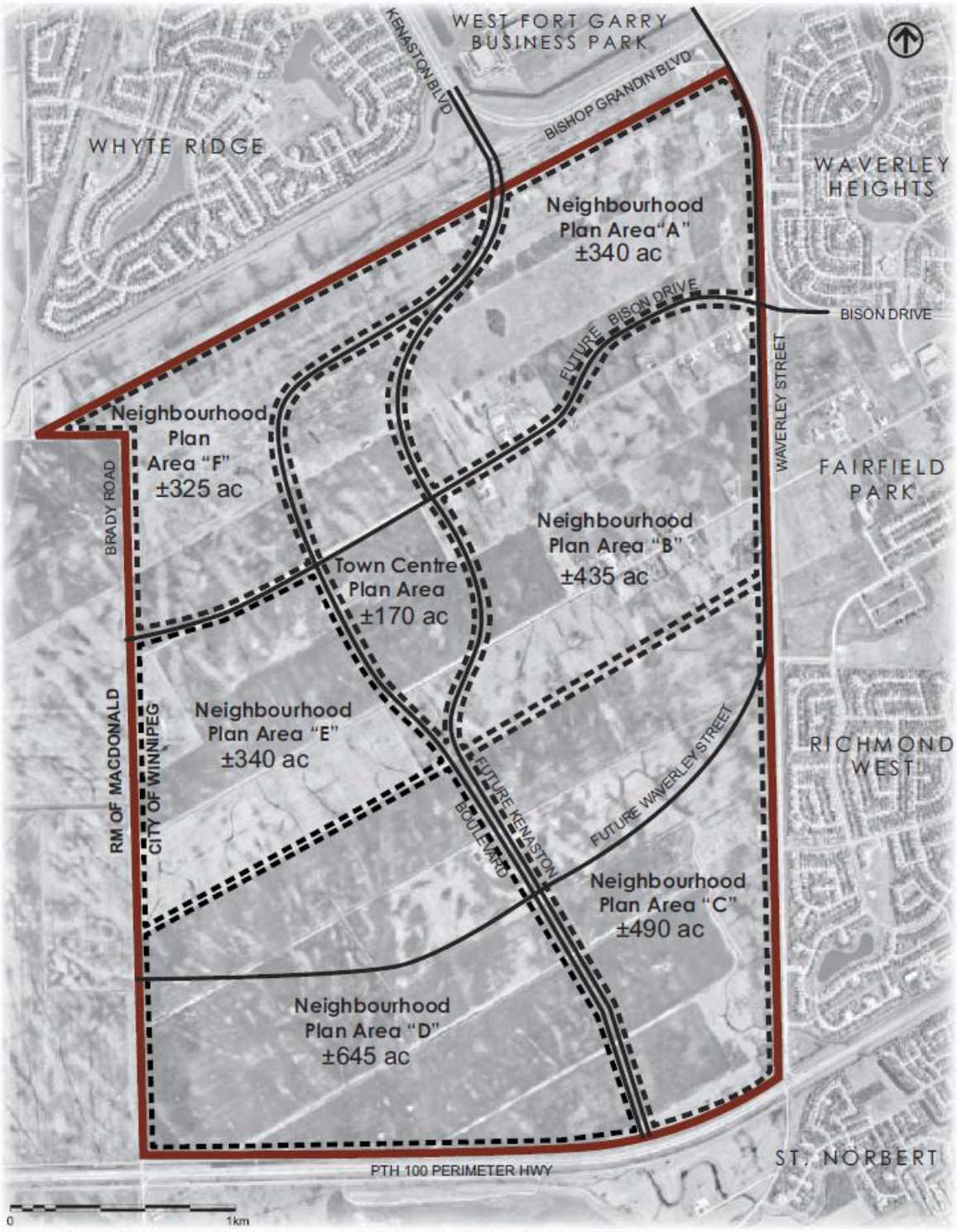


Figure 4-4 – Location Plan of Proposed Works

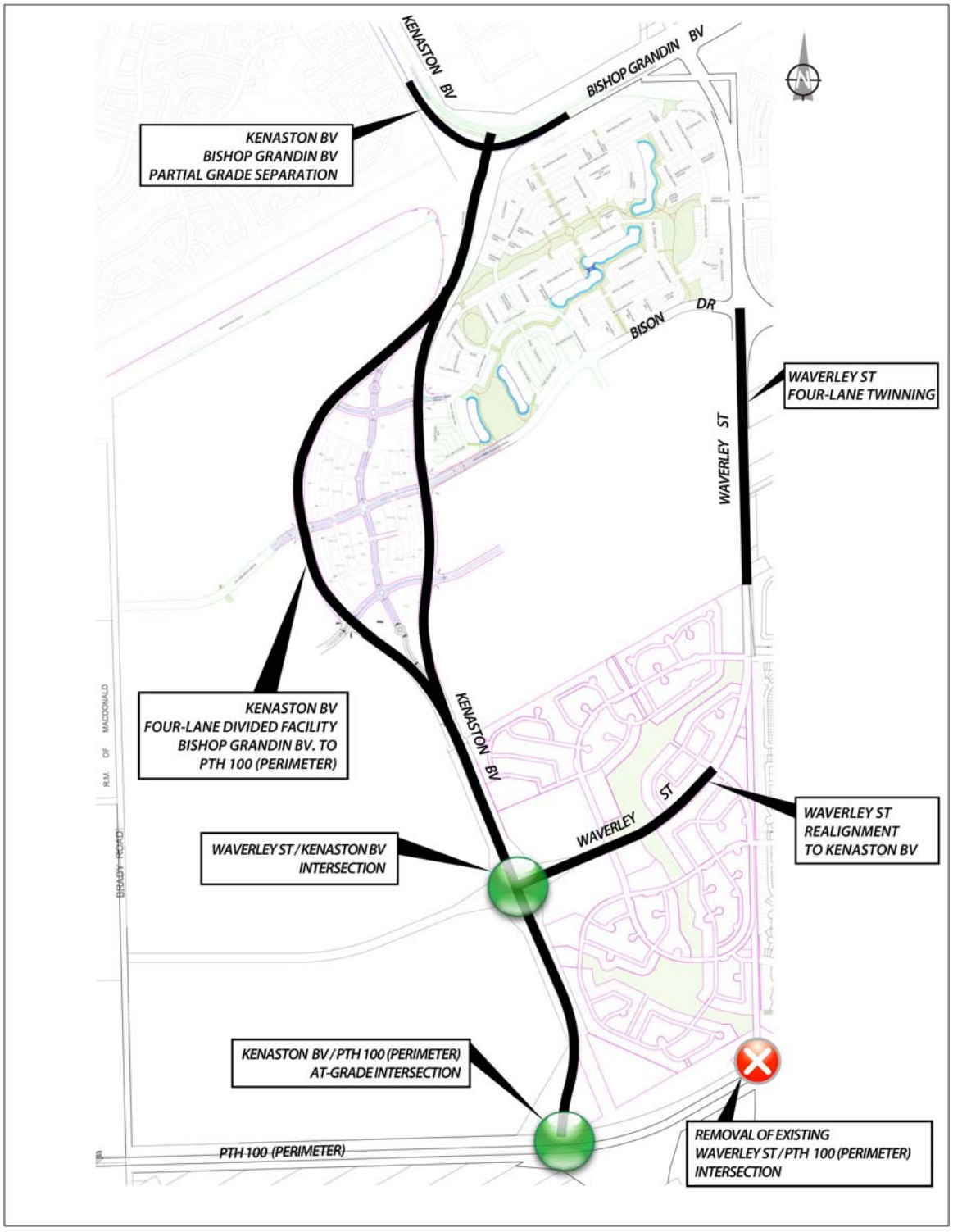
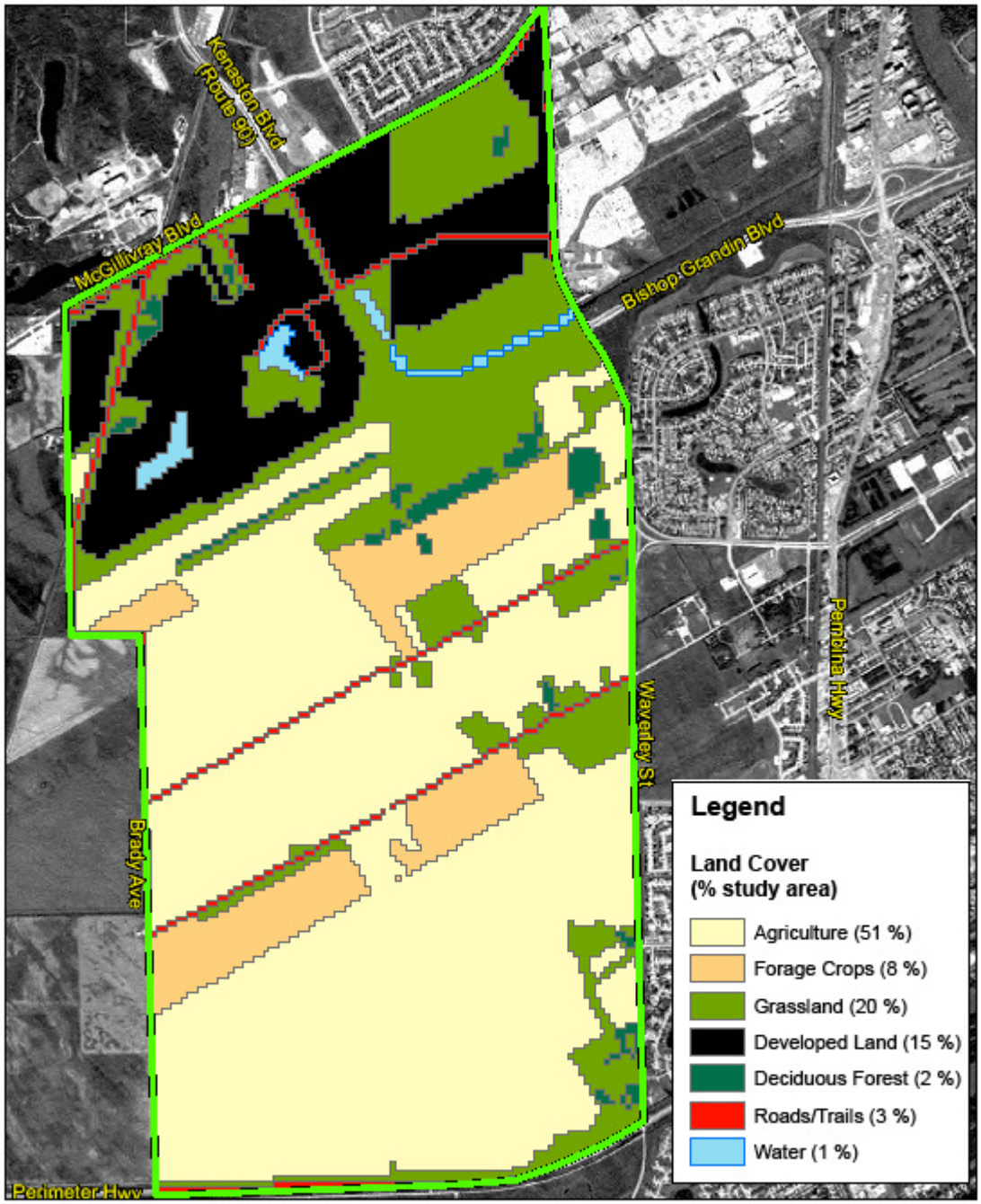


Figure 5-1 – Land cover and classification of Waverley West Study Area



ROUTE 90 EXTENSION PROJECT

Study Area Land Cover

NORTH

0 100 200 400 600 800 1,000 Meters

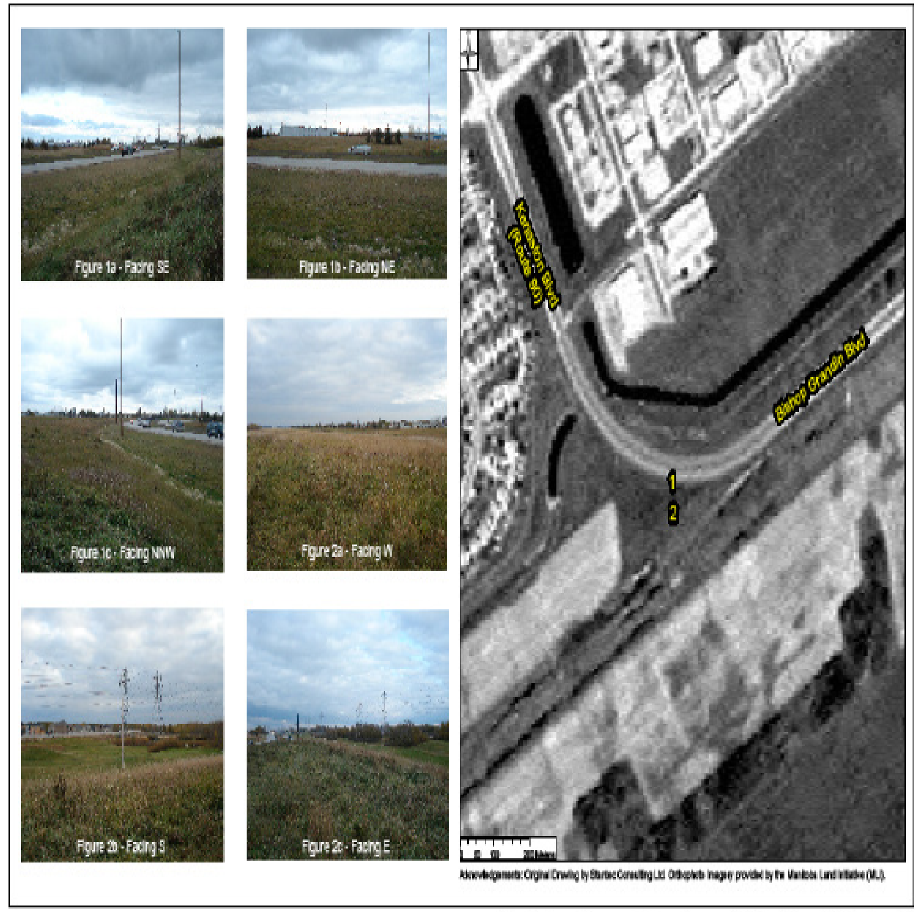
Acknowledgements:
Original Drawing by Stantec Consulting Ltd.
Orthophoto imagery and Landcover Data provided by the Manitoba Land Initiative (MLI).

PREPARED BY: Stantec

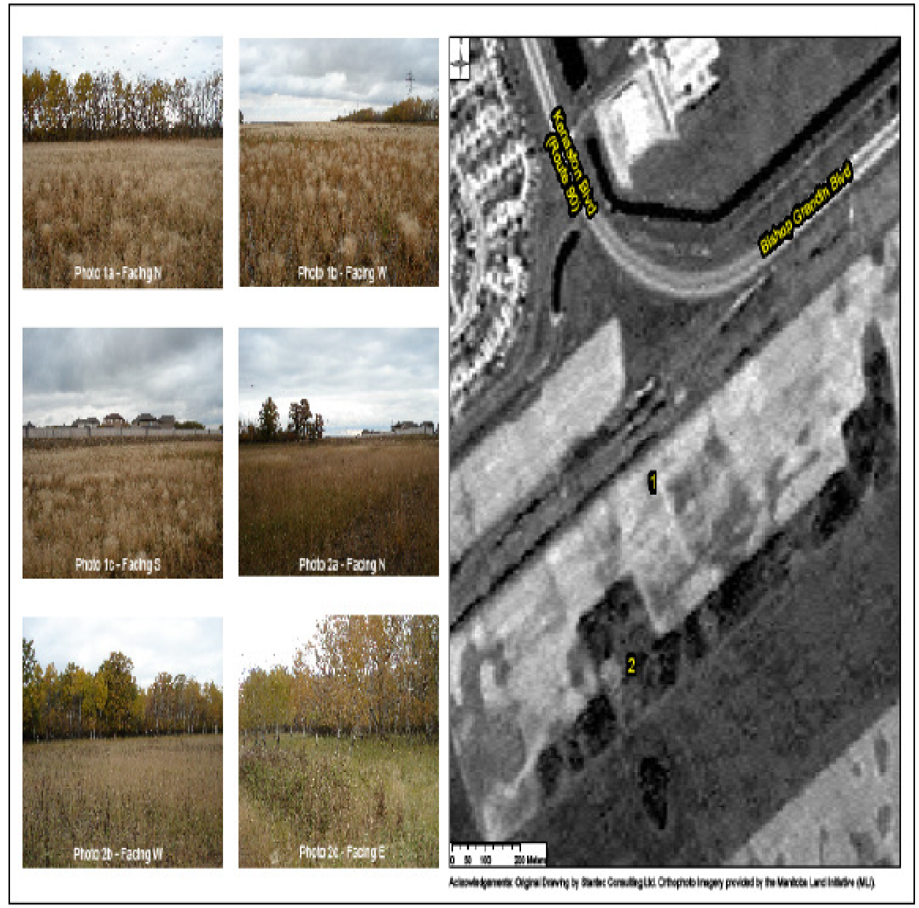
MAP SCALE	DATA SCALE
1:30,000	NA

DRAFT DATE: November 4, 2009

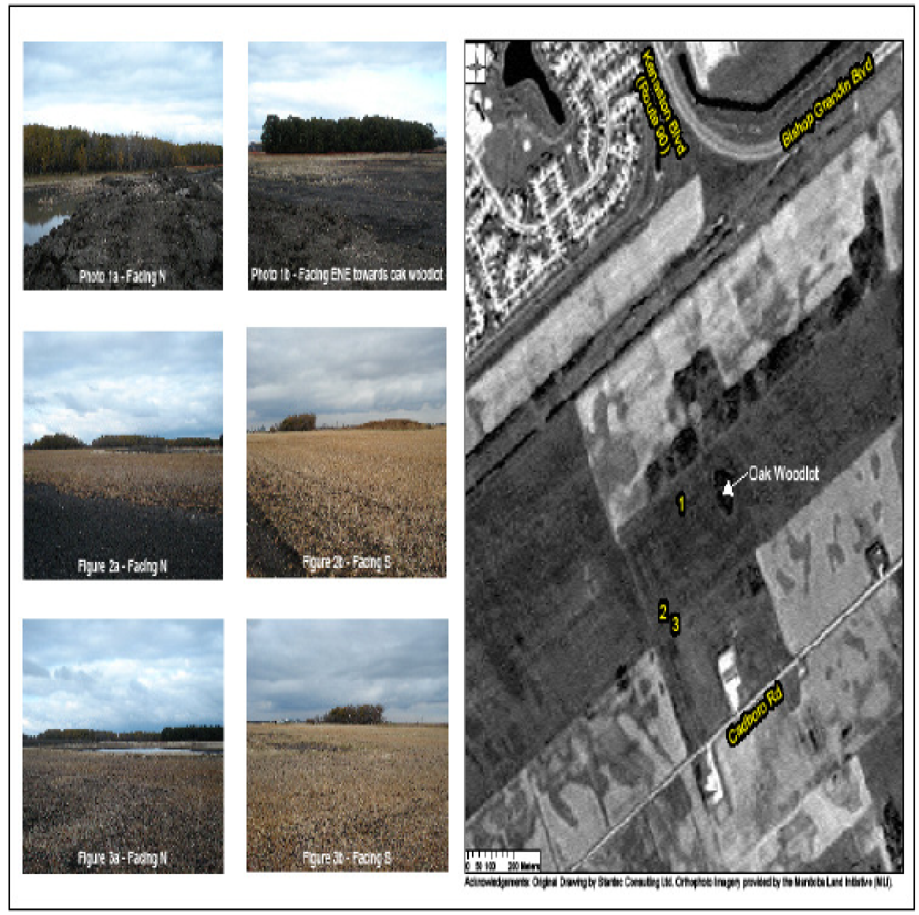
DRAWN	CHECKED	APPROVED	PROJECT	FIGURE NO.
DS	MG	MG	113704840	5-1



Land Cover Types at Kenaston and Bishop Grandin Boulevards
Appendix C, Figure 5-2



Land Cover in the Vicinity of the Proposed Kenaston Extension Area
Appendix C, Figure 5-3



Land Cover in the Vicinity of the Proposed Kenaston Extension Area
Appendix C, Figure 5-4

Figure 6-1 - Approximate Location of Small Semi-permanent Wetlands

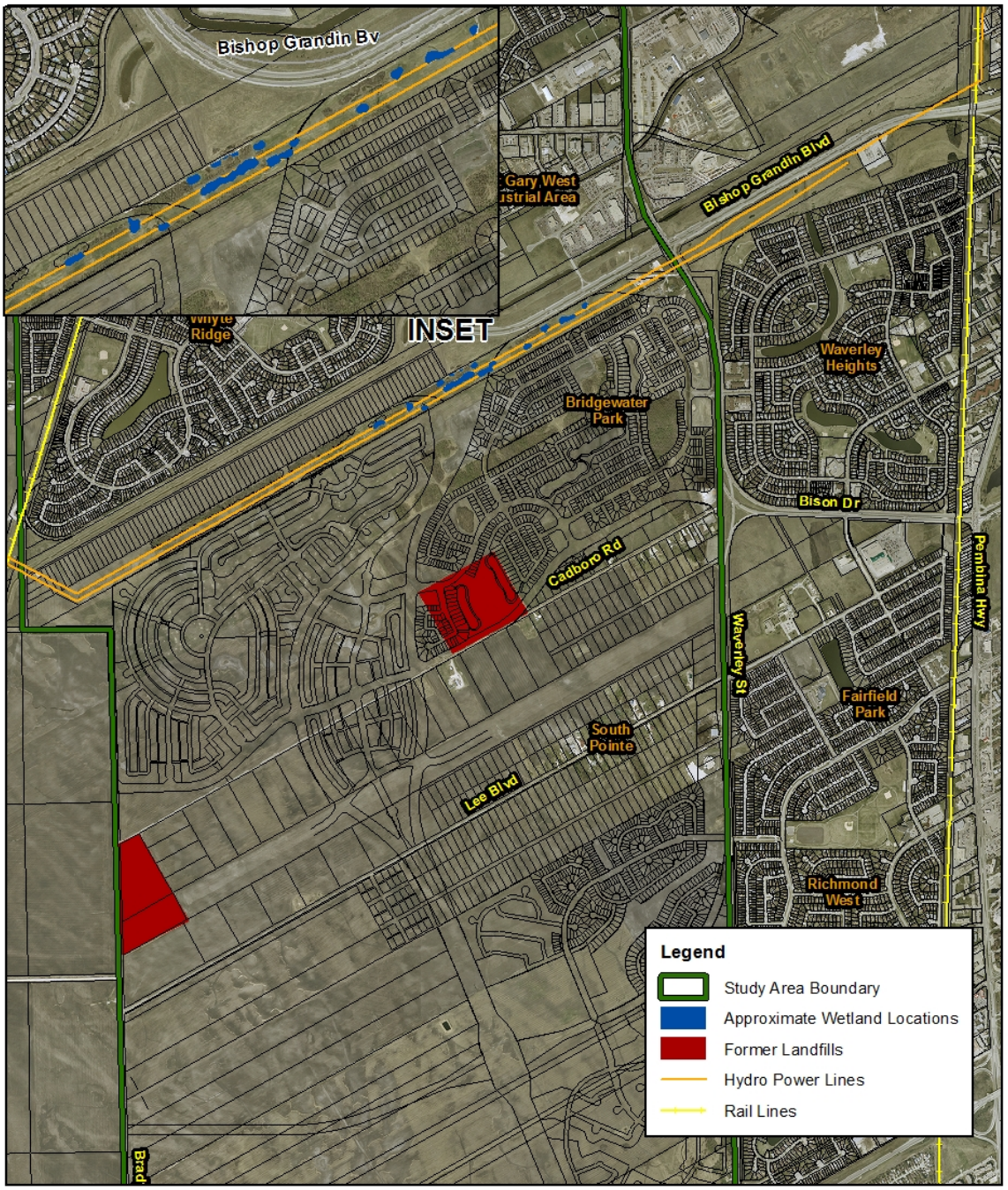
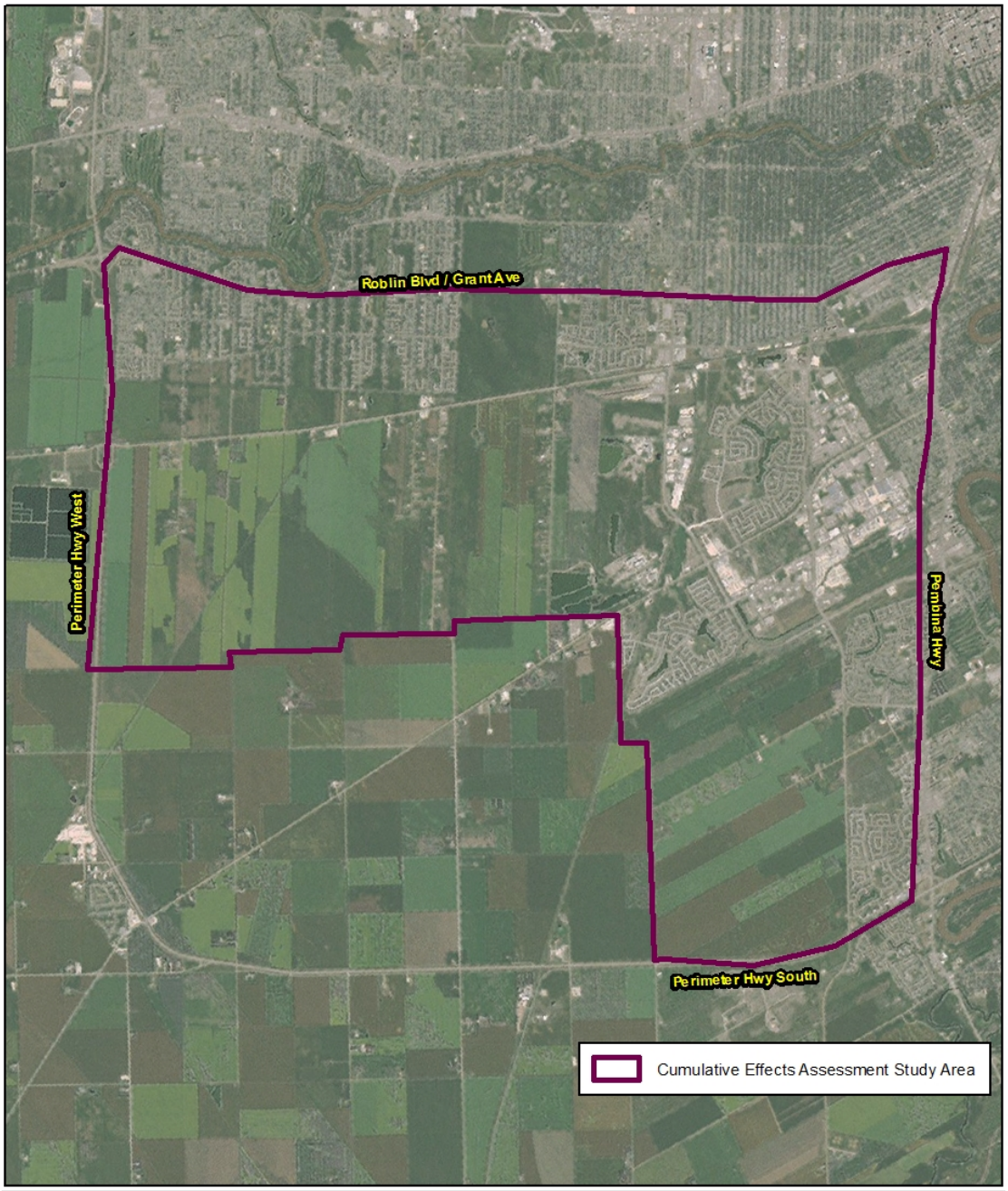


Figure 7-1 – Regional Boundary for Cumulative Effects Assessment



APPENDIX 2: TABLES

Table A-1: Bird Species Potentially Using the Regional Project Area

Scientific name	Common name	Status[b] within the Project Area
Gavia immer	Common Loon	B, M
Podilymbus podiceps	Pied-billed Grebe	B
Podiceps auritus	Horned Grebe	B
Podiceps grisegena	Red-necked Grebe	B
Podiceps nigricollis	Eared Grebe	B
Aechmophorus occidentalis	Western Grebe	B
Pelecanus erythrorhynchos	American White Pelican	B
Cygnus columbianus	Tundra Swan	M
Phalacrocorax auritus	Double-crested Cormorant	B
Botaurus lentiginosus	American Bittern	B
*Ixobrychus exilis**	Least Bittern*	B
Ardea herodias	Great Blue Heron	B
Grande aigrette	Great Egret	M
Nycticorax nycticorax	Black-crowned Night-Heron	B
Branta canadensis	Canada Goose	B
Chen caerulescens	Snow Goose	M
Aythya marila	Greater Scaup	B
Aix sponsa	Wood Duck	B
Anas crecca	Green-winged Teal	B
Anas americana	American Widgeon	B
Anas platyrhynchos	Mallard	B
Anas rubripes	American Black Duck	B
Anas discors	Blue-winged Teal	B
Anas acuta	Northern Pintail	B
Anas strepera	Gadwall	B
Anas clypeata	Northern Shoveler	B
Aythya valisineria	Canvasback	B
Aythya americana	Redhead	B
Aythya collaris	Ring-necked Duck	B
Aythya affinis	Lesser Scaup	B
Bucephala albeola	Bufflehead	B
Melanitta fusca	White-winged Scoter	M
Oxyura jamaixensis	Ruddy Duck	B

Scientific name	Common name	Status[b] within the Project Area
Bucephala clangula	Common Goldeneye	B
Clangula hyemalis	Long-tailed Duck	M
Lophodytes cucullatus	Hooded Merganser	B
Mergus merganser	Common Merganser	B
Mergus serrator	Red-breasted Merganser	M
Haliaeetus leucocephalus	Bald Eagle	B
Cathartes aura	Turkey Vulture	B, N
Circus cyaneus	Northern Harrier	B
Accipiter striatus	Sharp-shinned Hawk	B
Accipiter cooperii	Coopers Hawk	B
Accipiter gentilis	Northern Goshawk	B
Buteo platypterus	Broad-winged Hawk	B
Buteo lagopus	Rough-legged Hawk	M
Buteo jamaicensis	Red-tailed Hawk	B
*Buteo regalis**	Ferruginous Hawk*	B
Aquila chrysaetos	Golden Eagle	B
Buteo swainsoni	Swainson's Hawk	B
*Falco peregrinus**	Peregrine Falcon*	M
Falco columbarius	Merlin	B
Falco sparverius	American Kestrel	B
Perdix perdix	Gray Partridge	A, I
Bonasa umbellus	Ruffed Grouse	A
Tympanuchus phasianellus	Sharp-tailed Grouse	B
*Coturnicops noveboracensis**	Yellow Rail*	B
Rallus limicola	Virginia Rail	B
Prozana carolina	Sora	B
Fulica americana	American Coot	B
Grus canadensis	Sandhill Crane	M
*Charadrius melodus**	Piping Plover*	B
Pluvialis dominica	Lesser Golden-Plover	M
Pluvialis squatarola	Black-bellied Plover	M
Pluvier bronze	American Golden-Plover	M
Charadrius semipalmatus	Semipalmated Plover	M
Charadrius vociferus	Killdeer	B

Scientific name	Common name	Status[b] within the Project Area
Tringa solitaria	Solitary Sandpiper	B
Catoptrophorus semipalmatus	Willet	B
Tringa melanoleuca	Greater Yellowlegs	M
Tringa solitaria	Lesser Yellowlegs	M
Actitis macularia	Spotted Sandpiper	B
Tryngites subruficollis	Buff-breasted Sandpiper	M
Calidris himantopus	Stilt Sandpiper	M
Limnodromus griseus	Short-billed Dowitcher	M
Limnodromus scolopaceus	Long-billed Dowitcher	M
Bartramia longicauda	Upland Sandpiper	B
Limosa fedoa	Marbled Godwit	B
Limosa haemastica	Hudsonian Godwit	M
Gallinago gallinago	Wilson's Snipe	B
Phalaropus lobatus	Red-necked Phalarope	M
Scolopax minor	American Woodcock	B
Arenaria interpres	Ruddy Turnstone	M
Calidris melanotos	Pectoral Sandpiper	M
Calidris alpina	Dunlin	M
Calidris alba	Sanderling	M
Calidris fuscicollis	White-rumped Sandpiper	M
Calidris bairdii	Baird's Sandpiper	M
Calidris minutilla	Least Sandpiper	M
Calidris mauri	Western Sandpiper	M
Larus pipixcan	Franklin's Gull	B
Larus argentatus	Herring Gull	M
Larus philadelphia	Bonaparte's Gull	M
Larus delawarensis	Ring-billed Gull	B
Larus californicus	California Gull	B
Sterna hirundo	Common Tern	M
Sterna forsteri	Forster's Tern	B
Childonias niger	Black Tern	B
Sterna caspia	Caspian Tern	M
Columba livia	Rock Pigeon	A
Zenaida macroura	Mourning Dove	B

Scientific name	Common name	Status[b] within the Project Area
Otus asio	Eastern Screech Owl	A
Strix varia	Barred Owl	A
Asio otus	Long-eared Owl	B
Surnia ulula	Northern Hawk Owl	M
Aegolius funereus	Boreal Owl	A
*Asio flammeus**	Short-eared Owl*	B
Strix nebulosa	Great Gray Owl	B
Nyctea scandiaca	Snowy Owl	W
Aegolius acadicus	Nothern Saw-whet Owl	A
Chordeiles minor	Common Nighthawk	B
Caprimulgus vociferus	Whip-poor-will	B
Chaeura pelagica	Chimney Swift	B
Archilochus colubris	Ruby-throated Hummingbird	B
Ceryle alcyon	Belted Kingfisher	B
Sphyrapicus varius	Yellow-bellied Sapsucker	B
*Melanerpes erythrocephalus**	Red-headed Woodpecker*	B
Picoides pubescens	Downy Woodpecker	A
Picoides villosus	Hairy Woodpecker	A
Picoides arctus	Black-backed Woodpecker	A
Picoides tridactylus	American Three-toed Woodpecker	A
Colaptes auratus	Northern Flicker	B
Dryocopus pileatus	Pileated Woodpecker	A
Contopus borealis	Olive-sided Flycatcher	B
Empidonax flaviventris	Yellow-bellied Flycatcher	B
Empidonax alnorum	Alder Flycatcher	B
Empidonax traillii	Willow Flycatcher	B
Empidonax minimus	Least Flycatcher	B
Sayornis phoebe	Eastern Phoebe	B
Contopus virens	Eastern Wood-Pewee	B
Contopus sordidulus	Western Wood-Pewee	B
Myiarchus crinitus	Great Crested Flycatcher	B
Tyrannus verticalis	Western Kingbird	B
Tyrannus tyrannus	Eastern Kingbird	B
Eremophila alpestris	Horned Lark	B

Scientific name	Common name	Status[b] within the Project Area
Progne subis	Purple Martin	B
Vireo solitarius	Blue-headed Vireo	M
Vireo gilvus	Warbling Vireo	B
Vireo philadelphicus	Philadelphia Vireo	B, M
Vireo olivaceus	Red-eyed Vireo	B
Vireo flavifrons	Yellow-throated Vireo	B
Perisoreus canadensis	Gray Jay	B
Cyanocitta cristata	Blue Jay	A
Pica pica	Black-billed Magpie	A
Corvus brachyrhynchos	American Crow	B
Corvus corax	Common Raven	A
Tachycineta bicolor	Tree Swallow	B
Riparia riparia	Bank Swallow	B
Hirundo rustica	Barn Swallow	B
Stelgidopteryx serripennis	Northern Rough-winged Swallow	B
Parus atricapillus	Black-capped Chickadee	B
Parus hudsonicus	Boreal chickadee	A
Sitta canadensis	Red-breasted Nuthatch	A
Sitta carolinensis	White-breasted Nuthatch	A
Certhia americana	Brown Creeper	M
Troglodytes aedon	House Wren	B
Troglodytes troglodytes	Winter Wren	M
Cistothorus platensis	Sedge Wren	B
Cistothorus palustris	Marsh Wren	B
Regulus satrapa	Golden-crowned Kinglet	M
Regulus calendula	Ruby-crowned Kinglet	B
Sialia sialis	Eastern Bluebird	B
Sialia currucoides	Mountain Bluebird	B
Catharus fuscescens	Veery	B
Catharus ustulatus	Swainson's Thrush	M
Catharus minimus	Gray-cheeked Thrush	M
Catharus guttatus	Hermit Thrush	M
Turdus migratorius	American Robin	B
Dumetella carolinensis	Gray Catbird	B

Scientific name	Common name	Status[b] within the Project Area
Toxostoma rufum	Brown Thrasher	B
*Anthus spragueii**	Sprague's Pipit*	B
Anthus rubescens	American Pipit	M
Bombycilla garrulus	Bohemian Waxwing	W
bombycilla cedrorum	Cedar Waxwing	B
*Lanius ludovicianus**	Loggerhead Shrike*	B
Lanius excubitor	Northern Shrike	W
Sturnus vulgaris	European Starling	A
Vermivora peregrina	Tennessee Warbler	M
Vermivora celata	Orange-crowned Warbler	M
Vermivora ruficapilla	Nashville Warbler	M
Vermivora chrysoptera	Golden-winged Warbler	B/U
Dendroica petechia	Yellow Warbler	B
Dendroica pensylvanica	Chestnut-sided Warbler	M
Dendroica magnolia	Magnolia Warbler	M
Parula americana	Northern Parula	M
Dendroica tigrina	Cape May Warbler	M
Dendroica coronata	Yellow-rumped Warbler	M
Dendroica virens	Black-throated Green Warbler	M
Mniotilta varia	Black-and-white Warbler	M
Dendroica fusca	Blackburnian Warbler	M
Dendroica castanea	Bay-breasted Warbler	M
Dendroica striata	Blackpoll Warbler	M
Dendroica pinus	Pine Warbler	M
Dendroica palmarum	Palm Warbler	M
Setophaga ruticilla	American Redstart	B
Seiurus aurocapillus	Ovenbird	M
Seiurus noveboracensis	Northern Waterthrush	B
Oporornis agilis	Connecticut Warbler	B
Oporornis philadelphia	Mourning Warbler	M
Geothlypis trichas	Common Yellowthroat	B
Wilsonia canadensis	Canada Warbler	M
Wilsonia pusilla	Wilson's Warbler	M
Pipilo erythrophthalmus	Rufous-sided Towhee	B

Scientific name	Common name	Status[b] within the Project Area
Spizella passerina	Chipping Sparrow	B
Spizella pallida	Clay-colored Sparrow	B
Ammodramus savannarum	Grasshopper Sparrow	B
Pooecetes gramineus	Vesper Sparrow	B
Chondestes grammacus	Lark Sparrow	B
Spizella arborea	American Tree Sparrow	M
Zonotrichia querula	Harris' Sparrow	M
Zonotrichia leucophrys	White-crowned Sparrow	M
Passerella iliaca	Fox Sparrow	M
Passerculus sandwichensis	Savannah Sparrow	B
*Ammodramus bairdii**	Baird's Sparrow*	B
Ammodramus leconteii	Le Conte's Sparrow	B
Ammodramus caudacutus	Sharp-tailed Sparrow	B
Melospiza melodia	Song Sparrow	B
Melospiza lincolnii	Lincoln's Sparrow	M
Melosppiza georgiana	Swamp Sparrow	B
Zonotrichia albicollis	White-throated Sparrow	M
Calcarius lapponicus	Lapland Longspur	M
Calcarius pictus	Smith's Longspur	M
Plectrophenax nivalis	Snow Bunting	W
Junco hyemalis	Dark-eyed Junco	B
Passerina cyanea	Indigo Bunting	B
Dolichonyx oryzivorus	Bobolink	B
Agelaius phoeniceus	Red-winged Blackbird	B
Sturnella neglecta	Western Meadowlark	B
Xanthocephalus xanthocephalus	Yellow-headed Blackbird	B
Euphagus carolinus	Rusty Blackbird	B
Euphagus cyanocephalus	Brewer's Blackbird	B
Quiscalus quiscula	Common Grackle	B
Molothrus ater	Brown-headed Cowbird	B
Icterus galbula	Northern Oriole	B
Piranga olivacea	Scarlet Tanager	B
Carpodacus purpureus	Purple Finch	B
Loxia leucoptera	White-winged Crossbill	W

Scientific name	Common name	Status[b] within the Project Area
Loxia curvirostra	Red Crossbill	A
Spiza americana	Dickcissel	B
Carduelis pinus	Pine Siskin	B
Carduelis tristis	American Goldfinch	B
Cocoothraustes vespertinus	Evening Grosbeak	A
Pinicola enucleator	Pine Grosbeak	W
Passer domesticus	House Sparrow	A
Cardurlis hornemanni	Hoary Redpoll	W
Cardurlis flammea	Common Redpoll	W

Source: Godfrey 1986; Birds of North America (2009) online at: http://bna.birds.cornell.edu/bna

a Either breeding within, migrating through and/or stopping over during migration, winter resident or year round resident

b Note: B = breeding, M = migrant, P = permanent resident, N = northern extent of range, W = winter range, I = introduced, A=year-round, U= Unknown (no records of occurrence)

* species at risk (i.e. listed by the Manitoba Endangered Species Act [MBESA) and/or Schedule 1 of the federal Species at Risk Act [SARA})

Refer to Table A-4 for a list of the status of species at risk

Table A-2: Mammals Potentially Inhabiting the Project Area

Scientific name	Common name
Odocoileus virginianus	White-tailed deer
Canis latrans	Coyote
Vulpes vulpes	Red fox
Ursus americanus	Black bear
Mephitis mephitis	Striped skunk
Procyon lotor	Raccoon
Castor canadensis	Beaver
Ondatra zibethicus	Muskrat
Mustela rixosa	Least weasel
Mustela erminea	Shorttail weasel
Mustela frenata	Longtail weasel
Mustela vison	Mink
Erethizon dorsatum	Porcupine
Sylvilagus floridanus	Eastern cottontail
Lepus townsendi	Whitetail jackrabbit
Lepus americanus	Snowshoe hare
Marmota monax	Woodchuck
Taxidea taxus	Badger
Condylura cristata	Starnose mole
Blarina brevicauda	Short-tail shrew
Sorex palustris	Northern water shrew
Microsorex hoyi	Pygmy shrew
Sorex cinereus	Masked shrew
Sorex arcticus	Arctic shrew
Zapus hudsonius	Meadow jumping mouse
Peromyscus maniculatus	Deer mouse
Napaeozapus insignis	Woodland jumping mouse
Onychomys leucogaster	Northern grasshopper mouse
Microtus pennsylvanicus	Meadow vole
Microtus ochrogaster	Praire vole
Spermophilus tridecemlineatus	Thirteen-lined ground squirrel
Citellus franklini	Franklin ground squirrel
Citellus richardsoni	Richardson ground squirrel

Scientific name	Common name
Thomomys talpoides	Northern pocket gopher
Tamias striatus	Eastern chipmunk
Sciurus carolinensis	Eastern gray squirrel
Tamiasciurus hudsonicus	Red Squirrel
Glaucomys sabrinus	Northern flying squirrel
Myotis lucifugus	Little brown bat
Myotis septentrionalis	Northern myotis
Lasionycteris noctivagans	Silver-haired bat
Lasiurus borealis	Red bat
Eptesicus fuscus	Big brown bat
Lasiurus cinereus	Hoary bat

Source: Banfield 1984

Table A-3: Reptiles and Amphibians Potentially Inhabiting the Project Area

Scientific Name	Common Name
Opheodrys vernalis	Smooth Green Snake
Thamnophis radix haydeni	Western Plains Garter Snake
Thamnophis sirtalis parietalis	Red-sided Garter Snake
Storeria occipitomaculata occipitomaculata	Northern Redbelly Snake
Chrysemys picta belli	Western Painted Turtle
Chelyfra serpentina serpentina	Common Snapping turtle*
*Rana pipiens**	Northern Leopard Frog*
Rana sylvatica	Wood Frog
Pseudacris triseriata maculata	Boreal Chorus Frog
Bufo americanus hemiophrys	Canadian Toad
Bufo americanus	American Toad
Ambystoma tigrinum diaboli	Gray Tiger Salamander
Necturus maculosus maculosus	Mudpuppy

Source: Preston 1982

* listed by SARA and COSEWIC as a species of "special concern"

Table A-4: Terrestrial Species at Risk* Potentially Occurring in the Vicinity of the Project Site

Common Name	Scientific Name	Category			Probability of Occurring at the Project Site	Rationale[e]
		COSEWIC[a]	MBESA[b]	SARA[c]		
Birds						
Chimney Swift	*Chaeura pelagica*	Threatened		Threatened	Low (for breeding) to moderate (for foraging)	Nests in urban and rural chimneys, tall snags of old growth forest; forages for insects over a variety of habitats including open areas and wetlands
Loggerhead Shrike (*excubitoride*, prairie population subspecies)	*Lanius ludovicianus excubitorides*	Threatened	Endangered	Threatened	Low to Moderate	118 individuals in MB in 2002; inhabits a wide variety of open habitats, including grasslands, sagebrush stands, pastures, agricultural areas and thinly wooded areas with small trees and shrubs where it can nest and forage. This shrike has a preference for small bushy trees and dense or thorny bushes.
Loggerhead Shrike (*migrans* subspecies)	*Lanius ludovicianus migrans*	Endangered	Endangered	Endangered	Low	Approximately 5 breeding pairs in MB; inhabits open ranges with occasional trees and shrubs that provide nesting sites and perches from which to hunt.
Golden-winged Warbler	*Vermivora chrysoptera*	Threatened	-	Threatened	Low to Moderate	Small populations are found in a narrow corridor along the transition between prairie and forest from the far southeast of the province, near Winnipeg, to the border with Saskatchewan to the northwest. Nests are placed on the ground within patches of herbs and low scattered shrubs and trees associated with a forested edge used for song posts and foraging. Examples of some preferred habitat areas present at the Project site include hydro/utility right-of-ways and field edges.
Vascular Plants						
Riddell's Goldenrod	*Solidago riddellii*	Special Concern	Threatened	Special Concern	Low	Inhabits undisturbed roadside ditches and allowances, and wet prairie habitats in SW MB.

a = Committee on the Status of Endangered Wildlife in Canada
b = Manitoba's The Endangered Species Act
c = Species at Risk Act (Schedule 1)
E = Source: various COSEWIC species status reports found at:http://www.cosewic.gc.ca
* Species at Risk as listed by Manitoba's The Endangered Species Act (MBESA) and/or 'Threatened' or 'Endangered' in Schedule 1 of the federal Species at Risk Act (SARA) that may potentially reproduce within the Project Site