9.0 Effects assessment and mitigation

9.1 Biophysical environment

9.1.1 Physical / meteorological environment

9.1.1.1 Groundwater

Boundaries

The temporal boundaries for the assessment of potential environmental effects of the Project on groundwater resources include the duration of Project construction, operation and maintenance. Operation and maintenance of the Project will begin following construction and will occur throughout the life of the Project.

The potential for Project environmental effects on groundwater resources will peak during construction, and will diminish during operation and maintenance phases.

The spatial boundaries for the environmental effects assessment of groundwater resources are as follows:

Local Assessment Area (LAA): The LAA includes the PAA and is defined as a 500 m radius around the station site. This is the maximum area where Project-specific potential environmental effects on groundwater resources are likely to occur and can be predicted or measured with a reasonable degree of accuracy and confidence.

Regional Assessment Area (RAA): The RAA includes the LAA and is defined as a 5 km radius within which potential cumulative environmental effects stemming from Project-related construction and operation and maintenance may occur (Map 9-2).

There are no administrative or technical boundaries for the assessment of groundwater resources.

Potential environmental effects

The assessment of groundwater resources focuses on near surface groundwater resources, specifically the lenses of sand and gravel aquifers within the till layer which overly the carbonate bedrock. These can be common in the Project regional assessment area.

Project interactions with groundwater resources have the potential to effect shallow groundwater quantity and quality. Normal pile foundation construction could intersect an aquifer but is not expected to negatively affect groundwater resources in terms of either flow or quality. However, in flowing well areas the potential exists for disturbance from construction activities, including drilling or foundation installations, to result in direct groundwater discharge to the surface or interconnections of aquifers, if auger holes are not sealed properly or quickly enough.

Groundwater resources could also be negatively affected by spills or accidents.

During Project operations, application of herbicides for vegetation management at the site could affect shallow groundwater quality through leaching of applied herbicides. Under normal application conditions, most herbicide chemicals used in vegetation management programs degrade within the unsaturated zone above the water table (vadose zone).

The environmental effects analysis is summarized in Table 9-1.

Mitigation

To reduce risk to groundwater, geotechnical drilling will be conducted prior to site works to better characterize local groundwater conditions. Should drilling reveal shallow groundwater conditions, measures will be put in place to manage conditions on site, including using licenced well drilling contractors.

Mitigation measures intended to minimize potential Project-related effects to groundwater quality and quantity to acceptable levels include, but are not limited to:

- using qualified drillers with appropriate experience;
- monitoring water levels during drilling and foundation installation;
- having emergency response plans in place for sealing/grouting and pumping in artesian areas;
- having an emergency spill kit on-site in case of fluid leaks or spills from machinery; and
- following all applicable permits and provincial regulations when using herbicides as required to control vegetation growth.

Table 9-1: Environmental effects analysis for groundwater

Environmental Effect	Mitigation Measures	Residual Effects	Evaluation
Changes in shallow groundwater quantity / quality of sand and gravel aquifers.	• Using qualified drillers with appropriate experience. • Monitoring water levels during drilling and foundation installation. • Having emergency response plans in place for sealing / grouting and pumping in artesian areas. • Having an emergency spill kit on-site in case of fluid leaks or spills from machinery. • Following all applicable permits and provincial regulations when using herbicides as required to control vegetation growth.	Small change to groundwater quantity or quality	Low

Residual effect and significance

Residual effects on groundwater were determined to be low adversity. The potential environmental effects will be restricted to the local assessment area and would only last for a short period of time during the construction phase. With the implementation of the above noted mitigation measures the potential effects of the Project on groundwater are considered not significant.

9.1.2 Fish and fish habitat

9.1.2.1 Boundaries

The temporal boundaries for potential environmental effects assessment of the Project on fish and fish habitat include the duration of the Project construction and operation and maintenance. Operation and maintenance of the Project will begin following construction and will continue throughout the life of the Project.

The potential for effects to fish and fish habitat is highest during the construction phase when the potential for erosion and sedimentation is highest

The spatial boundaries for the environmental effects assessment of fish and fish habitat are defined below.

Local Assessment Area (LAA): The LAA consists of the Project PAA and extends 100 m upstream and 300 m downstream of the Project site on Tourond Creek. The LAA represents the area where indirect or secondary effects of construction and operation and maintenance on fish and fish habitat are likely to be most pronounced or identifiable.

Regional Assessment Area (RAA): The RAA includes the LAA and the Rat River Watershed.

9.1.2.2 Potential Project effects

Potential effects of the proposed Project to fish and fish habitat include release of sediment or hazardous materials (deleterious substances) into Tourond Creek which in turn could affect fish or fish habitat.

The dike on the south side of Tourond Creek separates the station site from the creek. The Project site is generally flat. During a heavy rain event, surface water from the site would flow to the ditch along Suncrest road, through a small culvert under Suncrest Road, through another set of culverts through the dike into Tourond Creek.

Riparian vegetation along the creek at this location is grass and is maintained to the edge of the creek. There will be no change to the riparian vegetation.

The environmental effects analysis is summarized in Table 9-2.

Mitigation

The following mitigation measures will be implemented to minimize the potential effects to fish and fish habitat:

- erosion protection and sediment control measures will be put in place prior to commencement of construction activities and will remain intact for the duration of construction;
- erosion protection and sediment control installations will only be removed after disturbed areas are protected and sediments are disposed of;
- construction activities will be suspended during extreme wet weather events where erosion protection and sediment control measures are compromised;
- orientation for Contractor and Manitoba Hydro employees working in construction areas will include erosion protection and sediment control techniques and procedures;

- the Contractor will be responsible for implementing and maintaining Erosion Protection and Sediment Control measures prior to commencement of construction activities;
- the Contractor will be responsible for modifying erosion protection and sediment control installations to ensure continued effectiveness;
- the Contractor will communicate erosion protection and sediment control information to all Project staff and a copy will be made available at the Project site; and
- the Environmental Inspector will make regular inspections of erosion protection and sediment control measures to confirm implementation and continued effectiveness.

Table 9-2: Environmental effects analysis for fish and fish habitat

Environmental effect	Key mitigation measures	Residual effects	Evaluation
Release of deleterious substances (sediment; hazardous materials) to the aquatic environment	• Erosion and Sediment control measures	• Release of deleterious substances into the aquatic environment	Low

Residual effect and significance

Residual effects on fish and fish habitat were determined to be low adversity. The potential environmental effects will be restricted to the LAA and would only last for a short period of time (construction). With the implementation of the above noted mitigation measures the potential effects of the Project on fish and fish habitat are considered not significant.

9.1.3 Wildlife and wildlife habitat

9.1.3.1 Boundaries

The temporal boundaries for the assessment of potential environmental effects of the Project on wildlife and wildlife habitat include the periods of construction, and operation and maintenance of the Project.

Operation and maintenance of the Project will begin following construction and will be carried out until Project decommissioning.

The spatial boundaries for the environmental effects assessment of wildlife and wildlife habitat include:

Local Assessment Area (LAA): The LAA is defined as a 2 km radius, centred on the station site. The LAA is the area where indirect or secondary environmental effects of construction, and operation and maintenance are likely to be most pronounced or discernible.

Regional Assessment Area (RAA): The RAA includes the LAA and the Rat River Watershed.

9.1.3.2 Potential Project effects

Potential effects of the proposed Project to wildlife and wildlife habitat include change in habitat availability and mortality risk from workforce presence, material hauling, stripping / stockpiling / excavating / grading soils, machinery operation, equipment testing, site operation and maintenance.

The proposed Project site has been extensively altered from its natural state by agricultural development including cultivation and water drainage. The proposed Project site, including adjacent agricultural developed properties, provide little to no wildlife habitat. A narrow strip of riparian vegetation adjacent to the proposed Project site near Tourand creek drain provides only minimal habitat for a few species of birds, mammals, and amphibians. No species of conservation concern are known to occur at the Project site. Due to the lack of suitable wildlife habitat, there is little risk of an increase in wildlife mortality risk.

There will be no change in the baseline condition for wildlife and wildlife habitat with the development of the proposed Project. There will be no change to the riparian habitat within the adjacent Tourond Creek drain.

The environmental effects analysis is summarized in Table 9-3.

Mitigation

The following mitigation measures will be implemented to minimize the potential effects to wildlife and wildlife habitat:

- material hauling will be restricted to established roads, trails and cleared construction areas;
- vehicle, equipment and machinery operators will perform a daily inspection for fuel, oil and fluid leaks and will immediately shutdown and repair any leaks found. All machinery working near watercourses will be kept clean and free of leaks;
- In instances where construction must occur during sensitive breeding bird timing periods, nest sweeps will be conducted to reduce risk of disturbing nesting birds;
- applying applicable buffers and setbacks during construction activities for any bird nesting

and breeding sites;

- hunting and harvesting of wildlife or possession of firearms by Project staff will not be permitted while working on the Project site; and
- station will be designed, operated and maintained to Manitoba Hydro standards, guidelines and procedures to minimize the possibility of wildlife accidently coming in contact with electrified components.

Table 9-3: Environmental effects analysis for wildlife and wildlife habitat

Environmental effect	Key mitigation measures	Residual effects	Evaluation
Mortality due to: • vehicular collisions • accidental electrocution and/or death of wildlife that come in contact with electrified components	• Material hauling will be restricted to established roads, trails and cleared construction areas. • Station will be designed, operated and maintained to Manitoba Hydro standards, guidelines and procedures to minimize the possibility of wildlife accidently coming in contact with electrified components.	Wildlife mortality may occur during material hauling	Low
Machinery operation, equipment testing, coolant installation, and site operation may result in fluid leaks and disturbance to wildlife and wildlife habitat.	• Vehicle, equipment and machinery operators will perform a daily inspection for fuel, oil and fluid leaks and will immediately shutdown and repair any leaks found. All machinery working near watercourses will be kept clean and free of leaks.	Release of deleterious substances into the surrounding environment.	Low
Machinery operation and stripping / stockpiling, excavating / grading may result in disturbance to nesting birds.	• Applying applicable buffers and setbacks during construction activities for any identified bird nesting and breeding sites.	Disturbance to nesting birds.	Low

Table 9-3: Environmental effects analysis for wildlife and wildlife habitat

Environmental effect	Key mitigation measures	Residual effects	Evaluation
Change in habitat availability due to presence of the station	NA	Loss of wildlife habitat	Low

Residual effect and significance

Residual effects on wildlife and wildlife habitat were determined to be low adversity. The environmental effect will be restricted to the local assessment area, which supports little to no wildlife or wildlife habitat. No species of conservation concern are known to occur at the local assessment area. With the implementation of the above noted mitigation measures the potential effects of the Project on wildlife and wildlife habitat are considered not significant.

9.2 Socioeconomic environment

9.2.1 Land use and ownership

Boundaries

The temporal boundaries for the assessment of potential environmental effects of the Project on land use and ownership include the construction and operation and maintenance phases of the Project. Operation and maintenance of the Project will begin following construction and will be carried out until Project decommissioning.

The spatial boundaries for the environmental effects assessment of land use and ownership include:

Local Assessment Area (LAA): The LAA is the area encompassed by the boundary of the property being purchased; and

Regional Assessment Area (RAA): The RAA includes a one mile radius surrounding the property .

Potential environmental effects

The assessment of land use and ownership focuses on the transfer of ownership of the property and the effects on previous land use at the station site (i.e., agriculture). The station

will be located on the northerly portion of NE-35-6-4E (approximately 74 acres). The landowner has accepted an offer to purchase the property at fair market value by Manitoba Hydro where the station will be located; this parcel will be owned by Manitoba Hydro. The landowner requested modifications to the land title which would enable the landowner to retain access to an adjacent parcel of land.

The current land use on the property is for agricultural purposes and, therefore, there will be no opportunity for the current landowner to farm the property where the station will be located.

The environmental effects analysis is summarized in Table 9-4.

Mitigation

The following mitigation measures will be implemented to minimize the potential effects to land use and ownership:

- purchase of property at the station site at fair market value; and
- Manitoba Hydro made accommodations with the landowner to change the footprint of the area purchased so he could maintain access to an adjacent land parcel via an access road.

Table 9-4: Environmental effects analysis for land use and tenure

Environmental effect	Key mitigation measures	Residual effects	Evaluation
Transfer ownership of affected parcel	• Offer fair market value for purchase of property where station will be located	Loss of ownership interest of parcel.	Low
Change of agricultural activities due to presence of station	• Offer fair market value for purchase of property where station will be located	Elimination of agricultural activities at station site	Low

Residual effect and significance

Purchase of the property where the station will be located for fair market value is the key mechanism to address the effects of change in land ownership and elimination of agricultural activities. The effects will be limited to the LAA, but will occur for the life of the Project. With

the application of mitigation measures the above effects are consider low adversity and, therefore, not significant.

9.2.2 Employment and economy

Boundaries

The temporal boundaries for the assessment of potential environmental effects of the Project on Employment and Economy includes only the construction phase of the Project since any operation and maintenance activities will be carried out by existing Manitoba Hydro employees and any indirect business opportunities will occur when the workforce is at its largest (i.e., construction phase).

The spatial boundaries for the environmental effects assessment of employment and economy include:

Local Assessment Area (LAA): The LAA is the area encompassed by southern Manitoba. This area is the region most likely to be drawn upon for employment needs. Due to the highly specialized nature of the Project, more than likely a contract will be awarded to companies who reside outside the immediate vicinity of the Project; and

Regional Assessment Area (RAA): The RAA includes the same area as the LAA for this VC as this is the region in which both Project and cumulative effects are likely to be experienced.

Potential Project effects

Construction of the new station will take approximately 2.5 years to construct. There will be approximately 100 workers in total required at different stages of Project construction.

Construction of the station will take place in three stages. Construction commences with civil works which includes site clearing and preparation, installing foundations, and erecting any necessary buildings. The workforce is expected to peak during this stage of construction at approximately 45 workers. Towards the completion of civil works, risers, buswork, and steel structures will be erected. The workforce will peak at 12 workers for this stage of construction. Following the erection of structures, electrical work will proceed. The workforce is expected to peak at approximately 12 workers during this stage of construction.

All decisions pertaining to employment needs will be decided during the final design and awarding of the contract. It is anticipated that due to the specialized nature of the work, the contract will be awarded to companies who reside outside of the immediate vicinity of the

Project. Furthermore, any employment opportunities that do occur will be short-term in duration and only occur during the construction phase of the Project.

Regarding business effects, modest indirect, positive business effects could be expected by communities in the vicinity of the station through the purchase of meals and gasoline and potentially accommodations by the contractors, as well as incidental purchases of repairs and parts for construction vehicles and equipment during the construction phase.

The environmental effects analysis is summarized in Table 9-5.

Mitigation

No mitigation is planned as Project effects are anticipated to be positive.

Table 9-5: Environmental effects analysis for employment and economy

Environmental effect	Key mitigation measures	Residual effects	Evaluation
Project will provide employment opportunities	• N/A	Increase in employment opportunities during construction	Low
Project will provide indirect business opportunities	• N/A	Increase in business opportunities during construction	Low

Residual effect and significance

Effects are predicted to be positive; however, due to the small workforce required for the Project, its short-term duration and limited business opportunities, positive effects on employment and economy will be minimal.

9.2.3 Infrastructure and services

The Infrastructure and Services VC includes individual effects on emergency services, including: hospital usage due to Project-related accidents and fire services, as well as effects related to interference with radio frequency devices and traffic. Effects on emergency services will be addressed together, and effects related to interference with radio frequency devices and traffic will be addressed separately. The residual effect and significance determination of the VC is made at the end of the section.

Boundaries

The temporal boundaries for the assessment of potential effects of the Project on infrastructure and services include the construction phase when the workforce is at its largest, except interference with radio frequency devices which occurs during the operations and maintenance phase.

The spatial boundaries for the environmental effects assessment of infrastructure and services include:

Local Assessment Area (LAA): The LAA for understanding effects to emergency services and traffic includes the RMs of De Salaberry and Hanover due to the location of the provision of services. This area is the region in which emergency services are managed, and therefore most likely to experience effects related to the Project.

The LAA for understanding effects to radio interference is 1.6 km as this is the area in the immediate vicinity of the station where there is a possibility for interference; and

Regional Assessment Area (RAA): The RAA for emergency services, traffic and radio frequency includes 5 km as this is the region in which both Project and cumulative effects are likely to be experienced.

Potential Project effects – emergency services

The Project will contribute to a temporary increase in the local population due to an influx of workers during Project construction. This temporary increase in population has the potential to affect local infrastructure and services by changing the availability and/or quality of infrastructure and services for local residents on a temporary basis. The presence of workers during construction has the potential to increase the demand for emergency services (e.g., hospitals, firefighting). It is not anticipated that policing would be affected by the Project.

Given the relatively modest amount of workers required for construction during any phase (45 workers maximum) and short-term duration of construction (i.e., 2.5 years), it is anticipated that there will be limited additional demand for emergency services during the construction phase. Existing emergency services should be able to accommodate the small and temporary day-time increase in workers in the area.

For example, regarding hospital/ambulance usage due to accidents, it was calculated based on the workforce estimates the number of injuries that would occur over the construction phase using Safe Work Manitoba 2000-2012 data that estimated 7.9 injuries per 100 full-

time workers. The number of injuries was estimated for peak, average monthly and total injuries are as follows for the Project:

- 0.46 injuries at peak month;
- 0.17 average monthly injuries during construction; and
- 5.2 total injuries for construction.

A total of 5.2 injuries over 2.5 years of construction should not impact the ability of the Bethesda Hospital to provide services for the workforce.

In the event there is a fire during the construction phase at the site, in accordance with provincial regulations, the Contractor would also be required to maintain firefighting trained workers and fire suppression systems at construction sites. The incremental demand placed on local firefighting services is anticipated to be negligible due to the frequency of the occurrences and the number of fire departments in close proximity to the Project as indicated in section 7.2.3.3.

Mitigation

The following mitigation measures will be implemented to minimize the potential effects to emergency services:

- the contractor will have an:
    - Emergency Response Plan (ERP);
    - onsite first aid, fire-fighting; and
    - security procedures.
- all Project personnel will be made aware of the ERP and designated staff will receive ERP training. Among other elements, the plan will address handling and storage of materials, driving safety, animal encounters, emergency response communications, spill response, personnel injury response and vehicle accidents. The plan will describe response measures for major medical emergencies and include procedures for emergency response coordination with local emergency response personnel and local medical facilities;
- First Aid – Manitoba Hydro and its contractors will meet or exceed the requirements of Manitoba Workplace Safety and Health Act. Manitoba Hydro or relevant contractors will provide first aid supplies and facilities, and trained first aid personnel to deal with minor injuries. In the case of major injuries, medical aid will be summoned and/or evacuation via land or air ambulance to medical facilities will be undertaken; and
- all emergency services will be notified of construction activities.

Potential Project effects - radio frequency devices

There is often concern regarding the interference of radio frequency devices from transmission lines and stations (e.g., TV antenna and satellite dishes, radio, cellular phones). Electrical interference from a proposed station on radio and television equipment is not normally a problem because most transmission lines and stations transmit their radio noise below the operating range of most Radio Frequency devices. The most common cause of such interference occurs when loose electrical hardware causes unintended arcing. These situations are managed through proper construction and routine maintenance (e.g., tightening of hardware components). Manitoba Hydro will attempt to resolve any radio or television interference problems traceable to the new station; however, proximity to such receptors were considered during routing (e.g., homes/commercial building) and, therefore, no effects are anticipated during the operation and maintenance phase.

Mitigation

The following mitigation measures will be implemented to minimize the potential effects to Radio Frequency Devices:

- Manitoba Hydro will meet the requirements of The Radio Communications Act (R.S., 1985, c. R-2 [as amended to 2007-07-09];
- Manitoba Hydro will meet the Radio Communication Regulations (SOR/96-484, Registration 5 November 1996 [as amended to 2011-02-17]); and
- Manitoba Hydro also meets the requirements of the Industry Canada's Interference-Causing Equipment Standard - ICES-004 Issue 3 December, 2001 - Alternating Current High Voltage Power Systems.

Potential Project effects - traffic

During the construction phase of the Project, materials, equipment and workers will be transported to and from the site using different types of vehicles. Vehicles will include excavators, loaders, dozers, graders, backhoes, cranes, semi-trailers, dump trucks, tracked vehicles, pick-up trucks, drill rigs and all-terrain and support vehicles. There will be increased traffic on Highway 59 and 52 which could lead to concerns regarding localized congestions, safety concerns and a need for permits.

Efforts will be made to utilize transportation routes that can accommodate the increase in traffic to transport materials and equipment to address concerns of congestion and safety. Two major highways are in the vicinity of the Project – Provincial Trunk Highways (PTHs) 59

and 52 which are identified as primary arterial by MIT. Utilizing roadways with increased capacity should result in no impact on traffic congestion on these major roadways due to the roadways currently operating under capacity.

There may be a minor impact on traffic congestion at the primary access to the station site, which will be via Suncrest Road off PTH 52. Heavy construction equipment will use Suncrest Road for the duration of construction. All necessary safety signs and offsets will conform to MI standards. Manitoba Hydro will also need to construct a new access point from Suncrest Road to the station site with a culvert along the ditch. The access road is currently under design. It will meet the requirements for the weight of equipment required to access the site.

In addition to traffic volumes and safety, another concern includes the impact on the quality of roadways from the transportation of large equipment and station components. All materials transported by truck on provincial highways are subject to provincial weight restrictions. The primary routes to transport heavy machinery and station equipment (PTH 52 and 59) are designed to allow for heavy loaded vehicles which will minimize impacts to the roadways. During the course of the Project, if Manitoba Hydro or its contractors need to operate overloaded vehicles on provincial highways, all necessary permits (e.g., overweight permits) will be acquired and any restrictions (e.g., Spring Road Restrictions) will be respected.

The environmental effects analysis is summarized in Table 9-6.

Mitigation

Mitigation of potential Project effects on traffic include:

- construction methods and timing will be designed to minimize traffic disruption to the extent possible;
- if Manitoba Hydro or its contractors need to operate overloaded vehicles on provincial highways, all necessary permits (e.g., overweight permits) will be acquired and any restrictions (e.g., Spring Road Restrictions) will be adhered to; and
- all necessary safety signs and offsets will conform to MI standards.

Table 9-6: Environmental effects analysis for infrastructure and services

Environmental effect	Mitigation measures	Residual effects	Evaluation
Increased demand on	• Emergency Response Plan • On-site first aid, firefighting	• Minimal increase in demand on	low

Table 9-6: Environmental effects analysis for infrastructure and services

Environmental effect	Mitigation measures	Residual effects	Evaluation
Emergency Services (hospital usage and firefighting)		emergency services	
Change in traffic volumes/congestion	• Construction methods and timing will be designed to minimize traffic disruption to the extent possible. • All necessary safety signs in the vicinity of Suncrest Road and offsets will conform to MI standards.	Increase in traffic volumes / congestion	Low
Road quality impacts due to transportation of station components	• if Manitoba Hydro or its contractors need to operate overloaded vehicles on provincial highways, all necessary permits will be acquired and any restrictions (e.g., spring road restrictions) will be adhered to.	Negative effect on road quality due to transportation of station components	Low
Interference with Radio Frequency Devices	• Manitoba Hydro will meet the requirements of *The Radio Communications Act* (R.S., 1985, c. R-2 [as amended to 2007-07-09] and the Radio Communication Regulations (SOR/96-484, Registration 5 November 1996 [as amended to 201 I-02-17]). Manitoba Hydro also meets the requirements of the Industry Canada's Interference-Causing Equipment Standard- ICES-004 Issue 3 December, 2001 - Alternating Current High Voltage Power Systems.	Possible interference with Radio Frequency Devices	Low

Table 9-6: Environmental effects analysis for infrastructure and services

Environmental effect	Mitigation measures	Residual effects	Evaluation
	• Manitoba Hydro will attempt to resolve any radio or television interference problems traceable to the new station.		

Residual effect and significance

With the implementation of mitigation measures, small workforce and short-term duration of the effects (i.e., construction phase) there will be minimal increase in demand on emergency services; limited opportunity for effects on radio frequency devices and limited impact on traffic congestion/safety and road quality due to the small scale of the Project and implementation of mitigation measures. Therefore, a low adversity rating was assigned and effects are considered not significant.

9.2.4 Heritage resources

Boundaries

The temporal boundaries for the assessment of potential effects of the Project on heritage resources includes only the construction phase when heritage resources have the potential to be disturbed.

The spatial boundaries for the environmental effects assessment of heritage resources include:

Local Assessment Area (LAA): The LAA for understanding effects to heritage resources include the property purchased for Project due to the in situ nature of new heritage resources.

Regional Assessment Area (RAA): The RAA for heritage resources includes a 1.0 mile radius around and encompassing the property to include effects related to projects in proximity to the Project.

Potential Project effects

Based on existing site data from the Historic Resources Branch (HRB) there are no heritage sites located at the proposed station site. In the event that previously unknown heritage resources or burials are unearthed or exposed during construction, work will cease and the Project archaeologist will be contacted to provide further direction.

The environmental effects analysis is summarized in Table 9-7.

Mitigation

Mitigation of potential Project effects on heritage resources includes pre-construction archaeological work at station site.

In addition to the measures developed in the environmental protection plan, a Cultural and Heritage Resources Protection Plan (Appendix B) has been developed to specifically deal with potential effects. It includes the following measures:

- All archaeological finds discovered during site preparation and construction will be left in their original position until the Project Archaeologist is contacted and provides instruction;
- Orientation information will include typical heritage resource materials and reporting procedures;
- The Contractor will report heritage resource materials immediately to the Construction Supervisor will cease construction activities in the immediate vicinity until the Project Archaeologist is contacted and prescribes instruction; and
- Relevant measures within the Cultural and Heritage Resource Protection Plan will be adhered to during construction and operations phases of the Project.

Table 9-7: Environmental effects analysis for heritage resources

Environmental effect	Mitigation measures	Residual effects	Evaluation
Identification of unknown heritage resources or burials at station site	• Pre-construction archaeological work in Project footprint • Follow relevant measures outlined in the Cultural and Heritage Resource Protection Plan	• Disturbance of unknown heritage resources or burials	low

Residual effect and significance

No heritage resource sites are located at the Project site based on HRB data. Therefore, the potential for unknown archaeological sites being discovered during clearing and construction remains low, especially since the Project site is disturbed due to existing agricultural activities. While there is low potential, there could be unknown heritage resource sites brought to light during clearing and construction of the site. Pre-construction archaeological work should limit the possibility. Damage to unknown heritage sites was considered unlikely and therefore, the effect is considered not significant.

9.2.5 Health (including noise, air emissions, EMF, aesthetics)

Health effects related to the Project are largely nuisance-based and/or perceived health effects, except for aesthetics. The following section will include a discussion on effects due to noise, air emissions, EMF and aesthetics during the Project phases. Each effect will be discussed separately, but the residual effects and significance determination on the VC "health" will be discussed collectively.

Boundaries

The temporal boundaries for the assessment of potential effects on health are:

- noise – occurs during construction and operations and maintenance phases;
- electric and Magnetic Fields (EMF) – EMF only occurs during operation and maintenance phase;
- air quality – Discernable air quality effects occur during construction phase; and
- aesthetics –occurs during station construction and once the station is in operation.

The spatial boundaries for the environmental effects assessment of health include:

- Noise – Local Assessment Area (LAA): The LAA is defined as a 1.6 km radius centered on the station site. This is the area where direct or secondary environmental effects of construction and operation and maintenance are likely to be most pronounced or discernable;
- Electric and Magnetic Fields (EMF) – The LAA is defined as the station site, where immediate Project effects are anticipated to occur;
- Air quality– LAA: The LAA is defined as a 3.2 km radius centered on the station site. This is the area where direct or secondary environmental effects of construction and operation and maintenance are likely to be most pronounced or discernable as dust from construction activities may be experienced within this radius; and
- Aesthetics LAA: The LAA is defined as a 5 km radius centered on the station site. This is the area where direct or secondary environmental effects of construction and operation

and maintenance are likely to be most pronounced or discernable as the Project may be visible from this distance.

9.2.5.1 Noise

Potential Project effects

During the construction phase of the proposed Project there will be increased noise and vibration levels from vehicles and equipment and activities including clearing, grading and drilling. Table 9-8 identifies sound levels for some of the machinery that could be used for the Project during the construction phase and other activities for the sake of comparison.

Table 9-8 Construction noise sources (Golder Associates 2008)

Source Name	Sound Power (dBA)	Type
Blast noise	137	Highly Impulsive
Back-up alarm	115	Impulsive, tonal
Feller	111	Continuous
Skidder	105	Continuous
Wheeled loader	110	Continuous
Hand held chainsaw	110	Continuous
Track dozer	116	Continuous
Excavator/hoe	110	Continuous
Compressor	94	Continuous
Dump/highway/logging trucks	116	Continuous
Concrete truck	107	Continuous
Generator	110	Continuous
65/80t crane	116	Continuous
Medium backhoe	100	Continuous
Rough terrain crane	111	Continuous
Hydraulic hammer pile driver	137	Impulsive
Helicopter - lift type, approach and takeoff	139	Continuous
Helicopter - lift type at hover or flyover	131	Continuous

During construction there will be intermittent, elevated noise levels in the vicinity of the Project site. The site is zoned for agricultural use where activities that include elevated noise levels are permissible. Proximity to residential development and receptors were taken into consideration during the site selection process to ensure the site is not situated near these

receptors. Furthermore, the station is located adjacent to PTH 52 which experiences elevated noise levels due to traffic.

During operation of the station, the principal source of continuous noise will be the operation of the transformer units themselves. There are CSA standards and other related standards respecting transformers and permissible noise levels (CSA 2014). For regulation of ambient daytime and nighttime noise levels, Manitoba Sustainable Development does not enforce specific noise limits but instead will review nuisance noise in the event that five complaints have been reported by residents. These standards will be adhered to by Manitoba Hydro. As noted earlier, nuisance based effects such as proximity to residential receptors were taken into consideration during the site selection process. There are no residential properties located within one mile of the station site. Given the location of the proposed station site in an agricultural use area where elevated noise levels are a common occurrence, noise levels are not expected to be a concern during the operations phase.

Mitigation

The following mitigation measures will be implemented to minimize the potential noise effects during construction and operations and maintenance phases:

- Manitoba Hydro will meet the requirements of CSA and other related standards regarding noise associated with station equipment;
- the RMs of De Salaberry and Hanover will be notified at the start of construction activities; and
- Work at the station site will conform to the hours set out in the noise by-law for nuisance-based activities.

9.2.5.2 EMF

Electric and magnetic fields associated with the proposed Project will only occur during the operations phase. The electrical system carries power from generating stations to homes by transmission lines, stations and distribution lines. Each component of the system produces electric and magnetic fields in the extremely low frequency range that includes 60 Hz.

Electric fields are due to a system's voltage and area measured in kilovolts per meter (kv/m). Magnetic fields are due to the flow of electrical current and are measured in milligauss (mG). Electric and magnetic field (EMF) levels measured near any source depend upon a number of factors but diminish rapidly with increasing distance from the source. Station equipment is configured in such a way that fields drop off quickly with distance. At the fence surrounding a

station, the EMF levels are typically within the range of background levels, except where the transmission lines cross.

Canadian (Manitoba Clean Environment Commission (2001)) and international studies including World Health Organization (2007) and International Agency for Research on Cancer (2001) have concluded that there is insufficient scientific evidence showing exposure to low EMFs can cause adverse health effects. Health Canada (2004) states that there is no conclusive evidence of any harm caused by exposures at levels normally found in Canadian living environments.

While Manitoba Hydro is sensitive to public concerns regarding potential health effects from electric and magnetic fields, there is at present no scientific evidence to justify modification of existing practices respecting facilities for the generation, transmission and distribution of electricity. Manitoba Hydro continues to undertake the following actions regarding the issue:

- monitoring of worldwide research programs on electric and magnetic fields for its large scale projects; and
- maintaining communications and provision of technical information to interested parties, including the public and agencies responsible for public and occupational health and the environment.

No mitigation measures are required.

9.2.5.3 Air quality

Potential Project effects

The effects of transmission stations and lines on air quality have been reported by Manitoba Hydro for its other projects. Potential effects include local increases in fugitive dust and emissions as a result of vehicular traffic and the use of heavy equipment during construction. The storage and dispensing of fuels such as gasoline and diesel, and storage of lubricants has the potential to cause localized effects on air quality. The proposed station may result in increased fugitive dust, increased nitrogen oxide, sulfur dioxide, greenhouse gases and volatile organic compound emissions, and decreased carbon dioxide absorption in the vicinity of the Project site during the construction phase due to machinery operation.

Mitigation

Mitigation measures include:

- using acceptable dust control measures such as water or approved dust suppression agents on gravel roads to limit the amount of airborne dust;
- storage, handling and transport of fuels will be in accordance with Manitoba Conservation's Storage and Handling of Petroleum Products and Allied Petroleum Products Regulation and guidelines as well as Manitoba Hydro's Code of Practice for Storage and Handling of Petroleum Products and Allied Petroleum Products Storage Tank Systems (2003) and Environmental Protection Guidelines, Construction, Operation and Decommissioning, Manitoba Hydro Work Sites and Facilities (2006); and
- hazardous substances will be subject to provincial and federal workplace hazardous materials information system regulations and guidelines, and the Manitoba Workplace Safety and Health, Workplace Safety and Health Regulation, and will be managed in accordance with Manitoba Hydro's Hazardous Materials Management Handbook (2016b).

9.2.5.4 Aesthetics

Potential Project effects

Aesthetic concerns regarding development are often associated with the physical presence of the infrastructure.

The land within the LAA consists primarily of agricultural properties interspersed with rural residences, a major highway, and a major transmission line (Bipole III). In the immediate vicinity of the Project the land is flat with few trees primarily located within shelterbelts. A wooded area is visible from the Tourond Creek Discovery Center (TCDC).

The station will be visible from PTH 52 and Suncrest Road. The physical presence appearance or profile of transmission stations and transmission lines may cause visual or aesthetic concerns for drivers along these routes. Visual disturbance is situationally specific. There are no residential properties/homes located within one mile of the station site. The proposed station site is approximately 1.25 miles south-east of the nearest receptor. This receptor and all adjacent homes have shelterbelts that create a visual screening/barrier between the receptors and the station.

Proximity to residential development and zoning was considered during the site selection process to address aesthetic concerns. Compatible zoning was a consideration during the site selection process. The section to host the proposed development is designated as "Agriculture 1". Along with a full range of agriculture use, "Agriculture 1" also permits the

expansion of existing livestock operations to a maximum of 600 animal units and new livestock operations to a maximum of 600 animal units. The area in the immediate vicinity of the station site has commercial agricultural operations.

Excluding residential and agricultural properties, the closest recreational/interpretive opportunity is TCDC. The TCDC is located approximately one mile east of the station site. The TCDC was developed as an outdoor classroom that would serve school classes in surrounding school divisions. There is a large wooded area directly west of the property (NE-36-6-4E) that will provide screening. The station will be a net addition to the visual rural landscape but will not substantially alter the existing situation.

The environmental effects analysis is summarized in Table 9-9.

Table 9-9: Environmental effects analysis for health effects

Environmental effect	Mitigation measures	Residual effects	Evaluation
Elevated noise levels during construction and operation	• Work at the station site will conform to the hours set out in the noise by-law for nuisance-based activities • The RMs of De Salaberry and Hanover will be notified at the start of construction activities • Meet CSA standards related to noise associated with station equipment.	• Temporary increase in noise during construction phase and a small increase in noise during operations phase at station site	low
Elevated EMF levels due to station operation	• N/A	• Small increase in EMF levels at station site	low

Table 9-9: Environmental effects analysis for health effects

Environmental effect	Mitigation measures	Residual effects	Evaluation
Elevated levels of fugitive dust and gases during construction phase	• Use acceptable dust control measures such as water or approved dust suppression agents on gravel roads to limit the amount of airborne dust. • Storage, handling and transport of fuels will be in accordance with MSD Storage and Handling of Petroleum Products and Allied Petroleum Products Regulation and guidelines as well as Manitoba Hydro's Code of Practice for Storage and Handling of Petroleum Products and Allied Petroleum Products Storage Tank Systems (2003) and Environmental Protection Guidelines, Construction, Operation and Decommissioning, Manitoba Hydro Work Sites and Facilities (2006).	• Temporary increase in fugitive dust and gases during construction	low

Residual effect and significance

Effects associated with noise, air emissions and EMF and aesthetics are given a low adversity rating due to the short-term duration of the effect or the negligible change from baseline conditions, therefore, Project effects are considered not significant.

9.3 Accidents and malfunctions

During construction and operation of the proposed Project there are risks of accidents involving construction vehicles, machinery and equipment, releases of hazardous substances including fuels, fires and explosions due to the presence of fuel, flammable materials and explosives, vehicle accidents due to increased construction traffic. During operation of the station there are risks of transformer oil spills, releases of hazardous substances, fires and

explosions, worker electrocution and vehicle accidents. Following are summaries of some of the main concerns for accidents and malfunctions:

Transformer oil: Transformer oil or insulating oil is a highly-refined mineral oil that is stable at high temperatures and has excellent electrical insulating properties. Transformer oil is not classified as a dangerous good under Manitoba's Dangerous Goods Handling and Transportation Regulation and is not regulated as a petroleum product under the Storage and Handling of Petroleum Products and Allied Petroleum Products Regulation. Spills of transformer oil are possible as a result of equipment malfunction or human error during initial filling of transformers or periodic replacement of oil. Procedures for filling and replacing oil in transformer are outlined in Manitoba Hydro's Hazardous Materials Handbook (2016b). In addition, an emergency response plan will be put in place for the construction phase of the Project and will be updated for the operation and maintenance phase. The scope of the plan will include transformer oil spills. The final design of the station will incorporate an oil containment system that will meet the requirements of the *Storage and Handling of Petroleum Products and Allied Products Regulation under The Dangerous Goods Handling and Transportation Act (C.C.S.M. c. D12).* Upon decommissioning of the station a contaminated site assessment will be carried out and remediation will be undertaken to achieve petroleum hydrocarbon criteria for agricultural soil.

Fuels, oils and greases: Fuels (gasoline, diesel, propane) as well as lubricating oils and greases will be used during construction of the station. Storage, handling and transport of fuels will be in accordance with Manitoba Conservation's Storage and Handling of Petroleum Products and Allied Petroleum Products Regulation and guidelines as well as Manitoba Hydro's Code of Practice for Storage and Handling of Petroleum Products and Allied Petroleum Products Storage Tank Systems (2003) and Environmental Protection Guidelines, Construction, Operation and Decommissioning, Manitoba Hydro Work Sites and Facilities (2006). After construction is complete, no fuel, oil or grease will be stored at the station on an ongoing basis.

Hazardous substances: Other hazardous substances used at transmission stations and along transmission lines include sulphur hexafluoride, carbon tetrafluoride, herbicides, fire extinguishers, solvents, epoxies, household cleaners and paints. No halon-containing fire extinguishers will be used at the station. Hazardous substances will be subject to provincial and federal workplace hazardous materials information system regulations and guidelines, and the Manitoba Workplace Safety and Health, Workplace Safety and Health Regulation,

and will be managed in accordance with Manitoba Hydro's Hazardous Materials Management Handbook (2016b).

Sulphur Hexafluoride (SF6) is a colourless, odourless, non-toxic and non-combustible gas that is used as an insulating medium in hermetically-sealed circuit breakers. It poses a health hazard as an asphyxiant in confined areas but poses negligible risk to humans in outdoor locations. The main concern with SF6 is its greenhouse gas properties since the gas can potentially affect global warming by a factor about 23,900 times larger than that of carbon dioxide emissions.

Carbon Tetrafluoride (CF4) is also used as an insulting medium in hermetically-sealed circuit breakers. It is colourless, has a characteristic odour and is non-flammable. It poses a health hazard as an asphyxiant in confined areas but poses negligible risk to humans in outdoor locations. CF4 is also a greenhouse gas a greenhouse warming potential of 6,500 compared to carbon dioxide.

Herbicides will be used to manage vegetation growth within the fenced area of the station and along the transmission lines in accordance with Manitoba Hydro's Transmission Line and Transmission Station Vegetation Management Guidelines (2007). Herbicides used will be those approved or recommended by Manitoba Sustainable Development and application of herbicides will be in accordance with permit terms and conditions.

Fires and explosions: The main sources of fuel for fires at transmission stations are transformer and cable insulating oils. Manitoba Hydro's Fire Protection Manual includes procedures for preventing and responding to fires and explosions. Only trained and licensed personnel are permitted to use explosives. An emergency response plan will be put in place for the construction phase of the Project and will be updated for the operation and maintenance phase. The scope of the plan will include fires and explosions. In addition, the station site will be kept free of vegetation that would provide a fuel source.

Mitigation measures identified for accidents and malfunctions include preparing an emergency response plan that addresses all risks, providing the plan to local authorities, adhering to provincial fuel storage and transport regulations, following electrical codes, complying with Manitoba Hydro safe work procedures, providing site security and warning signs, and regular maintenance of vegetation. Levels of transformer oil, sulphur hexafluoride and carbon tetrafluoride at the station will be monitored continuously and reported electronically to the Manitoba Hydro control centre. Follow-up identified includes regular inspection of works sites and updating the emergency response plan. Residual effects are

provided a low adversity rating with the implementation of mitigation measures and follow-up actions and, therefore, not significant. Environmental effects analysis for accidents and malfunctions are summarized in Table 9-10.

Table 9-10: Environmental effects analysis for accidents and malfunctions

Environmental effects	Mitigation measures	Residual environmental effects	Evaluation
Increased risk of construction vehicle/ equipment accidents during construction	• provide warning signage, speed control, flag persons; • adhere to provincial; highway safety regulations and codes; and • adhere to Manitoba Hydro safe working guidelines.	Minimal risk of accidents	Low
Increased risk of vehicle accident during operation	• adhere to provincial highway safety regulations and codes; and • adhere to Manitoba Hydro safe working guidelines.	Minimal risk of accidents	Low
Risk of electrocution to workers during construction and operation	• adhere to electrical codes; and • adhere to Manitoba Hydro safe working guidelines.	Minimal risk of electrocution	Low
Risk of electrocution to public during construction and operation	• adhere to Manitoba Hydro safe working guidelines; • provide warning signage, fencing and site security; and • provide information to local area residents.	Negligible risk to public	Low
Risk of transformer explosion/fire during operation	• provide adequate/required spacing between transformers; • provide blast walls if adequate/ required distances are not possible; and • prepare emergency response plan that includes transformer explosion/fire.	Minimal risk of transformer explosion/fire	Low
Risk of transformer	• provide oil containment for each transformer; and	Minimal risk of	Low

Table 9-10: Environmental effects analysis for accidents and malfunctions

Environmental effects	Mitigation measures	Residual environmental effects	Evaluation
oil leak/ spill during initial filling	• prepare emergency response plan that includes transformer leaks/spills.	oil leak/spill	
Risk of transformer oil leak/ spill during operation including refilling	• provide oil containment for each transformer; and • prepare emergency response plan that includes transformer leaks/spills.	Minimal risk of oil leak/spill	Low
Risk of fuel spill during construction	• adhere to provincial fuel storage and handling regulations and guidelines; and • prepare emergency response plan that includes fuel spills.	Minimal risk of fuel spill	Low
Risk of fire or explosion during construction	• adhere to Manitoba Hydro safe working guidelines; and • prepare emergency response plan that includes fires and explosions.	Minimal risk of fire or explosion	Low
Risk of fire or explosion during operation	• adhere to Manitoba Hydro safe working guidelines; • maintain station and transmission line rights-of-way vegetation; and • prepare emergency response plan that includes explosions and fires	Minimal risk of fire or explosion	Low

9.4 Effects of the environment on the Project

The proposed station will be subject to damage from extreme weather events (e.g., tornado, intense lightening, wind sheer, ice storm) and grass fires resulting in power outages. Climate change will increase the risk over time of extreme weather events and grass fires. Mitigation measures proposed include ensuring proper grounding of equipment; managing vegetation at the station; coordinating emergency procedures with the Rural Municipality of De Salaberry and Hanover, and maintaining an emergency response plan that includes extreme weather

events and grass fires. Follow-up identified includes regular updates of the emergency response plan. Residual effects were determined unlikely with the implementation of mitigation measures and follow-up actions and, therefore, not significant. Environmental effects analysis for effects of the environment on the Project is summarized in Table 9-11.

Table 9-11: Environmental effects analysis for effects of the environment on the Project

Environmental effects	Mitigation measures	Residual environmental effects	Evaluation
Risk of power outages from station due to extreme weather events	• ensure proper grounding of electrical equipment; • coordinate contingency procedures with RM of De Salaberry and Hanover; and • prepare emergency response plan that includes extreme weather events	Minimal risk of power outages	low
Risk of power outages from grass fires	• manage vegetation at station • coordinate contingency procedures with RM of De Salaberry and Hanover; and • prepare emergency response plan that includes grass fires.	Minimal risk of power outages	low

9.5 Cumulative effects

9.5.1 Introduction

Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future human actions (Canadian Environmental Assessment Agency, online). The Canadian Environmental Assessment Agency Operational Statement (March 2015) provides guidance on how cumulative environmental effects should be considered. The cumulative effects assessment process involves the following steps:

- scoping;
- analysis of effects;
- identification of mitigation;
- evaluation of significance; and
- analysis.

9.5.2 Scope of the cumulative effects assessment

Some VCs selected are sensitive to both Project-specific effects and cumulative effects (such as Wildlife and Wildlife habitat, Aesthetics and Health). Each VC experiencing a potential adverse residual effect has been assessed for potential cumulative effects. The spatial boundary identified for the Project effects was expanded in order to evaluate how multiple projects and activities may cause cumulative effects at both the local and regional scale. The temporal scope of the cumulative assessment includes the time frame of the Project effects assessment, and includes a past temporal boundary that extends back to include Bipole III construction start.

Existing and future projects/activities that occur in the regional assessment area that have the potential to interact cumulatively with the Project VCs were identified from the Manitoba Public Registry, and through conversations with the CAO of the RM of Hanover and De Salaberry. Those projects are included below. Potential effects that may result from the interaction of other projects and activities with the proposed Project are discussed in Section 9.5.

Activities identified in the vicinity of the Project area that occur over time include:

- agriculture;
- transportation (use of highways);
- resource use (domestic hunting and fishing); and
- recreational use (activities such as snowmobiling, hiking, skiing).

Past projects identified through the Manitoba Public Registry include:

- Crystal Spring Colony Farms Ltd./Wastewater Treatment Lagoon, R.M. of De Salaberry (1996).

Current, future and prospective projects identified through internal records and the Manitoba Public Registry includes:

- Bipole III Transmission Project (construction 2013 to 2018; operation 2018 for at least the next 50 years);
- St. Vital Transmission Complex (construction June 2019 to July 2020; operation July 2020 for at least 50 years); and

- potential future projects include the expansion of Highway 52 (not listed, but a provincial representative noted the possibility of this prospective Project in the far future).

9.5.3 Analysis

This section documents the analysis of the cumulative effects that may result from the interaction with the components and activities of the proposed Project in conjunction with actions for other existing and future projects on the VCs selected for the proposed Project.

The cumulative effects assessment of the Project included the following steps:

- identification of potential residual effects of the Projects;
- determination of spatial and temporal boundaries for each biophysical and socioeconomic element where residual effects have been identified for the Project;
- identification of existing activities and known current and future Projects with residual effects that may act in combination with the residual effects of the Project;
- identification of potential cumulative effects;
- identification of mitigation measures; and
- determination of the significance of cumulative effects.

Potential residual effects were identified for the following VCs:

- physical / meteorological environment;
- fish and fish habitat;
- wildlife and wildlife habitat;
- land use and ownership;
- infrastructure and services;
- heritage resources; and
- human health.

Land use and ownership has not been moved forward into the cumulative effects assessment as residual effects related to the Project are negligible since the valuation of the land purchased takes into consideration its existing land use.

9.5.3.1 Mitigation

For any residual cumulative effects identified, measures that can mitigate adverse cumulative effects are proposed.

9.5.3.2 Determination of significance

Residual cumulative environmental effects were evaluated using the same criteria for potential Project effects to the VCs, and a similar adversity category evaluation is described.

The significance of any adverse environmental effects that was likely to result from the proposed Project in combination with other past, present and future projects and their activities/actions after implementation of mitigation is also determined.

9.5.4 Follow-up

Follow-up was recommended to address both cumulative effects and Project specific environmental effects. Chapter 10 provides more detail for the Environmental Protection and Follow-up to be implemented for the proposed Project.

9.5.5 Cumulative effects assessment

The VCs with potential residual effects that may interact with the residual effects of past, present or future projects or activities are identified in Table 9-12, below.

Table 9-12: Cumulative effects interaction matrix

Projects or Activities	VCs with adverse residual effects																
	Physical / Meteorological Environment	Fish and Fish Habitat	Wildlife and Wildlife Habitat				Land Use and Ownership		Infrastructure and Services				Heritage Resources	Health (Air Quality Emissions, EMF, Noise)			
Potential Adverse Effect	Changes in shallow groundwater quantity / quality of sand and gravel aquifers.	Release of deleterious substances (sediment, hazardous materials) to the aquatic environment	Mortality due to vehicular collisions and accidental and/or death of wildlife that come in contact with electrified components	Machinery operation, equipment testing, coolant installation, and site operation may result in fluid leaks and disturbance to wildlife and wildlife habitat.	Machinery operation and stripping/stockpiling, excavating/grading may result in disturbance to nesting birds.	Change in habitat availability due to presence of the station	Transfer ownership of affected parcel.	Change of agricultural activities due to presence of station	Increased demand on emergency Services (hospital usage and firefighting)	Change in traffic volumes/congestion	Road quality impacts due to transportation of station components	Interference with Radio Frequency Devices	Identification of unknown Heritage Resources or burials at station site	elevated noise during construction	elevated EMF levels due to station operation	Elevated levels of fugitive dust and gases during construction	Visual disturbance due to construction and physical presence of station
Proposed Project	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X
Project Residual Effects that May interact with Past, Present and Future Projects																	
Bipole III						X	X					X	X	X	X		X
St. Vital Transmission Complex	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X
Crystal Spring Colony Farms Ltd/ Wastewater Treatment Lagoon																	
Highway 52 Expansion							X						X				X
Project Residual Effects that may Interact with Past, Present or Future Activities																	
Agriculture	X	X	X	X	X	X	X		X	X			X	X		X	X
Transportation		X	X	X		X	X		X	X			X			X	X
Resource Use			X	X					X	X						X	
Recreational Use			X	X					X	X						X	

9.5.6 Past, Present and Future Projects and Activities that may interact with the Project

The Bipole III Transmission Project is divided into segments, where construction on the segment closest to the proposed De Salaberry East station was completed in 2017. As a result, many potential projects effects associated with Bipole III construction activities will not interact with residual effects assessed for the Project. Construction activities for the St. Vital Transmission Complex may overlap, or partially overlap, with Project construction activities. The Crystal Spring Colony Farms Ltd - Wastewater Treatment Lagoon was identified on the Manitoba Public Registry as a past Project in the RM of De Salaberry. Due to the location of the Project (near Ste. Agathe), the date of construction (1996), and the nature of the Project (a lagoon located south and not in the same subwatershed as the Project), overlap with the Project is not anticipated spatially or temporally. The expansion of PTH 52 is a potential future Project with no planned construction schedule at this time to the best of our knowledge. As no plans were available it was assumed construction activities will not overlap Project construction activities.

Past, present and future activities that may overlap with the Project include agriculture, transportation, resource use and recreational use. Effects associated with traffic along PTH 52, agricultural activities in adjacent properties may interact with residual effects of the Project.

9.5.7 Physical / Meteorological Environment

In general, groundwater quality and quantity will not be affected under normal conditions of construction and operation of the Project. There is a small potential pathway for construction activities to release groundwater or cause an interconnection of aquifers through site foundation work or through potential effects from spills or accidents. These effects may act cumulatively with other projects if shallow groundwater aquifers extend into an affected area from adjacent projects. These effects are highly unlikely with mitigation measures in place. Both the Bipole III and St. Vital Transmission Complex are located in close proximity to the Project; however, only activities associated with the St. Vital Transmission Complex have potential to interact with the Project. Bipole III construction activities will be completed prior to construction start for the Project and

vegetation management for the Bipole III transmission line will be managed through existing agriculture activities.

Project effects that may act cumulatively with other past, present and future activities include agriculture due to the application of herbicides.

With mitigation measures proposed (Section 9.1.1) for this Project, and St. Vital Transmission Complex, and regulatory measures in place for the application of pesticides, cumulative residual effects on groundwater are determined to be low. The low level of exposure due to limited foundation work, low potential for spills or accidents and the mitigation measures in place for both projects result in low potential cumulative effects to groundwater. Cumulative effects of the Project on groundwater are considered not significant.

9.5.8 Fish and Fish Habitat

There is potential for residual effects on fish and fish habitat as a result of the Project to interact with the St. Vital Transmission Complex and past, present and future activities related to agriculture and transportation. A potential release of sediment or hazardous materials into Tourond Creek could interact with sediment or hazardous materials from other projects or activities within the watershed. Mitigation measures for this Project and the St. Vital Transmission Complex will include measures to prevent sediment transport to the creek, and include protocols to implement in emergency situations. Additionally, a dike separates the proposed station and Tourond Creek as well as the future St. Vital Transmission Complex and Tourond Creek, reducing potential contributions to the creek.

Over the longer term Tourond Creek has seen substantial change as the portion alongside the Project was channelized and redirected alongside PTH 52 to accommodate high flows in spring conditions. During a heavy rain event, surface water from the site would flow to the ditch along Suncrest road, through a small culvert under Suncrest Road, through another set of culverts through the dike into Tourond Creek. Transportation and agricultural activities may overlap with Project construction activities to contribute sediment to Tourond Creek. Silt fencing installed prior to site construction activities will act to prevent local contributions of sediment.

With mitigation measures proposed (Section 9.1.2) for this Project, and St. Vital Transmission Complex, cumulative residual effects on fish and fish habitat are determined

to be low. The low potential for sediment or hazardous materials release due to the small size of the Project, the existing site landscape conditions, and the effectiveness of mitigation measures proposed, results in low potential cumulative effects to fish and fish habitat. Cumulative effects to fish and fish habitat are considered not significant.

9.5.9 Wildlife and Wildlife Habitat

There is potential for residual effects to wildlife and wildlife habitat as a result of the Project to interact with the St. Vital Transmission Complex and past, present and future activities related to agriculture, transportation, resource use and recreational use.

Over a longer temporal scale there has been substantial change to wildlife and wildlife habitat in the regional assessment area. Land conversion to agriculture decades ago changed habitat availability for key species and mortality related to vehicular collisions and transmission line strikes from other projects with the regional assessment area contribute to wildlife loss. Residual effects on wildlife and wildlife habitat were determined to be low as effects will be restricted to the local assessment area which supports little to no wildlife or wildlife habitat. Project site selection activities were aimed at selecting a site with minimal natural habitat so further contribution to habitat loss would not occur. Mitigation measures described in Section 9.1.3 will be applied to the future St. Vital Transmission Complex as well, reducing cumulative effects. Lessons learned from Bipole III activities have informed and will continue to inform other projects, such as the De Salaberry East Station Project.

With mitigation measures proposed for this Project, and St. Vital Transmission Complex, cumulative residual effects on wildlife and wildlife habitat are determined to be low. The low potential for vehicular collisions or hazardous materials release due to the small size of the Project, the existing lack of habitat in the region, and the effectiveness of mitigation measures proposed, results in low potential cumulative effects to wildlife and wildlife habitat. Cumulative effects to wildlife and wildlife habitat are considered not significant.

9.5.10 Infrastructure and Services

The residual effects anticipated for infrastructure and services include individual effects on emergency services, including: hospital usage due to Project-related accidents and fire services, as well as effects related to interference with radio frequency devices and traffic.

It is anticipated that residual effects of the Project will act cumulatively with other activities in the area and may contribute to increased traffic volumes and demand on services.

Electrical interference from the proposed station and Bipole III Transmission Project (DC) and the St. Vital Transmission Complex (AC) is not anticipated to contribute to radio disturbance because the radio frequency signals emitted from stations and transmission lines do not overlap with radio frequencies from radio communication towers, therefore no effect is anticipated.

It is anticipated there will be increased traffic and demand on services with the proposed Project, potentially the St. Vital Transmission Complex and agricultural activities typical in the region during the time of Project construction. Traffic volumes are anticipated to increase for each of these activities, and spread across the RAA. Increased demand on services is also anticipated to be low, but increase in the relatively large centres of Steinbach and Winnipeg. Both of these centres are able to support anticipated increases in service needs.

The anticipated residual cumulative effects of these activities in combination with the Project is anticipated to be low due to the short duration of the Project and extremely low magnitude of materials, traffic and emergency service needs during construction. With the low increase in service needs, traffic and no overlap in radio frequencies, cumulative effects to infrastructure and services are considered not significant.

9.5.11 Heritage

As a result of past and existing projects and activities, land conversion from natural prairie landscape to developed lands has occurred. Effects related to past activities and existing projects (agriculture, transportation, flood infrastructure) may overlap with residual effects of the Project should resources be encountered during construction. No heritage resource sites are located at the Project site based on HRB data and the potential for unknown archaeological sites being discovered during clearing and construction remains low, especially since the Project site is disturbed due to existing agricultural activities. The mitigation measures described in Section 9.2.4, including pre-construction archaeological work, should limit the possibility of further contributions to heritage resource effects. Due to the existing site conditions and the mitigation measures proposed, is was determined that cumulative effects related to heritage resources are low as a result of the Project in combination with past, present and future projects, and therefore these effects are considered not significant.

9.5.12 Health

There is potential for residual effects to human health as a result of the Project to interact with the St. Vital Transmission Complex and past, present and future activities related to agriculture, transportation, resource use and recreational use.

Residual effects on health were determined to be low as effects will be restricted primarily to Project construction and include intermittent, elevated noise due to construction-related activities and elevated levels of fugitive dust. These residual effects may act cumulatively with the St. Vital Transmission Project and agricultural activities typical in spring. During construction there will be intermittent, elevated noise levels in the vicinity of the Project site. The site is zoned for agricultural use where activities that include elevated noise levels are permissible. Mitigation measures described in Section 9.2.5 will be applied to the future St. Vital Transmission Complex as well, reducing cumulative effects for noise and dust conditions. Manitoba Hydro adheres to CSA standards and other related standards respecting transformers and permissible noise levels (CSA 2014). For regulation of ambient daytime and nighttime noise levels, Manitoba Sustainable Development does not enforce specific noise limits but instead will review nuisance noise in the event that five complaints have been reported by residents. As noted earlier, nuisance based effects such as proximity to residential receptors were taken into consideration during the site selection process, as well as the routing process for the Bipole III Transmission Project and the St. Vital Transmission Complex. There are no residential properties located within one mile of the station site. Given the location of the proposed station site is an agricultural use area, as well as where elevated noise levels are a common occurrence, noise and dust levels are not expected to be a concern during either the construction or operations phase of the Project.

Visual disturbance will extend into Project operations and act cumulatively with the current Bipole III Transmission Project, the future St. Vital Transmission Complex, existing infrastructure and activities associated with agriculture and transportation. Without further mitigation this effect would be considered moderate due to the concentration of transmission-related infrastructure in the area. Visual receptors travelling along PTH 52 will observe the St. Vital Transmission Complex, Bipole III and the proposed station. As a result, the following mitigation measures have been proposed:

Table 9-13: Cumulative effects analysis for health effects

Environmental effect	Mitigation measures	Residual effects	Evaluation
Visual disturbance due to physical presence of the station in combination with visual effects from Bipole III and St. Vital Transmission Complex	• Visual screening on the north and east side of the station using tree and/or shrubs	• Net addition to the landscape creates a visual disturbance for sensitive receptors	low

With mitigation measures proposed for this Project in Section 9.2.5 and described within this section, cumulative residual effects on health are determined to be low. The lack of noise receptors at the Project site and the short duration of Project construction activities results in a low potential for noise or dust-related effects. The additional visual disturbance in the area when contemplating all three transmission projects cumulatively will be reduced with visual screening planned for the Project site. Cumulative effects to health are considered not significant.

9.6 Assessment Conclusion

Environmental effects were identified using a Project interactions matrix, and an analysis that considered how environmental elements could be affected by all phases of the proposed Project. Low residual effects are anticipated for the physical/meteorological environment, fish and fish habitat; wildlife and wildlife habitat; land use and ownership, infrastructure and services, heritage resources and human health. Positive effects are anticipated for employment and economy.

A cumulative effects assessment was completed to understand how residual effects caused by the Project may interact with other past, present and future projects or activities in the area. With other major Manitoba Hydro projects in the area, cumulative effects to aesthetics prior to mitigation were considered moderate; however, with the mitigation measures contemplated between the proposed station and potential visual receptors, cumulative effects to health are considered low.

After conducting the analysis, and applying the above noted cumulative mitigation measure, no significant effects are anticipated for either Project effects or cumulative environmental effects.