4.0 Description of the proposed development

4.1 Overview

The proposed Project involves the installation of a new 230-66 kV station northwest of Kleefeld to address reliability, voltage and loading issues resulting from above average load growth in southeast Manitoba, including the Steinbach, Richer, and south St. Vital areas.

Related projects, not included in the assessment, include:

- two new 230 kV lines as part of the St. Vital Transmission Complex (Environment Act License No. 3207); lines V78G (St. Vital to De Salaberry East) and G79L (De Salaberry East to Letellier);
- salvage of Hanover station;
- salvage of VJ50 from the 115 kV system between Randolph station and Hanover station; and
- the addition of 66 kv distribution lines.

Although these components are not included in the assessment, engagement activities will occur with area landowners to provide notification and address concerns.

4.1.1 Project location

The Project is located in the Rural Municipality of De Salaberry. The station will be located in NE 35-6-4-E. The total area purchased in the quarter section is 73.3 acres. The total area purchased where the station will be located and where immediate projects effects occur is referred to as the Project footprint.

4.2 Ownership and rights

Manitoba Hydro is in the process of purchasing the property required for the station on NE-35-6-4-E in the Rural Municipality of De Salaberry. A formal offer has been accepted by the landowner.

4.3 Existing land use at site and adjacent properties

Development in the RM of De Salaberry is subject to (2011) *Development Plan by-law No. 2194-04* (and amendments) and (2005) *Zoning By-law No. 2208-05* (and amendments). There are three rural/agricultural land use designations in the RM: "Limited Agriculture

Area", "Agriculture 1" and "Agriculture 2". These three designations provide for a full range of agricultural use but differ with respect to provisions for livestock production operations.

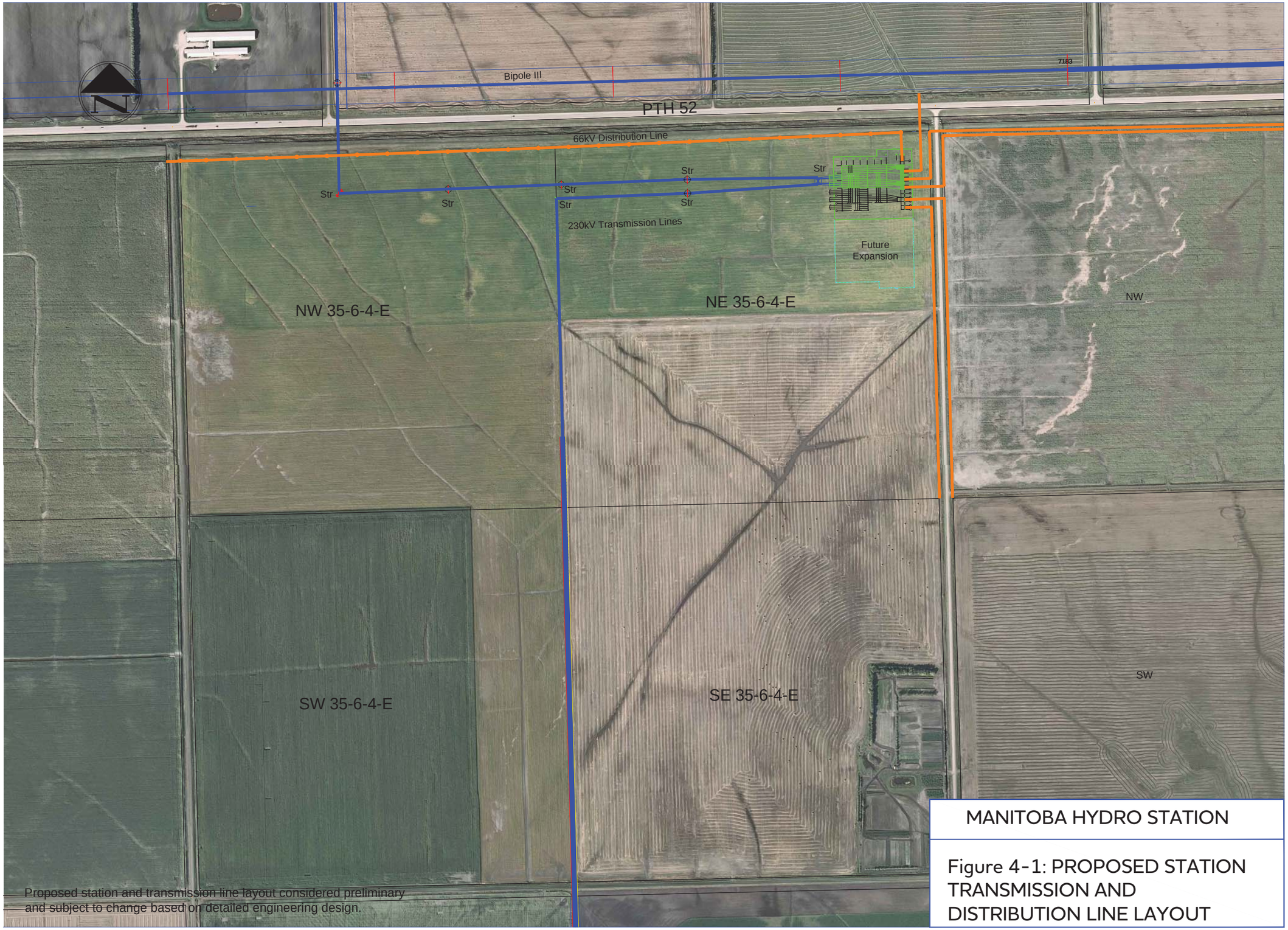
The section to host the proposed development (NE-35-6-4-E) is designated as "Agriculture 1". Along with a full range of agriculture use, "Agriculture 1" also permits the expansion of existing livestock operations to a maximum of 600 animal units and new livestock operations to a maximum of 600 animal units.

4.4 Project components

4.4.1 Station layout and profile

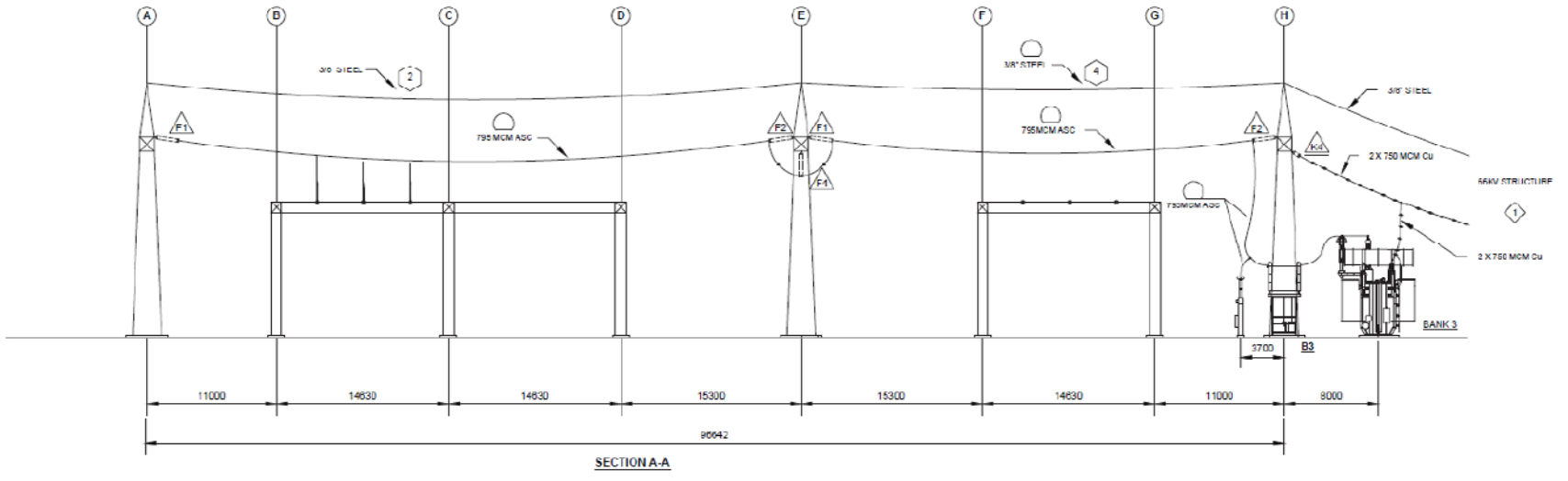
The footprint of the new station will measure approximately 150 m x 170 m. The perimeter of the station will be surrounded with approximately 620 linear meters of fencing, with a 6m vehicle gate and a control building (18.3 m x 18.3 m).

The conceptual site layout for the proposed station, the 230 kV transmission lines into the station and 66 kV lines out of the station and access road are shown in Figure 4-1. Section profiles for the proposed station are illustrated in Figure 4-2.

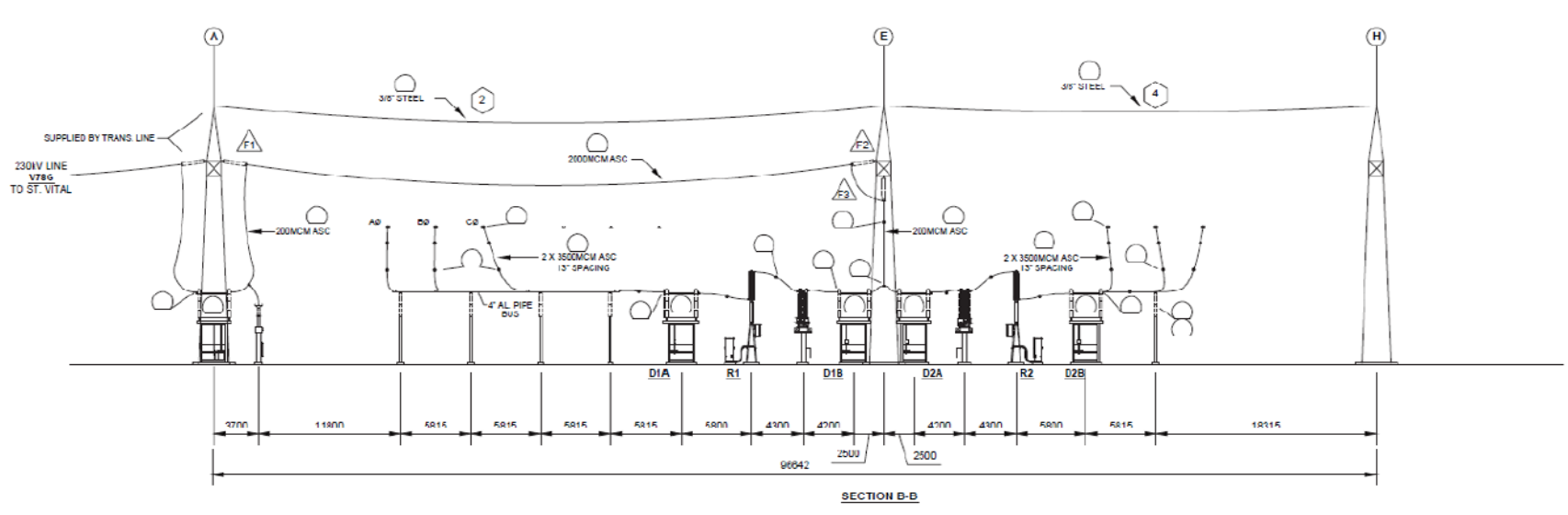


MANITOBA HYDRO STATION

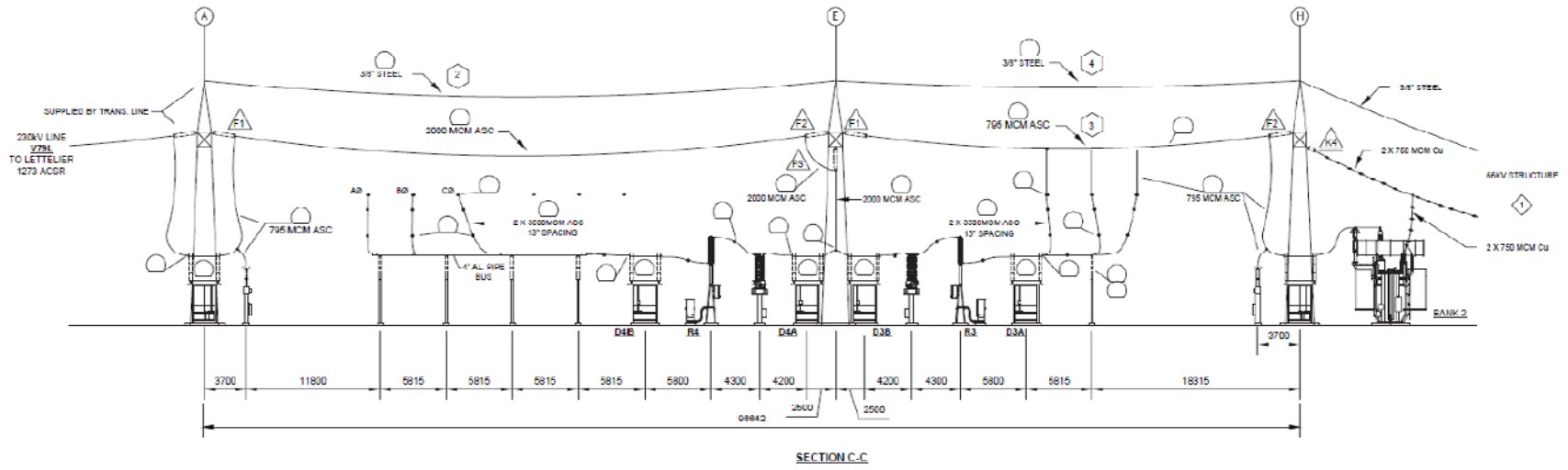
Figure 4-1: PROPOSED STATION TRANSMISSION AND DISTRIBUTION LINE LAYOUT



SECTION A-A



SECTION B-B



SECTION C-C

Figure 4-2: De Salaberry East Station Profiles

4.4.2 Station components

The major station equipment includes:

- disconnect switches (centre break/vertical break/selector side) – used to isolate the system equipment for maintenance purposes and system configuration;
- power-transformers – used to allow power to flow between the 230 kV and 66 kV systems;
- Capacitive Voltage Transformers (CVT) – used to measure the voltage on a transformer;
- circuit breakers (dead tank) – used to energize/de-energize the new transformer for regular switching and during system faults;
- surge arrestors – used to protect system equipment from damaging short duration, high voltages;
- current transformer – used to measure the current flowing in a transformer;
- station service transformer – a transformer used to generate electricity for use at the station (e.g. lighting, mechanical);
- power fuse - provides overcurrent protection of a larger device such as a distribution transformer; and
- ground bank - provides a path to ground for fault currents or unbalanced currents on systems that have no other suitable ground.

Table 4-1 provides details on the quantity, size, dimensions, and oil and gas volumes for all major equipment.

Table 4-1: Summary of station equipment*

Equipment	Quantity	Dimensions	Weight	Oil or gas contents
230 kV equipment				
Three-phase 230 kV Center Break Disconnect Ground Switch (Disconnect Switch)	2	Length: 3.0 m Width: 1.5 m Height: 2.9 m	2,268 kg	N/A
Single-phase 230 kV CVT (Capacitive Voltage Transformer)	8	Length: 0.6 m Width: 0.5 m Height: 2.8 m	267 kg	Mineral Oil: 30.0 L Dielectric Synthetic Oil: 12.3 L

Table 4-1: Summary of station equipment*

Equipment	Quantity	Dimensions	Weight	Oil or gas contents
Three-phase 230 kV Center Break Disconnect Switch (Disconnect Switch)	8	Length: 3.0 m Width: 1.5 m Height: 2.9 m	2,268 kg	N/A
Three-phase 230kV Dead Tank Breaker (Circuit Breaker)	4	Length - 3.056m Width- 5.368m Height-6.585m	5148kg	SF6-55kg CF4-33.1kg
Three-phase 230 kV Vertical Break Disconnect Switch(Disconnect Switch)	2	Length: 3.0 m Width: 1.5 m Height: 2.9 m	2,268 kg	N/A
Single-phase 230 kV Surge Arrester (Surge Arrester)	6	Width: 3.6 m Height: 2.3 m	180 kg	N/A
Three-phase 230 kV/66 kV Power Transformer (Power Transformer)	2	Length: 8.3 m Width: 3.2 m Height: 4.8 m	190,510 kg	Oil: 61,814 L
66 kV Equipment				
Single-phase 66 kV Surge Arrester(Surge Arrester)	18	Width: 1.8 m Height: 1.2 m	31 kg	N/A
Three-phase 66 kV Side Break Disconnect Switch(Disconnect Switch)	12	Length: 1.5 m Width: 1.2 m Height: 1.2 m (3 per crate)	590 kg	N/A
Single-phase 66 kV CVT (Capacitive Voltage Transformer)	6	Length: 0.5 m Width: 0.5 m Height: 1.6 m	230 kg	N/A
Three-phase 66 kV Power Fuses (Power Fuse)	2	Length: 1.5 m Width: 1.1 m Height: 1.2 m	390 kg	N/A

Table 4-1: Summary of station equipment*

Equipment	Quantity	Dimensions	Weight	Oil or gas contents
Three-phase 66 kV Station Service Transformer (Station Service Transformer)	2	Length: 4.3 m Width: 2.7 m Height: 3.9 m	15,575 kg	Oil: 7,300L
Three-phase 66 kV Selector Side Switch (Disconnect Switch)	8	Length: 3.0 m Width: 1.5 m Height: 1.2 m	1588 kg	N/A
Three-phase 66 kV Dead Tank Breaker (Circuit Breakers)	8	Length: 3.0 m Width: 2.0 m Height: 3.4 m	2,000 kg	SF_6 Gas: 7 kg CF_4 Gas: 4 kg
Three-phase 66 kV Ground Bank (Ground Bank)	2	Length: 4.3 m Width: 2.7 m Height: 3.9 m	14,470 kg	Oil: 5,370 L

*Text in parentheses corresponds to definitions in section 4.4.2

4.5 Project activities

The Project activities are described below and will be carried out in the following stages.

- Pre-construction / Construction;
    - Property acquisition;
    - Workforce presence;
    - Access road;
    - Culvert upgrade;
    - Material Hauling;
    - Surveying;
    - Stripping / stockpiling / excavating / grading soils;
    - Machinery operation;
    - Equipment installation;
    - Foundation installation;
    - Site Preparation;
    - Ground Grid Installation;
    - Oil containment;

- Backfill, Clean-up, Final Restoration;
- Equipment testing and coolant installation (i.e., Transportation and Handling of Dangerous Goods); and
- Waste Disposal;

- Operation and Maintenance;
  - Station operation and presence; and
  - Station Maintenance (equipment repairs and equipment installation).

The scope of this environmental assessment does not include the decommissioning of station infrastructure.

4.5.1 Pre-construction / construction

4.5.1.1 Property acquisition

Manitoba Hydro is in the process of purchasing the property required for the station on NE 35-6-4-E.

Workforce presence

Subject to receipt of a licence work at the station is currently scheduled to commence in spring 2018 and will be completed by fall 2020. Table 4-2 outlines the estimated workforce for each stage of construction.

Table 4-2: Workforce presence

Project activity	Start	End	Workforce
Civil Construction Site improvements	May 2018	November 2018	25
Civil Construction Install Foundations, ground grid, fence, trench, oil containment, building	May 2019	November 2019	45
Electrical Construction structures	November 2019	April 2020	12
Electrical Construction equipment	March 2020	September	12

assembly, test and install		2020	
Telecommunications install and commission	August 2020	September 2020	3
Commissioning	September 2020	October 2020	1

4.5.1.2 Access road

Primary access to the station will be via Suncrest Road, an existing all-weather gravel municipal road. Suncrest Road runs directly off PTH 52. Heavy construction equipment will use Suncrest Road for the duration of construction.

Manitoba Hydro will 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.

4.5.1.3 Culvert upgrade

Manitoba Hydro will work with Manitoba Infrastructure to ensure that the culverts on Suncrest Road, crossing Tourond Creek can accommodate the potential loads of heavy equipment and materials required to construct the station.

4.5.1.4 Material hauling

Material hauling is ongoing throughout the construction phase as different types of materials are required for specific activities such as foundation or steel support structure construction. Materials will generally be hauled from Winnipeg likely via PTH 59 and 52.

4.5.1.5 Surveying

Prior to construction, the station site and required easements will be surveyed and flagged to establish alignments. The survey will also establish the specific locations of the various structures and grades.

4.5.1.6 Stripping / stockpiling / excavating / grading soils

Initial site preparation will generally consist of clearing, grubbing and disposal of vegetation; stripping and removal of organic soils; and, grading and drainage for control of surface water.

Sub-grade preparation at the construction site will remove unsuitable material prior to fill placement. Soft areas of the sub-grade surface will be broken up and then compacted to acceptable density.

Suitable fill will be placed and compacted in accordance with site grading plans. Grading at Suncrest Road will be based on roadway and structure development requirements, traffic loading, adjusted for local topography and drainage requirements, and designed to minimize the volume of excavated material and fill.

Site drainage will be achieved by use of swales, culverts and ditches within and around the roadway and structures.

Silt fences will be installed where necessary to prevent sediment from reaching natural waterways.

4.5.1.7 Machinery operation

Machinery operation may include excavators, loaders, dozers, graders, backhoes, cranes, semi-trailers, dump trucks, tracked vehicles, pick-up trucks, drill rigs, bucket trucks, telehandlers, tensioners, pullers, person lifts, all-terrain and support vehicles as well as generators, compressors and other small construction equipment.

4.5.1.8 Equipment installation

A variety of manufactured steel structures will be installed for new equipment. Standalone equipment required for the station will have steel supporting structures that are manufactured, supplied and then attached to foundations (See Photo 4-1 below). Tubular steel stand structures will be used to support major equipment. Steel lattice structures are typically taller to accommodate clearances for required voltages on equipment such as bus conductors. Examples of steel structures and bus work are provided below.

Photo 4-1: Example of manufactured steel supporting structures for a capacitor

Photo 4-2: Example of tubular steel structures for bus work and related equipment

Photo 4-3: Example of steel lattice structures (bus work)

4.5.1.9 Foundation installation

Concrete piles and slab on grade foundations will be required to support installation of structures and equipment at the station. Foundations to attach steel lattice structures to support electrical components and bus work will largely consist of concrete caps on deep piles.

The piles will be cast in place, which involves drilling a shaft into the soil, placing a reinforcing cage and filling it with concrete.

Slab on grade foundations without piles will also be used for low-seated equipment.

Slab on grade foundations supported by multiple piles may be used for standalone equipment such as transformers, switches and reactors. Some examples of different foundation types are provided below.

Photo 4-4: Example of a slab on grade foundation

Photo 4-5: Example of slab on grade foundation on piles

4.5.1.10 Site Preparation

The installation of over 600 linear meters of new fence will occur at the site. Site development will take into account existing drainage patterns surrounding the site.

Additional localized drainage may be required. A newly developed drainage system for the site will integrate the existing site grading and drainage design.

All newly developed areas will be covered with an insulation stone course.

4.5.1.11 Ground Grid Installation

The primary purpose of station grounding is to provide personnel, public and equipment safety through a grounding grid. The Canadian Electrical Code requires that all metallic objects in an outdoor station be bonded to ground.

A grounding grid is made up of mesh copper conductors and ground rods buried in the station soil. The grounding grid system normally encompasses the entire station site and extends 1 m past the station fence and gate swings.

4.5.1.12 Oil containment

Manitoba Hydro will conduct an oil containment assessment for the station to determine the level of containment required. Oil containment 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).

4.5.1.13 Backfill, clean-up, final restoration

The final step in construction is the clean-up (and if required, rehabilitation) at the station site as well as landscaping activities. Construction clean-up will occur throughout construction. As soon as possible after completion of construction, the sites will be cleaned up and left in standard operating condition. All non-toxic materials will be disposed of using existing, appropriately licensed local facilities. Material supply and waste handling will be subject to conventional Manitoba Hydro codes of practice and relevant provincial and federal legislation. All clean-up and rehabilitation activity will be subject to the requirements of the Environmental Protection Program described in Chapter 10.

4.5.1.14 Equipment testing and coolant installation

Fuels and hazardous materials likely to be used during construction of the proposed Project are listed below. No polychlorinated hydrocarbons (PCBs) will be used in electrical equipment or stored at the station location. The types and quantities of all fuels and hazardous materials to be used in the construction project have not been determined but

are likely to include those listed below. No fuels or other hazardous substances will be stored at the station after construction.

- diesel / Gasoline (construction equipment / vehicle fuel);
- propane (heating);
- paints / epoxies / solvents (control building);
- transformer oil (cooling insulating the transformer);
- sulphur hexafluoride / carbon tetrafluoride (interrupting electrical faults); and
- chromated copper arsenate (wood preservative).

Management procedures for specific hazardous materials are detailed in the Hazardous Material Management Handbook (Manitoba Hydro 2016b).

4.5.1.15 Waste disposal

Wastes will be managed, collected and disposed of in accordance with current provincial and/or federal regulations. Protective measures will include general guidelines for non-hazardous waste management. Opportunities to reduce, reuse, and recycle the wastes will be taken whenever possible. Wastes will be stored in designated areas and disposed of regularly to reduce potential for unsafe conditions and adverse impacts. Typically, waste will be disposed of by haulage to an existing permitted waste disposal site.

4.5.2 Operation and maintenance

4.5.2.1 Station operation and presence

The station will be operated continuously throughout the year, and will be maintained in accordance with Manitoba Hydro standards, guidelines and procedures. The site will be visited as required by Manitoba Hydro personnel to perform inspections, and undertake maintenance and repairs.

4.5.2.2 Station maintenance (equipment repairs and equipment installation)

Maintenance will include scheduled servicing and replacement of structures, equipment and components, and periodic repair of equipment malfunctions and damaged structures. Environmental protection guidelines for the construction, operation and decommissioning of Manitoba Hydro work sites and facilities will be followed (Manitoba Hydro 2006).

Vegetation at transmission stations will be managed in accordance with established guidelines (Manitoba Hydro 2007).

4.6 Construction schedule

The proposed construction schedule to achieve an in-service date of October 2020 is summarized in Table 4-3.

Table 4-3: Construction schedule

Project Activity	**Start**	**End**
Civil Construction Site improvements	May 2018	November 2018
Civil Construction Install Foundations, ground grid, fence, trench, oil containment, building	May 2019	November 2019
Electrical Construction structures	November 2019	April 2020
Electrical Construction equipment assembly, test and install	March 2020	September 2020
Commissioning	September 2020	October 2020