WAASIGAN
TRANSMISSION LINE

FINAL ENVIRONMENTAL ASSESSMENT

Section 3.0 Project Description

November 2023

Acknowledgements

We wish to acknowledge that the Waasigan Transmission Line Project is located within lands that represent the traditional territories and homelands of the Robinson-Superior Treaty (1850) and Treaty #3 (1873) First Nations, and traverse the Red Sky Métis Independent Nation, Northwestern Ontario Métis Community and Northern Lake Superior Métis Community.

Hydro One also wishes to acknowledge Indigenous artist, Storm Angeconeb, for developing the covering page and wildlife designs throughout the Final Environmental Assessment Report. Storm is a highly recognized visual artist from Lac Seul First Nation in Treaty #3 and currently resides in Red Lake. Many of her works include animals and birds as representations of herself or those close to her. The artist's description of the covering page is presented below.

Hydro One Environmental Study Art:

What stands out in this art piece is the symbolic representation of solar rays as "Bringing Power"; we can see the environment represented through the wildlife and Ojibwe floral visuals. This artwork is an excellent representation of Hope, Life, and Opportunity, visually portrayed through the Black Bear and her two cubs. The colour theme of this artwork comes from the Waasigan Transmission Line Project brand identity.

Artist: Storm Angeconeb

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3.0 Project Description

Waa-izhichigeyang

This section provides a detailed description of the proposed Waasigan Transmission Line Project at the current stage of design. The Project will undergo further refinement as it proceeds to the detailed planning stage; however, this Project description is based on the information available at the time of the EA submission and is intended to be representative of the Project that will be permitted and built. Potential future Project refinements are not anticipated to affect the predicted environmental effects and mitigation.

The evaluation of alternative routes and the rationale for the selection of the preferred route for the transmission line is presented in Section 2.0 of this EA report.

3.1 Project Overview and Location

The Project includes the construction, operation and maintenance of a double-circuit 230 kilovolt (kV) transmission line in northwestern Ontario between Lakehead Transformer Station (TS) in the Municipality of Shuniah and Mackenzie TS in the Town of Atikokan, and a new single-circuit 230 kV transmission line between Mackenzie TS and Dryden TS in the City of Dryden (refer to Figure 1.0-1). The total length of the Project will be approximately 360 kilometres (km). The Project also includes the separation of approximately 1.0 km of the double-circuit section of the existing 230 kV transmission line outside of Mackenzie TS in Atikokan (circuits F25A and D26A) into two separate single-circuit transmission lines. Modifications will be required to the existing Hydro One stations that serve as connection points for the undertaking.

3.2 Project Design and Planning

3.2.1 Facility Design and Design Codes

The Project will comply with North American Electric Reliability Corporation (NERC) and Independent Electricity System Operator (IESO) reliability standards. The Project technical specifications and connection locations for the Project (e.g., number of circuits, capacity, etc.) were determined by the IESO (see Appendix 3.0-A).

The Project will be designed and constructed according to standard industry design codes and guidelines applicable to transmission projects. These include, but are not limited to, the following:

- Canadian Standards Association (CSA) Standard C22.3 No. 1-10 and 1-06 – Overhead Systems;
- CSA-C22.3 No.3 – Electrical Coordination;

- CAN3-C108.3.1-M84 (R2009) – Limits and Measurement Methods of Electromagnetic Noise from AC Power Systems;
- CSA-015-90 – Wood Utility Poles and Reinforcing Stubs;
- CSA-080 – Wood Pole Preservation;
- CSA-C83-96 – Communication and Power Line Hardware;
- CSA-C49.6 – Zinc Coated Steel Wires for use in Overhead Electrical Conductor;
- ASCE 48-11 Design of Transmission Line Steel Poles;
- CSA-C411.1 – AC Suspension Insulators;
- CSA-C108.3.1 – Limits and Measurements Method or Electromagnetic Noise from AC Power System;
- CSA-C61089-11 – Round Wire Concentric Lay Overhead Electric Stranded Conductor;
- CSA-C60889:03 – Hard Drawn Aluminum Wire for Overhead Line Conductors;
- CSA-C60888:03 – Zinc-Coated Steel Wires for Stranded Conductors;
- IEEE P-524 – Guide to the Installation of Overhead Conductors;
- IEEE P-951 – Guide to the Assembly and Erection of Metal Transmission Structures;
- IEEE P-977 – Guide for the Installation of Foundations for Transmission Line Structure;
- IEEE P-1441 – Guide for the Inspection of Transmission Line Construction;
- IEEE P-1243 – Design Guide for Improving the Lightning Performance of Transmission Lines;
- IEEE Std.751 – Design Guide for Wood Transmission Structures;
- IEC 61987 – Overhead Lines Requirements and Tests for Stockbridge Type Vibration Dampers; and
- ASTM A123 – Galvanization (hardware).

3.2.2 Environmental Planning

Integration of environmental and Indigenous community considerations from the earliest stages of Project planning and design is an integral part of Hydro One's approach to developing projects. This approach allows potential environmental issues and interactions to be identified early so they can be considered in a proactive manner through appropriate Project planning and

design. The objectives are to avoid adverse environmental effects where possible and, where they cannot be avoided, establish mitigation measures to reduce potential impacts to acceptable levels.

This Project has included consideration of various alternative routes to meet Project objectives (see Section 2.0). These were evaluated on Indigenous, natural, socio-economic, and technical considerations. This evaluation process also included input from Indigenous, public and stakeholder engagement.

To the extent practicable, Project design and location incorporated the following design considerations, while also considering engineering and cost factors:

- Minimize the length of the transmission line to the degree possible and practicable;
- Avoid difficult and complex terrain, where practicable;
- Minimize the requirement for new access;
- Minimize waterbody and wetland crossings;
- Avoid or minimize effects to sensitive land and resource use areas, based on input from Indigenous community engagement;
- Minimize impacts to communities and residents, when possible;
- Avoid interactions with protected areas, where practicable;
- Avoid interactions with environmentally sensitive areas, where practicable; and
- Avoid and/or minimize effects to areas and sites of known archaeological and built heritage features.

After the EA stage, detailed planning and the construction execution approach will be finalized for the Project, including incorporation of route refinements, mitigation, and monitoring, as identified in this report, and applicable permits.

3.3 Project Components

The proposed Project includes the following main components:

- A new overhead Alternating Current (AC) double-circuit 230 kV transmission line from Lakehead TS to Mackenzie TS, and single-circuit 230 kV transmission line from Mackenzie TS to Dryden TS, and associated components that will be located within a typical 46 m wide transmission line right-of-way (ROW), approximately 360 km in length.

- Modifications to existing structures and facilities including the Lakehead TS, Mackenzie TS and Dryden TS, and separation of existing transmission lines out of the Mackenzie TS in Atikokan.
- Development of associated permanent infrastructure, such as access roads and waterbody crossings, to support the operation phase of the Project.
- Development of temporary supportive infrastructure associated with construction including, but not limited to, temporary access roads, temporary workspaces (including helicopter staging areas), construction camps, laydown areas, and waterbody crossings.
- Development of aggregate pits to support the Project.

3.3.1 Transmission Line and Right of Way

The new transmission line will be an overhead 230 kV AC transmission line, with double-circuit between Lakehead TS and Mackenzie TS, and single-circuit between Mackenzie TS and Dryden TS. It will consist of transmission structures, conductors, insulators, overhead shield wires/optical ground wire and grounding.

The proposed ROW for the Project is expected to be approximately 46 m wide. In some sections of the ROW, additional width may be required depending on the specific location of the new transmission line, the local terrain, distance between the transmission structures and specific contractor requirements. The proposed ROW for the Project generally follows existing transmission lines. The width of the existing ROW is approximately 46 m but may vary along the length of the transmission line. The expected ROW is shown on the Project footprint map book provided in Appendix 3.0-B.

Different types of steel lattice transmission structures and wood pole structures will be used for the Project (e.g., Figure 3.3-1, Figure 3.3-2, and Figure 3.3-3). The final structure type and number of structures required will be dependent on the final Project siting identified during detailed planning. Typical towers are expected to be approximately 30 m to 48 m high for single-circuit towers (typical) and 36 m to 54 m high for double-circuit towers. Tower height will vary due to terrain and other design considerations. Typical tower spacing is approximately 385 m for both single-circuit and double-circuit towers. Preliminary tower locations are shown on the Project footprint map book provided in Appendix 3.0-B. These locations may change as detailed planning is completed, including geotechnical studies.

Self-support and guyed structures are expected to be used for light, medium, and heavy angles or where unique design considerations require engineering mitigation. Guy guards will be installed on the guy wires which will increase visibility. Concrete foundations are anticipated to be used at certain structure locations; however, this will be dependent on results from geotechnical investigations to determine soil type and conditions. Temporary wood pole structures will be used during stringing operations to provide protection to roadways, utilities or infrastructure being crossed.

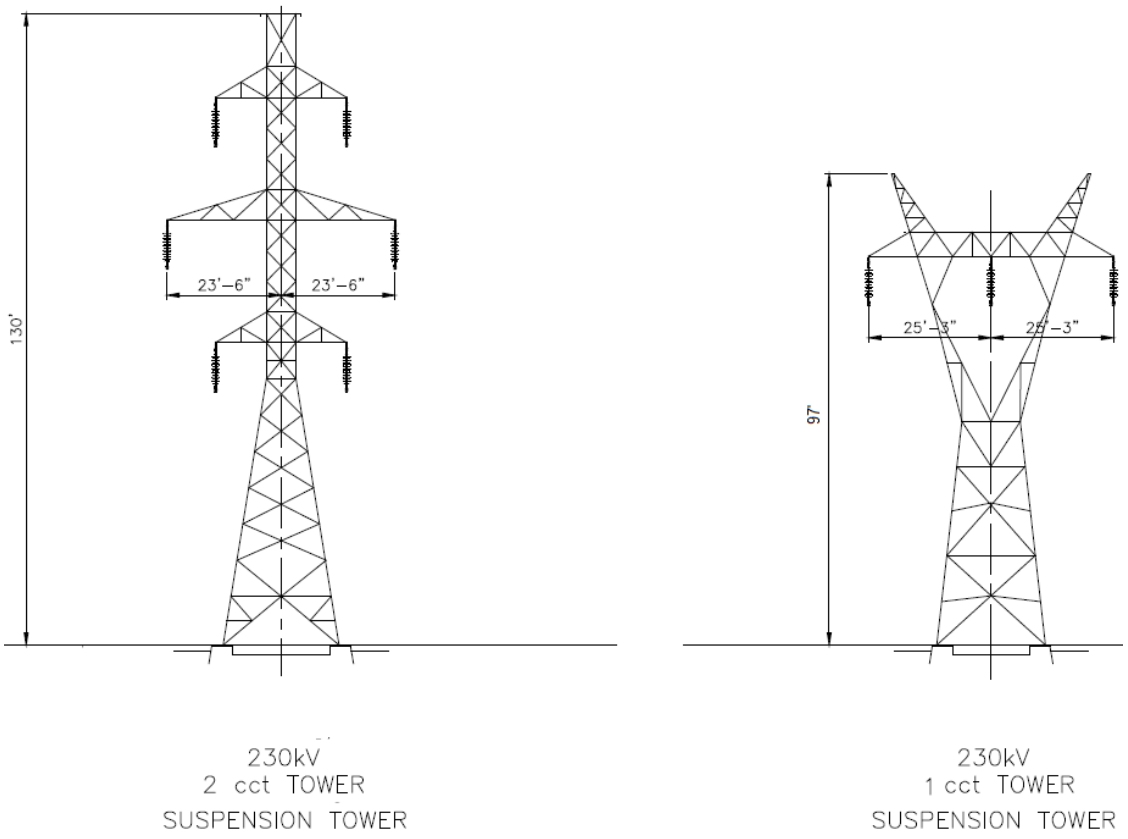


Figure 3.3-1: Example 230 kV Suspension Transmission Structure

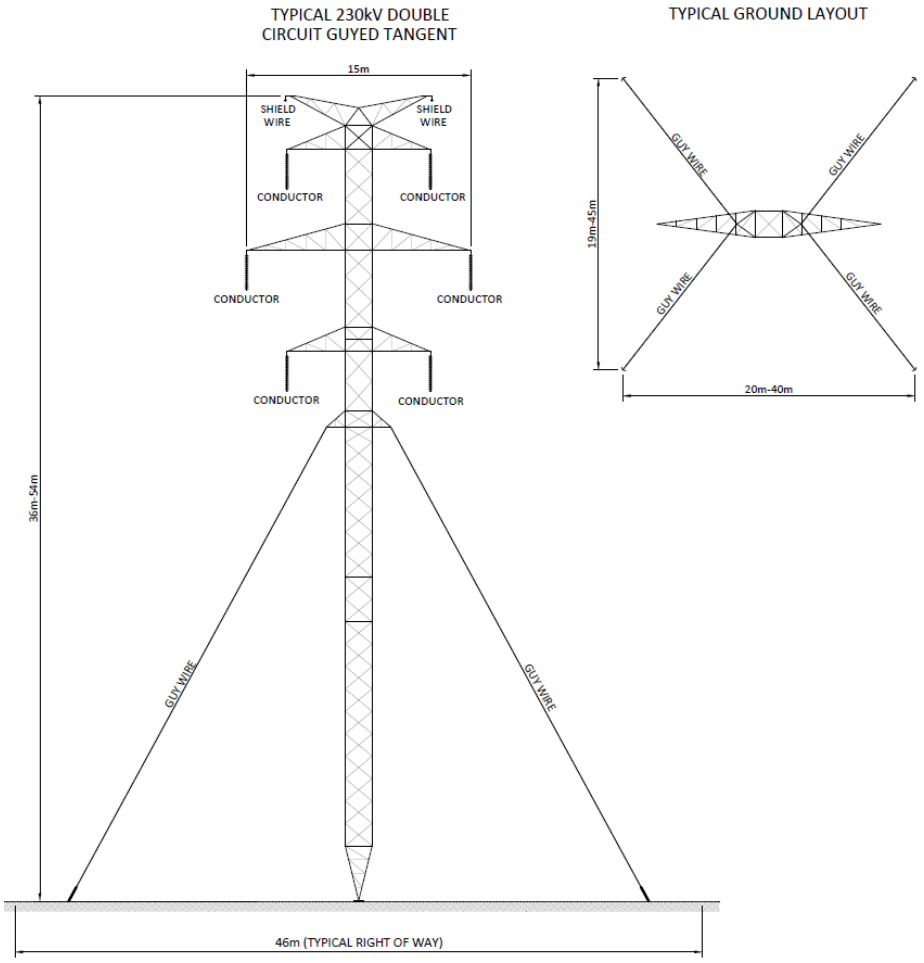


Figure 3.3-2: Example 230 kV Double-Circuit Guyed Tangent Transmission Structure

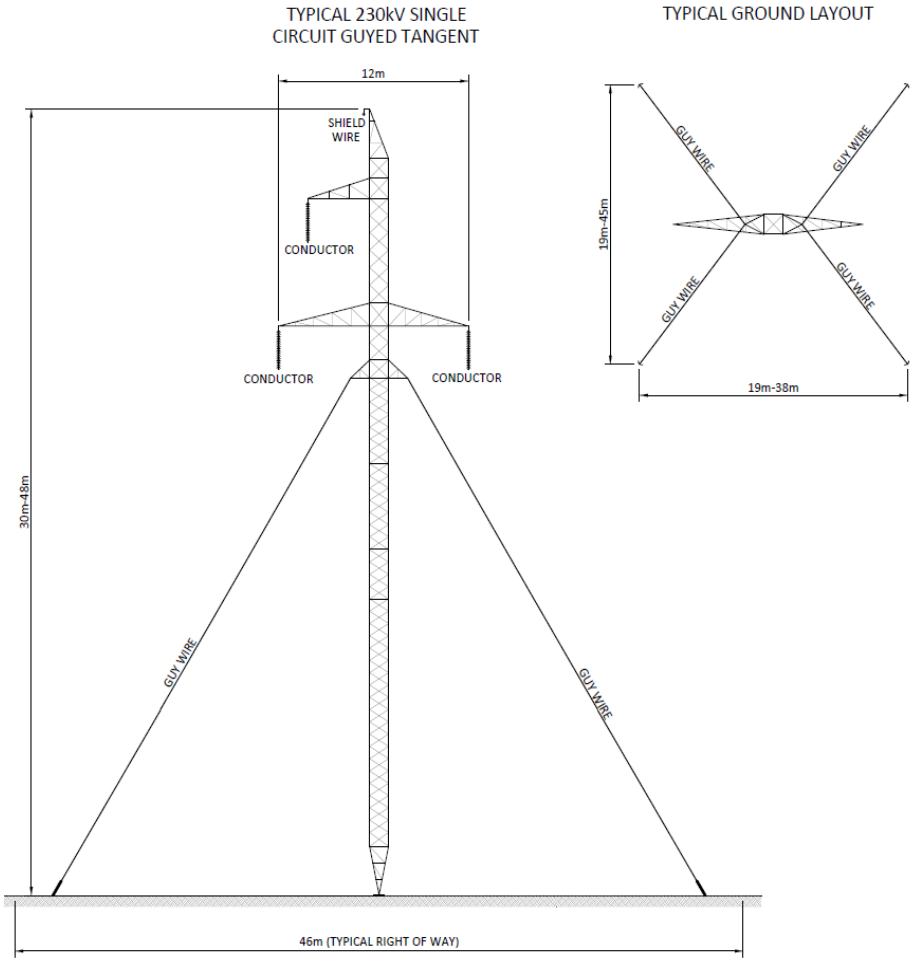


Figure 3.3-3: Example 230 kV Single-Circuit Guyed Tangent Transmission Structure

3.3.2 Modifications to Existing Transformer Stations

Connections to existing transformer stations will be required for the Project, including at Lakehead TS, Mackenzie TS, and Dryden TS. The type and extent of station work will be determined and confirmed during detailed planning and after detailed requirements are identified by the IESO; however, may generally include the following:

- Movement of the station fences of Lakehead TS, Mackenzie TS, and Dryden TS within Hydro One-owned property;
- Installation of new line terminations, bus-work extensions, circuit breakers, disconnect switches, and associated protection, control, and telecommunication facilities at all three of the above-mentioned stations; and
- Installation of shunt reactors and other reactive devices, as may be required by the IESO's System Impact Assessment (SIA), at the three above-mentioned stations.

No new transformer stations are required for the Project at this time. Lakehead TS, Mackenzie TS, and Dryden TS are located on Hydro One-owned land and no additional Crown or private land will need to be acquired to facilitate work at the existing stations.

3.3.3 Separation of Existing Transmission Lines

The Project also includes the separation of two existing 230 kV transmission circuits out of Mackenzie TS in Atikokan (circuits F25A and D26A). Approximately 2.5 km of these two circuits currently share one set of structures. Approximately 1 km of this double-circuit section of transmission line needs to be separated into two single-circuit sections (without sharing structures), as required by the NERC transmission planning standard. Additional ROW to accommodate the separation of the existing 230 kV transmission circuits out of Mackenzie TS is included in the Project footprint and assessed as part of the EA as shown on Figure 41 in Appendix 3.0-B.

The type and extent of work associated with this activity will be determined and confirmed during detailed planning; however, may generally include the following:

- Expansion of the existing F25A/D26A ROW by approximately 30 m;
- Installation of new single-circuit structures, and
- Removal of the existing conductors and their insulators of one of the circuits (D26A or F25A) from the existing common structures and installation of new conductors/insulators and required shield wires on the new structures.

3.3.4 Access Roads

Temporary and permanent access roads are anticipated for the construction and operation phases of the Project. The access requirements for construction and operation are different. During construction, temporary access is required to the ROW for clearing and site preparation, construction of each tower with heavy equipment, and for cleanup and site restoration. The operation phase requires permanent access to the ROW for lighter vehicles conducting inspections, maintenance, emergency repairs, and routine vegetation management. Temporary and/or permanent watercourse crossings may also be required.

Hydro One's preference will be to use the Project ROW for access and build access roads within the ROW, where possible. Where travel in the ROW with heavy equipment is not possible due to terrain, ground conditions or environmental considerations, Hydro One may use existing roads or trails that connect to the Project ROW (including access along adjacent existing transmission line or utility corridors upon receipt of applicable permissions), which in some cases may require upgrades or improvements. In the event there are no existing roads or trails that connect to the ROW, Hydro One may need to build new access roads. Permits or authorizations to construct access roads and water crossings on Crown land and consent from

landowners for access roads and water crossings on private land will be obtained prior to construction, as applicable.

An access road may be established within the Project ROW for use during operation and maintenance. The access will be located, for the most part, within the cleared ROW. However, in some places (e.g., where the ROW spans a waterbody or crosses difficult terrain) an access road off ROW may be required to reduce the number of watercourse crossing requirements. Access roads will use in-situ and/or other locally sourced material (e.g., gravel pits) where appropriate to create a stable surface for travel (e.g., cleared wood, logs and swamp mats may be used as a base for travel across wetlands, bogs, and/or low-lying areas).

The number, location, and characteristics of existing and proposed new access roads to be used for the Project will be refined through detailed planning and design work and through consultation with Indigenous communities, government officials and agencies, landowners and interested persons and organizations. In sections where the Project crosses provincial parks, access roads will be located along existing roads, within the proposed ROW or the adjacent existing transmission ROW to the extent reasonably possible.

An access plan has been included as part of the Project footprint and is shown on the Project footprint map book in Appendix 3.0-B. This includes the following categories of access roads:

- New Access Road – Preferred – These roads are the preferred option to be used for construction.
- New Access Road – Alternate – These roads are alternatives that could be used during construction if there are constraints identified for the preferred new access road. It is expected that both the preferred and alternate access roads would not be used during construction, but both have been included as part of the Project footprint as a conservative measure so that environmental effects are not underestimated.
- Existing Access Road – Potential Improvements – These are existing roads that require minor improvements, such as clearing of regrowth, surfacing, widening, and water crossing repair.
- Existing Access Roads – No Improvements – These are existing access roads that do not require improvements, but could require regular maintenance such as grading and spot gravelling.
- Construction access roads that are presented in the EA Report would be considered preliminary subject to refinement based on detailed planning and design.

The area and length of the access roads included in the Project footprint are provided in Table 3.3-1.

Table 3.3-1: Access Road Lengths and Area for the Project Footprint

Access Road Type	Length (km)	Area (ha)
New Access Road – Preferred	330	662
New Access Road – Alternate	117	220
Existing Access Road – Potential Improvements	304	588
Existing Access Roads – No Improvements	549	1083
Total	1,300	2253

All new and upgraded all-season access roads will typically be built to the following standards:

- 6 m driving surface with widening up to 8 m on corners, within a 20 m clearing;
- Roads less than 15% grade;
- Trails less than 18% grade (tracked equipment access);
- Grade breaks less than 9%;
- Minimum 15 m radius on horizontal curves;
- Turnouts every 500 m and incorporated into tower access approaches; and
- Ditches 0.3 m to 1 m wide and 0.25 m to 0.5 m deep.

To minimize adverse effects, Hydro One commits to progressively restoring new temporary construction access roads located on previously undisturbed lands as described in Section 3.4.1.11. To minimize future potential access development impacts, some access roads may be left permanently to support long-term inspection and maintenance activities and for multiple use/integration with other existing industrial operations (e.g., forestry operations within forest management areas).

Approximately 30% of access roads and trails outside of the ROW will remain in place to provide access for operation and maintenance activities. This includes new access roads and existing access roads with potential improvements for approximately 143 km (290 ha). All others will be decommissioned and rehabilitated using applicable and appropriate methods and standards. At this stage in the Project, it is unknown which access roads will be left in place to support operations and maintenance of the transmission line. Engagement with Indigenous communities and appropriate stakeholders, including the MNRF, will occur prior to determining which roads will not be removed and any necessary permits/approvals will be obtained.

Unless otherwise directed by regulatory agencies, Hydro One does not anticipate requiring closure of any public roads during construction operations. Traffic control may be required from time-to-time which may cause short duration interruptions/delays to road users.

3.3.5 Waterbody Crossings

The Project is expected to include 315 transmission line crossings of waterbodies, 515 access crossings of waterbodies (i.e., 404 preferred access roads and 111 alternative access road crossings).

During construction, existing access will be used as much as possible to limit disturbance. Existing culverts will be repaired or replaced, as appropriate. Where the construction of new access infrastructure for the Project will involve waterbody crossings, these will be minimized to the extent appropriate. The waterbody crossings will involve temporary bridges (i.e., clear span bridges), rig mats, ice bridges/snow fills (for winter construction), log fills, and culverts. When installing waterbody crossings, ford crossings of waterbodies will be required for clearing and access building equipment. Crossing locations will be identified in accordance with best management practices. As appropriate, some waterbody crossings may use a very short-term rig mat to facilitate clearing and access equipment, before being immediately replaced with a temporary bridge. Water extraction will be required for ice bridges and some snowfills to create ice and snow if none are present at the crossing site. Permits will be obtained to take water from different locations for snowfills if none is available at the crossing site.

Where new waterbody crossing structures are proposed, the primary preferred structures to be used are clear-span bridges, ice bridges/snow fills (for winter construction), culverts, and rig mats.

Clear-span bridges and rig mats will be placed above the highwater mark (HWM) (i.e., no work will occur below the HWM during construction or operation and maintenance). A rig mat is a rigid portable platform used to support equipment in construction and other resource-based activities. While a rig mat is not technically a clear span bridge as classified by the MNRF in the Crown Land Bridge Management Guidelines, it will function as a clear-span bridge over small waterbodies (i.e., bank-full width less than 3 m). For clear-span bridges and rig mats, it is expected that no new temporary or permanent fill would be placed below the HWM.

Where rig mats are necessary for crossing unstable or unconfined waterbodies the following mitigation measures will be used as appropriate: 1) Prioritize crossing during the frozen season to limit disturbance, 2) Where winter construction is not feasible, sediment and erosion control measures will be implemented (i.e., silt fencing, silt curtains, aqua dams, coffer dams etc.) to minimize disturbance to fish and wildlife habitat, and 3) On-site monitoring will be completed during these crossings to monitor effects on fish and wildlife (i.e., distress, stranding, mortalities) and be prepared for rescue/salvage, where required.

Log fills will only be used in wet areas where there are no defined channels and are intended only to maintain natural drainage patterns. There will be no log fills installed in any actual waterbody or in any defined channel, whether it is wet or dry. In effect, log fills will only be used where there is clearly no impact to fish or fish habitat. Log fills will be characterized by a layer of logs covered with geotextile and fill material as required.

Hydro One will incorporate the best management practices within the MNRF Environmental Guidelines for Access Roads and Water Crossings (MNR 1990) MNRF and DFO Protocol for the Review and Approval of Forestry Water Crossings (2021), DFO's Measures to Protect Fish and Fish Habitat (DFO 2022a) and applicable Codes of Practice (DFO 2022b), Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (MNR 2010a), for access road construction and temporary waterbody crossing during construction to the extent practicable. If there is any circumstance under this cannot be met, DFO and MNRF will be contacted to discuss any permits and approvals required.

Road construction will avoid long, sustained grades and steep grades down to watercourses; there will be no through cutting, if possible, to control runoff. Roads will be built with swales to divert surface water onto stable ground thereby minimizing high volume or high-water velocity.

Removal of riparian vegetation will be limited to the extent practicable, and to the requirement of the access road or trail width only. Removal of compatible vegetation at waterbody crossings along the transmission line alignment ROW will generally be limited to a 10 m-wide ROW for equipment access to waterbody crossing structures (e.g., temporary bridges). Additional removal of incompatible vegetation may be required for technical or safety reasons as appropriate. Erosion will be controlled by using low ground pressure equipment for clearing operations near waterbodies outside the 10 m buffer and retaining compatible vegetation to the extent practicable. Trees within the 10 m buffer would be hand felled and removed if the risk of soil erosion is low. Otherwise, trees will be limbed and topped in place and cut to lay low to the ground for added soil protection. Chips will not be placed near waterbodies for erosion control or any other purpose.

Culvert selection will consider site-specific conditions such as the width of the water crossing, fish habitat characteristics, substrate type, and hydrologic characteristics of the individual waterbody based on a desktop and field observed conditions. Culvert selection is primarily based on design flow calculations that consider the expected rainfall in the geographic area, the catchment basin area, and the slope and composition of the channel. Culvert design criteria dictate the function of the culvert including the minimum and maximum water levels in the culvert for fish passage, erosion control and the proper hydraulic function of the culvert. Each culvert is selected based on hydrology analysis and according to the MNRF and DFO Protocol for the Review and Approval of Forestry Water Crossings (2021). Culverts will be sized to handle peak flow, embedded by 10% to consider low flow conditions and aligned parallel to the waterbody channel on a straight section of uniform gradient. Culverts will be designed for fish passage and will meet DFO's species-specific passage requirements (Di Rocco and Gervais 2022), as they will be in operation for longer than a year. Open bottom culverts (i.e., arch structure culverts with no bottom that does not disturb the bed of a waterbody) may be considered for water crossings with high value fish habitat. At the Project detailed design stage, site-specific fish and fish habitat and surface water surveys will be completed at all water crossings where work below the HWM is proposed to support engineering and permitting. If site-specific features, such as a bedrock bottom, prevent the installation of a culvert then a different

crossing method will be chosen. Each waterbody crossing will be visited ahead of construction to ensure that the crossing location is conducive to a culvert install, such that any changes in site conditions can be addressed through adaptive management. All water crossings will be confirmed to be on the water crossing lists before construction to correctly identify waterbodies, the appropriate crossing structure and mitigation measures (see Section 6.6 for additional details). Site-specific fish and fish habitat and surface water surveys may be required at water crossings where work below the HWM is proposed to support engineering and permitting. If new waterbodies are identified, a qualified environmental specialist will be engaged to determine the recommended crossing methods, proposed restricted activity timing window, and the MNRF and DFO will be contacted regarding permits and approvals required. Hydro One will inform regulators and relevant stakeholders of any new waterbodies identified.

Temporary crossing materials, if used, will be removed immediately following the completion of construction activities. Sediment and erosion control measures will be installed prior to commencing construction activities. Upon removal of the crossing materials, the waterbody banks will be returned to their original profile if needed and disturbed areas will be stabilized, as necessary, to prevent soil erosion.

3.3.6 Equipment/Material Laydown Areas

Equipment and material laydown areas, as well as fly yards, construction/stringing pads, and staging areas, may be required to receive and distribute material and support construction activities during the Project. The preference will be to use previously disturbed areas or the ROW for these areas where practicable.

Electricity for lighting at laydown yards areas will form part of the overall load of the construction camp / laydown area. Electricity will be supplied through grid-connected power or generators as appropriate. LED lighting will be used to focus light downward and reduce wasted light.

Materials stored at the laydown areas will typically include steel or wood pole structures, foundation/anchoring and guy wire material, structure materials, conductor and groundwire reels, insulators and conductor fittings, breakers, reactors, switches, bus work, and miscellaneous hardware. The laydown areas will be cleared of vegetation, grubbed, and levelled, as required. Vegetation will generally be cleared using mechanical harvesters to remove the merchantable timber and bulldozers to remove the remaining woody vegetation. The laydown areas may be equipped with perimeter lighting and fencing for safety and security, depending on the location. As described in Section3.3.8, laydown areas may also be located within temporary construction camps.

It is anticipated that construction material and equipment from the laydown areas will be transported by truck to specific locations along the ROW. Materials and/or equipment may also be transported by helicopter to areas not accessible by ground. Permits, authorizations and/or agreements for the construction and use of these areas will be obtained prior to their use, as applicable.

To minimize adverse effects, Hydro One commits to progressively restoring areas to be used on a temporary basis during construction, such as laydown areas, pull sites, and helipads, located on previously undisturbed lands. Some of these areas may be required on a permanent basis depending on the future operational needs.

Where Crown land is needed to erect supporting infrastructure (e.g., construction offices, laydown areas and/or work camps, etc.), permits and authorizations from the MNRF will be acquired, as required.

3.3.7 Fuelling Areas

During construction, fuel will be transported by tanker trucks, in drums, or other approved containers. Fuelling areas will be established at laydown areas and temporary construction camps, with barricaded double-walled above-ground storage tanks (AST) or other suitable fuel tanks with secondary containment measures (e.g., berm system) for safety. A fuelling truck may also be used for refuelling vehicles and equipment and filling fuel tanks in temporary construction camps. All ASTs will be registered under, and in compliance with, applicable federal and provincial legislation. ASTs will meet the Canadian Council of Ministers of the Environment (CCME) Environmental *Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products* (CCME 2003). The transportation, storage and handling of fuels will be in compliance with the Ontario *Technical Standards and Safety Act* and Canada's *Transportation of Dangerous Goods Act*. The transport vehicles will be licensed and maintained according to safety requirements.

Fuelling areas at laydown areas and temporary construction camps will include appropriate drainage controls including secondary containment with a storage capacity of at least 110% of the fuel tank. Drainage will be retained in a sump where hydrocarbons can be captured and separated prior to the release of any rainwater run-off, as appropriate. Equipment with reduced mobility, such as heavy lift cranes and excavators, will have fuel delivered by a mobile tank and re-fuelling will take place on site. All fuel transfers will follow safety procedures to prevent leaks and drips, and spill response kits will be available on all vehicles used to transport fuel. Refueling, service, and maintenance of vehicles and equipment will generally be carried out in designated areas at temporary construction camps and temporary laydown areas located a minimum of 120 from waterbodies to the extent possible. These areas will be designed and constructed to collect and contain minor leaks and spills. If refueling within 120 of a waterbody cannot be avoided, enhanced spill containment measures will be used. In the event that refuelling, servicing and maintenance is required in the field, 120 m buffer will be respected to the extent possible. There may be locations where this is not possible due to the prevalence of wetlands; however, in these locations enhanced spill containment measures will be used.

3.3.8 Temporary Construction Camps

Lodging and accommodation for construction workers will be required during the construction stage. Construction camps are expected to be established along the transmission line to provide

accommodation to workers on a temporary basis in select locations along the preferred route. At peak construction periods, a temporary construction camp is expected to house up to 350 people. Construction camps may also be used as laydown yards. The camps will vary in size as shown in Table 3.3-2:. Camps will be located at least 30 m from any waterbodies and will be located within previously disturbed areas, to the extent practicable. A typical layout of a temporary camp is shown on Figure 3.3-4. Specific features and/or layout will vary due to local topography and site conditions. Table 3.3-2: lists 12 potential camp locations. However, only three construction camps are expected to be required. The remaining locations will either not be used or could be used as laydown areas during construction. The construction camps included are generally conservative and the entire area may not be required during construction. The final area required, and which areas will be used as construction camps or laydown areas, will be determined during detailed design.

The proposed locations were planned in consideration of existing access, proximity to an electricity source and water, general site characteristics (e.g., level, favourable soil types, etc.), and proximity to the Project. All sites have been located within previously disturbed sites (e.g., new or regenerated cutblocks) as shown in Table 3.3-2. For construction camps L20 and L24, feedback from Indigenous communities indicates that this area is of cultural significance and a new location, construction camp L27, was identified to replace these locations. In addition, MNRF and MECP raised concerns with construction camp L16 and it will no longer be used. The assessment completed as part of this EA was done assuming construction camps L16, L20 and L24 would be used, and, therefore, the results of the EA are conservative.

Table 3.3-2: Temporary Construction Camps

ID	Disturbance	Nearby Road	Area (ha)
L13	Existing Anthropogenic	Highway 11	21.3
L15	Cutblock	Highway 17	11.7
L16	Cutblock(1)	Highway 623	29.6
L17	Cutblock	Highway 17	6.7
L18	Cutblock	Mameigwee Road	10.0
L23	Cutblock	Mameigwee Road	9.6
L24	Cutblock(1)	Ann Bay Road	22.7
L22	Cutblock	Ann Bay Road	10.6
L25	Cutblock	Mitch Road	20.5
L26	Cutblock	Patent Road	5.4
L20	Cutblock(1)	Ann Bay Road	27.7
L27	Cutblock(2)	Ann Bay Road	24.1

1) These locations will not be used based on feedback from Indigenous communities or MECP and MNRF during the Final EA Report review.

2) This location will be used instead of construction camps L20 and L24 based on feedback from Indigenous communities.

ha= hectare

Figure 3.3-4: Typical Layout of a Temporary Construction Camp and Laydown Yard

Construction camp facilities will comply with the Ontario *Occupational Health and Safety Act* and required permits, authorizations, and approvals will be acquired prior to their construction. In particular:

- It is anticipated that potable water for construction camps will be obtained from municipal sources, where available. If municipal sources are not available, the source of water with either be drilled from groundwater wells or sourced from the nearest waterbody or stream. Permits to take water or Environmental Activity and Sector Registry (EASR) will be required prior to taking or discharging groundwater.
- Municipal sewage disposal services will be used where available and where they are not, septic fields, on-site treatment and trucking off-site are options for sewage disposal. An application for the use of septic beds will be submitted to the Northwestern Health Unit and MECP. Municipal waste will be disposed of either through a registered carrier or using approved on-site incinerators.
- The appropriate approvals (e.g., environmental compliance approvals, municipal approvals, etc.) will be acquired, as needed.

- Grey water will be discharged according to permit and/or authorization requirements.
- Electricity will be supplied through the existing electrical grid or temporary diesel generators.

Equipment that presents risk of leaks or spills will be protected using appropriate methods (e.g., spill containment systems for oils, fuels and chemical storage and transfer areas, and spill containment systems under stationary equipment, such as generators, pumps and compressors).

Hydro One will progressively restore temporary construction camp sites as the Project construction progresses and they are no longer needed as described in Section 3.4.1.11.

Hydro One recognizes the sensitivity and concern related to temporary construction camps where workers are brought temporarily to the area to support construction. Hydro One requires a strong health and safety management system and a commitment to following utility best practices. Hydro One incorporates public health and safety into business decisions and will implement the following policies related to the operation of the construction camps:

- The Project contractor will create safety protocols applicable to the project area (including construction camps). For example, the Project contractor will maintain a Substance Abuse program, which is a term and condition of employment for their employees.
- Workers will be required to adhere to an Employee and Contractor Code of Conduct that outlines appropriate behavior at the worksite, temporary construction camps, communities, and while travelling to and from work rotations.
- The contractor will support community safety programs for the First Nations close to the proposed Project.
- The contractor will implement mandatory training for all employees on gender-based and sexual violence, anti-racism, cultural safety, diversity and inclusion, and the effects of colonization on Indigenous peoples.
- Transport to the construction camp and site will generally be completed using multi-passenger vehicles; personal vehicles will be minimized to the extent practicable.
- The contractor will prohibit non-Project personnel from riding in company vehicles (including hitch hikers).
- The contractor will maintain a set of camp rules that describes what is and is not acceptable practice in camp, including a curfew, and prohibited items, actions or practices.

- Only authorized individuals will be allowed within the construction camp and visitors will be required to check in with security upon arrival. Bringing an unauthorized individual onto site would be a violation of the terms and conditions of employment.
- The contractor will develop and implement systems for tracking and reporting incidents of harassment and violence. Any incidents that violate the contractor policies or rules and require immediate attention or action, will be appropriately addressed by Project leadership, which may include termination.
- The contractor will explore options to increase the representation of Indigenous women and gender diverse individuals in the workforce at all employment levels.
- Hydro One will work with Gwayakocchigewin Limited Partnership on a community-led committee to provide feedback and develop additional mitigation measures, where required.

3.3.9 Construction Office

Temporary mobile offices will be required during the construction period. It is anticipated that these temporary offices will be co-located with the Project laydown yards and other temporary facilities. The construction offices are anticipated to be decommissioned following Project construction. Hydro One commits to progressively restoring mobile construction office sites as the Project construction progresses and the construction office sites are no longer needed.

Where Crown land is needed to erect supporting infrastructure (e.g., construction offices, laydown areas and/or construction camps, etc.), permits and/or authorizations from the MNRF will be acquired, as required.

3.3.10 Temporary Land Permissions

Temporary land permissions will be required at some locations along the ROW to accommodate construction activities, such as providing additional working space, stockpiling, and equipment/material laydown or to facilitate conductor pulling/tensioning. These sites are anticipated to be decommissioned and restored following construction. Appropriate approvals, agreements and/or authorizations will be obtained for any Crown land or private lands required for construction activities.

3.3.11 Aggregate Pits

The Project will require aggregate material. Engineered aggregate may be required for the construction of the substations, culvert watercourse crossings, access roads, concrete mixing, and for camps and laydown areas. The total quantity of aggregate required will be determined during the detailed planning and design stage. Aggregate sourced from existing pits will be imported and engineered from qualified and approved suppliers. There will be new temporary aggregate pits required for the Project where volume of material required and distances across the Project cannot feasibly be accommodated by existing pits. Aggregate material will be

extracted from new permitted Category 9 (Sand and Gravel) pits which will remain 1.5 m above the water table. Preliminary aggregate pit locations are identified as part of the Project footprint and are listed in Table 3.3-3 and shown on the Project footprint map book in Appendix 3.0-B.

Table 3.3-3: Potential Aggregate Pits

ID	Status	Landform	Area (ha)
AP5	New	Kame	15.3
AP7	New	Outwash Plain	11.1
AP8	New	Outwash Plain	11.0
AP9	New	Outwash Plain	15.4
AP10	New	Kame	4.1
AP11	New	Kame	10.6
AP13	New	Kame	6.1
AP17[(1)]	New	Ground Moraine	11.2
AP21	New	Kame	7.5
AP22	New	Kame	3.1
AP23	New	Bedrock Knob	5.3
AP24	Existing Inactive	Bedrock Knob	2.0
AP25	Existing Inactive	Bedrock Knob	1.7
AP26	Existing Inactive	Ground Moraine	6.8
AP27	Existing Inactive	Outwash Plain	1.5
AP28	New	Kame	1.5
AP30	New	Ice Contact Delta	2.5
AP31	New	Ice Contact Delta	5.2
AP14	New	Kame	3.0
AP12	New	Kame	4.4
AP18	New	Kame	8.1
AP20	New	Kame	7.5
AP32	New	Esker	17.5
AP33	New	Esker	18.1

[(1)]This location will not be used based on feedback from MNRF during the Final EA Report review.

Note: Pits labelled as “Existing Inactive” are listed as “Surrendered” as per the Ontario GeoHub system. Based on aerial imagery and online information status, these pits were labelled as “Existing Inactive” since there may be some material left in them that could facilitate some construction activities, subject to field verification.

ha= hectare

The pits will be excavated primarily using excavators, loaders, or other equipment common to aggregate operations, including blasting and crushing activities, as appropriate. Excavated topsoil or overburden will be stored on-site and used for eventual reclamation of the pits. Aggregate material excavated and topsoil/overburden will be placed within the footprints identified for the pits prior to transport. Existing access roads and Project roads, including within

the 46 m ROW, will be used to transport aggregate to the source of use. Appropriate sediment and erosion controls will be implemented at each pit and associated storage area. Once no longer used, the pits will be progressively reclaimed. A reclamation plan will be prepared by Hydro One and submitted to the MNRF. Reclamation success of the pit sites will be monitored by Hydro One.

Hydro One does not anticipate becoming the long-term permittee of new pits for the construction of the line. Hydro One continues to work with Indigenous communities near off-reserve gravel pits to develop or adapt facility permitting to allow the supply of aggregates to the Project. Further, any rights associated with aggregate pits that are developed by the contractor for the Project will be offered to Indigenous Businesses prior to completing any reclamation activities. Discussions will continue with Indigenous communities, sustainable forest licence holders (where applicable) and appropriate regulatory agencies regarding required approvals.

Development of new aggregate resources will undergo the applicable permitting process outlined at https://www.ontario.ca/page/aggregate-resources#section-7, including any required engagement.

3.3.12 Helicopter Pads and Fly Yards

Helicopters may be used to transport material, equipment and personnel in areas that are difficult to access by ground vehicle, or for erection and stringing activities. The exact size of the helicopter pads may vary, but they are expected to generally be approximately 60 m by 60 m. Where helicopter pads are required, they will generally be spaced approximately every 5 km along the transmission line and will be located adjacent to the ROW. Preliminary helicopter pad locations are shown on the Project footprint maps in Appendix 3.0-B and are included in the Project footprint assessed in the EA. However, the final locations will be determined during detailed planning and will vary depending on season of use, finalized stringing plans and construction methods. Therefore, the helicopter pads shown are expected to move along the ROW as further construction planning is completed.

The Project footprint also includes 47 fly yards as shown in Table 3.3-4 and on the Project footprint maps in Appendix 3.0-B. Fly yards are larger clearings where structures are assembled in mass and flown to the structure locations to be erected using helicopter rather than assembling the structure at the end location and erected using cranes. The fly yards included are generally conservative and the entire area may not be required during construction. The final area required will be determined during detailed design.

Hydro One and their contractor(s) will develop a notification process for Indigenous communities on the use of helicopters during the fall and spring hunting season.

Table 3.3-4: Fly Yards

ID	Disturbance	Nearby Road	Area (ha)
F_1	Cutblock	Highway 17	20.9
F_3	Cutblock	Highway 17	20.6
F_4	Cutblock	Highway 11	11.4
F_5	Cutblock	Highway 17	22.6
F_6	Cutblock	Anderson Road	13.8
F_8	Grassland	Paesel Road	4.9
F_12	Cutblock/Existing Anthro	Mavis Lake Road	10.0
F_13	Cutblock	Mavis Lake Road	4.3
F_14	Cutblock	Copenhagen Road	36.0
F_15	Cutblock	Kam Current Road	15.3
F_18	Cutblock	Hardtack Road	3.2
F_19	Cutblock	Highway 11	15.3
F_20	Cutblock	Finmark Road	17.4
F_22	Existing Anthro	Kam Current Road	15.3
F_23	Cutblock	Nemi Road	14.7
F_24	Cutblock	Highway 11	7.9
F_25	Cutblock	Goldie Road	15.0
F_26	Cutblock	Athelstane Road	57.9
F_27	Cutblock	Highway 11	19.2
F_37	Cutblock	Goldie Road	21.9
F_40	Existing Anthro	Highway 802	5.3
F_41	Cutblock	Highway 11	23.2
F_42	Cutblock	Highway 11	7.3
F_44	Cutblock	Highway 11	8.0
F_45	Cutblock	Highway 11	10.8
F_46	Cutblock	Highway 11	11.3
F_49	Cutblock	Osaquan Road	44.9
F_50	Cutblock	Highway 17	42.1
F_51	Cutblock	Highway 17	13.1
F_53	Grassland	Anderson Road	6.0
F_55	Existing Anthro	Highway 17	21.5
F_56	Cutblock	Silver Spring Road	28.3
F_57	Cutblock	Silver Spring Road	8.4
F_59	Cutblock	Stanton Bay Road	17.2
F_60	Cutblock	Highway 11	11.4
F_61	Cutblock	Osaquan Road	37.7
F_62	Cutblock	Morin Road	224.4
F_64	Cutblock	Osaquan Road	31.9

ID	Disturbance	Nearby Road	Area (ha)
F_65	Cutblock	Highway 11	25.1
F_66[(1)]	Existing Anthro	Highway 622	4.1
F_67	Cutblock	Drift Lake Road	69.4
F_68	Cutblock	Highway 11	23.4
F_69	Grassland	Powell Avenue	3.4
F_70	Cutblock	Turgeon Road 1	32.1
F_71	Cutblock	Highway 11	8.5
F_74	Existing Anthro	Hardtack Road	5.4

[(1)]This location will not be used based on feedback from MNRF during the Final EA Report review.

The flight paths for helicopters will be governed by the location of fly yards and helicopter pads which may need to be adjusted as construction operations are being completed. Flight paths are generally restricted to the proximity within/along the transmission line ROW. When using helicopter techniques for erecting structures (i.e., towers), helicopters will fly directly between the fly yards and the structure sites. Due to the weight of the structures, the helicopter cannot easily adjust flight paths and must use the most direct path possible. The total number of helicopters anticipated on the project will be less than four; however, this is subject to change based on construction execution requirements, weather and/or access or other factors impacting planned execution methods. Where helicopter erection is required, helicopter use will be characterized by periods of heavy activity while lifting the structures into place. The yards will be busy for several days while any one place on the line will only be impacted for a very short period (e.g., five minutes to set the tower) before the helicopter moves to the next structure. A second helicopter may be required to move crews from structure to structure if road access is unavailable. During stringing activities, helicopters will operate within a pull location for a few days then move down the corridor a few kilometres. Other activities, such as hanging marker balls where needed, will be quick (e.g., requiring only a few minutes per marker ball).

Helicopters are restricted from flying over populated areas while long-lining loads. Traffic control is necessary when carrying external loads (i.e., structures) across major roadways. Helicopters will operate constantly throughout the stringing activity at or slightly below structure top height (35 to 50 m). Helicopters will not fly during nighttime or under severe weather.

3.3.13 Concrete Production

Concrete will be mixed on-site using bagged concrete along the ROW, or sourced from local suppliers, if available. For concrete sourced from local suppliers, the owner/operator of the concrete batch plant will operate the plant in compliance with applicable regulatory requirements (e.g., ECA). Concrete production will be carried out in accordance with the mitigation measures outlined in the EA. Water for concrete may be trucked in or groundwater sourced. In accordance with the *Ontario Water Resources Act*, Permit(s) to Take Water will be obtained or Environmental Activity and Sector Registry will be completed prior to taking groundwater.

3.3.14 Project Footprint Summary

A summary of the Project footprint by component is provided in Table 3.3-5.

Table 3.3-5: Project Footprint Summary

Project Component	Number	Length (km)	Area (ha)
Structures	988	n/a	n/a
Transmission Line ROW	n/a	359.1	1,651.9
Temporary Pull Sites	n/a	n/a	19.3
Fly Yards	47	n/a	1,072.2
Aggregate Sites	24	n/a	180.6
Helicopter Pads	71	n/a	25.6
Construction Camps / Laydown Areas	11	n/a	175.7
Expansion of the Existing F25A/D26A ROW	n/a	1	9.4
Modifications to Existing Transformer Station	n/a	n/a	5.0
New Access Road – Preferred	n/a	329.6	661.9
New Access Road – Alternate	n/a	117.0	219.9
Existing Access Road – Potential Improvements	n/a	303.8	588.3
Existing Access Roads – No Improvements	n/a	549.1	1083.3
Total (excluding overlap of Project components)	n/a	n/a	5,124.5

3.4 Project Phases and Activities

The lifecycle of a transmission line occurs in three phases that includes initial construction, commissioning and energization, ongoing operation and maintenance, and eventually decommissioning. The various activities around these phases, as well as the various components of the Project, are described separately below.

3.4.1 Construction, Commissioning and Energization

The main construction activities anticipated for the Project include the following:

- Surveying and staking;
- Clearing, grubbing and grading the ROW;
- Construction of access roads, watercourse crossings, laydown areas, and construction camps;

- Materials and equipment delivery;
- Tower structure foundation installation;
- Tower structure assembly and erection;
- Conductor stringing and installation;
- Grounding installation;
- Testing and commissioning;
- Clean-up and restoration, and
- Post-construction monitoring.

3.4.1.1 Surveying and Staking

A light detection and ranging (LiDAR) survey was completed in summer 2021 to create a topographical map of the ROW with information on the precise land features and elevations. From this survey, the preliminary location of the ROW, structures, access roads or trails, turn-around areas and laydown areas were determined. However, detailed planning will be completed, including geotechnical studies, which could influence the final location of Project components.

Ground survey or global positioning system (GPS)-equipped machinery will be used to accurately delineate the ROW boundary and sensitive areas. Following the ROW clearing (see Section 3.4.1.2), field survey crews will physically mark (i.e., stake) the specific locations of the structures, foundations and guy anchors using GPS technology, data from the LiDAR survey, and detailed planning.

3.4.1.2 Vegetation Removal, Grubbing, and Grading the ROW

Vegetation removal along the ROW and grading of access and structure pads along the ROW will be completed, where required. ROW preparation will be carried out in accordance with standard utility practices and procedures and will involve removal of all non-compatible vegetation that exceeds 2 m at maturity.

Vegetation will be removed that may prohibit the construction and safe operation of transmission lines from the ROW. The extent of vegetation removal will vary depending on the type of structure selected for the design and on vegetation heights. Some areas may not require cutting such as fields and farmland. Vegetation removal along the ROW will take into consideration: widths of waterbodies; location of wetlands; locations of known archaeological and cultural heritage sites; areas of commercial timber and the method of cutting and storing commercial timber, and required riparian buffer zones (e.g., for waterbodies and other sensitive natural features).

Vegetation removal will consist of cutting tree trunks parallel to, and within 15 cm of the ground or lower, as well as the removal of all shrubs, debris, and other such materials. Grubbing may be required along some parts of the ROW. Vegetation will be largely removed by mechanical means, except within 10 m of a watercourse or wetland. In these areas, vegetation will be removed manually, using chain saws and other hand-held equipment, while leaving the under growth and duff layer undisturbed to prevent erosion.

Trees of merchantable value will be felled, de-limbed, mulched, or piled at the edge of the ROW according to clearing contract requirements. Hydro One will work with local communities and Forest Management Units to manage merchantable timber cleared by the Project. In addition, merchantable trees may also be used where practicable across the Project, such as in the construction of the roads. These are not expected to be widespread but would be in areas where extra subgrade support may be required (i.e., wet areas) and in areas where extra fill may be required, such as in rocky areas. This reduces the amount of rock blasting and aggregate required and therefore reduces the overall environmental impact of the Project. Any merchantable timber used in the subgrade will be accounted for under a scaling agreement with the MNRF.

Residual logging debris and timber not reserved for landowner use or sale may be mulched in place and spread on the ROW or piled and burned. Where piling and burning is prescribed, trees will be sheared at the stump using bulldozers equipped with shear blades. Unless they are to be used to meet other environmental objectives, chips are to be spread as soon as reasonably possible and are not to exceed a spread depth of 18 cm. Other slash and debris resulting from mechanical clearing operations will be spread to ensure depths do not exceed 0.3 m. In-situ mulch may also be used to help stabilize soils prone to erosion in combination with other erosion control measures. Chips/mulch will not be placed near waterbodies for erosion control or any other purpose. Slash and debris windrows are not expected to be required, but if they are required the windrows will be left open at all roads or access trails, along property lines, and along wetlands and watercourses to provide access for wildlife not capable of crossing the low vegetation pile. Felled trees from clearing the ROW may be used to build corduroy access where required and for erosion control. The windrows will be allowed to decompose naturally. Designated tree species (if applicable) will be disposed of in accordance with local or provincial regulations.

If burning is the appropriate method of disposal, care will be taken to ensure piles are pushed up properly to promote adequate drying and to minimize the inclusion of dirt. Any residual material following burning will be buried or spread on the ROW. Burning on-site will be contingent on the approval of a burn plan and will be completed in accordance with the Ontario *Forest Fires Prevention Act* and *Regulation 207/96 Outdoor Fires* under this Act.

3.4.1.3 Construction of Access Roads, Watercourse Crossings, Laydown Areas, and Construction Camps

Construction of the temporary construction camps, access roads or trails, and laydown areas will be conducted prior to transmission line construction. Areas for these temporary structures will be delineated, cleared of vegetation, and graded, as required. Where necessary, sediment and erosion control measures will be implemented.

3.4.1.4 Materials and Equipment Delivery

The types of materials anticipated for construction of the Project include: foundations (e.g., concrete, steel or other); conductors; insulators; transmission structures (e.g., composite, wood and/or steel); and optic fibre ground wire (OPGW); counterpoise; guy wires; hardware (e.g., nuts and bolts);high-voltage circuit breakers; high-voltage switches; capacitors; reactors; dynamic reactive sources; steel structures and foundation material; galvanized steel building; protection relays; metering equipment; fences; and miscellaneous electrical equipment.

In addition to these materials, equipment and supplies required to construct the Project include heavy equipment, fuel, and limited amounts of propane (for temporary construction camps). The types and approximate numbers of heavy equipment and vehicles that are anticipated to be used during construction are provided in Table 3.4-1. The final types and numbers will be determined during the detailed planning stage.

The quantities of material required for the Project will be confirmed during the detail planning stage. The suppliers of this material will be determined during the procurement stage of the Project, and it is anticipated that material not available locally will be imported from out-of-province suppliers. All permanent material will be provided by manufacturers with strong supply experience. The material may be sourced from within Ontario, Canada or internationally depending on economics and availability. Expendables will be sourced locally to the extent possible.

The Project may require various types of aggregates, including engineered aggregate for the construction of access roads or trails, and for concrete mixing. The total quantity of aggregate required will be determined during the detailed planning stage. As described in Section 3.3.11, aggregate pits will be developed to support the Project.

Laydown areas will be used to receive and temporarily store materials and equipment during construction. Material will be transported to the ROW using flatbed transport trucks and pickups/trailers, where possible. Off-road track units may be used where trucks cannot drive. Helicopters may also be used to transport material, equipment and personnel in areas that are difficult to access by ground vehicle. If concrete is required, it may be prepared on-site or locally sourced and delivered to the ROW using ready mix trucks.

Construction materials will be distributed from the temporary laydown areas using trucks, or other appropriate equipment as dictated by the terrain or other environmental considerations. Distributed materials may include foundation material, structure sections, guy wires, conductors and other required hardware, among others.

Table 3.4-1: Anticipated Typical Types and Numbers of Construction Heavy Equipment and Vehicles

Equipment Type	Equipment Make	Equipment Model	Estimated Quantity Phase 1 - Double Circuit	Estimated Quantity Phase 2 - Single Circuit	Construction stage Clearing/Access	Construction stage Foundations	Construction stage Assembly	Construction stage Erection	Construction stage Stringing
Pickup Truck	Ford	F250	23	25	Yes	Yes	Yes	Yes	Yes
1 ton truck	Ford	F350	58	49	Yes	Yes	Yes	Yes	Yes
Picker - 17 Ton	National Crane	17 T	1	1	-	Yes	-	-	-
Picker - 25 Ton	National Crane	25 T	1	1	-	Yes	-	-	Yes
Picker - 36 Ton	National Crane	36 T	5	4	-	-	-	-	Yes
130T all-terrain crane	Liebherr	LTM 1200-5.1	1	1	-	-	-	Yes	-
200T all-terrain crane	Terex	RT130	1	1	-	-	-	Yes	-
Digger Truck	TelElect	5000 series	1	1	-	-	-	-	Yes
Man lift	Genie	S-120 HD	1	1	-	-	Yes	Yes	Yes
Zoom boom	JLG	1055	2	2	-	Yes	Yes	Yes	Yes
Tractor Trailer	Cancade CBI	High Boy Trailer	6	5	Yes	Yes	Yes	Yes	Yes
Gravel Truck	John Deere	260E	1	1	Yes	Yes	-	-	-
Articulating dump truck	John Deere	310E	2	2	Yes	Yes	-	-	-
200 class excavator	John Deere	200 series	10	8	Yes	Yes	Yes	-	-
300 class excavator	John Deere	300 series	6	5	Yes	Yes	-	Yes	Yes
400 class excavator	John Deere	400 series	1	1	Yes	Yes	-	-	-
Watson 1010	Watson	1010	1	1	-	Yes	-	-	-
Juttan	Juttan	PM23	1	1	-	Yes	-	-	-
Loader	John Deere	JD 624	6	5	-	Yes	Yes	Yes	Yes
Back-hoe	John Deere	JD 410	1	1	-	Yes	-	-	-
Dozer	John Deere	JD 750	1	1	Yes	Yes	-	Yes	Yes
Reel trailer	Slabach	Wheeler Reeler I-85	3	2	-	-	-	-	Yes
Large tensioner	Sherman Reilly	PT-3000 Puller Tensioner	2	1	-	-	-	-	Yes
Large puller	Sherman Reilly	PT-3000 Puller Tensioner	2	1	-	-	-	-	Yes
1 drum puller	Sherman Reilly	PT-3000 Puller Tensioner	1	1	-	-	-	-	Yes
Single tensioner	Sherman Reilly	PT-3000 Puller Tensioner	1	1	-	-	-	-	Yes
Pilot line winder	Sherman Reilly	PLW-200X	2	2	-	-	-	-	Yes
A-Star helicopter	A-star	N/A	1	1	-	-	-	-	Yes

N/A = not applicable; - = no equipment or vehicles used

3.4.1.5 Tower Structure Foundation Installation

Foundation types will be determined during detailed planning. Foundation drawings will be prepared based on structure loading and soil condition at the structure location. The type of foundation and anchors used for the Project will generally be based on terrain and soil conditions, and geotechnical studies will be completed to finalize the design of the foundation and embedment requirements.

Geotechnical investigations and detailed foundation design will be completed as early as reasonably possible. The foundation design will be specific to each soil type, and structure foundations, including guy anchors, will be designed and constructed to meet structure load requirements for soil conditions at the structure locations. Guy anchors will be installed within the ROW. The final distribution of tower types over the route will be determined after geotechnical investigations are complete.

Foundation and anchors may require excavation where they will be located. For structure locations with adequate overburden and/or in wet areas, an excavator can be used to install subsurface foundation elements. Alternatively, steel pile and grouted anchor elements can be installed to minimize the need for excavation. For foundations installed on bedrock, drilling equipment will be used to make holes for anchor rods which will be grouted and capped with concrete. It may be necessary to blast a hole in which to pour the concrete foundation in the bedrock. Once the area is prepared for installation, a drilling unit will be mobilized to the site. Contingent upon access and terrain, it is expected that the mobilization of the blasting equipment and materials will either occur using reasonable conventional ground access or be air-lifted into the area. Notification requirements for blasting will be outlined in the Blasting and Communication Management Plan to be prepared prior to construction. All blast operations shall be carried out in accordance with DFO guidelines (Wright and Hopky 1998) and *Ontario Provincial Standard Specification 120 General Specification for the Use of Explosives*.

Where concrete is required, it is anticipated that the concrete will either be mixed on-site or delivered by truck or helicopter. Anchor foundations will require drilling for rods followed by concrete grouting (typically with a small on-site concrete mixer). Excess concrete from foundations or back wash concrete grout from anchor installations will be buried on-site within the tower footprint such that it does not impede the natural regeneration of the site.

Efforts will be made to avoid locating towers within wetlands and waterbodies to the extent reasonably possible. Where it is not possible to avoid locating structures in wetlands or waterbodies, appropriate precautions will be taken to protect the environment and the foundation. No pole structures are anticipated to be placed below the HWM, any structures that are to be located within the HWM will require permitting approvals. Mitigation measures are presented in Section 6.6.7.1.1.1 (Placement of Materials and Water Crossing Structures).

3.4.1.6 Tower Structure Assembly and Erection

Structure assembly and erection will begin once the materials are distributed to the transmission structure locations. Depending on the structure type and contractor preferences, various ground-based assembly methods will be deployed with the support of lifting equipment and elevated platforms. Cranes will be used to attach structure sections and lift the structure into place on the foundations.

As required, guy wires will be attached to the structure, fastened to previously installed anchors, and tensioned to keep the structure in place. Where helicopter slinging is required, the structures may be assembled in laydown areas or fly yards and flown to site.

Hardware, such as insulators, may then be attached to the structures in preparation for the installation of the conductor. This may also be done prior to erection of the structure. Generally, structure assembly will occur at the site where the structure is to be erected.

3.4.1.7 Conductor Stringing and Installation

Conductors will be installed on the transmission structures once they have been erected and a stringing section (dead-end to dead-end) is complete. If necessary, because of long stringing sections, construction sequencing, or other constraints, snub anchors may be required in the middle of stringing sections. In these locations, temporary anchors will be set and the conductor will be snubbed to the ground. Reels of conductor and OPGW will be delivered to pre-identified conductor stringing sites. Delivery method is contingent upon terrain and access. The equipment will then be staged at the identified locations in preparation for stringing activities.

The conductor will be rolled onto the line using stringing blocks (i.e., pulleys used to string the conductor from structure to structure). The conductors are then tensioned and sagged to ensure that the correct design tension is applied, and the necessary ground clearance is maintained. Tension stringing requires pulling a light messenger wire or rope through travellers (pulleys) and the wire is then attached to the conductor. The messenger wire or rope is then rolled back using specially designed tensioners and pullers, which pulls in the conductors from the reel stands. A helicopter or ground vehicle will be used to pull or lay out a messenger wire or rope.

Cable splicing will be required for approximately every 4 km of conductor. Splicing of conductor uses an implosion method that requires the use of explosives that generate an impulsive noise event. This results in a compression force to splice two lengths of conductor together. Crews will install an implosive dead-end fitting on the end of the conductor and attach it to the dead-end structures at the ends of the lines or splice two runs of conductor where dead-end structures are not available (i.e., snub sites).

Conductor and ground wire stringing typically takes place within the ROW. Puller tension stringing equipment may be set up at up to 8 km intervals along the ROW to pull in the conductor and ground wire. Temporary wood poles (i.e., rider poles) will be used at infrastructure crossings to keep the conductors clear of the infrastructure during stringing.

OPGW requires fibre splicing at each pull run, typically every 6-7 km. Fibre splicing equipment, typically truck mounted, will visit each splice site to complete both splicing and fibre optic testing.

3.4.1.8 Grounding Installation

Counterpoise grounding arrangements will be installed at the base of towers and anchors to provide an electrical path to ground for operational and safety reasons. Fences, gates, pipelines, or other metal appurtenances may require additional grounding depending on their orientation and proximity to the conductors. The counterpoise wire may be copper clad steel wire, which is typically buried at least 0.50 m below-grade. The existing stations' grounding will be extended to cover the new equipment installation areas.

3.4.1.9 Connection to Transformer Stations

Connection of the new transmission line to Lakehead TS, Mackenzie TS, and Dryden TS will require reconfiguration of the 230 kV station equipment. The reconfiguration will include fence line extension, bus work, foundation installation, reactor with associated facilities, including oil/water separator, spill containment, switches, breakers, reactors, new Protections, Control and Telecommunication buildings, drainage modification, grading, grounding grid extension, and other required equipment. The connection point between the new transmission line and the stations will be structures inside the station fenced area.

3.4.1.10 Testing and Commissioning

Upon completion of the transmission line, ground and air acceptance patrols and inspections will be conducted by Hydro One staff to verify that the line is ready for service. Any deficiencies discovered during these patrols will be corrected prior to energizing the line. Following this, the line will be commissioned and energized.

3.4.1.11 Decommissioning of Temporary Construction Infrastructure and Reclamation

Construction infrastructure that is not required for Project operation will be decommissioned upon completion of construction. This will include the decommissioning of temporary construction camps, temporary access roads or trails and bridges, borrow pits, staging areas, turn-around areas and laydown areas, and clean-up rehabilitation of construction infrastructure sites. Areas with low risk of erosion will be left to naturally revegetate following grading and stabilizing activities. Any areas that demonstrate or pose high risk to erosion will require additional mitigative measures, including soil stabilization and seeding as appropriate.

Temporary Construction Camps and Offices

All temporary construction camps and offices will be decommissioned upon completion of Project construction. All buildings will be removed. Water and sewer systems, and all in-ground infrastructure will be decommissioned in accordance with applicable regulatory requirements.

Temporary Access Roads, Trails and Waterbody Crossings

Approximately 30% of access roads and trails outside of the ROW will remain in place to provide access for operation and maintenance activities. All others will be decommissioned and rehabilitated using applicable and appropriate methods and standards. At this stage in the Project, it is unknown which access roads will be left in place to support operations and maintenance of the transmission line. Engagement with Indigenous communities and appropriate stakeholders, including the MNRF, will occur prior to determining which roads will not be removed and any necessary permits/approvals will be obtained.

Some waterbody crossings will be removed and sediment and erosion control measures will be installed prior to their removal. Removal of waterbody crossings as part of reclamation activities will ensure slopes are recontoured and stabilized to maintain similar hydrologic function and drainage as pre-construction condition. Temporary watercourse crossing structures and all materials will be removed upon project completion in accordance with approvals from MNRF, DFO and Conservation Authorities as warranted. Snowfill and ice bridge removals will comply with DFO's Interim Code of Practice: Temporary Stream Crossings. All permit requirements and applicable measures from DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat including Aquatic Species at Risk will be followed. No construction activities are to be completed below the HWM to remove crossing structures or fill within the restricted activity timing windows. No logs or woody debris will be left within the water body or on the banks or shoreline where they can wash into the water body.

Borrow Pits

If required, all borrow pits will be decommissioned as work is completed in that area if opened during construction of the transmission line. Decommissioning will include, but not be limited to, the replacement of unused excavated material, the replacement of topsoil, and installation of erosion control structures, as appropriate.

Laydown Areas and Fly Yards

All surface infrastructure will be removed from the temporary laydown areas and fly yards.

Clean-up and Reclamation

Prior to reclamation activities, a detailed Project Reclamation Plan will be developed and submitted to the MNRF. The plan will consist of a map depicting the level of reclamation and a corresponding description of the reclamation activities to be undertaken for each level of reclamation.

Decommissioning of temporary locations will occur as soon as practicable, following ceased use of the location. Clean-up and rehabilitation will be conducted progressively after temporary construction infrastructure has been decommissioned and removed, with the goal for the area to be returned to a similar land capacity to that of the pre-construction condition. These activities will include, but not be limited to removing refuse, grading disturbed areas, contouring disturbed slopes to a stable profile and decompaction, and re-establishing natural drainage patterns.

General clean-up and interim reclamation activities will take place throughout the construction of the Project.

Unless directed otherwise by the MNRF, new access roads will be recontoured and stored topsoil and organic material will be spread across the disturbed road width. Natural drainage will also be restored. Existing access roads may be stabilized and left in place depending on feedback from appropriate stakeholders (e.g., MNRF, MTO, municipalities and road users). In wetlands, gravel and corduroy (logs used to support the subgrade) will be removed to the extent practicable and/or as directed by the MNRF. In upland areas, road prism materials will be recontoured and covered with stored soil and organic material. Organic material may include brush, tree stems and logs to control erosion and create microsites to facilitate regrowth and provide habitat for small mammals. Tree stems may also be used to create barriers to travel and facilitate local wildlife objectives depending on the feedback from agencies and stakeholders.

Areas that have had aggregate placed will be recontoured as necessary to return hydrology and drainage to pre-construction conditions. Topsoil will be spread evenly over all areas that have been stripped. Topsoil replacement will be postponed during wet conditions or high winds to prevent damage to soil structure or erosion of topsoil.

Final reclamation will be completed outside of frozen conditions as soon as weather and soil conditions permit. Reclamation efforts within and near wetlands will be completed as soon as reasonably possible to reduce the potential impact and to take advantage of access.

Flagging, signage and other markings will be removed upon construction completion. Likewise, all waste, geotextile, silt fencing, filter fabric, wood debris, and other Project waste will be removed from Project Site and will be properly disposed. All waste disposal and recycling, including hazardous and excavated materials, will comply with applicable regulations and disposed of at authorized facilities.

Natural recovery is the preferred method of reclamation on stable terrain where erosion is not expected. Enhanced vegetation recovery methods (e.g., seeding, planting seedlings) will be implemented where these enhanced methods are appropriate. Seeding is required in erosion-prone areas and at waterbody crossing locations that have been removed after construction, or where required by landowner commitments, or regulatory authorization. These areas will be seeded in accordance with MNRF, or other applicable regulatory agency, requirements to promote plant species establishment during reclamation, as soon as feasible after construction. Indigenous communities will be engaged on the detailed Project Reclamation Plan, including on seed mixes to be used. Seeding will follow as close as possible to final cleanup and topsoil material replacement pending seasonal or weather conditions (i.e., in a timely manner following construction activities, preferably as soon as the vegetation is removed while considering the seasonality of seed mix application).

Hydro One will plant seedlings along new off-ROW access roads in conservation reserves and provincial parks. In addition, Hydro One will plant seedlings in the one temporary helicopter pad within the Campus Lake Conservation Reserve following construction.

Rehabilitation will also include site-specific measures to promote the natural revegetation of disturbed areas, as appropriate. Erosion control during construction will be maintained until the disturbed ground has been adequately stabilized with vegetation.

3.4.1.12 Post-Construction Monitoring

Hydro One, with their contractor, will prepare and implement a post-construction monitoring plan after the completion of the construction activities and continue into the operation and maintenance stage and will include activities such as examining and documenting the success of revegetation and rehabilitation measures. Typically, a one- to two-year period will be specified for correction of any construction defects for the transmission line.

3.4.1.13 Potential Emissions, Discharges and Waste

During Project construction, the following emissions, discharges, and wastes are anticipated:

- Air emissions from equipment and vehicle exhausts;
- Fugitive dust emissions from equipment and vehicle exhausts and cleared areas;
- Noise emissions from equipment and vehicles;
- Liquid effluent from the temporary construction camps;
- Liquid effluent from dewatering activities, concrete batch plants, wash water from cleaning concrete mixing equipment and concrete delivery systems;
- Stormwater runoff;
- Domestic solid waste (hazardous and non-hazardous); and
- Oil waste products.

Emissions (e.g., air, dust, noise, and effluent) are addressed in the appropriate chapters as part of the effects assessment of the Project (see Section 6.0). All waste will be appropriately stored, transported and disposed of according to applicable provincial and federal laws and regulations.

Construction water sources, methods of accessing water and volume of water for concrete production will be confirmed during detailed planning and design and will be conducted in accordance with applicable regulatory requirements and in such a way that ensures no wash water will enter waterbodies. Water used for dust suppression will be brought to the site by tanker truck. Permits for this will be acquired, if necessary.

3.4.2 Operation and Maintenance

Upon commissioning, the Project is predicted to operate continually. Operation of the Project involves the transmission of electricity through the conductors along the transmission line from Lakehead TS to Mackenzie TS to Dryden TS. The electrical equipment and facility systems will

be remotely monitored and controlled using a supervisory control and data acquisition (SCADA)/operational data system. The anticipated operating services include:

- Structure climbing and helicopter inspections;
- ROW inspections;
- Visual ground patrol;
- Line hardware and insulator thermography;
- Vegetation management;
- Remote or local operation of breakers and switches to accommodate electrical system requirements; and
- Ongoing repairs and maintenance activities.

3.4.2.1 Inspection

The new transmission line will typically be inspected on a three-year basis. These inspections are generally completed using a helicopter, but some inspection will be undertaken using available access roads and trails. The transmission line will be inspected for signs of physical damage (e.g., broken or missing insulators), loose or eroded parts (e.g., bolts) and condition of the conductors (e.g., frayed or areas of reduced clearance). Minor adjustments such as bolt tightening may be done during the inspections.

Power equipment at the stations will typically be inspected twice per year and monthly for environmental inspections. Thermography testing of the power equipment will occur annually. Breakers will be tested on a regular interval of approximately seven to eight years for diagnostic testing. The frequency of testing may vary depending on the practices of the transmitter or as regulatory requirements change. Switches will be maintained on a conditional basis.

3.4.2.2 Maintenance and Repairs

Typical transmission line maintenance activities include minor adjustments and replacements (e.g., replacement of insulators). However, more extensive repairs may be required that could involve the replacement of anchors or guy wires, necessitating the use of heavy equipment such as backhoes or cranes. Other maintenance to a lesser degree includes station service and protection re-verification, as well as grounds maintenance and snow removal.

Routine maintenance involves planned repairs of a localized nature, which usually take over one-half to one day to complete in an area, are carried out to avert potential problems. These repairs may require trucks to be moved to the site where maintenance is required. The frequency of such repairs is approximately once each year for every 160 km of line. There are also larger maintenance activities such as conductor, shieldwire, pole, and insulator

replacement. These activities are usually of such a nature as to permit long-range planning, and they can usually be scheduled to minimize inconvenience to property owners.

Equipment maintenance will be conducted in accordance with manufacturer's requirements and will be completed on site. All maintenance and repair activities will be undertaken in compliance with applicable environmental rules and regulations. Any field servicing will be conducted a minimum of 30 m from any waterbody or wetland, unless otherwise approved or in the event of an emergency. Waste oil will be collected and stored in drums (clearly marked as waste oil) inside a dyked area and will be regularly shipped for disposal. Waste oils, lubricants and other used oil will be disposed of at authorized disposal sites.

Access roads and waterbody crossings will be maintained during the life of the Project, as required. Additional access and crossing maintenance may be identified during post-construction monitoring.

In most cases, transformer stations, including those related to the Project, are unattended and are operated remotely from a district/provincial control centre. Maintenance personnel make periodic inspections and can be dispatched to the station in the event of an emergency. In stations where attendance is required, working facilities are provided within the control, meter and relay area.

Emergency repairs are needed when assets are out of service or in response to an imminent risk of failure (but are not yet out of service) presenting the potential risk of a power disruption or safety or environmental hazards. Emergency repairs, which may include replacement of stations equipment and/or structures, must be carried out as quickly as possible. It may take several days to replace damaged equipment and/or structures. Heavy equipment and materials are usually required to replace equipment/structures during emergency situations, and mitigating measures will be taken as soon as possible to repair any damage. Emergency maintenance will be carried out in the most time sensitive manner, while recognizing the need to notify landowners and acquire the necessary permits. Spare parts and poles will be stored in case emergency maintenance is required. The quantity of this material and storage location will be determined by Hydro One.

3.4.2.3 Vegetation Management

The transmission line will be commissioned to Hydro One vegetation standards that reflect provincial legislative requirements and are designed to ensure the long-term safety and reliability of the transmission line and protection of the environment. The standard states that any non-compatible vegetation is to be removed from the ROW. Non-compatible vegetation is defined as vegetation that, at any point in its lifecycle, may grow tall enough to impede Hydro One's standing and falling clearance distances to the conductor. Compatible vegetation includes vegetation beneath the transmission lines and within the ROW that will grow to a height that will not interfere with the safe operation of transmission lines. This includes groundcover vegetation and shrub species. Example compatible species for northern Ontario are provided in

Table 3.4-2. Hydro One Forestry Services will review vegetation left on the ROW and provide final approval prior to commissioning.

Table 3.4-2: Example Northern Ontario Compatible Vegetation Species

Scientific Name	Common Name
Perennials and Grasses	
Achillea millefolium	Common Yarrow
Doellingeria umbellata	Flat-topped Aster
Onoclea sensibilis	Sensitive Fern
Physostegia virginiana	Obedient Plant
Sanguinaria canadensis	Bloodroot
Shrubs - Deciduous	
Cornus sericea/stolonifera	Red Osier Dogwood
Myrica gale	Sweet Gale
Physocarpus opulifolius	Ninebark
Rhus glabra	Smooth Sumac
Ribes americanum	Wild Black Currant
Rose blanda	Meadow Rose
Rosa woodsii	Wood's Rose
Salix candida	Sage-leaved Willow
Salix cordata	Heart-leaved Willow
Salix exigua/interior	Sandbar Willow
Salix petiolaris	Slender or Meadow Willow
Shepherdia canadensis	Buffaloberry
Viburnum alnifoilium	Hobblebush
Viburnum cassinoides	Viburnum Cassinoides
Viburnum trilobum var. americanum	American Cranberry
Shrubs - Coniferous	
Juniperus communis	Common Juniper

Maintenance will be performed to Hydro One's vegetation standards. Vegetation that will impede Hydro One's standing and falling clearance distances to the conductor will be addressed by Hydro One Forestry Services. Clearance distances align with the NERC Vegetation Management standard FAC-003 and the minimum vegetation clearance distance required to prevent flashover. Through engagement during the Draft EA Report review process, Hydro One heard feedback from Indigenous communities and stakeholders regarding concerns with the use of herbicides to remove and manage vegetation on the Project. After extensive consideration of this feedback, herbicides will not be used during construction of the Project or for future maintenance of this transmission line.

Hydro One will implement vegetation management practices to maintain vegetation within the transmission line ROW. For example, implementation of a “wire zone – border zone” approach to vegetation management (Ballard et al. 2007) in the ROW. This method manages vegetation in the two zones, where herb/grass/forb species are promoted in the wire-zone, and shrub/short tree species are promoted in the border-zone. This approach allows for the safe delivery of electricity while also fostering wildlife habitat and biodiversity, and simultaneously developing overall aesthetics and decreased long-term vegetation management costs.

3.4.2.4 Potential Emissions, Discharges and Waste

The operation of the Project is expected to result in limited emissions and discharges, including audible noise, electromagnetic noise, and electric and magnetic fields (EMF).

Audible Noise due to Overhead Transmission Lines

Audible noise is emitted by a transmission line when a small amount of electrical energy within the conductor interacts with the air surrounding the conductor surface. These ionization reactions, known as corona, depend on ambient conditions such as temperature, humidity, wind speed, and wind direction. The noise emitted typically resembles a crackling or sizzling sound. Noise level limits for transmission lines are specified at the edge of the ROW and are measured using A-weighted decibel (dBA).

Modern transmission lines (such as those used for the Project) are designed, constructed, and maintained so that during dry conditions they will minimize corona-related sound. Therefore, during dry weather conditions, noise from the proposed transmission line will be generally indistinguishable from background sound levels at locations beyond the edge of the transmission line ROW. During rainfall events or high humidity, the noise level at the edge of the transmission line ROW will remain at a low level, but elevated when compared to dry conditions.

The proposed 230 kV lines will produce some noise under foul weather conditions (e.g., rain, fog, snow and frost), but this noise will not likely be higher than ambient noise conditions beyond the ROW (see Section 6.9).

Audible Noise due to Connection Facility and Transformer Station

The operation noise levels of transformer stations are predicted to meet the Ontario noise level limit of 40 dBA at all identified points of reception and are not expected to change from present noise levels. Therefore, the Project activities are expected to be in compliance with guidelines specified in NPC-300 at all identified representative points of reception. Equipment, layout, and noise emissions may be altered through the detailed planning of the Project; however, the final Project will be in compliance with regulatory limits.

Communications Interference

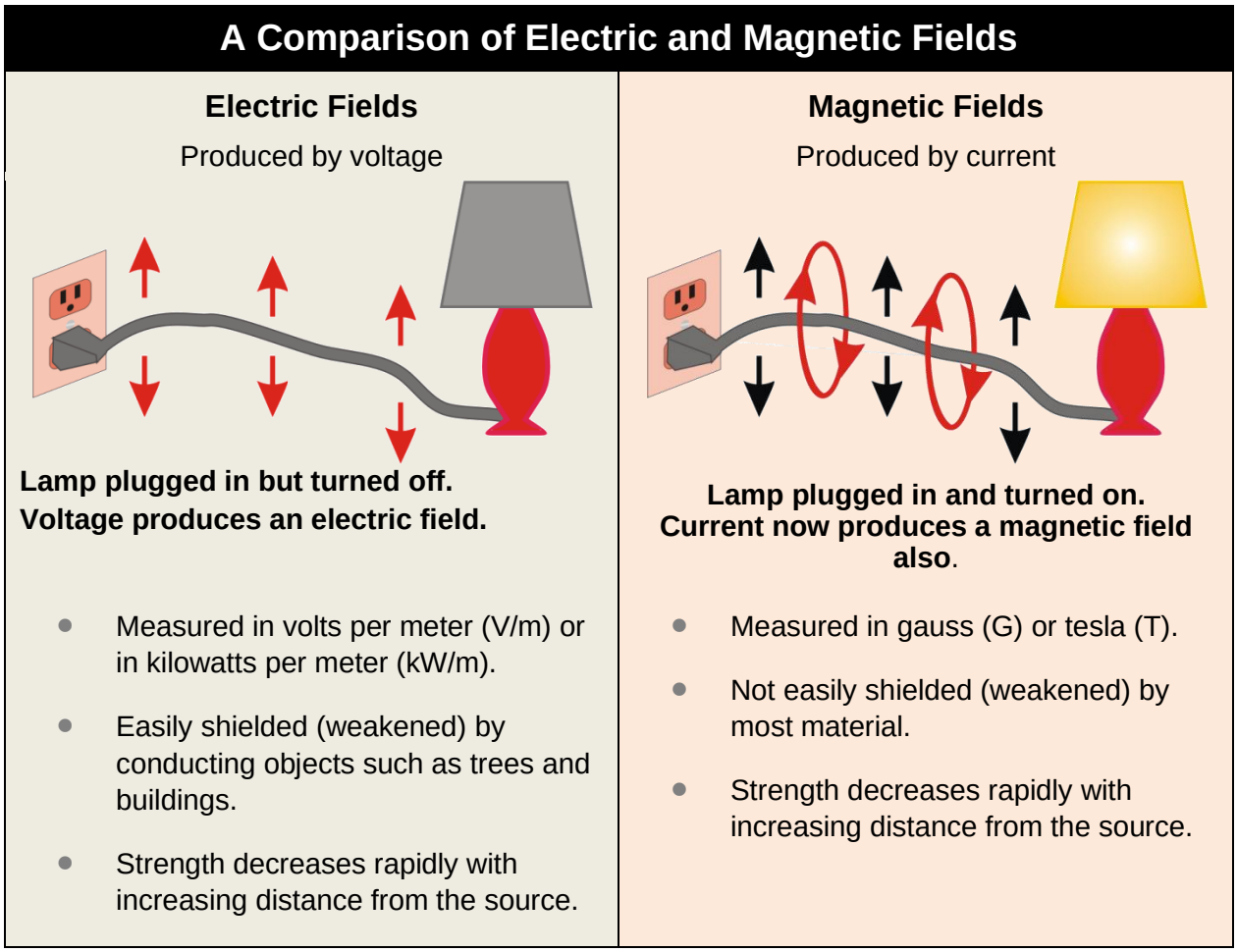
Corona caused by the conductors can also generate electromagnetic noise in the frequency bands used for radio and television signals. Interference with electromagnetic signals by corona is generally associated with lines operating at voltages of 345 kV or higher. The transmission

line will be designed and constructed to minimize corona noise by proper selection of the conductor and associated hardware (CSA-C108.3.1 – Limits and Measurements Method or Electromagnetic Noise from AC Power System). Interference complaints from the public will be tracked and investigated by Hydro One, and repairs will be made as needed to resolve the interference.

Electric and Magnetic Fields

Hydro One understands changes to infrastructure can spark interest about electric and magnetic fields (EMF). EMF are invisible forces that surround electrical equipment, power cords, and wires that carry electricity. EMFs are strongest close to their source. As you move away from the source, the strength of the fields fades rapidly. Hydro One is committed to meet safe EMF exposure levels for the proposed Project and EMF are taken into consideration during the design of any new electrical transmission project. This commitment ensures that both employees maintaining the infrastructure, as well as members of the public in the vicinity of transmission infrastructure are not exposed to elevated EMF levels.

Hydro One has a dedicated team that regularly monitors global studies around EMF and ensures that our infrastructure is built and maintained following best practices and industry standards. The company looks to Health Canada, the World Health Organization, and the International Commission on Non-Ionizing Radiation Protection, for guidance on EMF. Health Canada monitors scientific research on EMF and human health as part of its mission to help Canadians maintain and improve their health. Health Canada's conclusion about EMF is that there is no conclusive evidence of adverse effects caused by EMF exposure from transmission lines and that Health Canada does not consider that any precautionary measures are needed regarding daily exposures to EMFs at extremely low frequencies (Health Canada, 2022). The modelled values for the future state of the circuit indicate electric fields being 53% of the Health Canada referenced (ICNIRP) public limits under the conductor and less than 12% at approximate edge of the ROW. The magnetic fields are modelled in future state to be less than 1% of ICNIRP public limits under the circuit and less than 0.2% at edge of right of way. For this project, Hydro One retained Exponent Consulting, who are a multidisciplinary independent engineering and science consulting firm, to review and comment on any possible health impacts. Exponent Consulting, concluded there is no evidence of adverse health effects cause by EMF at extremely low frequencies for both the existing and planned configuration of the new transmission line. Figure 3.4-1 illustrates the comparison of electric and magnetic fields.



Source: Courtesy of Halpin (no date).
V/m = volts per metre; kW/m = kilowatts per metre; G = gauss; T = tesla

Figure 3.4-1: Comparison of Electric and Magnetic Fields

3.4.3 Retirement

The Project will be operated for an indeterminate period and retirement, or decommissioning, is not anticipated. The new transmission line and related facilities would undergo regular maintenance in adherence with Hydro One's maintenance standards and regulatory requirements to maintain a safe and reliable electricity transmission system. The timing of retirement, or decommissioning, is not known at this time as it is anticipated that upgrades to reinforce or rebuild portions of the Project may occur over its lifetime to maintain its longevity.

When transmission facilities become obsolete or unserviceable and/or deemed to be at end-of-life, the equipment would be retired from service. Transmission facilities that are retired from service are often left in place (idle) for potential future use. The facilities may eventually be

removed, and the site made suitable for other purposes. The foundations are typically cut back 1.0 m below-ground surface when transmission structures are removed.

Should a decision be made to decommission the Project in the future, a detailed review of the potential effects and mitigation measures will be completed. Decommissioning will be planned and conducted in accordance with the relevant standards and regulatory requirements in effect at that time. Activities that would typically be completed to facilitate the decommissioning of a project of this type would include removing towers and transmission line cables, insulators, and other hardware, and ground reclamation. The potential effects and mitigation measures to be identified during the EA for the construction of the Project will likely equally apply to the potential removal of the Project at a future point in time, should it ever be required.

3.4.3.1 Potential Emissions, Discharges and Waste

During Project retirement, the following emissions, discharges, and wastes are anticipated:

- Air emissions from equipment and vehicle exhausts;
- Fugitive dust emissions from equipment and vehicle exhausts and cleared areas;
- Noise emissions from equipment and vehicles;
- Domestic solid waste (hazardous and non-hazardous); and
- Oil waste products.

Emissions are anticipated to be less during the retirement stage than the construction stage due to the anticipated lower numbers of construction equipment and vehicles used.

3.5 Project Schedule

The construction of the Project is expected to commence in 2024, once all applicable permits and authorizations have been obtained. The duration of construction is dependent upon in-service requirements established by the IESO. At this time, construction is expected to take approximately three to five years. Operation of the Project will occur continually over an indefinite period. All required permits, approvals, and authorizations will be obtained, as necessary.

Construction activities are expected to occur throughout the year with staging to avoid or minimize potential effects on environmentally sensitive areas or wildlife breeding cycles (e.g., breeding bird period, fisheries windows, etc.), where possible. The initial phase of the Project involves vegetation clearing that is anticipated to start in 2024 after EA approval and continue into 2025, followed closely by access road and waterbody crossing development and maintenance. Foundation work is expected to follow, starting in 2025, leading into structure assembly, structure erection, and conductor stringing. Reclamation is scheduled to be

completed after the stringing work is done and will occur progressively as soon as areas are no longer required for construction.

The preliminary construction schedule is provided in Table 3.5-1. This schedule is subject to change based on the Final EA approval date and further direction from the IESO regarding the in-service date requirements for the Project.

Table 3.5-1: Preliminary Construction Schedule

Activity	2024		2025				2026				2027		
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Vegetation Clearing(1)	■	■	■	■	■	■	■						
Access Road and Waterbody Crossing Construction		■	■	■	■	■	■				■		
Structure Assembly			■	■	■				■	■	■		
Structure Erection			■		■	■			■	■	■		
Conductor Stringing					■	■					■	■	■
Reclamation					■	■	■	■	■			■	■

1) While vegetation clearing is shown to occur during sensitive wildlife timing windows (generally Q2-Q3), clearing during these windows will be minimized and will target the early/late portion of these windows to avoid the core wildlife breeding season to the extent practicable. Also, additional mitigation measures will be implemented as appropriate (e.g., additional permitting requirements) if work is required in these windows. Additional details on the sensitive wildlife timing windows applicable to the Project are included in Section 6.5 (Wildlife and Wildlife Habitat) and Section 6.6 (Fish and Fish Habitat).

Construction activities will typically occur for one 11-hour shift per day, with normal working hours of 07:00 to 18:00. Night-time work is not anticipated. However, subject to contractor-employee labour agreements or contractor detailed construction plans, longer shifts may be required. Project commissioning and start-up is expected to occur shortly after construction and testing is completed.

Construction of the transmission line is anticipated to start at multiple locations along the corridor. Consequently, there may be concurrent construction and operation of temporary construction camps, turn-around areas, laydown areas, and access road or trail use. Hydro One will contact land users and landowners along the transmission line during the detailed planning stage and prior to construction to inform them of construction schedule and general procedure. This will include a minimum 48-hour notification in advance of major activities commencing to Indigenous Communities, directly affected landowners, or as otherwise required by

permits/approvals. Notification will typically be completed via email or phone call. Signage will be posted identifying active construction areas along public roadways to better communicate hazards to local road users. Details of construction activities/schedule will be made available via Hydro One's project website. Communication will continue until after the Project construction has been completed. The detailed process and procedures for notifications during construction will be developed collaboratively with Indigenous communities.

3.6 Project Workforce and Procurement Opportunities

The Project is expected to generate both local and regional employment and procurement opportunities, as described below.

3.6.1 Construction Workforce

To the extent possible, Hydro One will source the workforce locally for the construction of the Project. If the necessary labour skills for construction cannot be sourced locally, labour will need to be sourced from other areas in Ontario or outside of Ontario, if required. However, opportunities for employment of nearby residents are possible if the appropriate training and qualifications are obtained in time to meet the construction schedule.

To construct the Project, approximately 220 full time equivalents (FTEs) of direct employment are anticipated, dependent on the activities being completed (e.g., peak direct construction employment is expected to occur during the construction stage for foundation and structure assembly). The general occupations expected to be involved in Project construction include:

- Project and construction managers;
- Engineers and technologists;
- Safety and environmental professionals;
- Indigenous and community relations professionals;
- Surveyors;
- Electricians;
- Heavy equipment operators;
- Labourers;
- Line workers;
- Concrete finishers;
- Drillers;

- Carpenters;
- Helicopter pilots;
- Truck drivers;
- Building custodial staff;
- Forestry workers;
- Mechanics;
- Construction camp staff (e.g., cooks); and
- Building and accommodation staff.

3.6.2 Operation and Maintenance Workforce

Approximately three to eight FTEs per year will be required to operate and maintain the Project. Specialized services will be required on a periodic basis to perform technical operations and maintenance. The types of maintenance personnel will likely include:

- Transmission line maintenance – transmission line maintenance person, labourers, equipment operators and helicopter pilots;
- Transformer station maintenance – electrical maintenance person, protection and control technicians, operators, and ground maintenance personnel; and
- Vegetation maintenance – utility forester, utility arborist, equipment operation, and forestry maintainer.

3.6.3 Procurement Opportunities

The Project is expected to generate both local and regional employment and procurement opportunities, as well as economic spinoffs, during the construction period including, but not limited to:

- **Equipment and related rentals**
  - Truck and car rentals;
  - All-terrain vehicle rental (e.g., Argos, side-by-sides, quads/4-wheelers, snowmobiles, etc.);
  - Construction equipment and supplies (e.g., helicopters, aggregates, etc.);
  - Storage facilities;
  - Outdoor gear; and

- Health and safety equipment and field camp supplies.

- **Accommodation and food**
  - Restaurants and/or fast-food chains;
  - Catering services;
  - Hotels; and
  - Event venues.
- **Labour services**
  - Heavy equipment operators; and
  - General labourers.
- **Technical and professional services**
  - Engineers, planners, biologists, archaeologists, construction monitors, communication liaisons, etc.

3.7 Health, Safety and Environment

In line with Hydro One's *Health and Safety Policy* and *Environmental Policy*, utility best practices will be implemented regarding the Project safety, health of workers and the public, and environmental protection.

3.7.1 Health, Safety and Emergency Response

Project personnel will receive training in health and safety emergency response. Hydro One will identify potential safety, health and environmental concerns related to all Project stages. Prevention measures and response procedures will be described in a Health and Safety Plan and a Spill Prevention and Emergency Response Plan.

The objectives of the plans will include:

- Protection and maintenance of human health and safety, including workforce and public safety;
- Identification of the potential for accidents and emergency situations; and
- Planned response to accidents and emergency situations.

In addition, health and safety protocols, to address any risks associated with COVID-19, will be included in the contractor's Health and Safety plan which will be developed prior to construction starting. COVID-19 protocols will be employed during the Project if a pandemic is declared by Health Authorities.

3.7.2 Aviation Safety

The design, construction, operation and decommissioning of the proposed 230 kV transmission line shall not adversely affect the safety, operation or usability of nearby aviation infrastructure. As required, the following organizations will be engaged during detailed planning of the transmission line: the Ontario Ministry of Transportation as airport owners/operators; NAV CANADA as the authority responsible for air navigation, and Transport Canada as the regulatory authority.

The design and physical characteristics of the 230 kV transmission lines will be evaluated against the following:

- Existing and Future Obstacle Limitation Surfaces per TP312 – Aerodrome Standards and Recommended Practices;
- Instrument Approach Procedures per TP308 – Criteria for the Design of Instrument Procedures;
- Electronic Interference per TP1247 – Land Use in the Vicinity of Aerodromes; and
- Aeronautical Obstruction Lighting Requirements per Canadian Aviation Regulations 621 – Obstruction Marking and Lighting.

The following forms will be completed prior to the construction and operation and maintenance stages:

- NAV CANADA Land Use Proposal Submission Form; and
- Transport Canada Obstruction Clearance Form.

3.7.3 Fire Safety and Prevention

The transmission line will be designed, constructed, and maintained in accordance with the Ontario *Occupational Health and Safety Act* and other relevant regulations, codes, and standards. The Act establishes clearances from other man-made and natural structures as well as tree-trimming requirements to reduce or avoid fire hazards and associated accidents. Hydro One will maintain the transmission line ROW and immediate area in accordance with existing regulations and accepted industry practices that will include identification and abatement of any fire hazards.

All work will adhere to the *Forest Fires Prevention Act* (R.S.O. 1990) and *Regulation 207/96*. The Act provides direction for the prevention and suppression of wildland fires in forest areas within the fire region during the fire season, normally April 1 to October 31.

Hydro One will adhere to the *Industrial Operations Protocol* (MNRF 2015) and provide to MNRF upon request fire prevention and preparedness plans, planned fire preparedness activities and planned modifications and/or mitigation actions.

As part of the EPP, a Fire Prevention and Preparedness Plan will be prepared which will include mitigation measures such as:

- Implementing appropriate protection measures (e.g., use of fire-resistant mats or wetting down the area prior to work commencing, etc.), if the fire hazard is high;
- Maintaining an adequate supply of fire-fighting equipment on hand as regulated by provincial regulations and government agencies;
- Ensuring each vehicle is carrying fire-fighting equipment (e.g., fully charged fire extinguisher, shovel) required by the *Fire Protection and Prevention Act*;
- Maintaining a fire watch and/or reduced hours of work as appropriate during high fire hazard situations; and
- Following all Fire Orders as implemented by MNRF.

The comprehensive Fire Prevention and Preparedness Plan will be in place for the Project to address fire prevention, preparedness and emergency response procedures.

3.7.4 Environmental Management

Hydro One is committed to developing the Project in an environmentally responsible manner, consistent with sustainability principles during the construction and operation of the Project. Several environmental protection and management measures will be implemented to guide the construction, and operation and maintenance of the Project:

- Employing good planning, design and management practices to comply with regulated and industry design and management standards to satisfactorily deal with environmental risks such as seismicity, unusual weather events, flooding, and erosion, and to minimize environmental effects and emissions.
- Preparing and implementing an Environmental Management System (EMS) with a supporting Environmental Protection Plan (EPP), which will contain mitigation measures, best management practices and procedures to avoid and reduce potential adverse environmental effects of the Project. The goal of the EMS is to promote sound environmental practices and environment stewardship throughout the Project and to ensure commitments and conditions identified during the EA phase are known, documented, communicated and complied with during the Project.
- Preparing and implementing Project-specific emergency response and contingency procedures to advise Project personnel on how to implement specific actions to respond to accidents, malfunctions, or unplanned events. Hydro One and their contractor(s) will develop a notification process for emergency response.

- Siting facilities to avoid sensitive areas, such as wetlands, watercourses and important habitat types, where possible.
- Implementing progressive environmental protection, mitigation, and management strategies that avoid or minimize adverse environmental effects, and maintain or enhance positive effects.
- Continue to engage Indigenous communities, stakeholders, and members of the public, such that, wherever possible, concerns about the Project have been accommodated to the extent possible in its design, construction, operation, and decommissioning.

3.7.5 Climate Change Considerations

The extent to which the climate will change over the next 100 years is uncertain. However, predictive modelling suggests the potential for changes in temperature, precipitation patterns, the frequency and severity of extreme events, and sea levels. These changes could lead to an increase in ice and wind loading on transmission line infrastructure, the availability of dry vegetation for forest fire propagation, or a change in the frequency of lightning strikes. The potential effects of the changing climate on the Project are mitigated through the selection of an appropriate meteorological return period and the application of safety factors to the design process.

Hydro One will inspect the transmission line to assess the condition of the infrastructure and adapt its maintenance and capital programs accordingly. Typically, these inspections will be completed using a helicopter, although some inspection activities will be made by using road access. During these inspections, the effects of climatic events (e.g., sign of physical damage, general condition of the equipment) will be noted and repairs or equipment replacement will be conducted as necessary. Hydro One will also monitor extreme weather events and has well-established emergency response plans in place to address the effects of these events on the Project. Emergency response personnel are trained to respond to all forms of emergency situations that may affect transmission infrastructure and electricity services to customers. This includes continuously improving response to any disruption to the province-wide electricity system as quickly and as safely as possible.

Additional details on climate change considerations and resilience measures for the Project are provided in Appendix 3.0-C.

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