Attachment 5

Interactions Table

Company Name: Manitoba Hydro
Project Name: Modification to Riel International Power Line to allow for cross-over of Bipople III
NEB File No. OF-Fac-IPL-M180-2016-02 01

Interactions Table

A	B	C	D	E	F	G	H	I	J
Element	**Interaction (Y/N)**	**Description of Interaction(s)** **(If no interaction is predicted, provide a justification)**	**Status of Element-specific study or survey (complete, underway, date expected, or N/A)**	**Description of Potential Effects**	**Mitigation will be implemented to resolve potential adverse effect (Y/N)**	**Specify the mitigation**	**Description of Residual Effects after Mitigation**	**Description of the Cumulative Effects**	**Monitoring Plan/Details**
Physical and Meteorological Environment	Y	The project may be affected by meteorological conditions or extremes.	Complete	The project may be subject to extreme weather events such as wind, ice and snow.	Y	Tower designs are designed to exceed • CSA7 C22.3 No. 1-10, Canadian Standards Association (CSA), 2010. • C22.3 No. 60826-2010, Canadian Standards Association (CAN/CSA), 2010.	The residual effects of tower failure would depend on the nature and the timing of the specific event. For example, a tower failure during the growing season could result in the need for construction equipment to remove or repair a damaged tower on agricultural fields, which could lead to crop damage and soil degradation. A collapsed tower could result in a power outage and the potential for human and wildlife injury or mortality, damage to vegetation or soils, or fires resulting from downed lines.	No cumulative effects	Manitoba Hydro Emergency Response Plans are implemented if an extreme weather event occurs affecting infrastructure. Annual line maintenance patrols identify any deficiencies. Deficiencies are assessed, prioritized and workplans developed to resolve deficiency.

Soil and Soil Productivity	Y	• Loss of soil structure and increase in soil bulk density due to compaction • Loss of topsoil due to erosion by wind or water • Soil mixing	Complete	**Compaction** Soil compaction refers to the squeezing together of soil particles which results in reduced space available for air and water and a loss of soil structure. The movement of vehicles and equipment, the temporary and long-term storage of materials, and the placement of structures can result in soil compaction and rutting. The effects of soil compaction can be mitigated by targeting dry or frozen ground conditions for construction activities, using temporary ground cover or matting in problem areas, reducing the extent of traffic movements, and rehabilitating areas that have been compacted by ploughing. **Erosion** Erosion is a natural process and refers to the detachment, movement and removal of soil from the land by wind or water. Project activities that disturb and expose soil surfaces or concentrate water drainage, such as moving equipment, clearing and removing vegetation, stripping and stockpiling soils can accelerate naturally occurring erosional processes.	Y	• The effects of soil compaction can be mitigated by targeting dry or frozen ground conditions for construction activities, using temporary ground cover or matting in problem areas, reducing the extent of traffic movements, and rehabilitating areas that have been compacted by ploughing. • Erosion and sediment control measures will be implemented as per the CEnvPP and contractor developed erosion and sedimentation management plans. • Mitigation measures such as constructing during dry or frozen ground conditions, • stripping and stockpiling topsoil and subsoil separately for use in site rehabilitation, • using liners under stockpiles of excavated saline subsoils and filling excavations with suitable material may prevent or reduce adverse effects due to soil admixing. • Please see the Bipole III Transmission Project, Transmission Line Construction Environmental Protection Measures	The use of standard construction methods and mitigation methods, will result in minor Project residual effects associated with loss of soil structure, topsoil erosion and soil mixing.	Negligible cumulative effects on soil and soil productivity	The condition of any erosion and sediment control environmental protection measures Implemented will be monitored by the Contractor and/or Manitoba Hydro Inspector during construction of the Project.

				Soil Mixing Soil mixing, or admixing, refers to the blending of organic, nutrient-rich surface soils with subsoil materials that are less suitable, due to salinity content, stoniness or texture, resulting in a loss of soil capability (National Energy Board 1995). The movement of vehicles and equipment, stripping and grading of work areas and excavation and trenching of foundations and lines can result in admixing. Soils with thin topsoil horizons or Solozenetic (saline) subsoils are susceptible to a loss of capability due to admixing.		•			
Vegetation	Y	Change in Invasive Plant Species Abundance and Distribution that affect Native Vegetation	Complete	Introduction of invasive plant species from surface disturbance and traffic related to construction and operational activities	Y	• All equipment must arrive at the ROW or Project site clean and free of soil or vegetation debris. • Equipment will be cleaned before moving from locations with identified invasive weed infestation. Manitoba Hydro employees and contractors will follow the Transmission Business Unit's Agricultural Biosecurity Standard Operating Procedures to prevent the spread of invasive weeds. • Please see Appendix F to the Bipole III Transmission Project, Transmission Line Construction Environmental Protection Measures for Biosecurity Protocols	The use of standard construction and mitigation methods, such as equipment cleaning, will result in minor Project residual effects associated with invasive plant species during construction.	Negligible Cumulative effect to the loss of native vegetation as a result of the change in the abundance and distribution of invasive plant species as there is no native vegetation is within the Project area.	No specific monitoring is being conducted as the project area in under annual agricultural cropping.

Water Quality and Quantity	Y	Change in groundwater quality.	Complete	In general, groundwater quality is not expected to be affected under normal conditions of construction and operation of the Project however there is the potential for environmental effects to groundwater quality through foundation drilling for tower installation creates the potential for ground and surface water interconnection.	Y	• A qualified driller with appropriate experience will always be used for work in areas underlain by artesian aquifers; • Water levels will be monitored during drilling and foundation installation; • Emergency response plans will be in place for sealing/grouting and pumping in artesian areas. • Please see the Bipole III Transmission Project, Transmission Line Construction Environmental Protection Measures	The use of standard construction methods and mitigation measures will result in minor Project residual effects associated with groundwater quality during construction and operations.	Negligible cumulative effect on water quality and quantity.	Follow up inspections of installed foundations will be undertaken to monitor for excess moisture.
Fish and Fish Habitat	N	No Fish or Fish habitat is within 30m of the project area							
Wetlands	N	No wetlands within 30m of the Project area							

Wildlife and Wildlife Habitat	Y	Change in Mortality Risk	Complete	• Due to collisions with vehicles or machinery, and collisions with transmission wires; • Of waterfowl, other waterbirds, and upland game birds due to hunting; • Mortality or nest loss due to construction or maintenance during the spring nesting season	Y	• Construction activities will be restricted to established roads, trails. • Hunting and harvesting of wildlife, or possession of firearms by Project staff will not be permitted while working on the Project sites. • Bird nest sweeps will be conducted prior to construction activity as per ECC guidelines. Setbacks and buffers will be implemented if nests are discovered. • Bird collision risk is being reduced from existing condition as conductors are being lowered from existing height and skywires removed. • Please see Appendix E to the Bipole III Transmission Project, Transmission Line Construction Environmental Protection Measures for Buffers and Setbacks	The use of standard construction methods and mitigation, such as bird nest sweeps, will result in minor Project residual effects associated with change in mortality risk during construction. Therefore, the Project-related introduction or spread of invasive plant species is not expected to threaten the viability of native vegetation	Cumulative effect to the change in Mortality Risk is negligible as there is limited wildlife habitat within Project area.	Any nests discovered, will be monitored during and post construction for disturbance related effects. If any effects are determined additional mitigation measures such as larger buffers or activity restrictions will be implemented. Wildlife collisions with project equipment will be tracked and monitored, additional mitigation measures will be implemented when required.
Species at Risk, or Species of Special Status, and related habitat	N	No species at Risk or species of special Status and related habitat are found within cultivated agricultural Project area	Complete						

Air Quality	Y	Change in localized air quality.	Complete	Potential effects on air quality can result from clearing, construction and operation and maintenance activities. There will be a temporary increase in vehicular and equipment traffic during clearing and construction activities associated with the Project. As a result, there will potentially be higher vehicle (i.e., engine exhaust and hydrocarbon vapours) and dust emissions affecting local air quality. The concentration of vehicles and equipment will be localized to specific sites for limited amounts of time. As the air quality in Manitoba is very good in general and the Project activities are away from urban areas, there is limited effect on air quality for workers or any surrounding public.	Y	• To mitigate the emissions from internal combustion engines used for construction, low-sulphur diesel fuels will be used and unnecessary idling restricted. • Please see the Bipole III Transmission Project, Transmission Line Construction Environmental Protection Measures	Local emissions From construction and maintenance activities, will result in minor residual effects.	Negligible cumulative effect on air quality.	None