## **Interactions Table**

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Element	Interaction (Y/N)	Description of Interaction(s) (If no interaction is predicted, provide 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	N	The Project is not located in areas of unstable terrain, or permafrost. Potential effects associated with erosion are discussed as they relate to soil productivity.  The Project does not affect the meteorological environment. Extreme weather events are discussed in the context of effects of the environment on the Project.	N/A	None	N	N/A	None	None	N/A
Soil and Soil Productivity	Y	The Project will be located within TransCanada owned land, on and adjacent to an existing TransCanada right-of-way, compressor station, and meter station site.  Construction:  Construction of the new Sales Meter Station (SMS) will require stripping and stockpiling of soils that currently support agriculture (pasture)  Construction of the new NPS 20 connection pipe will require disturbance of upland and wetland soils.  Interactions during construction could occur due to:  clearing, soil stripping and grading  soil admixing, rutting, and compaction  wind and water erosion  Decommissioning:  Decommissioning activities for the existing SMS will be limited to the existing fenced and graveled site.  Decommissioning activities for the existing NPS 12 connection pipe will occur within the existing SMS site and existing compressor	Complete	Change in soil quality during construction and decommissioning due to:  Soil loss through wind or water erosion following vegetation removal  Soil loss during soil handling and storage  Admixing, compaction, rutting, or loss of soil structure through vehicle and equipment movement  Remediation of preexisting contamination (if any)	Y	<ul> <li>Soil Erosion</li> <li>If wet/thawed soil conditions occur, implement the Wet Soil Contingency Plan.</li> <li>Salvage topsoil prior to hydrovac use in all areas with agricultural potential.</li> <li>Should high winds or heavy rains damage the tackifier during construction, the Environmental Inspector(s) or designate, in consultation with the Construction Manager, may implement contingency measures as outlined in the Adverse Weather Contingency Plan.</li> <li>Should construction traffic or other related construction activity disturb the topsoil/strippings piles and there is a potential for wind erosion, apply additional water and/or tackifier.</li> <li>Undertake all grading with the understanding that original contours and drainage patterns will be reestablished during clean-up unless otherwise authorized by the Environmental Inspector(s) or designate.</li> <li>Soil Handling</li> <li>Conduct topsoil salvage on all arable or potentially arable lands to promote successful reclamation and ensure this resource is returned to an equivalent land capability.</li> <li>Salvage topsoil prior to hydrovac use in all areas with agricultural potential.</li> <li>Salvage topsoil/strippings as indicated on the Environmental</li> </ul>	Change in soil quality might occur during construction:  Changes in soil chemical or physical characteristics where topsoil at the new SMS site is stockpiled  Soil erosion and compaction in the new NPS 20 connection pipe right-of-way until vegetative cover has been reestablished  Change in soil quality might occur during decommissioning at the existing compressor station or SMS site:  Improvement in soil quality if pre-existing contamination is encountered and remediated  Soil erosion and compaction until gravel has been replaced	None Effects on soil capability will be limited to the Project site and are not likely to overlap with residual effects of other past, present, or future projects and activities.	Monitoring/ Inspection will occur during construction.

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Element	(T/N)	station site.  No pre-existing contamination is expected to be encountered on the Project site, though has the potential to occur.  Interactions during decommissioning may occur as a result of:  clearing, soil stripping and grading soil admixing, rutting, and compaction wind and water erosion pre-existing contaminated soil (if any)	N/A)	Ellects	(T/N)	Alignment Sheets and/or other Project-specific environment documents and in accordance with the typical drawings.  Topsoil/strippings from areas of temporary disturbance and/or the permanent Project footprint will be salvaged and conserved in a designated, approved location, in a manner that will not cause erosion or sedimentation and will be stabilized by establishing vegetative cover.  Following salvage of the topsoil/strippings, if warranted, stabilize topsoil /strippings windrows and stockpiles using either water or a suitable tackifier as directed by the Environmental Inspector(s) or designate. Refer to the Soil Erosion Contingency Plan.  Salvage topsoil/strippings from areas to be graded.  Ensure grade material does not spread off the construction footprint.  As trenching proceeds, identify areas of potential trench wall instability that may affect unstripped topsoil areas. Strip a wider area if the trench walls slough into the ditch and the potential for mixing of topsoil and subsoil exists. Back slope trench wall until stable.  Where pulverization of soils has the potential of causing soil loss or long-term structural impact, salvage topsoil/strippings, regrade and/or stabilize the construction footprint using a tackifier or water.  Admixing, Compaction, Rutting	arter Miligation		Pidil/DetailS
						Where pulverization of soils has the potential of causing soil loss or long-term structural impact, salvage topsoil/strippings, regrade and/or stabilize the construction footprint using a tackifier or water.  Place spoil to maintain an adequate separation between topsoil and subsoil piles. Avoid overlap of the spoil and topsoil in agricultural lands.			

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						If the potential of overlap is identified, move the topsoil, or in some space restricted cases, protect with a geotextile cover.  In the event of adverse weather that could result in rutting, sedimentation and erosion, and/or compaction, the Environmental Inspector(s) or designate, in consultation with the Construction Manager, may implement contingency measures as outlined in the <i>Adverse Weather Contingency Plan</i> . A soils specialist and/or the responsible regulatory agency may be consulted, if warranted.  Place spoil back into the trench in such a way as to prevent loss or mixing of topsoil/strippings.  Remediation  In the event unanticipated contaminated soils, surface water and/or groundwater are encountered during construction, implement the <i>TransCanada Waste and Hazardous Materials Management Manual</i> and the <i>Contaminated Soils Contingency</i>			
Vegetation	Y	The Project will be located within TransCanada owned land, on and adjacent to an existing TransCanada right-of-way, compressor station, and meter station site.  Construction:  Construction of the new SMS will require removal of <0.1 ha of native vegetation (forb meadow) and approximately 0.3 ha of non-native vegetation (pasture).  Construction of the new NPS 20 connection pipe will require disturbance of up to 2.0 ha of native vegetation (forb meadow, deciduous swamp and coniferous wetland).	Underway - pre- construction field surveys will be completed in spring 2017 to confirm the presence/ absence of species at risk	Change in community and species diversity during construction due to:  Direct loss or alteration of native and non-native vegetation communities arising from clearing and ground disturbance Introduction or spread of noxious weeds or invasive species through vehicle and equipment movement	Y	Plan.  Vegetation Removal     Prior to the start of clearing, clearly mark all sensitive resources as identified on the Environmental Alignment Sheets and/or other Project-specific documents and in the Environmental Protection Plan (EPP).     Avoid disturbance to environmentally sensitive features during clearing as identified by the appropriate signage and/or fencing. The Environmental Inspector(s) or designate and appropriate Environmental Resource Specialist will determine the size of avoidance buffer surrounding these features, if appropriate.     Restrict all construction activities to the approved construction footprint. All construction traffic will adhere to safety and road closure regulations.	Change in abundance or distribution of native vegetation communities and species due to:  Native wetland vegetation will be cleared during pipeline construction  Weeds may be introduced or spread during pipeline and SMS construction	Project contribution to ongoing cumulative effects on native vegetation are predicted to be negligible.	Monitoring/ Inspection will occur during construction

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		Interactions during construction could occur due to:  • vegetation clearing • vehicle and equipment movement  Decommissioning:  • Decommissioning activities for the existing SMS will be limited to the existing fenced and graveled site, which contains no native vegetation.  • Decommissioning activities for the existing NPS 12 pipe will occur within the existing compressor station site and SMS site (which contain no native vegetation) and within the new SMS site (for which disturbance is already accounted for as part of construction activities).  Interactions with native vegetation are not anticipated during decommissioning.				<ul> <li>Following clearing, re-mark all sensitive resources as necessary and supplement markings with signage.</li> <li>The Environmental Inspector(s) or designate will confirm the accuracy of all environmentally sensitive resource locations, and will ensure marking is maintained during construction.</li> <li>Use a cover crop to assist in weed and erosion control where warranted or where requested by the landowner.</li> <li>Natural recovery is the preferred method of reclamation in nonagricultural areas on level terrain where erosion is not expected. Where natural recovery is not feasible, seed disturbed areas as per site requirements and as specified by the Environmental Inspector(s) or designate.</li> <li>If previously unidentified rare plants or rare ecological communities are found on the construction footprint during construction, implement the <i>Plant Species and Ecological Communities of Concern Discovery Contingency Plan</i>. If wet/thawed soil conditions occur, implement the <i>Wet Soil Contingency Plan</i>.</li> <li>Where non-frozen soils are encountered during construction in areas of wet terrain/muskeg that are not impacted by the permanent Project footprint, refer to the <i>Wet Soils Contingency Plan</i>. Install corduroy, wooden mats or equivalent, as approved by the Company, in areas of wet soils to reduce terrain disturbance and soil structure damage. These materials will be removed during clean-up.</li> <li>Consult with relevant regulatory agencies to develop appropriate species-specific mitigation measures, if determined to be present on the Project site.</li> <li>Weeds and Invasive Species</li> <li>All equipment must arrive at the Project site clean and free of soil or</li> </ul>			

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				vegetative debris. Equipment will be inspected by the Environmental Inspector(s) or designate, and if deemed to be in appropriate condition will be approved for use and identified with a suitable marker or tag. Any equipment which does not arrive in appropriate condition shall not be allowed on the construction footprint until it has been cleaned, re-inspected by the Environmental Inspector(s) or designate, and deemed suitable for use.  • Strip topsoil/strippings from the construction footprint on lands where localized weed infestations are encountered. Store soil piles containing regulated weeds to prevent mixing with the surrounding soil during re-grading and final clean-up.  • Monitor topsoil/strippings piles for weed growth during the course of construction and implement corrective measures (e.g., spraying, mowing, hand pulling) to avoid infestation when warranted.  • If previously unidentified locations with noxious or prohibited noxious weed infestations are found on the construction footprint during construction, the Environmental Inspector(s) or designate will be contacted and will establish the appropriate mitigation or control procedures prior to continuing construction activities in the area.  • Use only Certified No. 1 seed, unless Certified No. 1 is not available for select reclamation seed species (i.e., native species).  • Unless a certificate of weed analysis can be provided, all construction material sources used for supplies of sand, gravel, rock, straw and mulch will be visually inspected to ensure they are free of noxious weeds to the extent possible. If sources are suspected as having noxious weeds, they shall be sampled and lab analyzed to ensure they meet the			

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						requirements of the responsible regulatory agency prior to obtaining or transporting any material to the Project site.  • Use a cover crop to assist in weed and erosion control where warranted, or where requested by the landowner. Apply cover crops to the approach slopes of all water crossings where there is a risk of wind and water erosion.  • Restrict the general application of herbicide near rare plants or rare ecological communities. Spot spraying, wicking, mowing, or handpicking are acceptable measures for weed control in these areas.			
Water Quality and Quantity	Y	Water quality and quantity, as it relates to surface water and groundwater are discussed in the context of wetlands and human occupancy and resource use.	Underway - will be completed in Q1 2017	Refer to the wetlands and human occupancy and resource use elements of this table.	Y	Refer to the wetlands and human occupancy and resource use elements of this table	Refer to the wetlands and human occupancy and resource use elements of this table.	Refer to the wetlands and human occupancy and resource use elements of this table	Monitoring/ Inspection will occur during construction
Fish and Fish Habitat	N	There are no fish bearing watercourses within 30 m of the Project.	N/A	None	N	N/A	None	None	N/A
Wetlands	Y	The Project will be located within TransCanada owned land, on and adjacent to an existing TransCanada right-of-way, compressor station, meter station site. The Project will be located adjacent to the Goulbourn Provincially Significant Wetland Complex.  Construction:  Construction of the new SMS will not disturb wetland vegetation.  Construction of the new NPS 20 connection pipe will require disturbance of up to 1.4 ha of deciduous swamp and coniferous wetland.  Interactions during construction could occur due to:  wetland vegetation clearing vehicle and equipment	Underway - Hydrogeological modelling will be completed in Q1 2017; Field surveys in spring 2017	Change in wetlands during construction due to:  • Alteration of wetland area or wetland class arising from vegetation clearing and ground disturbance  • Changes in surface water or groundwater flow or quality potentially affecting wetland function	Y	Restrict all construction activities to the approved construction footprint. All construction traffic will adhere to safety and road closure regulations.     Reduce the removal of vegetation in wetlands to the extent possible.     Where applicable, conduct ground level cutting/mowing/mulching of wetland vegetation instead of grubbing. The method of removal of wetland vegetation is subject to approval by the Company.     Where applicable, reduce grading within wetland boundary. Do not use temporary workspace within the boundaries of wetlands, unless required for site specific purposes. Temporary workspace within the boundary of a wetland must be approved by the Environmental Inspector(s) or designate.  Where applicable, in areas not	Change in wetlands due to:  Alteration of wetland area arising from vegetation clearing and ground disturbance to construct the NPS 20 pipe  Changes in surface water or groundwater flow due to ground disturbance and trench water management during construction	The Project and future development (urban, industrial, agricultural) will cumulatively lead to further alteration of wetlands in the RAA. The Project contribution to ongoing cumulative effects on wetlands are predicted to be negligible.	Monitoring/ Inspection will occur during construction

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		movement Decommissioning:				impacted by the permanent Project footprint, if ground conditions are			
		Decommissioning activities for the existing SMS will be limited to the existing fenced and graveled site, which contains no wetland vegetation.      Decommissioning activities for the existing NPS 12 connection pipe will occur within the existing compressor station site, existing SMS site and proposed SMS site (which contain no wetland communities). Interactions with wetlands are not anticipated during decommissioning.				encountered that create potential for rutting, admixing or compaction, minimize ground disturbance by using a protective layer such as matting or biodegradable geotextile and clay ramps or other approved materials between wetland root/seed bed and construction equipment.  The Contractor will use sediment fencing and/or other appropriate measures to prevent erosion and siltation into adjacent wetland areas as outlined in the Environmental Alignment Sheets. Refer to the Soil Erosion Contingency Plan for additional measures.  Natural recovery is the preferred method of reclamation in wetland areas that will not be permanently infilled. Do not seed wetland areas.			
						Surface and Groundwater			
						<ul> <li>If springs and ground water are encountered, the Company will review the area and determine the appropriate mitigation.</li> <li>Monitor water levels in all open trenches.</li> </ul>			
						<ul> <li>Leave gaps in windrows, at obvious drainages, on side-hill terrain and wherever seepage occurs to reduce interference with natural drainage patterns.</li> <li>Where practical, grade the construction footprint to divert surface water away from the open trench.</li> <li>Where the open trench has the potential to dewater a wetland, undertake trenching in a manner that prevents the flow of water along the trench.</li> <li>Pump water onto stable, well vegetated areas, tarpaulins, sheeting, rocks, sand bags, or into settling ponds, using filter bags or other appropriate sediment filtering devices. Complete dewatering in a manner that does not cause erosion or allow</li> </ul>			

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						<ul> <li>sediment to re-enter a watercourse or waterbody</li> <li>Do not permit pumped water to flow directly into any watercourse. If water is released onto private land, landowner consent must be acquired prior to release.</li> <li>Conduct refuelling at least 100 m away from any watercourse or waterbody, when feasible.</li> <li>Measures will be implemented in accordance with the conditions of permits from the RVCA under O. Reg. 174/06 – Rideau Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses and the Permit to Take Water from the Ministry of Environment and Climate Change, if required.</li> <li>Ensure water withdrawal is in compliance with site-specific permit or license conditions.</li> <li>Abide by applicable provincial or federal approval conditions.</li> </ul>			
Wildlife and Wildlife Habitat	Y	The Project will be located within TransCanada owned land, on and adjacent to an existing TransCanada right-of-way, compressor station, and meter station site.  Construction:  Construction of the new SMS will require the removal of 0.3 ha of native and non-native upland vegetation that may provide wildlife habitat.  Construction of the new NPS 20 connection pipe will require disturbance of up to 2.0 ha of meadow and native wetland vegetation that may provide wildlife habitat.  Interactions during construction could occur due to:  vegetation clearing	Underway - pre- construction field surveys will be completed in spring 2017 to confirm the presence/ absence of species at risk	Change in habitat  Direct habitat loss or alteration through vegetation clearing and ground disturbance, including potential habitat and residences for species at risk  Indirect loss or alteration of habitat effectiveness through sensory disturbance  Change in movement  Alteration or blockage of wildlife movement due to physical barriers, sensory disturbance, or vegetation clearing  Change in mortality risk  Ground disturbance and vegetation clearing resulting in physical	Y	Change in Habitat Restrict all construction activities to the approved construction footprint. All construction traffic will adhere to safety and road closure regulations. Prior to the start of clearing, clearly mark all sensitive resources as identified on the Environmental Alignment Sheets and/or other Project-specific documents and in the EPP. To prevent inadvertent trespass, stake the approved construction footprint to clearly delineate all boundaries. If previously unidentified listed or sensitive wildlife species or their site-specific habitat (e.g., dens, nests) are identified during construction of the Project, report to the Environmental Inspector(s) or designate and implement the Wildlife Species of	Change to habitat will occur:  small area of native wetland vegetation will be cleared during construction resulting in direct habitat loss for wildlife  habitat near the Project site may become less suitable during construction due to sensory disturbance to wildlife (e.g., light, noise)  Change in movement may occur:  Alteration or blockage of wildlife movement due to physical barriers, sensory disturbance, or vegetation clearing will be short in duration  Change in mortality risk may occur:  ground disturbance could disturb or destroy nests or dens  accidental collisions with	The Project and future development (urban, industrial, agricultural) will cumulatively lead to further effects on wildlife, in particular loss of wetland habitat.  The Project contribution to ongoing cumulative effects on wildlife and wildlife habitat are predicted to be negligible to moderate.	Monitoring/ inspection will occur during construction

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Interaction (If no interaction is predicted, provide justification)  • vehicle and equipment movement	Status of Element- Specific Study or Survey (Complete, Underway, Date Expected, or N/A)	Description of Potential Effects  destruction of key habitat features (e.g., nests,	Mitigation Will Be Implemented to Resolve Potential Adverse Effect (Y/N)	Specify the Mitigation  Concern Discovery Contingency Plan.  Report sightings of project-specific species of interest to the	Description of Residual Effects after Mitigation Project-related equipment and vehicles	Description of the Cumulative Effects	Monitoring Plan/Details
movement increased traffic increased noise Decommissioning: Decommissioning activities for the existing SMS will be limited to the existing fenced and graveled site, which contains no wildlife habitat. Decommissioning activities for the existing NPS 12 connection pipe will occur within the existing compressor station site and SMS site (which contain no wildlife habitat) and within the proposed SMS site (for which disturbance is already accounted for as part of construction activities) Interactions with wildlife and wildlife habitat are not anticipated during decommissioning, with effects related to increased noise being accounted for under Project construction.	r	dens, roosts)  Vehicle and equipment movement and ground disturbance resulting in accidental mortality of small, less mobile species or individuals (e.g., small rodents, amphibians, reptiles, juvenile birds)  Vehicle collisions  Entrapment (i.e., within the proposed NPS 20 connection pipeline trench)		species of interest to the Environmental Inspector(s) or designate. Specific protection measures may be implemented and the sighting will be recorded.  In the event that clearing or construction activities cannot be avoided during the migratory bird primary nesting period (PNP; April 15 - August 15 [Zone C3]), refer to the Breeding Bird and Nest Management Plan (BBNMP).  Ensure that noise abatement equipment on machinery is in good working order  Change in Movement  The Environmental Inspector(s) or designate will identify and notify the Contractor of the appropriate locations for wildlife gaps.  Leave gaps in windrows (e.g., topsoil/strippings, grade spoil, rollback, snow) and strung pipe at obvious drainages and wildlife trails, and to allow for livestock and vehicle/machinery passage across the construction footprint. Locations where wildlife gaps are appropriate will be determined in the field by the Environmental Inspector(s) or designate. Gaps should align.  Backfill the trench as soon as practical, following lowering-in, to minimize hazards to wildlife.  Change in Mortality Risk  Avoid disturbance to environmentally sensitive features during clearing as identified by the appropriate signage and/or fencing. The Environmental Inspector(s) or designate and appropriate Environmental Resource Specialist will determine the size of avoidance buffer surrounding these features, if appropriate.  In the event that clearing or construction activities cannot be	Verificies		

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Element	(Y/N)	provide justification)	N/A)	Effects	(Y/N)	primary nesting period (PNP; April 15 - August 15 [Zone C3]), refer to the Breeding Bird and Nest Management Plan (BBNMP).  Environment and Climate Change Canada's avoidance guidelines and policy on incidental take of migratory bird in Canada (ECCC 2017) will be followed to determine the presence of nesting birds and to prevent disturbance to active nests.  Construction and clean-up activities will occur outside of PNP, where feasible.  Where clearing or construction activities will occur during the PNP in nesting habitat, a non-intrusive preconstruction breeding bird survey will be conducted unless the area has been pre-cleared.  If an active nest is identified within the Project footprint, the BBNMP will be implemented to avoid or minimize risks of negative effects to migratory birds, their nests and eggs.  Conduct pre-construction non-intrusive raptor nest surveys prior to vegetation clearing that occurs within the raptor nesting period (approximately February 15 to July 31) based on recommendations from a wildlife biologist.  If a raptor nest is identified and the worksite is within the provincial setback buffer, refer to the Wildlife Species of Concern Contingency Plan.  Do not harass or feed wildlife or	after Mitigation	Cumulative Effects	Plan/Details
						livestock. Do not permit construction personnel to have dogs on the construction footprint. Firearms are not permitted in Project vehicles or on the construction footprint, or at associated Project facilities. In addition, prohibit the recreational use of all-terrain vehicles (ATVs) or snowmobiles by construction personnel on the construction footprint. Report any incidents with wildlife to a TransCanada			

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						Representative immediately.  Restrict all construction activities to the approved construction footprint. All construction traffic will adhere to safety and road closure regulations.  Prior to clearing, TransCanada will consult with the MNRF Kemptville Office about any specific mitigation measures for bats that require implementation to avoid and/or reduce impacts.  Conduct surveys of potential Western chorus frog, snake and turtle habitat in early spring 2017 according to provincial protocols to determine presence of listed species and use of habitat. If listed frogs, snakes or turtles are found within the Project footprint, the following mitigations will be implemented:  The contractor will erect the appropriate signage and supply and install exclusion fencing, as directed by the EI in consultation with the Wildlife Resource Specialist.  If required, conduct area searches of the fenced Project footprint and remove listed frogs, snakes and turtles encountered within the exclusion area (distance and location to be determined). Obtain applicable permits (i.e., Scientific Collectors Permit for Wildlife) for handling frogs, snakes and turtles from the MNRF.  Exclusion fencing should not be removed until construction is complete.  If listed frogs, snakes or turtles are encountered during construction, the Wildlife Species of Concern Discovery Contingency Plan will be implemented.  If additional work, including clean-up and restoration, is required in subsequent seasons,			

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						<ul> <li>If wildlife or livestock are discovered in the trench, or in association with any other activity or facility, report to the Environmental Inspector(s) or designate who will contact the responsible regulatory agencies, as required. In the case of livestock, the land agent assigned to the Project will contact the landowner.</li> <li>To facilitate free movement of livestock and wildlife, follow trenching operations as closely as possible with lowering-in and backfill operations, unless for construction purposes there is a need to have the trench open for an extended period of time.</li> <li>Minimize the amount of open trench at any one time.</li> <li>The Contractor will monitor the open trench for trapped wildlife. Should any wildlife be identified, the Contractor will contact the Environmental Inspector(s) or designate and Construction Manager. The Environmental Inspector(s) or designate will contact the responsible regulatory agency or a Wildlife Resource Specialist, where required, for direction.</li> <li>Consult with relevant regulatory agencies to develop appropriate species-specific mitigation measures, if determined to be present on the Project site.</li> </ul>			
Species at Risk, or Species of Special Status, and related habitat	Y	The Project will be located within TransCanada owned land, on and adjacent to an existing TransCanada right-of-way, compressor station, and meter station site.  No wildlife species of management concern or species at risk were observed during the field survey; however, have the potential to occur due to the presence of potential habitat in the Project footprint.	Underway - pre- construction field surveys will be completed in spring 2017 to confirm the presence/ absence of species at risk	Change to habitat, movement and mortality risk for wildlife species at risk may arise during construction.  See the Wildlife and Wildlife Habitat element of this table for potential effects and pathways that may affect wildlife, including wildlife species of management concern.  Change to vegetation community and species	Y	See the Wildlife and Wildlife Habitat element of this table for mitigation measures regarding changes in wildlife habitat, wildlife movement, and mortality risk.  See the Vegetation element of this table for mitigation measures regarding vegetation removal and introduction of weeds.	Change to wildlife habitat, movement and mortality risk for wildlife species at risk could arise during construction.  See the Wildlife and Wildlife Habitat element of this table for predicted residual effects on wildlife, including wildlife species at risk.  Change in abundance or distribution of native vegetation species, including species of management concern could arise during construction.	The Project and future development (urban, industrial, agricultural) will cumulatively lead to further effects on wildlife and vegetation, which could include effects on species of management concern.	Monitoring/ Inspection will occur during construction

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		No plant species of management concern or species at risk were observed during the field survey; however, have the potential to occur due to the presence of native vegetation in the Project footprint.  Construction:  Construction of the new SMS will require the removal of approximately 0.3 ha of native and non-native vegetation that may provide habitat for species at risk (e.g., Monarch butterfly, bobolink, Eastern meadowlark).  Construction of the new NPS 20 connection pipe will require disturbance of up to 2.0 ha of native wetland and meadow vegetation that may provide wildlife habitat for species at risk (e.g., Eastern small-footed myotis, little brown bat, Northern long-eared bat, tricolored bat, Western chorus frog, Blanding's turtle, spotted turtle, snapping turtle, milksnake, Eastern ribbonsnake, Monarch butterfly).  Interactions during construction with wildlife and vegetation species at risk and species of management concern could occur due to the following Project activities:  vegetation clearing vehicle and equipment movement increased noise increased traffic Decommissioning:  Decommissioning activities for the existing SMS will be limited to the existing fenced and graveled site, which contains no vegetation or wildlife habitat.		diversity may arise during construction.  See the Vegetation element of this table for potential effects and pathways that may affect vegetation, including vegetation species of management concern.			See the Vegetation element of this table for predicted residual effects on vegetation, including vegetation species of management concern.		

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Element	Interaction (Y/N)	Description of Interaction(s) (If no interaction is predicted, provide 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
		Decommissioning activities for the existing NPS 12 connection pipe will occur within the existing compressor station site and SMS site (which contain no vegetation or wildlife habitat) and within the proposed SMS site (for which disturbance is already accounted for as part of construction activities) Interactions with wildlife and vegetation species at risk and species of management concern are not anticipated during decommissioning, with effects related to increased noise being accounted for under Project construction.							
Air Emissions and Greenhouse Gas (GHG) Emissions	Y	Interactions could occur due to vehicle and equipment used during construction and decommissioning.	N/A	Increase in criteria air contaminants (CAC) and GHG emissions during construction and decommissioning due to:  Project contribution to CACs Increased GHG emissions during construction.	Y	<ul> <li>Reduce idling of equipment, where possible.</li> <li>The Contractor will ensure that equipment is well-maintained.</li> <li>Where practical, use multi— passenger vehicles for the transport of crews to and from job sites.</li> </ul>	CAC and GHG emissions during construction and decommissioning are anticipated to be negligible.	Negligible Project contribution to CACs and GHGs from vehicle exhaust during construction and decommissioning.	Monitoring/ Inspection will occur during construction.
Acoustic Environment	Y	Interactions could occur due to noise generated by equipment and vehicles during construction and decommissioning activities.	N/A	Increased nuisance noise emissions during construction and decommissioning activities	Y	<ul> <li>Ensure that noise abatement equipment on machinery is in good working order.</li> <li>Take reasonable measures to control construction related noise near residential areas.</li> </ul>	Noise emissions during construction and decommissioning are anticipated to be negligible.	Negligible additional noise arising from Project activities during construction and decommissioning.	Monitoring/ Inspection will occur during construction.
Human Occupancy and Resource Use	Y	The Project will be located within TransCanada owned land, on and adjacent to an existing TransCanada right-of-way, compressor station, and existing meter station site.  Interactions may occur due to access restrictions during construction and decommissioning on other land and resource uses in proximity to the Project.	Underway - Hydrogeological modelling in Q1 2017	Change to agricultural activities	Y	Notify affected landowners and lessees of the intended Project schedule before the start of construction to prevent or reduce impacts to their operations or activities.     To prevent inadvertent trespass, stake the approved construction footprint to clearly delineate all boundaries.     Post signage to discourage	Effects to access for nearby agricultural activities, oil and gas and industrial activities, hunting and groundwater use are anticipated to be localized, temporary, and negligible.	None	Monitoring/ Inspection will occur during construction.

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Element	Interaction (Y/N)	Description of Interaction(s) (If no interaction is predicted, provide justification)	Status of Element- Specific Study or Survey (Complete, Underway, Date Expected, or N/A)	Description of Potential Effects construction	Mitigation Will Be Implemented to Resolve Potential Adverse Effect (Y/N)	Specify the Mitigation  unauthorized public access onto the	Description of Residual Effects after Mitigation	Description of the Cumulative Effects	Monitoring Plan/Details
				Change to hunting  Access restrictions during construction  Sensory disturbance or a change in habitat due to construction and operation, which results in decreased hunting opportunities  Removal of areas for hunting activities during construction and operation  Change to groundwater use  Change in groundwater quality or quantity in wells used for domestic or agricultural purposes as a result of construction activities (e.g., dewatering)		unautnorized public access onto the construction footprint during construction.  Restrict all construction activities to the approved construction footprint. All construction traffic will adhere to safety and road closure regulations.  Clearly delineate areas that have access restrictions. Restrict access to construction personnel only.  Review landowner requests as they appear on the landowner line list, or as they arise in the field to ensure conformance with the environmental commitments.  Notification to Affected Parties  Arrange for landowners to harvest crops, if practical. Mow, cut or bale any remaining crops and remove from the construction footprint to facilitate topsoil handling.  Mark and locate all foreign lines and cables using Ontario One-Call services before the start of construction to ensure the safety of the workers and public.  Notify registered hunters and trappers at least two weeks prior to construction.  Project personnel are not permitted to hunt or fish on the construction footprint.  Groundwater Use  If springs and ground water are encountered, the Company will review the area and determine the appropriate mitigation.  Monitor water levels in all open trenches.  Where practical, grade the construction footprint to divert surface water away from the open trench.  Where the open trench has the potential to dewater a wetland, undertake trenching in a manner that			

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Element	Interaction (Y/N)	Description of Interaction(s) (If no interaction is predicted, provide 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
						prevents the flow of water along the trench.  In the event unanticipated contaminated soils, surface water and/or groundwater are encountered during construction, implement the TransCanada Waste and Hazardous Materials Management Manual and the Contaminated Soils Contingency Plan.  Prohibit the use of herbicides within 30 m of an open body of water, unless the herbicide application is conducted by ground application equipment, or otherwise approved by the responsible regulatory agency.			
Heritage Resources	Y	The Project will be located within TransCanada owned land, on and adjacent to an existing TransCanada right-of-way, compressor station, and existing meter station site. A Stage I Archaeological Assessment was undertaken and submitted to the Ministry of Tourism, Culture and Sport on December 22, 2016. The Project will be located on land that may contain heritage resources; the likelihood of these resources occurring will be determined following additional investigation prior to construction.	Underway - a Stage 2 Archaeological Assessment will be undertaken in spring 2017.	With the implementation of proposed mitigation measures, including those required to satisfy the Ministry of Tourism, Culture and Sport prior to undertaking construction, effects on heritage resources are not predicted.	Y	Do not permit clearing in proximity to known archaeological sites unless otherwise approved by the responsible regulatory agency.  If historical or palaeontological features (e.g., arrow heads, modified bone, pottery fragments, fossils) not previously identified are found on the construction footprint during construction implement the measures outlined in the Heritage Resource Discovery Contingency Plan.  If potential human remains are found on the construction footprint during construction implement the measures outlined in the Heritage Resource Discovery Contingency Plan.  Prohibit the collection of Historical Resources by Project personnel.	None	None	Monitoring/ Inspection will occur during construction
Navigation and Navigation Safety	N	The Project will not take place in or near navigable waterways. No interaction is predicted	N/A	None	N	N/A	None	None	N/A
Traditional Land and Resource Use	N	The Project will be located within TransCanada owned land, on and adjacent to an existing TransCanada right-of-way, compressor station, and existing meter station site.  The Algonquins of Ontario received information about the Project. To	N/A	None	N	N/A	None	None	N/A

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Element	Interaction (Y/N)	Description of Interaction(s) (If no interaction is predicted, provide 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
		date, no Project-related concerns or issues have been communicated to TransCanada. No interaction with Traditional Land and Resource Use is predicted. If previously-unidentified traditional							
		land use (TLU) sites are found on the Project footprint during construction, TransCanada will implement the process outlined in the Traditional Land Use Sites Discovery Contingency Plan.							
Socio and Cultural Well-Being	N	The Project has a limited scope, relatively small workforce of approximately 25 workers, and a short duration of approximately 2 months of construction.	N/A	None	N	N/A	None	None	N/A
		There are limited predicted interactions with socio-cultural well-being.							
Human Health or Aesthetics	N	The Project has a limited scope; limited residual effects on air quality and the acoustic environment are predicted.	N/A	None	N	N/A	None	None	N/A
		There are no anticipated interactions with human health and aesthetics.							
Infrastructure and Services	Y	The Project has a limited scope, relatively small workforce of approximately 25 workers, and a short duration of approximately 2 months of construction. Local infrastructure and services will support the Project.  There are limited predicted	N/A	None	N	N/A	None	None	N/A
		interactions with infrastructure and services.							
Employment and Economy	Y	The Project has a limited scope, relatively small workforce of approximately 25 workers, and a short duration of approximately 2 months of construction.  There are limited predicted interactions with employment and	N/A	None	N	N/A	None	None	N/A

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Interaction Element (Y/N)	Description of Interaction(s) (If no interaction is predicted, provide 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
Accidents and Malfunctions  Y	The Project's construction and decommissioning activities have the potential to cause:	N/A	A release or rupture could occur during operation due to:  Internal and external corrosion or stress corrosion cracking  Defects associated with either manufacturing or onsite installation  Overpressure events  Natural force  Third-party damage A hazardous materials release could occur during construction (or operation to a lesser extent) due to improper handling, use or storage  Fire could occur during construction due to explosion, lightning or other natural event.  A vehicle accident, including one that involves wildlife, could occur during construction or operation during movement of vehicles to and from the Project site or heavy equipment on-site.  Damage to existing pipelines and/or facilities near the Project site could occur during Project construction.	Y	<ul> <li>Releases or Ruptures</li> <li>All equipment shall arrive on the project free of leaks and in good working condition. Any equipment which does not arrive free of leaks and in good working condition shall not be allowed on the construction footprint until it has been repaired, reinspected by the Environmental Inspector(s) or designate, and deemed suitable for use.</li> <li>The Contractor will ensure equipment is well-maintained and free of fluid leaks.</li> <li>If an accidental release does occur, measures to control, contain, recover and clean up the release are to be implemented immediately to minimize the potential for adverse environmental and human health effects, or to ensure the release does not spread or increase in size. Refer to the Release Contingency Plan.</li> <li>In the event of a release of any size, the Contractor shall immediately report the release to the Environmental Inspector(s) or designate.</li> <li>In the event of a release, refer to the Release Contingency Plan.</li> <li>Hazardous Materials Release</li> <li>In the event of a release, refer to the Release Contingency Plan.</li> <li>Bulk fuel trucks, service vehicles, and pick-up trucks equipped with box-mounted fuel tanks shall carry spill prevention, containment, and clean-up materials that are suitable for the volume of fuels or oils carried.</li> <li>All fuel tanks, hazardous materials and chemicals shall be stored within appropriate secondary containment per requirements outlined in the Chemical and Waste Management Plan.</li> <li>Fire</li> <li>In the event of a fire or high fire hazard conditions, follow the measures outlined in the Fire</li> </ul>	With the implementation of mitigation, preventative and response measures, the residual effects of accidents and malfunctions on VCs considered in this assessment are predicted to be not significant.	None	Monitoring/ Inspection will occur during construction and operation

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Element	Interaction (Y/N)	Description of Interaction(s) (If no interaction is predicted, provide 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
						<ul> <li>Suppression Contingency Plan.</li> <li>Ensure the Contractor has the necessary fire-fighting equipment on hand that is capable of controlling any fire that may occur as a result of their activities, as identified by provincial regulations and responsible government agencies.</li> <li>Prior to commencement of construction, the Contractor will designate one of his staff as Fire Boss. The Fire Boss will be familiar with fire-fighting techniques and equipment. A Fire Boss should have some degree of fireline certification and fire experience, or knowledge of fire weather and fire behavior.</li> <li>All motorized equipment must carry a fully charged fire extinguisher. The Fire Boss will ensure that fire extinguishers are present and fully charged and all fireline equipment is present and in working order.</li> <li>Vehicle Accident</li> <li>Restrict all construction activities to the approved construction footprint. All construction traffic will adhere to safety and road closure regulations.</li> <li>Damage to Existing Pipelines and/or Facilities</li> <li>Mark and locate all foreign lines and cables using Ontario One-Call services before the start of construction to ensure the safety of the workers and public.</li> </ul>			
Effects of the Environment on the Project	Y	Interactions could occur due to the following events:  • severe weather events  • wildfires	N/A	Effects on the Project may arise during construction due to:  • extreme temperatures  • heavy precipitation and flooding  • lightning  • high winds and tornadoes  • wildfires	Y	In the event of adverse weather that could result in rutting, sedimentation and erosion, and/or compaction, the Environmental Inspector(s) or designate, in consultation with the Construction Manager, may implement contingency measures as outlined in the Adverse Weather Contingency Plan. A soils specialist and/or the responsible regulatory agency may be consulted, if warranted.      Following an adverse weather event,	None	None	Monitoring/ Inspection will occur during construction and operation

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Richmond North Sales Meter Station

Element	Interaction (Y/N)	Description of Interaction(s) (If no interaction is predicted, provide 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
						the Contractor will confirm the efficacy of sediment and erosion control measures and whether corrective action is required.  • Should high winds or heavy rains damage the tackifier during construction, the Environmental Inspector(s) or designate, in consultation with the Construction Manager, may implement contingency measures as outlined in the Adverse Weather Contingency Plan.  Wildfires  • In the event of a fire or high fire hazard conditions, follow the measures outlined in the Fire Suppression Contingency Plan.  • Ensure the Contractor has the necessary fire-fighting equipment on hand that is capable of controlling any fire that may occur as a result of their activities, as identified by provincial regulations and responsible government agencies.  • All motorized equipment must carry a fully charged fire extinguisher. The Fire Boss will ensure that fire extinguishers are present and fully charged and all fireline equipment is present and in working order.			

## NOTE:

TransCanada confirms that all the standard environmental mitigation noted in the above table as well as the following contingency plans and management plans will be included in a Project-specific Environmental Protection Plan (EPP): Release Contingency Plan; Adverse Weather Contingency Plan; Flood and Excessive Flow Contingency Plan; Wet Soils Contingency Plan; Fire Suppression Contingency Plan; Soil Handling Contingency Plan; Contaminated Soils Contingency Plan; Plant Species and Ecological Communities of Concern Discovery Contingency Plan; Wildlife Species of Concern Discovery Contingency Plan; TLU Sites Discovery Contingency Plan; Chemical and Waste Management Plan; Traffic Control Management Plan; Hydrovac Slurry Handling Management Plan; and Breeding, Bird and Nest Management Plan.

## **REFERENCES:**

Environment and Climate Change Canada. 2017. Safeguarding Migratory Birds: Technical Information. Website: https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=8D910CAC-1#\_03. Accessed February 2017.

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