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14.0 MONITORING AND FOLLOW-UP

14.1 Monitoring Program

ESRA will be implementing a program to monitor the proper application of measures and controls to minimize the potential for adverse environmental effects during all phases of Project development. The Monitoring Program is intended to assess whether the:

The objective of the Monitoring Program is to assess whether proper measures and controls are in place and are being properly implemented for environmental protection and human health and safety.

- The Project is being implemented as proposed;
- Measures implemented to mitigate the adverse effects of the Project (e.g., fish habitat off-setting, if required) are effective and the assessment of Project effects is accurate; and
- The Project is proceeding in accordance with required conditions as stipulated in regulatory permits, authorizations and ESRA guidance documents.

Regular inspections of Project design, construction, operations and maintenance components and activities will be documented and improvements will be implemented using appropriate and effective adaptive management techniques as needed. The program will also monitor the application of action plans and emergency response procedures for environmental protection and human health and safety.

The mitigation and environmental protection measures that will be implemented during all phases of the Project are described in **Chapter 5**. The specific mitigation measures that will be implemented to reduce or avoid adverse effects to Valued Components are outlined in the potential effects/proposed mitigation tables within **Chapters 7** through **10** for the physical, aquatic, terrestrial, and socio-economic and cultural environments, respectively.

In the event of the observation of non-compliance with legal and/or environmental requirements or contractor obligations to environmental protection, ESRA will have intervention mechanisms in place in the form of a clearly-defined management structure for reporting, decision-making, correction of non-compliance, and monitoring of corrective actions. ESRA's Environmental Management Plan described in **Chapter 5** is the tool that will provide the means to confirm that environmental protection activities have occurred and are being implemented as required. Monitoring, reporting, and management decision-making are integral to the various levels and elements of ESRA's environmental protection planning which is designed after the 5-step model for an environmental management system produced by the International Organization for Standardization (ISO) Standard 14001 (see **Figure 5-2**, **Chapter 5**).

14.1.1 Management Structure

The Monitoring Program will be administered by ESRA through its staff and third-party Contract Administrators. As part of the Environmental Management Plan (**Chapter 5**), the construction

environmental protection plans will describe the environmental inspection and reporting responsibilities.

Environmental inspections will be conducted by civil technologists and other construction inspectors with oversight and periodic inspections by environmental inspectors. ESRA's Senior Environment Officer, with experience managing an environmental field inspection unit and administering contract documents, will monitor inspection activities and reports. The site will be inspected to check for compliance with the environmental protection requirements outlined in the contract documents. A standardized inspection form will be used to maintain a documented record of the site conditions. In the event of a non-compliance issue, environmental concerns will be brought to the attention of the Contract Administrator to be addressed by the contractor.

The Contract Administrator will have a representative on the work site at all times work is being undertaken to check that the environmental protection measures are constructed, implemented, and maintained (e.g., silt fences and sediment barriers are installed, maintained, and cleaned) in accordance with contract documents. The onsite inspectors have the authority to issue a stop work order and/or order other additional environmental protection measures deemed necessary to provide environmental protection.

The contractor's inspection responsibilities are prescribed by the contract documents and reported as outlined in the Environmental Protection Plans (**Chapter 5**). The contractor's responsibility is to check that the construction proceeds as required by law in the pertinent Acts, regulations, authorizations and permits. Inspections will include fuel storage containers, tank vehicles, dangerous goods and hazardous wastes storage facilities/sites for releases of fuel, dangerous goods or hazardous waste, sediment and erosion controls, clearing and grubbing debris, clean-up and litter controls. The contractor will be required to maintain records such as the dates that inspections took place, the name of the inspector, the length of silt fence cleaned and in the event of debris or deleterious substance releases and the corrective actions taken. **Figure 14-1** outlines the activities involved in ESRA's Environmental Program for the operations and maintenance phase.

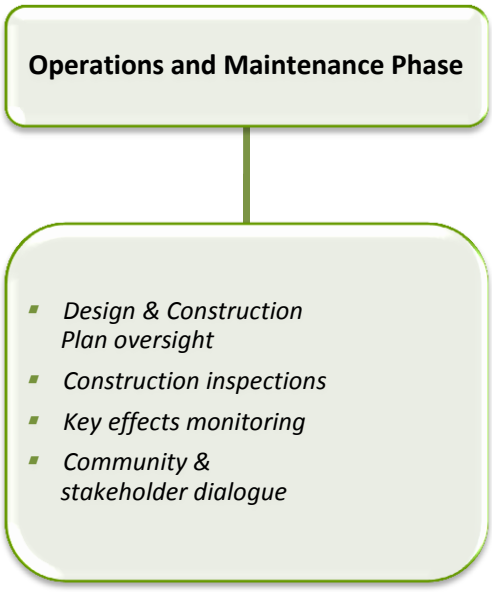

Figure 14-1: Activities of ESRA's Operations and Maintenance Phase

14.1.2 Design & Construction Plan Oversight

The first phase of monitoring is the oversight of design and construction plans to confirm that measures to protect the environment are being incorporated (**Figure 14-1**). This occurs during the Project Planning and Construction Planning phases. Staff from ESRA's Engineering, Safety, and Environment units review design iterations and contract drafts as they become available from engineering specialists who are contracted to design and prepare contract tenders for each road or bridge segment of the Project. The documents are checked to see that applicable comments received from the community and other stakeholders, design, and mitigation commitments identified in the EIS, and other regulatory requirements are appropriately reflected in the contract documents.

14.1.3 Construction Monitoring

Construction phase monitoring inspections will commence with the start of construction and be conducted as described in the Construction Phase Environmental Protection Plans (**Chapter 5**). The activities will include, but will not be limited to, inspections that will be conducted to protect the aquatic environment during Project construction and maintenance activities. Inspections will be conducted on a weekly basis at minimum during construction and maintenance activities, with additional inspections for erosion and sediment control conducted during and/or immediately after significant rain events. A list of mitigation items that will be inspected throughout construction and maintenance phases at sites located at or near watercourses is provided in **Appendix 14-1**.

14.1.4 Water Quality Monitoring

Water quality will be monitored for potential adverse effects of construction on fish, fish habitat, and aquatic resources related to the introduction of sediment and other deleterious substances into watercourses, as well as adverse changes to drinking water quality potentially affecting human health. Water quality will be monitored during in-water works and/or other construction activities conducted near water, as appropriate.

Potential effects of in-stream construction activities are typically disturbance to the streambed and bank resulting in erosion and suspension of sediment, alterations to channel hydraulics, and discharge of sediment and other deleterious substances during dewatering. The primary indicator for these impacts is Total Suspended Solids (TSS), with turbidity used as a surrogate for rapid on-site monitoring[1]. A turbidity monitoring program will be conducted during in-stream construction activities to document the spatial extent and magnitude of potential impacts. Other sampling may occur to monitor for other water quality properties, as appropriate. Data collected at downstream sites will be compared to upstream reference sites (i.e., background conditions) to monitor the effects of construction in relation to MWQSOGs[2] for the protection of aquatic life.

[1] TSS will be measured in the laboratory and turbidity will also be measured in situ. A relationship between TSS and turbidity will be developed to facilitate the use of more frequent in situ measurements of turbidity to estimate TSS concentrations.
[2] Manitoba Water Quality Standards, Objectives, and Guidelines for Aquatic Life (MWS 2011)

14.1.5 Post-Construction Monitoring and Follow-up

Post-construction (operations and maintenance phase) monitoring will be conducted for various durations appropriate to the conditions being monitored. Valued Components (VCs) requiring post-construction monitoring and follow-up will have specific monitoring and follow-up programs developed and initiated.

Reporting on VC monitoring and follow-up studies will be submitted to ESRA annually by consultants conducting the studies. Post-construction monitoring reports and data will be made available to regulatory authorities as required. Due to the sensitivity of the information and data contained in post-construction monitoring and follow-up reports (e.g., caribou monitoring/location data), ESRA will discuss with regulatory authorities the appropriateness of releasing reports/data to the public in consideration of the on-going protection of VCs, as needed. General update information on the status of monitoring studies will be provided to local communities (Poplar River First Nation, Berens River First Nation, and Berens River Northern Affairs Community) and the general public in the form of Project briefs (e.g., newsletters) and updates to ESRA's website for the P4 Project. ESRA is committed to on-going dialogue with local community members regarding the monitoring of species important to traditional use. ESRA will take an adaptive management approach in providing appropriate and effective monitoring programs that address feedback received from affected communities.

To demonstrate accuracy of the predicted Project effects and mitigation on VCs where uncertainty exists as stated in this EIS, post-construction monitoring programs targeting VCs will be implemented where and when appropriate. Follow-up/post-construction monitoring studies will be developed in concert with appropriate regulatory bodies and will be based on the results of the pre-construction and construction monitoring programs, specific site situations, and licence/authorization/permit/approval requirements. It is anticipated that post-construction monitoring studies may be carried out on the following VCs: Fish Habitat, Mapleleaf Mussel, Caribou, Moose, and Furbearers as summarized below.

14.1.5.1 Fish Habitat

To determine if mitigation measures are performing as intended, post-construction monitoring may be performed at fish-bearing crossing sites and off-setting sites where necessary. Parameters may include fish passage, sediment, and erosion control and/or off-setting projects. Methods may include conducting inspections, collecting photographic records, biological sampling, and physical measurements. Frequency and duration of monitoring will be determined in discussion with Fisheries and Oceans Canada, and Manitoba Conservation and Water Stewardship, and will be designed specifically to each site.

If required, fish habitat that is constructed, restored or enhanced to offset habitat losses resulting from Project construction will be monitored (as part of the Monitoring Program) on an annual basis for three years following construction to check that the physical integrity of the site has been maintained and that the habitat is performing as intended. The nature of monitoring and follow-up will depend on the type

of offsetting habitat provided but may include physical measurements and/or biological sampling. Physical measurements may include water velocities, depths, substrates, and channel conditions. Biological sampling may include seining, electrofishing, ponar grabs, etc. If an offsetting project is not performing as intended, potential modifications to the habitat will be reviewed and implemented, if necessary. Monitoring programs will be described in detail in offsetting plans reviewed with Fisheries and Oceans Canada and Manitoba Conservation and Water Stewardship.

14.1.5.2 Mapleleaf Mussel

To determine the health of Mapleleaf mussels following relocation, post-construction monitoring may be required. Parameters may include species occurrence, survival, growth, and/or movement. Methods may include conducing ponar grabs, diving operations, mussel raking, and bathyscope identification. Frequency and duration of monitoring will be determined in discussion with the Fisheries and Oceans Canada, and Manitoba Conservation and Water Stewardship, and will be designed specifically to each site where Mapleleaf mussels have been relocated.

14.1.5.3 Caribou

To determine if the predicted effects are occurring and if mitigation measures are performing as intended, post-construction monitoring may be performed as necessary. Parameters for caribou follow-up monitoring studies may include distribution, calving, habitat, range fragmentation, and/or pregnancy analysis. Methods may include conducting aerial surveys, caribou collaring, obtaining GPS tracking data, point density analysis, blood, and fecal sample analysis and/or traditional knowledge acquired through Trapper Participation Programs. Frequency and duration of monitoring efforts will be determined in discussion with Manitoba Conservation and Water Stewardship. Construction monitoring results may indicate that no follow-up monitoring is required.

14.1.5.4 Moose

To determine if predicted effects are occurring and if mitigation measures are performing as intended, post-construction monitoring may be performed as necessary. Parameters for moose follow-up monitoring studies may include distribution, moose/caribou range overlap, and/or predation by wolves or other animals. Methods may include conducting aerial surveys, wolf collaring, and/or traditional knowledge acquired through Trapper Participation Programs. Frequency and duration of monitoring efforts will be determined in discussion with Manitoba Conservation and Water Stewardship. Construction monitoring results may indicate that no follow-up monitoring is required.

14.1.5.5 Furbearers

To determine if predicted effects are occurring and if mitigation measures are performing as intended, post-construction monitoring may be performed as necessary. Parameters may include distribution and/or abundance. Methods may include conducting aerial surveys, trail camera studies and/or Trapper Participation Programs. Frequency and duration of monitoring efforts will be determined in discussion

with Manitoba Conservation and Water Stewardship. Construction monitoring results may indicate that no follow-up monitoring is required.

The post-construction monitoring studies summarized above will be implemented where and when necessary and reviewed with regulatory authorities and finalized prior to the initiation of the proposed post-construction monitoring program. In the event that unexpected adverse effects to a VC(s) are observed during post-construction monitoring studies, adaptive management strategies to mitigate adverse effects will be determined in discussion with regulatory authorities, and appropriate mitigation will be implemented as required.

14.1.6 Reporting

Reporting on follow-up studies will be submitted to ESRA annually by consultants conducting the studies. Post-construction monitoring reports and data will be made available to regulatory authorities as required. ESRA's Environmental Senior Officer and Contract Administrator will report results of the Monitoring Program to ESRA's Project Managers and the Manager of Special Projects and Environmental Services (Environmental Manager) who will take corrective action as necessary based on ongoing measurement of key characteristics of the construction and post-construction activities and implemented mitigation efforts. Results of the Monitoring Program will be reported to regulatory authorities, the communities and public as indicated in the permits, authorizations, approvals, or licence requirements for the Project, or as otherwise requested. The content, format, number, and frequency of Monitoring Program reports for regulatory authorities will be determined in accordance with guidance received from regulators.