FINAL TERMS OF REFERENCE
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR ST. MARY RIVER IRRIGATION DISTRICT
PROPOSED

CHIN RESERVOIR EXPANSION PROJECT

Located in Southern Alberta within
Lethbridge County, County of Warner, and the Municipal District of Taber

ISSUED BY: **Environment and Protected Areas**

DATE: **November 2, 2023**

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PURPOSE OF THE TERMS OF REFERENCE

The purpose of this document is to identify for St. Mary River Irrigation District (SMRID), the public, Indigenous communities, and appropriate stakeholders, the information required by government agencies for an Environmental Impact Assessment (EIA) report prepared under the *Environmental Protection and Enhancement Act* (EPEA) for the Chin Reservoir Expansion Project (the Project).

PROJECT BACKGROUND

Chin Reservoir is an off-stream storage reservoir that is located roughly in the middle of SMRID system, approximately 30 kilometres (km) east of Lethbridge and 15 km south of Taber. The existing reservoir is located between NE-27-8-18-4 and SE-26-7-16-4. It is the largest off-stream reservoir within SMRID and has a current storage volume of 154,320 acre-foot (ac-ft) (190,350 cubic decameter [dam^3]) at the operating full supply level (FSL) of 861.40 metres (m).

Chin Reservoir is located in a major glacial melt coulee known as Chin Coulee. The reservoir is impounded by two dams on its east and west ends: Chin 1 (West Dam), and Chin 2 (East Dam). Chin Coulee continues to the west and east of both dams. West of the West Dam is Stafford Reservoir. An ephemeral creek channel extends eastward from the East Dam. Typically, the flow in the channel stops by mid-summer, stranding small pockets of water that, depending on the environmental conditions of a given year, may or may not dry up by the end of summer.

The two dams were completed in 1955 and no major modifications have been completed since their construction. In 1989, Forty Mile Coulee Reservoir, 50 km to the east of the Chin Coulee Reservoir, was added to SMRID for water storage for irrigation.

Since the addition of Forty Mile Coulee Reservoir, there has been a dramatic increase in the demand for water for irrigation purposes. To meet the increased demand for irrigation, SMRID has proposed to expand the existing Chin Reservoir. The Project is planned for privately held land where landowners continue to be included in the planning of the Project. The Project involves the creation of a new dam at the invert of the Chin Coulee which will result in a larger reservoir. The new dam and eastern limit are within SW 23-7-15-W4 and NW-14-7-15-W4 in the MD of Taber and Lethbridge County. The new dam will be approximately 40 m in height and is expected to inundate (flood) approximately 650 hectares (ha) of Chin Coulee east of the existing East Dam.

Three noteworthy aspects of the operation of the SMRID system limit the potential effects of the Project. The first is that the water in the SMRID system is drawn from the Milk River Ridge Reservoir and not directly from a river. The water diverted to the Milk River Ridge Reservoir cannot increase due to the constraints of the existing infrastructure managed and controlled by the Government of Alberta. Decisions regarding water conservation objectives and instream objectives are under the jurisdiction of the Government of Alberta. Second, while the goal is to increase storage capacity, the additional water required for the additional reservoir capacity would be filled without the need for SMRID to exceed the water allocation of their existing water licence. Finally, water released downstream of the Chin Reservoir cannot increase due to the constraints of the existing conveyance infrastructure.

SCOPE OF THE EIA REPORT

SMRID shall prepare and submit an EIA report that examines the environmental and socio-economic effects of the Project.

The EIA report shall be prepared considering all applicable provincial and federal legislation, codes of practice, guidelines, standards, policies, and directives.

The EIA report shall be prepared in accordance with these Terms of Reference and the environmental information requirements prescribed under EPEA and associated regulations, and the *Impact Assessment Act*, if applicable. The EIA report will form part of the application to the Natural Resource Conservation Board (NRCB). An EIA report summary will also be included as part of the NRCB Application.

SMRID shall refer to the *Guide to Preparing Environmental Impact Assessment Reports in Alberta* published by Alberta Environment and Protected Areas (the Guide) and these Terms of Reference when preparing the Environmental Impact Assessment report. In any case where there is a difference in requirements between the Guide and these Terms of Reference, the Terms of Reference shall take precedence.

CONTENT OF THE EIA REPORT

1 PUBLIC ENGAGEMENT AND INDIGENOUS ENGAGEMENT

[A] Document the public engagement program implemented for the Project including:

a) a list of meetings and the specific comments or issues raised at the meetings;
b) a list of other consultation methods including communication via websites, radio, television, newspaper, and the intended audience reached;
c) a description and documentation of concerns and issues expressed by the public, SMRID's analysis of those concerns and issues and the actions taken to address those concerns and issues; and
d) a description of how the public input was incorporated into the Project development, impact mitigation and monitoring.

[B] Document the Indigenous consultation program implemented for the Project including:

a) a list of meetings and the specific comments or issues raised at the meetings;
b) a description and documentation of concerns and issues expressed by Indigenous communities and groups, SMRID's analysis of those concerns and issues, and the actions taken to address those concerns and issues;
c) a description of how Indigenous values are considered in the framework of decision making;
d) how Indigenous knowledge helped shape project development, impact mitigation, monitoring and reclamation; and
e) the consultation undertaken with Indigenous communities and groups with respect to traditional ecological knowledge and traditional use of land and water.

[C] Describe plans to maintain the public engagement and Indigenous consultation process following completion of the EIA report to ensure that the public and Indigenous peoples will have an appropriate forum for expressing their views on the ongoing development, operation, and reclamation of the Project.

[D] Provide the presentation materials and associated documents (e.g., agendas, minutes, briefings) used for public meetings and Indigenous consultations.

2 PROJECT DESCRIPTION

2.1 Overview

[A] Provide a brief project description in sufficient detail to provide context for the EIA, including:

a) proponent information;
b) the need for the Project and why this project was chosen over other projects;
c) roles of various government departments and agencies and non-governmental organizations;
d) which communities would benefit from the Project; and
e) the development plan and schedule.

[B] Describe how the Project links to and realizes the outcomes of the Alberta Irrigation Modernization Program.

[C] Describe the benefits of the Project, including jobs created, local training, employment and business opportunities, and royalties and taxes generated that accrue to:

a) the Proponent;
b) local and regional communities, including Indigenous communities;
c) the local authority;
d) Alberta; and
e) Canada.

[D] Describe the priority rights of SMRID for the licensed allocation of water in comparison to upstream users, and how decisions are made with respect to annual diversions from the source of the SMRID water supply (i.e., Milk River Ridge Reservoir).

[E] Describe how the existing Chin reservoir affects downstream users, including junior license holders, municipal and industrial uses, and Indigenous communities. Discuss:

a) past and existing contracts that SMRID has entered into with non-irrigators to supply water for domestic, commercial, or industrial uses; and
b) whether alternative (non-irrigation) water contracts have been explored for water above current SMRID requirements up to SMRID total license allocation.

[F] Detail historic and planned water conservation practices adopted by SMRID and the outcomes on the water balance, including:

a) total water volume realized through efficiency gains over the past ten years;
b) how past water savings gained through efficiency improvements are currently stored and/or returned to natural systems; and
c) a description of the need for additional storage considering past and future gains realized through conservation and efficiency practices.

[G] Discuss the current need for the Project including:

a) the need for drought mitigation and climate resiliency;
b) rural and regional economic development objectives;
c) changes in agricultural practices on lands using the water supply from SMRID and on lands currently without a secure water supply; and
d) enhancement of public recreational opportunities.

[H] Describe and provide maps and/or drawings of the components of the Project, including, but not limited to:

a) the proposed dam structure;
b) existing East Dam;
c) existing infrastructure, leases, and clearings;
d) proposed facilities, buildings and infrastructure (e.g., pipelines and utilities);
e) temporary structures;
f) transportation and access routes;
g) containment structures;
h) sources of aggregate resources, borrow material and other construction material and locations of any stockpiles that will be developed if known;
i) waste and debris storage area and disposal sites;
j) borrow pits;
k) the water supply system, and the existing Waterton-St. Mary Headworks System;
l) water conveyance structures;
m) reservoirs;
n) total potential areas to be flooded in extreme (e.g., 1 in 100-year and 1 in 300-year) flood scenarios; and
o) water wells/intakes, pipelines, and storage structures.

[I] Discuss the alternatives for the Project and the rationale for not selecting the identified alternatives.

[J] Discuss the implications of a delay in proceeding with the Project, or any phase of the Project, or not going ahead with the Project.

[K] Discuss the overall positive and negative economic, environmental, and social impacts of the Project.

[L] Provide the adaptive management approach that will be implemented throughout the life of the Project. Include how monitoring, mitigation and evaluation were incorporated.

[M] Provide a list of commitments SMRID has made. This would include any mitigation, monitoring and operational commitments made as part of this assessment.

2.2 Constraints

[A] Discuss the process and criteria used to identify constraints to development, and how the Project was designed to accommodate those constraints. Including the following:
a) any applicable *Alberta Land Stewardship Act* Regional Plan, sub-regional plan;
b) any approved water management plan enacted under the *Water Act*;
c) watershed plan;
d) apportionment agreement with downstream provinces, and how the apportionment commitments are met;
e) management plan implemented by Watershed Planning and Advisory Councils and/or Watershed Stewardship Groups;
f) applicable municipal plans;
g) the Government of Alberta Rural Economic Development Action Plan;
h) Indigenous traditional land and water use;
i) land use policies and resource management initiatives that pertain to the Project;
j) the environmental setting;
k) results of project-specific and regional monitoring; and

l) potential for changes in the regulatory regime.

[B] Describe the process and criteria used and options considered to select sites for project components, including:
a) the dam;
b) water conveyance structures;
c) the source of water;
d) borrow sites; and
e) material disposal sites, including materials from the existing East Dam.

[C] Provide a list of project components for which locations will be determined later. Discuss the selection criteria that will be used to determine the specific location of these.

[D] Describe the potential effects of raising the full supply level on the West Dam, Chin Chute, Chin Power Plant, Chin conduits, and the Stafford Reservoir.

[E] Describe roads, pipelines, well sites, power lines, or other infrastructure that may be affected by the Project.

[F] Document communication with the owner of the infrastructure regarding potential impacts and relocation requirements and other measures required to mitigate permanent or short-term impacts.

[G] Describe proposed protection, relocation, or reconstruction of infrastructure and measures proposed to mitigate impacts during construction.

[H] Describe public lands that may overlap with the Project.

[I] Describe the cumulative effects of the Project in combination with any other activities in the Regional Study Area.

2.3 Regional and Cooperative Efforts

[A] Discuss SMRID's involvement in regional and cooperative efforts to address environmental and socio-economic issues associated with regional development.

[B] Describe opportunities for sharing infrastructure (e.g., access roads, utility corridors, water infrastructure) with other resource development stakeholders. Provide rationale where these opportunities will not be implemented.

[C] Discuss potential cooperation with other parties regarding water related infrastructure and management including, but not limited to, water supply, water intakes, pipelines, water storage and withdrawals, flow monitoring and reporting and ecological monitoring.

2.4 Transportation Infrastructure

[A] Assess the geotechnical impacts of the Project on rate of retrogression and overall stability of the Highway 36 Chin Coulee landslide (identified as site S005 in Transportation and Economic Corridors' Geohazard Risk Management Program).

[B] Describe the potential effects of raising the full supply level on the Highway 36 causeway.

[C] Discuss the potential impacts of the Project to Highway 36, as well as the bridge crossing the Chin reservoir, including:

a) freeboard impacts, wave/wind run-up impacts, ice impacts, bank erosion impacts, scour impacts, and structural capacity; and
b) conceptual solutions to address any adverse effects. Include a cost assessment that considers initial costs and predicted operation and maintenance costs.

[D] Prepare a Traffic Impact Assessment as per the latest Transportation and Economic Corridors' *Traffic Impact Assessment Guidelines* (https://open.alberta.ca/publications/traffic-impact-assessment-guidelines), including the following:
a) describe and map the Project boundary, internal road network, and any existing or proposed access location to/from the provincial highway system;
b) discuss the options considered for the proposed highway access locations and provide rationale for selecting the preferred option;
c) discuss compatibility of the preferred option with Transportation and Economic Corridors' future highway plans;
d) describe existing and future background traffic and development traffic, and consider the cumulative effects from other existing and planned developments that are or will be using the same highways and highway accesses;
e) consider the potential traffic impacts for all stages of the Project (e.g., construction, operations, expansion, shutdown, etc.), and determine any necessary improvements to maintain the safe operations of the highway intersection and access road infrastructure; and
f) provide a schedule for undertaking the necessary improvements prior to commencing the Project.

[E] Describe any project infrastructure (e.g., utilities and facilities that cross or in close proximity to a provincial highway) that may impact the provincial highways, and any effects from the Project (e.g., smoke, dust, light, noise, precipitation, etc.) that may impact the highway users, and provide solutions.

[F] Provide a summary of any discussions with Alberta Transportation and Economic Corridors in regard to the Project and its traffic impacts.

[G] If the Project involves the transport of dangerous goods by trucks, include the following:
a) state the classes, divisions, and characteristics of the dangerous goods; and
b) state where the dangerous goods will be transported to.

2.5 Air Emissions Management

[A] Discuss the selection criteria used, options considered, and rationale for selecting mitigation measures to minimize air emission and ensure air quality management.

[B] Provide emission profiles (type, rate, and source) for the Project's construction and operating emissions including point and non-point sources, area, mobile and fugitive emissions. Discuss:
a) odorous and visible emissions from the Project;
b) greenhouse gas emissions during all stages of the Project. Identify the primary sources and provide calculations;
c) amount and nature of criteria air contaminants emissions; and
d) control technologies and mitigative measures used to reduce emissions.

2.6 Dam Safety

[A] Describe how the Project will adhere to the Alberta Dam and Canal Safety Directive and include:

a) the Project components and scope;
b) the overall approach for design and technical specification;
c) any hypotheses and assumptions used;
d) data collection methods, models and studies;
e) the degree of uncertainty, reliability and sensitivity of models used to reach conclusions; and
f) any gaps in knowledge and understanding related to key conclusions, including steps to address these gaps.

[B] Describe the physical characteristics of the proposed reservoir, including:

a) normal operating range;
b) spatial extent/overlap into other tributaries, if any;
c) surface area at the maximum normal reservoir level;
d) normal operating water volume; and
e) the volume between the maximum normal reservoir level and the minimum normal reservoir level.

[C] Describe the consequence classification of the Project and its appurtenant structures.

[D] Describe preliminary design of the proposed structures, including:

a) characteristics of the proposed site, including field and lab test results and geotechnical properties;
b) principal dimensions of the structures and related works including spillway/ outlet structures;
c) anticipated quantities of materials required for construction;
d) seepage control and drainage provisions for both the dam and rim of the proposed reservoir extension;
e) stability under usual and unusual loading conditions; and
f) freeboard requirements.

[E] Describe expected performance of the dam and its appurtenant structures during and after extreme weather events (e.g., floods, earthquakes, etc.) including:

a) ability of the structures (e.g., earth dams, diversions, flow control) to withstand those events and potential challenges and mitigation measures;
b) potential challenges that could impact the safety of the proposed structures; and
c) proposed measures to mitigate challenges identified.

[F] Describe construction activities of the proposed structures including:

a) site clearing and grubbing;
b) construction and operation of any temporary structures required (e.g., cofferdam, river diversion, etc.) if any;
c) excavation and stockpiling of suitable material, including drilling, blasting, sorting and screening in rock quarries, and moisture conditioning of impervious material;
d) excavated slope stabilization and foundation preparation;
e) placing impervious lining and erosion protection;
f) installation of instrumentation, mechanical and electrical equipment; and

g) testing and commissioning.

[G] Describe decommissioning, removal and/or reclamation of the existing or temporary structures including:
a) removal of temporary structures (e.g., coffer dams etc.); and
b) breach/removal of any existing structures.

[H] Describe the operation of structures including:
a) approach used for first filling of the reservoir;
b) debris management during reservoir filling;
c) shoreline stabilization during reservoir filling, including potential impacts with higher reservoir water levels on the reservoir shoreline;
d) operation, maintenance and surveillance needs for safe operation of the structures;
e) expected fluctuations in the reservoir and its impacts; and
f) approach to manage the reservoir in usual and unusual conditions.

[I] Provide details regarding potential accidents or malfunctions, including:
a) identification of potential accidents and malfunctions that could occur during all stages of the Project's construction (e.g., cofferdam leakage or failure or other dam safety incidents);
b) description of the effects of a failure by tabulating the flow arrival time at downstream of the structures until the estimated contents of the reservoir are within the estimated 100-year flood level; and
c) assessment of the potential for cascade failure and the impacts of such a cascade failure if there are other dam or canal structures located downstream.

2.7 Water Management

2.7.1 Water Supply

[A] Describe the water supply requirements for the Project as it relates to the source of water for the reservoir, including:
a) the water requirements and sources for normal operation of the reservoir. Identify the volume of water to be diverted from each source;
b) the variability in the amount of water required on an annual and seasonal basis as the Project is implemented;
c) the expected water balance prior to and resulting from the Project including, but not limited to:
    i) total annual diverted volumes of water,
    ii) volume of water lost from canals and reservoirs,
    iii) volume of return flows,
    iv) licensed volumes used for other purposes than irrigation (e.g., agricultural and industrial water convenance agreements),
    v) volume of remaining license water available for crop use, and
    vi) volumes of consumptive use;
d) a complete water balance for the reservoir (including existing and proposed using historical hydrologic data [especially watershed natural runoff yield and natural flow]);
e) a discussion of assumptions made or methods chosen to arrive at the water balances; and

f) the expected cumulative effects on water losses/gains resulting from the Project's operations.

[B] Describe the water supply requirements for the Project as it relates to process and/or potable water needs during construction, operation and/or decommissioning, including:

a) the process water, potable water, and non-potable water requirements and basin water supply sources for construction and normal operation of the reservoir. Identify the volume of water to be withdrawn from each source and potential changes in the operation of upstream water supply reservoirs;
b) potable water treatment systems for all stages of the Project;
c) type, quantity, and process of potable water treatment chemicals used; and
d) measures for ensuring efficient use of water such as water use minimization, recycling, conservation, and technological improvements.

2.7.2 Surface Water

[A] Describe the surface water management strategy for all stages of the Project, including:

a) plan for diverting water during decommissioning of the existing East Dam and subsequent filling of the expanded reservoir upon completion of the new dam;
b) design factors considered, such as:
    i) site drainage,
    ii) run-on management,
    iii) road run-off,
    iv) erosion/sediment control,
    v) geotechnical stability concerns,
    vi) surface water protection and groundwater interaction,
    vii) waterbody dewatering,
    viii) groundwater seepage, and
    ix) flood protection;
c) permanent or temporary alterations or realignments of watercourses, waterbodies, and wetlands (including the relevance of the Alberta Wetland Policy); and
d) the pre- and post-disturbance alignment and condition of ephemeral and permanent streams, wetlands and waterbodies including those created by the Project.

[B] Describe and map roadway, pipeline, powerline and other utility crossings of watercourses, wetlands, or waterbodies.

2.7.3 Wastewater Management

[A] Describe the types and characteristics of wastewater that will be generated during the Project.

[B] Describe the wastewater management strategy for each wastewater type generated during all stages of the Project, including:

a) the criteria used, options considered and rationale for the selection of wastewater treatment and wastewater disposal and a discussion of why the other options were not chosen;
b) the proposed mitigation and monitoring measures (water management and wastewater management treatment systems) to protect water quality; and
c) design of facilities that will collect, treat, store and release wastewater streams.

2.8 Waste Management

[A] Describe the types and characteristics of waste that will be generated during all stages of the Project.

[B] Discuss the selection criteria used, options considered, and rationale for waste disposal during construction and decommissioning. Include:

a) the location and availability of on- and off-site waste disposal; and
b) site suitability from a water quality protection perspective, geotechnical perspective and with regard to existing and potential human activities.

[C] Characterize and quantify the anticipated dangerous goods, hazardous, non-hazardous, and recyclable wastes generated by all phases of the Project, and describe:

a) the composition and volume of specific waste streams and discuss how each stream will be managed; and
b) plans for pollution prevention, waste minimization, recycling, and management to reduce waste quantities for all stages of the Project.

[D] Describe the nature and amount of on-site hydrocarbon storage. Discuss containment and other environmental protection measures.

2.9 Conservation and Reclamation

[A] Provide a conceptual conservation and reclamation plan for all phases of the Project. Describe and map as applicable:

a) borrow pits;
b) waste material disposal sites;
c) temporary roadways or utility corridors;
d) any other disturbance;
e) current land use and capability and proposed post-development land use and capability;
f) anticipated timeframes for completion of reclamation stages including an outline of the key milestone dates for reclamation and how progress to achieve these targets will be measured;
g) constraints to reclamation such as timing of activities, availability of reclamation materials and influence of natural processes and cycles including natural disturbance regimes;
h) a revegetation plan for the disturbed terrestrial, riparian, and wetland areas;
i) reclamation material salvage, storage areas, and handling procedures; and
j) existing and final reclaimed site drainage plans.

[B] Discuss, from an ecological perspective, the expected timelines for establishment and recovery of vegetative communities and wildlife habitat, the expected success of establishment and recovery, and the expected differences in the resulting communities.

[C] Describe how SMRID considered the use of progressive reclamation in project design and reclamation planning.

[D] Discuss uncertainties related to the conceptual reclamation plan.

3 ENVIRONMENTAL ASSESSMENT

3.1 Air Quality and Noise

3.1.1 Baseline Information

[A] Identify residences or other facilities that could be affected by air emissions, dust, noise or vibration from construction, operation, and decommissioning.

[B] Discuss baseline air quality conditions including appropriate ambient air quality parameters and baseline noise conditions.

[C] Discuss baseline soil drifting from the footprint of the reservoir during current reservoir draw-down.

3.1.2 Impact Assessment

[A] Identify construction and operational components of the Project that have the potential to increase noise levels or affect air quality.

[B] Discuss the nature, severity, extent, and duration of activities likely to produce noise, vibration, dust, or affect air quality that could impact residences, livestock, other facilities or receptors during construction and operation.

[C] Assess the probability of soil drifting during reservoir draw-down from the expanded reservoir.

[D] Discuss the frequency, severity, and potential impacts of dust generation.

[E] Describe how air quality, dust, and noise impacts resulting from the Project will be mitigated.

[F] Discuss the Project's relative contribution to cumulative effects on regional air quality and noise.

3.2 Hydrogeology

3.2.1 Baseline Information

[A] Provide an overview of the existing geologic and hydrogeologic setting. Document new hydrogeological investigations, including methodologies, analysis, results, and interpretations undertaken as part of the EIA, and:

a) present regional and project area geology to illustrate depth, thickness and spatial extent of lithology, stratigraphic units, and structural features; and
b) describe and review the geology of the region and project area, including both surficial and bedrock units (both aquifer and non-aquifer units).

[B] Present regional and project area hydrogeology describing:

a) the major aquifers, aquitards and aquicludes (quaternary and bedrock), their spatial distribution, properties, hydraulic connections between aquifers, hydraulic heads, gradients, groundwater flow directions and velocities, include maps and cross sections;
b) the chemistry of groundwater aquifers including baseline concentrations of major ions, metals and hydrocarbon indicators;

c) the potential groundwater discharge zones, potential sources and zones of groundwater recharge, areas of groundwater-surface water interaction and areas of quaternary aquifer-bedrock groundwater interaction; and
d) an inventory of water well development and groundwater use.

[C] Provide a detailed review and inventory with site reconnaissance for the entire project area to determine what boreholes are present, including:
a) a determination of which party will be responsible for the cost of decommissioning and if replacement is required. Identify where the new wells will be installed;
b) an outline of how decommissioning will be completed. Identify what regulatory authorizations are required for the replacement of existing water wells; and
c) details of the compensation requirements if new wells cannot be installed.

[D] Describe the potential for current seeps or flows from watercourses (permanent and intermittent) bringing overland agricultural contaminated runoff into the current channel or the proposed reservoir expansion.

3.2.2 Impact Assessment

[A] Describe project components and activities that have the potential to affect groundwater resource quantity and quality at all stages of the Project.

[B] Describe the nature and significance of the potential project impacts on groundwater with respect to:
a) inter-relationship between groundwater and surface water in terms of surface water quantity and quality;
b) implications for terrestrial or riparian vegetation, wildlife and aquatic resources including wetlands;
c) changes in groundwater quality, quantity, and flow;
d) conflicts with other groundwater users, and proposed resolutions to these conflicts;
e) groundwater protection including reclaiming wells in the Project area prior to construction of the Project;
f) potential implications of seasonal variations;
g) groundwater withdrawal for project operations, including expected alterations in the groundwater flow regime during and following project operations; and
h) a discussion of the groundwater vulnerability below the proposed reservoir expansion and along the meltwater valley channel.

[C] Detail the proposals, and/or mitigation strategies to protect the potential contamination of groundwater aquifers.

[D] Discuss the Project's relative contribution to cumulative effects on regional groundwater with respect to:
a) changes in regional groundwater quality and quantity; and
b) conflicts with regional groundwater users.

3.3 Hydrology

3.3.1 Baseline Information

[A] For the local and regional study areas:

a) describe the rationale used to define the local and regional study areas considering the location and range of probable project and cumulative effects;
b) provide maps illustrating the boundaries of the local and regional study areas;
c) describe meteorological conditions;
d) describe and map the surface hydrology; and
e) describe the sediment yield.

[B] Provide an inventory of surface water users who have existing approvals, permits or licenses in the local and regional study areas, including traditional agricultural and household users.

[C] Describe baseline surface water quantity characteristics, including:
a) seasonal variation, low, average, and peak flows for watercourses; and
b) low, average, and peak levels and trends for the waterbodies impacted by the Project.

3.3.2 Impact Assessment

[A] Identify project activities that may affect surface water during all stages of the Project, including site preparation, construction, operation, decommissioning and reclamation.

[B] Discuss potential hydrological changes (in terms of quantity, extent, and duration) to watersheds due to the project implementation, including changes in:
a) surface and near-surface drainage conditions;
b) channel regime (during minimum, average and peak flows);
c) water levels in water bodies and water courses;
d) evaporation, transpiration and seepage amounts;
e) sediment transport and yield; and
f) open-water surface areas.

[C] Describe the extent of hydrological changes that will result from potential changes to groundwater and surface water movement, and:
a) include changes and timing of those changes to the quantity of surface flow and water levels in watercourses (during minimum, average and peak flows) and water levels in waterbodies, and wetlands;
b) assess the potential impact of alterations in flow and water levels on local or regional hydrology and identify temporary and permanent alterations or disturbances;
c) assess changes in runoff rates and volumes before, during and after construction of the Project; and
d) identify changes in erosion including changes in sedimentation in watercourses resulting from the Project.

[D] Describe how water conservation objectives may be adversely affected with the development of the Project.

[E] Describe the impacts on other surface water users resulting from the Project. Identify any potential water use conflicts.

[F] Discuss how potential impacts of temporary and permanent roads on wetland hydrology will be minimized and mitigated.

[G] Describe mitigation measures to address surface water quantity impacts during all stages of the Project including:

a) alteration in flow regimes;
b) potential flood events; and
c) potential water use conflicts.

[H] Discuss the Project's relative contribution to cumulative effects on regional water quantity (e.g., timing, volume, peak and minimum flow rates of water courses, waterbody levels).

[I] Discuss the impact of low flow conditions and in-stream flow needs on water supply and water and wastewater management strategies.

3.4 Surface Water Quality

3.4.1 Baseline Information

[A] Describe the baseline water quality of water courses and water bodies (current Chin Reservoir and downstream (natural or man-made) bodies of water). Discuss the effects of seasonal and flow variations, other controlling factors, and temporal and spatial trends. Include water quality for high flow events (1 in 20-year and 1 in 100-year and 1 in 300-year) under current conditions. Consider appropriate water quality parameters (e.g., metals, nutrients, pesticides, temperature, BOD/TOC, bacteria, aquatic and benthic invertebrates, aquatic plants, algae, dissolved oxygen, etc.) Provide a summary of existing information available from literature review(s).

[B] Describe and map the current point and identify non-point sources in the Project area.

[C] Describe all the current water uses of the Chin Reservoir (e.g., flood storage, fish habitat, hydroelectric, municipal discharge, recreation, etc.)

3.4.2 Impact Assessment

[A] Identify project activities that may affect surface water during all stages of the Project (including site preparation, construction, operation, maintenance, decommissioning and reclamation). Determine the local and regional extent of potential impacts as well as their frequency, duration, magnitude, and seasonality.

[B] Describe and predict the potential impacts of the Project (during site preparation, construction, operation, maintenance decommissioning and reclamation) on surface water quality of the current Chin Reservoir and downstream (natural or manmade) bodies of water using modelling or other scientifically defensible approach, including:

a) changes in water quality that may exceed the Environmental Quality Guidelines for Alberta Surface Waters, the Canadian Water Quality Guidelines, the Federal Environmental Quality Guidelines or mainstem reaches in the Surface Water Quality Management Framework included as part of the South Saskatchewan Regional Plan;
b) changes in concentrations, loading amounts, and timing of key water quality parameters including routine parameters that could impact the current Chin Reservoir and downstream (natural or manmade) bodies of water, including:
    i) impacts on their use as a drinking water supply, recreation, agriculture, domestic use, aesthetics, and other water uses,
    ii) potential implications to water quality on the current Chin Reservoir and downstream (natural or manmade) bodies of water due to the water drawn during the initial filling of the Project,

iii) potential implications to aquatic resources (e.g., aquatic and benthic invertebrates, biota, vegetation, algae, biodiversity, habitat),
iv) changes in water quality due to seasonal and flow variation;
v) groundwater and surface water interactions,
vi) changes in the quality of surface water runoff,
vii) implications to the health and extent of riparian lands,
viii) impacts in the event of a catastrophic failure of the structure, and
ix) impact on creek banks during flood events;

c) the level of uncertainty derived from the models and tools used in the analysis; and
d) any limitations of expected water quality on municipal/domestic use, recreational use, fisheries, stock watering or other uses.

[C] Describe the water quality expected in the Project and downstream (natural or manmade) bodies of water. Include water quality for high flow events (1 in 20-year and 1 in 100-year and 1 in 300-year) under expected reservoir conditions.

[D] Describe the potential and implications for metals (e.g., lead, arsenic, cadmium, selenium, and mercury) methylation in the Project to:

a) enter the aquatic food chain, including downstream in the Project and downstream (natural or manmade) bodies of water; and
b) impact treatment of water from the Project and downstream (natural or manmade) bodies of water for drinking water purposes.

[E] Describe the potential and implications for organic carbon and nutrient management in the Project, based on the proposed operating regime to:

a) Impact treatment of water the Project and downstream (natural or manmade) bodies of water for drinking water purposes (e.g., disinfection by-products); and
b) impact productivity of aquatic vegetation (e.g., macrophyte, algae).

[F] Describe the potential and implications for cyanobacteria/microcystin in the proposed Chin Reservoir to:

a) impact treatment of water from the Project and downstream (natural or manmade) bodies of water for drinking water purposes; and
b) impact recreation of the Project and downstream (natural or manmade) bodies of water.

[G] Describe the potential and implications for release and contamination of hydrocarbons and associated materials from pipelines and other oil and gas infrastructure, farm infrastructure and/or contaminated surface soil or subsoil in the area, on water quality and aquatic environment.

[H] Describe mitigation measures to address surface water quality impacts during all stages of the Project including:

a) alteration in flow regimes;
b) potential flood events;
c) potential water use and operations conflicts; and
d) increased loading of water quality parameters of concern.

[I] Provide a summary of the management plan to prevent or reduce impacts to surface water, and a spill response plan should an accidental release occur.

[J] Discuss the contribution of the Project to cumulative effects on water quality, including downstream (natural or manmade) bodies of water, and discuss the implications to the South Saskatchewan Region - Surface Water Quality Management Framework and any other regional initiatives.

[K] Discuss the impact of low flow conditions and in-stream flow needs on water quality and water and wastewater management strategies.

3.5 Aquatic Ecology

3.5.1 Baseline Information

[A] Describe and map the fish, fish habitat, and other aquatic resources (e.g., aquatic, and benthic invertebrates) for water bodies and watercourses and other waters affected by the Project that may provide habitat for fish. Describe the species composition, distribution, relative abundance, quantitative population estimates, seasonal movement trends, and general life history parameters.

[B] Identify fish species that are:

a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Protected Areas);
b) listed as threatened or 'Endangered' under the *Alberta Wildlife Act*;
c) listed as 'Threatened' or 'Endangered' under Schedule 1 the federal *Species at Risk Act;*
d) listed as 'Threatened' or 'Endangered' by Committee on the Status of Endangered Wildlife in Canada (COSEWIC); and
e) species of cultural significance.

[C] Quantitatively describe the current extent of aquatic habitat. Describe and map fish habitat and aquatic resources in water bodies and watercourses and identify:

a) key indicator fish species and provide the rationale and selection criteria used;
b) habitat used by fish, whether seasonally or year-round, for water bodies and watercourses and other connected water bodies that may provide habitat for fish, including critical or sensitive areas such as spawning, rearing, and over-wintering habitats;
c) water quality parameters in water bodies and watercourses that may affect suitability for fish; and
d) current and potential use of the fish resources by Indigenous peoples or sport fisheries.

3.5.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to fish, fish habitat, and other aquatic resources, including but not limited to:

a) change in habitat suitability and availability during construction and operation of the Project;
b) survival of eggs and fry, chronic or acute health effects, and increased stress on fish populations from release of contaminants, sedimentation, flow alterations, temperature and habitat changes;
c) changes to riparian areas that could affect aquatic biological resources and productivity;

d) changes to benthic invertebrate communities that may affect food quality and availability for fish;
e) the potential for increased fragmentation of aquatic habitat;
f) potential water quality and quantity changes;
g) acidification and/or eutrophication;
h) groundwater-surface water interactions; and
i) potential for thermal plumes to affect aquatic habitat.

[B] Identify the key indicator fish species and provide the rationale and selection criteria used.

[C] Discuss the design, construction, and operational factors including specific diversion and reservoir operations that will be incorporated into the Project to minimize impacts to fish and fish habitat and protect aquatic resources.

[D] Identify plans proposed to offset a reduction in the productivity of fish habitat. Indicate how environmental protection plans address applicable provincial and federal policies on fish habitat protection.

[E] Discuss the potential impacts of new water control structures on seasonal fish movements relative to baseline conditions.

[F] Discuss the potential effects on fish and fish habitat during the filling of the expanded reservoir and decommissioning of the existing East Dam.

[G] Discuss the potential for aquatic invasive species to occur and the potential for the Project to affect occurrence or distribution of these species. Describe measures to monitor for and remove aquatic invasive species should they be encountered during project works.

[H] Discuss the potential increase in fishing pressures that could arise from the improved access from the Project in the region and how the sport fishery could change.

[I] Identify plans proposed to offset any loss in the productivity of fish habitat. Indicate how environmental protection plans address applicable provincial and federal policies on fish habitat including the development of a no net loss fish habitat objective.

[J] Describe the effects of surface water withdrawals and water diversions including the impacts to:
a) St. Mary, Oldman, Waterton, and Belly Rivers, and
b) cumulative effects on fish, fish habitat and other aquatic resources.

[K] Discuss changes in the aquatic environment with predicted climate change scenarios, with and without the Project in the local and regional study areas.

3.6 Terrain and Soils

3.6.1 Baseline Information

[A] Describe and map the terrain and soil resources, including:
a) surficial geology and topography;
b) soil types and their distribution;
c) soils that could be affected by the Project;
d) specific locations of erosion sensitive and saline-sodic soils; and
e) an inventory of geohazards, such as erosion, landslides, floods etc.

3.6.2 Impact Assessment

[A] Describe project activities and other related issues that could affect soil quality (e.g., wetting/drying/rewetting of soil, salinization, silt accumulation, soil crusting, compaction, anaerobic decomposition of organic matter, contaminants) and:

a) indicate the amount (ha) of surface disturbance from the Project construction, operation, and decommissioning activities;
b) indicate the size and location of soil types and land capability classes that will be disturbed;
c) describe potential sources of soil contamination (e.g., industry infrastructure and activities, agricultural infrastructure and activities, contaminated sites, etc.), along with the appropriate remedial measures;
d) describe the impact of the Project on soil types and reclamation suitability and the approximate volume of soil materials that are salvaged for reclamation. Discuss constraints or limitations to achieving vegetation/habitat reclamation based on anticipated soil conditions (e.g., compaction, contaminants, salinity, soil moisture, nutrient depletion, erosion, etc.);
e) discuss potential changes to the rate and type of soil erosion;
f) discuss potential changes to slope instability, wind erosion, and other geohazards; and
g) discuss the relevance of changes for the local landscape on biodiversity, productivity, ecological integrity, aesthetics, and future use.

[B] Discuss the potential impacts caused by the mulching and storing woody debris considering, but not limited to, vulnerability to fire, degradation of soil quality and increased footprint.

[C] Provide a mitigation plan including:

a) possible measures to minimize surface disturbance;
b) possible actions to mitigate effects of constraints or limitations to habitat reclamation;
c) possible actions to address impacts to land capability; and
d) any other measures to reduce or eliminate the potential impacts that the Project may have on soil capability and/or quality and include:
    i) soil mapping and typical profiles,
    ii) losses of agricultural soils,
    iii) erosion issues, and
    iv) characteristics related to handling, reclamation of site disturbances.

3.7 Vegetation

3.7.1 Baseline Information

[A] Describe and map the vegetation communities, native grasslands, wetlands, wetland habitat, riparian lands, rare plants, invasive species, and communities of rare and scarce distribution. Identify the occurrence, relative abundance and distribution and identify any species that are:

a) listed as “at Risk, May be at Risk and Sensitive” in the *General Status of Alberta Wild Species* (Alberta Environment and Protect Areas);

b) listed as threatened or 'Endangered' under the *Alberta Wildlife Act*;
c) listed as 'Threatened' or 'Endangered' under Schedule 1 of the federal *Species at Risk Act*;
d) listed as 'Threatened' or 'Endangered' by COSEWIC;
e) species tracked by the Alberta Conservation Information Management System (ACIMS) as being SU, S1, S2, S3;
f) rare ecological communities as tracked by ACIMS, and
g) traditionally used species.

[B] Discuss the potential of each ecosite phase or ecological range site to support rare plant species, plant species of cultural significance, and plant communities of limited distribution. Consider their importance for local and regional habitat, rare plant habitat and the hydrologic regime.

[C] Describe the regional relevance of landscape units that are identified as rare.

[D] Describe and quantify the current extent of habitat fragmentation.

[E] Describe and quantify the local and regional relevance of native grassland, and:
a) discuss the distribution and relative abundance of native grassland units;
b) discuss locations and size of native grassland units;
c) characterize the flora and fauna of the native grassland units; and
d) evaluate and discuss native grassland integrity.

3.7.2 Impact Assessment

[A] Identify the area of each vegetation community mapped, including various native grassland plant communities, that would be permanently lost due to the Project.

[B] Identify and quantify areas that will be temporarily lost to the Project and will be reclaimed (e.g., access routes).

[C] Discuss the predicted changes to upland, native grassland, riparian, and wetland habitats resulting from increased fragmentation.

[D] Identify areas that will be avoided during construction.

[E] Discuss the potential project impacts on rare plants, endangered species, or rare ecological communities, and describe any required regulatory authorizations and/or possible mitigation plans/strategies needed to address these impacts.

[F] Describe and assess the potential impacts of the Project on vegetation communities considering:
a) both temporary (include timeframe) and permanent impacts;
b) the potential for introduction and colonization of weeds and non-native invasive species and how those species will be managed;
c) potential increased fragmentation and loss of upland, native grassland, riparian and wetland habitats;
d) implications of vegetation changes for other environmental resources (e.g., terrestrial and aquatic habitat diversity and quantity, water quality and quantity, erosion potential); and
e) the species that will be used in reclaiming areas disturbed during construction and for erosion control and site stabilization.

[G] For temporary disturbances, discuss from an ecological perspective, the expected timelines for establishment and recovery of vegetative communities and the expected differences in the resulting vegetative community structures.

[H] Describe how the Alberta Wetland Policy was considered in the assessment of impacts, including but not limited to:

a) avoidance, minimization, reclamation or replacement of wetlands in accordance with the Alberta Wetland Mitigation Directive;
b) temporary and permanent alterations (direct and indirect) to wetlands classified under the Alberta Wetland Classification System;
c) any expected changes in wetland class or type and cause for this change; and
d) consideration of cumulative effects in the watershed to wetlands.

[I] Discuss the effect of a loss or development of wetlands and riparian areas, including how the loss or development will affect land use.

[J] Discuss the regional significance of the indirect effects of the conversion of native grassland pasture to tame pasture or cultivated lands with an increase in water availability.

3.8 Wildlife and Wildlife Habitat

3.8.1 Baseline Information

[A] Describe and map current and potential wildlife resources (amphibians, reptiles, birds, and terrestrial and aquatic mammals). Describe species relative abundance, distribution and their use and potential use of habitats. Also identify species that are:

a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Protected Areas);
b) listed as threatened or 'Endangered' under the Alberta *Wildlife Act*;
c) listed as 'Threatened' or 'Endangered' under Schedule 1 of the federal *Species at Risk Act;*
d) listed as 'Threatened' or 'Endangered' by COSEWIC;
e) migratory bird species listed under the *Migratory Birds Convention Act*; and
f) species of cultural significance.

[B] Describe and map existing wildlife habitat and habitat disturbance including assessment activities. Identify habitat disturbances that are related to existing and approved projects.

3.8.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to wildlife, wildlife habitats, and biodiversity considering:

a) how the Project will affect wildlife relative abundance, habitat availability, habitat fragmentation, mortality, movement patterns, and distribution for all stages of the Project, including a prediction of future use due to habitat alteration;
b) how improved or altered access may affect wildlife, including future prediction of wildlife use and movements, potential obstruction of movements, and increased vehicle wildlife collisions;
c) how altered habitat conditions (loss, change, fragmentation) may effect wildlife and biodiversity values. Consider habitat change (e.g., riparian), the availability of

habitat and the influence of anthropogenic features and infrastructure on wildlife movements and predator-prey relationships;
d) the contribution of the Project to changes in regional biodiversity and the impact to local and regional ecosystems;
e) potential effects on wildlife resulting from changes to air and water quality, including both acute and chronic effects to animal health;
f) how the risk to wildlife and habitat can be managed, including the use of setbacks; and
g) the resilience and recovery capabilities of wildlife populations and habitats to disturbance.

[B] Provide a strategy and mitigation plan to avoid or minimize effects on wildlife and wildlife habitat for all stages of the Project considering:
a) consistency of the plan with applicable regional, provincial and federal wildlife habitat objectives and policies;
b) a schedule for the return of habitat capability to areas temporarily affected by the Project;
c) the use of setbacks to protect habitat and connectivity of habitat for species of conservation concern;
d) anticipated access controls or other management strategies to protect wildlife during construction and operation;
e) measures to prevent human-wildlife encounters and consequent destruction of wildlife; and
f) habitat fragmentation and habitat connectivity resulting from linear features (e.g., above ground canals, roads etc.) and other project infrastructure and activities.

[C] Identify opportunities for habitat creation or enhancement which may occur as a result of the Project.

[D] Identify the key wildlife and habitat indicators used to assess project impacts. Discuss the rationale for their selection.

3.9 Climate Change

3.9.1 Baseline Information

[A] Describe climate norms and variability as they relate to agricultural productivity in the Project area.

[B] Identify elements of the Project that are sensitive to changes or variability in climate parameters, including frequency and severity of extreme weather events and discuss the potential impacts over the life of the Project.

3.9.2 Impact Assessment

[A] Describe and assess the greenhouse gas emissions during construction, operation, and decommissioning phases of the Project.

[B] Estimate the impacts of the Project to carbon sequestration capacity, including impacts on sequestration in soil and water systems across the expanded reservoir.

[C] Discuss the benefits and consequences of the Project on the affected area with regards to its ability to counteract climate change impacts and the associated risks.

[D] Evaluate the feasibility of the Project under scenarios of climate change, including and explanation of :

a) how drier conditions would affect the long-term viability of local agriculture with and without the Project;
b) how potential adverse effects of excess rainfall events will be mitigated by the Project; and
c) how changes to the volume and timing of spring runoff and river flows may affect the supply of water from the St. Mary's River and/or the Milk River Ridge Reservoir and the risks posed to water availability for the Chin Reservoir.

[E] Review and discuss potential changes in local climate under multiple climate projections, and:

a) identify representative climate change scenarios that reflect a full range of future climate variability (e.g., wet and dry conditions); and
b) evaluate relative changes in climate indices (e.g., annual/seasonal precipitation and temperature) between baseline and future periods.

[F] Describe potential effects of climate change on water demands and supply, including:

a) changes in water demand for irrigation;
b) potential changes in flow and impacts on downstream watercourses and waterbodies; and
c) a description of adaptations (e.g., reservoir operation) to climate change for sustainable water resource management.

3.10 Land Use and Management

3.10.1 Baseline Information

[A] Describe and map the ownership status of the subject lands, including lands owned by the Crown, local municipalities, and patented lands. Describe and map the current land uses in the Project area, including private land, Crown land dispositions, and Crown land reservations.

[B] Describe and map the existing land and resource uses and potential conflicts that exist considering oil and gas development, renewable energy production, agriculture, tourism, Indigenous uses, and outdoor recreational activities.

[C] Identify and map unique sites or special features such as Parks and Protected Areas, Heritage Rivers, Historic Sites, Environmentally Significant Areas, culturally significant sites, and other designations (e.g., World Heritage Sites, Ramsar Sites, Internationally Important Bird Areas).

[D] Identify land use policies and resource management initiatives that pertain to the Project and discuss how the Project will be consistent with the intent of these initiatives.

[E] Describe and map land clearing activities, showing the timing of the activities.

[F] Describe existing access control measures.

3.10.2 Impact Assessment

[A] Identify the potential impacts of the Project on land uses, including:
- a) unique sites or special features;
- b) effects caused by changes in public access, including secondary effects related to increased hunter, angler and other recreational access, and access to traditional use sites;
- c) the implications of relevant land use policies and resource management initiatives for the Project, including constraints to development; and
- d) the anticipated changes (type and extent) to the topography, elevation, and drainage pattern within the Project area.

[B] Identify existing private land uses that would be impacted by the Project and describe the:
- a) area of land affected and the nature of the impact;
- b) opportunities for mitigation and compensation, including the cost of implementation; and
- c) procedures that will be followed in compensating landowners for lands required for the Project and for associated damages or disturbances.

[C] Discuss possible mitigation strategies to address:
- a) the need for, and plans to address, access management during and after project operations (public, traditional use);
- b) the process for addressing the needs of other land users in the Project area; and
- c) project effects that may lead to changes in land use.

[D] Provide a fire control plan highlighting;
- a) fire prevention, detection, reporting, and suppression measures, including proposed fire equipment; and
- b) measures taken to ensure continued access for firefighters to adjacent wildland areas.

4 HISTORIC RESOURCES

4.1 Baseline Information

[A] Provide a brief overview of the regional historic resources setting, including a discussion of the relevant archaeological, historic and palaeontological records.

[B] Describe and map known historic resource sites in the Project area, considering:
- a) site type and assigned Historic Resource Values; and
- b) existing site-specific *Historical Resources Act* requirements.

[C] Provide an overview of previous Historic Resources Impact Assessments that have been conducted within the Project area, including:
- a) a description of the spatial extent of previous assessment relative to the Project area, noting any assessment gap areas; and
- b) a summary of *Historical Resources Act* requirements and/or clearances that have been issued for the Project to date.

[D] Identify locations within the Project area that are likely to contain previously unrecorded historic resources. Describe the methods used to identify these areas.

[E] Describe consultation with Alberta Arts, Culture and Status of Women concerning the program and schedule of *Historical Resources Act* requirements for the Project, including:
a) any historic resources issues raised during consultation on the Project; and
b) any *Historical Resources Act* programs required to evaluate and mitigate the impacts on historic resources.

4.2 Impact Assessment

[A] Provide a summary of the results of any Historic Resources Impact Assessments that have been conducted for the Project.

[B] Describe the Project components and activities, including all ancillary activities, that have the potential to affect historic resources at all stages of the Project.

[C] Describe the nature and magnitude of the potential project impacts on historic resources, considering:
a) effects on historic resource site integrity; and
b) implications for the interpretation of the archaeological, historic and palaeontological records.

5 TRADITIONAL ECOLOGICAL KNOWLEDGE AND TRADITIONAL LAND USE

[A] If consultation with Indigenous groups reveals traditional use areas and spiritual sites within lands affected by the Project, provide:
a) a map and description of traditional land use areas including fishing, hunting, trapping, water use (e.g., for drinking, cooking and navigation) and nutritional, medicinal, or cultural plant harvesting by affected Indigenous peoples (if the Indigenous community or group is willing to have these locations disclosed); and
b) a map of cabin sites, spiritual sites, cultural sites, graves and other traditional use sites considered historic resources under the *Historical Resources Act* (if the Indigenous community or group is willing to have these locations disclosed), as well as traditional trails and resource activity patterns.

[B] Discuss the species, abundance and availability of vegetation, fish and wildlife used for food, traditional, medicinal, and cultural purposes in the identified traditional land use areas, considering all project related impacts.

[C] Discuss access for traditional uses during all stages of the Project.

[D] Describe how TEK and Traditional Land Use information was incorporated into the Project, EIA development, the conservation and reclamation plan, monitoring and mitigation.

[E] Determine the impacts of the Project on traditional, medicinal, and cultural land use and identify possible mitigation strategies.

6 PUBLIC HEALTH AND SAFETY

6.1 Public Health

[A] Describe aspects of the Project's activities and emissions during construction and operation that may have implications for public health or the delivery of regional health services.

[B] Conduct a human health risk assessment following guidance from Alberta Health for project components that have implications for public health and describe the results of this or, provide a qualitative assessment of potential risks.

[C] Document health concerns raised by stakeholders during consultation on the Project.

[D] Document health concerns identified by Indigenous communities or groups resulting from impacts of existing development and of the Project, specifically on their traditional lifestyle. Include an Indigenous receptor type in the assessment.

6.2 Public Safety

[A] Describe aspects of the Project that may have implications for public safety. Specifically:

a) describe the emergency response plan including public notification protocol and safety procedures to ensure public safety and minimize adverse environmental effects, including emergency reporting procedures for spill containment and management;
b) document any safety concerns raised by stakeholders during consultation on the Project and the actions taken to address those concerns;
c) describe how local residents will be contacted during an emergency and the type of information that will be communicated to them;
d) describe the existing agreements with area municipalities or industry groups such as safety cooperatives, emergency response associations, regional mutual aid programs and municipal emergency response agencies or other industry partner emergency response/spill response agreements; and
e) describe the potential safety impacts resulting from higher regional traffic volumes.

[B] Discuss mitigation plans to safeguard workforce and public safety for the construction and operation of the Project.

7 SOCIO-ECONOMIC ASSESSMENT

7.1 Baseline Information

[A] Describe the existing socio-economic conditions in the region and in the communities in the region.

[B] Describe factors that may affect existing socio-economic conditions including:

a) population changes;
b) workforce requirements for all stages of the Project, including a description of when peak activity periods will occur;
c) planned accommodations for the workforce for all stages of the Project. Discuss the rationale for their selection;
d) the SMRID's policies and programs regarding the use of local, regional and Alberta goods and services;

e) the Project schedule; and
f) the overall engineering and contracting plan for the Project.

[C] Describe the socio-economic contribution of current agricultural operations (irrigated and non-irrigated) in the local and regional study areas including:
a) historic and current livestock operations;
b) historic and current cropping patterns;
c) historic and current irrigated acreages; and
d) other agricultural uses (e.g., greenhouses).

[D] Describe the current impacts of drought on agricultural operations in the local and regional study area including:
a) revenue losses (e.g., productivity loss and forced timing of sale of products);
b) drought-related costs (e.g., emergency water supply, and trucking of livestock and feed);
c) impacts to operations (e.g., forced herd reduction);
d) costs related to drought recovery; and
e) long term community impacts.

[E] Describe the process used to establish rates ($/unit water) for supplying water to irrigated crop producers, and include:
a) current water rates (2020-2022); and
b) forecast water rates following the Project.

[F] Describe the socio-economic impacts of the current wetlands within the Project area.

7.2 Impact Assessment

[A] Describe the socio-economic impacts of construction and operation of the Project on:
a) land owners;
b) agricultural productivity;
c) local and regional infrastructure and community services;
d) availability and quality of health care services;
e) local training, employment and business opportunities;
f) housing;
g) recreational activities; and
h) First Nations and Métis (e.g., traditional land use and social and cultural implications).

[B] Provide a discussion as to which communities will benefit from the Project.

[C] Discuss opportunities to work with Indigenous communities and groups, other local residents, and businesses regarding employment, training needs and other economic development opportunities arising from the Project.

[D] Provide the estimated total project cost, including a breakdown for engineering and project management, equipment and materials, and labour for both construction and operation stages, including maintenance of the Project. Indicate the percentage of expenditures expected to occur in the region, Alberta, Canada, outside of Alberta, and outside of Canada.

[E] Provide an estimate of the costs and benefits of providing livestock watering facilities supported from the Project as it relates to improved range management and livestock production.

[F] Provide an estimate of the Project's impact on current irrigators (e.g., increased output, more stable output, increased demand, water rates) and impact on average annual farm income.

[G] Provide details on the total number of existing and new irrigable acres to be serviced by the Project, including the costs and benefits of expanding irrigable acres.

[H] Discuss considerations made by irrigation districts when evaluating requests to add new irrigated parcels.

[I] Provide an estimate of the nature and cost of the development of recreational infrastructure.

[J] Provide a benefit/cost analysis of the Project, including costs of construction, operation, and maintenance, increase value of agricultural production, indirect and induced benefits (livestock production, food processing etc.), recreational activities and sport fisheries. Present a sensitivity analysis of assumptions used to generate these values.

[K] Identify non-quantifiable benefits and costs expected during the life of the Project. Discuss how these might affect the overall project benefit/cost analysis.

[L] Provide an estimate of the wetland losses and gains related to the Project and the economic costs and benefits considering Alberta's current wetland policy.

8 MITIGATION MEASURES

[A] Discuss mitigation measures planned to avoid, minimize, or eliminate the potential impacts for all stages of the Project.

[B] Identify the mitigation objectives for each associated impact and describe those mitigation measures that will be implemented. Provide rationale for their selection, including a discussion on the effectiveness of the proposed mitigation.

9 RESIDUAL IMPACTS

[A] Describe and characterize the residual impacts of the Project following implementation of SMRID's mitigation measures and SMRID's plans to manage those residual impacts.

10 ACCIDENTS AND MALFUNCTIONS

[A] Describe the potential challenges that could impact the safety of the proposed structures and proposed mitigation measures (e.g., during excavations, during reservoir filling, debris management, operations, maintenance and surveillance philosophy, performance under extreme weather events [floods, tornados, etc.], emergency preparedness and response, etc.).

11 MONITORING

[A] Describe the surface water quality monitoring program that will be implemented to assess the future impacts of construction and operation (including maintenance) of the expanded reservoir and decommissioning of the existing East Dam. Consider appropriate water quality parameters (e.g., metals, nutrients, pesticides, temperature, BOD/TOC, bacteria,

aquatic and benthic invertebrates, aquatic plants, algae, dissolved oxygen, etc.) and their spatial (e.g., lateral and depth) and temporal (e.g., seasonal) flow variations.

[B] Describe SMRID's current and proposed monitoring programs, including:

a) how the monitoring programs will assess any project impacts and measure the effectiveness of mitigation plans. Discuss how SMRID will address any project impacts identified through the monitoring program;
b) how SMRID will contribute to current and proposed regional monitoring programs;
c) monitoring performed in conjunction with other stakeholders, including Indigenous communities and groups;
d) new monitoring initiatives that may be required as a result of the Project;
e) regional monitoring that will be undertaken to assist in managing environmental effects and improve environmental protection strategies;
f) how monitoring data will be disseminated to the public, Indigenous communities, or other interested parties; and
g) how the results of monitoring programs and publicly available monitoring information will be integrated with SMRID's environmental management system.