Water Act Application No. DAPP0071185
NRCB Application No. 2401

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1 Acronyms

The following acronyms are used in this Supplemental Information Request.

AAAQO	Alberta Ambient Air Quality Objectives
AAD	Average Annual Damage
AAF-IDWQ	Alberta Agriculture and Forestry-Irrigation District Water Quality
AER	Alberta Energy Regulator
AET	Actual evapotranspiration
BUOW	Burrowing Owl
CBA	Cost benefit analysis
CMIP	Coupled Model Intercomparison Project
COPC	Contaminant of Potential Concern
C&R	Conservation and Reclamation
CSM	Conceptual Site Model
EC	Electrical conductivity
ECCC	Environment Climate Change Canada
EIA	Environmental Impact Assessment
EPA	Environment and Protected Areas
ESA	Environmental site assessment
FSL	Full Supply Level
FTE	Full-time equivalent
GDP	Gross domestic product
GoA	Government of Alberta
HHRA	Human Health Risk Assessment
HRIA	Historic Resources Impact Assessment
HRMB	Historical Resources Management Branch
HRV	Historic Resource Value
IDF	Inflow Design Flood
IDP	Intermunicipal Development Plan
IO	In-stream objectives
km	kilometre
LSA	Local Study Area
m	metre
MDP	Municipal Development Plan
MK	Mann Kendall
MRRR	Milk River Ridge Reservoir
PET	Potential evapotranspiration
pHRIA	Paleontological Historical Resources Impact Assessment
PMF	Probable maximum flood
PPT	Precipitation
RID	Raymond Irrigation District
RSA	Regional Study Area
SAGE	Southern Alberta Group for the Environment
SAR	Sodium adsorption ratio
SIR	Supplemental Information Request
SMK	Seasonal Mann Kendall
SMRID	St. Mary River Irrigation District
SPEI	Standard Precipitation Evapotranspiration Index
SSRP	South Saskatchewan Regional Plan
SWQMF	Surface Water Quality Management Framework
TBR	Technical Baseline Report

TDS	Total Dissolved Solids
TN	Total Nitrogen
TEK	Traditional ecological knowledge
TOC	Table of Contents
TOR	Terms of Reference
TP	Total Phosphorus
TSS	Total Suspended Solids
TRV	Toxicity Reference Values
WCO	Water conservation objectives
WQI	Water Quality Index

2 Natural Resource Conservation Board

2.1 General

1. Environmental Impact Assessment Report Summary, Section 1.3, Page 2 and 3;
Volume 1, Section 1.9, Page 13-15;
Volume 2, Section 2.2.3.2.3, Page 30;
Volume 3, Section 3, Page 34

St. Mary River Irrigation District (SMRID) states that the intent of the Project is to *boost the level of resilience of the agricultural sector, municipal water supply, and theenvironment against the effects of climate change and extreme drought events*. Much of the project rationale (1-1.9) focuses on enhancing water security and optimizing storage to benefit water users and the environment. SMRID further states that *A key positive effect of the Project is that increased storage will assist in supplying water to the region during water-scarce years, while reducing pressure for GoA to increase diversions from rivers*, referencing studies conducted by WaterSmart Solutions (2023) and AMEC (2014). However, the objective of the socio-economic analysis was to assess and contrast the social and economic benefits achieved by expanding the irrigation area by converting existing dryland farms to irrigated acreage, and explicitly did not assess the impacts of climate change. Toward the expansion of irrigated acreage, SMRID refers to modelling work carried about by WaterSmart Solutions Ltd. (2023) that indicated that the Project could support up to 63,333 new acres of irrigated land, but Raymond Irrigation District (RID) and SMRID opted for the Project to support up to 46,500 of new irrigated acres.

a. Rank the priorities of the Project as they relate to irrigation expansion, water security, flood and drought mitigation, habitat, or recreation and provide rationale behind this ranking.

b. Describe the volumes of water that will be held in the expanded reservoir that will be attributed to the ranked priorities, as live storage volumes.

c. Provide rationale toward not including climate change impacts in the socio-economic modelling when water security in the face of climate change was stated as important rationale behind the Project.

d. Explain why model scenario(s) focusing explicitly on water security for existing users or assessing the economic value of stored water for drought mitigation were not included in the socio-economic assessment.

e. Provide the WaterSmart Solutions Ltd. (2023) and AMEC (2014) reports.

2. Volume 1, Section 1.2.1, Table 1.1 and 1.2, Page 6;
Volume 1, Section 1.6.2, Page 11;
Volume 2, Section 2.2.1, Page 24;
Volume 4-1, Section 1.1, 1.3, Page 1-3

SMRID defines the Regional Study Area (RSA) for hydrology as starting from the headworks of the Milk River Ridge Reservoir (MRRR), noting that the MRRR and other upstream reservoirs are operated by the Government of Alberta (GoA). SMRID defends that there will be no expected effects on licensees or river flows because the GoA will not increase water allocations in the basin and controls diversions from reservoirs to meet water conservation objectives (WCO) or in-stream objectives (IO). Maps of the RSA and the Local Study Area (LSA) referred to in Volume 4-1 Hydrology Technical Baseline Report (TBR) as Map Figures 1.1 and 1.2 were not provided. The SMRID states that their combined license allocation is 890,574 dam^3 from the Belly, Waterton and St. Mary Rivers. The water licenses from these systems that are presented in Tables 1.1 and 1.2 have conditions in place that constrain diversions, effectively limiting access to water, should instream flow requirements (per WCOs or IOs) not be met. Consequently, there exists a risk to the Project of utilizing the full extent of Chin Reservoir for additional storage during periods of drought and water shortage; however, this reality is not reflected in the Environmental Impact Assessment (EIA).

a. Provide maps of the LSA and RSA (Map Figures 1.1 and 1.2) for the hydrology baseline study.

b. Provide additional detail on how water is diverted from the source systems identified in SMRIDs water licenses (i.e. Belly, Waterton, and St. Mary Rivers) ultimately into the Milk River Ridge Reservoir.

c. Provide the range and average of monthly diversion rates from the Waterton-St. Mary's headworks to the MRRR, and from the MRRR to the SMRID works for a 30-year period up to and including 2023.

d. Present the proportion of time, on a monthly basis, that the flow in the Belly, Waterton, and St. Mary rivers is below the respective WCO/IOs for these systems over a 30-year period up to and including 2023.

e. Present the proportion of time, on a monthly basis, that diversions of SMRID were restricted over a 30-year period up to and including 2023.

f. Justify why the RSA was chosen to only include the SMRID irrigation works in the context of risks to the Project from constrained water supply.

g. Support the assumption that climate change will not substantively impact flows in the source rivers relative to their respective WCO or IO in the context of risks to the Project.

3. Volume 1, Section 1.4-1.8, Page 8-12

SMRID mentions carbon sequestration and carbon emissions but did not quantify a carbon balance or assess greenhouse gas emissions during the three phases of the Project.

a. Identify the sources and quantities of greenhouse gas emissions during all three phases of the Project.

b. Provide an estimate of the influence the Project will have on carbon sequestration and/or emissions through changes to the project area.

4. Volume 1, Section 1.4-1.8, Page 8-12;
Volume 2, Section 2.2.3.2.1, Page 30

SMRID states that *potential effects of the Project on the water supply for licensees, river flows, or the sustainability of waterbodies downstream of the diversion are not expected to be attributed to the project* and that *Project-related effects on river flows, transboundary apportionment, riverine and riparian habitat, communities, recreation, and water licencees downstream from the Waterton-St. Mary Headworks System are not expected*.

a. Provide a quantitative water balance to justify these statements, including:
   i. the range and average of total annual diversion from the Waterton-St. Mary's Headworks toward the Milk River Ridge Reservoir over a 30-year period up to and including 2023.
   ii. the range and average of total annual discharge from Waterton-St. Mary's Headworks into St. Mary's River over a 30-year period up to and including 2023.
   iii. the range and average total annual discharge at the St. Mary River near Lethbridge, Oldman River near Lethbridge, Oldman River near the Mouth, and South Saskatchewan River transboundary hydrometric stations over a 30-year period up to and including 2023.
   iv. estimated annual volumes of water diverted from Waterton-St. Mary's Headworks to SMRID as a result from the project, with respect to the increased amount required to fill Chin Reservoir following expected annual drawdowns.
   v. the estimated change in annual water discharged to the St. Mary's River downstream of Saint Mary's Reservoir resulting from the Project.

b. Assess the significance of impact of the Project case on water quantity at downstream locations.

5. Volume 1, Section 1.10, Page 15;
Volume 3, Section 2.1, Figure 4, Page 26-28;
Volume 3, Section 3.1, Page 34;
Volume 4-5, Section 2.1, Page 2;
Volume 4-6, Section 2.1, Page 2

SMRID defines the RSA for the socio-economic assessment to include a conversion of land to irrigated land within the RID and SMRID and identifies four target areas for irrigated agriculture expansion. Volume 4-5 TBR (Soils and Terrain), Section 2.1, broadly includes Chin Coulee and a 100 m buffer as the extent of the LSA and does not describe a RSA. Volume 4-6 TBR (Vegetation and Wetlands), Section 2.1, broadly includes Chin Coulee and a 100 m buffer as the extent of the LSA and does not describe a RSA. SMRID also aligns the Project with components of the South Saskatchewan Regional Plan (SSRP) that refer to water supply, water management, and Alberta's Irrigation Strategy, but does not mention alignment with the conditions placed on converting grasslands to irrigated agriculture.

a. Provide maps of the irrigation expansion areas.

b. Demonstrate that sufficient area is available for irrigation expansion by summarizing land use and land capability in the expansion areas, including:
   i. cumulative areas of dryland agriculture, irrigated agriculture, native grassland, and tame pasture in the expansion areas.
   ii. cumulative areas within each irrigation capability category in the expansion areas.

c. Justify including an assessment of the economic benefits and costs of cropping changes over a regional area without an assessment of soils and vegetation over a regional area.

d. Explain what constraints exist toward irrigation area expansion with respect to irrigation capability and grassland conversions.

6. Volume 1, Section 2, Page 27-42;
Volume 2, Section 4.2, 4.3, Page 159-170;
Volume 5, Section 2, 2.6

SMRID reports much, but not all, of the information required in final Terms of Reference Section 2.6 and Section 2.3 of the *Information required for Environmental Impact Assessment of the 2018 Alberta Dam and Canal Safety Directive*. Instead of specifics, SMRID refers several supplementary technical reports that are not publicly accessible.

a. Complete and provide final Terms of Reference Section 2.6 and Section 2.3 of the Alberta Dam and Canal Safety Directive.

b. Provide the following reports:
   i. Klohn Crippen Berger Ltd. (KCB). 2023. Chin Reservoir Expansion - New East Dam Preliminary Design Report. Prepare for MPE Engineering Ltd. and St. Mary River Irrigation District. December 2023.
   ii. Matrix Solutions Inc. (Matrix). 2019. 2018 Chin Reservoir Dam Safety Review – Chin 1 Dam (West) and Chin 2 Dam (East). Prepared for the St. Mary Irrigation District by Matrix Solutions Inc. with Tetra Tech Inc, Calgary, Alberta.
   iii. MPE. 2022. Chin Reservoir Expansion, Chin Outlet – Conceptual Design Options. Report for: St. Mary River Irrigation District.
   iv. MPE Engineering Ltd. (MPE). 2020. Chin Reservoir Expansion Conceptual Design Report. September 2020. Final Report for: St. Mary River Irrigation District.
   v. WaterSMART 2023. Hydrological Modelling to Evaluate Changes in Streamflow Availability in the St. Mary River Watershed. Prepared by WaterSMART Water Management Solutions for St. Mary River Irrigation District. Lethbridge, Alberta.

7. Volume 1, Section 2.1, Page 27;
Volume 1, Section 2.4, Page 31-33;
Volume 1, Section 2.5, Page 34-38;
Volume 1, Section 2.6.1, Page 38 and 39;
Volume 2, Section 2.2.2, Page 25

SMRID describes elevations of the pre- and post-construction elements of the Chin Reservoir, but it is difficult to interpret in text format, and states that *the estimated storage volume in the Reservoir Expansion Area (i.e., between the Existing East Dam and the New East Dam) at El. 864 m is approximately 76,400 dam^3*. However, based on the elevations described, the new reservoir appears to hold a significant volume of water that would be rendered inaccessible when the water level goes below the elevation of the decommissioned old East Dam. The volumes of water that would be accessible to the SMRID as live storage versus inaccessible as dead storage with a drop in water level is not clearly defined. Further, there is no clear summary of the water balance for the existing and expanded reservoirs presented.

a. Provide cross-sectional figure(s) that clearly represent the design elements of the inlet structure, current east dam, decommissioned old East Dam, New East Dam, and existing and refurbished west dam, including:
   i. base elevations;
   ii. crest elevations;
   iii. full supply level (FSL) elevation;
   iv. spillway elevations;
   v. inlet elevations from Chin chute and the hydropower facility;
   vi. target maintained FSL of Stafford Reservoir;
   vii. elevations of base and crest of the west dam of Stafford Reservoir.

b. Provide expected annual volumes of water that are held as:
   i. live storage volumes in the expanded Chin Reservoir comparing FSL to the mean and minimum drawdown levels;
   ii. dead storage volumes in the expanded Chin Reservoir as the volume that would be rendered inaccessible during low-flow periods.

c. Provide average water balances, in terms of annual cumulative volumes, for the existing and expanded Chin Reservoir, estimating:
   i. inputs from the main canal, precipitation, surface runoff, and groundwater discharge.
   ii. outflows to Stafford Reservoir, evapotranspiration, and seepage or recharge.

8. Volume 1, Section 2.5, Page 34-38;
Volume 1, Section 2.7, Page 40-42;
Volume 2, Section 2.7.4, Page 111-119;
Volume 2, Section 2.8, Page 125-143

SMRID estimates that the construction process is expected to occur over four years and proposes an incremental filling schedule to occur over three years. SMRID describes land acquisition and infrastructure relocation requirements to mitigate impacts to existing infrastructure but does not provide details on potential impacts to project scheduling. The filling schedule is prescribed to occur over three years to optimize flow rates into the reservoir with consideration of water supply and restricts reservoir filling between April 1 and August 31 to mitigate potential impacts of filling on migratory birds. SMRID further describes a variety of monitoring and mitigation options to minimize and assess the impacts of construction on ecosystem components. However, the aggregate monitoring actions described in the EIA and the scheduling of the Project phases relative to the monitoring and mitigation actions is difficult to follow.

a. Provide a detailed, consolidated schedule that shows the phasing, overlapping, and dependencies of the Project construction, including:
   i. land clearing;
   ii. access road construction;
   iii. rerouting of transmission lines;
   iv. rerouting of oil and gas pipelines;
   v. replacement of pumphouses and private water intakes;
   vi. decommissioning of water wells;
   vii. abandonment and potential remediation of oil and gas wells;
   viii. refurbishment of the Chin Chute and West Dam of Chin Reservoir;

ix. construction of temporary works, such as laydown, borrow, stockpile and waste areas;
x. construction of the New East Dam and Auxiliary Spillway; and
xi. old East Dam decommissioning.

b. Provide a detailed, consolidated summary and schedule of monitoring and mitigation activities that corresponds with the construction and operation schedule, including:
   i. scheduling of reservoir filling and monitoring actions for wildlife impact mitigation;
   ii. monitoring for aquatic ecosystem impacts and fish mercury content;
   iii. monitoring for impacts to groundwater and surface water quality; and
   iv. monitoring for soil erosion, weed control, and revegetation efficacy.

c. Describe how and the frequency with which the results of the monitoring actions will be communicated to affected stakeholders and be used to inform adaptive management practices for the project.

9. Volume 1, Section 2.7, Page 40–42;
Volume 2, Section 2.8.4 and 2.8.5, Pages 131–139;
Volume 3

SMRID cites the construction cost of the Project as $190 million as part of the socio-economic assessment. SMRID describes in many cases that compensation will be used as their mitigation option for altered land uses, including acquisition of private crop and grazed lands, and acquisition of land area for oil and gas wells. SMRID also describes the potential need for rerouting of pipelines or other utilities in the inundation zone. However, it is not apparent whether the costs of land acquisition and associated activities (e.g. rerouting utilities or decommissioning oil and gas wells) are factored into the Project costs and into the cost equation for the socio-economic assessment. The estimated costs of land acquisition and other activities may impact the viability of the Project if not adequately addressed in the cost-benefit models.

a. Provide a copy of the report that was used to estimate the Project costs.

b. Provide a rating of the Project design level and the corresponding cost contingency value.

c. Provide a breakdown of estimated project costs, including cost estimates for constructing the New East Dam, decommissioning the old East Dam, land acquisitions, pipeline rerouting or reinforcement, water well decommissioning, oil and gas well decommissioning, utilities rerouting, relocation of water intakes, and any other activities in the Project Area (PA) and LSA.

d. Provide the documentation for the status of communications made with owners of the lands or infrastructure required by the Project regarding potential impacts, relocation requirements, compensation, or any other mitigation measures.

e. Identify the parties responsible for relocating or decommissioning affected infrastructure in the project area.

f. Provide cost-benefit results (i.e., sensitivity analysis) for:
   i. construction costs without contingency, and
   ii. construction costs including contingency.

10. Volume 1, Section 2.5.4, Page 36;
Volume 1, Section 2.5.5, Page 36 and 37;
Volume 3, Section E.1, Page 106;
Volume 3, Section E.4, Page 107

SMRID states in Volume 1, Section 2.5.4 that *a four-year construction duration is assumed as the Stage 1 embankment construction may not be completed in the first year because the dam foundation preparation, cutoff trench excavation, grout curtain, and blanket drain construction may require the Stage 1 embankment construction to extend to the second year of construction*. SMRID states in Volume 1, Section 2.5.5 that *the filling schedule would have the Reservoir Expansion Area filled to 856 m by the summer of the third annual filling cycle*. However, assumptions made in the cost-benefit analysis of the socio-economic assessment as described in Volume 3, Appendix E were that *The life of the project was assumed to be 50 years after the completion of construction activities. It was assumed that construction would take place during the initial 3 years;* it was *Assumed that construction expenditures would be divided into 3 years as follows: Year 1 – 50%, Year 2 – 25%, and Year 3 – 25%.*; and that *Irrigation activity was assumed to start in the fourth year.*

a. Clarify the expected scheduling of irrigation commencement given an expected four-year construction duration followed by a three-year reservoir filling process.

b. Clarify the beginning of the expected 50-year life of the Project relative to construction completion, end of reservoir filling and/or beginning of irrigation from the expanded reservoir.

c. Clarify the timing of benefits expected from flood mitigation, drought mitigation, livestock development, and expanded crop irrigation relative to the construction schedule.

11. Volume 1, Section 2.7.11, Page 40 and 41;
Volume 2, Section 2.8.4.2.3, Map Figure 2.8.19, Page 135 and 136;
Volume 2, Section 4.3.2, Page 169 and 170;
Volume 2, Appendix 1, Table I-3;
Volume 2, Appendix 11;
Volume 2, Appendix 12

SMRID states in Section 2.7.11 that *As per Directive 020 issued by the Alberta Energy Regulator (AER 2023), the oil and gas infrastructure found within the coulee is to be removed...* and abandonment of the wells according to AER Directive 020 is discussed as a mitigation measure against the introduction of deleterious substances into the expanded reservoir. Section 2.8.4.2.3 (page 135 to 136) states *eight pipelines intersect the PA… six will be affected by the Expanded Reservoir*, a statement supported in Map Figure 2.8.19 that shows six pipelines in the expansion area. However, Section 4.3.2 states *The coulee crossings of two abandoned utility corridors (CNRL and Ridal), and one active pipeline (InterPipeline) are to be inundated* and states that *Should a breach result in pipeline content entering the reservoir, the water would not be released from the reservoir until the water was remediated*. The pipeline stress level of three Inter Pipeline crude oil pipelines is rated as 63% - 79%. No discussion on the more likely or impactful mitigation measures, between rerouting pipelines versus minimizing access to affected water supply until remediated, is made in the EIA.

a. Discuss the status of mitigation measures toward decommissioning and remediation of the oil and gas wells in the inundation zone presented in Appendix 11.

b. Discuss the risk of pipeline failure if the pipelines are left in place given the characteristics and stress levels of the pipelines presented in Appendix 12.

c. Discuss the potential for impact to the reservoir water from pipeline infrastructure in the context of the existing pipeline stress levels, and describe the mitigation options (e.g., rerouting vs. restricted water use, etc.) in terms of likelihood of occurrence and costs of impacts.

d. Discuss the projected cost of impacts owing to the mitigation option of retaining water from a reservoir if a pipeline failure is encountered and compare against the cost of rerouting the pipelines.

12. Volume 2, Section 2.5, Page 63-73

The SMRID describes reclamation suitability ratings for soils within the project area and quantifies soil volumes by broad management classes but omits details with regards to overall soil management and placement for the project.

a. Provide the estimated volumes of soil and surface land area that are associated with each operational area of the Project (e.g. dam fill waste area, auxiliary spillway).

b. Provide the calculated volume of soil that is expected to be salvaged for reclamation purposes from each operational area.

c. Provide details on which operational project areas will undergo reclamation and estimate the volume of soil needed for reclamation purposes.

13. Volume 2, Section 2.3.3.2, Page 35-37;
Volume 2, Section 2.3.5.1, Page 39-42;
Volume 4-2, Section 2.2.2, Page 11 and 12;
Volume 4-5, Section 2.4, Page 4;
Volume 4-5, Section 3.4, Table 3.3, Page 18

SMRID states that the incremental filling of the Expanded Reservoir is expected to create water quality conditions … *similar to those observed in Watercourse 126419*… and that *concentrations and behaviors within Watercourse 126419 to serve as a probable analog of the Chin Reservoir Expansion Area* (Volume 2, Section 2.3.5.1.1). In effect, they use two pooled water sources downstream of the existing East Dam in Watercourse 126419 to represent the impact of flooded soils on reservoir water quality during filling. Best practice to assess potential impacts of flooded areas is to characterize and analyze the different soil types existing in the inundation area for all target indicators of soil quality and estimated impacts to surface waters (e.g., heavy metals, salts). However, there are no relationships made to the different soil types that exist in the new flooded area and the two water sources sampled. There exist eight (8) different soil series in the flooded area, and the differences or similarities of these soil types on water quality upon inundation are not made clear.

a. Map and describe the location of the two pooled water samples relative to the soil series identified in the Soils and Terrain baseline report.

b. Using the soil quality and descriptions, justify the representativeness of the two pooled water samples to represent the impact of inundated soil and reservoir water quality.

14. Volume 2, Section 2.2.3.1.2, Table 2.3, Page 29;
Volume 4-2, Section 2.2.1, Table 2.1, Page 6-9

SMRID presents a comprehensive list of surface and groundwater water licenses in the LSA and RSA for surface water quality and a list of local water users that draw water from the Chin Reservoir shoreline as part of their assessment of effects from the Project. However, the information is not presented clearly to support a decision of impacts to surface and groundwater licensees directly affected by an expansion of Chin Reservoir. Further, the potential project effects on local water users does not specify impacts to surface and groundwater users in the reservoir expansion area or downstream of the New East Dam on Watercourse 126419.

a. Tabulate the surface water and groundwater license holders that exist in the project area (i.e., reservoir inundation zone) that would be directly affected by the reservoir expansion, including the authorization number, date, licensee name, license volume, water source, and purpose of the water use.

b. Estimate the project effects on and mitigation options for downstream surface water users within Watercourse 126419 through the reduction of catchment area directing runoff to the downstream impoundments, including details on:
   i. total remaining allocations for surface water uses in Watercourse 126419 following the Project; and
   ii. estimating the reduction in annual water volumes in Watercourse 126419 owing to the reduction of catchment area to this watercourse.

c. Estimate the impacts to and mitigation options for groundwater users in the LSA and RSA in or adjacent to reservoir expansion area in terms of direct impacts through the loss of water wells in the inundation area and indirect impacts due to expected impact of the reservoir on local aquifers.

15. Volume 2, Section 2.3.2.2, Page 34;
Volume 4-1, Table 2.1, Page 5;
Volume 4-2, Appendix I, Table I.1 - I.9, Page I-1 - I-9

SMRID concludes that the *Water in the Chin Reservoir was neutral to slightly alkaline, hard, with moderately low TDS. No guideline exceedances reported for several parameters (CCME 1999, GoA 2018a), except for fecal coliforms in July 2021*. This conclusion does not specify the water use that the guidelines referred to and appears to assume irrigation water uses. In all Chin Reservoir samples, at least one sample exceeded livestock water guidelines for phenols, but no discussion on these exceedances are presented in the EIA. No reference was made to drinking water quality guidelines, despite water users drawing water directly from the reservoir for consumption.

a. Provide an estimated total volume of livestock water use from the Chin Reservoir or downstream SMRID canals, based on the surface water licenses presented in Table 2.1 of Volume 4-1 TBR.

b. Discuss the relative impact of phenols on livestock health at the concentrations observed in the reservoir or other SMRID monitoring stations.

c. Compare the measured values of water quality parameters to the Canadian Drinking Water Quality Guidelines (2022).

16. Volume 2, Section 2.2-2.3, Page 24-42;
Volume 5, Section 2, 2.7.1 [B]

Information on the process and/or potable water needs during construction, operation and/or decommissioning was not provided.

a. Discuss the process water and potable water requirements for construction and operation of the reservoir as requested in the final Terms of Reference.

17. Volume 2, Section 2.3.6, Page 41 and 42;
Volume 2, Section 2.4.2.2.4, Page 48;
Volume 2, Section 2.4.4.2.4, Page 58 and 59;
Volume 2, Appendix 7, Page 1-18;
Volume 4-3, Section 4.1, Page 22 and 23;
Volume 4-3, Section 5.1, Page 50;
Volume 4-3, Section 3.5.2.2, Page 20;
Volume 5, Section 3, 3.4.2 [D]

SMRID states that the *reservoir is expected to reach equilibrium with no significant difference in water quality within a year* based upon a mass-balance study conducted by INTERA Incorporated. However, SMRID also estimates that *… it is expected that mercury concentrations in fish at Chin Reservoir will increase for approximately 4–6 years before beginning to decline*, based on observations at other regional reservoirs. The water quality analysis conducted by INTERA was used, in part, to assess methylation of mercury. INTERA states that a simple linear relationship exists between concentrations and flow for the inflows, which was used as rationale to average the different inflow types and for deciding that storm events did not have to be explicitly modeled. INTERA further deemed sediment exchange as a negligible input and did not address whether this included the potential for groundwater inputs. Best practice is to maintain distinct input and outputs into the mass-balance model, regardless of overall importance to the results, and to incorporate a storm hydrograph into the modeled loading via surface inflows.

a. Provide a summary of all input data used in the model, including concentration and flow for each:
   i. input type including canal inflow, runoff, precipitation, and sediment exchange (or groundwater discharge)
   ii. output type including outflow to Stafford Reservoir, evapotranspiration, and leakage (or groundwater recharge)

b. Provide justification as to why groundwater input was not considered in the mass balance model, considering the presence of four flowing artesian wells exist in the reservoir expansion area (Volume 4-3 TBR: Section 4.1, Section 5.1) and shallow discharge from shallow overburden flow (Volume 4-3 TBR: Section 3.5.2.2);

c. Justify the assumption of linearity in the concentration and flow relationship for all inputs into the reservoir.

d. Explain how the mass (g) of each parameter can effectively double for all indicator parameters while concentrations remain effectively unchanged.

e. Justify the use of the mass-balance model toward addressing the potential for transformation and methylation of the indicator metals, requested per final Terms of Reference 3.4.2 [D].

18. Volume 2, Section 2.4, Page 43-62;
Volume 5, Section 3, 3.5.2 [A] (i) and [K]

While the information provided in Section 2.4 of Volume 2 covers most of the potential impacts regarding fish, fish habitat and other aquatic resources, some topic areas requested in the final Terms of Reference were not referenced.

a. Discuss whether there is potential for thermal plumes, and if relevant, how it would affect aquatic habitat.

b. Discuss potential changes in the aquatic environment based on the climate change scenarios, within and without the Project.

19. Volume 2, Section 2.5.2, Page 64;
Volume 2, Section 3.1, Page 151;
Volume 4-5, Section 3.6.2, Table 3.10-3.11, Page 22-24;
Volume 5, Section 3, 3.1.1 [C];
Volume 5, Section 3, 3.1.2 [C]

SMRID states in Section 3.1 that *Air emissions from the Project would be limited to the construction phase only, as no air emissions will be associated with the operation of the Project* and states in Section 2.5.2 states *Wind erosion risk for the LSA soil map units range from low on low relief moderately fine textured soils, to moderate and high in areas of moderately coarse to coarse textured soils.* SMRID discusses that the majority of soils in the LSA have a moderate wind erosion risk. However, the intent of the air quality assessment requested in the final Terms of Reference question it is about estimating the magnitude, extent, frequency, and duration of soil drifting during drawdown at the current and expanded reservoirs; in effect, creating air emissions during the operational phase of the project.

a. Discuss baseline soil drifting from the footprint of the reservoir during current reservoir draw-down.

b. Assess the probability of soil drifting during reservoir draw-down from the existing reservoir and the expanded reservoir in the operational phase of the Project.

20. Volume 2, Section 2.8.4.5, Page 137 and 138;
Volume 2, Section 2.8.6, Page 139–143

SMRID describes a regulatory details section that states *…identify the municipal and provincial regulations and policies that were considered pertinent to the proposed Project design*. However, SMRID does not indicate whether the Project is in alignment with the presented municipal and provincial policies or any foreseeable constraints that may be imposed on the Project by these policies.

a. Explain why relevant provincial directives or policies related to the abandonment of oil and gas wells are not presented in this section.

b. For each Municipal Development Plan (MDP) or Intermunicipal Development Plan (IDP) presented, provide a discussion on alignment of the Project with the bylaws or outcomes of the plans and describe any constraints to development associated with these plans.

c. For each provincial legislation, framework, or plan in Section 2.8.6, discuss the alignment of the Project with the outcomes of the policy tools, and whether any foreseeable constraints on project outcomes exist.

21. Volume 2, Section 4.2.1, Table 4.1 and 4.2, Page 159 and 160;
Volume 2, Section 4.2.2.5, Page 165;
Volume 5, Section 6, 6.1 [A] (b)

SMRID references the New East Dam breach inundation study as presented in the Preliminary Design Report (KCB 2023) and had applied a 1D HEC-RAS model to estimate breach outflow hydrographs for fair-weather and flood-induced failures, culminating in a table of peak discharge and volumes for the flood scenarios. SMRID states *For a fair-weather breach (with and without Hwy 879 failure), four permanent residences would be impacted by the breach flow*; however, no mitigation measures are described in the EIA to address the effect of a dam breach on the downstream residents other than referencing breaching of the existing dam on impacts to workers during construction.

a. Provide map(s) of the lateral extent of fair-weather and flood-induced dam breaches relative to the residences that are located in the Chin Coulee.

b. Provide mitigation measures to protect these residences in the event of a dam breach during the operation phase of the Project.

c. Describe how residents will be contacted during emergencies other than fires and the type of information that will be communicated to them, similar to *Community Engagement and Preparedness* Section for fire control.

d. Document any safety concerns raised by stakeholders during consultation on the Project and the actions taken to address those concerns, per the final Terms of Reference.

22. Volume 2, Section 2.8.4.2.2, Page 135;
Volume 5, Section 3, 3.10.2 [B] (c)

Final Terms of Reference 3.10.2[B] (c) requires descriptions of *Procedures that will be followed in compensating landowners for lands required for the Project and for associated damages or disturbances.*

a. Provide information regarding the procedures that will be used.

b. Discuss the status of negotiations with affected landowners/grazing lease holders.

23. Volume 2, Section 3, Page 151;
Volume 2, Appendix 14;
Volume 5, Section 6, 6.1 [C] and [D]

The final Terms of Reference Sections 6.1 C states *Document health concerns raised by stakeholders during consultation on the Project* and 6.1 D states *Document health concerns identified by Indigenous communities or groups resulting from impacts of existing development and of the Project, specifically on their traditional lifestyle* and *Include an Indigenous receptor type in the assessment.*

a. Provide the requested documentation.

b. Provide the results of a human health risk assessment that includes an indigenous receptor.

24. Volume 2, Section 5.1.2, Page 171;
Volume 5, Section 2, 2.4 [B], [C], [E] and [F]
SMRID indicates that the Highway 36 re-design is currently in the preliminary design phase, with design completion anticipated in December 2024.

a. Answer all final Terms of Reference questions in Section 2.4 [B], [C], [E] and [F].

b. Provide this report once the preliminary design is completed.

25. Volume 3, Section 2.2, Table 4, Page 29
SMRID describes the type of direct, indirect, and induced impacts that are estimated in the assessment. It appears that some indirect impacts to irrigation producers are estimated independently, while some are estimated using an Input-Output model.

a. Provide clarification on what activities are considered direct, indirect, and induced with respect to irrigation production expansion afforded by the Project.

b. Provide clarification on which impacts were estimated outside of the Input-Output model and which were estimated using the Input-Output model.

c. Provide clarification on how double counting was avoided when estimating direct, indirect, and induced economic impacts.

26. Volume 3, Section 2.2.1, Page 30
SMRID refers to several sources of historical data.

a. Provide clarification whether historical data relied upon in the assessment was inflated and what year dollars are presented in the report (e.g., are all dollars $2023?).

27. Volume 3, Section 2.2.2, Page 31
SMRID describes the assessment of forward linkages associated with expanded irrigation production afforded by the Project.

a. Justify the inclusion of forward linkage impacts in the analysis. For example, establish what, if any, excess capacity exists with processors.

b. Specify all forward linkage industries analyzed in the assessment.

c. Provide a clarification for how much additional production resulting from the Project is assumed to be purchased by forward linkage industries in Alberta versus exported.

28. Volume 3, Section 3.3.1, Page 41
SMRID refers to both gross domestic product (GDP) and labour income; however, it is not clarified in the assessment that labour income is a component of GDP.

a. Include a clarification in the assessment that labour income is a subset of GDP and that the two measures are not additive.

29. Volume 3, Section 4.1, Page 48-53;
Volume 4-1, Section 2.3-3.1.1, Page 12-15
A discrepancy appears to exist between the runoff estimates in the hydrology baseline study and the estimated value of flood mitigation in the socio-economic assessment. In the hydrology baseline study, SMRID summarizes that runoff entering the expanded reservoir from the effective

drainage area is expected to be low. Here, SMRID references a number of reports in their discussion on effective or contributing drainage areas (KCB 2022a), probable maximum precipitation and flood (Matrix 2017), and the Inflow Design Flood (IDF) for the East Dam (KCB 2022b) that establish the basis for runoff estimates. However, no specific or summary information were presented in the EIA, and these reports are not publicly available for cross-referencing. In the socio-economic assessment, SMRID states that the main canal intercepts runoff from storm events and emphasizes the importance of the Project for flood mitigation, stating an overall economic impact of $155,926,700, and a 50-year revenue and expense saving of $326,375,896. The assumptions made in the expected value of flood mitigation are for a 1:10 year flood return interval, but no specific information is provided on the hydrological or areal extent of the 1:10 year flood.

a. Provide a detailed summary of all relevant information related to runoff estimation and flood mitigation including, but not limited to:
   i. maps of the LSA and RSA used in the hydrological baseline study relevant to runoff capture by Chin Reservoir.
   ii. topographic maps of the contributing catchment area for the existing and expanded reservoirs used in the hydrology study and for the flood inundation areas assessed in the socio-economic assessment.
   iii. summary of the land use and land cover classes that exist in the contributing catchment and flood inundation areas.
   iv. the depth of precipitation used to estimate runoff volumes according to the return intervals used in the hydrology study.
   v. details of the design storm event(s) that would be expected to trigger a 1:10 year flood event assumed for the socio-economic assessment;
   vi. a description of methods used to calculate the runoff coefficient that was reported to range from 0.46-0.60. Provide evidence to support the calculation.
   vii. Explain how this coefficient is considered low. Provide evidence to support this conclusion.
   viii. quantitative estimates of surface runoff volumes for the assumed precipitation return intervals.
   ix. estimates of the expected change in reservoir water level of the existing and expanded Chin Reservoir assuming the modelled events.

b. Justify the estimated value of flood mitigation for the Chin Reservoir Expansion Project in the context of the estimated volume of runoff water captured per the methods used and results reported in the hydrology baseline study.

c. Provide the reports cited as KCB (2022a), KCB (2022b), and Matrix (2017) that were referenced as supporting information for the hydrology baseline study.

30. Volume 3, Section 4.1.3, Page 49

SMRID reference an MPE Engineering Ltd. report that *…identified nine inter-related infrastructure improvements which, when implemented, are expected to significantly mitigate the impacts of future excess stormwater runoff events.* The proposed Project is described as being one of these nine inter-related improvements.

a. List how many (and which) of the eight other inter-related infrastructure improvements described in the cited engineering report will be constructed and functioning prior to the Project being constructed.

b. Provide a clarification whether and to what extent the Project provides the flood mitigation benefits relied upon in the assessment in the absence of any or all of the eight other inter-related infrastructure improvements.

31. Volume 3, Section 4.1.4, Page 53

SMRID states that *Flood mitigation related to the Chin Reservoir expansion would generate an increased level of economic activity in Alberta, not only for those who are directly affected by flood events, but also for others who are indirectly impacted.* Relative to a status quo year, flood mitigation efforts reduce economic losses, they do not generate economic activity.

a. Include a clarification in the assessment that flood mitigation impacts of the Project represent avoided economic losses.

32. Volume 3, Section 4.2, Page 53 and 54

SMRID states that *Based on an 8% drought probability in any given year, the annual irrigation benefits are estimated to generate about $3.3 million to the provincial GDP and $3.3 million in labour income. No FTEs are supported.* Relative to a status quo year, drought mitigation efforts reduce economic losses, they do not generate economic activity.

a. Provide a clarification in the assessment that drought mitigation impacts of the Project represent avoided economic losses.

b. Provide a clarification in the assessment that the estimated $3.3 million in provincial GDP is not an annual estimate, but rather an estimate for a drought year.

c. Clarify why the estimated $3.3 million in provincial GDP is entirely attributed to labour income.

d. Provide clarification why there are no full-time equivalents (FTEs) supported by the $3.3 million in labour income.

33. Volume 3, Section 6.6, Table 36, Page 65 and 66

Economic impacts presented in Table 36 suggest that several categories of activity yield total GDP impacts that are greater than the initial output shock (direct output). Alberta economic multipliers for many of the relevant industries describe total multipliers of less than 1.

a. Demonstrate the calculation of GDP impacts and clearly describe all multipliers relied upon.

34. Volume 3, Section 6.6, Table 37, Page 66

In Table 37, SMRID sums all estimated impacts (short-term, periodic, and annual).

a. Provide the rationale for aggregating impacts that occur over varying timescales and frequencies.

35. Volume 3, Section 7.1, Table 38, Page 67

SMRID summarizes the costs and benefits evaluated in the farm financial analysis in Table 38, including capital asset charges to producers.

a. Describe what the revenue collected from the capital asset charges is used for.

36. Volume 3, Section 7.2, Pages 68-70

SMRID describes the benefits and costs evaluated in the social-benefit cost analysis, including multiplier/secondary effects (i.e., direct, indirect, and induced benefits and costs). Best practices for cost-benefit analysis suggests that all multiplier/secondary effects be excluded.

a. Justify why multiplier/secondary effects are included in the social cost benefit analysis (CBA).

b. Itemize what costs related to food processing (forward linkages) were included in the analysis.

c. Clarify and explain any adverse effects to existing producers that may occur as a result of the Project (e.g., during periods of drought).

d. Clarify and explain whether any sensitivity analyses were completed for either the financial analysis or the social benefit-cost analysis and provide the results.

e. Calculate and provide the breakeven discount rate for the social benefit-cost analysis.

37. Volume 3, Section 7.2, Table 40, Page 69

SMRID summarize the benefits and costs evaluated in the social-benefit cost analysis in Table 40.

a. Explain how the net benefits of crop and livestock production were calculated.

38. Volume 3, Appendix D, Pages 101-105;
Volume 3, Appendix D, Table 59, Page 103

SMRID describe the methods used to estimate provincial and federal government revenues associated with the Project, including a series of regressions developed for tax estimation. SMRID also states that the provincial and federal governments will not be funding the Project and so face no costs.

a. Justify the use of linear regression analysis for the estimation of government revenue associated with the Project.

b. Provide a detailed description and list of what other functional model forms were considered and provide the rationale for selecting the models described in Appendix D.

c. Justify relying on coefficients and/or regression models that are not statistically significant.

d. With respect to the provincial model, justify the assumption that implies a corporate tax rate of 2.1%, which is materially different than the current tax rate of 8% as well as the corporate income tax rates in place for the time period reflected in the underlying data.

e. Justify estimating total government revenue and its contingent parts individually and discuss what methodological issues may arise in summing these estimates.

f. On Page 103 and with regards to personal income tax, the SMRID states *For every $1.00 of income earned, an average of $0.112 goes to the GOA*. The coefficient on personal (household) income in Table 59 is 0.0529. Explain this discrepancy.

g. Explain how the Project will be funded.

39. Volume 3, Appendix E, Section E.1 and E.4, Page 106 and 107

SMRID lists assumptions for the "Financial Benefit-Cost Analysis" and the "Benefit-Cost Analysis" stating that, for the financial benefit-cost analysis *Discounted value used for this analysis was assumed to be 4%* and for the benefit-cost analysis *The social discount rate was maintained at 4%.*

a. Justify the use of a 4% discount rate and provide a source that supports use of the rate.

b. Explain why a social discount rate was used for both the farm financial analysis and the social cost-benefit analysis.

40. Volume 3, Appendix E, Section E.4, Page 107

SMRID provided additional details regarding the assumptions employed for the benefit-cost analysis (i.e., the social cost-benefit analysis). SMRID states that *Flood damage mitigation was assumed to occur once every 10 years. The first flood year was determined using a random number table.* No additional details are provided with respect to how drought frequency is applied to the model. Best practices for flood damage assessment suggests that an expected value be taken to estimate annual flood damages, also known as an Average Annual Damage (AAD).

a. Explain how the random assignment of flood events using a random number table may impact the final results of the social benefit-cost analysis.

b. Explain why an AAD estimate was not relied upon to estimate the flood mitigation benefits in the social benefit-cost analysis.

c. Clarify and explain how drought damage mitigation was assumed to occur in the social benefit-cost analysis.

41. Volume 4-1, Section 2.3, Table 2.5, Page 11

SMRID states that the average runoff volume of the RSA and LSA has reduced in comparison to estimates obtained from Niall et al. (1970). However, the runoff estimates in the baseline study appear to be calculated from simple subtraction of the long-term average annual evapotranspiration (assumed to be actual) from long-term average annual precipitation. No mention is made to the equivalence of methods used in this study to those used by Niall et al. (1970) for estimating runoff. Best practice is to calculate elements of a water balance at common timepoints (e.g., monthly, annually) and aggregate summary statistics from common timepoints rather than to calculate some elements based on aggregating or averaging functions of others.

a. Specify that the annual evapotranspiration referred to in Table 2.5 is either potential or areal evapotranspiration (ET).

b. Compare the methods used against the cited reference and justify the appropriateness of subtracting two long-term averages of precipitation (PPT) and (Potential or Actual) ET to calculate an element of the water balance (i.e., runoff) to conclude a temporal effect.

42. Volume 4-3, Section 4.6, Page 38-49

SMRID provides groundwater chemistry data for common anions, nutrients, and metals from installed monitoring wells and existing/historical wells at the project location. Analysis for hydrocarbon indicators was not conducted for any of the installed wells and may not have been analyzed for private wells.

a. Explain why hydrocarbon indicators were excluded from monitoring well analysis and whether hydrocarbon indicators be included in continued sampling efforts for the monitoring wells.

3 General

3.1 Public Engagement and Aboriginal Consultation

43. Volume 1, Section 1.13.2;
Volume 1, Section 1.14

SMRID discussed that the Southern Alberta Group for the Environment (SAGE) has registered to receive project updates from Environment and Protected Areas (EPA) and the Natural Resource Conservation Board (NRCB). SMRID has also provided an invitation to the Blood Tribe for participation in ongoing dialogue and discussions.

a. Discuss SMRID's plans to maintain public engagement during the Project's development, operation, and reclamation.

b. Discuss how the invitation to the Blood Tribe for participation in an ongoing dialogue and discussions of project-related issues or concerns will be maintained through project development, operation, and reclamation.

44. Volume 1, Section 1.13.1, Page 24;
Volume 1, Appendix IV;
Volume 5, Section 1, 1.0 [A] (a) and (c)

The final Terms of Reference states *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
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

SMRID identified multiple meetings with stakeholders and the public. The meetings include a landowner meeting on March 11, 2022, a county council meeting on September 20, 2022, and 4 meetings held for land owners and the public.

The meeting minutes and/or the specific comments or issues raised at the Seven Persons Community Hall on November 24, 2022, and Readymade Community Hall on November 25, 2022, have not been provided.

a. Provide a description of the specific concerns and issues raised at all meetings, include SMRID's analysis of the concerns and issues raised, and how each were addressed.

b. If there are any outstanding issues, describe how SMRID plans to address these issues.

45. Volume 1, Section 1.13.2, Page 24

SMRID states *On March 31, 2021, the SMRID received an email outlining concerns with the Project from the Southern Alberta Group for the Environment (SAGE).*

a. Provide a description and documentation of the concerns and issues expressed by SAGE.

b. What were SMRID's analysis of these concerns and issues expressed, and what actions did SMRID take to address the concerns and issues?

46. Volume 1, Section 1.14, Page 25

SMRID outlines the consultation completed with the Blood Tribe and the request for access of the inundation area for a walk-though prior to filling.

a. Explain if any additional consultation will occur with Indigenous communities and groups with respect to traditional ecological knowledge, and traditional use of land and water.

47. Volume 1, Section 1.14, Page 25;
Volume 5, Section 1, 1.0 [B] (c)

The final Terms of Reference states *Document the Indigenous consultation program implemented for the Project including:*
c) a description of how Indigenous values are considered in the framework of decision making.

a. Based on the consultation SMRID has completed, describe how Indigenous values are considered in the framework of decision making.

b. Discuss how Indigenous values will be considered if additional information is identified during the walk-through with the Blood Tribe prior to inundation.

48. Volume 1, Section 1.14, Page 25-26

SMRID states *Indigenous Consultation was initiated with Mike Oka of the Blood Tribe on October 12, 2022…a site meeting was delayed until December 15, 2022.*

a. Provide a description and documentation of the specific concerns, comments, or issues raised by the Blood Tribe, SMRID's analysis of these concerns and issues, and how these were addressed.

b. If there are any outstanding issues, concerns, or comments describe how SMRID plans to address these concerns.

49. Volume 1, Appendix IV;
Volume 1, Appendix VI

SMRID has identified topics discussed, information packages provided, and presentations materials used at the stakeholder, public, SAGE, and Indigenous consultation meetings.

a. Provide clarification if the Appendix IV Chin Reservoir Expansion – Environmental and Regulatory and Appendix VI – Chin Reservoir Expansion HRIA are all the presentation materials and information packages that were presented to the public and Indigenous for consultation.

b. If not, provide all presentation materials and information packages used for all public meetings and Indigenous groups for consultation.

50. Volume 5, Section 1, 1.0 [A] (d)

The final Terms of Reference states *Document the public engagement program implemented for the Project including:*

d) a description of how the public input was incorporated into the Project development, impact mitigation and monitoring.

Volume 5, Section 1.0 [A] (d) indicates that this information can be found in Volume 1, Section 1.13 however this information is not discussed.

a. Provide the sections where this information is discussed.

b. If this information is not identified in another section, provide a description of how the public input was incorporated into the Project development, impact mitigation, and monitoring.

51. Volume 5, Section 1, 1.0 [B] (d)

The final Terms of Reference states *Document the Indigenous consultation program implemented for the Project including:*
d) How Indigenous knowledge helped shape project development, impact mitigation, monitoring and reclamation.

Volume 5, Section 1.0 [B] (d) indicates that this information can be found in Volume 1, Section 1.14 however this information is not discussed.

a. Provide the sections where this information is discussed.

b. If this information is not identified in another section, describe how the Indigenous knowledge helped shape the Project's development, impact mitigation, monitoring program and reclamation.

3.2 Noise

52. Volume 2, Section 3.3, Page 152–157;
Volume 5, Section 3, 3.1.1 [B];
Volume 5, Section 3, 3.1.2 [B] and [F]

SMRID has not provided a table for noise prediction results as stated in the Guide to Preparing Environmental Impact Assessment Reports in Alberta.

The Guide to Preparing Environmental Impact Assessment Reports in Alberta states *Noise prediction results should be presented at each assessment stage in a Noise Contribution Table similar to the one shown in Appendix A.*

The Guide to Preparing Environmental Impact Assessment Reports in Alberta states *The Baseline Case establishes the conditions that exist or would exist prior to development of the project or the conditions that would exist if the project were not developed* and *Proponents must present sufficient data, from detailed and current field surveys or existing databases, to provide a clear description of current environmental conditions in the area that will be directly and indirectly affected by the project.*

The Guide to Preparing Environmental Impact Assessment Reports in Alberta states *The Application Case describes the Baseline Case with the effects of the project added.*

The Guide to Preparing Environmental Impact Assessment Reports in Alberta states *The Planned Development Case describes the environmental conditions that would exist as a result of the*

interaction of the proposed project, other existing projects and other planned projects that can be reasonably expected to occur.

The final Terms of Reference states:
3.3.1 [B] *Discuss baseline air quality conditions including appropriate ambient air quality parameters and baseline noise conditions.*
3.1.2 [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.*
3.1.3 [F] *Discuss the Project's relative contribution to cumulative effects on regional air quality and noise.*

SMRID states *Based on research conducted by the Environment Council of Alberta, the average rural ambient sound level at nighttime in Alberta is approximately 35 dBA Leq and the BSL was determined to be 40 dBA Leq (AER 2023).*

SMRID provides an example of a grader using the inverse square law to determine sound pressure levels that would be detected at the closest residences.

SMRID states *In addition, most of the construction activity would be located within the coulee, further shielding residences from construction noise.*

SMRID states …*the potential effects of excessive noise of the Project would be expected to be localized, short in duration, and temporary* and *In general, residual effects of Project noise are not expected. Significant cumulative effects of noise are not expected due to very limited additional sources of noise across the Chin Coulee region.*

a. Provide justification for using the AER 2023 report for baseline conditions and not current field surveys.
b. Provide justification and evidence to show that the grader mentioned in Section 3.3.4 is sufficient for the Application Case showing the Baseline Case with the effects of the Project added.
c. Provide evidence to show that the coulee will shield residence from the construction noise.
d. Provide justification and evidence that the excessive noise would be localized, short in duration, and temporary, and that residual effects of the Project are not expected.
e. Provide justification for the statement that significant cumulative effects are not expected.

53. Volume 2, Section 3.3.2.1, Page 154 and 155;
Volume 5, Section 3, 3.1.2 [A]

SMRID states *During the construction phase the major sources of environmental noise associated with Project activities are:*

- *On-site heavy-duty machinery operation;*
- *Loading, stockpiling, and excavation activities; and*
- *Local traffic.*

The final Terms of Reference states *Identify construction and operational components of the Project that have the potential to increase noise levels or affect air quality.*

a. Identify operational components of the Project, if any, that have the potential to increase noise levels.

54. Volume 2, Section 3.3.2.1, Page 155;
Volume 2, Section 3.3.2, Table 3.2, Page 155
SMRID states *The equipment may also not be an accurate representation of actual equipment which would be used during construction.*

a. Explain why the equipment listed may not be an accurate representation for equipment used during construction.

b. Explain if SMRID will be using equipment that is expected to produce higher noise levels than what is outlined in Table 3.2.

c. Explain what additional mitigation measures would be included if equipment is expected to be louder than what is outlined in Table 3.2.

55. Volume 2, Section 3.3.2.1, Table 3.2, Page 154 and 155
SMRID provides Table 3.2 that lists examples of potential equipment that will be used at the Project site. This table lists the potential noise level for one of each type of equipment.

a. Discuss how the amount of equipment working may impact the severity of the potential noise levels.

56. Volume 2, Section 3.3.4, Page 157;
Volume 5, Section 11 [B]
SMRID states *With mitigation strategies in place, the potential effects of excessive noise of the Project would be expected to be localized, short in duration, and temporary.*

The final Terms of Reference states *Describe SMRID's current and proposed monitoring programs…*

a. Discuss the monitoring program that will be implemented during construction and operation to ensure mitigation strategies are successful.

57. Volume 2, Map Figure 3.3.1
The Map Figure 3.3.1 does not include the spatial extent for the wildlife noise assessment.

a. Update the Map Figure 3.3.1 to include the spatial boundary for the wildlife noise assessment.

3.3 Socio-Economic

58. Volume 3
A list of acronyms was not provided in Volume 3.

a. Provide a list of acronyms for Volume 3.

59. Volume 3, Section 4.1.3.1, Page 51;
Volume 3, Section 4.1.3.2, Page 52;
Volume 3, Section 4.1.3, Table 26, Page 52

The assessment of economic benefits for the two categories in Table 26 are based on 1:10 year flood probability in the region. The damage caused by 2005 flood event is later discussed in Sections 4.1.3.1 and 4.1.3.2. The 2005 flood event is used as basis to estimate economic losses. However, the estimated return period of 2005 flood event is not clear.

a. Provide clarification on if the 2005 flood was a 1:10 year flood?

60. Volume 3, Section 7.2, Table 40, Page 69

Provide a table showing the cash flow that underlies Table 40 for each year of the 50-year project showing annual undiscounted benefits and costs separated for: crops, livestock, drought mitigation, food processing, flood damage mitigation, construction costs, and pivot system and specialized farm equipment. The table must include:

a. The cash flow table only for "direct benefits/costs".

b. A line in the table that indicates the total cumulative number of acres brought online for irrigation for each corresponding year column of the table.

Note - Benefits as defined herein are not to include:

- transfer payments
- taxes and fees (these are counted as transfers)
- "Food Processing" (unless irrigation provides inputs to food processors at market discount)
- land value increases already included in "Net Irrigation Crops Direct"

61. Volume 3, Section 7.2, Table 40, Page 69

a. Provide definitions of each row label in the column called "Particulars" in regard of the "Direct Benefits/Costs" only.

62. Volume 3, Section 7.2, Table 40, Page 69

a. State what items in Table 40 are discounted and the rate of discount. Label all items in the "Particulars" column that it is present valued/NPV'ed.

63. Volume 3, Section 7.2, Table 40, Page 69

a. In Table 40:
   i. Add the costs of reconstruction of the bridge over the reservoir's new FSL or explain why it is irrelevant.
   ii. Add costs of relocating the recreation area or explain why it is irrelevant.
   iii. Add a list of costs and benefits that are relevant but that were not quantified.

b. Discuss how benefits of drought mitigation for current acres, assuring volume for flood mitigation, and satisfying requirements of new acres is managed so as not be conflicting objectives.

c. Discuss uncertainty estimate to benefits and costs.

64. Volume 3, Section 8.6;
Volume 5, Section 7, 7.1 [B] (b), (c), (d), (e) and (f);
Volume 5, Section 7, 7.2 [C], [D] and [E]

a. Provide the following information as required in the final Terms of Reference Section 7.1 and 7.2 or identify where they are in the EIA as they are not in Volume 3 as indicated in the concordance table:

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

7.2 [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.*
7.2 [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.*
7.2 [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.*

65. Volume 5, Section 7, 7.2 [A];
Volume 5, Section 8, [A]

The final Terms of Reference 7.2 [A] states *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).

The final Terms of Reference 8 [A] states *Discuss mitigation measures planned to avoid, minimize, or eliminate the potential impacts for all stages of the Project.*

a. Provide the information as required in the final Terms of Reference.

b. The final Terms of Reference 8 [A] was not answered with respect to the socio-economic impacts. Discuss mitigation measures planned to avoid, minimize, or eliminate the potential impacts for all stages of the Project.

3.4 Transportation

66. Volume 1, Section 2.5.1, Page 34

SMRID states *the alignment of the permanent road will be developed once the dam has been constructed.*

a. Explain why the access roadway design was not prepared in the engineering assignment for this project? When will the access roadway design be ready? How will this design be communicated to Transportation and Economic Corridors so it can be reviewed?

b. If the design has been developed, provide the design and the methodology behind how it was developed.

67. Volume 1, Section 2.5.6, Page 38

a. Provide the section of the EIA report where the impacts of the existing east dam decommissioning are discussed.

68. Volume 1, Section 2.7.4, Page 40

a. Explain if the removal and construction of a new Highway 36 bridge is expected to have any residual impacts.

69. Volume 1, Section 2.7.13, Page 42

The Chin Park Campgrounds are accessed via Highway 36 and as a result will be inundated by the Project. SMRID has stated that a new campground location is being discussed. The new location has the potential to impact the Highway 36 bridge replacement/realignment project from an access management and design standards perspective.

a. Describe SMRID's plan to include Transportation and Economic Corridors in these discussions.

70. Volume 2, Section 5

a. Provide an explanation as to whether or not the Transportation and Economic Corridors' Water Control Structures Selected Design Guidelines were used in the Project. If not, provide justification for why the guidelines were not used.

71. Volume 2, Section 5.2.3.3.3, Page 178;
Volume 2, Section 5.2.4.1, Page 179

The EIA's Traffic Impact Assessment did not provide an assessment of the adequacy of highway intersections, such as whether they can accommodate additional traffic volume and truck type generated by the construction phase of the Project, and whether any improvements are required. Instead, the EIA deferred to future analysis when a construction plan is developed.
In addition, the estimated truck volumes during peak hours are inconsistent (e.g., Section 5.2.3.3.3 states 10 trucks, while Section 5.2.4.1 states 20 trucks).

a. Explain why the construction plan has not been developed prior to the submission of the EIA. How will the construction plan be provided to Transportation and Economic Corridors for review? If a construction plan has been developed, provide the plan.

b. Provide the correct estimations for truck volumes during peak hours.

c. Assess and discuss the adequacy (e.g., geometric and level of service) of highway intersections that are impacted by the Project. Explain if any intersection improvements are required, what they are, and when they will be completed.

72. Volume 5, Section 2, 2.4 [A]

The final Terms of Reference states *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).*

Site S005 is not fully documented in the EIA (e.g., boundary, groundwater, slip surface, movement rate, instrumentation, relationship with the water level of the reservoir, past repair, maintenance history, etc.)

a. Assess the geotechnical impacts of the Project on rate of retrogression and overall stability of the Highway 36 Chin Coulee landslide (Site S005) and risks that the landslide may pose to the reservoir.

b. A geotechnical assessment has not been submitted for the Project. If an assessment has been completed, provide the results of the assessment. The assessment should include a rapid drawdown analysis, in addition to, bare earth LiDAR for the known land slide Site S005 and analysis of any additional landslide features for the reservoir banks and surrounding terrain. Transportation and Economic Corridors can provide background information and data if requested.

3.5 Historic Resources

73. Environmental Impact Assessment Report Summary, Section 4.3.5, Page 20

The summary description of Historic Resources includes only a discussion of archaeological resources.

a. What development effects are anticipated for the other types of resources within the project area that are protected under the *Historical Resources Act*, including palaeontological resources and historic built heritage?

74. Volume 1, Section 1.12.1.5, Page 21

A summary of the permit application, field investigation and reporting schedule has been provided for the archaeological Historic Resources Impact Assessment (HRIA) conducted, but there is no mention of the palaeontological HRIA.

a. What was the schedule of the acquisition of the palaeontological HRIA permit, and the completion of the subsequent fieldwork and reporting?

75. Volume 1, Section 2.7.13, Page 42

Two campgrounds described in Section 2.7.13 on the south shore of the Chin Coulee Reservoir are identified as being locations that will be inundated as the result of the Project.

a. Clarify whether these sites have sufficient characteristics to be recorded as Heritage Survey sites under the *Historical Resources Act*.

76. Volume 2, Map Figures 2.9.1-2.9.4

Map Figures 2.9.1 to 2.9.4 show the extent of the Historic Resources Impact Assessment conducted for the project.

a. Within these maps, clarify which portion of the study area was investigated relative to archaeological resources, and which portion of the study area was investigated relative to palaeontological resources.

77. Volume 2, Section 2.9.1.2, Page 145;
Volume 5, Section 4, 4.1 [B]

The final Terms of Reference Section 4.1 [B] requires a map of known historic resource sites represented by Historic Resource Value (HRV). No map of archaeological and historic built heritage HRV ratings across the project study area has been provided.

a. What is the mapped representation of Historic Resource Values for archaeological resources and historic built heritage sites within the project study area?

78. Volume 2, Section 2.9.2, Page 148;
Volume 5, Section 4, 4.1 [B]

The final Terms of Reference Section 4.1 [B] requires a map of known historic resource sites represented by Historic Resource Value (HRV). No map of palaeontological HRV ratings across the project study area has been provided.

a. What is the mapped representation of Historic Resource Values for palaeontological resources within the project study area?

3.6 Climate Change

79. Volume 1, Section 1.5, Page 9 and 10

SMRID states *By 2021-2050, annual precipitation is projected to increase by roughly 100 mm/year relative to the 1991-2020 period*.

Based on the above statement, with annual precipitation ranging from 300 mm/year to 400 mm/year in prairie area, the annual precipitation is estimated to increase by 25%~35%.

In a recent climate change study (Eum et al., 2023) that investigated potential changes in the natural regions in Alberta under the latest Coupled Model Intercomparison Project Phase 6 (CMIP6) climate projections, +2.24 mm/decade in annual precipitation was expected in the Grassland region, southern part of Alberta, resulting in an increase of 6.72mm in annual precipitation.

a. Explain and provide the data that was used to calculate the projections in Section 1.5.

b. Provide the justification for using the Coupled Model Intercomparison Project Phase 5 (CMIP5) climate projections when more recent studies have been conducted.

80. Volume 1, Section 1.5, Page 9 and 10;
Volume 1, Section 1.6.1, Page 10 and 11

SMRID states *As temperatures rise, evapotranspiration is expected to increase, leading to overall decreases in soil moisture, especially during the summer months.*

In addition, SMRID also states *This is true even if there are no significant changes in precipitation levels during the growing season (Hayhoe and Stoner 2019).*

Section 1.5 discusses how an increase in precipitation and temperature may induce an off-set effect on soil moisture rather than a decrease in soil moisture. A recent study by Eum et al. (2023) evaluated a trend in a drought index (Standardized Precipitation Evapotranspiration Index, SPEI) and projected a decrease in SPEI under climate change, particularly a larger decreasing trend in the southern Alberta.

a. Provide the rationale as to why more recent studies were not used when projecting future drought conditions.

81. Volume 2, Section 2.2.3.2.3, Page 30 and 31

SMRID states *Therefore, the addition of storage capacity will provide the means to capture the increased early* runoff *(including extreme events which currently would lead to flooding) and have a reliable source to continue to support irrigation throughout the growing season*. As the main source of inflow to the Chin Reservoir is from the upstream diversion infrastructure and any changes in the operation policies are not expected, the additional storage capacity may not have any contributions to storing surplus inflows under climate change unless the operation policies on the upstream diversion infrastructure are altered to adapt to climate change.

a. Explain under what conditions surplus inflows are expected and how the additional storage capacity can store the surplus inflows without alterations of upstream diversion operating policies.

3.7 Traditional Ecological Knowledge and Traditional Land Use

82. Volume 1, Section 1.14;
Volume 5, Section 5 [A] (a) and (b)

The final Terms of Reference states *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.

In addition, the concordance table indicates that [A] (a) and (b) are located in Volume 1, Section 1.14. There are no maps in this section or in the Volume 1 appendices that relate to these questions.

a. Provide the maps for [A] (a) and (b).

83. Volume 1, Section 1.14;
Volume 2, Section 2.8.4.4, Page 137;
Volume 5, Section 5 [C]

The final Terms of Reference states *Discuss access for traditional uses during all stages of the Project.*

Volume 5, Section 5, [C] indicates that this information can be found in Volume 1, Section 1.14 however the information is not present. Volume 2, Section 2.8.4.4 discusses access for traditional uses.

a. Provide all sections where this information is discussed.

84. Volume 1, Section 1.14;
Volume 5, Section 5 [D]

The final Terms of Reference states *Describe how TEK and Traditional Land Use information was incorporated into the Project, EIA development, the conservation and reclamation plan, monitoring and mitigation.*

Volume 5, Section 5, [D] indicates that this information can be found in Volume 1, Section 1.14 however the information is not present.

a. Provide the sections where this information is discussed.

b. If this information is not identified in another section, describe how TEK and Traditional Land Use information was incorporated into the Project, EIA development, the conservation and reclamation plan, monitoring, and mitigation.

85. Volume 4-4, Section 3.5, Page 39;
Volume 5, Section 5 [B]

The final Terms of Reference states *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.*

SMRID states *Traditional use of the fishery is undetermined.*

a. Provide an explanation for why the traditional use is undetermined for the current Chin Reservoir.

b. Explain what, if any, fish species are being used for food, traditional, medical, or cultural purposes in the current Chin Reservoir.

86. Volume 5, Section 5

The final Terms of Reference states *Determine the impacts of the Project on traditional, medicinal, and cultural land use and identify possible mitigation strategies.*

This question is missing from the concordance table under Volume 5, Section 5 and it's unclear where this question is addressed in the EIA.

a. Provide the sections where this information is discussed.

b. If this information is not found in the EIA, provide the determination of the impacts of the Project on traditional, medicinal, and cultural land use and identify possible mitigation strategies.

4 Air

4.1 Air Quality Assessment

87. Volume 2, Section 3.1, Page 151
SMRID states *The available data for construction-phase emissions of air contaminants from EIAs for analogous projects involving the use of heavy equipment to modify and build water reservoirs or flood retention structures suggest that any increases in the ground-level air concentrations outside the immediate PA are not expected to be significant.*

a. Provide supporting evidence and examples for this statement.

88. Volume 2, Section 3.1, Page 151
SMRID states *While the Springbank Off-Stream Reservoir Project identified potential short-term inhalation exposure risks for $PM_{2.5}$, the authors noted that these risks were manageable with the use of dust suppression and other mitigation strategies*.

a. Describe the potential air quality risks associated with the Chin Reservoir Expansion Project in relation to the Springbank Off-Stream Reservoir Project.

b. Describe dust mitigation and air quality risk mitigation strategies planned during construction of the Chin Reservoir Expansion Project.

c. Discuss the rational and effectiveness of proposed mitigation strategies for the Chin Reservoir Expansion Project.

89. Volume 2, Section 3.1, Page 151
SMRID states *The construction emission sources for the Chin Reservoir Expansion Project will be located primarily in a low point of the Chin coulee. The nearest residence is on top of the coulee, so the opportunity for exposure to the construction emissions will be reduced with the walls of the coulee limiting the ability of the construction emissions to disperse to nearby receptors.*

a. Provide justification and supporting evidence to verify the statement that exposure to construction emissions will reduce due to the walls of the coulee.

90. Volume 2, Section 3.1, Page 151
SMRID states *Construction of the Chin Reservoir Expansion Project will involve comparatively fewer emission sources than the construction of the Springbank Off-Stream Reservoir.*

a. Provide a list of anticipated Project construction emission sources.

b. Compare the anticipated Project construction emission source list to those of the analogous Springbank Off-Stream Reservoir Project and discuss the difference in potential impacts.

91. Volume 2, Section 3.1, Page 152
SMRID states *Based on the findings of air quality assessments of similar projects, the construction emissions from the Project are not expected to result in adverse health effects*.

a. Provide justification for this statement.

5 Water

5.1 Water Management

92. Volume 1, Map Figure 1 and Map Figure 2
For clarity:

a. Add flow directions (arrows) on Map Figure 1 and Map Figure 2 in the EIA.

93. Volume 1, Section 1.2.1, Page 6 and 7
While the priority of rights of the SMRID licences is described, they are not described in context of other users upstream of their diversion from the headworks. Further, there is no explanation about how decisions are made from the source with regards to water supply.

a. Describe priority of rights of the SMRID licences in the context of other users upstream of their diversion from the headworks. Explain how decisions are made with respect to annual diversions from the source of the SMRID water supply.

94. Volume 1, Section 1.4, Page 8
SMRID states *In general, the overall amount of precipitation is expected to increase in Alberta; however, when and in what form the precipitation will fall is predicted to change.*

a. Clarify the statement by providing specific details about how precipitation is expected to change (e.g., numbers referring to amount, timing, and duration, etc.).

95. Volume 1, Section 1.7, Page 12
SMRID states *Therefore, the addition of storage capacity will provide the means to capture the increased early runoff (including extreme events which currently would lead to flooding) and have a reliable source to continue to support irrigation throughout the growing season.*

a. Explain the timing for the projected early runoff.

b. Explain the timing of the projected early runoff and if it coincides with the operational availability of the headworks canal systems, i.e. diversion structures and canals are free of ice and snow to permit safe operation.

c. Explain if the projected early runoff will only be captured in the onstream headworks storage reservoirs.

96. Volume 1, Section 1.7, Page 12;
Volume 2, Section 2.2.1, Page 25
SMRID states *The typical operation that is described represents an ideal condition in years when water supply is not limited, which is often not the case.*

a. If typical operation only occurs in years when water supply is not limited, then provide and discuss the percentage of years water supply is not limited to years that it is limited.

b. Under the modelled scenarios described in Volume 1, Section 1.7, Page 12, discuss the likelihood of filling the expanded Chin Reservoir each year.

97. Volume 1, Section 2.6.1, Page 39

SMRID states *As noted for the Existing Chin Reservoir operating condition, reservoir operation will vary depending on inflows and demands, and under drought conditions the reservoir level would be drawn down as far as the outlet structure invert elevation will allow.*

a. Explain the impacts to other off stream reservoirs and the water supply headworks reservoirs for recovering the storage in the expanded Chin Reservoir under drought conditions.

b. Explain the impact and likelihood of consecutive multi-season drought conditions on the ability to refill the expanded Chin Reservoir.

98. Volume 2, Section 2.2.3.2.1, Page 30

SMRID states that there will be no effect on transboundary apportionment because the Project will be drawing water from the Milk River Ridge Reservoir and not directly from the river.

a. Provide impacts on downstream flow as well as headwater storages. What impact will there be on the Milk River Ridge, Waterton, and St. Mary reservoirs? Will volume be drawn to fill the expanded Chin Reservoir, or will the Chin Reservoir expanded area only be filled in certain years?

99. Volume 2, Section 2.2.3.2.1, Page 30

The section identifies that the headworks system (the source) from which Chin Reservoir is filled from. It does not appear that there is any quantitative assessment of the impact to the headworks system (Waterton Reservoir, St. Mary Reservoir, Milk River Ridge Reservoir).

The additional volume needed to fill the expanded Chin Reservoir must be analyzed to determine the impact to storage volumes within the headworks reservoirs. Further, the change in timing of diversions must be analyzed if withdrawals are anticipated to occur earlier or later.

a. Analyze and discuss the impacts to storage volumes within the headworks reservoirs (Waterton Reservoir, St. Mary Reservoir, Milk River Ridge Reservoir) with the additional volume needed to fill the expanded Chin Reservoir.

b. Analyze and discuss the change in timing of diversions if withdrawals are anticipated to occur earlier and/or later in the year.

100. Volume 2, Section 2.2.3.2.2, Page 30

SMRID has mentioned 1:1,000 year flood and probable maximum flood (PMF) but have not provided the discharge values for these return periods.

a. Provide a table of return periods (e.g, 1:2, 1:5, 1:10, 1:20, 1:35, 1:50, 1:75, 1:100, 1:200, 1:350, 1:500, 1:750, and 1:1000 return periods) with associated discharge values for a range of low and high flood events.

101. Volume 2, Section 4.2.1.2, Table 4.4, Page 161;
Volume 2, Section 4.2.1.2, Table 4.5, Page 162

For context and a better understanding of inundation depths:

a. Provide the flood inundation extent and depths on maps and identify on those maps the areas discussed in Table 4.4 and 4.5.

b. Explain if all flood water is contained in the coulee.

5.2 Hydrogeology

102. Volume 2, Section 2.1.2.2.2, Page 17;
Volume 2, Section 2.1.3.1, Pages 19 and 20

The EIA indicates that historical water supply wells are submerged in the existing reservoir (e.g. Chin Park) and those potentially/likely not grout sealed, which provide a potential vertical conduit for reservoir water to flow into the Milk River Aquifer.

a. Explain measures taken to ensure that all water wells submerged by the Project are properly grouted and sealed to prevent the potential mixing of different water qualities and therefore potentially negatively impacting water quality (e.g. contamination from manure, fertilizer, oil and gas spills, pesticides, herbicides, etc.) of aquifers located below the reservoir expansion footprint including the Milk River aquifer.

b. Provide the procedure and process used to identify and reclaim the wells located in the Chin reservoir expansion footprint and the material used to reclaim each water well. Who will be the responsible party to undertake and pay for this reclamation to ensure it meets all government requirements?

103. Volume 2, Section 2.1.2.2.2, Page 18

The EIA discusses legacy oil and gas wells existing east of the existing East Dam, however, no formal public information is available on these wells.

a. Provide the procedures and processes used to identify and reclaim the oil and gas wells located in the Chin reservoir expansion footprint and the material used to reclaim each legacy gas well as per Alberta Energy Regulator (AER) Guidelines and Regulations.

104. Volume 2, Section 2.1.2.2.3, Page 18

The EIA states that the Chin Reservoir expansion will submerge 4 of 5 current flowing artesian water wells used for stockwatering that are supplied from the Milk River aquifer.

a. Explain if these 4 water wells will be replaced for their current owners. If the wells will be replaced, provide a discussion on the party responsible for paying to redrill the new water wells.

b. Provide a description on where these new water wells will be drilled. Discuss if the current owners have land outside of the reservoir expansion that will allow for replacement wells to be redrilled. If they do not have land to accommodate a new well, how will the current owners be compensated?

c. Explain who will assist the landowners with any water well licensing, testing, and reporting requirements.

105. Volume 2, Section 2.1.3.1, Page 19

SMRID states *Seepage of water is anticipated through shallow alluvium from upstream of the New East Dam to downstream of the New East Dam…*

a. Explain if additional fieldwork and testing will be completed to better identify and understand the degree of hydraulic connectivity in these sediments. Provide justification if no additional fieldwork and testing will be completed.

106. Volume 2, Section 2.1.3.1, Page 19

The EIA identifies two potenital impacts of enhanced seepage to the east of the New East Dam, those being a heightened water table and salinization.

a. Describe the mitigation measures that are planned to mitigate these issues and discuss if the productivity of these lands will be reduced including if arable lands will be lost for grazing.

b. Provide a discussion on how affected landowners will be compensated and identify the party who will be responsible for providing compensation.

107. Volume 2, Section 2.1.3.1, Pages 19 and 20

SMRID states *With the enlargement of the footprint of the Chin reservoir and raising of the FSL, the seepage to the Milk River Aquifer could be enhanced (Note '4' on Map Figure 2.1.4). Like the existing conditions conceptual flow regime, a component of this seepage could discharge along the coulee downstream of the New East Dam and a component could contribute to a more regional groundwater flow system in the Milk River Aquifer and ultimately discharge in areas outside of the confines of the Chin Coulee. The enlargement and heightening of the reservoir level could result in a redistribution of the percentage of flow to local and regional flow paths. The magnitude of the effect depends on the degree of hydraulic connection through the Foremost Fm and the Lea Park Fm through fractures, which is currently uncharacterized. Based on the operation of the Chin reservoir over several decades, the magnitude of this impact is negligible.*

a. Provide post Chin Reservoir supporting documentation (monitoring data, reports, studies, etc.) that supports the above claim.

108. Volume 2, Section 2.1.3.1, Pages 19 and 20

There are 4 monitoring wells two of which (MW22-02 and MW22-03) are located in the very upper few meters of the Foremost Formation.

a. Explain how 4 monitoring wells are representative of groundwater flow and how these monitoring wells provide an understanding of the fractures in these formations and the degree of hydraulic connectivity.

b. Explain if additional fieldwork and testing will be conducted to identify and understand the fractures in these formations and the degree of hydraulic connectivity. Provide justification if no additional fieldwork and testing will be completed.

c. Explain the potential risks for leakage outside the confines of Chin Coulee and the mitigation strategies in place to address these risks.

109. Volume 2, Section 2.1.3.1, Page 20

The EIA states that it is highly likely that any open groundwater wells not grouted propery will have flow greatly impeded by silt.

a. Provide documentation from previous monitoring data, reports, studies etc. that substantiates this claim.

110. Volume 2, Section 2.1.3.1, Pages 19 and 20;
Volume 2, Section 2.1.3.2, Pages 20 and 21

The EIA states that the injection of water into the reservoir could cause significant water quailty concerns for wells in the Milk River aquifer by altering its chemistry, however the volumes due to leakage would be low.

The EIA further states that it is anticipated that these wells would be properly decomissioned prior to reservoir filling.

a. Provide the procedure and process to identify and reclaim all wells located in the Chin reservoir expansion footprint and the material used to reclaim each water well.

b. Who will be the responsible party to undertake and pay for this reclamation to ensure it meets all government requirements?

111. Volume 2, Section 2.1.3.2, Pages 20 and 21

SMRID states *Injection of reservoir water into the Milk River Formation via newly submerged Milk River Aquifer wells (Note '1' on Map Figure 2.1.4) could introduce oxygenated water, altering the redox conditions in the Milk River Aquifer resulting in mineral dissolution or precipitation or introduction of nutrients and bacteria resulting in biofouling. However, the ratio of reservoir leakage volumes through wells, to regional aquifer throughflow, makes this a low potential risk.*

The EIA report further states that it is anticipated that these wells would be properly decomissioned prior to reservoir filling.

a. Provide the procedure and process(s) used to identify and reclaim the wells located in the Chin reservoir expansion footprint and the material used to reclaim each water well.

b. Explain who the responsible party will be to undertake and pay for this reclamation to ensure it meets all government requirements.

c. Explain how the reclamation will be completed in accordance with the EPA Reclamation guidelines in the Water (Ministerial) Regulation and the Water Wells and Ground Source Heat Exchange Systems Directive.

112. Volume 2, Section 2.1.3.2, Pages 21 and 22

The EIA states that based upon water chemistry samples from wells completed in the Milk River Formation, the results appear to indicate that the water chemistry in these wells has not been negatively impacted by any reservoir water that may have moved vertically downwards through the Foremost and Lea Park Formations and mixed with the rocks in these formations to form poorer quality water that then impacts/alters the water quality of the Milk River Formation.

The EIA also states that since the current Chin Reservour has been in operation since 1955, (which is assumed to be an adequate amount of time for reservoir water to seep into the Milk River Aquifer) that the new exapasion of the reservoir will similarily have no anticipated impacts on Milk River Aquifer's water quality.

While approximately 70 years may seem like an adequate amount of time in most circumstances for cause and effect to occur it is known from literature that vertical hydraulic conductivity values

are generally 1- 2 orders of magnitude lower than those for horizontal hydraulic conductivity value, thereby subsequently impacting travel time calculations.

a. Provide the vertical hydraulic conductivity values and subsequent vertical travel time calculations for the movement of reservoir water between the surficial alluvial sediments and the Milk River aquifer to support the conclusion that 70 years is an appropriate amount of time.

113. Volume 2, Section 2.1.3.3, Pages 22 and 23

The EIA states that a three-dimensional steady-state numerical model of groundwater flow would be required to adequately determine the potential for soil salinity impacts from groundwater seepage downstream of the New East Dam. As a proxy a qualitative assessment was used that considered the long history of operation of the existing East Dam. The qualitative assessment involved the results of a single soil salinity mapping survey done in 1997, with no pre dam and reservoir conditions to compare and contrast against. Since the survey identified only negligible impacts the conclusion was made that no new impacts are anticipated from the reservoir expansion.

a. Explain the rationale as to why a three-dimensional steady-state model of groundwater flow was not completed.

114. Volume 2, Section 2.1.3.5, Page 23

SMRID states *There remain several unknowns relating to hydrogeology and groundwater conditions in the LSA. Given the size and complexity of the groundwater system within, under, and adjacent to Chin Coulee, it is impractical to attempt to quantify these unknowns over the area of the LSA. However, the hydrogeological system pertaining to the Expanded Reservoir is very similar to that of the Existing Reservoir and the latter has been in operation since 1955 with no apparent negative impacts to groundwater quantity or quality…it is reasonable to expect that the proposed reservoir expansion will not introduce any new negative impacts that cannot be mitigated with engineering design of the New East Dam*.

a. Provide evidence to support this statement. Including previous monitoring data from reports, studies, etc. that provides background data from the previous Chin Reservoir Project that would validate the above assumption.

b. Provide the monitoring sites/locations and the data from the previous Chin Reservoir Project.

c. Explain how collection, analysis, and quality control for the data was completed. In addition, indicate where this data is stored and how it can be accessed by EPA or when this information will be submitted to EPA for review.

115. Volume 2, Section 2.1.3.5, Page 23

SMRID states *Operational monitoring of groundwater downstream from the New East Dam will provide the data to verify these statements*.

a. Explain if there is more than one monitoring site. If there is only one monitoring site, provide the justification and rationale to show that this site is representative of all areas of concern.

b. Provide the locations of the operation monitoring sites that will be used to verify cause and effect.

c. Describe how the site(s) were chosen.

d. Provide a description of the types of data will be collected and who will be responsible for data collection.

e. Explain who will review the data, perform quality control of the data, and analyze and compare the results with previous baseline data.

f. Explain how long, at what intervals, and during what seasons the data will be collected?

g. Explain where the data be stored and who will have access to the data. How will this data be provided to EPA for review?

h. Describe the mitigation measures that are in place to address any negative impacts that might be identified during the monitoring and analysis of the data.

116. Volume 2, Section 2.1.4, Page 23

SMRID states that *aside from abandonment of Milk River Aquifer wells and orphaned gas wells no additional mitigation is anticipated for groundwater.*

a. Provide the mitigation measures and strategies for other potential groundwater concerns such as the production of new flowing wells outside the reservoir proper, groundwater seepage downstream of the New East Dam, and replacement of inundated water wells.

b. Provide justification if no mitigation plans or strategies for these additional groundwater concerns will be completed.

117. Volume 2, Section 2.1.5, Page 23

SMRID states *Due to the presence of a snake hibernaculum, groundwater investigations were restricted until after April 2022*.

Due to the hibernaculum, it appears that the location of the monitoring well(s) would have to be moved to allow for year-round access to the site.

a. Explain which monitoring well(s) are located near the snake hibernaculum.

b. Identify where the new monitoring well(s) would be located.

c. Explain who will conduct the drilling, installation and testing of the new well(s) to ensure they will collect the appropriate data to address any concerns with the Project.

d. Explain when the new well(s) will be constructed and when and how the results will be submitted to EPA for review.

e. Explain how moving the monitoring well(s) will affect the overall timeframe and goals of the Project in the context of the current monitoring regime.

118. Volume 2, Section 2.1.5, Pages 23

SMRID states *The groundwater monitoring network was instrumented…and these instruments continue to monitor groundwater levels in the project monitoring wells*.

SMRID also states that *periodic groundwater quality monitoring of flowing artesian Milk River Aquifer wells downstream of the New East Dam is also recommended.*

a. Provide the monitoring schedule and frequency of the groundwater monitoring network and artesian wells.

b. Explain who will be responsible to complete the monitoring, analyze the data, complete quality control, and assess if additional monitoring sites or samples are required.

c. Explain where the data will be stored and how will data be submitted to EPA for review.

119. Volume 2, Section 2.1.5, Page 23;
Volume 4-3

SMRID states *The environmental assessment is based on the data provided in the Hydrogeology TBR (Volume 4) and does not currently include groundwater quality monitoring through a full year, including a freshet. An update to the TBR and, potentially, to the environmental assessment is anticipated based on the acquisition of seasonal groundwater quality data*.

a. Provide the rationale as to why the EIA was submitted prior to a full year of groundwater quality monitoring being completed including a freshet. Provide the completed Hydrogeology TBR and revised Section 2.1 in the Supplemental Information Request (SIR) 1 response.

b. Discuss the mitigation strategies if new or additional groundwater concerns are identified from the data.

c. Provide a strategy or plan if additional monitoring is required. In addition, explain under what circumstances would additional monitoring be required.

120. Volume 4-3, Section 2.1.1, Map Figure 2.1, Page 7

The EIA references Map Figure 2.1, however, this Map Figure is not provided.

a. Provide the location in the EIA where Map Figure 2.1 is found. If it is not in the EIA, provide the map figure.

121. Volume 4-3, Section 3.3.2.2, Page 16

25 well logs are noted in the EIA within the LSA. However, only one cross-section was produced crossing back and forth across the Chin Coulee, but no cross section was produced perpendicular to Chin Coulee for comparisons of subsurface sediments and bedrock thicknesses and variability.

a. Provide additional cross sections to better understand and constrain the surficial and bedrock geology in the LSA.

122. Volume 4-3, Section 3.3;
Volume 4-3, Section 3.3.2.1, Page 16;
Volume 4-3, Map Figure 3.6;
Volume 5, Section 3, 3.2.1 [A] (a) and (b)

The final Terms of Reference states *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).

Given the inherent subsurface variability over such a large area the use of 1 monitoring well in each of the 4 identified physiographic areas does not appear to be representative of these spatially extensive physiographic areas.

a. Provide the justification for the use of 1 monitoring well in each of the 4 identified physiographic areas.

b. Provide confirmation of sand and gravel thicknesses using field data to verify the thicknesses mapped in Map Figure 3.6.

123. Volume 4-3, Section 3.5.2, Table 3.1, Pages 19;
Volume 4-3, Appendix IV

Having the most accurate aquifer parameters is of importance when determining the potential flow paths of these aquifer systems, the connection to one another, the surface water and potential leakage and flow to surrounding wells and springs resulting from the filling of the reservoir.

a. Explain why long-term pump tests were not conducted in all aquifer units identified in Table 3.1 given the increased accuracy of their results as compared to slug tests, which only provide short term snapshot estimates of the aquifer parameters close to the wellbore.

124. Volume 4-3, Section 3.5.2, Table 3.1, Page 19;
Volume 4-3, Section 4.5, Pages 27 and 28

There is potential for gradient changes to occur with the filling of the reservoir expansion specifically in wells that are not decommissioned/improperly decommissioned and between aquifers through bedrock cracks and fractures to overlying aquifer units.

a. Explain why vertical hydraulic gradients were not calculated between the various identified aquifer units in Table 3.1 (i.e. surficial deposits (2 aquifers)) and Foremost and Milk River Formations. Provide these calculations and a discussion of the results.

125. Volume 4-3, Section 3.5.2.2, Page 20;
Volume 5, Section 3, 3.2.1 [B] (a), (b), (c) and (d)

The final Terms of Reference states *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.

SMRID states *Well completions in the overburden were not identified. Lacking regional overburden information in the public domain, the flow in the overburden is described qualitatively as follows.*

The description of the hydrogeology in the Project area is lacking hydraulic head information of all major subsurface units identified (i.e. surficial allivium, Foremost and Lea Park Formations, not restricted to the Milk River Aquifer), groundwater flow directions and velocities (vertical and horizontal) within each unit and between units, groundwater-surface water interactions, cross sections, baseline water chemistry of all major units identified, zones of groundwater recharge identified, and inventory of groundwater use in the area.

a. Provide a response to the final Terms of Reference [B] (a), (b), (c), and (d).

126. Volume 4-3, Section 3.5.3, Table 3.2, Page 20;
Volume 4-3, Map Figure 4.2

None of the samples listed in Table 3.2 appear to be linked to any of the major subsurface units. If there are multiple samples representative from each unit and historical versus recent samples then these comparisons need to be provided. In addition, Map Figure 4.2 groundwater sampling locations do not appear to indicate a representative spread and coverage of these sites across the LSA, with the majority clustered around the New East Dam location.

a. Link the samples in Table 3.2 to the major subsurface units. If multiple samples are being used (historical and recent) then provide a comparison.

b. Explain how the groundwater sampling locations were chosen and how these are representative of the LSA.

127. Volume 4-3, Section 4.2, Page 23

SMRID describes the 4 monitoring well locations and the rationale for their selection, however the monitoring wells are only completed in the lower surficial sand and gravel alluvial unit or the upper Foremost Formation bedrock unit. None of the other major subsurface units have monitoring wells.

a. Explain why no other major subsurface units have monitoring wells.

128. Volume 4-3, Section 4.2, Page 23

Area B (Chin Coulee) is the most important area when determining if underlying aquifer units have the potential to cause increased flow, changes in flow direction, etc. resulting from the filling of the reservoir expansion.

a. Provide the justification as to why 3 of the 4 monitoring well locations were chosen based on their close proximity of the New East Dam.

b. Explain why more monitoring wells were not installed within the LSA, most importantly in Area B (Chin Coulee).

129. Volume 4-3, Section 4.3, Pages 24 and 25;
Volume 4-3, Appendix III

SMRID indicates that sand was observed in the following monitoring wells:

MW22-01 : 24.7-26.8 m (artesian conditions between 24.5-26 m)
MW22-02 : 0-2.1 m, 19.8-21 (initially dry)
MW22-03 : 4.6-6.4 m (wet)
MW22-04 : 21.6-22.9, 25-26.5

Each of these units appears to have the potential to have high hydraulic conductivity values even though some were intially dry. Therefore, they serve as preferential flow pathways by which water from lower aquifer units could potentially flow into and surcharge these units as a result of the filling of the reservoir. This could result in flow beyond the New East Dam of the reservoir.

a. Explain why screens not completed for each unit or at a minimum why a slug test was not conducted in each unit.

b. Explain why the water table level was not recorded or noted on the monitoring well logs. Provide the missing information.

130. Volume 4-3, Section 4.3, Pages 24

SMRID states *After well completion and a period for equilibration after well develoment, the depth to water on May 18, 2022 was 32.98 m bgs*.

a. Explain why the well screen was completed between 30.76 and 32.29 m bgs, as this is above the water level.

131. Volume 4-3, Section 4.4, Pages 25 and 26;
Volume 4-3, Appendix IV

Early-time data is typically more indicative of aquifer properties adjacent to the well, while late-time data is typically more indicative of aquifer properties at a distance from the well. The various properties and characteristics of the aquifer (i.e. thickness, grain size, hydraulic conductivity, etc.) result in different values after the inflection point/slope change.

Explain why in the Slug test:

a. Time-Displacement plots for BH21-03\VT21-01 only the Bouwer-Rice solution method was used in the analyses, while in the other monitoring well slug test analyses for confined aquifer models the Cooper-Bredehoeft-Papadopulos solution method (primarily applicable to confined aquifers) was also used to compare and contrast between the solution method results.

b. Time-Displacement plots for MW22-03 only the Cooper-Bredehoeft-Papadopulos solution method was used in the analyses, while in contrast MW22-01 and MW22-04 analyses used both the Cooper-Bredehoeft-Papadopulos and Bouwer Rice solution methods to compare and contrast between the solution method results.

c. Time-Displacement plots for MW22-04 using the Bouwer Rice solution method is matched to the late-time data points (i.e. after the inflection point/change of slope) to calculate the aquifer's k value, while in monitoring well numbers BH21-03\VT21-01, MW22-01 and MW22-02, the early-time portion data (i.e. after inflection point/change of slope) is matched.

d. Explain what properties of the aquifer(s) SMRID is most concerned with to best characterize the hydrogeology of the LSA. Explain if the concerns are aquifer properties near the well, the properties at a distance, or both, and provide the rationale for this decision.

e. Provide justification for the short duration slug tests, and evidence to show that the early-time data point matches using the Bouwer Rice solution method (i.e. 1000 seconds and under) are valid when determining accurate aquifer parameters.

132. Volume 4-3, Section 4.6.1, Page 40;
Volume 4-3, Figure 4.10, Page 44

SMRID provides a sodium-chloride water type conclusion for the overburden flow system. However, based on the data in the lower right anion triangle of the Piper Trilinear diagram it appears as though this should be sodium-sulphate rather than sodium-chloride.

a. Confirm if a sodium-chloride water type conclusion was used for the overburden flow system or if this should read sodium-sulphate. If a sodium-chloride water type conclusion was used, provide the rationale for how this conclusion was reached.

133. Volume 5, Section 3, 3.2.1 [C]

The final Terms of Reference states *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.

a. A response to this question has not been provided. Answer the final Terms of Reference question.

134. Volume 5, Section 3, 3.2.1 [D]

The final Terms of Reference states *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.*

a. A response to this question has not been provided. Answer the final Terms of Reference question.

135. Volume 5, Section 3, 3.2.2 [B] (b), (d), (f), and (h)

The final Terms of reference 3.2.2 [B] states: *Describe the nature and significance of the potential project impacts on groundwater with respect to:*
b) implications for terrestrial or riparian vegetation, wildlife and aquatic resources including wetlands;
d) conflicts with other groundwater users, and proposed resolutions to these conflicts;
f) potential implications of seasonal variations;
h) a discussion of the groundwater vulnerability below the proposed reservoir expansion and along the meltwater valley channel.

a. Responses to these questions have not been provided. Answer the final Terms of Reference questions.

136. Volume 5, Section 3, 3.2.2 [C]

The final Terms of Reference states *Detail the proposals, and/or mitigation strategies to protect the potential contamination of groundwater aquifers.*

a. A response to this question has not been provided. Answer the final Terms of Reference question.

137. Volume 5, Section 3, 3.2.2 [D]

The final Terms of Reference states *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.

a. A response to this question has not been provided. Answer the final Terms of Reference question.

5.3 Hydrology

138. Volume 1, Section 1.5, Page 9

SMRID states *Compared to baseline conditions, annual precipitation is projected to increase upstream of the diversion from Government of Alberta water resource infrastructure into the SMRID system (the diversion) (WaterSMART 2023). By 2021-2050, annual precipitation is projected to increase by roughly 100 mm/year relative to the 1991-2020 period. Increases are expected to be the greatest at lower elevations, due predominantly to the increase mostly occurring during the summer months, when convective storms have a less defined elevational gradient. By 2051-2080, annual precipitation is projected to decrease relative to 2021-2050, though relative to 1991-2020, annual precipitation is still projected to increase by approximately 100 mm/year (WaterSMART 2023).*

a. Provide and discuss the assumptions and calculations made for the future time periods annual precipitation increases.

139. Volume 1, Section 1.7, Page 12

SMRID states *The results of the hydrological modeling conducted by WaterSMART (2023) demonstrated that under predicted climate change conditions, RCP's 8.5 and 4.5, along with two scenarios of glaciers present and absent, the water supply to the SMRID is predicted to remain sufficient to fill the expanded Chin Reservoir.*

a. Explain the impacts of filling the expanded Chin Reservoir on storage volumes in the water supply headworks at the end of the irrigation operating season under the various scenarios modelled.

b. Explain if modelling of the various scenarios utilized target elevations in the water supply headworks reservoirs at the end of the irrigation operating season.

c. Explain if the modelling of the various scenarios identified any changes to the operation of the water supply headworks storage reservoirs in support for filling the expanded Chin Reservoir.

140. Volume 1, Section 2.1, Figure 2.1, Page 28

SMRID provides a table titled *Existing Chin Reservoir – Mean and Range of Reservoir Levels – 1994 to 2009* and *The average total diversion volume over 1992-2021 period is.*.

a. Provide justification for why the entire period of record for the existing project isn't being used to illustrate the mean and range of reservoir levels and average total diversion volume for the proposed project.

b. Provide justification for why the range of records used to illustrate the mean and range of reservoir levels and average total diversion volume provides a full representation of climatic and water supply conditions the project has historically operated under.

141. Volume 2, Section 2.2.1, Page 24

SMRID states *The RSA (Map Figure 1.1 in Volume 4: Hydrology TBR) included the SMRID infrastructure from Milk River Ridge Reservoir (MRRR) diversion to Medicine Hat in assessing surface water hydrology and the potential for cumulative effects from the Project. MRRR receives inflow from St. Mary Reservoir, which in turn receives from the Waterton Reservoir. Both reservoirs receive inflow from three headwater watersheds – Waterton River watershed, Belly River watershed, and St. Mary River watershed.*

a. Since both reservoirs receive inflow from three headwater watersheds, Waterton River watershed, Belly River watershed, and St. Mary River watershed, describe the impacts on the three headwater watersheds and Oldman and South Saskatchewan Rivers mainstem downstream of the diversion to the Project. Provide evidence to support these findings.

b. Explain mitigation measures to address the potential regional effects.

142. Volume 2, Section 2.2.2, Page 24

a. Provide map(s) showing climate and hydrology conditions in the Regional Study Area.

143. Volume 2, Section 2.2.2, Page 24

a. Provide details, including location, of existing flow monitoring and meteorological station(s) in the area.

144. Volume 2, Section 2.2, Page 24

a. Provide datasets used for hydrologic analysis.

145. Volume 2, Section 2.2.3, Page 28;
Volume 2, Section 2.2.3.2.2, Page 30

a. In addition to flood mitigation, explain the potential influence on low flows (e.g., 7Q10).

146. Volume 2, Section 2.2.3.1.2, Page 29;
Volume 5, Section 3, 3.3.2 [E]

SMRID evaluated impacts to licences in the footprint of the new reservoir, A description of impacts on water users downstream of the New East Dam were not provided.

The final Terms of Reference states *Describe the impacts on other surface water users resulting from the Project. Identify any potential water use conflicts.*

a. Describe the impacts on surface water users downstream of the New East Dam. Identify any potential water use conflicts.

147. Volume 2, Section 2.2.3.2.1, Page 30

Given the same operation of the upstream diversion infrastructure and SMRID's water license, it is expected that water quantity will be reduced downstream of Chin Reservoir during a period of filling the enlarged portion of the reservoir over several years.

a. Discuss the potential effects on downstream water quantity during the period of filling the expanded portion of the reservoir.

148. Volume 2, Section 2.2.3.2.2, Page 30

SMRID states *With the expanded stormwater retention capability, it is estimated that all stormwater runoff entering the main canal between Ridge Reservoir and Chin Reservoir could be contained, resulting in zero outflow downstream of Chin Reservoir*.

The expanded Chin Reservoir should be infilled up to a normal condition, zero outflow downstream of Chin Reservoir under a Inflow Design Flood (IDF). The IDF seems to be overestimated with regard to flood mitigation capacity.

a. Provide the rationale as to how the IDF was estimated.

149. Volume 2, Section 2.2.3.2.3, Page 30

SMRID has repeatedly quoted WaterSMART modeling results to confirm no impacts on hydrology and a sufficient supply of water. The WaterSMART 2023 report is not listed in the references for review.

a. Provide charts and/or summaries of WaterSMART modelling results with and without Chin Reservoir Expansion Project for the following performance measures listed in "Adaptation Roadmap for the SSRB: Assessment of Strategic Water Management Projects to Support Economic Development in the South Saskatchewan River Basin (SSROM Phase 3) Final Report": Cross-border apportionment contribution, Flow less than 42 m3/s at the AB/SK border, minimum flows by year, and Oldman Shortages.

150. Volume 2, Section 2.2.3.2.1, Page 30

SMRID states *As the Chin Reservoir Expansion will operate under the existing conditions of SMRID's water license, changes in flow regimes from source rivers are not anticipated as it is assumed that changes to government-controlled water allocation will not change.*

a. Provide evidence to support this assumption.

b. Explain how the downstream water quantity and pattern will be impacted, comparing conditions before and after the project, and indicating the change in timing and quantifying the magnitude of the impact.

c. Explain mitigation measures to address the potential regional effects.

151. Volume 2, Section 2.2.3.2, Page 30 and 31

a. Explain the difference in timing and magnitude of potential regional effects on in-stream flow needs and water conservation objectives, including impacts on the three headwater watersheds and Oldman and South Saskatchewan Rivers mainstem downstream of the diversion to the project, and comparing conditions before and after the Project. Provide evidence to support these findings.

b. Explain the difference in timing and magnitude of potential regional effects on other surface water users, including impacts on the three headwater watersheds and Oldman and South Saskatchewan Rivers mainstem downstream of the diversion to the Project, comparing conditions before and after the Project. Provide evidence to support these findings.

c. Explain mitigation measures to address the potential regional effects.

152. Volume 2, Section 2.2.6, Page 32;
Volume 5, Section 11 [B]

The final Terms of Reference states *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.

SMRID states *Monitoring requirements related to hydrology have not been identified.*

a. Provide justification as to why a monitoring plan has not been identified.

b. When will the monitoring plan will be prepared, and how will it be submitted to EPA for review?

c. If a monitoring plan has been prepared, provide the plan.

153. Volume 4-1, Section 2.1.2, Figure 2.1, Page 5

Figure 2.1 is mentioned in Section 2.1.2, but it is not provided in Volume 4-1 TBR. The Figure 2.1 citation is linked to the monthly temperature graph.

a. Provide the correct Figure 2.1.

154. Volume 4-1, Section 2.2, Page 6

SMRID states that *Nearby Environment Climate Change Canada (ECCC) climate stations were identified..*

a. Provide a map showing the spatial distribution of ECCC stations and the Chin Reservoir.

155. Volume 4-1, Section 2.2, Table 2.2, Page 6

Table 2.2 shows two climate normal periods: 1971-2000 and 1981-2010.

a. Explain why the two climate periods were not provided for all of the stations.

156. Volume 4-1, Section 2.2.1, Page 6

SMIRD states that *The comparison of 1971-2000 and 1981-2010 climate normal data shows that the low winter temperatures increase, with the mean monthly temperature between 5°C and -9°C.*

a. Explain why a trend detection method wasn't used to detect temperature change between the two climate time periods.

157. Volume 4-1, Section 2.2.2, Table 2.3, Page 8

SMIRD states that *The comparison of 1971-2000 and 1981-2010 annual precipitation shows that the average annual precipitation remains similar (+/- 5%) between the two 30-year periods.*

a. Explain why a trend detection method wasn't used to detect precipitation change between the two climate time periods.

158. Volume 4-1, Section 2.2.2, Figure 2.5 and 2.6, Page 9 and 10

SMIRD states that *The comparison of 1971-2000 and 1981-2010 climate normal data shows that the June precipitation increased in 1981-2010 (June precipitation exceeding 60 mm) compared to the previous 30-year estimate.*

a. Explain how this conclusion was reached based on Figure 2.5 and Figure 2.6.

b. Provide evidence to support how this conclusion was reached based on Figure 2.5 and Figure 2.6.

c. Include a figure that shows the difference between 1971-2000 and 1981-2010.

159. Volume 4-1, Section 2.3, Table 2.5, Page 11

Table 2.5 suggests that there will be no runoff generated, therefore the reservoir will be recharged solely by diverting from St. Mary Reservoir. Throughout most of the year, the Chin Reservoir catchment area does not have enough water to meet existing demand.

a. Explain where water for the Chin Reservoir Expansion would come from.

b. Explain how demand for water would be met in instances where St. Mary's reservoir is low.

160. Volume 4-1, Section 3.1.2, Page 17

Despite being titled *Chin Reservoir and Stafford Reservoir Water Balance* this section only considers inflow and outflow which is not a complete water balance analysis.

a. Provide a complete water balance analysis (1994– 2023) showing past and projected balances for the Chin Reservoir and Stafford Reservoir

161. Volume 5, Section 3, 3.3.1 [B]

No inventory of licensed water users was included for either the RSA or the LSA.

The final Terms of Reference states *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*.

a. 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.

5.4 Surface Water Quality

162. Volume 2, Section 1.7, Page 10 and 11;
Volume 2, Section 2.3.5, Page 39

Section 2.3.5 refers to Section 1.7 however, Section 1.7 does not seem to contain the information described. It seems to be an error.

a. Provide the correct section that discusses the methods and ranking used to assess residual effects on surface water quality.

163. Volume 2, Section 2.3.2.3, Page 34;
Volume 4-2

The SMRID states that *Sediment in Chin Reservoir was found to be silty sand to silty clay with trace sand.*

Based on the context and description in Volume 4-2 TBR, the sediment quality is described only for the grab samples collected from the reservoir bed surface.

a. Provide an assessment for Total Suspended Solids (TSS) in waterbodies and the quality of suspended sediment.

164. Volume 2, Section 2.3.6, Page 42

The SMRID states that *an adaptive management plan is to be developed to monitor water quality parameters. SMRID will implement a detailed sampling schedule to track water quality parameters at various stages of the filling process.*

a. Explain why the adaptive management plan was not developed prior to the EIA being submitted. In addition, how will this plan be communicated to EPA so it can be reviewed?

b. If the adaptive management plan has been developed, provide the plan.

165. Volume 2, Section 2.3.2;
Volume 4-2, Section 2.2.4, 2.2.5, and 2.2.6;

Volume 4-2 Section 3.1;
Volume 4-2, Section 3.3, Figures 3.3–3.10;
Volume 4-2, Appendix I and II;
Volume 5, Section 3, 3.4.1 [A]
The Final Terms of Reference states *Describe the baseline water quality of water courses and water bodies (current Chin Reservoir and downstream (natural or man-made) bodies of water).*

Only raw data was found in Appendix I and Appendix II for parameters listed in Sections 2.2.4, 2.2.5, and guideline exceedances in Section 2.2.6 of Volume 4-2 TBR, but actual descriptions of water quality were only provided for very select parameters in Section 3.3 (Figures 3.3 to 3.10) of Volume 4-2 TBR and Volume 2, Section 2.3.2.
A description should include additional parameters and an increased level of complexity in describing the results but a sufficient description was not found for all parameters.

Volume 4-2 TBR Section 2.2.6.1 states *For guidelines related to the protection of irrigation where guidelines varied for crops and livestock, the appropriate guideline was based on the dominant agricultural practice in the RSA.*
Guideline comparisons should include the most sensitive crop grown in the RSA (not only on the dominant crop).

Volume 4-2 TBR, Section 3.1 states *Surface water quality was compared to the applicable guidelines for the PAL, irrigation and livestock and summarized in Appendix I: Tables I.1 to I.8 and Appendix II: Tables II.1 to II.3 for historic data*. Providing highlighted raw data for select guideline exceedances is not a description.
Identifying guideline exceedances with italics or underlining is difficult to see in the small font and thick cell bordering.

Answer the final Terms of Reference by:

a. Describing the baseline water quality that the raw data embodies for all parameters in the Appendix Tables using descriptive text and graphs.
b. Describing and summarizing guideline exceedances for all parameters that have guidelines and for all types of guidelines individually (Irrigation, livestock, recreation, protection of aquatic life, etc.), for parameters that have multiple. Ensure that all guideline values for all parameters are included as some guidelines are missing in the current Appendix Tables.
c. Providing guideline comparisons to the most sensitive crop grown in the RSA (not only on the dominant crop).
d. Providing the Appendices in different highlighting (e.g. full cell fill coloring) to identify guideline exceedances (PAL (Acute, Chronic), Irrigation, Livestock etc.).

166. Volume 2, Section 2.3;
Volume 2, Appendix 7;
Volume 4-2, Section 3.3;
Volume 5, Section 3, 3.4.1 [A];
Volume 5, Section 3, 3.4.2 [C]
The final Terms of Reference Section 3.4.1 [A] states *Include water quality for high flow events (1 in 20-year and 1 in 100-year and 1 in 300-year) under current conditions.*

The final Terms of Reference Section 3.4.2 [C] also states *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.*

Information in response to Section 3.4.1 [A] was not found in the EIA sections referenced (Volume 4-2, Section 3.3**)**. For Section 3.4.2 [C], Volume 2, Section 2.3 or Appendix 7 did not appear to include the three high flow event scenarios in the analysis and Appendix 7 states *the model was deemed sufficiently representative of the Chin Reservoir System without any further efforts to specifically model the effects of rare storm events (1:20, 1:100, 1:300) on the system.*

The final Terms of Reference asks for ' high flow' events not 'rare storm' events.

The Volume 2, Section 2.3 information and the statement provided in Appendix 7 is insufficient to address changes in water quality due to variable changes in flow.

Answer the final Terms of Reference by:

a. Providing a description of water quality for high flow events (1 in 20-year and 1 in 100-year and 1 in 300-year) under current conditions for all parameters as required by the Baseline Section 3.4.1 [A] of the final Terms of Reference.

b. Providing a description of predicted water quality for high flow events (1 in 20-year and 1 in 100-year and 1 in 300-year) under expected conditions for all parameters as required by the Impact Assessment Section 3.4.2 [C] of the final Terms of Reference.

167. Volume 2, Section 2.3.2.2, Page 34;
Volume 2, Appendix 7;
Volume 4-2, Section 3.3.3;
Volume 4-2, Appendix III;
Volume 5, Section 3, 3.4.1 [A]

The final Terms of Reference Section 3.4.1 [A] states *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.)*

The Baseline Surface Water Quality summaries provided in Section 3.3.3 of Volume 4-2 TBR describes the water quality in Watercourse 126419 as poor quality with multiple elevated concentrations and guideline exceedances. This is reiterated in Volume 2 Section 2.3.2.2, and in Appendix III of Volume 4-2 TBR. It is also mentioned in the Volume 2 Appendix 7 but only for a very few select parameters.

a. Answer the final Terms of Reference by describing why water quality is poor in this area and demonstrate (with modelling or science) how the source will impact the water quality in the expanded reservoir after mixing (and if any guideline exceedances are expected) for all parameters.

168. Volume 4-2, Section 3.3;
Volume 4-2, Section 3.3, Figure 3.2–3.10;
Volume 4-2, Appendix I and II;
Volume 5, Section 3, 3.4.1 [A]

The final Terms of Reference Section 3.4.1 [A] states *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.)*

The Baseline Surface Water Quality descriptions provided in Section 3.3 of Volume 4-2 TBR are insufficient. The EIA only provides descriptive details for select Physical Parameters (depth/pH), Major Ions and Nutrients (phosphorus only) (Figures 3.3 to 3.10), while there is insufficient information provided for Metals, Hydrocarbons, PAH's, Bacti, Organic and Phenol, and methyl-mercury. Pesticide results for sites sampled in 2021 and 2022 were not found at all in Section 3.3 of the EIA. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions.

a. Answer the final Terms of Reference by providing figures, graphs, and descriptions for all parameters.

b. Provide pesticide results and descriptions for 2021 and 2022 sampling and include pesticide sampling in future monitoring.

169. Volume 4-2, Section 3.2, Page 19;
Volume 4-2, Section 3.2, Figure 3.1 and 3.2, Page 20 and 21;
Volume 5, Section 3, 3.4.1 [A]

The final Terms of Reference states *Provide a summary of existing information available from literature review(s).*

Other than the Alberta Agriculture and Forestry-Irrigation District Water Quality (AAF-IDWQ) project information (Section 3.2 of Volume 4-2 TBR), a literature review was not found in the EIA.

The AAF-IDWQ project information provided (Section 3.2 of Volume 4-2 TBR) is incomplete. The AAF-IDWQ summary provided in Section 3.2 of Volume 4-2 TBR mentions a water quality index (WQI), but index results are not provided for each station in the appendix of the EIA and the external reference indicates an unconventional combined general/pesticide WQI which could mask important results.

The AAF-IDWQ summary mentions a water quality index (WQI) and indicates a rating for irrigation, livestock, and protection of aquatic life but the external reference does not concretely confirm this.

The AAF-IDWQ summary only provides analysis for Ions and TDS (Figures 3.1 & 3.2) for spatial and temporal patterns and trends and information on chosen statistic was not found for each test ran.

Answer the final Terms of Reference by:

a. Providing a summary of existing information available from literature review(s).

b. Providing the WQI results for each station and each WQI sub-grouping (Routine, Nutrients, Metals, Pesticide) and not a combined general/pesticide WQI.

c. Providing evidence that all protection of aquatic life guidelines were included in the WQI calculations for all parameters and guideline types (AAF 2021a) and that sub-indices are not combined (i.e. general/pesticide).

d. Providing figures and graphs similar to Figures 3.1 & 3.2 for all parameters and provide the results for all statistical trend analysis results (including which statistic was chosen (Mann Kendall or Seasonal Mann Kendall) for each.

170. Volume 2, Section 2.3.2, Page 33;
Volume 2, Section 2.3.3.2.5, Page 37;
Volume 2, Section 2.3.4, Page 37;
Volume 5, Section 3, 3.4.2 [A]

The final Terms of Reference states *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.*

In the Volume 2 Section 2.3.2 and Section 2.3.4, impacts of project activities are described in some detail but minimal detail is provided to address potential impacts in Section 2.3.3.2.5 Potential Regional Effect and the frequency duration, magnitude, and seasonality of each was not found.

a. Answer the final Terms of Reference by expanding on Potential Regional Effects to water quality including determining their frequency, duration, magnitude, and seasonality during all stages of the Project, at a local and regional extent.

171. Volume 2, Section 2.3;
Volume 2, Appendix 7, Page 1 and 2;
Volume 2, Appendix 7, Table 1, Page 3;
Volume 2, Appendix 7, Figure 3 and 4, Page 7 and 8;
Volume 2, Appendix 7, Table 4, 5 and 6, Page 9 and 10;
Volume 2, Appendix 7, Figure 19, Page 20;
Volume 4-2, Appendix I and II;
Volume 5, Section 3, 3.4.2 [B] (a), (b) (i)-(ix), (c) and (d)

Volume 2 Section 2.3 references Appendix 7.
INTERA Figure 19 indicates increased downstream observed values for Arsenic, Lead and Mercury but an assessment of 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 for these metals or other metals was not found in the EIA.

INTERA states *The models do not estimate the incremental filling of the reservoir, salinity, or nutrient water quality, as those would involve further complex efforts to analyze which are beyond the scope of this work.*

INTERA states *Nutrient water quality was not explicitly modeled. However, using existing water quality in the Chin Reservoir system as an analog, future water quality with the expanded reservoir volume can be reasonably estimated*. And that incremental filling scenarios*…were not modeled, due to the difficulty of representing the complex interactions.*

Nutrients are commonly increased during reservoir filling from extensive erosion and should not be overlooked. *Difficulty of representing the complex interactions* is not a reason for not completing the modelling.

INTERA Table 1 shows high Nutrient values for Total Phosphorus (TP) and Total Nitrogen (TN) indicating the need for modelling these parameters.

INTERA states *The observations from the existing reservoir indicate that neither conductivity nor salinity are currently an issue. Safe conductivity values should be in the range of 200 to 800 µS/cm. There is a potential for salt to leach from the soils and into the reservoir during the incremental filling stages, but once connected to the full reservoir, the salinity would quickly equilibrate to the low values characterizing the existing reservoir salinity…*

INTERA Figure 3 and 4 and Table 4, 5 and 6 indicate high electrical conductivity (EC), sodium adsorption ratio (SAR) and salinity results. INTERA states *The impact of the increased salinity is difficult to assess at this time due to insufficient data with which to estimate salt mass in the area*

There is salinity data available (especially in Appendix I and II) as well as other publicly available data sources and being difficult to assess is not justification for not completing the modelling.

The final Terms of Reference section 3.4.2 [B] states *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*…for aspects in all sub clauses listed in bullet [B].

a. Answer the final Terms of Reference 3.4.2 [B] (a), (b) (i)-(ix), (c) and (d) by providing descriptions and predictions of 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 for all parameters that have the potential to be affected by the project.

172. Volume 2, Section 2.3;
Volume 2, Section 2.3.6, Page 42;

Volume 2, Appendix 7;
Volume 5, Section 3, 3.4.2 [B] (a)

The final Terms of Reference states *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;

Volume 2, Section 2.3.6 The Monitoring Requirements section states that *The adaptive management plan should include contingency plans for scenarios where concentrations approach or exceed water quality guidelines.*
Water quality guidelines are not designed to be pollute up to levels and adaptive management plans should include evaluations for undesirable change (before approaching guidelines).

Volume 2 Section 2.3 references Appendix 7 which addresses this part of the final Terms of Reference specific to guideline exceedances, but only with mass balance modelling for four parameters (Arsenic, Cadmium, Lead, Mercury, Selenium) and analysis or modelling was not found for nutrients, dissolved oxygen, blue-green algae or salts. Moreover, analysis or modelling was not found in the EIA for the remaining parameters with guidelines.

Volume 2 Appendix 7 does not provide a reference citation for the model used (if trademarked) or provide a detailed description of how the model works (e.g. mathematics), is calibrated or the merits of its robustness if self-developed (e.g. accepted as part of a peer reviewed publication, or other confirmation of scientifically defensible approach).

A reference to the South Saskatchewan Regional Plan (SSRP) Surface Water Quality Management Framework (SWQMF) was not found in the EIA in Volume 4-2 TBR or Volume 2, Section 2.3.

Answer the final Terms of Reference by:

a. Providing a modelled response or other scientifically defensible approach to the final Terms of Reference question for predicting potential changes in downstream guideline exceedances for all parameters that have guidelines, and include all types of guidelines (Irrigation, livestock, recreation, protection of aquatic life, etc.) for parameters that have multiple guidelines.
b. Providing a revised statement to Volume 2, Section 2.3.6, Page 42 to reflect an adaptive management plan that includes undesirable change.
c. Providing the reference citation for the model used or a detailed description of the model workings and confirmation of the model as a scientifically defensible approach.
d. Describing and predicting 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 predicting changes in water quality that may exceed triggers for mainstem reaches in the Surface Water Quality Management Framework included as part of the South Saskatchewan Regional Plan.

173. Volume 2, Section 2.3;
Volume 2, Appendix 7;
Volume 5, Section 3, 3.4.2 [B] (b) (i)

The Final Terms of Reference states *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: 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,*

While information was provided for current and past water quality in the local and regional study areas the parameters reported on were not comprehensively described and not fully representative of all of the parameters (key parameters) that could be influenced by the project. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions. Moreover, the full final Terms of Reference requirement is to use modelling or other scientifically defensible approach for descriptions and predictions, of changes in concentrations, loading amounts and timing of key water quality parameters including routine parameters during site preparation, construction, operation, maintenance, decommissioning and reclamation and addressing impacts on their use as a drinking water supply, recreation, agriculture, domestic use, aesthetics, and other water uses. While section 2.2.3 and Appendix 7 mention select potential impacts, all aspects of this clause are required by the final Terms of Reference, but all aspects were not found in the EIA.

a. Answer the final Terms of Reference by using modelling or other scientifically defensible approach for all parameters that have the potential to be influenced by the project. For each parameter both comprehensively describe and predict changes in each concentrations, loading amounts, and timing during each project stage including site preparation, construction, maintenance, decommissioning and reclamation and for each water use including drinking water supply, recreation, agriculture, domestic use, aesthetics, and other.

174. Volume 2, Section 2.3;
Volume 2, Appendix 7;
Volume 4-2;
Volume 5, Section 3.4.2 [B] (b) (ii)

The Final Terms of Reference states *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:*

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:

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,

While information was provided for current and past water quality in the local and regional study areas the parameters reported on were not comprehensively described and were not fully representative of all of the parameters (key parameters) that could be influenced by the project. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions. Moreover, the full final Terms of Reference requirement is to use modelling or other scientifically defensible approach for descriptions and predictions, of changes in concentrations, loading amounts and timing of key water quality parameters including routine parameters during site preparation, construction, operation, maintenance, decommissioning and reclamation and addressing impacts for potential implications to water quality due to the water drawn during the initial filling of the project. All aspects of this clause are required by the final Terms of Reference, but all aspects were not found in the EIA.

a. Answer the final Terms of Reference by using modelling or other scientifically defensible approach for all parameters that have the potential to be influenced by the project. For each parameter both comprehensively describe and predict changes in each concentrations, loading amounts, and timing during each project stage including site preparation, construction, maintenance, decommissioning and reclamation to identify potential implications to water quality due to the water drawn during the initial filling of the project.

175. Volume 2, Section 2.3;
Volume 2, Appendix 7;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [B] (b) (iii)

The Final Terms of Reference states *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: 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:*

iii) potential implications to aquatic resources (e.g., aquatic and benthic invertebrates, biota, vegetation, algae, biodiversity, habitat),

While information was provided for current and past water quality in the local and regional study areas the parameters reported on were not comprehensively described and were not fully representative of all of the parameters (key parameters) that could be influenced by the project. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions provided. Moreover, the full final Terms of Reference requirement is to use modelling or other scientifically defensible approach for descriptions and predictions, of changes in concentrations, loading amounts and timing of key water quality parameters including routine parameters during site preparation,

construction, operation, maintenance, decommissioning and reclamation and addressing impacts for potential implications to aquatic resources (e.g., aquatic and benthic invertebrates, biota, vegetation, algae, biodiversity, habitat). All aspects of this clause are required by the final Terms of Reference, but all aspects were not found in the EIA.

a. Answer the final Terms of Reference by using modelling or other scientifically defensible approach for all parameters that have the potential to be influenced by the project. For each parameter both comprehensively describe and predict changes in each concentrations, loading amounts, and timing during each project stage including site preparation, construction, maintenance, decommissioning and reclamation to identify potential implications to aquatic resources (e.g., aquatic and benthic invertebrates, biota, vegetation, algae, biodiversity, habitat).

176. Volume 2, Section 2.3;
Volume 2, Appendix 7;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [B] (b) (iv)

The Final Terms of Reference states *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: 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:*

iv) changes in water quality due to seasonal and flow variation;

While information was provided for current and past water quality in the local and regional study areas the parameters reported on were not comprehensively described and were not fully representative of all of the parameters (key parameters) that could be influenced by the project. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions. Moreover, the full final Terms of Reference requirement is to use modelling or other scientifically defensible approach for descriptions and predictions, of changes in concentrations, loading amounts and timing of key water quality parameters including routine parameters during site preparation, construction, operation, maintenance, decommissioning and reclamation and addressing impacts for changes in water quality due to seasonal and flow variation. All aspects of this clause are required by the final Terms of Reference, but all aspects were not found in the EIA.

a. Answer the final Terms of Reference by using modelling or other scientifically defensible approach for all parameters that have the potential to be influenced by the project. For each parameter both comprehensively describe and predict changes in each concentrations, loading amounts, and timing during each project stage including site preparation, construction, maintenance, decommissioning and reclamation to identify changes in water quality due to seasonal and flow variation.

177. Volume 2, Section 2.1;
Volume 2, Section 2.3;
Volume 2, Appendix 7;

Volume 4-2;
Volume 5, Section 3, 3.4.2 [B] (b) (v)

The Final Terms of Reference states *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:* 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:*

v) groundwater and surface water interactions,

While information was provided for current and past water quality in the local and regional study areas the parameters reported on were not comprehensively described and were not fully representative of all of the parameters (key parameters) that could be influenced by the project. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions. Moreover, the full final Terms of Reference requirement is to use modelling or other scientifically defensible approach for descriptions and predictions, of changes in concentrations, loading amounts and timing of key water quality parameters including routine parameters during site preparation, construction, operation, maintenance, decommissioning and reclamation and addressing impacts for changes in water quality due to groundwater and surface water interactions. The concordance table refers to Volume 2 Section 2.1 but insufficient information is found regarding the above clause. All aspects of this clause are required by the final Terms of Reference, but all aspects were not found in the EIA.

a. Answer the final Terms of Reference by using modelling or other scientifically defensible approach for all parameters that have the potential to be influenced by the project. For each parameter both comprehensively describe and predict changes in each concentrations, loading amounts, and timing during each project stage including site preparation, construction, maintenance, decommissioning and reclamation to identify changes in water quality due to groundwater and surface water interactions.

178. Volume 2, Section 2.3;
Volume 2, Appendix 7;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [B] (b) (vi)

The Final Terms of Reference states *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: 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:*

vi) changes in the quality of surface water runoff,

While information was provided for current and past water quality in the local and regional study areas the parameters reported on were not comprehensively described and were not fully representative of all of the parameters (key parameters) that could be influenced by the project. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions. Moreover, the full final

Terms of Reference requirement is to use modelling or other scientifically defensible approach for descriptions and predictions, of changes in concentrations, loading amounts and timing of key water quality parameters including routine parameters during site preparation, construction, operation, maintenance, decommissioning and reclamation and addressing impacts for changes in the quality of surface water runoff. All aspects of this clause are required by the final Terms of Reference, but all aspects were not found in the EIA.

a. Answer the final Terms of Reference by using modelling or other scientifically defensible approach for all parameters that have the potential to be influenced by the project. For each parameter both comprehensively describe and predict changes in each concentrations, loading amounts, and timing during each project stage including site preparation, construction, maintenance, decommissioning and reclamation to identify changes in the quality of surface water runoff.

179. Volume 2, Section 2.6;
Volume 2, Appendix 7;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [B] (b) (vii)

The Final Terms of Reference states *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: 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:*

vii) implications to the health and extent of riparian lands

While information was provided for current and past water quality in the local and regional study areas the parameters reported on were not comprehensively described and were not fully representative of all of the parameters (key parameters) that could be influenced by the project. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions. Moreover, the full final Terms of Reference requirement is to use modelling or other scientifically defensible approach for descriptions and predictions, of changes in concentrations, loading amounts and timing of key water quality parameters including routine parameters during site preparation, construction, operation, maintenance, decommissioning and reclamation and addressing impacts for implications to the health and extent of riparian lands. The concordance table refers to Volume 2 Section 2.6 but insufficient information is found regarding the above clause specifically for water quality changes due to changes is riparian lands. All aspects of this clause are required by the final Terms of Reference, but all aspects were not found in the EIA.

a. Answer the final Terms of Reference by using modelling or other scientifically defensible approach for all parameters that have the potential to be influenced by the project. For each parameter both comprehensively describe and predict changes in each concentrations, loading amounts, and timing during each project stage including site preparation, construction, maintenance, decommissioning and reclamation specifically regarding water quality changes due to possible implications to the health and extent of riparian lands.

180. Volume 2, Section 4.2;
Volume 2, Appendix 7;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [B] (b) (viii)

The Final Terms of Reference states *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: 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:*

viii) impacts in the event of a catastrophic failure of the structure

While information was provided for current and past water quality in the local and regional study areas the parameters reported on were not comprehensively described and were not fully representative of all of the parameters (key parameters) that could be influenced by the project. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions. Moreover, the full final Terms of Reference requirement is to use modelling or other scientifically defensible approach for descriptions and predictions, of changes in concentrations, loading amounts and timing of key water quality parameters including routine parameters during site preparation, construction, operation, maintenance, decommissioning and reclamation and addressing all possible impacts in the event of a catastrophic failure of the structure. The concordance table refers to Volume 2 Section 4.2 but insufficient information is found regarding the above clause for water quality changes due to catastrophic structure failure. All aspects of this clause are required by the final Terms of Reference, but all aspects were not found in the EIA.

a. Answer the final Terms of Reference by using modelling or other scientifically defensible approach for all parameters that have the potential to be influenced by the project. For each parameter both comprehensively describe and predict changes in each concentrations, loading amounts, and timing during each project stage including site preparation, construction, maintenance, decommissioning and reclamation specifically for water quality changes for all parameters to address all possible impacts in the event of a catastrophic failure of the structure.

181. Volume 2, Section 2.3;
Volume 2, Section 4.2;
Volume 2, Appendix 7;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [B] (b) (ix)

The Final Terms of Reference states *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: 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:*

ix) impact on creek banks during flood events;

While information was provided for current and past water quality in the local and regional study areas the parameters reported on were not comprehensively described and were not fully representative of all of the parameters (key parameters) that could be influenced by the project. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions. Moreover, the full final Terms of Reference requirement is to use modelling or other scientifically defensible approach for descriptions and predictions, of changes in concentrations, loading amounts and timing of key water quality parameters including routine parameters during site preparation, construction, operation, maintenance, decommissioning and reclamation and addressing all possible impacts impact on creek banks during flood events. The concordance table is blank but assumedly refers to Volume 2 Section 4.2, however insufficient information is found regarding the above clause for water quality changes due to impacts on creek banks during flood events. All aspects of this clause are required by the final Terms of Reference, but all aspects were not found in the EIA.

a. Answer the final Terms of Reference by using modelling or other scientifically defensible approach for all parameters that have the potential to be influenced by the project. For each parameter both comprehensively describe and predict changes in each concentrations, loading amounts, and timing during each project stage including site preparation, construction, maintenance, decommissioning and reclamation specifically for water quality changes to address all possible impacts on creek banks during flood events.

182. Volume 2, Section 2.3;
Volume 2, Appendix 7;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [B] c)

The Final Terms of Reference states *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: c) the level of uncertainty derived from the models and tools used in the analysis*

The full final Terms of Reference requirement is to use modelling or other scientifically defensible approach for descriptions and predictions, 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.
The modelling that was provided in Appendix 7 addresses uncertainties in data as an argument for not doing a complete analysis but an assessment about the level of uncertainty derived from the models and tools that were used in the analysis was not found in the EIA.

a. Answer the final Terms of Reference question by addressing the level of uncertainty derived from the models or other scientifically defensible approaches used in the analysis of all parameters that have the potential to be influenced by the project, to both describe and predict changes in each concentrations, loading amounts and timing during all stages of the Project (site preparation, construction, operation, maintenance, decommissioning and reclamation) for each parameter.

183. Volume 2, Section 2.3;
Volume 2, Section 3;

Volume 2, Appendix 7;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [B] (d)
The Final Terms of Reference states *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: d) any limitations of expected water quality on municipal/domestic use, recreational use, fisheries, stock watering or other uses.*

While information was provided for current and past water quality in Section 3 and in the local and regional study areas, the parameters reported on were not comprehensively described and were not fully representative of all of the parameters (key parameters) that could be influenced by the project. The suite of parameters where data is available is numerous for the tables SMRID provided in appendices and should be used to provide summaries and descriptions. Moreover, the full final Terms of Reference requirement is to use modelling or other scientifically defensible approach for addressing any limitations of expected water quality on municipal/domestic use, recreational use, fisheries, stock watering or other uses. All aspects of this clause are required by the final Terms of Reference, but all aspects were not found in the EIA.

a. Answer the final Terms of Reference by using modelling or other scientifically defensible approach for all parameters that have the potential to be influenced by the project. For each parameter both comprehensively describe and predict changes in each concentrations, loading amounts, and timing during each project stage including site preparation, construction, maintenance, decommissioning and reclamation to address any limitations of expected water quality on municipal/domestic use, recreational use, fisheries, stock watering or other uses.

184. Volume 2, Section 2.3;
Volume 2, Appendix 7, Table 2 and 3, Page 7-9;
Volume 2, Appendix 14, Section 5-5.2;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [D] (a)
The final Terms of Reference states *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

While some information was provided in Appendix 7 it was only for the four metals given as examples in the final Terms of Reference, which is insufficient and a description of the potential and implications for metals to enter the aquatic food chain including downstream bodies of water was not found in sufficient detail in the EIA. The submission provided in Volume 2 Appendix 14 sections 5.0 to 5.2 is an example of an informative level of detail, but it was not part of the water quality submission and is only for Mercury and not all metals that may impact water uses.

Data in Appendix 7 Table 3 Water Quality Limits is displayed in number format (e.g. Mercury PAL Acute 0.013 ug/L) while the data is displayed in Table 2 in scientific format (e.g. Mercury WQCR3-S 4.18E-02 which is 0.04 ug/L and an exceedance, although this is not mentioned in the

text). As this is a public document, do not display data in scientific format (8.00E-04) display all data as number format.

Concentration sum is not defined as it is used in the table caption.

INTERA Appendix 7 Table 3 displays water quality limits but is missing the Cadmium (acute and chronic) and Lead (chronic) guidelines for Freshwater Protection of Aquatic Life. While these metals guidelines are based on hardnes and must be individually calculated from tables they should also be included in the table, assessed, and results provided in respective tables (e.g. 7, 8, 9) and text in the EIA.

a. Answer the final Terms of Reference for all applicable metals parameters (not limited to those given "as examples" in the final Terms of Reference).

b. Answer the final Terms of Reference by addressing the potential and implications of metals entering the aquatic food chain including downstream bodies of water.

c. Display data consistently in number format.

d. Compare metals to all water use guidelines (and not a chosen subset).

185. Volume 2, Section 2.3;
Volume 2, Appendix 7, Table 1, Page 3-4;
Volume 2, Appendix 7, Page 1-2, and 20;
Volume 5, Section 3, 3.4.2 [E]

Volume 2 Section 2.3 references Appendix 7.
INTERA states *INTERA did not analyze a gradual reservoir filling scenario, nor were organic carbon, nutrient management, or other organic water quality parameters examined within the project confines* and *As the reservoir expands, the low flow rate is likely to increase at least slightly the growth of organics within the water volume, such as cyanobacteria/microcystin. However, like the nutrients above, these scenarios were not modeled, due to the difficulty of representing the complex interactions that determine the growth of such elements falling outside the scope.*

INTERA states *The models do not estimate the incremental filling of the reservoir, salinity, or nutrient water quality, as those would involve further complex efforts to analyze which are beyond the scope of this work.*

INTERA states *Nutrient water quality was not explicitly modeled. However, using existing water quality in the Chin Reservoir system as an analog, future water quality with the expanded reservoir volume can be reasonably estimated.* And that incremental filling scenarios*…were not modeled, due to the difficulty of representing the complex interactions.*

INTERA Table 1 shows high Nutrient values for TP and TN indicating the need for modelling these parameters.
Organic Carbon and Nutrients are commonly increased during reservoir filling from extensive erosion, are drivers of ecosystem productivity which influences drinking water treatment and should not be overlooked.

Difficulty of representing the complex interactions is not a reason for not completing the modelling.

The final Terms of Reference states *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).

Answer the final Terms of Reference by describing 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). Blue-green algae includes *cyanobacteria/microcystin.*

186. Volume 2, Section 2.3;
Volume 2, Section 3;
Volume 4-2, Appendix 1;
Volume 5, Section 3, 3.4.2 [H]

The final Terms of Reference states *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.

A description of mitigation measures to address all applicable parameters at all stages, were not sufficiently addressed (in Appendix 1 Tables) in the Volume 4-2 TBR, Volume 2 Section 2.3, Volume 2 Section 3 or do not seem to specifically address the subclauses regarding water quality.

Answer the final Terms of Reference:

a. for alterations in flow

b. for flood

c. for operations conflicts, and

d. for increased loading of parameters.

187. Volume 2, Section 2.3;
Volume 2, Section 3;
Volume 2, Section 4;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [I]

The final Terms of Reference states *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.*

No summary of the management plan to prevent or reduce impacts to surface water or a summary of a spill response plan were found in Volume 2 (Sections 2.3, 3, or 4) or Volume 4-2 TBR. Only reference to the need for them to be developed later were found.

Answer the final Terms of Reference by:

a. Providing a summary of the management plan to prevent or reduce impacts to surface water for all applicable parameters.

b. Providing a summary of a spill response plan for all applicable parameters.

188. Volume 2, Section 2.3;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [J]

The final Terms of Reference states *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.*

Discussion for all applicable parameters on cumulative effects or the surface water quality management framework was not found in the Volume 4-2 TBR or Volume 2, Section 2.3.

Answer the final Terms of Reference by:

a. Discussing the contribution of the Project to cumulative effects on water quality, including downstream (natural or manmade) bodies of water for all applicable parameters.

b. Discussing the implications to the South Saskatchewan Region - Surface Water Quality Management Framework and any other regional initiatives.

189. Volume 2, Section 2.3;
Volume 4-2;
Volume 5, Section 3, 3.4.2 [K]

The final Terms of Reference states *Discuss the impact of low flow conditions and in-stream flow needs on water quality and water and wastewater management strategies.*

Discussion was not sufficiently found in the Volume 4-2 TBR or Volume 2, Section 2.3. for all applicable parameters.

a. Answer the final Terms of Reference by discussing the impact of low flow conditions and in-stream flow needs on water quality for all applicable parameters.

190. Volume 2, Section 2.3.6, Page 41 and 42

A detailed monitoring plan for all stages of operations going forward was not found. Section 2.3.6 only mentions one parameter Total Suspended Solids but indicates a plan will be developed.

a. Provide a detailed monitoring plan including all parameters, stations, and frequency of monitoring.

191. Volume 2, Appendix 7, Page 5

INTERA states *Analysis of the spatial distribution of surface water sampling locations and the average constituent concentrations recorded at those locations revealed no significant spatial trends between the north and south ends of the chin reservoir.*

Statistical trend analysis does not use averages as input data, it must input raw data points.

a. Complete the methodology for spatial and temporal trends and seasonality analysis using raw data and following all assumptions of the statistics used. Provide statistical tests chosen and statistical analysis results for all parameters.

192. Volume 4-2, Table 2.2, Page 10

The SMRID states, *Sample Frequency* in the last column of Table 2.2.

The last column lists the sampling time rather than frequency.

a. Provide an updated table with the corrected title for sampling time and add a column for sampling frequency (e.g., bi-weekly or monthly).

193. Volume 4-2, Section 2.2.4, Page 14 and 15

SMRID lists parameters that were analyzed. E.coli and Total mercury were seemingly missed.

a. Provide an updated list to include E.coli and Total Mercury to future sampling.

194. Volume 4-2;
Volume 5, Section 3, 3.4.1 [A]

The final Terms of Reference states *Discuss the effects of seasonal and flow variations, other controlling factors, and temporal and spatial trends.*

A discussion was not sufficiently provided in Volume 4-2 TBR for all parameters sampled (and in the appendix tables). Some parameters are described in detail while others only mention some guideline exceedances.

a. Answer the final Terms of Reference by providing a discussion on the effects of seasonal and flow variations and temporal and spatial trends in the highest provided level of detail for all parameters with available data.

195. Volume 4-2, Appendix II, Table II.3;
Volume 5, Section 3, 3.4.1 [A];
Volume 5, Section 3, 3.4.2. [A], [B], [C], [H], [J], [K]

In the raw data provided in Table II.3 *Summary of Historic Pesticide Parameters*, 2,4-Dichlorophenoxyaceticacid (4-D) appears to be ubiqitous in the sample results at all locations. Some values are above guidelines. Except for these raw data tables and a brief mention of combined parameter results from a reference document, pesticides do not appear to be addressed in this section of the EIA.

a. Answer the final Terms of Reference by including a description of 2,4-D and all pesticides detected at the stations and a response as to how 2,4-D (and all pesticides detected) detection frequencies and concentrations will be influenced by the Project as per the final Terms of Reference 3.4.1 [A] and 3.4.2 [A], [B] (a), (b) (i) - (ix), (c), and (d), [C] [H] [J] [K].

196. Volume 5, Section 3, 3.4.1 [A]

The final Terms of Reference states *Describe the baseline water quality of water courses and water bodies (current Chin Reservoir and downstream (natural or man-made) bodies of water).*

a. Include available data on the Milk River Ridge Reservoir, SMRID main canal, Chin canal or other source water (upstream) data in the baseline information for Section 3.4 of the final Terms of Reference.

6 Terrestrial

6.1 Land Use and Land Management

197. Volume 2, Section 2.8

SMRID does not provide a discussion on the occupation of bed and shore of the newly created dam structure on crown lands.

a. Explain what type of disposition or how the occupation of Crown Lands, primarily the bed and shore area of the newly proposed reservoir site, will be obtained.

198. Volume 2, Section 2.8.4.1.2, Page 132;
Volume 2, Map Figure 2.8.25

The map of Public Lands refers to crown land dispositions that may be occupying future dam areas and becoming inundated. There are identified dispositions that may be affected by this change and not only a grazing lease.

a. Discuss the mitigation measures implemented by SMRID and provide details on how SMRID will discuss these potential impacts with all affected disposition holders.

b. Provide documentation of any discussions with the Lease and disposition holders.

6.2 Conservation and Reclamation

199. Volume 2, Section 2.5.4, Page 72

SMRID states *a site-specific conservation and reclamation plan (C&R Plan) will be developed.*

a. Explain why the site-specific conservation and reclamation plan was not developed prior to the EIA being submitted? In addition, how will this plan be communicated to EPA so it can be reviewed? If the plan has been developed, provide the plan.

200. Volume 2, Appendix 8;
Volume 5, Section 2, 2.9 [A]

The final Terms of Reference Section 2.9 [A] states *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.

It is unclear where the applicable maps are for the conservation and reclamation plans for all phases of the project.

a. Provide the section of the EIA where these maps are located.

b. If they are not in the EIA, provide the applicable maps.

201. Volume 5, Section 2.9

The concordance table only references Volume 2: Section 2.6 for Section 2.9 Conservation and Reclamation. SMRID confirmed that there is also conservation and reclamation content in Section 2.5. Appendix 8 is also missing from the concordance table.

a. Provide all sections where conservation and reclamation are addressed.

6.3 Terrain and Soils

202. Volume 2, Section 2.5, Page 63

a. Provide the data sources (e.g., soil survey) that were used for soil analysis under baseline conditions.

203. Volume 5, Section 3, 3.6.2 [A] (c)

The final Terms of Reference states *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:*
c) describe potential sources of soil contamination (e.g., industry infrastructure and activities, agriculture infrastructure and activities, contaminated sites, etc.), along with the appropriate remedial measures.

SMRID does not mention a plan for encountering unknown/undocumented contamination during construction. (i.e., old automotive battery pits, used oil disposal or anything buried from previous decades).

a. Provide a plan for encountering unknown/undocumented contamination during construction and operation. The plan should include identification, reporting, and possible next steps (i.e. phase 1 environmental site assessment (ESA), phase 2 ESA and remediation.

6.4 Vegetation and Wetlands

204. Volume 2, Section 2.1.3.1, Page 19

The SMRID states *Discharge to the coulee and the ephemeral stream east of the New East Dam could have two potential problematic effects. Areas of grazing land could become seasonally saturated, and a heightened water table could result in the salinization of soils along the base of the Chin Coulee.*

a. Explain if any wetlands may experience a change in classification or function as a result of this additional discharge. Describe the area and nature of changes to wetland classification or function that are anticipated.

205. Volume 2, Section 2.6.4.1.1, Page 86

SMRID states *Native seed mix will be applied at appropriate times to promote germination, growth, and reproduction of native grasses* and *native seed and root propagules of forbs will be conserved through the salvage and placement of topsoil.*

a. Provide the species included in the Native seed mix and discuss if wetland adapted species were included in the mix. Provide justification if wetland adapted species were not included.

b. Describe if wetland material salvaged will be reserved for reclamation of wetland impacts or if this material will be combined with upland materials.

206. Volume 2, Section 2.6.4.1.3, Page 87

SMRID states *Pre-disturbance surveys will be conducted to inventory wetland habitat to support an application for Approval under the Water Act (2000), and to identify opportunities to restore or enhance degraded wetlands to compensate for wetland impacts. Draining, infilling, inundating, or alteration (including vegetation clearing) of wetlands will be conducted in accordance with the conditions of a Water Act (2000) Approval. Permanently affected wetlands will be replaced by undertaking a wetland replacement or restoration project or by paying wetland replacement fees.*

Alberta Wetland Policy, and the supporting Alberta Wetland Mitigation Directive, places an emphasis on avoidance and minimization as preferable mitigation options for wetland impacts. The mitigation directive requires applicants to demonstrate that they have made concerted effort to avoid wetland impacts or minimize impacts prior to using replacement as a mitigation option. There is very high likelihood that some of the wetlands impacted by the proposed project will be A-value wetlands, (given location in area of high historic wetland loss and location in rare species areas), which at the time of *Water Act* application may require a comparative analysis of options, including at least one option that will avoid A-value wetland(s) entirely.

a. Describe the alternative locations for the reservoir that were considered that would avoid or minimize the loss of wetland area that will occur with the current proposed design. Explain why these alternative locations were not chosen.

b. Explain the alternative activities that were considered at the proposed location that would avoid impacts to wetlands. Explain why these alternative activities were not chosen.

c. Explain the modifications to the proposed design that were considered that might have avoided or minimized the area of wetland loss. Provide an explanation if no modifications were made to avoid or minimize wetland loss.

207. Volume 2, Section 2.6.4.1.3, Page 88

SMRID states *Where temporary disturbance and restoration of wetlands is anticipated, restoration will occur in accordance with a site-specific C&R Plan.*

a. Explain how wetlands will be restored in accordance with the Wetland Assessment and Impact Report Directive.

208. Volume 2, Section 2.6.5.1.3, Page 90

SMIRD states *It is anticipated that wetland replacement will be required to compensate for loss of wetland habitat, in accordance with the Alberta Wetland policy, which will offset the loss of*

habitat value resulting from the Project. As a result, residual adverse effects on wetland habitat are not anticipated.

Opportunities to replace wetlands have not been identified within the LSA.

a. Explain why permanent losses of wetland habitat are not reported as residual at the local scale.

209. Volume 5, Section 3, 3.7.2 [J]

SMRID did not address the final Terms of Reference 3.7.2 [J].

The final Terms of Reference states *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.*

a. 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.

b. Provide maps and figures indicating the locations and extent of associated local and regional water and/or irrigation infrastructure (canals, irrigation networks, water pipelines, etc.) that may arise after the completion of the reservoir expansion.

6.5 Wildlife

210. Volume 2, Section 2.7.4, Page 111-119;
Volume 4-7, Section 3.2.1, Page 19

SMRID states *No Burrowing Owls were detected during either survey. A single young of the year owl was observed on the fence line…*

Mitigation measures for potential Burrowing Owl (BUOW) nests were not provided.

a. Describe species-specific mitigation measures for potential BUOW nests.

211. Volume 4-7, Section 2.1, Page 4

a. Provide the shapefiles of the Project footprint (including all project components) that were used for the valued components.

212. Volume 4-7, Section 3.2.4, Page 21

a. Provide details on the snake surveys that were completed including GPS tracks, number of operators, weather conditions, and any ancillary observation (e.g., burrows).

7 Health

213. Volume 1, Section 1.13, Page 23;
Volume 2, Section 2.3.3.2.1, Page 35;
Volume 2, Section 2.3.3.2.2, Page 36

SMRID states *In addition to irrigation, the SMRID maintains agreements to provide water for other uses such as municipal water supply, stock watering, commercial and industrial use, wildlife habitat maintenance and enhancement, and recreation (Table 1.4). In addition, the SMRID has support agreements with 1536 households to supply domestic water from the irrigation portion of the annual licensed volume.*

SMRID states *The expansion of a reservoir can increase the occurrence and concentration of cyanobacteria, which can produce various toxins, including neurotoxins (e.g., anatoxins), hepatotoxins (e.g., microcystins), skin irritants, and other harmful substances which can be toxic to humans, livestock and wildlife (GoC 2018).*

SMRID states *The expansion of a reservoir can have potential effects on the inorganic water quality. Construction activities can disturb sediments, releasing metals such as arsenic, lead, mercury, and nickel into the water column.*

The Human Health Risk Assessment (HHRA) does not assess the potential risk of drinking water or recreational activity exposure pathways.

a. Provide an assessment of potential risk to human health associated with using the proposed reservoir water as a human drinking water and domestic water source as per Alberta Health (2019) guidance.

b. Provide an assessment of potential risk to human health associated with recreational use of the proposed reservoir as per Alberta Health (2019) guidance.

Alberta Health, Government of Alberta. August 2019. Guidance on Human Health Risk Assessment for Environmental Impact Assessment in Alberta, Version 2.0 ISBN: 978-1-4601-4359-9, https://open.alberta.ca/publications/9781460143599

214. Volume 2, Section 2.4.4.2.4, Page 59;
Volume 2, Appendix 14, Section 5, Pages 22;
Volume 2, Appendix 14, Section 6, Page 23

SMRID states *Based on the limitations of predicting mercury and methylmercury concentrations post-inundation and the fact that the baseline total mercury levels measured in walleye and northern pike from Chin Reservoir meet Alberta Health's (2019) criteria for issuing fish consumption advisories, the establishment of an environmental monitoring program after the expansion of the reservoir is expected to be the most effective way to determine the evolution of mercury concentrations in sportfish in Chin Reservoir.*

SMRID states *…it is expected that mercury concentrations in fish at Chin Reservoir will increase for approximately 4-6 years before beginning to decline*.

SMRID states *SMRID plans to monitor the mercury concentrations in fish from the Chin Reservoir over time. A methylmercury monitoring plan will be developed and shared with Alberta Environment and Protected Areas and Alberta Health*.

a. Confirm the conclusions of the HHRA and water quality assessment are that the Project is expected to result in an increased concentrations of methylmercury in fish tissue that would not meet current guidance for sportfish consumption.

b. Discuss any stakeholders concerns regarding this conclusion.

c. Discuss any Indigenous communities' concerns regarding this conclusion.

d. Provide details for the development of the proposed fish methylmercury monitoring plan.

215. Volume 2, Section 3.1, Page 151 and 152;
Volume 5, Section 2, 2.5 [B] (a), (b), and (c)

For response to the Air Emissions Management final Terms of Reference Section 2.5, SMRID refers to Volume 2: Section 3.1 (the HHRA). Although there is a discussion of potential air quality associated with the construction phase of the proposed Chin Reservoir Expansion project, the HHRA does not address subsections of Section 2.5 [B] (a), (b), and (c).

a. Provide correct references to the responses developed for the final Terms of Reference Section 2.5 [B] (a), (b), and (c).

216. Volume 2, Section 3.3.1.2, Page 153

SMRID states *The spatial boundary for identification of receptors for the noise assessment was defined as a 1.5 km area surrounding the proposed Project Footprint (Map Figure 3.3.1). The boundary was used to identify human and ecological receptors which may be exposed to noise impacts resulting from construction activities at the Project sites.* Figure 3.3.1 is difficult to locate in Volume 2.

a. Provide the location of *Map Figure 3.3.1 - Noise and Air Quality.*

217. Volume 2, Appendix 14, Section 2, Figure 2-2, Page 2

SMRID identifies two residential receptors in Figure 2-2; a discussion of receptor characteristics and types was not provided. SMRID also identified two recreational receptors; their locations are not identified in Figure 2-2 and receptor characteristics were not discussed.

A brief Google Maps search identified one of the residential receptors identified to potentially be the Evergreen Hutterite colony (population 99). The search also identified additional potential receptors seen south of the proposed dam's location. These included: Owen Oil (potential worker receptor), two potential farms (potential agricultural receptors) one east and one west of the Owen Oil location, and a second Hutterite colony (Prairie Home Farms, population 122) farther south. SMRID did not identify these receptors in the HHRA.

SMRID did not provide a discussion of the receptor types for potential receptors located near the proposed dam (e.g., agricultural, residential, worker, Indigenous). It is likely that some receptors are agricultural and therefore would be assumed to consume locally grown produce. Alberta Health (2019) guidance requires a description of potential receptor characteristics including assessment of individuals who may consume "country" or "natural foods" (i.e., Indigenous people and persons eating locally grown produce).

a. Provide a description of the receptor types and characteristic identified in Figure 2-2 and other receptors in the LSA and RSA.

b. Provide a description of the types and characteristics of human receptor identified (e.g., residential, agricultural, recreational, worker, Indigenous) and the age classes (e.g., infant, toddler, child, adult).

c. Provide a discussion with adequate supporting evidence for screening of any receptor types (residential, agricultural, recreational, worker, Indigenous)

d. Provide an adequate scientific rationale for exclusion of the consumption of local foods and traditional foods pathway.

Google map search, August 2024: https://www.google.com/maps/@49.5645327,-112.049986,8604m/data=!3m1!1e3!5m1!1e1?entry=ttu

The Hutterite Brethren: Colonies of North America (Evergreen Colony population 99; and Prairie Home, population 122)
https://storymaps.arcgis.com/stories/4ae1b9d48aee41d9a379d7c1946596e2

Alberta Health, Government of Alberta. August 2019. Guidance on Human Health Risk Assessment for Environmental Impact Assessment in Alberta, Version 2.0 ISBN: 978-1-4601-4359-9, https://open.alberta.ca/publications/9781460143599

218. Volume 2, Appendix 14, Section 4.3.2, Page 8

SMRID states *The conclusions of the Springbank Off-Stream Reservoir HHRA noted that "the emissions from the limited number of vehicles would not affect the regional air quality to a degree that could affect the health of the population" (Stantec 2018)*.

The Springbank HHRA reported Contaminant of Potential Concern (COPC) exceedances at numerous residential receptor locations (Springbank EIA, Volume 4, Appendix O Section 8) as follows:

- *Acute concentrations of PM2.5, for which both short-term (1-hour or 24-hour) and long-term (annual) ERs are greater than 1.0 at up to 18 of the 58 human receptor locations. Even with partial mitigations, model results indicate there could still be an unacceptable short-term risk to human health for residents and people adjacent to the PDA. Although concentrations of PM2.5 are expected to be lower than the modelled predictions, more intensive dust mitigation measures may be considered during the construction phase, including dust suppressants or water on haul roads on an as-needed basis during dry periods with high wind conditions.*
- *1-hour concentrations of DEP at some receptor locations may exceed the acute (2- hour) DEP exposure limit (maximum frequency of exceedances is less than 5%). Based on multiple studies on test subjects, Health Canada (2016b) concluded that at concentrations above the DEP exposure limit, healthy and/or mildly asthmatic participants may experience increased measures of airway resistance and/or respiratory inflammation. Additional mitigation that may be used to reduce PM2.5 exposures (such as adjusting the construction schedule to reduce the number of vehicles operating in an area during dry periods with high wind conditions) would also mitigate acute DEP exposures*.

Alberta Transportation provided an air mitigation and monitoring plan which included dust mitigation and an air monitoring program in response to an air quality round 2 SIR (IR4-04). The SIR was made in response to predicted Alberta Ambient Air Quality Objectives (AAAQO) exceedances in the Springbank air quality assessment.

a. Provide evidence that the mitigative measures proposed for the Springbank construction phase will be effective (*e.g.*, results of air monitoring data during the

Springbank construction phase, magnitude of air quality complaints, validation of the predicted air quality modelling results).

b. Discuss SMRID's plan for collecting and responding to potential air quality complaints during the construction phase of the proposed Chin Reservoir Expansion project.

Springbank EIA https://open.alberta.ca/dataset/ed520427-3b66-41c5-b36a-33fbdeaea9aa/resource/18aa2004-bed8-46d0-986d-0c80d5581971/download/vol_4_appo_public_health.pdf

IR4-04, page 107 / 256)
https://www.alberta.ca/system/files/custom_downloaded_images/trans-springbank-reservoir-ir-response-package-4-round-2.pdf

219. Volume 2, Appendix 14, Sections 4.3, 4.4 and 4.5, Pages 5-9

SMRID provides four historical project EIAs as supporting evidence for not completing an HHRA for the Chin Reservoir Expansion emissions. The oldest was completed 17 years ago and most current seven years ago (Dunvegan Project in 2007; Tazi Twé Hydroelectric Project in 2014; Cougar Creek in 2016; Springbank in 2018). Guidance for the assessment of criteria air contaminants has evolved over the last 17 years which may impact historical HHRA conclusions. Air quality objectives have been reduced and PM2.5 and NO2 have been defined as non-threshold contaminants.

a. Provide a discussion of changes in HHRA guidance and criteria air quality guidelines used in the historical projects compared to current guidance.

b. Provide discussion on how any changes would impact the conclusions of the SMRID HHRA conclusions.

220. Volume 2, Appendix 14, Pages 1-24

The SMRID HHRA did not follow standard risk assessment framework as described by Alberta Health (2019) (problem formulation, exposure assessment, hazard/toxicity assessment and risk characterization). Adequate scientific rationale was not provided to support screening out completion of a detailed HHRA.

a. Provide a problem formulation as per Alberta Health (2019) guidance which includes: a list of project related COPC, potential exposure pathways, potential receptor descriptions, and a conceptual site model (CSM).

b. The problem formulation should provide scientific rationale and discussion for the screening of COPC, receptor types and exposure pathways (including multimedia exposure and cumulative exposures) from a detailed HHRA.

c. The problem formulation should provide scientific rationale and discussion for the screening of the exposure assessment, hazard/toxicity assessment and risk characterization steps typical of an HHRA.

Alberta Health, Government of Alberta. August 2019. Guidance on Human Health Risk Assessment for Environmental Impact Assessment in Alberta, Version 2.0 ISBN: 978-1-4601-4359-9, https://open.alberta.ca/publications/9781460143599

221. Volume 2, Appendix 14, Pages 1-24

Alberta Health (2019) guidance for HHRA requires definition of spatial boundaries for the HHRA, a RSA and a LSA. The guidance states *Adequate definition of these study area boundaries from the standpoint of potential human exposure is critical to the identification of human receptors for the HHRA.*

a. Describe the LSA and RSA defined for the HHRA.

b. Provide on a map, the LSA, RSA and locations of all human receptors identified within the LSA and RSA.

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222. Volume 2, Appendix 14, Page 1-24

The HHRA does not include an evaluation of data gaps and uncertainties as per Alberta Health (2019) guidance.

a. Provide an evaluation of the data gaps and uncertainties associated with the HHRA. In particular, discuss the potential for human health impacts to be greater than those predicted in the assessment.

Alberta Health, Government of Alberta. August 2019. Guidance on Human Health Risk Assessment for Environmental Impact Assessment in Alberta, Version 2.0 ISBN: 978-1-4601-4359-9, https://open.alberta.ca/publications/9781460143599

223. Volume 2, Appendix 14, Page 1-24

The conclusions of the HHRA are dependent on the predicted air and water quality impact assessment results. Through the SIR process, additional assessment may be required for the air and surface water quality portions of the application thus generating new predicted concentration data.

a. In the event that new or additional concentration data is generated for selected COPC, compare the results to health-based Toxicity Reference Values (TRVs) and discuss the potential health impact or provide justification for not completing these steps.

8 Approvals

The responses to questions in Section 8 will not be considered as part of the EIA completeness decision made by Alberta Environment and Parks.

8.1 Public Lands Act

224. Volume 1, Section 2.3.2, Page 30;
Volume 1, Section 2.4.3 and 2.4.4, Page 33

SMRID has proposed buried riprap for the auxiliary spillway channel to prevent headcut erosion progressing upstream of the spillway crest. SMRID has also proposed to armor the outer face of the cofferdam with riprap to limit the potential for wave erosion. The size of the riprap is not discussed for the auxiliary spillway channel or the outer face of the cofferdam.

Riprap size to protect the dam embankment slope from erosion was mentioned. However, it appears water velocity was not considered in estimating the rock size.

a. Provide a discussion on the consideration of erosion at downstream infrastructure (i.e. bridges) and provide the estimated appropriate size of riprap to prevent erosion.

b. Discuss how the flood water velocity has been considered when determining riprap size.

c. Provide the riprap size that will be used to armor the outer face of the cofferdam.

d. Provide justification for why water velocity was not considered when determining riprap size to protect the dam embankment slope.

9 Errata

225. Environmental Impact Assessment Report Summary, Section 1.1, Page 1

The SMRID states *With the dam relocation and the rise in FSL, the total estimated storage would increase to 257,820 ac-ft and add 1,000 acres to the reservoir's footprint.*

a. Provide the reservoir storage volume in both cubic decameters and acre-feet for clarity.

226. Environmental Impact Assessment Report Summary, Section 3.3, Page 13

SMRID states *A federal duty to consult may yet be triggered during federal approvals reviews as outlined in Section* ***Error! Reference source not found...***

a. Provide the correct section reference.

227. Environmental Impact Assessment Report Summary, List of Abbreviations and Acronyms, Page ii
Volume 1, List of Abbreviations and Acronyms, Page ii
Volume 2, List of Abbreviations and Acronyms, Page ii
Volume 4, List of Abbreviations and Acronyms

The acronyms HRA *(Historical Resources Impact Assessment), HRMB (Historical Resources Management Branch)* and *pHRIA (Paleontological Historical Resources Impact Assessment)* have all incorporated the word historical rather than the correct term historic. While these represent processes and an agency that operate under the *Historical Resources Act*, all address historic resources, as defined under Section 1(e) of the Act.

a. Provide the correct term.

228. Volume 1, Section 1.11.1, Page 17

Under the heading *Natural Resources Conservation Board*, the second bulleted point from the bottom of the list of legislation describes the *Historical Resources Act* as being *Enacted to preserve, protect, and present historical and archaeological resources of provincial, national, and international significance.* This is incorrect, as the Act does not apply to national or international interests and includes the protection of more sites than just those of archaeological or historic interest. The definition should reflect that the *Historical Resources Act* is enacted to promote the preservation, study, interpretation and promotion of appreciation of historic

resources in the Province of Alberta, which includes archaeological, palaeontological, historic structure (built heritage) and cultural (traditional land use) sites.

a. Provide a correction of this definition.

229. Volume 1, Section 1.12.1.5, Page 21

The heading of Section 1.12.1.5 is *Alberta Culture, and the Status of Women*. The correct name of this agency is Alberta Arts, Culture and Status of Women.

a. Provide the correct heading.

230. Volume 1, Section 1.12.1.5, Page 21

Within this Section, reference is made to a *Historical Resources Application,* the *Historical Resources Management Branch,* and an archaeological and palaeontological *Historical Resources Impact* Assessment. This application, agency and investigation should be correctly identified as a Historic Resources Application, the Historic Resources Management Branch and a Historic Resources Impact Assessment.

a. Provide the correct terms.

231. Volume 1, Section 1.13.3, Page 25

SMRID states *The publication initiated a 50-day public review period…*

a. This number is incorrect. It was a 48-day comment period from November 16, 2023, to January 3, 2024. Revise the statement with the correct number.

232. Volume 1, Section 1.14;
Volume 2, Section 2.6 and 2.7;
Volume 4-6;
Volume 4-7;
Volume 5, Section 5 [B]

The final Terms of Reference states *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.*

The concordance table lists Volume 1: Section 1.14 and Volume 2: Section 2.6 and 2.7. This information is not found in Volume 1: Section 1.14. This information was also discussed in Volumes 4-6 and 4-7.

a. Provide the sections for where this information is located.

233. Volume 1, References, Page 45;
Volume 2, References, Page 188

The Volume 1 References list the report *Klohn Crippen Berger Ltd. (KCB) 2023. Chin Reservoir Expansion – New East Dam Preliminary Design Report. Prepared for MPE Engineering Ltd. and St. Mary River Irrigation District. December 2023.*

The Volume 2 References list lists the report *KCB. 2023. Chin Reservoir Expansion – New East Dam Preliminary Design Report. Prepared for MPE Engineering Ltd. and St.Mary River Irrigation District, January 2023.*

a. Provide the correct reference used for the EIA. If two reports have been referenced provide both reports.

234. Volume 2, Table of Contents, Pages vi, xi and xii

Section 2.9 is identified as *Historical Resources* and the map titles for Map Figures 2.9.1 to 2.9.4 are labelled as *Historical Resources Impact Assessment.* The proper name of this discipline area and the investigation process in Alberta uses the term Historic, not historical.

a. Provide the correct heading and titles.

235. Volume 2, Table of Contents, Page v;
Volume 2, Section 2.3, 2.3.1 – 2.3.6, Page 33 – 42.

SMRID states only one sub-section *2.3.6 Monitoring Requirements* under *2.3 Surface Water Quality* in the Table of Contents (TOC).

In Section 2 of Volume 2, Section 2.3 assesses the surface water quality in sub-sections 2.3.1-2.3.6. However, the TOC of Volume 2 is missing sub-sections 2.3.1-2.3.5.

a. Provide an updated TOC.

236. Volume 2, Section 2.3.1, Page 33;
Volume 4-2, Map Figure 2

SMRID states that *The LSA includes:*

- *The catchment area of Chin Reservoir and the proposed expansion;*
- *The unnamed ephemeral watercourse downstream (hereafter named Watercourse 126419) of the Existing East Dam in Chin Coulee; and*
- *The Stafford Reservoir catchment area.*

The catchment areas of Stafford Reservoir, Chin Reservoir and the proposed expansion are not included in the LSA based on Map Figure 2 of Volume 4-2. Map Figure 2 indicates that the catchment areas are included in the RSA, whereas the reservoir bodies are in the LSA.

a. Update Map Figure 2 with the boundaries for the three reservoir areas and the Watercourse 126419. Revise the LSA statement to match Figure 2.

237. Volume 2, Section 2.8;
Volume 2, Section 4.2;
Volume 5, Section 2, 3.10.2

The concordance table incorrectly identifies Section 3.10.2 [D] in Volume 2, Section 2.8 of the EIA. The fire control plan is located in Volume 2, Section 4.2.

a. Provide the correct EIA sections for 3.10 Land Use and Management.

238. Volume 2, Section 2.9, Page 144

The heading used for Section 2.9 is *Historical Resources*, although the project Terms of Reference correctly identifies this discipline area as Historic Resources. Although the resources associated with this discipline are protected under the *Historical Resources Act*, the resources themselves are actually historic resources, as defined under Section 1(e) of the Act.

a. Provide the correct heading, to ensure consistency with the discipline heading in Section 4 of the Final Terms of Reference.

239. Volume 2, Section 3.3.1, Page 153;
Volume 2, Section 3.3.1, Table 3.2, Page 155;
Volume 2, Section 5.2.3.3.3, Page 178

SMRID states *The greatest source of noise associated with the construction of the Project would be construction and drilling equipment*. However, Table 3.2 does not include drilling equipment.

Section 5.2.3.3.3 of Volume 2 identifies that 70 trucks are assumed to be moving material to and from the construction site on a daily basis. Trucks are also missing from Table 3.2.

a. Add drilling equipment to Table 3.2.

b. Add trucks to Table 3.2.

240. Volume 4-2, Section 2.1, Page 5;
Volume 4-2, Map Figure 2

SMRID states that the LSA includes catchment areas of Stanford Reservoir, Chin Reservoir and Chin expansion.

As per Map Figure 2, the LSA consists of the reservoirs and unnamed ephemeral watercourse downstream, while their catchment areas are part of the RSA.
The three areas of Stanford Reservoir, Chin Reservoir and Chin expansion shall be clearly indicated with their own boundaries within the LSA. In addition, the unnamed ephemeral watercourse downstream (Watercourse 126419) needs to be added into the LSA for ease of reading and understanding.

a. Update Map Figure 2 with the boundaries for the three reservoir areas and the Watercourse 126419. Revise the LSA statement to match Map Figure 2.

241. Volume 4-3, Section 2.3.4, Page 9;
Volume 4-3, Map Figure 4.2

The EIA references monitoring well VT21-01, however, this well cannot be found on any Figures other than Map Figure 4.2. VT21-01 is incorrectly identified on this Map Figure.

a. Provide the corrected monitoring well VT21-01 on Map Figure 4.2.

b. Monitoring well VT21-01 appears to be missing from Map Figure 2.2, provide the corrected Map Figure.

242. Volume 4-3, Section 4.5, Page 27

SMRID states *Figure 4.1 through to shows the hydrographs…*

a. A Figure reference is missing in this statement. Provide the missing Figure reference.

243. Volume 5, Section 3.1

The concordance table outlines Volume 2, Section 2.5, Section 3.1 and Section 3.2 for the location of air quality and noise content in the EIA. Noise is addressed in Volume 2 Section 3.3.

a. Provide all sections where air quality and noise information are found.