Table of Contents

LIST OF TABLES

LIST OF FIGURES

Abbreviations

AAAQG	Alberta Ambient Air Quality Guideline
AAAQO	Alberta Ambient Air Quality Objective
AEP	Alberta Environment and Parks
AQMG	Alberta Air Quality Model Guideline
EBAM	Environmental Beta Attenuation Monitor
ECO Plan	Environmental Construction Operations Plan
GSD	grain size distribution
MC1	McLean Creek Option
NRCB	Natural Resources Conservation Board
NZME	New Zealand Ministry for the Environment
OLM	ozone limiting method
PDA	Project development area
PM	particulate matter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter
Project	Springbank Off-stream Reservoir
TDR	technical data report
TSP	total suspended particulate

4 AIR

4.1 EMISSIONS MANAGEMENT

Question 205

Volume 3B, Section 3.2.4.1, Page 3.9

Air emissions for the post-flood scenario were determined for the 1:100 year flood as well as the design flood (2013 flood). Alberta Transportation states in Section 3.2.4.1 *The 2013 flood removed an appreciable portion of fine sediment (e.g., clay and fine silt) from the upstream Elbow River drainage basin. The remaining surficial materials in the stream bed and on the banks of the Elbow River and its tributaries that may be prone to mobilization during a future flood would comprise mostly larger material (e.g., sand). Hence, most of the sediment deposited in the reservoir during future floods would be dominated by sand, not fine silt. The sand is less prone to result in fugitive dust during dry windy meteorological conditions.* However, during the time between floods natural geomorphological processes will re-create fines such as clay and fine silt in the drainage basin system.

a. How would the addition of fines into the basin from natural processes impact the assumptions made in Section 3.2.4.1 and the resultant emission rates used in the modelling?

Response 205

a. The potential increase of fines in the upstream Elbow River drainage basin due to natural geomorphological processes over a long regeneration period is estimated to be approximately 7%. The magnitude of fines increase was determined based on comparison of surface and subsurface sediment samples taken at an average depth of approximately 0.3 m along Elbow River and bore hole data collected at depths between 1.8 and 4.0 m from the Elbow River floodplain near the diversion structure. This conclusion is derived from the following logic:

   1. The surface and sub-surface sediment data showed that Elbow River is dominated by gravel-sized material (2 mm to 64 mm) and coarse silt/sand (0.063 mm to 2 mm) as described in Volume 3B, Section 6 and Volume 4, Appendix J, Hydrology TDR. For the subsurface grain size distribution (GSD), coarse silt/sand accounts for 13% and fines account for 3% of the GSD.

   2. The GSD of the bore hole data showed that sand-sized fractions account for 17% to 36% of the GSD. Fines accounted for less than 10% and are silt-sized (Volume 3B, Section 6 and Volume 4, Appendix J, Hydrology TDR).

3. The difference between the fines in bore hole data (10%) and the fines in shallow subsurface samples (3%) is equal to 7% (10% - 3%).

4. The shallow subsurface samples could be considered representative of river conditions since the 2013 flood, and the bore hole data could be considered representative of river conditions before the 2013 flood. The difference of 7% in the fine fraction between the bore hole data (10% fines) and the shallow subsurface samples (3% fines) is an indication of the washout effect of the 2013 flood. The amount of washout fines (7%) could be accumulated as a result of long-term natural processes until river conditions are restored to conditions before the 2013 flood.

The GSD of the suspended sediment in the Elbow River that is derived from the surface and subsurface samples is an input to the hydrological model (Volume 3B, Section 6), which predicts the transport and deposition of sediment into the reservoir during a flood. Under flood conditions, the primary particle size carried in flow diverted from the Elbow River would likely be coarse silt/very fine sand (average grain size of 0.063 mm) and medium sand-sized material (average grain size of 0.36 mm). The hydrological model (Volume 3B, Section 6 and Volume 4, Appendix J, Hydrology TDR) estimates an approximate composition of the deposited sediment in the reservoir to have a mean value of 77% sand and 23% silt, based on a 1:100 year flood for the three months with the highest probability of flood (June to August). Therefore, a 7% increase of fines in the upstream Elbow River drainage basin could result in a maximum of 7% increase of fines in the suspended sediment and, subsequently, in the deposited sediment in the reservoir. A 7% increase of fines in the deposited sediment will result in an increase of the silt fraction from 23% to 30%.

The natural removal of fine sediment (e.g., clay and fine silt) from the upstream Elbow River drainage basin associated with the 2013 (or future floods) is estimated to have a small effect on potential fugitive dust emissions for post-flood operations. Based on the emission estimation methods described in the air quality assessment of wind erosion emissions from the post-flood sediment (Volume 3B, Section 3 and Volume 4, Appendix E), a 7% increase of fines in the deposited sediment does not change the soil classification of the sediment ("sandy loam", Volume 4, Appendix E) and, therefore, does not change the emission calculation. The particulate emission rate used in the air quality assessment is considered representative of the range of fine and coarse sediment that have the potential to be deposited in the reservoir after floods including the potential influence of natural geomorphological processes that can increase the fraction of fines in the drainage basin system.

Question 206

<u>Volume 3A, Section 3.4.4.1, Page 3.55</u>

Alberta Transportation states *Therefore, chemical dust suppression will be applied on an as-needed basis during high wind conditions or if PM concentrations are in exceedance of the Alberta Air Quality Objectives and if an increase of watering is determined ineffective or unfeasible at the time.*

a. How will it be determined that PM concentrations would be exceeding the AAQO, thus requiring dust suppressant?

b. Describe the implementation plan for this mitigation measure.

Response 206

a. During construction, adaptive management techniques will be used to help control the generation of airborne dust (see Volume 3, Attachment 3A, Section 3.4.4.1 and Volume 3C, Section 2.2); the management techniques will include ambient air monitoring in conjunction with dust emission mitigation. Ambient air monitoring will be combined with review of weather data (from an onsite meteorological station) to assess the need for more rigorous dust mitigation. Monitoring will include the installation and operation of an anemometer to measure wind speed and wind direction, and an environmental beta attenuation monitor (EBAM) to measure ambient particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$) and total suspended particles (TSP) concentrations. Monitoring will be continuous over 24 hours and extend throughout the construction period.

   If the monitoring program indicates that the ground-level $PM_{2.5}$ and TSP concentrations are greater than Alberta ambient air quality objectives (AEP 2019), additional mitigation to reduce dust emissions will be implemented. This mitigation could include increased watering of access roads, the spraying of surfactants, or the suspension of construction activity at the site.

b. An Environmental Construction Operations Plan (ECO Plan) will be developed by the selected construction contractor using Alberta Transportation's ECO Plan framework (Volume 4, Supporting Documentation, Document 4). The ECO Plan will identify the mitigation measures for the potential environmental effects of construction, including the ambient air monitoring program and adaptive management techniques to control the generation of airborne dust. The ECO Plan will follow the requirements outlined in Alberta Transportation's *Civil Works Master Specifications for Construction of Provincial Water Management Projects* (Volume 4, Supporting Documentation, Document 10).

The highest fugitive dust emissions during construction are likely to be generated by the haul trucks transporting earth material from the diversion channel to the dam. Therefore, the monitoring equipment will be placed at two locations outside the PDA and between the haul road from the diversion channel excavation work to the dam construction site and nearby residences. Monitoring equipment will also be placed outside the PDA between the borrow source area and nearby residences. The proposed locations of the monitoring equipment are presented in Figure IR206-1. The exact locations of the monitoring stations will be determined during the development of the ECO Plan by the construction contractor. Air quality information will be made available in a matter that is consistent with AEP's normal practices and procedures.

The ECO Plan will include the mitigation measures identified in Volume 4, Appendix C, Table C-1, page C.3 to page C.4. Key points related to the ambient air monitoring program and dust mitigation follows:

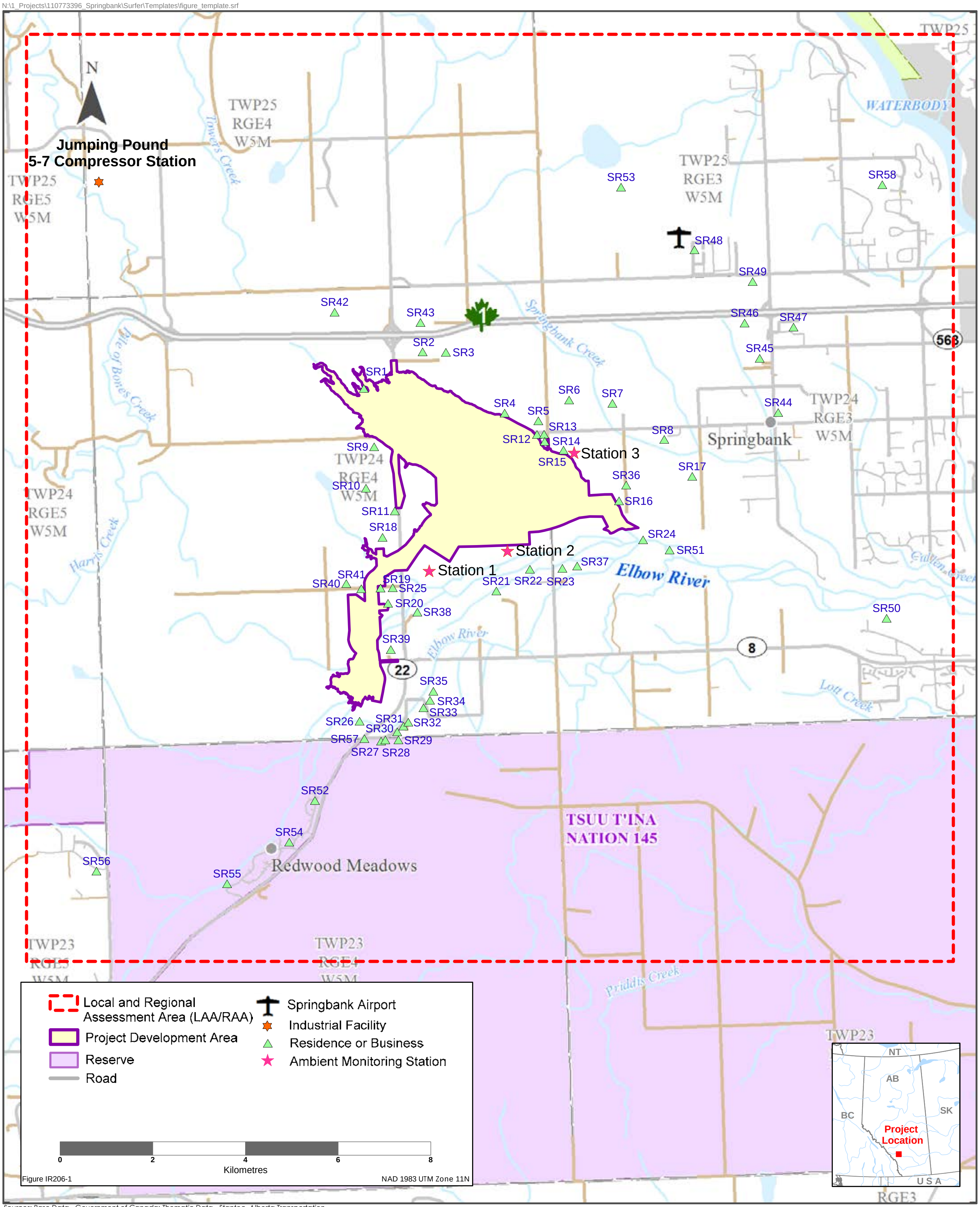
Ambient Monitoring

- During construction, activities between the diversion channel and the dam, there will be 24-hour continuous wind and air quality monitoring for $PM_{2.5}$ and TSP at Stations 1 and 2 along the haul road and at Station 3 near the borrow source area as illustrated on Figure IR206-1. The proposed locations of the air quality monitoring stations were selected based on modelling results.
- In accordance with AEP (2019), the air quality objectives for particulate matter listed in Table IR206-1 should be met:

Table IR206-1 Air Quality Objectives During Construction, $PM_{2.5}$ and TSP

Substance	Averaging Period	Measurement
Fine Particulate Matter – 2.5 microns or less ($PM_{2.5}$)	24-hour	30 µg/m³
Total Suspended Particulate Matter (TSP)	24-hour	100 µg/m³

- Copies of the results of all sampling and testing will be prepared in a daily summary format. Upon completion of construction activities between the diversion channel and the dam, a final report will be submitted to Alberta Transportation containing all sampling and testing data. A copy of the report will be provided to AEP Operations.
- Alberta Transportation will conduct random quality assurance inspection to monitor the Contractor's quality control program.
- Records of dust control measures implemented on site will be maintained on daily basis and air quality results will be provided to Alberta Transportation within 12 hours of each work shift.



Sources: Base Data - Government of Canada; Thematic Data - Stantec, Alberta Transportation

Preliminary Locations of Ambient Monitoring Stations during Construction

EXECUTION

- Water will be applied to haul roads and disturbed areas for mitigating dust emissions. Watering could be repeated several times a day during dry periods with high wind conditions (Volume 4, Appendix C, Table C-1).
- Dust abatement brine solution will be applied on haul roads if particulate matter concentrations are in exceedance of the Alberta Ambient Air Quality Objectives and if an increase of watering is determined ineffective or unfeasible at the time (Volume 4, Appendix C, Table C-1).
- Dust abatement brine solution on haul roads will be applied to a width of 7 m; 3.5 m either side of roadway centerline, as follows:
    1. apply dust abatement brine solution blend at a rate of 3 L/m²
    2. provide a smooth and relatively dust free surface
    3. after the one application of brine solution, road maintenance will be implemented, including grading and addition of water
- Dust generating construction activities will be suspended during periods of excessive winds when dust suppression measures might not be working adequately (Volume 4, Appendix C, Table C-1).
- In the event of carryout of soils, road cleaning will be conducted by manually picking up and sweeping material or by using rotary or vacuum street cleaning vehicles (Volume 4, Appendix C, Table C-1).
- Disturbed surfaces will be revegetated promptly following construction to prevent wind erosion and to control dust (Volume 4, Appendix C, Table C-1).
- Surfaces of temporary soil and overburden stockpiles will be stabilized during extended periods between usage, by vegetating or covering the exposed surfaces (Volume 4, Appendix C, Table C-1).
- Silt fences and other (e.g., mulching) erosion control methods will be used to prevent soil loss from soil stockpiles due to wind erosion.

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AEP 2019. Alberta Ambient Air Quality Objectives and Guidelines Summary. January 2019. Alberta Environment and Parks (AEP). Available at: https://open.alberta.ca/dataset/0d2ad470-117e-410f-ba4f-aa352cb02d4d/resource/4ddd8097-6787-43f3-bb4a-908e20f5e8f1/download/aaqo-summary-jan2019.pdf. Accessed: May 2019.

4.2 DISPERSION MODELLING

Question 207

Volume 4, Appendix E, Section 3C.3.5, Page 3C.10
Volume 4, Appendix E, Section 3C.3.6, Page 3C.11

Alberta Transportation discusses the chemical transformation model options applied in the dispersion modelling in Section 3C.3.5. The RIVAD/ARM3 chemical scheme was selected, consistent with the Alberta Air Quality Model Guideline, for the chemical transformation processes including NO to NO_2 conversion. However, section 3C.3.6 states that the ozone limiting method (OLM) was applied for NO to NO_2 conversion.

a. Confirm the NO to NO_2 conversion method used in the dispersion modelling.

b. Confirm that the modelled NO results were used in OLM not the NO_2 results based on the RIVAD/ARM3 transformation.

c. Provide updated NO_2 results if necessary.

Response 207

a. The RIVAD/ARM3 chemical scheme in the CALPUFF dispersion model was used to model the chemical transformation of nitrogen oxide (NO_X) and sulfur dioxide (SO_2) to nitrates (NO^{3-}) and sulphates (SO_4^{2-}) that contribute to the formation of secondary particulate matter.

   The RIVAD/ARM3 chemical scheme was not used to convert nitrogen monoxide (NO) to nitrogen dioxide (NO_2) concentrations. NO_X was modelled as an inert substance in addition to its components NO and NO_2, with no chemical transformation applied. The dispersion model predictions of NO_X concentrations were converted at the post-processing stage to NO_2 concentrations using the ozone limiting method (OLM), as recommended in AEP 2013.

b. The modelled NO_X concentrations were converted at the post-processing stage to NO_2 concentrations using OLM.

c. No update to NO_2 concentration results is necessary.

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AEP 2013. Air Quality Model Guideline. October 2013. Alberta Environment and Parks (AEP), formerly Alberta Environment and Sustainable Resource Development (ESRD). Available at: http://aep.alberta.ca/air/air-quality-modelling/documents/AirQualityModelGuideline-Oct1-2013.pdf. Accessed: May 2019.

Question 208

<u>**Volume 4, Appendix E, Section 3B.4, Page 3B.13**</u>
<u>**Volume 4, Appendix E, Section 3B.3, Page 3B.11**</u>

Alberta Transportation states *there are no surface stations with concurrent hourly data for the 2002-2006 period within the model domain*. However, Section 3B.3, Page 3B.11 discusses meteorological measurements at the nearby Environment and Climate Change Canada Springbank Airport climate station (for 1981-2010), located within the local assessment area.

a. Provide justification for not using the hourly data from the Springbank Airport climate station as supplement inputs into CALMET.

Response 208

a. The statement, "there are no surface stations with concurrent hourly data for the 2002-2006 period within the model domain" pertains to the modelling protocols that compensate for the absence of a complete set of hourly data. The Springbank Airport station observations record covered only 18 hours per day (from 4 am to 10 pm) up to April 2014. This results in 10,950 missing hours (5 years x 365 days x 6 missing hours per day) of observations from the Springbank Airport (starting April 2014, the station began recording observations 24 hours per day).

   The Alberta Air Quality Model Guideline (AQMG) (AEP 2013) specifies the requirements for the meteorological data to be used as an initial estimate for the CALMET meteorological preprocessor. According to the AQMG, the 5-year MM5 meteorological dataset (2002-2006) distributed by AEP must be used for refined modelling assessment.

   When CALMET is run in "observation mode" (i.e., with supplemental surface station data), one of the requirements is that at least one of the surface stations in the study area must have an observation for each hour of the modelled period. However, there are no other surface stations within modelling domain. Therefore, CALMET was run in "no-observation mode" (i.e., with no supplemental surface station data) using the MM5 dataset provided by AEP. This protocol is consistent with the AQMG recommendation of using supplemental data for surface meteorological stations if the meteorological data coincides with the 5-year period provided in the MM5 dataset and the data is at least 90% complete.

REFERENCES

AEP 2013. Air Quality Model Guideline. October 2013. Alberta Environment and Parks (AEP), formerly Alberta Environment and Sustainable Resource Development (ESRD). Available at: http://aep.alberta.ca/air/air-quality-modelling/documents/AirQualityModelGuideline-Oct1-2013.pdf. Accessed: May 2019.

4.3 AIR QUALITY ASSESSMENT

Question 209

Volume 3B, Section 7.4.3, Page 7.24
Volume 4J, Section 2.4.2, Page 2.37

Alberta Transportation states that in the proposed reservoir *Dissolved oxygen can be consumed by retained water because of organic matter decomposition, if the residence time and weather conditions create suitable conditions for decomposition to occur*. In addition, Alberta Transportation states that *flows in the Elbow River needed to be less than 20 m³/s before release could occur. This threshold was based on a maximum design release rate of 27 m³/s and the effective discharge for suspended sediment transport of between 35 and 50 m³/s*. Given the potential for lengthy detention in the reservoir that could include summer there is a potential for an anoxic water condition to be created that could promote the release of hydrogen sulphide odours.

a. What measures would be considered to mitigate air quality if an anoxic condition occurs?

Response 209

a. In Volume 3B, Section 7, the assessment considers the factors that affect dissolved oxygen and temperature in reservoirs and compares these factors to the Glenmore Reservoir to understand the direction and magnitude of potential changes in these variables. The following detailed discussion provides further support for not needing mitigation.

Based on available organic material and organic carbon, biochemical oxygen demand and sediment oxygen demand is predicted to be similar to the Glenmore Reservoir (Volume 3B, Section 7.4.3, pages 7.24 and 7.23), and anoxic conditions do not occur in Glenmore Reservoir: see IR308, Figure IR308-20 where it is shown that dissolved oxygen in Glenmore Reservoir are above guideline levels at the time that the off-stream reservoir would be inundated (the reference data for Glenmore Reservoir is for the 2005 and 2013 floods). In addition, wind action mixing in the off-stream reservoir (which will be much higher than in the much deeper Glenmore Reservoir) is predicted to replenish oxygen levels and diffusion of oxygen will prevent anoxic conditions at water-sediment interface where hydrogen sulfide could be released.

Hydrogen sulfide is not likely to be produced in the off-stream reservoir during the time it contains water. Several types of oxidation-reduction reactions have higher energy yields and will occur before sulphate reduction that would result in hydrogen sulfide production (Faulwretter et al 2009; Szogi et al. 2004). Higher energy yield reactions will be exhausted in sequence if the relevant supply of electron receptors is available (Table IR209-1). Oxygen provides the most energy and, therefore, microbial growth is greatest under aerobic reactions. Once bacterial respiration uses up the supply of oxygen, subsequent microbially mediated, anaerobic reactions will begin to occur. The supply of nitrate, manganese and iron will be preferentially selected as electron receptors before sulfate will be used. These components are available in Elbow River surface water (Volume 4, Section 3.2.2.1).

Table IR209-1 Common Microbial Oxidation – Reduction Reactions

Electron Acceptor	Energy release (ΔG) kJ/mole of electrons	Redox Potential (mV)	Oxidation Status
Oxygen	-125.1	300 to 700	Oxidized (aerobic)
Nitrate	-118.8	100 to 350	Moderately reduced (anaerobic)
Manganese	-94.5	-100 to 300	Moderately reduced (anaerobic)
Iron	-24.3	-100 to 200	Reduced (anaerobic)
Sulfate	-25.4	-200 to -100	Highly Reduced (anaerobic)
Carbon Dioxide	-23.2	-350 to -100	Highly Reduced (anaerobic)
SOURCES: Faulwretter et al. 2009; Szogi et al. 2004.			

REFERENCES

Faulwretter, J.L., V. Gagnon, C. Sundberg, F. Chazarenc, M. Burr, J. Brisson, A. Camper, O. Stein. 2009. Microbial processes influencing performance of treatment wetlands: A review. Ecological Engineering. Vol. 35: 987-1004

Szogi, A.A., P.G. Hunt, E.J. Sadler, D.E. Evans. 2004. Characterization of Oxidation -Reduction Processes in Constructed Wetlands for Swine Wastewater Treatment. Applied Engineering in Agriculture. Vol. 20(2): 189-200

Voesenek, L. and J. Bailey-Serres. 2015. Flood Adaptive Traits and Processes: an Overview. New Phytologist. Vol. 206: 57-73

Question 210

Volume 4, Appendix E, Section 3C.3.2.1, Page 3C.5
Volume 4, Appendix E, Figure 3C-2, Page 3C.7
Volume 3A, Section 3.4.1.1, Page 3.40.

Alberta Transportation describes in Volume 4, Appendix E, Section 3C.3.2.1, the receptor grid spacing used in the modelling. Specifically that receptors were not included for modelling within the project 'fenceline' or PDA. Volume 3A, Section 3.4.1.1, Page 3.40 states *concentrations and deposition inside the PDA are not compared to the ambient criteria because public access is restricted in this region*. Volume 4, Appendix E, Figure 3C-2, Page 3C.7 indicates that Highway 22 and several other roads dissect the PDA, thus there will be public access through the PDA.

a. Describe the air quality impacts to the public that access the PDA on Highway 22 or other PDA through roads.

b. How does Alberta Transportation plan on managing air quality and dust impacts on the public that access the PDA on Highway 22 or other PDA through roads?

Response 210

a. Vehicles traveling through the PDA on Highway 22 and Springbank Road will be in the PDA for only a few minutes and exposure of the passengers to particulate matter less than 2.5 micrometers in diameter is short term. In particular, the following describes the presence of the public in the PDA during construction:

- The current speed limit on Highway 22 is 80 km/h, but this will be reduced to 60 km/h on a segment of Highway 22 along the bridge construction area for raising of Highway 22. Considering the segment of Highway 22 between the intersection with Highway 8 and the bridge construction area (approximately 4 km), the time a vehicle travels along this segment will be 3 minutes (4 km/80 km/h x 60 min/h) when travelling at 80 km/hr. At a speed limit of 60 km/h along the bridge construction area on Highway 22 (approximately 3 km), the time a vehicle travels along this segment would be 3 minutes (3 km/60 km/h x 60 min/h). In total, the travel time along Highway 22 will be approximately 6 minutes.
- The speed limit on Springbank Road is 80 km/h and, at this speed, the travel time through the PDA is about 4.5 minutes (6 km/80 km/h x 60 min/h).

The predicted maximum 1-hour $PM_{2.5}$, 24-hour $PM_{2.5}$ and total suspended particles (TSP) concentrations for the Application Case along the sections of Highway 22 and Springbank Road that intersect the PDA are presented in Table IR210-1. The maximum predicted concentrations along the road sections are greater than the Alberta ambient air quality objectives (AAAQO; [AEP 2018]) for 24-hour average $PM_{2.5}$ (30 µg/m³) and TSP (100 µg/m³), and greater than the Alberta ambient air quality guideline (AAAQG; [AEP 2018]) for 1-hour average $PM_{2.5}$ concentrations (80 µg/m³). Elevated TSP and $PM_{2.5}$ concentrations will be addressed through ambient air monitoring and adaptive management.

Table IR210-1 Maximum Predicted Concentrations along Sections of Highway 22 and Springbank Road that Intersect the PDA (Application Case)

Substance	Averaging Period	Maximum Predicted Concentration (µg/m³)		AAAQO/G (µg/m³)
		Highway 22	Springbank Road	
TSP	24-hour	200 to 400	350 to 500	100
$PM_{2.5}$	1-hour	120 to 200	70 to 90	80
$PM_{2.5}$	24-hour	60 to 100	30 to 40	30

Nuisance Effects from TSP

As noted by the Federal - Provincial Working Group on Air Quality Objectives and Guidelines (1999), data indicate that TSP is not an appropriate indicator of human health effects from particulate matter. However, TSP can be used as an indicator of potential nuisance effects. The nuisance effects associated with elevated dust include reduced visibility and deposition in the eyes and nose.

Although regulatory guidelines for TSP are based on 24-hour averaging periods, dust events would need to be intense to cause nuisance effects, but of relatively short duration (seconds to minutes) (NZME 2016). Federal and provincial agencies in Canada have not provided short-term TSP guidelines for short-term (less than 1-hour) averaging periods. In the absence of that guidance, New Zealand standards can be used for guidance: the New Zealand Ministry for the Environment (NZME 2016) developed TSP trigger levels protective of nuisance effects for different averaging periods and sensitivity of the receiving environment. The NZME (2016) guidance characterizes public roads as low sensitivity since roads users will typically be exposed to adverse effects from air emissions for only short periods of time and, therefore, did not provide trigger level concentrations for 5-minute or 1-hour averaging periods. Further, the NZME (2016) notes that a dust management approach using monitoring and trigger levels is typically only carried out in circumstances where people may reasonably be exposed over a 24-hour period.

Since short-term exposure to TSP is not an indicator of health effects, the sensitivity of the receiving environment is considered low for nuisance effects, and with the application of dust mitigation measures to reduce the potential of dust impeding visibility while driving, the effects associated with the maximum predicted concentrations of TSP to the public that access the PDA through roads are considered not significant.

HEALTH EFFECTS FROM PM2.5

The potential for health effects is not solely a function of the concentration of the exposure, but also the frequency and duration of exposure. The evidence for the health impacts of $PM_{2.5}$ is typically based on exposure periods of 24 hours or longer. However, as noted by Alberta Environment (2007), controlled exposures of healthy or asthmatic subjects have been observed to cause mild lower respiratory symptoms (such as cough) and produce functional changes in the respiratory tract at concentrations ranging from 100 µg/m³ to1,000 µg/m³ for exposure periods ranging from 1-3 hours. Although the maximum predicted 1-hour average concentrations of $PM_{2.5}$ along the segment of Highway 22 that intersects the PDA are higher than the range associated with exposures of 1-3 hours, significant adverse health effects are not expected because of the following reasons:

- Actual exposures are expected to be less than 10 minutes (i.e., exposure duration is considerably lower than that associated with reported effects).
- Public exposure is transient (i.e., motorists passing through the area); exposure would require a receptor to be present at the same time as the maximum predicted air concentration (i.e., likelihood and frequency of exposure are low).
- The one-hour ambient air quality guideline for $PM_{2.5}$ (80 µg/m³) is to be used as “a general performance indicator” for airshed planning and management purposes (AEP 2018) rather than to access compliance.

The duration, likelihood and frequency of exposure to $PM_{2.5}$ while driving through the PDA are low. With the application of dust mitigation measures to reduce the exposure to dust while driving, the effects associated with the maximum predicted concentrations of $PM_{2.5}$ to the public that access the PDA through roads are considered not significant.

b. An Environmental Construction Operations Plan (ECO Plan) will be developed by the selected construction contractor using Alberta Transportation’s ECO Plan framework (Volume 4, Supporting Documents, Document 4).

The ECO Plan will outline the mitigation measures for the potential environmental effects of construction, including the mitigation measures for air quality identified in Volume 4, Appendix C, Table C-1, page C.3 to page C.4. The ECO Plan will follow the requirements outlined in Alberta Transportation’s *Civil Works Master Specifications for Construction of Provincial Water Management Projects* (Volume 4, Supporting Documents, Document 10).

Reduced visibility along the roads due to generation of airborne dust and potential health effects from exposure to $PM_{2.5}$ of the public that access the PDA through roads will be mitigated by applying the dust mitigation measures outlined in the Eco Plan.

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