From:	Matthew Hebert
To:	"Springbank Community Association"
Cc:	Laura Friend; CEAA.Springbank.ACEE@ceaa-acee.gc.ca; "info@springbankcommunity.com"
Subject:	SR1 inquiries
Date:	December 3, 2019 1:41:06 PM
Attachments:	Responses to Springbank Community Association.pdf

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Dear Ms. Hunter,

Thank you for your July 26 e-mail to me that brought my attention to your April 1, April 2, and June 5 e-mails regarding the Springbank Community Association's feedback on the Springbank Off-stream Reservoir (SR1 or the Project). Please accept my apologies for the delay in receiving a response. Alberta Transportation remains committed to ongoing engagement with stakeholders as regulatory review of the project continues.

We are pleased to provide the enclosed responses to the Community Association's questions on:

- Construction Impacts
- Air Quality
- Traffic Management
- Fish and Wildlife
- Pipelines
- Diversion Channel
- Design
- Testing
- Project Costs
- Water Quantity and Quality
- Silt

You may have follow-up questions to our responses, and we would like to meet with you and your board to discuss any outstanding concerns or questions that the Springbank Community Association may have about SR1. Please contact me to arrange a time that accommodates your schedule. I can be reached toll-free at 310-0000, then 780-644-7780, or at matthew.hebert@gov.ab.ca.

Sincerely,

Matthew Hebert
Executive Director, Transportation Policy
Safety and Policy Division
Alberta Transportation

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1.0 General

A. Through which Alberta Government approval process is this project proceeding (i.e. Water Act Approvals)?

Alberta Transportation (AT) is required to comply with the *Environmental Protection and Enhancement Act* administered by Alberta Environment and Parks (AEP). Following review and completion of the *Springbank Off-stream Reservoir Project Environmental Impact Assessment* (EIA), AT will finalize its application to the Alberta Natural Resources Conservation Board (NRCB) for approval to construct and operate the Springbank Off-stream Reservoir Project (the Project). AT is also applying to the Canadian Environmental Assessment Agency (CEAA) for approval by the federal Minister of Environment and Climate Change. The Project is being reviewed under CEAA 2012 and will follow the federal review process that was in place prior to the change of CEAA to the Impact Assessment Agency of Canada (IAAC).

In March 2018, AT submitted the EIA to Alberta Environment and Parks (AEP), the Natural Resources Conservation Board (NRCB), and CEAA for review as part of the regulatory process. After reviewing the submission, AEP, NRCB and CEAA asked for additional information (information requests, or "IRs") as part of the regulatory process. On June 14th, 2019, AT submitted responses to the IRs to AEP, NRCB and CEAA. In July and August 2019, CEAA requested additional information from AT. AT is in the process of responding to CEAA's questions. The first set of responses were filed on November 5th with the remaining responses expected to be filed by the end of 2019.

Completed responses are available at alberta.ca/resources-springbank-off-stream-reservoir.aspx.

B. Under what authority has land been acquired and under what budget, given SR1 is not an approved provincial project. Please explain or correct our understanding.

This is a provincially funded project. While seeking regulatory approval, the Government of Alberta is pursuing voluntary land purchases of the project area through voluntary negotiations with the landowners who own impacted parcels. These negotiations are being conducted under the same authority as any other land transaction in Alberta between a prospective seller and interested purchaser. A budget has been established by Government of Alberta for these negotiations, which will continue during the regulatory review process. Land acquired through this process that is not required for the operations of the Springbank Reservoir is planned to be re-sold following construction.

2.0 Construction Impacts

A. How will Project construction impact surrounding communities and what measures are Alberta Transportation taking to mitigate these potential impacts?

Project construction impacts have been factored into the EIA and AT has and will continue to ensure that there are mitigation measures in place to help reduce the impact on surrounding communities.

For example, potential changes in ambient air quality during construction will be managed through mitigation measures outlined in EIA, Volume 4, Appendix C. These include proper maintenance of equipment, suspension of dust generating construction activities during periods of excessive winds, application of water to haul roads and silt fences and other erosion control methods such as mulching to prevent soil loss from stockpiles due to wind erosion. Monitoring will also be implemented in conjunction with emissions mitigation to determine if there is a need for more rigorous mitigation. For more information on mitigation measures to address construction impacts please see the EIA, Volume 4, Appendix C available at https://open.alberta.ca/dataset/ed520427-3b66-41c5-b36a-33fbdeaea9aa/resource/6c2dc653-faf0-47d7-b8c9-d8a67c9cc2dc/download/vol_4_appc_mitigation_measures.pdf,

B. What is the construction season for this project?

It is anticipated that construction will occur year-round for a period of approximately 36 months. There will also be some activity following construction as part of the construction contract warranty and acceptance of completion.

3.0 Air Quality

A. Explain the risks to air quality as the reservoir is drained assuming that, each day, some of the silt will be exposed. Board 18 from the 2018 open houses: "In the event of a design flood the modelling predicts the potential to exceed air quality objectives for up to 4 days following drainage of SR1." If the reservoir is draining over a long period of time, please explain how air quality risks are limited to 4 days?

The air quality assessment in the EIA concluded that the only potential source of fugitive dust during post-flood operations is wind erosion of deposited sediments in the reservoir after they dry out, and when strong wind conditions occur. The air quality model results indicated the greatest air quality changes due to these emissions occur inside and near the Project development area (PDA), decreasing to baseline levels with increasing distance from the PDA. The main finding of the modelling is the potential for total suspended particulate (TSP) concentrations to be greater than the regulatory air quality criteria up to four days per year outside the PDA. The four days per year estimate is based upon the air quality model predictions which account for the probability of meteorological conditions that will both cause surface erosion and result in transport and dispersion of pollutants which result in exceedance of the Alberta Ambient Air Quality Objectives. Given the rarity of SR1 operation and the proposed mitigation measures, it is expected that fugitive dust emissions would not have significant adverse effects on ambient air quality.

AEP will monitor the air quality and may use a tackifier, hydroseeding, or other measures to help re-establish vegetation and reduce risks posed by dust. The details of anticipated impacts from dust, and the mitigations for dust are available in Volume 3B, Section 3 and Volume 4, Appendix E of the EIA available at https://open.alberta.ca/dataset/ed520427-3b66-41c5-b36a-33fbdeaea9aa/resource/45c2f98b-5864-4f55-b072-d1143993fe99/download/vol_3b_s03_air_quality_and_climate.pdf and https://open.alberta.ca/dataset/ed520427-3b66-41c5-b36a-33fbdeaea9aa/resource/12f342cc-f8ab-4ce8-b101-f531fbd85c0c/download/vol_4_appe_air_quality_and_climate.pdf.

4.0 Traffic Management

A. What is the expected number of construction vehicles (ex. dump trucks), service vehicles and transportation vehicles for site workers projected on the roads during the construction phase of the Project?

AT has estimated the number of vehicles and equipment required during construction of the Project in the EIA, Volume 1, Section 3.3.2, Table 3-6, Table 1, available athttps://open.alberta.ca/dataset/ed520427-3b66-41c5-b36a-33fbdeaea9aa/resource/f80c62e6-ac4f-4c2c-aac4-5eefeb502e14/download/vol_1_project_description.pdf. A summary of estimated equipment used is provided in Table 1 below. Note that not all equipment will be used for the entirety of the construction duration, the various pieces of equipment will be deployed as needed for a given activity.

Equipment	Number of Units
Articulated dump trucks	29
Scrapers	14
Backhoes	10
Dozers	8
Excavators	5
Front end Loader	1
Skid steers	3
Water trucks	3
Graders	3
Vibratory compactors	5
Smooth drum rollers	3
Impact pile drivers	4
Truck-mounted crane	4
Concrete trucks	5
Asphalt paver	2
Roller/compactors	2
Mini backhoe	2
Portable light generator	87
Diesel generators	2

However, under AT's contracting and delivery framework, the contractor has the flexibility to determine what equipment to use and where and when to deploy it. Contractor plans must be in accordance with conditions imposed by AT.

Once a contractor has been selected, they will be required to prepare a traffic accommodation strategy (TAS) and submit it to AT for review and approval. The TAS must be developed in accordance with Alberta Transportation Standard Specification for Highway Construction which provides the base constraints on their TAS. A copy of the Alberta Transportation Standard Specification for Highway Construction can be downloaded from the web here https://open.alberta.ca/dataset/260d170d-5049-48a5-aa01-6149740636cc/resource/a199231a-b741-494f-bbdd-e931407d9bcb/download/7027236-2013-standard-specifications-highway-construction.pdf.

In addition to the TAS, AT has the authority to impose project specific requirements on the contractor. For example, they might require a contractor to cross at a specific location, or limit traffic volumes on specific roadways.

AT is interested in meeting with Rocky View County to identify specific concerns related to traffic volume, logistics, and safety. AT will identify areas to impose constraints or other contractual

requirements on the contractor and incorporate them into the tender contract. Following selection of a prime contractor, AT is also willing to meet with Rocky View County to present the contractor's TAS, solicit feedback, and explore areas where any outstanding concerns can be accommodated.

B. Explain whether any upgrades are planned for Twp Rd 250 and Hwy 22, which is a high-accident area.

As part of the SR1 project, the intersection of Highway 22 at Twp 250 will be upgraded to a Type IVa intersection with a southbound left turn lane. This intersection improvement is required in the event Springbank Road is flooded due to a large storm event, such as the 2013 flood. Traffic will be diverted to RR40, and from there to TP 250 and then to Hwy 22. The details regarding AT's plans for Highway 22, as they relate to Twp Rd 250, are detailed in the "Highway 22 Functional Planning Study South of Highway 8 to Town of Cochrane South Corporate Limits" available at http://www.transportation.alberta.ca/projects/assets/Area_7_Calgary_Area/Hwy_22_twinning_from_Hwy_8_to_Cochrane/Executive%20Summary.pdf .

In addition, Highway 22 is proposed to be twinned as part of a long-range plan, and the raising and offsetting of a portion of Highway 22 for the Project has been designed in consideration of these future plans.

AT does not have any plans to upgrade Township Road 250 as part of the Project.

C. Will construction vehicles use local roads during the construction phase or are they confined to Highway 22, Highway 1 and Springbank Road?

Construction vehicles will use both local roads (township and range roads) and highways such as Highway 22, Highway 1, and Springbank Road. This will include transportation of Project workers, equipment, and materials to the Project site. AT is willing to meet with Rocky View County with the aim of addressing any specific concerns related to the use of local roads for construction.

D. Will service vehicles travel through Cochrane during the construction phase?

AT cannot, at this time, confirm whether service vehicles will travel through Cochrane. The selected contractor, as well as the companies that will be supplying the construction material, have not been selected through the public tender process. As described above, a TAS will be developed in accordance with Alberta Transportation Standard Specifications for Highway Construction.

E. Will homeowner access along Highway 22 be impacted during the construction phase?

No. Access to homes along Highway 22 and access to properties to the west by Township Road 242 and Township Road 244 will be maintained during construction.

F. Will cyclists be impacted by service vehicles during the construction phase of the Project and what mitigation measures are Alberta Transportation taking to ensure cyclist safety?

Cyclist passage and safety will be taken into consideration during the construction of the Project. Once a contractor is selected, a traffic accommodation strategy (TAS) will be developed in accordance with AT's (2010) Specifications for Bridge Construction (Available at: http://www.transportation.alberta.ca/Content/docType246/Production/10bcsApxA.pdf). The TAS will describe methods for accommodating traffic throughout the work zones. It will outline how traffic, including cyclists, will be accommodated during construction to ensure that all drivers and cyclists in the Project area remain safe.

The TAS consists of drawings detailing the configuration of temporary construction signs, other traffic control devices in the work area(s), and written confirmation of the methods or procedures being used by the Contractor to address specific traffic safety related issues or situations at the work zone.

When localized detours are required, the Contractor's TAS will include detailed drawings of proposed traffic accommodation measures, signed and stamped by a professional engineer registered in the Province of Alberta.

G. What are the potential risks to commuters that rely on impacted roads (ex. school buses) during the construction phase of the project?

AT recognizes the importance of Hwy 22 as a commuter corridor. Once a contractor is selected, a TAS will be developed in accordance with the standard practices for all transportation construction projects done in Alberta. The TAS will outline how traffic will be accommodated during construction to ensure that all commuters in the Project area remain safe and to minimize their inconvenience to the greatest degree practical.

5.0 Fish and Wildlife

A. Has Alberta Transportation updated the wildlife count /assessment since releasing the original report?

AT has not updated the wildlife count and assessment since the completion of the EIA in March 2018.

B. What are potential impacts to the resident elk herd residing on the Project footprint and other local wildlife?

The EIA determined that construction activities and associated noise will result in a temporary loss of elk habitat within and adjacent to the Project development area. Once construction is complete, permanent loss of habitat for elk would be limited to within the PDA of the Project. Approximately 117 ha of high and 377 ha of moderate winter elk feeding habitat would be affected by the Project. Where possible, construction activities during the restricted activity period for the Key Wildlife Biodiversity Zone identified along the Elbow River (December 15 to April 30) will be avoided or reduced. This would lessen potential noise disturbance to wintering ungulates, including elk. To mitigate potential Project effects on elk movement during dry operations, Project design features (e.g., vegetated side-slopes of diversion channel, Highway 22 bridge over the diversion channel) and wildlife-friendly fencing will be installed at selected locations to facilitate elk movement.

C. Are local communities or wildlife at risk if they attempt to cross the diversion channel?

No, Project design features will help facilitate wildlife movement across the diversion channel during dry operations of the Project. Wildlife-friendly fencing will be placed around the diversion channel, which will delineate property boundaries but will allow wildlife passage. Wildlife friendly fencing is designed without barbs on the top and bottom strands and at a height so that ungulates (e.g. elk) can jump over and other animals (e.g. coyotes) can go under. The side slopes of the channel will be at a slope similar to a highway embankment which can be traversed by persons or animals. The side slopes and bottom of the diversion channel will be vegetated, except in select locations where there will be gravel filled riprap. The vegetation and gravel filled riprap will provide a more conducive material for animals (and persons) to move across the diversion channel.

D. How will wildlife cross the diversion channel?

Please see response above.

E. Will the diversion channel be fenced off? If so, what type of fencing will be used?

Please see response to Question 5.C. In addition to the wire fencing that will delineate property boundaries there will be 2.4 m high chain link fencing around select structures, such as the control buildings, for security and public safety. The area protected by chain link fence represents only a very small percentage (<0.1%) of the project area.

F. What is the expected number of fish and other aquatic animals, by species, in the reservoir at various flood scenarios?

Identify each species and its sensitivity to water temperature & water quality changes. Please do not limit this to fish. Identify expected species mortality.

The number of fish displaced from the Elbow River and into the reservoir is difficult to predict. During floods, fish move out of the main flow of the river channel and into refuge habitat and the flood fringe area waiting for water levels to recede. Conservatively, the EIA assumed that the number of fish entering the reservoir would be directly proportional to the percentage of flow diverted. However, due to fish behaviour and their ability to move out of the main flood flows, the actual proportion of fish displaced into the reservoir is predicted to be lower. It is likely the smaller fish (e.g., minnows and young large bodied fish) will be displaced at a higher rate than larger adults due to weaker swimming capabilities. The proportion of flood flow diverted under each flood is as follows:

- design flood (2013) - 48% of river volume
- 1:100 year flood - 56% of river volume
- 1:10 year flood - 14% of river volume

A proportion of the fish are predicted to exit the reservoir when the reservoir outlet gates are opened, and reservoir drawdown occurs. Fish rescue activities are planned to monitor for stranded fish and relocate them back to the Elbow River. Some fish mortalities are expected; these mortalities will be accounted for under the Project's *Fisheries Act* Authorization and Offset Plan (i.e., compensation plan used to maintain fisheries productivity and sustainability).
Elevated water temperatures in the off-stream reservoir may affect entrained fish. Predicted water temperatures in the reservoir are discussed in the response to Question I (Section 11.0) below. Fish species resident to the Elbow River and relevant temperature thresholds are provided in Table 2.

Table 2 Preferred and Incipient Temperature Thresholds for Elbow River Resident Fish

Species Information				
Family	**Common Name**	**Scientific Name**	**Temperature preference (˚C)[1,2]**	**Incipient lethal temperature (˚C)[1,3]**
Catostomidae (suckers)	longnose sucker	*Catostomus catostomus*	11.1	26.8
	mountain sucker (Saskatchewan River populations)	*Catostomus platyrhynchus*		
	white sucker	*Catostomus commersonii*	23.4	27.8
Cyprinidae (carps and minnows)	fathead minnow	*Pimephales promelas*	26.6	31.3
	lake chub	*Couesius plumbeus*		
	longnose dace	*Rhinichthys cataractae*	15.3	-
	pearl dace	*Margariscus margarita*		
	spottail shiner	*Notropis hudsonius*	16.6	33.0
Esocidae (pikes and mudminnows)	northern pike*	*Esox lucius*	20.7	31.0
Gadidae (cods)	burbot*	*Lota lota*	13.2	23.3
Gasterosteidae (sticklebacks)	brook stickleback	*Culaea inconstans*	21.3	30.6
Percidae (perches and darters)	yellow perch*	*Perca flavescens*	17.6	25.6
Percopsidae (trout-perches)	trout-perch	*Percopsis omiscomaycus*	13.4	-
Salmonidae (trout, char, salmon and whitefish)	brook trout*	*Salvelinus fontinalis*	14.8	24.9
	brown trout*	*Salmo trutta*	15.7	25.0
	bull trout* (Saskatchewan - Nelson Rivers populations)	*Salvelinus confluentus*	-	-
	mountain whitefish*	*Prosopium williamsoni*	-	-
	rainbow trout*	*Oncorhynchus mykiss*	15.5	25.0

Species Information				
Family	**Common Name**	**Scientific Name**	**Temperature preference (˚C)[1,2]**	**Incipient lethal temperature (˚C)[1,3]**
	westslope cutthroat trout*	*Oncorhynchus clarkii lewisi*	14.9	21.9

NOTES:
- No data available
* Denotes sportfish species
[1] Hasnain, S.S, C.K.Minns, and B.J.Shuter. 2010. Key Ecological Temperature Metrics for Canadian Freshwater Fishes. Climate Change Research Report CCRR-17. Ontario Ministry of Natural Resources, Applied Research and Development Branch. 45pp.
[2] Temperature preference is the temperature each fish species gravitates toward when exposed to a temperature range.
[3] Incipient lethal temperature is the temperature where 50% of the fish survive for an extended period.

Studies suggest that adults have lower temperature thresholds relative to juveniles (Fowler et al. 2009), and adverse temperature effects are experienced for freshwater fish in the low 20°Cs. For example, adult Atlantic salmon have been shown to experience sublethal effects at temperatures of 25ºC, and behavioural changes were noted at 20°C (i.e., decreased feeding) (DFO 2012). Warm water temperatures are also recognized by the Government of Alberta as a parameter that can induce stress on the fish communities of Alberta. Local sport fishing closures are implemented during temperature spikes in the local waterways so as to reduce additional stress to fish during warmer temperatures. Suspended sediments (total suspended sediments [TSS]) will be elevated when flood water enters the off-stream reservoir. As water exits the diversion channel, and water movement slows, the suspended sediments will settle out of the water column and concentrations will drop. As the reservoir water is drawn down and levels become shallow, water near the reservoir outlet will begin to move and resuspend some of the sediments before exiting the outlet gates. Under the three different flood scenarios assessed in the EIA, suspended sediments in flood water and the reservoir are presented in Table 3.

Table 3 Total suspended sediment levels in flood water and reservoir water in the three assessment scenarios.

Flood Scenario	**TSS levels in Elbow River**	**Maximum TSS levels in the diversion channel (before entering the reservoir)**	**Minimum TSS concentrations in the reservoir after settling**	**Peak TSS at the reservoir outlet gate**
Design Flood (2013 equivalent)	139,682 mg/L	89,166 mg/L	200-300 mg/L	17,961 mg/L
1:100 year flood	77,649 mg/L	74,715mg/L	200-300 mg/L	20,789 mg/L
1:10 year flood	4,818 mg/L	2,064 mg/L	1,797 mg/L	1,798 mg/L

Empirical modelling has demonstrated that a correlation exists between suspended sediment concentrations and adverse behavioural and physiological effects on salmonid species (Newcombe and Jensen 1996; Newcombe and MacDonald 1991; Newcombe 2003; Kjelland et al. 2015). This relationship between sediment and effects on fish is commonly qualified through the Severity of Ill Effects (SEV) Index (Newcombe and Jensen 1996), which was developed through modelling the association of TSS levels with categories of physiological and metabolic stress related effects. In general, TSS presents a variety of adverse effects on fish physiology and behaviour, and these effects are compounded by the duration of TSS exposure. While the estimated temperature ranges in the reservoir are likely within a range of tolerance for fish, some indirect physiological stress may be experienced at the temperatures estimated during a release from the reservoir because of the compounded effects of suspended sediments.

With respect to aquatic animals other than fish, during a flood reservoir filling will result in temporarily inaccessible habitat for wildlife species. The extent of this change would depend on the flood magnitude available at: , inundation of amphibian breeding ponds with cold water from Elbow River might increase development time and reduce survivorship of egg masses and larvae. In addition, flood water diverted into the off-stream reservoir may contain predatory fish, which might result in direct mortality of amphibian eggs and larvae.

References

DFO (Fisheries and Oceans Canada). 2012. Temperature threshold to define management strategies for Atlantic salmon (Salmo salar) fisheries under environmentally stressful conditions. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/019.

Fowler, S.L., D. Hamilton and S. Currie. 2009. A comparison of the heat shock response in juvenile and adult rainbow trout (Oncorhynchus mykiss) – implications for increased thermal sensitivity with age. Canadian J. Fish. Aquat. Sci. 66: 91-100.

Newcombe, C.P., and J.O.T. Jensen. 1996. Channel suspended sediment and fisheries: a synthesis for quantitative assessment of risk and impact. North American Journal of Fisheries Management: 16:693-737.

Newcombe, C.P., and D.D. MacDonald. 1991. Effects of suspended sediments on aquatic ecosystems. North American Journal of Fisheries Management, 11:72-82.

Newcombe, C.P. 2003. Impact assessment model for clear water fishes exposed to excessively cloudy water. Journal of the American Water Resources Association, June 2003.

G. What, if any, risks to ungulates, carnivores, birds and other animals may exist from drinking from the SR1 reservoir? How will this risk be mitigated?

There will not be any risks to wildlife from drinking floodwaters from the reservoir. Based on the results of the surface water quality (EIA, Volume 3B, Section 7) and hydrology (EIA, Volume 3B, Section 6) assessments available at https://open.alberta.ca/dataset/ed520427-3b66-41c5-b36a-33fbdeaea9aa/resource/25e429dd-e0dd-4cac-af1e-a9cd40031071/download/vol_3b_s07_surface_water_quality.pdf, no toxicological effects on aquatic or terrestrial wildlife are anticipated.

H. Will there be other risks to animals from movement in the reservoir or diversion channel (i.e. from stranding in silt or difficulties crossing the diversion channel)?

During flood and post-flood operations, the water contained in the off-stream reservoir and diversion channel has the potential to create physical barriers that might temporarily hinder terrestrial wildlife movement. During dry operations, sections of the diversion channel will be vegetated, which will facilitate wildlife movement.

6.0 Pipelines

A. What requirements are in place to ensure pipelines are safely relocated?

Retrofitting and re-location of pipelines will be undertaken by the pipeline operators and in accordance with current provincial (Alberta Energy Regulator) and federal (Canadian Energy Regulator) standards for oil and gas pipelines and as applicable under their respective regulatory frameworks.

In EIA, Volume 4, Appendix C, mitigation measures are identified to ensure pipeline safety. Prior to any retrofitting or re-location activities, pipeline operators will execute emergency preparedness plans to reduce the potential for rupture. More information on mitigation measures can be found in EIA, Volume 4, Appendix C available at https://open.alberta.ca/dataset/ed520427-3b66-41c5-b36a-33fbdeaea9aa/resource/6c2dc653-faf0-47d7-b8c9-d8a67c9cc2dc/download/vol_4_appc_mitigation_measures.pdf.

7.0 Diversion Channel

A. What are the dimensions of the diversion channel?

The channel is approximately 4.5 km long and has a typical bottom width of 24 m. The channel cut will be similar to an irrigation canal or highway with side slopes between 2.5:1 and 3:1 (horizontal:vertical) with some variation around infrastructure, such as bridges.

B. How will silt be managed in the diversion channel? Is Alberta Transportation planning to flush out the channel after a flood?

Because of the velocities in the channel, it is expected that silt deposits within the channel will be minimal. AEP will ensure that silt deposits left in the channel will be removed by excavator if they affect drainage or the conveyance capacity of the channel. Flushing the diversion channel, the reservoir, or any other structures in the Project with water is not anticipated to be necessary following a flood.

C. What are the contents of the diversion channel following a flood?

The diversion channel will have some post-flood sediment and debris similar to the material found in the off-stream reservoir, though it is expected this to be minimal due to the velocities of the flow within the channel during operation. The river diversion structure includes a debris deflection barrier intended to keep woody debris and other large objects out of the diversion channel and SR1 reservoir.

8.0 Design

A. Comment on the usefulness of the SR1 project to address drought and fire.

The Project was chosen to be a flood mitigation project by temporarily diverting, retaining and releasing water back to Elbow River when flooding subsides. The Project was not intended to address other uses such as drought or fire prevention. Questions relating to water management in the Calgary area are best addressed by Alberta Environment and Park and the area's municipalities.

B. Please clarify if retention times are the estimated times for complete draining of the reservoir (i.e. 60 days until reservoir is empty) or the start of complete draining (draining will begin in 60 days)?
If the former, please estimate the number of days water will be held without draining in the reservoir, or is this dependent on flood size? If so, explain.

The amount of time the water is held in the reservoir will depend on the nature of the flood and when its peak passes. Based on the design flood (2013 event), modelling results show the off-stream reservoir filling in approximately four days, water being retained in the reservoir for approximately 20 days to allow flows in the Elbow River to return back to a level where the released water will not cause flooding, and at least 38 days for complete drawdown. The total estimated duration from start of diversion to complete drawdown is approximately 62 days for a flood the size of the 2013 event. Therefore, portions of land in the reservoir area are expected to be inundated for at least 62 days for such a flood. Smaller floods can be drained quicker depending on conditions in the river.

C. Please provide a statement on whether SR1 is a precedent-setting project for flood mitigation? i.e. Has anything like this been done in Canada? Other places? We cannot find anything similar. If there are precedents, provide examples (locations, date of construction, size) and comment on their similarities / differences. Do not include diversions, as the main purpose of this project is temporary storage of flood waters in the reservoir.

The individual components of the Project (diversion, conveyance, and temporary water retention) have historically been used in water management and flood mitigation. For example, the Red River floodway diverts part of the Red River's flood flow around Winnipeg in Manitoba, much like the diversion structure and diversion channel will divert water from Elbow River to the off-stream reservoir. Such temporary reservoirs are used to retain floodwaters in many places in the world, including large facilities used on the Miami River in Ohio.

D. If this project is new to Canada, please comment on the level of confidence that the project will work as planned.

The Project has been designed in accordance with the Canadian Dam Safety Guidelines and the Alberta Dam and Canal Safety Guidelines. The Project components have gone through engineering evaluation, independent third party technical review and an independent review board who evaluated all engineering design and operational aspects of the Project through its design life. The rigorous design and evaluation of the Project provides a high level of confidence that it will work as planned.

9.0 Testing

A. Is Alberta Transportation planning to simulate a flood to test the off-stream reservoir following the construction phase?
How often will the Project be tested?
Will water temperature, mosquito population, wildlife impacts, air quality and dust be monitored during the simulation?
How will AT notify local residents prior to Project simulations?

While there are no plans to flood test the reservoir, there will be regular testing of all mechanical components and control elements of the project infrastructure.
As a simulation flood is not planned for the Project, AT has developed and presented four draft monitoring plans for different environmental effects. These are located in the Round 1 NRCB/AEP and CEAA information request packages (available at https://open.alberta.ca/publications/environmental-assessment-springbank-off-stream-reservoir-eia-and-application-for-approval-sir1#summary):

- Draft Vegetation and Wetland Mitigation, Monitoring and Revegetation Plan (Round 1 NRCB/AEP IR407, Appendix 407-1; Round 1 CEAA Package 2, IR19, Appendix 19-1) https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/f52a6d10-85ff-4223-b933-465a8ed02b04/download/sr1_nrcb_aep_ir1_appendix_ir407-1.pdf and https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/7dcac346-bf5b-4698-ba84-b4d03cf4d7d6/download/sr1_ceaa_ir_package2_appendix_ir19-1.pdf
- Draft Wildlife Mitigation and Monitoring Plan (Round 1 NRCB/AEP IR425, Appendix 425-1; Round 1 CEAA Package 1, IR9, Appendix IR9-1) https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/595d2aa4-b353-424d-947c-8467043d5a6c/download/sr1_nrcb_aep_ir1_appendix_ir425-1.pdf and https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/8b83e6fa-21fb-44d1-bc2e-fbc3a9696139/download/sr1_ceaa_ir_package1_appendix_ir9-1.pdf
- Draft Surface Water Quality Monitoring Plan (Round 1 NRCB/AEP IR302, Appendix 302-1; Round 1 CEAA Package 1, IR2, Appendix IR2-1) https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/b087d184-cf39-4411-99c3-f709bcc9fa27/download/sr1_nrcb_aep_ir1_appendix_ir302-1.pdf and https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/e2ad8857-820d-4c3c-a108-3f841e029ea5/download/sr1_nrcb_aep_ir1_appendix_ir162-1.pdf
- Draft Groundwater Monitoring Plan (Round 1 NRCB/AEP IR46, Appendix 46-1; Round 1 CEAA Package 3, IR3-15, Appendix IR15-1) https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/c86e8be4-32b3-47bb-b47f-e21231e1b832/download/sr1_nrcb_aep_ir1_appendix_ir46-1.pdf and https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/3e4980ca-3cbf-46d5-9231-02857085d5a2/download/sr1_ceaa_ir_package3_appendix_ir15-1.pdf

Mitigation undertaken post-operation will be dependent on the results of the various monitoring programs listed above. These mitigation measures may include:

- Revegetation with native plant species to mitigate impact on wildlife habitat;
- Use of licensed pesticides to combat propagation of invasive species and/or noxious weeds;
- Relocation of sediment and reestablishment of grades to restore surface water drainage routes;
- Application of tackifier to prevent wind erosion; and/or
- Adjustment of water return rates to the Elbow River

As indicated above, there will be no flood simulations so notice to residents prior to simulations will not be required. However, the operations plan to be completed prior to construction completion will include notification protocols to be followed prior to mechanical testing and flood operation. In addition, the design will include appropriate localized warning elements (sirens, strobe lights, etc.) to provide notice of pending facility operation to anyone in the vicinity.

10.0 Project Costs

A. Will the Government of Alberta financially compensate Bragg Creek businesses for the decrease in tourism expected from road delays and closures during the Project construction?

AT does not anticipate major delays to traffic from the construction of the Project nor delays that could affect tourism in Bragg Creek or the Elbow River valley. Accordingly, AT does not anticipate the need for financial compensation for business interruption in Bragg Creek. If, following construction, AT receives business interruption claims, such claims will be reviewed and assessed on their individual merits.

B. Provide estimated costs for dust suppression (watering, etc.) during construction and provide sources of water.

The cost estimate for the Project includes $500,000 for the care and maintenance of existing and temporary roads during construction. This includes provision for dust suppression.

In the EIA, AT indicated that during dry periods, water would be applied to haul roads and/or disturbed areas to mitigate dust emissions (Volume 4, Appendix C, Table C-1, page C.3 found here: https://open.alberta.ca/dataset/ed520427-3b66-41c5-b36a-33fbdeaea9aa/resource/6c2dc653-faf0-47d7-b8c9-d8a67c9cc2dc/download/vol_4_appc_mitigation_measures.pdf). The preferred option to source water for dust suppression and other construction needs will be a local third-party permitted supply.

C. Identify whether costs of subdivision for any lands acquired by the Alberta Government are included in the cost/benefit analysis, if they are included in the proposed $60 million resale. If not, please estimate the costs of subdivision for all impacted lands.

Where AT acquires only part of a parcel (because only part falls within the PDA), the creation of separate parcels is being affected by the registration at Land Titles of Public Works Plans, not plans of subdivision. The cost of creating and registering Public Works Plans is included in the project budget.

In the case where AT acquires an entire parcel and later re-sells part of it, and that is done through registration of a plan of subdivision, the cost of doing so would be a project cost borne by AT. The cost of creating and registering Public Works Plans and subdivision plans is not expected to be significant.

D. Please provide the updated land acquisition values, including both cash and non-cash compensation and confirm that ALL compensation for land has been included in the cost model. Please describe non-cash compensation, if provided to any landowners, including land in lieu and tax credits or tax adjustments and any other item that may be considered compensation. If you are unable to provide the financial figures, please list ALL types of compensation to landowners by category.

Since the original land acquisition estimates, AT has begun negotiations with landowners with the objective of achieving voluntary, willing seller-willing buyer acquisitions. During this process, it has become apparent that voluntary acquisitions of land will cost more than originally anticipated. Details of specific transactions are confidential as between the vendor and AT as purchaser. However, for the Project overall, the updated estimate for acquiring land required for the Project is $140 million.

E. Identify whether any costs related to SR1 may have been included in other projects (i.e. road changes), and if so, identify them and include them in the SR1 cost model. Provide a breakdown of roadway changes by road (i.e. RR40 upgrades, Highway 22 Elevation, Highway 22 Bridge Crossings, Springbank Road and Hwy 22 Intersection Elevation, Diversion Channel Crossings on secondary roads).

All costs associated with changes to the transportation infrastructure that are required for the construction and operation of the Project have been included in the cost estimate. This includes the raising of Highway 22 and the associated local raising of Springbank Road to meet the new grades of Highway 22, as well as the secondary road bridge (Township Road 242) over the diversion channel.

While these changes to the road network have been designed in consideration of future plans, the Project does not affect the design of those projects nor their necessity to proceed. Even without the Project, those projects would proceed as to their current design.

F. Provide costs for moving / upgrading each individual pipeline impacted by the reservoir. Include compensation to pipeline operators for business disruption, if applicable, as a separate line item.

The cost estimate for the Project currently includes $15.7 million for modifications of pipelines and utilities within the Project footprint. AT does not compensate pipeline operators, or other utility owners for business disruption or commercial losses from such activities. AT will not be compensating these parties for this Project. For a breakdown of cost estimates see page six of CEAA Package 3 – Appendix IR45-2 at https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/5cd15472-08c3-465b-8cf4-03cd7c3c8a4f/download/sr1_ceaa_ir_package3_appendix_ir45-2.pdf. Utility Relocation cost estimates are summarized in the below table.

Utility Relocation item:	**Estimated Cost**
FORTIS - Salvage and Reinstate Utilities	$ 1,907,450
SHAW - Salvage and Reinstate Utilities	$ 401,200
TELUS - Salvage and Reinstate Utilities	$ 601,200
ATCO - Salvage and Reinstate Utilities	$ 351,150
TransCanada Pipelines Ltd.	$ 3,030,000
Pengrowth Energy Corporation	$ 718,750
Veresen Inc	$ 722,500
Plains Midstream	$ 7,672,500
Altalink	$ 300,000
UTILITY RELOCATION TOTAL	**$ 15,704,750**

G. Provide the cost of the development permit (Rocky View County) and other permits (if any).

The process and fees associated with land use redesignation(s) and potential development approval(s) will be discussed with Rocky View County prior to any applications being submitted. Because there are no current land use districts and/or land uses associated with an off-stream reservoir at this scale in the Rocky View County Land Use Bylaw (C-4841-97), discussions with the County will occur in order to identify a proper land use district (likely Direct Control), applicable subdivision fees, and relevant/necessary municipal approvals for any required development permit applications.

In Rocky View County, fees for land use redesignations are based on area and district(s) proposed and are currently capped at $100,000 per application. Subdivision fees are applied by instrument or plan and endorsement and are also capped at $100,000 per application. Development and road construction

application fees range from $200 to $5,000 per item depending on the item applied for (such as cattle guards, fence replacement). All applicable land use redesignation and development permit fees will be discussed with the County prior to any application submissions.

H. Provide an updated projection of annual operating costs of SR1. The most recent is from the 2017 IBI report ($5M per year). Please provide a breakdown of the annual operating costs, including dust suppression (water, tackifers, vegetation), safety management, emergency response, silt removal/management, staff, facilities & structural maintenance, berm and reservoir maintenance (planting, etc.) wildlife management and tracking, monitoring of fish passages, spawning areas and fish health, water quality testing, air quality monitoring, reporting, etc.

The current estimated annual operating and maintenance costs of SR1 are $975,000 (see the Round 1 NRCB/AEP IR6, Appendix 6-1 available at https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/f5f42497-23e3-48ad-90da-0111e05faf1f/download/sr1_nrcb_aep_ir1_appendix_ir6-1.pdf). Final costs will be determined once the project is operational.

11.0 Water Quantity and Quality

A. Is there expected to be increased mosquito activity on the SR1 footprint, relative to its current uses, once the reservoir has been used in any way? If so, by how much? Include assumptions and various scenarios of flood. Provide information on how far mosquitoes can travel within the local area and predict any impacts within the local area. Advise if there is any expected increase in West Nile or Zika risk for people and animals, both wild and domestic. If increased mosquito activity is expected, please predict or comment on mosquito activity at our community soccer park and schools, which are approximately 3 km directly east of the reservoir. What testing and mitigation measures are proposed to managed this risk?

Insect impacts are not required to be assessed through the EIA process. As such, AT has not conducted an assessment of Project impacts on mosquito population, but acknowledges the concern regarding mosquito activity following use of the reservoir. AT will forward this concern to AEP for their consideration as part of their post-operation monitoring and mitigation plan.

B. Identify the testing for water quality before SR1 for all water cooperatives or plants upstream of Glenmore Reservoir and describe plans for testing on an ongoing basis.

Water quality monitoring will be conducted in the Elbow River upstream of the diversion inlet and in the off-stream reservoir when the Project has been initiated for a flood and prior to the release of water back to Elbow River. AT has committed to providing the results to the City of Calgary and is willing to provide the results to downstream water cooperatives and/or plant operators. The water quality program is summarized in Table 3.

Table 3 Water Quality Parameter Frequency and Location Monitoring

Monitoring Parameter	**Unit**	**Frequency**	**Location1**
Total Suspended Sediments (TSS) and Turbidity	mg/L; NTU	Daily during operation	Res, O-C and u/s
Temperature	°C	Daily during operation	O-C and u/s
Dissolved Oxygen	mg/L; % saturation	Daily during operation	O-C and u/s
Conductivity	µS/cm	Daily during operation	O-C and u/s
pH	-	Daily during operation	O-C and u/s
Discharge (Flows in the channel)	m^3/s	Daily during operation	O-C and u/s
Major ions	mg/L	Weekly during operation	Res, O-C
Total and Dissolved Metals	µg/L	Weekly during operation	Res, O-C
Nutrients	mg/L	Weekly during operation	Res, O-C
Methyl Mercury	µg/L	Weekly during operation	Res, O-C
Hydrocarbons	mg/L	Weekly during operation	Res, O-C

NOTE:
1 O-C – outlet channel (includes the unnamed creek) between the reservoir and Elbow River; u/s – in Elbow River upstream of the intake structure and diversion channel; Res – within the off-stream reservoir.

C. Identify what water quality remediation plans will exist and what compensation or other remuneration would exist for compromised water quality (sedimentation, cyanobacteria, etc.) - for landowners, water plant owners and water cooperatives.

Water quality remediation plans do not exist because there are no anticipated water quality impacts to landowners, water plant owners, and water cooperatives that would warrant remediation. Consequently, AT has not established any mechanism to compensate for such damages. However, any claims against the Government of Alberta from the impacts of the Project will be dealt with on a case-by-case basis.

D. Explain whether the water in the SR1 footprint is effectively "stagnant" with no fresh water flow from the Elbow River (a closed system) and if fresh water is expected to enter the reservoir from a different source

The off-stream reservoir will function as a closed system isolated from the Elbow River until water is released. Fresh water will enter the reservoir through the tributaries connected to the diversion channel and the Unnamed Creek running through the reservoir as well as by precipitation falling directly within or flowing overland into the reservoir. Wind action will reaerate reservoir water and maintain oxygen levels reducing the likelihood of anoxic conditions that may cause odours. Water samples will be collected and analysed in the reservoir prior to being released to Elbow River.

E. Explain how the Alberta Government will monitor for seepage or loss of water from the SR1 reservoir and what the mitigation strategies are.

Seepage from the reservoir will infiltrate the subsurface at low rates due to the low hydraulic conductivity lacustrine clay and till underlying the reservoir. This natural barrier will limit seepage from the reservoir and is one of the reasons that the Project location is favourable for the construction of the reservoir. Seepage will also be limited by the short residence time of the water in the reservoir. The limited seepage from the reservoir would flow toward, and eventually discharge to, the Elbow River.

No specific mitigation for the temporary changes in groundwater quantity are considered necessary; however, groundwater monitoring and response plans will be in place to evaluate potential impacts. A draft groundwater monitoring plan is provided in the response to AT's response to Round 1 NRCB/AEP, IR46, Appendix IR46-1 available at https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/c86e8be4-32b3-47bb-b47f-e21231e1b832/download/sr1_nrcb_aep_ir1_appendix_ir46-1.pdf.

The groundwater monitoring well network will measure hydraulic head as the primary metric in evaluating potential changes in groundwater quantity resulting from seepage. The secondary metric for evaluating the potential effects of seepage is groundwater quality. The groundwater monitoring plan includes both quantity and quality monitoring and will use a tiered approach that will allow for early detection of seepage related effects.

Effects on groundwater quality will be mitigated through decommissioning and plugging of existing water wells within the reservoir footprint to prevent preferential pathways for seepage and groundwater contamination. Groundwater quality triggers are described in the groundwater monitoring plan. Should a trigger be exceeded and confirmed, a number of follow-up actions are described including:

- evaluate the potential sources or causes of the parameter concentration increases
- conduct a field assessment which may include installing additional monitoring wells to delineate the extent of impacts, both horizontally and vertically
- implement appropriate management controls to mitigate the impact
- identify, design and implement appropriate engineering control or remedial measures

F. Quantify the expected evaporation of water from the SR1 reservoir under various flood scenarios and retention lengths. Express this as a % of water retained. Compare this to the expected evaporation of the elbow river as a baseline.

Table 4 summarizes the predicted evaporative losses from the off-stream reservoir.

Table 4 Summary of Estimated Evaporation Rates and Volumes for Floods

Flood	Volume Diversion (dam^3)	Diversion Time (days)	Residence Time in Reservoir before Draining (days)	Average Daily Rate (mm)	Cumulative Evaporation (mm)	Total Evaporation Volume (dam^3)	Evaporated/ Diverted Volume (%)	Evaporated Volume/Annual Elbow River Volume (%)
Design	55,138	3.75	20	4.6	271	1,361	2.5	0.3
1:100 Year	33,014	1.8	43	4.5	386	1,579	4.8	0.3
1:10 Year	790	0.38	43	4.6	342	45	5.7	0.01

NOTES:
1 Period of retention and release: 06/24/2013 to 08/21/2013
2 Period of retention and release: 06/02/2100 to 08/23/2100
3 Period of retention and release: 05/25/2008 to 08/05/2008

G. How much will the flow rate of the Elbow River change when SR1 waters are released under various flood scenarios & retention times?

Information on changes in flow rates under various flood scenarios can be found in the EIA Volume 3B, Section 6.4.2, Table 6-5 available at https://open.alberta.ca/dataset/ed520427-3b66-41c5-b36a-33fbdeaea9aa/resource/0e02ab10-fc3b-4970-90b7-fcef282bba0f/download/vol_3b_s06_hydrology.pdf.

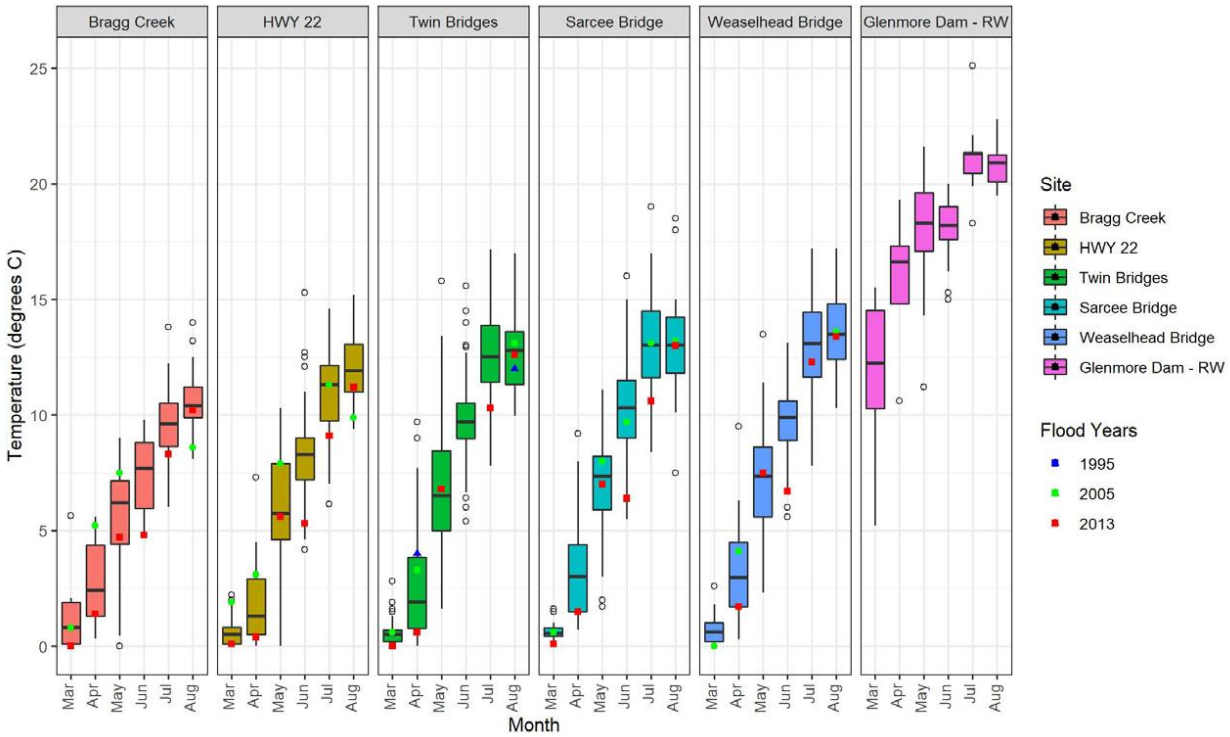
H. What is the expected contents of the waters being released out of the reservoir and how will the properties of the SR1 water differ from the Elbow River water that bypasses the SR1 footprint?

Reservoir operations will occur when sediment concentrations in the Elbow River are already high due to flooding and the diverted water will have the same characteristics as the water allowed to pass downstream during the flood operation.

As the water is held in the off-stream reservoir, some sediment will settle out. Temperature may rise in the retained waters, as described in the response below, and there might be a decrease in the water's dissolved oxygen concentration. Upon release, the water will have lower sediment concentrations than when it was first diverted; however, during the last stage of water release back into Elbow River, suspended sediment concentrations are predicted to increase as the bottom of the reservoir is drained and some sediment is remobilized. Most of the sediment that is delivered to the reservoir during a flood will stay in the reservoir.

I. What will be the water temperature in the SR1 reservoir (weekly expected forecasts at various reservoir depths & durations of retention). Compare that to the typical temperature of the Elbow River. This should further be broken down into various flood scenarios.

Historic water temperatures (upper 75th percentiles) in the receiving water (i.e., Elbow River near the PDA at Highway 22) for July and August have been approximately 13˚C and 14˚C, respectively (see Figure 4 below).



NOTE: Blue, Green, and Red Symbols Represent Maximum Concentrations during 1995, 2005 (1:10 year flood), and 2013 (design flood) flood years.

Figure 4 Historical Temperatures in the Upper Elbow River Mainstem Sites and at Glenmore Reservoir Dam from 1979 to 2016

Literature reported water temperatures from upper water column water temperatures in small shallow lakes in Alberta were used as an analog for the off-stream reservoir. Water temperatures in shallow lakes may reach the low 20˚Cs during the mid-summer months (Prepas and Mitchell 1990; ALMS 2016, 2017, 2018a, b, c). Historical Glenmore Reservoir water temperatures have reached the low 20˚C (see Figure 1 above).

References

ALMS (Alberta Lake Management Society). 2016. Lakewatch: Chestermere Lake. Alberta Lake Management Society Volunteer Lake Monitoring Program.

ALMS. 2017. Lakewatch: Pine Lake. Alberta Lake Management Society Volunteer Lake Monitoring Program.

ALMS. 2018a. Lakewatch: Buffalo Lake. Alberta Lake Management Society Volunteer Lake Monitoring Program.

ALMS. 2018b. Lakewatch: Burnstick Lake. Alberta Lake Management Society Volunteer Lake Monitoring Program.

ALMS. 2018c. Lakewatch: Wizard Lake. Alberta Lake Management Society Volunteer Lake Monitoring Program.

Prepas, E., and P. Mitchell. 1990. Atlas of Alberta Lakes. University of Alberta Press.

J. Will there be any impact on the water temperature of the Elbow River downstream of SR1, including the Glenmore reservoir?

Releasing reservoir water into Elbow River during the summer months may increase the thermal load on the river; however, dilution rates in the river are great enough to mitigate warm water inputs. Dilution rates in the Elbow River are predicted to be as follows:

- For the design flood, released water would contribute 29% to 59% of total flow in the Elbow River (i.e., dilution would result in reduction of reservoir constituent concentrations of 40% to 70%).
- For the 1:100 year flood, released water would contribute 5% to 35% of total flow in the Elbow River (i.e., dilution would result in reduction of reservoir constituent concentrations of 65% to 95%).
- For the 1:10 year flood, released water would contribute less than 5% of total flow in the Elbow River (i.e., dilution would result in reduction of reservoir constituent concentrations greater than 95%).

Based on these dilution rates, an estimated reservoir water temperature of 22˚C and receiving water temperature of 14˚C, the water temperature once fully mixed in the Elbow River would be approximately as follows:

Design flood, 16.3˚C to 18.7˚C

- 1:100 year flood, 14.4˚C to 16.8˚C
- 1:10 year flood, below 14.4˚C.

K. What is the risk of contamination of the SR1 waters from septic fields and sewer back up from Redwood Meadows and Bragg Creek and properties upstream of SR1? Please note that we expect the upstream berms to provide inadequate protection from groundwater flooding due to the width of the alluvial aquifer. Groundwater flooding will inevitably result in flooded septic systems. If you can prove otherwise, please do. What are the measures of contamination from septic systems?

Risks to groundwater quality due to inundation of septic systems situated in the Elbow River floodplain are related to floods, and not to the operation of the Project. The Project will not increase the impact of contamination from septic fields or sewer backups.

In general, potential measures of contamination from septic systems include bacteriological parameters (e.g. total coliforms, E.Coli.) and nutrients (e.g. nitrates/nitrites, phosphorus), along with other parameters potentially present in a domestic wastewater source.

L. We request that all area wells surrounding the SR1 footprint in all directions to be tested before any construction begins. Results must be released publicly for comparison. Testing should take place again, regularly - during and following construction and each time the reservoir is used. Testing should include a complete water quality report and along with water pressure. Propose mitigation measures if any negative impacts are recorded. Explain whether any compensation is considered for well owners who are negatively impacted. Please confirm what testing of area wells is proposed.

A draft groundwater monitoring plan has been prepared for the Springbank Reservoir and is included in AT's response to Round 1 CEAA Package 3, IR 3-15, Appendix IR15-1 (available at https://open.alberta.ca/dataset/c7b52cd4-2adc-4f14-8a3e-02255afca154/resource/3e4980ca-3cbf-46d5-9231-02857085d5a2/download/sr1_ceaa_ir_package3_appendix_ir15-1.pdf). The groundwater monitoring program (GWMP) considers the hydrogeologic setting of the Project and has been developed to provide monitoring through all Project phases: pre-construction baseline, construction, dry operations, flood operations, and post-flood operations. Proposed mitigation measures for potential effects on groundwater are also presented therein.

The groundwater monitoring program adopts a tiered approach for the siting of monitoring wells, whereby the number and distribution of monitoring wells will be variable to reflect the potential effects applicable during a particular project phase. Tier 1 monitoring wells will be shallow and located within or immediately adjacent to Project infrastructure, including the diversion channel, diversion intake, and dam. Tier 2 monitoring wells will be shallow and within or near the wetted perimeter of the off-stream reservoir. Tier 3 monitoring wells will be situated between the Project infrastructure and potential receptors and would be installed in unconsolidated or bedrock units depending upon local use and potential aquifers of interest.

During baseline data collection, there will be monitoring conducted prior to any Project disturbances with the intent to understand the variability in hydrogeologic conditions in location and time. During the construction phase, monitoring will be generally localized around construction activities that could lead to effects on groundwater (e.g. construction dewatering, deep excavations). During dry operations, there will be monitoring to confirm consistency with baseline conditions and to observe potential longer-term regional trends that are unrelated to Project activities (e.g. long term climatic trends). During flood and post-flood operations, there will be monitoring to observe potential effects on groundwater both near Project infrastructure and farther afield in the regional assessment area.

A baseline domestic water well testing program has been completed for select wells within the PDA. Ongoing monitoring of domestic wells may be considered via incorporation of select wells into the Tier 3 series of monitoring wells where appropriate. Results of the domestic water well monitoring could be made public within the annual groundwater monitoring reports; however, this is contingent on landowner consent to disclose the results publicly.

Effects on groundwater levels related to the Project are expected to be limited to areas within or immediately adjacent to Project infrastructure, including the diversion channel, off-stream reservoir, and dam. Existing domestic wells in these areas would be decommissioned during Project construction unless they will be used for monitoring purposes. Should wells outside the PDA be negatively affected by the Project, AT will consider mitigation or remedial solutions on a case-by-case basis.

12.0 Silt

A. Give the expected silt deposit buildup in the reservoir and related structures at various flood scenarios. How will the build-up evolve over time (multiple uses of SR1)?

As stated in the EIA (Volume 3B Section 10.2.2.3 found here: https://open.alberta.ca/dataset/ed520427-3b66-41c5-b36a-33fbdeaea9aa/resource/7aa6ec75-8266-48c0-b4cd-78b4a070d791/download/vol_3b_s10_vegetation_and_wetlands.pdf, no lasting effects to vegetation and wetlands would be anticipated as a result of a 1:10 year, 1:100 year or design (2013) flood. Sediment from the design flood would cover approximately 375 ha of the reservoir. Most of the sediment deposition would be to 1-3 cm deep (193 ha, 51%), 37 ha (10%) would be covered by 3-10 cm, 105 ha (28%) would be covered by 10-100 cm and 41 ha (11%) would be covered by more than 100 cm. In general, at sediment depths less than 10 cm, vegetation would be retained, and would only result in minor effects. However, at depths greater than 10 cm, vegetation would be adversely affected and in some cases would be re-established through colonization (seedlings from existing vegetation). Government has identified that work will likely be required for post flood reclamation and monitoring following a flood, including vegetation management.

Indigenous group and stakeholder engagement is ongoing and will guide monitoring and revegetation plans. Traditional use plant species will be included in revegetation plans.

B. What is the risk that silt accumulation impedes the future function of ANY of the structures associated with the reservoir, diversion channel, gates, outlets. spillways, etc? People in Redwood Meadows comment that the silt deposits from the 2013 flood have taken on concrete-like properties. Is this hardening of silt contemplated in the future functioning of the reservoir and its components?

The off-stream reservoir and diversion channel have been designed with 10% additional volume than what is required to meet its 2013 flood design basis. This additional volume is provision for additional runoff from within the unnamed creek basin while the reservoir is full and for sediment that may accumulate in the reservoir. The computer modelling described above suggests that a 2013 flood may deposit sediment that totals 1.1% of the reservoir's total volume. This means that the reservoir could hold sediment from more than nine floods of the equivalent size to that which happened in 2013. Should sediment impede positive drainage or capacity, mitigation measures will be taken.

C. If the silt is expected to be removed, please explain under what circumstances, the mechanism, its expected cost and the impacts on the community (dust, trucks, noise, frequency). Explain where the silt will be moved to, if in Rocky View County.

Silt removal from the reservoir is not expected to be necessary as described above. Should silt impede positive drainage or the capacity of the reservoir in localized areas following a flood, then the sediment or silt will be moved and recontoured within the reservoir.