
Bass Lake Outlet Berm Investigation



Township of Rideau Lakes
1439 County Road 8
Delta, Ontario
K0E 1G0

Prepared by



Jp2g Consultants Inc.

1150 Morrison Drive, Suite 410, Ottawa, Ontario, K2H 8S9
T.613.828.7800 F.613.828.2600
Jp2g Project No. 18-5109A

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1 Introduction

1.1 Project Description

The Township of Rideau Lakes (the Township) has received concerns from property owners on Bass Lake related to water levels and the existing outlet berm at the north end of the lake. More specifically, concerns related to a significant drop in water levels in the spring of 2018, apparent tampering with the berm in the spring of 2018, the long-term structural stability of the berm, ownership and access issues related to the berm, and the potential environmental and social impacts should the berm unexpectedly fail. Additionally, isolated concerns have been received in the past related to spring flooding and land inundation. The Township has engaged Jp2g Consultants Inc. (Jp2g) to assess the existing outlet and associated water level conditions; determine the full scope of resident and other stakeholder concerns (both upstream and downstream); develop potential solutions; and provide an evaluation and recommendation of these possible solutions. The scope of this study is primarily focused on the hydraulics of Bass Lake and the types of solutions available to the Township; related issues such as water quality, shoreline protection, and establishment of a specific lake surface elevation are not addressed in detail in the report. Should the Township wish to proceed with a particular option, a more detailed analysis, including establishment of desired lake surface elevations, would be required under a separate phase to produce detailed plans and specifications to the satisfaction of regulatory authorities. For more information on water quality and shoreline health please refer to supporting documentation such as the Rideau Lakes Subwatershed Report (RVCA, 2014).

1.2 Site Description

Bass Lake is spring fed from a 7.8 km² catchment area of primarily rural and undeveloped lands, characterized by a relatively flat topography and generally high water table featuring wetlands and forested areas. The lake is spring-fed, with no defined lakes, rivers, or creeks draining to Bass Lake. The area's annual precipitation is approximately 907 mm with the spring freshet dictating peak water levels. Bass Lake outlets to Lower Rideau Lake via a channel at the north end of Bass Lake; this outlet channel is approximately 1 km in length and discharges to Lower Rideau Lake at an approximate water level elevation of 124 m and is currently controlled by an earthen berm in a state of deterioration. The earthen berm was constructed without regulatory approval in 1995 on mostly private property, with the eastern portion encroaching roughly 15 m onto the Township's roadway easement that extends from Bass Lake Road. The area in the immediate vicinity of the berm is Provincially Significant Wetland environment subject to Conservation Authority oversight.

More detail surrounding the berm's original construction is provided courtesy of the Bass Lake Property Owners Association (BLPOA):

"In 1995, a major beaver dam which was effectively controlling lake water level in the 1990's was intentionally destroyed and removed and the Bass Lake water level dropped dramatically to a level never before encountered. Advice was initially sought from the authorities and the berm was later urgently constructed without permits or approval of regulatory authorities. In Spring of 1996, RVCA issued a Notice of Violation and after several meetings in summer of 1996 the RVCA was prepared to withdraw any violations if it was agreed to remove the culverts, grates and regrade the top of berm to lower level of spillway. Once final grading was



done instructions were to apply a suitable grass seed mixture to restore vegetative growth process to prevent erosion. It was stated by RVCA that the resultant dam made the effective water level no higher than the beaver dam and it should give more stable water level control than that provided by the beaver population. RVCA chose not to pursue the Notice of Violation.”

Figure 1-1 shows a satellite view of the area while **Table 1-1** shows the specific land use breakdown. **Figure 1-2** shows Bass Lake from an aerial view above the existing berm, looking south.

Table 1-1. Bass Lake Catchment Land Use

Land Use	Area [km ²]	Area [%]
Forest	2.5	32
Agricultural or Rural	1.2	15
Wetlands	1.1	14
Lakes	3.0	38
Developed / Paved	0.1	1
Total	7.8	100

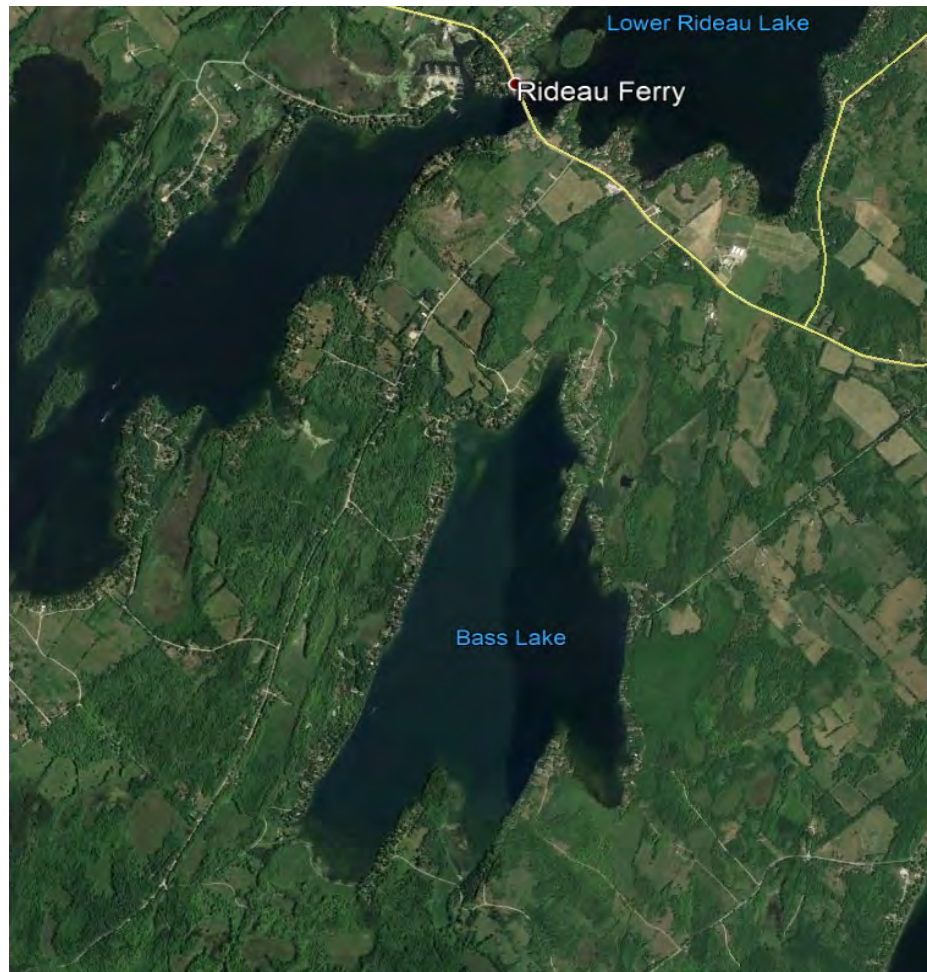


Figure 1-1. Bass Lake and surrounding area



Figure 1-2. Outlet channel of Bass Lake (Twp of Rideau Lakes, 2018)

As shown in **Figure 1-3**, Provincially Significant Wetlands around Bass Lake include the outlet itself, a large portion of the eastern shoreline, and much of the area around the sheltered bays to the south of the lake. Ontario Regulation 174-06 (entitled “Development, Interference with Wetlands and Alterations to Shorelines and Watercourses”) protects the hydrologic function of the wetland and also protects landowners and their property from natural hazards (flooding, fluctuating water table, unstable soils) associated with them. Under this regulation, any change to water levels in these wetlands is subject to the approval – with or without conditions – of the Rideau Valley Conservation Authority. It is understood that wetlands provide value to local ecosystems as well as providing some level of flood mitigation and protection; it is expected that impacts to these vital functions of the wetlands around Bass Lake would be unlikely to receive RVCA approval. Therefore, design of any hydraulic structure would have to include detailed analysis of the impacts to water levels and hydrologic function of wetlands both up and downstream of the Bass Lake outlet.



Table 1-2. Bass Lake Hydrology

Water Level Event	Peak Flow at Bass Lake Outlet [m ³ /s]	Approx. Lake Elevation	Approx. Water Depth at Berm*
1:2	1.5	134.50	- 0.01
1:5	2.0	134.52	0.01
1:10	2.5	134.53	0.02
1:20	3.0	134.56	0.05
1:50	3.5	134.60	0.09
1:100	4.0	unknown	unknown

* relative to assumed berm elevation of 134.51 mASL

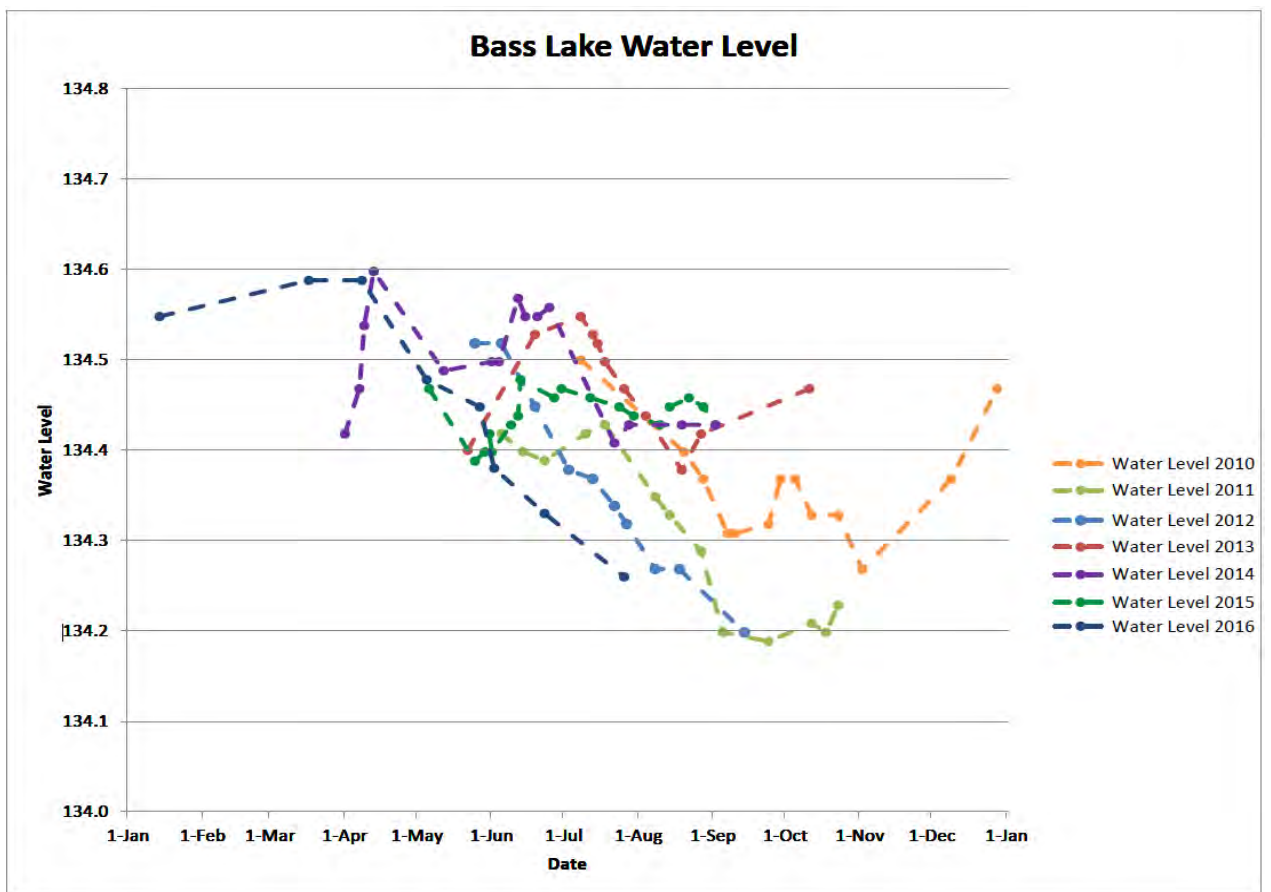


Figure 1-4. Recorded Bass Lake Water Elevation Data, provided by the Township (2010 - 2016)

2 Jp2g Preliminary Investigation

2.1 Existing Condition Review

Jp2g conducted a site visit to the Bass Lake outlet on April 18, 2019. The site visit was conducted during the spring freshet, with elevated water levels recorded throughout the Rideau Valley watershed during this time period. The existing berm is shown in **Figures 2-1** and **2-2**. The berm did not have a defined



structure and many spill points or channels could be seen having formed along the berm and braiding together immediately downstream of the structure. Flow overtopping the berm had noticeable velocity, including wind-driven wave action; flow downstream of the berm had little velocity, with the channelized overtopping flow quickly dispersing into a wetland environment. Despite the elevated water levels, the berm's "spillway" had accumulated significant debris with a stagnant flow and did not appear to serve its apparent intended purpose. This suggests that the original berm elevation was higher than what was observed during the site visit and has since deteriorated, rendering the spill way obsolete or with limited functionality. Survey results from July 2010 showing a top of berm elevation of 134.5 m, along with water level and channel bottom profile elevations.

The area in vicinity of the berm was evaluated for alternative construction locations, for example, a narrower channel downstream may be cheaper to construct than replacing at the exact location. However, this may involve additional property, access, maintenance, and ecological impact considerations rendering a different location unfeasible. The local ecosystem in vicinity of the Bass Lake Road culvert will require a Species at Risk (SAR) review during the design phase to determine necessary precautions are taken and documented during design and construction.



Figure 2-1. Bass Lake berm, April 18, 2019



Figure 2-2. Bass Lake Berm “Spillway”, April 18, 2019

**Bass Lake
 Bed of Creek and Water Level Elevations at outflow control (Causeway/beaver dam)
 Survey date: 2010.07.08**

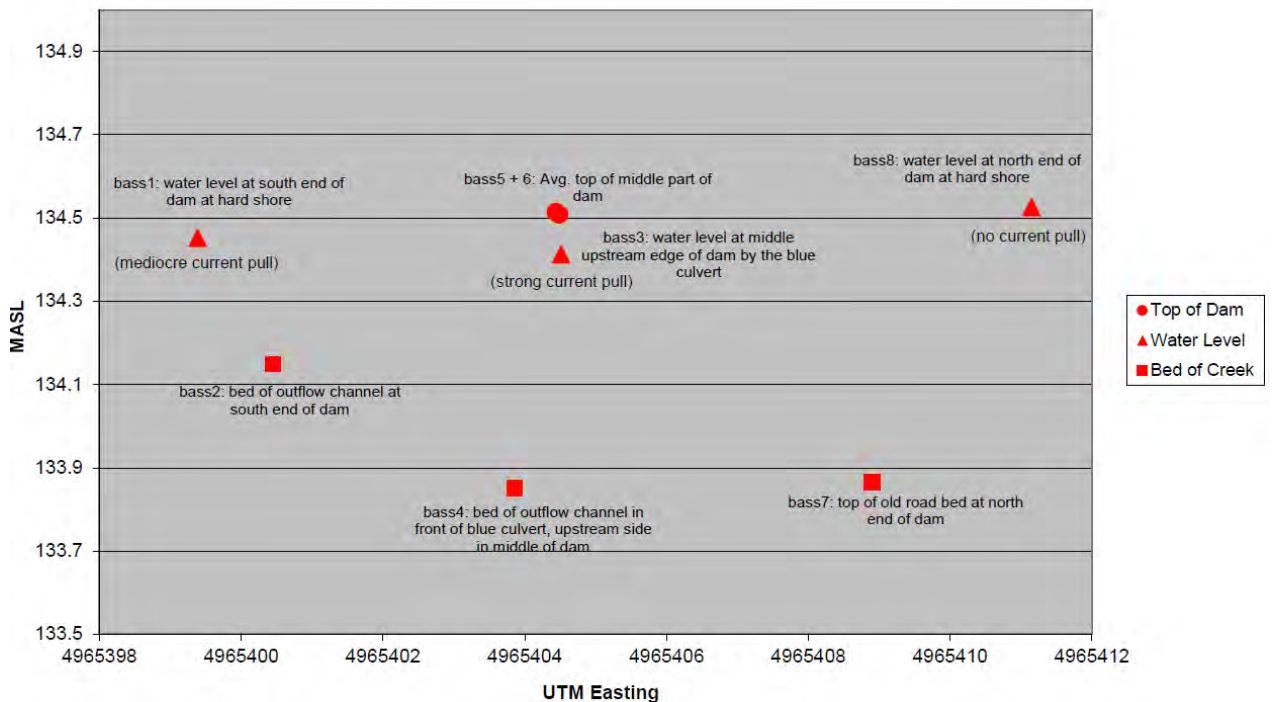


Figure 2-3. 2010 Survey data showing top of berm, water surface, and channel bottom profile elevations



Additional survey data was commissioned in August 2018 by BLPOA to establish more recent water level and berm elevation data. A total of 14 spot elevations were taken, representing the top of berm elevation and water surface elevation of the lake. The average for each location is shown in **Table 2-1**. Note that the average elevation for the top of berm is 0.3 m lower than the 2010 survey data, potentially indicating a corresponding deterioration in the berm's structure over the eight year period between surveys.

Table 2-1. Topographic survey data provided by BLPOA (circa August 2018)

Location	Description	Elevation (mASL)
Existing Berm	Top of berm	134.2
	Upstream Water surface	134.1
	Downstream Water surface	133.7
Bass Lake Lodge	Water surface	134.2

2.2 Engineering Considerations

This section briefly discusses the engineering considerations identified by Bass Lake stakeholders and how they may be addressed at a conceptual level.

2.2.1 Site Remediation Plan

The sensitive wetland area around the existing berm will need to be sufficiently protected and/or remediated to the satisfaction of approval authorities. The site remediation plan will need to show that the ecological function of the area is maintained or improved, and any construction impacts are sufficiently mitigated or offset with an appropriate vegetation plan. A biologist with expertise in Species at Risk evaluation should be engaged to determine specific design and construction constraints.

2.2.2 Construction Access Plan

Property land ownership in the vicinity of the berm may complicate site access and construction. Access agreements, easements, or land acquisitions may be required, with the preferred option minimizing impacts on private lands while reducing or removing the liability associated with the lake outlet being located principally on private property. Access to the east end of the berm via Bass Lake Road and the Township easement is relatively straightforward; however, depending on the preferred design solution, access to the berm's western edge via private property may be necessary.

2.2.3 Grading and Filling

A grading and filling plan will identify the quantity and type of material to be placed at or removed from the site, including the material specifications and cut and fill locations and volumes. The preferred option will have limited impact on the existing ecosystem and will therefore have as small a footprint as possible and will avoid significant alteration to existing wetlands. Re-use of the existing berm material may be a viable option to reduce volume of material exported from and imported to the site. A cut and fill balance should be optimized to reduce overall changes to wetland functionality.



2.2.4 Sediment Control

The successful design solution will demonstrate the ability to manage sediment during construction and operation of the hydraulic control. Expected erosion and deposition patterns will have to be understood and accommodated to ensure minimal inspection and maintenance requirements of the Township. Sediment and Erosion control plans will be required from the Contractor and are subject to review and approval from the Rideau Valley Conservation Authority.

2.2.5 Overflow

An understanding of drainage and flow patterns during peak events will be required, with peak levels managed to avoid negative impacts to the ecology or public health and safety. The proposed solution should be able to accommodate elevated lake levels without direct action required by private landowners or the Township. Passive overflow spillways directing to suitable storage and conveyance areas will be required.

2.2.6 Seasonal Target Water Level Range

As part of the consultation and preliminary design phase of this project a suitable range of water elevations should be established, such that stakeholder concerns are addressed and the ecological function of the shoreline and wetlands are maintained. **Table 2-1** summarizes the historic water levels for consideration.

Table 2-2. Bass Lake Recorded Water Levels

Date	Approx. Minimum Lake Surface Elevation (mASL)	Approx. Maximum Lake Surface Elevation (mASL)	Source
1968	133.8		RVCA Conservation Report
2010	134.27	134.50	Data provided by the Township
2011	134.19	134.43	
2012	134.20	134.52	
2013	134.38	134.55	
2014	134.41	134.60	
2015	134.39	134.48	
2016	134.26	134.59	

3 Stakeholder Consultation

Jp2g prepared a letter and hard copy of a survey for distribution to the key stakeholders, as shown in **Appendix A**. The notice included a brief description of the project scope, summary of background information, and Jp2g contact information. Hard copies were delivered to lakeshore residents by Jp2g staff while the Township also published notice of the online survey and public information session to residents. This public engagement lasted 6 weeks and resulted in 117 responses. These responses, along with results of Jp2g’s preliminary investigation, were summarized and presented to the public on



June 22nd at the South Elmsley Municipal Complex; the presentation slides are provided in **Appendix B**. Reports, photos, or other documents submitted from stakeholders to Jp2g during the consultation have been provided with brief comments in **Appendix C**. Survey responses are presented in **Section 3.2** with additional data provided in **Appendix D**.

3.1 Stakeholder Summary

Table 3-1 summarizes the Bass Lake stakeholders identified at this stage in the project.

Table 3-1. Bass Lake Stakeholder Summary

Stakeholder	Contact	Role
Jp2g Consultants Inc.	Stephen Arends, P.Eng. stephena@jp2g.com 613-828-7800 x229	Engineering Manager
Township of Rideau Lakes	Mike Dwyer, CAO mdwyer@twprideaulakes.on.ca Tel: 613-928-2251 ext. 231	Township Authority
Bass Lake Property Owners Association	Bill St Jean, President 613-283-3994; bill.stjean@icloud.com Peter McGann, Director 613-283-9618 pcmcgann@gmail.com	<ul style="list-style-type: none"> • Represent the interests of lakeshore property owners • Ensure continued health of the Bass Lake ecosystem • Ensure continued recreational opportunities on Bass Lake
Local Residents	N / A	Provide local perspective; document flooding or erosion issues
Rideau Valley Conservation Authority (RVCA)	Sommer Casgrain-Robertson – General Manager	Regulatory Authority
Ministry of Natural Resources and Forestry (MNR) (Kemptville Office)	Tim Harding – Lands and Water Technical Specialist; Tim.Harding@Ontario.ca Aaron Foss – Fish and Wildlife Technical Specialist; Aaron.Foss@Ontario.ca	Regulatory Authority – Land use and fish salvage and protection
Ministry of the Environment, Conservation, and Parks (MECP)	SAROntario@ontario.ca	Regulatory Authority - Species at Risk protections
Indigenous Communities	Chief Doreen Davis Shabot Obaadjiwan First Nation PO Box 175 Sharbot Lake K0h 2P0	TBD – No response has been received as of yet



Stakeholder	Contact	Role
Rideau Valley Conservation Authority (RVCA)	Sommer Casgrain-Robertson – General Manager	Regulatory Authority

3.2 Survey Results

The survey results from the hard copy distribution as well as the online portal have been combined and presented in the following charts. Note that Question 1 has been omitted from this discussion as it is simply a record of name, address, and contact information – see **Appendix C** for more detailed survey response data.



Figure 3-1. Summary of Respondent Roles

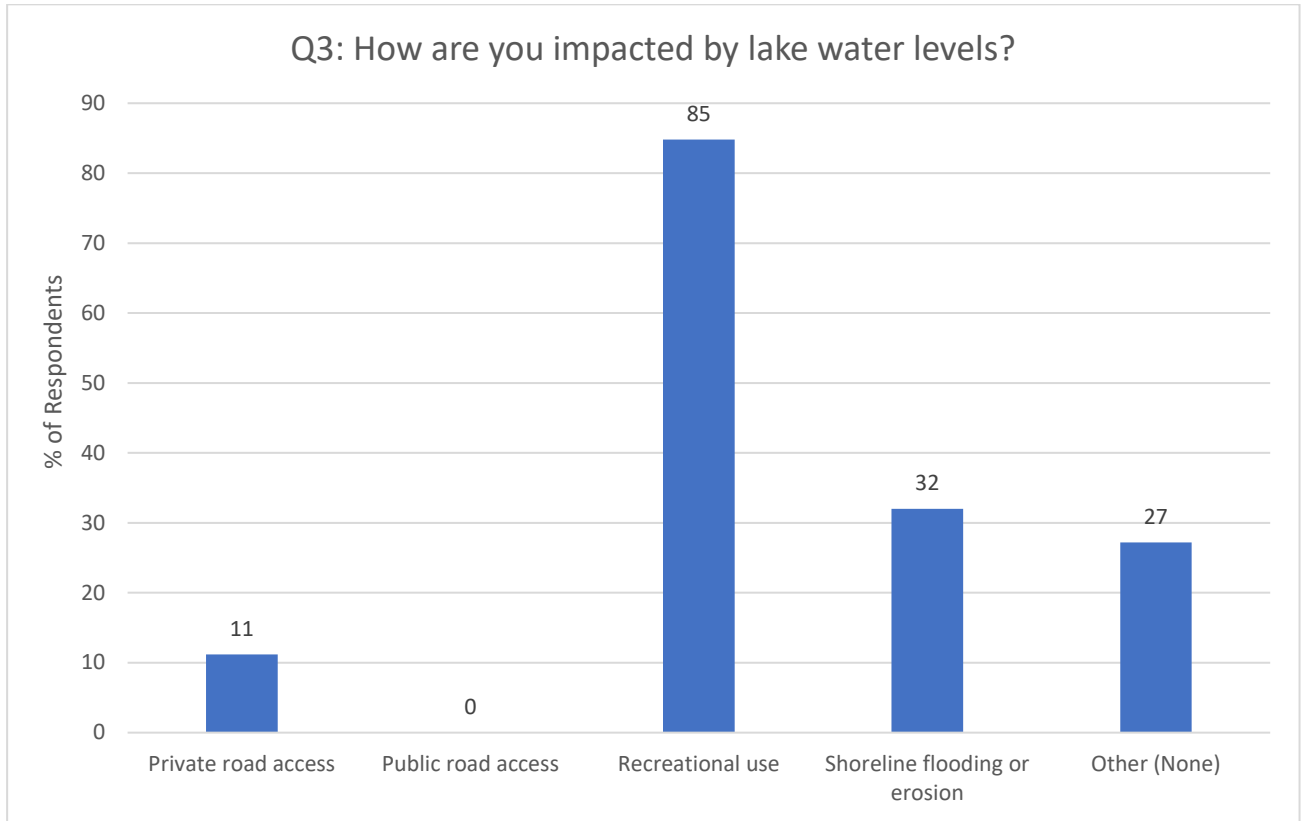


Figure 3-2. Summary of water level impacts experienced by respondents

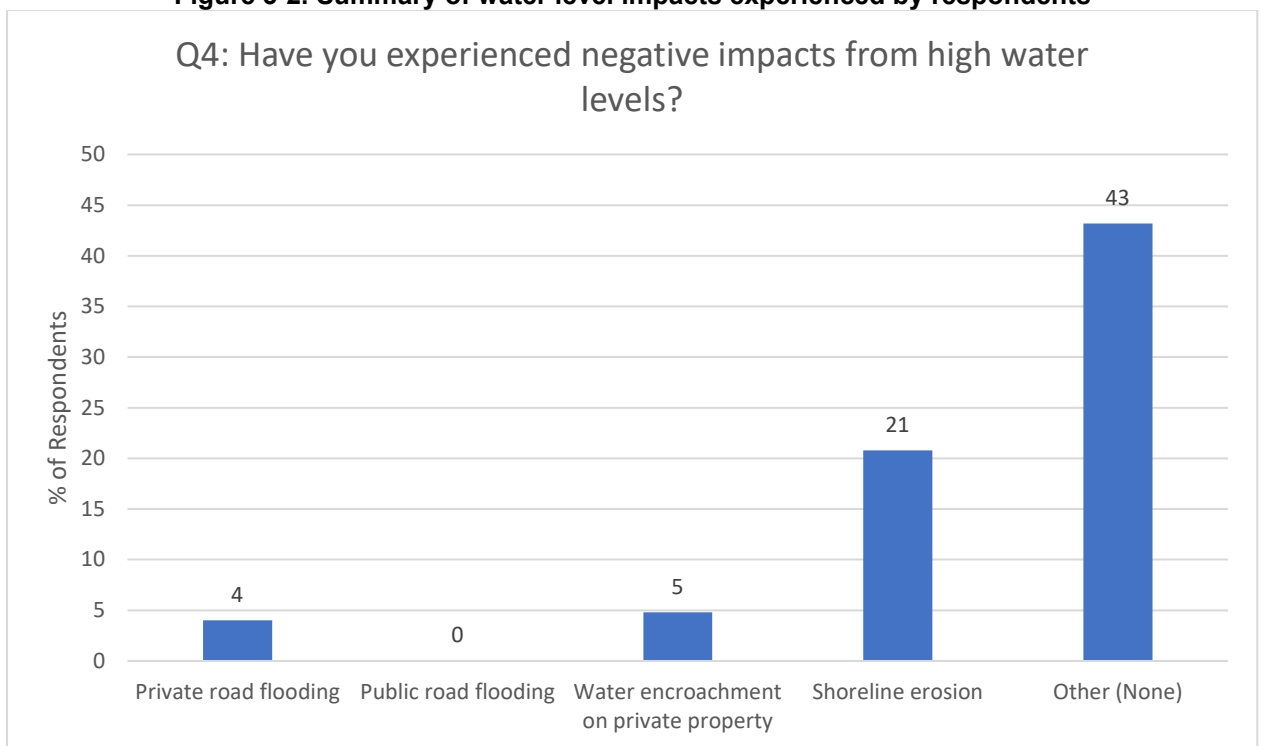


Figure 3-3. Summary of high-water impacts experienced by respondents

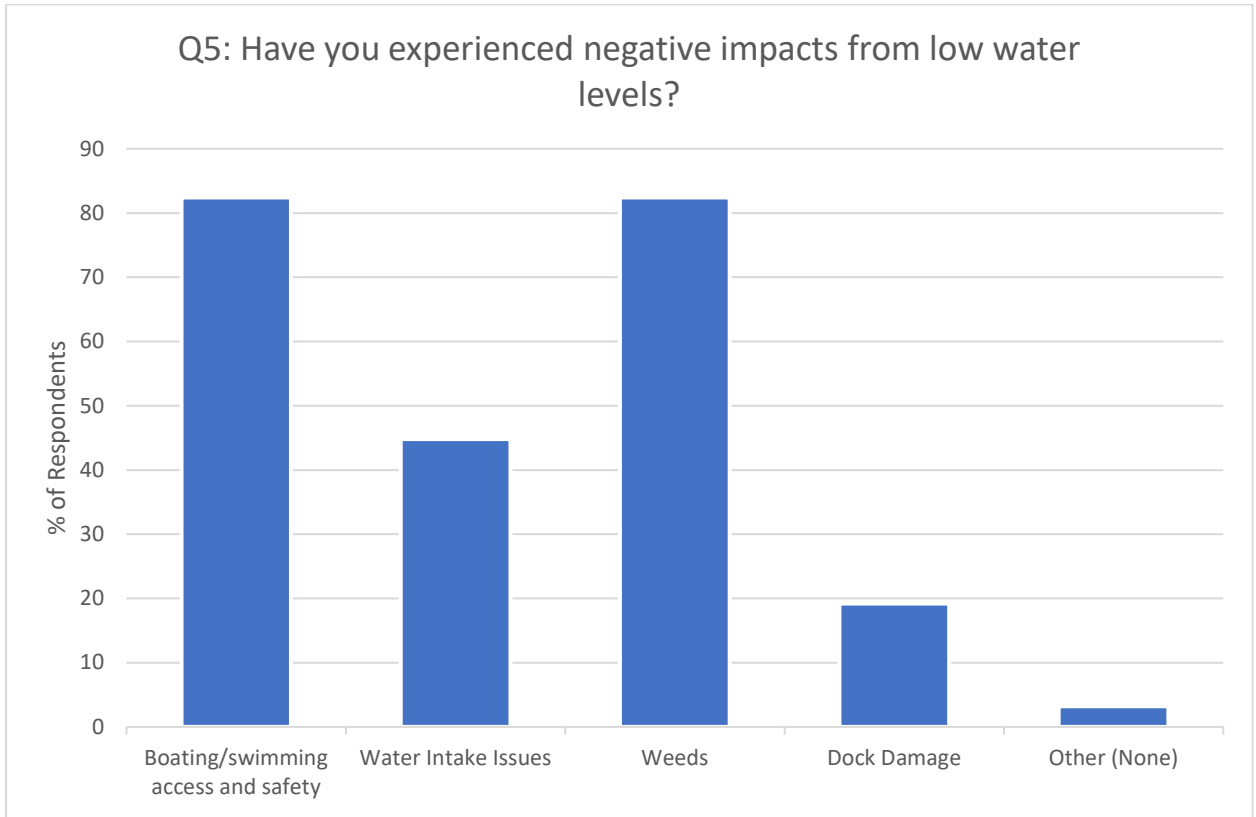


Figure 3-4. Summary of low-water impacts experienced by respondents

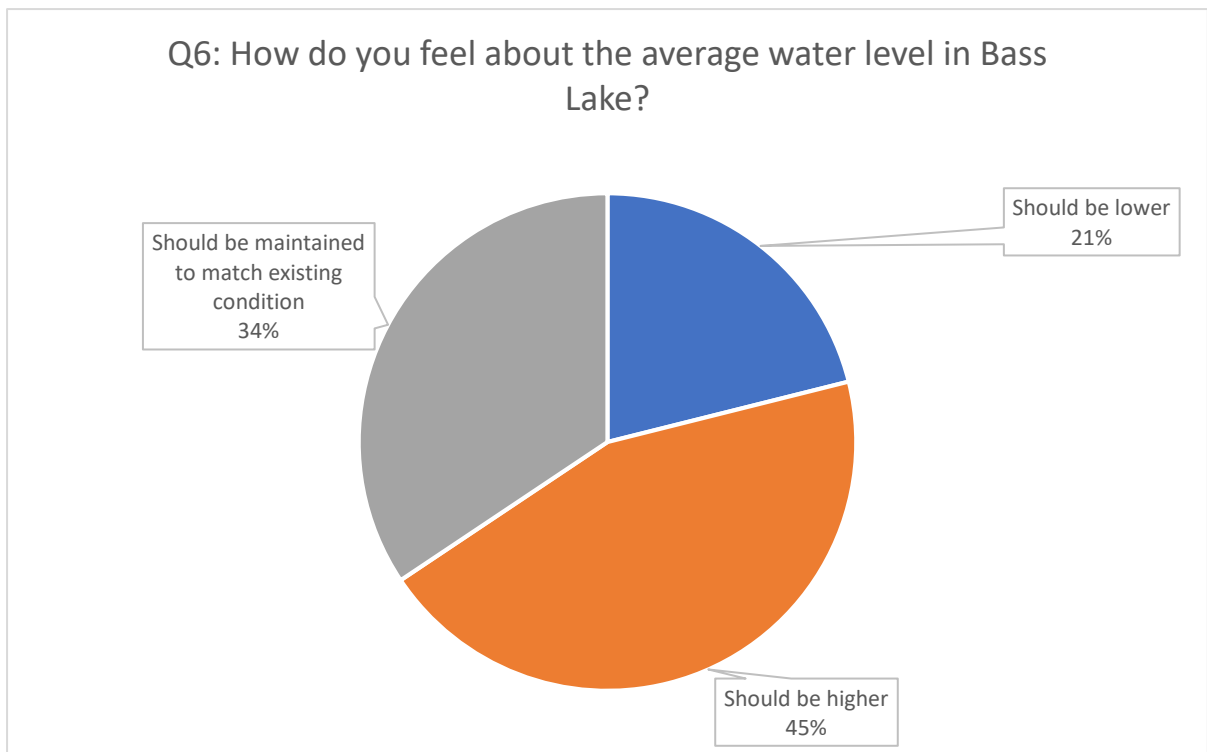


Figure 3-5. Preferred water level management strategy

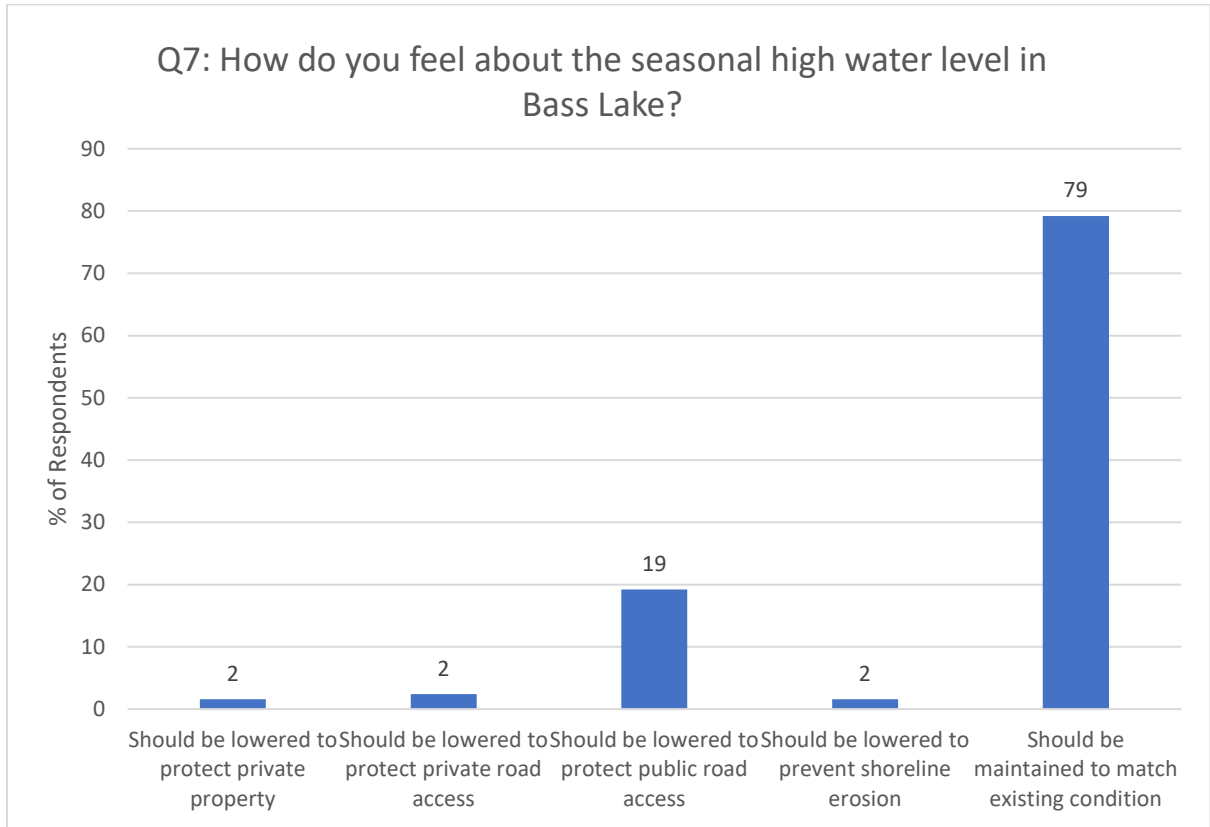


Figure 3-6. Summary of respondents' water level priorities related to peak flows

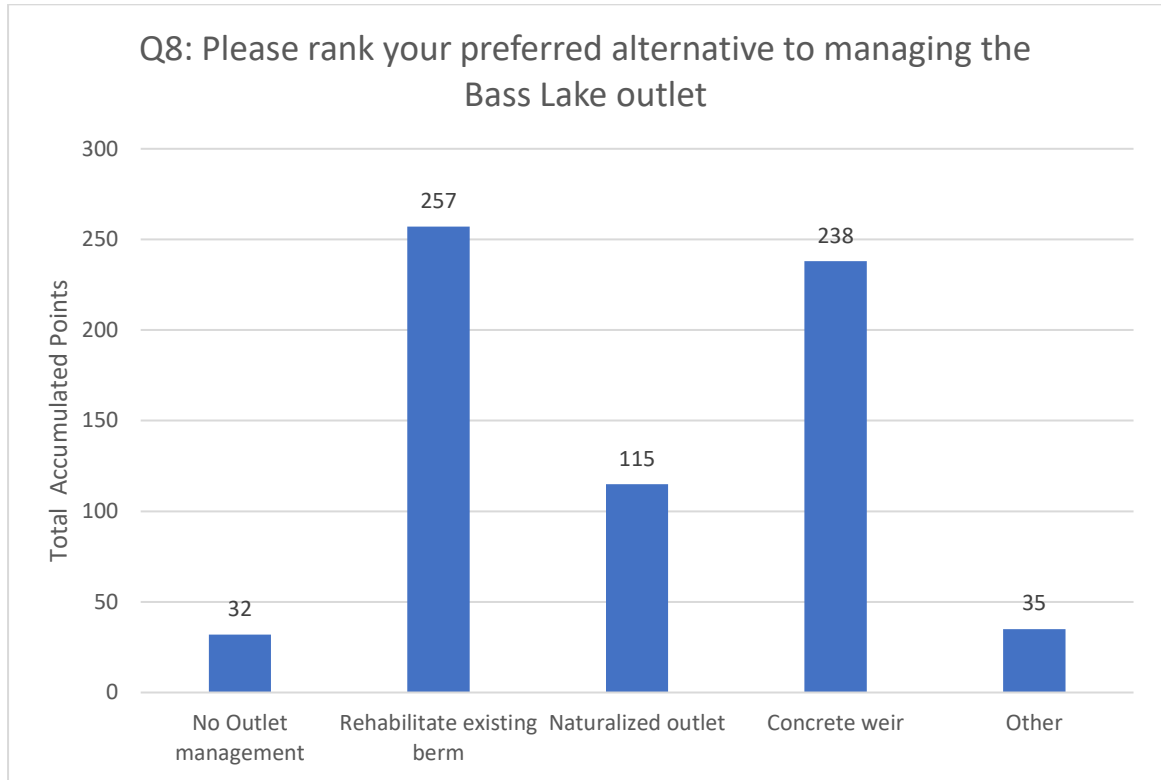


Figure 3-7. Preferred outlet management options

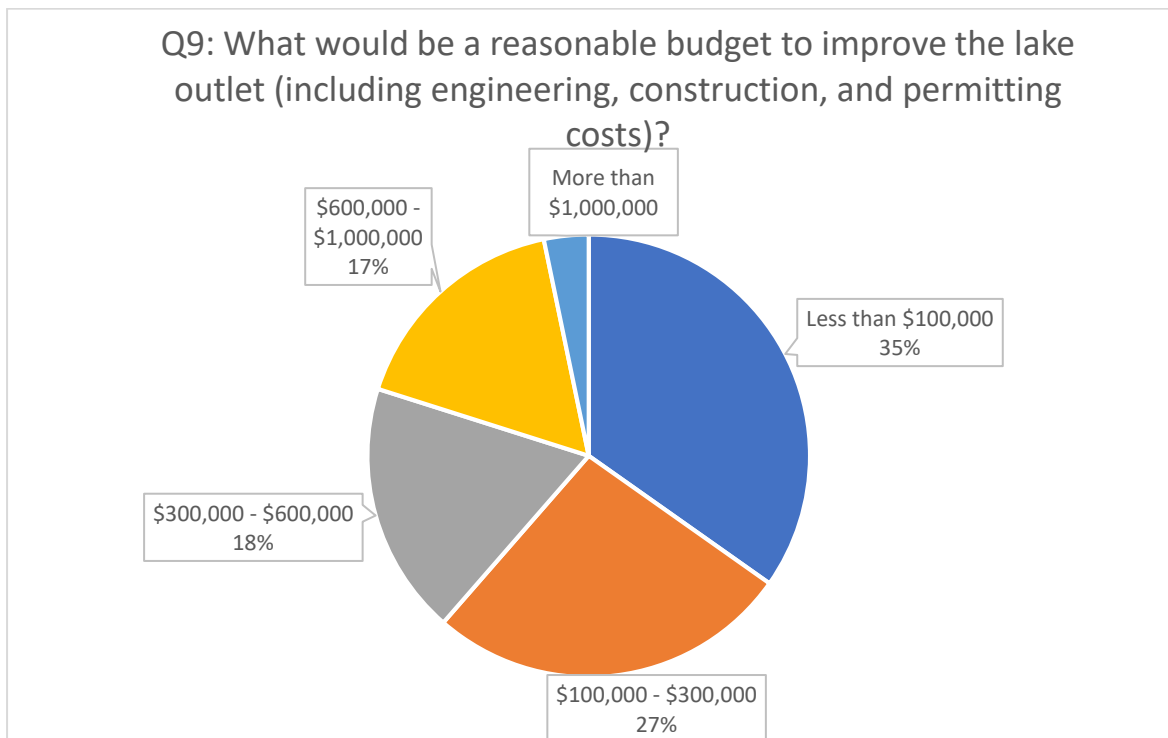


Figure 3-8. Preferred budget ranges of respondents

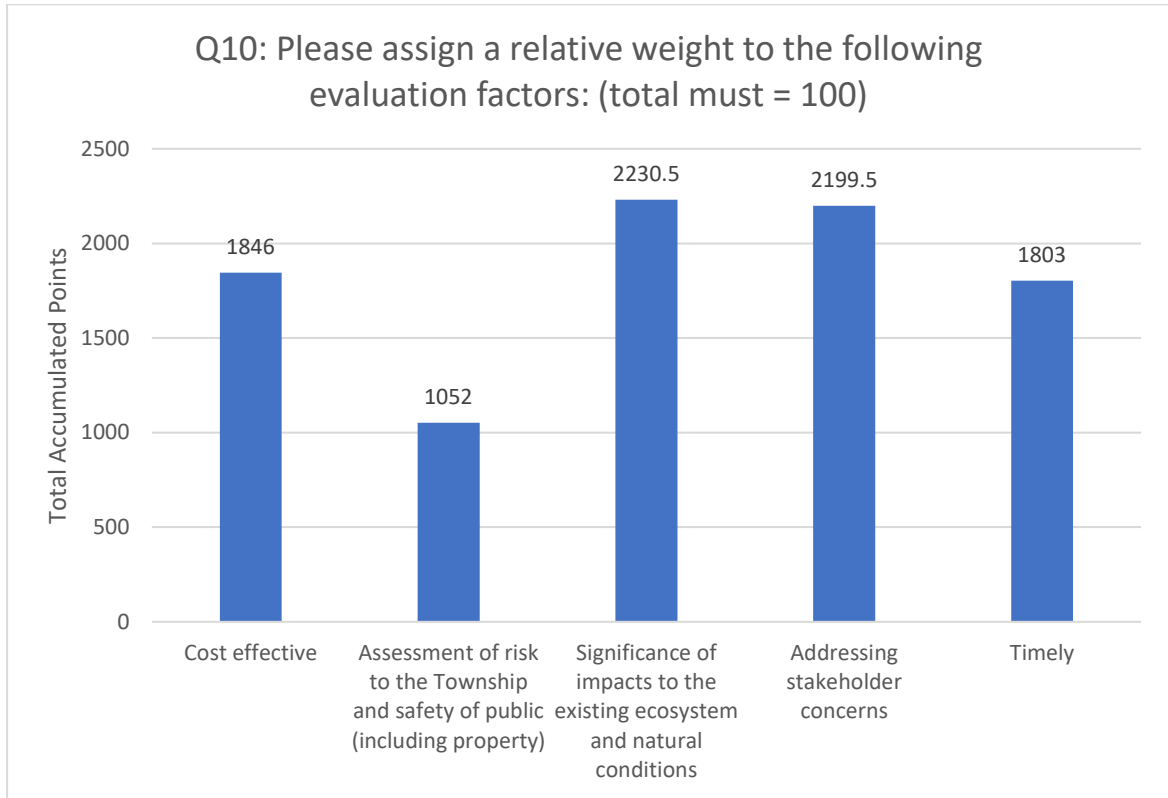


Figure 3-9. Summary of respondents' priorities for water level management

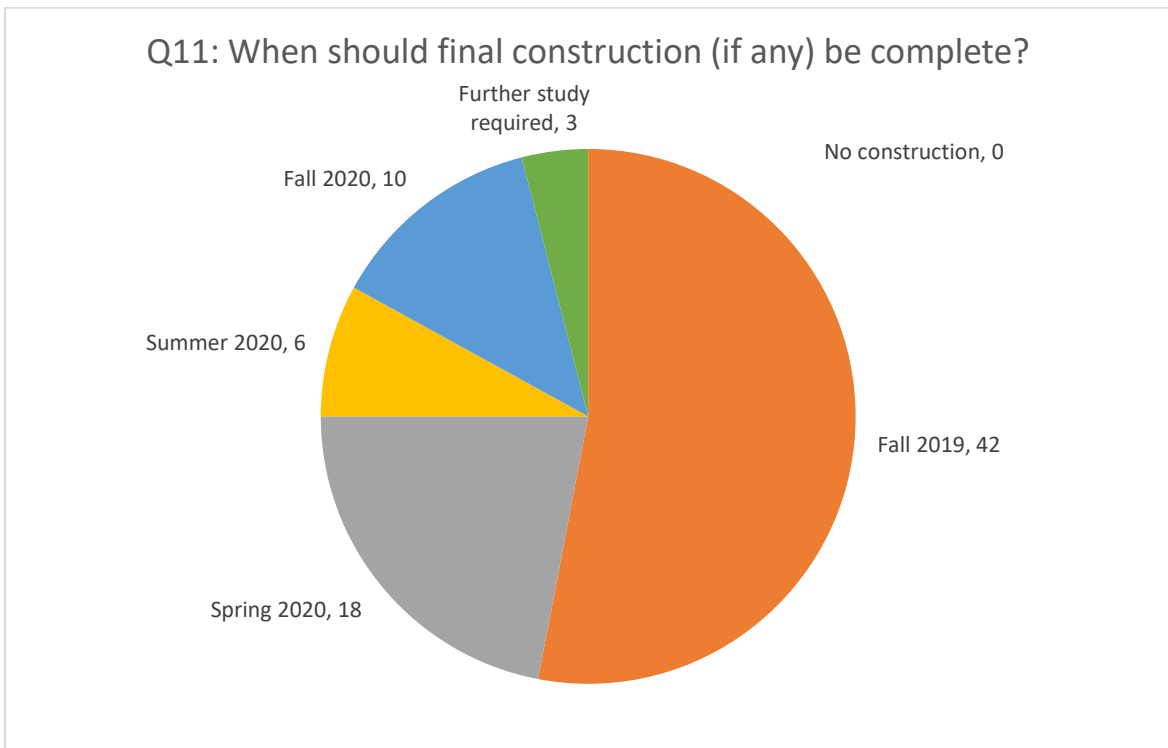


Figure 3-10. Summary of preferred construction timelines



3.3 Summary of Survey Responses

The majority of survey respondents (over 80 %) have experienced negative impacts from low water levels, with recreational access and weed or algae growth being the main concerns (~ 80 % each); while drinking water intake issues and dock damage have been experienced by roughly 40 % and 20 % of respondents, respectively. Conversely, only about a quarter of respondents indicated a concern over high water levels with shoreline erosions (21 %), private road flooding (4 %), and inundation of private property (5 %) representing these issues. These findings are corroborated by the fact that only 21 % of respondents indicated a desire for lower average water levels, while 79 % of respondents thought that it should be maintained per the existing condition or raised higher.

The preferred solution for managing the Bass Lake outlet was to rehabilitate the existing berm or construction of a typical structural weir out of concrete or similar material. This indicates a preference for the status quo or an improved, more resilient version of the status quo. A naturalized outlet control such as a rocky ramp received the third-highest score, while the “do nothing” option had very little support.

The most important evaluation factors according to respondents was that impacts to the natural environment are minimized and that stakeholder concerns are addressed – in other words, while there is a desire for action, it should be undertaken with respect and consideration for preservation of the existing ecosystems. “Timely” and “Cost Effective” were also ranked highly as evaluation factors, indicating a desire for the Township to address the issue quickly, but in a responsible manner. These results are corroborated with the fact that 60 % of respondents would like to see construction implemented by Spring 2020, while there were zero respondents who thought that there should be “no construction”. In terms of budget, 35 % of respondents would like to see a solution constructed for less than \$100,000, while 27 % would support up to \$300,000, 18 % would support a budget up to \$600,000, and a further 17 % would support a budget of \$600,000 or more.

Overall, these results indicate a strong desire for the Township to implement some type of outlet control at Bass Lake. It should, however, be noted that a minority (approximately 20 %) of respondents would prefer the lake the average water level in Bass Lake lowered.

The overall trends identified through the survey responses are generally corroborated by the tone and content of written comments as well, with many comments offering specific examples of issues related to lake water levels such as increased growth of algae or zebra mussels in certain areas; drinking water intake or water quality issues due to low lake levels; or water encroachment on property. Stakeholder comments received are shown in **Appendix D**.

4 Alternative Solutions

The following four options have been proposed regarding rehabilitation of the berm on Bass Lake. It is assumed that property and regulatory considerations must be resolved for options 1,2, and 4, due to the split private and public ownership of the lands occupied by the berm. For options 2, 3, and 4, the existing berm would need to be properly disposed of according to the Township and regulatory authorities. The options described below are intended to incorporate the constraints and opportunities identified by the RVCA and the Bass Lake Task Force.



4.1 Option 1 – No Intervention

The existing berm appears to be deteriorating and no longer providing a reliable hydraulic function. However, as there is no legal structure or ownership of the existing berm, it is possible that letting the berm fail would be perceived as restoring the outlet channel to its natural condition. This option has significant risk associated to it due to the potential for sudden and possibly catastrophic failure, likely altering the hydrologic function of wetlands in the vicinity (compared to their condition since the 1990s) and impacting property values. An experienced legal opinion in municipal and riparian law should be consulted prior to proceeding with this option. Furthermore, this option is unlikely to address the majority stakeholders' concerns for protection of current water levels.

4.2 Option 2 – Rehabilitate Existing Berm

The existing berm could be rehabilitated to maintain the water surface elevations experienced by residents and lake users over the past quarter century. It is possible that this would be considered the new normal in terms of wetland functionality, ecosystem health, and riparian rights and therefore confer the least liability onto the Township; however, it is recommended to consult an experienced legal opinion before proceeding under this assumption. The rehabilitation of the berm could be completed using typical construction materials and methods and would require minimal alterations to the existing structure's footprint. This would facilitate the approval process and reduce environmental impacts from construction activity. However, due to the inherently unstable nature of the existing structure, ongoing monitoring and maintenance would likely be required to ensure the desired water levels are maintained.

4.3 Option 3 – Rocky Ramp

A naturalized outlet could be achieved by installing boulders, armour stone, and rip rap at set elevations, creating a hydraulic control system along with an environment amenable to ecological function, habitat, and fish passage. This hydraulic control would be similar to that of a typical structural berm, as illustrated in **Figure 4-1**. This option has potential for the greatest ecological and aesthetic benefits while carrying the least ongoing inspection and maintenance resources. However, the design and construction processes must be carefully considered and managed to ensure the hydraulic constraints are satisfied. It should also be noted that a properly constructed rocky ramp weir has the lowest risk of sudden or catastrophic failure due to the construction method of the rocky ramp: massive boulders are embedded in the bottom of the channel to a depth that they are sufficiently stable under all anticipated conditions. In contrast to a conventional structural weir of concrete or wood, the boulders will not show signs of wear and deterioration within the typical 20-50 year life span, yet if designed and built correctly can provide a similar hydraulic control. This option may be a way to avoid the issue of property access and ownership and responsibility of the weir – once constructed, there would not be a conventional structure to be owned, operated and maintained – the channel would be restored to a “natural” condition with water surface elevations fluctuating within the desired range.



Figure 4-1. Before and after conversion of a traditional structural (wooden) weir to a rocky ramp

4.4 Option 4 – Structural Weir (50 m)

Install a new, conventional, structural, sharp-crested weir at a set elevation to control Bass Lake water levels. This could be constructed at essentially the same location as the existing structure but would require a new footprint subject to regulatory approval. Typical construction methods such as pre-cast armour stone or cast-in-place concrete are well understood and simplify the analysis and design phases. However, depending on the chosen material, construction method, and expected service life, this option may incur significant impacts to the local ecosystem. For example, a cast-in-place concrete structure would require substantial excavation and material placement subject to Conservation Authority approvals. Consideration of animal habitat and fish passage would restrict timelines for in-water works and require lengthy approval processes through regulatory stakeholders.

Minimizing construction impacts would likely dictate that the weir be installed immediately upstream of the existing berm; however, downstream locations may be worth evaluating to ensure all other impacts are minimized or stakeholder concerns addressed. The design and construction of this type of structure is fairly straightforward; however, the Township would be required to regularly inspect, maintain, and rehabilitate the structure as required over its lifespan. Furthermore, this option is contingent on the resolution of ownership and property issues between the township and the landowner on whose property the existing berm is currently built. The approximate footprint is shown as the red line 'A' in **Figure 4-3**.

4.5 Option 5 – Extended Structural Weir (100 m)

Install a new, conventional, sharp-crested weir at a set elevation to control Bass Lake water levels; the berm would be constructed within Township right-of-way to avoid legal and liability concerns on private property. This option has similar costs and benefits compared to Option 4 but the berm would be constructed upstream of and oblique to the existing structure, with a length of approximately 100 m (twice that of the existing structure). This option would avoid potential delays, costs, and complications



associated with property and ownership negotiations; however, it would have a significantly increased environmental impact and construction costs and may not receive approval from regulatory authorities unless it can be proven to be necessary for emergency or safety reasons. This option is shown as the blue line 'B' on **Figure 4-2**.

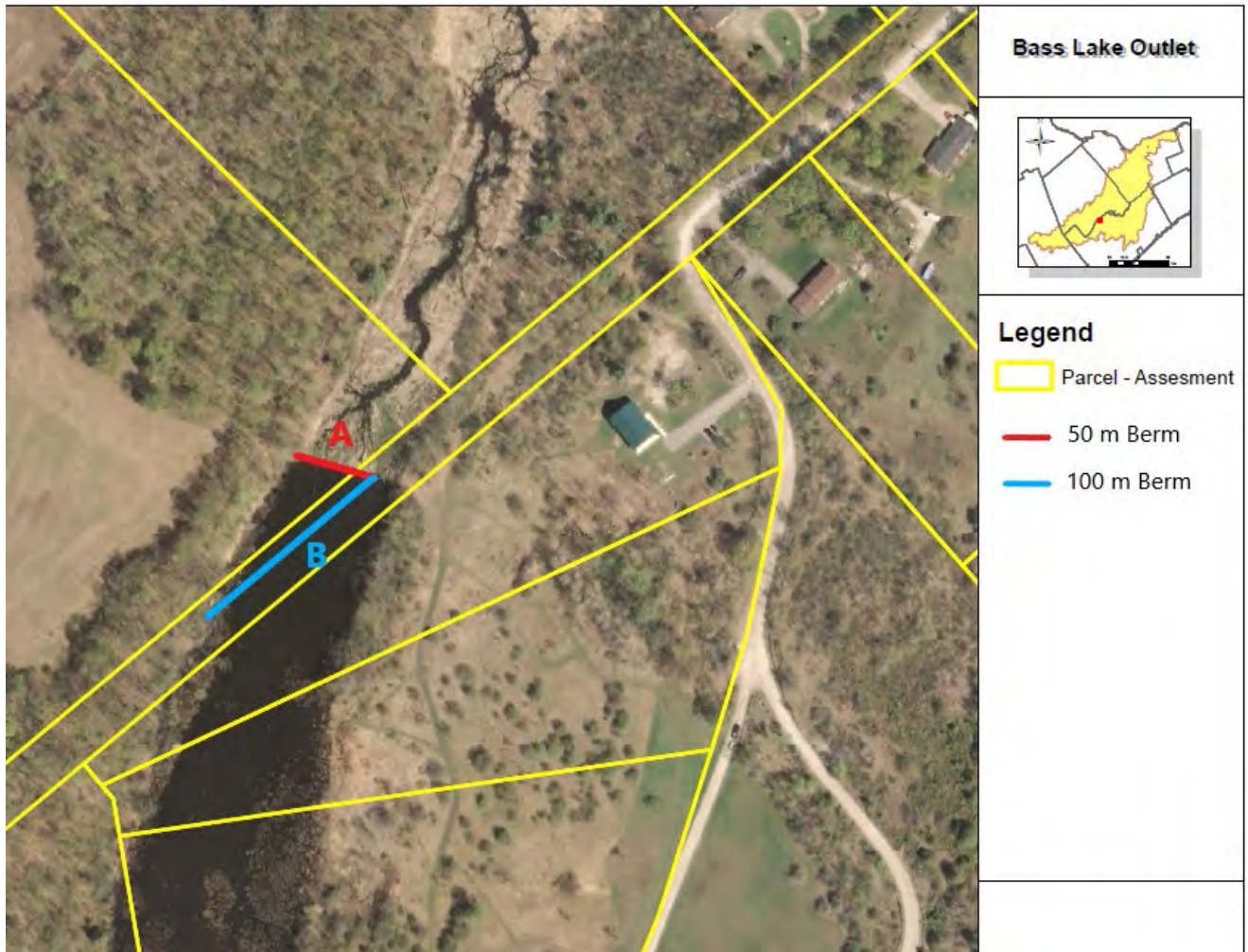


Figure 4-2. Property lines are shown in vicinity of the Bass Lake outlet. The red A line denotes existing berm, while the blue B line indicates a possible orientation to avoid construction on private property.

5 Evaluation

The potential interventions have been assigned scores according to the factors described in **Table 5-1**.

Table 5-1. Option Evaluation Scoring Framework



Factor	Description	Weight /100
Addresses Stakeholder Concerns	The proposed intervention is likely to satisfy Bass Lake stakeholder concerns and align with the Bass Lake Management Plan.	10
Environmental and Ecological Protection	How significant are the potential impacts to the existing ecosystem and natural conditions. This would also impact the complexity and duration of regulatory approval processes.	25
Cost Effective	How much improvement relative to existing condition can be expected relative to the required investment.	25
Timely	The proposed intervention is likely to be design and constructed by the end of 2020.	10
Risk	How likely the proposed intervention is to create liability to the Township with respect to protection of the safety and property of the public.	30

5.1 Factors and Weighting

The potential intervention options were evaluated individually based on the considerations outlined as above. Each option was assigned a score of 0, 0.25, 0.5, 0.75, or 1.0 for each factor. **Table 5-2** provides a visual indication of the rating for each option:

Green		Clear potential to meet the criteria - Score of 1.0
Blue		Likely to meet the criteria – Score of 0.75
Yellow		Potential to meet the criteria in part or in whole with impacts – Score of 0.5
Orange		Unlikely to meet criteria – Score of 0.25
Red		Significant challenges in meeting the criteria in part or in whole – Score of 0.0

Table 5-2. Option Evaluation

Factor	Option				
	1	2	3	4	5



	No Intervention	Rehabilitate	Rocky Ramp	Short Weir	Extended Weir
Risk					
Environmental and Ecological Protection					
Timely					
Addresses Stakeholder Concerns					
Cost Effective					

5.2 Scoring

Table 5-3 provides the weighted values and overall score for each intervention option.

Table 5-3. Evaluation of Alternative Solutions

Option 1 – No Intervention			
Factor	Score	Weight	Total
Risk	0.0	30	0
Environmental and Ecological Protection	0.25	25	6.25
Timely	0.5	10	5
Addresses Stakeholder Concerns	0.0	10	0
Cost Effective	1.0	25	25
Total		100	36.25
Option 2 – Rehabilitate Existing Berm			
Factor	Score	Weight	Total
Risk	0.25	30	7.5
Environmental and Ecological Protection	1.0	25	25



Timely	0.75	10	7.5
Addresses Stakeholder Concerns	0.5	10	5
Cost Effective	0.75	25	18.75
Total		100	63.75
Option 3 – Rocky Ramp Weir			
Factor	Score	Weight	Total
Risk	1.0	30	30
Environmental and Ecological Protection	1.0	25	25
Timely	0.5	10	5
Addresses Stakeholder Concerns	0.75	10	7.5
Cost Effective	0.5	25	12.5
Total		100	80
Option 4 – Short Conventional Weir			
Factor	Score	Weight	Total
Risk	1	30	30
Environmental and Ecological Protection	1.0	25	25
Timely	0.5	10	5
Addresses Stakeholder Concerns	1.0	10	10
Cost Effective	0.25	25	6.25
Total		100	76.25
Option 5 – Extended Conventional Weir			
Factor	Score	Weight	Total
Risk	0.75	30	22.5



Environmental and Ecological Protection	0.5	25	12.5
Timely	0.25	10	2.5
Addresses Stakeholder Concerns	1.0	10	10
Cost Effective	0.0	25	0
Total		100	47.5

Option 1 – No Intervention received the lowest score. Due to the significant stakeholder interest and apparently deteriorating nature of the berm, this option would not provide a satisfactory solution to most stakeholders. The specific consequences of a sudden berm failure are unknown, but it would likely disrupt the Bass Lake ecosystem, damage the wetlands in the area, damage downstream infrastructure, and impact residents’ enjoyment of the lake. This option carries potential for liability to the Township and is not recommended.

Option 2 – Rehabilitate Existing Berm received the third-highest score. This option scored relatively well on being timely and cost effective as it involves the least engineering analysis and new construction. The rehabilitation process would involve repair and reinforcement of the existing structure using conventional construction materials to establish a berm height acceptable to stakeholder consensus. The impacts to the natural environment are reasonably minimal and it would restore the hydraulic control of the lake to the expected condition of the past 20 years. However, due to the inherently unstable construction of the berm and risk of further deterioration after being rehabilitated, this option still carries some significant risk to the Township as they will become responsible for the operation and maintenance of an outlet control with an unknown service life. This option could be recommended as an interim solution to address immediate concerns over dropping water levels while detailed analysis and design are conducted simultaneously for a more permanent solution.

Option 3 – Rocky Ramp Weir received the highest score. This option would set a lake elevation according to stakeholder input – providing a similar hydraulic function as a conventional weir – but would eliminate the need for a structure requiring ownership, operation, and maintenance. The channel would be restored to a natural condition conducive to wetland habitat and fish passage, while the overall lake environment would be maintained to the condition that residents, flora, and fauna have adapted to over the past 20 years. The lifecycle liability and costs of this option are significantly less than a structural hydraulic control but the construction will require detailed design and oversight and carries some risk due to the unconventional design.

Option 4 – Short (50 m) Conventional Weir scored the second-highest. This option scored well overall due to the well-understood nature of conventional weir construction and the fact that it would satisfy stakeholder concerns for a permanent hydraulic control of lake water levels. This option would be designed to match the existing functionality of the berm and minimize impacts to the natural environment.



However, this option carries risk to the Township due to the uncertainty of ownership and property negotiations as well as the need for ongoing operation and maintenance of a structural weir.

Option 5 – Extended (100 m) Conventional Weir scored the second-lowest. This option has similar benefits of Option 4 in establishing a permanent hydraulic control and satisfying stakeholder concerns. However, the increased footprint, impact to the environment, and construction costs reduce the overall score. This option is only recommended if the Township would prefer a conventional structural weir, but property and ownership negotiations for Option 4 are not successful in establishing a long-term plan for outlet control of Bass Lake.

6 Recommendations

As described in Section 5 above, **Option 3 – Rocky Ramp Weir** is the recommended course of action. This option is the least likely to incur liability to the Township, while satisfying stakeholder and environmental concerns and minimizing the life-cycle costs compared to a typical structural weir.

It is recommended that the Township initiate detailed analysis and design of the preferred outlet control in a timely fashion to reduce the chance of a sudden failure of the existing berm. The berm should be regularly inspected in the meantime for signs of further deterioration. If the berm shows signs of imminent failure, it is recommended that the Township rehabilitate the existing berm as best as possible to maintain the current levels in order to preserve wetland functionality and protect the riparian rights of both up- and down-stream stakeholders. This could be done in conjunction with design and analysis of a permanent outlet control.

In establishing preferred water level ranges, it is recommended to consult a legal expert to determine the risk associated with permanently setting the water elevations above historic levels such as the suggested by the 1968 RVCA Conservation Report of 133.8 m. It is further recommended that the Township enter into negotiations with the residents on whose land the existing berm has been constructed to resolve property limits, access, and ownership issues.

If you should have any questions or concerns, please do not hesitate to contact the undersigned. Yours truly,

Alex Sereda, B.Eng
Civil Engineering Intern
Jp2g Consultants Inc.
alexs@jp2g.com

Stephen Arends, P.Eng.
Civil Project Manager
Jp2g Consultants Inc.
stephena@jp2g.com



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Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS
1150 Morrison Drive, Suite 410, Ottawa, ON K2H 8S9
T 613-828-7800, F 613-828-2600, www.jp2g.com

Appendix A – Consultation Letter



Jp2g No. 18-5109A

May 14, 2019

Bass Lake Residents, Landowners, and Stakeholders

**Reference: Notice of Consultation / Invitation to Consult
Bass Lake Outlet and Water Level Management
Consultation Period: May – June 14, 2019**

Jp2g has been contracted to assess the existing Bass Lake outlet and associated water level conditions, determine the full scope of stakeholder concerns and objectives, and develop a consensus on preferred solution. To that end, Jp2g has reviewed existing documentation of studies, discussion, and correspondence provided by the Township of Rideau Lake as this point regarding water level management on Bass Lake. The principal stakeholders and their resulting views (expressed within the initial documentation, but understood that the views are/will be more complex and are of a fluid nature) are summarized in the table below:

Stakeholder	Role	Concerns Understood at the Onset of the Project
Bass Lake Landowners and Concerned Residents	<ul style="list-style-type: none">• Represent the interests of lakeshore property owners• Ensure continued health of the Bass Lake ecosystem• Ensure continued recreational opportunities on Bass Lake	<ul style="list-style-type: none">• The outlet weir has been damaged, and this has lowered the normal lake level• Risk exists for complete failure, leading to ecological and social impacts• Isolated concerns with high spring water has been recognized• Wants to play an active role in ensuring the long-term stability of water levels on the Lake.

Stakeholder	Role	Concerns Understood at the Onset of the Project
Township of Rideau Lakes	<ul style="list-style-type: none"> • Protect public safety and property within Township jurisdiction • Ensure fair and equitable dispensation of public funds • Limit risk to Township liability 	<ul style="list-style-type: none"> • Passive management is required • Site ownership and access must be resolved • Outlet structure ownership, management, and responsibility must be resolved. • Long term structural stability must be addressed
Regulatory Authorities (RVCA, MNRF, MECP)	<ul style="list-style-type: none"> • Responsible for furthering the "conservation, restoration, development and management of natural resources in the watershed." • Responsible for protecting people and property from natural hazards like flooding and erosion. 	<ul style="list-style-type: none"> • The site is within a PSW, and will require permissions from the CA. • Flood risk must not be increased • Ecological services are not to be negatively impacted. • Current outlet berm implemented in the 1990's; but did not receive regulatory authority. This or any future structure should be in compliance with current regulations.

While there is likely that a solution that will be satisfactory to all stake-holders is possible, this process is intended to be open, transparent, and inclusive. As such, all stake-holders are invited to communicate with our office and ensure that your specific position is considered in development a plan to address the concerns with the existing structure.



The estimated schedule for this process is outlined below:

Task		Description	Timeline
1	Consultation	Solicit and compile stakeholder comments	May – June 14, 2019
2	Jp2g Site Investigation	Review site conditions during spring freshet	April 18, 2019
3	Public Presentation	Present summary of Jp2g investigation, consultant, and possible design solutions	Early June 2019
4	Conceptual Design	Perform hydrologic and hydraulic analysis for preferred solution	April – June 2019
Submit Conceptual Design Report – end of Phase 1 – June 2019			
5	Detailed Design	Create tender-ready design drawings and specifications for preferred option	TBD
6	Construction	Construction and commissioning of preferred solution	Spring - Summer 2020

This letter is an invitation to the above stakeholders to provide input on the process and ensure that each party's concerns are heard and addressed as part of the conceptual evaluation/design. Interested parties are invited to complete the attached survey and register to receive project updates and advance notice of the public presentation of alternatives. Note that communication by email or printed material will be accommodated depending on the stakeholder's preference.

Respectfully yours,

Stephen Arends, P.Eng.

Project Manager | Civil Engineer

Jp2g Consultants Inc.

613-828-7800 x 229

stephena@jp2g.com



²⁶¹
Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS
1150 Morrison Drive, Suite 410, Ottawa, ON K2H 8S9
T 613-828-7800, F 613-828-2600, www.jp2g.com

Appendix B – Public Presentation Slides (June 22, 2019)

Bass Lake

Outlet Berm - Options Evaluation

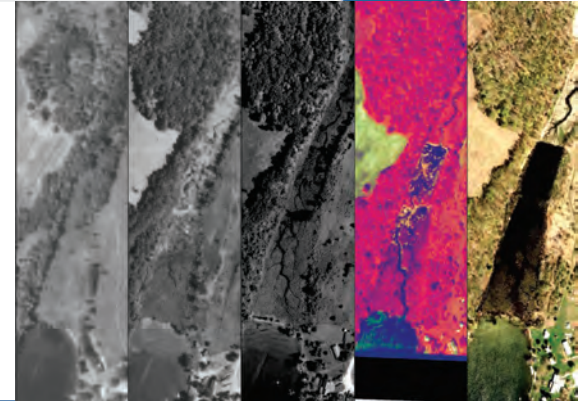
Public Information Session

June 22, 2019



J2g Agenda

1. Introduction
2. Project Background and Process
3. Outlet Options
4. Next Steps



J2g Who We Are

Local Expertise, Community focus

Steve Arends, P.Eng

Doug Nuttall, P.Eng

Alex Sereda, E.I.T.



J2g Our Perspective

Responsibilities of an Engineer

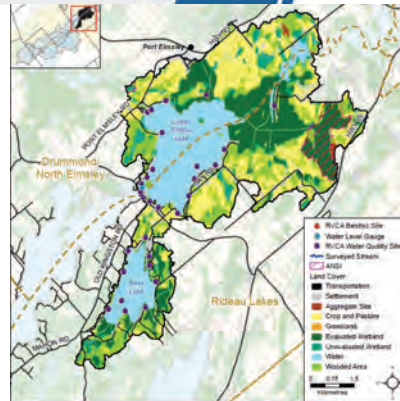
1. Duty to protect public health & safety
2. Duty to protect property & the environment
3. Duty to the client



12.1 Project Background

Jp2g Methodology

1. Desktop review of existing documentation, correspondence, modeling, etc
2. Site Investigation
3. Public survey and stakeholder consultation
4. Option Analysis and Recommendation



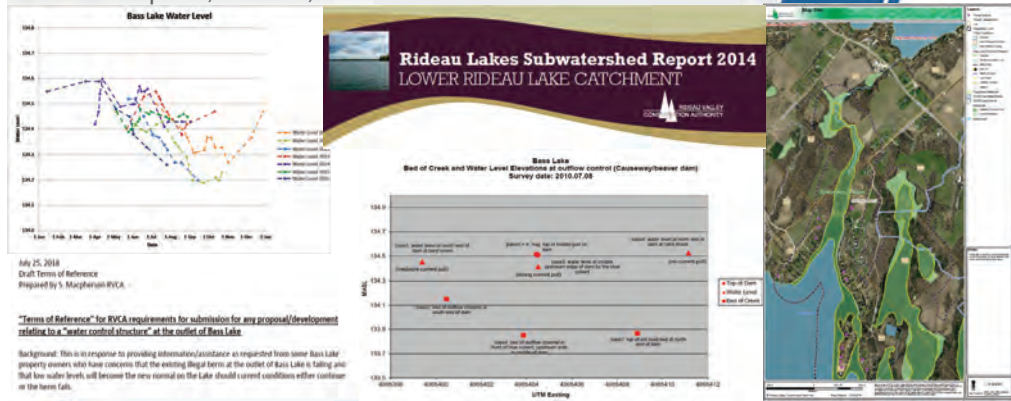
June 24, 2019

Bass Lake

5

12.1 Desktop Review

Reports, Studies, and Recommendations



June 24, 2019

Bass Lake

6

12.1 Site Investigation

April 18, 2019



June 24, 2019

Bass Lake

7

12.1 Public Survey and Stakeholder Consultation

1. Jp2g: 350 hard copies printed and distributed
2. Township: Online survey and print advertisements
3. 110+ responses received
4. Will be accepting further survey responses and stakeholder input until June 24th

June 24, 2019

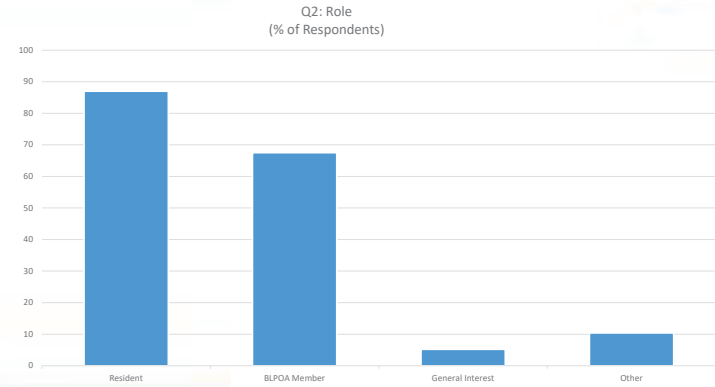
Bass Lake

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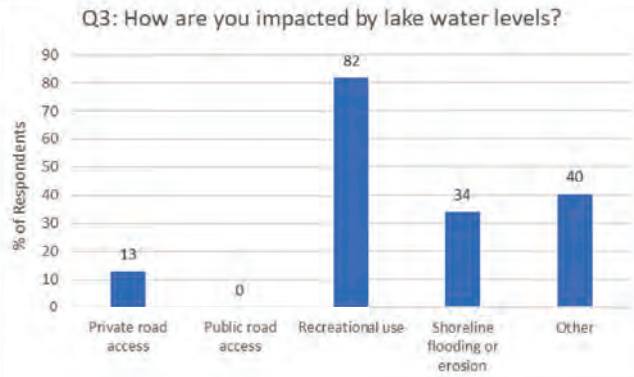
Public Survey and Stakeholder Consultation

1. Natural justice, why we had a broad survey

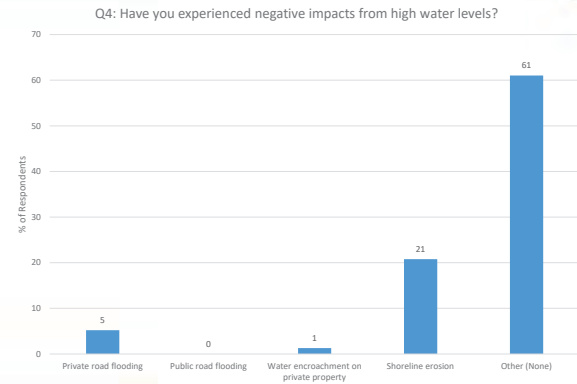
Public Survey and Stakeholder Consultation



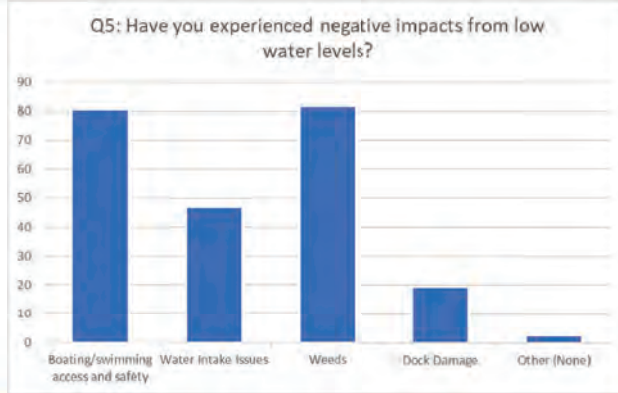
Public Survey and Stakeholder Consultation



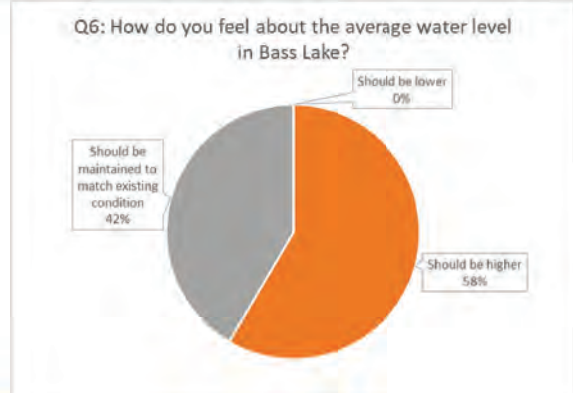
Public Survey and Stakeholder Consultation



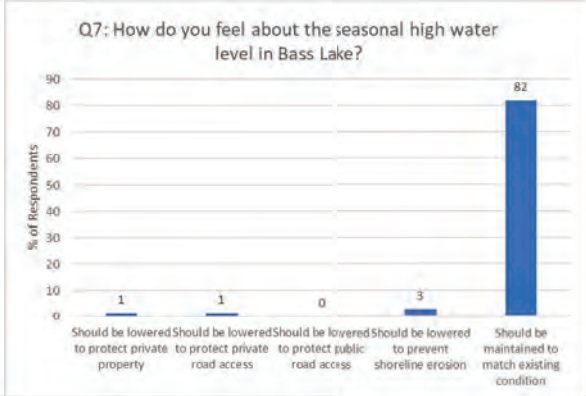
J21 Public Survey and Stakeholder Consultation



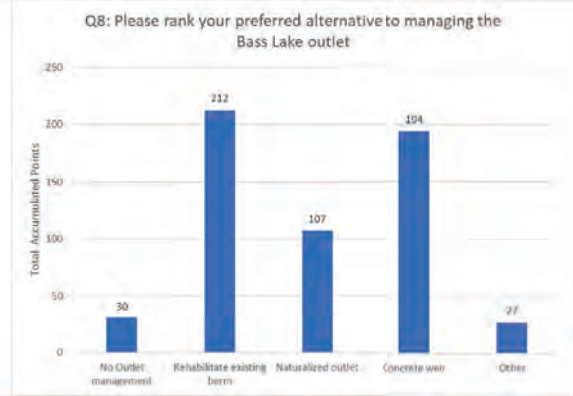
J21 Public Survey and Stakeholder Consultation



J21 Public Survey and Stakeholder Consultation

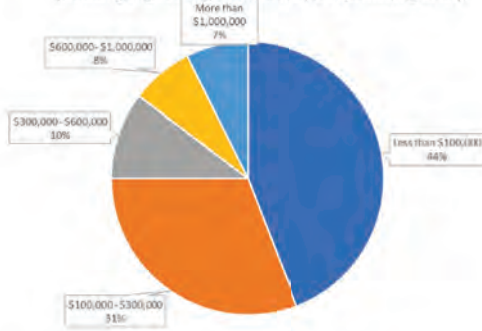


J21 Public Survey and Stakeholder Consultation



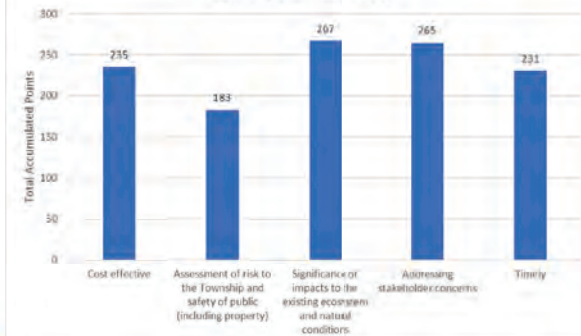
Public Survey and Stakeholder Consultation

Q9: What would be a reasonable budget to improve the lake outlet (including engineering, construction, and permitting costs)?



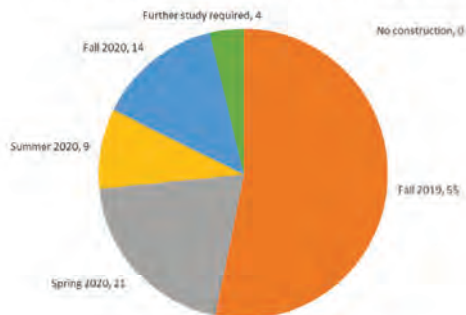
Public Survey and Stakeholder Consultation

Q10: Please assign a relative weight to the following evaluation factors: (total must = 100)



Public Survey and Stakeholder Consultation

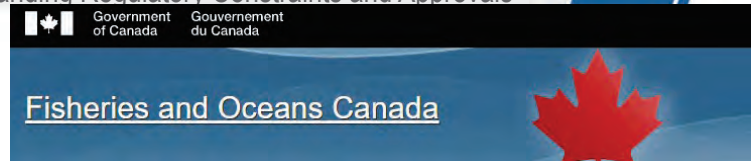
Q11: When should final construction (if any) be complete?



Summary of Preliminary Analysis

Understanding Regulatory Constraints and Approvals

- DFO
- MNRF
- RVCA
- MECP
- Transport Canada
- Township of Rideau Lakes



121 Preliminary Analysis

Understanding Regulatory Constraints and Approvals



PART VI REGULATION OF AREAS OVER WHICH AUTHORITIES HAVE JURISDICTION

Prohibited activities re watercourses, wetlands, etc.

28 (1) Subject to subsections (2), (3) and (4) and section 28.1 no person shall carry on the following activities or permit another person to carry on the following activities, in the area of jurisdiction of an authority:

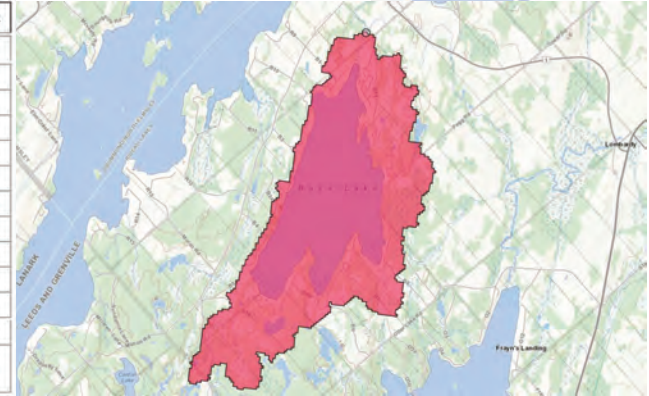
1. Activities to straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse or to change or interfere in any way with a wetland.

2. Development activities in areas that are within the authority's area of jurisdiction and are,

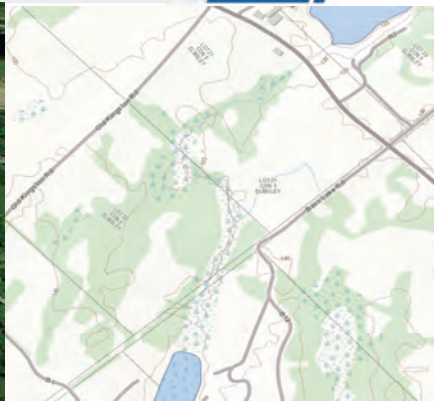
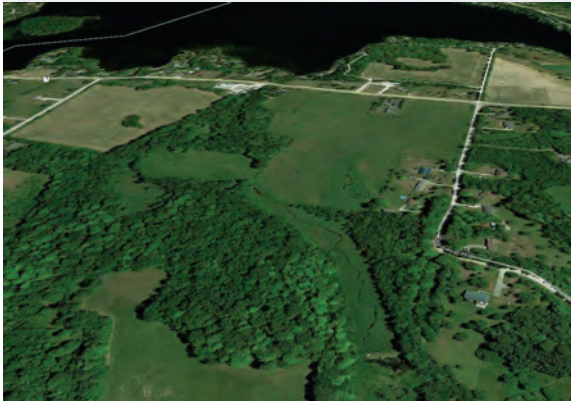
- i. hazardous lands,
- ii. wetlands,
- iii. river or stream valleys the limits of which shall be determined in accordance with the regulations,

121 Summary of Preliminary Investigation

Land Cover Type	Area (Sq. Km.)	Percent
Clear Open Water	2.97562	38.073%
Marsh	0.09360	1.198%
Swamp	0.68895	8.815%
Fen	0.07290	0.933%
Bog	0.26505	3.391%
Heath	0.00000	0.000%
Sparse Treed	1.26832	16.228%
Treed Upland	0.05220	0.668%
Deciduous Treed	0.18923	2.421%
Mixed Treed	0.57960	7.416%
Coniferous Treed	0.32805	4.197%
Community/Infrastructure	0.12172	1.557%
Agriculture and Undifferentiated Rural Land Use	1.18035	15.102%



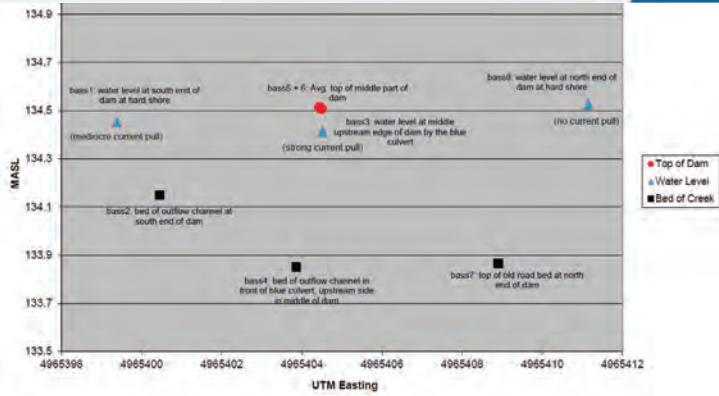
121 Summary of Preliminary Investigation



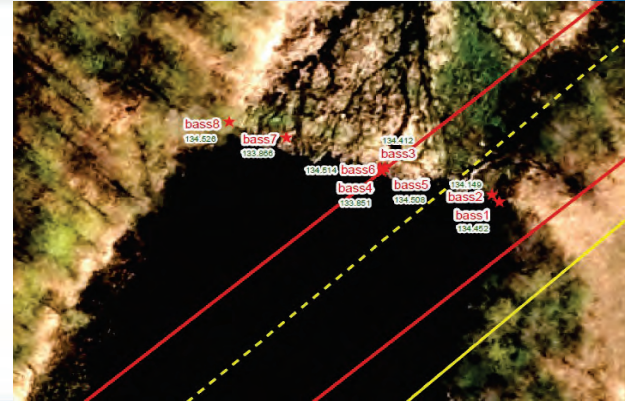
121 Summary of Preliminary Investigation



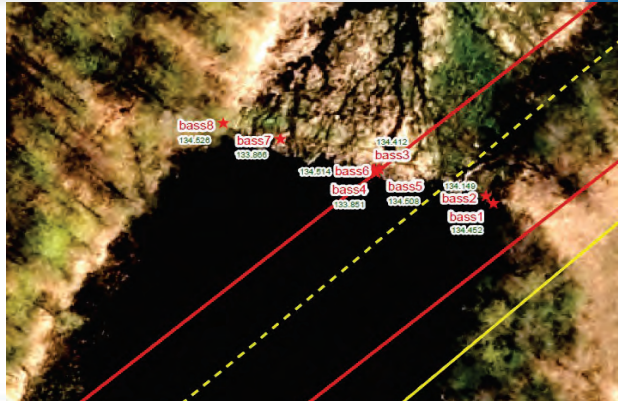
J21 Summary of Preliminary Investigation



J21 Summary of Preliminary Investigation



J21 Summary of Preliminary Investigation



J21 Summary of Preliminary Investigation

Flood Flow: Index Flood Method with EPA (Moin & Shaw 1985)	
Flow	Results (m ³ /s)
Q _{1.25}	1.63
Q ₂	1.72
Q ₅	2.12
Q ₁₀	2.46
Q ₂₀	2.87
Q ₅₀	3.41
Q ₁₀₀	3.84
Q ₂₀₀	4.3
Q ₅₀₀	4.82

Jp2g Summary of Preliminary Investigation

Suggested Next Steps:

1. Consensus from Lake Property owners for a low flow type water control structure at the outlet. (Rehabilitation vs Structural Weir vs Rocky Ramp)
2. Financial commitment from Lake Property owners to determine status of the stability of the existing berm without the sandbags recently placed on the berm.
3. Retain a Professional Engineer to determine stability of the existing berm. (Unstable and Deteriorating)
4. Determine need for an official lake outlet control structure with or without rehabilitation or restoration of the original (not including work completed in 2018). Confirmation from RVCA OMNRF and the municipality that a water level range is suitable, attainable and manageable.
5. If required, a preliminary financing plan, maintenance plan, property owner agreement must be established.
6. Design of proposal which will include all details noted above. Pending review of Jp2g Report and consideration by Township Council of preferred option
7. Submission of applications for approval with supporting documentation.

Jp2g Summary of Preliminary Investigation

Points of Consideration

- Ownership and access issues related to property lines
- Desire for passive system – minimize active controls and inspection/maintenance requirements
- Appropriate water levels for safety and recreation while protecting health and property (downstream and upstream users)

Jp2g Option Analysis

1. No Intervention
2. Rehabilitate Existing
3. Rocky Ramp
4. Structural Weir (50 m)
 - A. Land Swap or Purchase
 - B. On Private Property
5. Structural Weir (100 m)

Jp2g Option Analysis

1. No Intervention

Pros

- Least cost
- No immediate change to lake water levels or hydraulic performance
- No construction impacts

Cons

- Does not address hydraulic issues
- Risk to public property and safety due to potential failure
- Does not address property and ownership issues

12.1 Option Analysis

2. Rehabilitate Existing Berm



June 24, 2019

Bass Lake

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12.1 Option Analysis

2. Rehabilitate Existing Berm

Pros

- Relatively inexpensive
- Little change to lake water levels or hydraulic performance
- Simplified approvals process

Cons

- Does not address hydraulic issues
- Risk to public property and safety due to potential failure
- Ongoing maintenance and inspection required
- Does not address property and ownership issues

June 24, 2019

Jp2g Templates 101

34

12.1 Option Analysis

3. Rocky Ramp (Perth)



June 24, 2019

Bass Lake

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12.1 Option Analysis

3. Rocky Ramp (before)



June 24, 2019

Bass Lake

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J21 Option Analysis

3. Rocky Ramp

Pros

- Relatively cheap over lifecycle
- Stable system with limited risk of failure
- Aesthetics
- Eco-friendly – protects fish passage and habitat

Cons

- Potentially tricky process to accurately model and design
- Regulatory approvals may be delayed due to atypical design
- Significant construction oversight required

J21 Option Analysis

4. Structural Weir (50 m)



J21 Option Analysis

4. Structural Weir (50 m)



J21 Option Analysis

4. Structural Weir (50 m)

Pros

- Standard design and approval process
- Common construction process
- Predictable hydraulic performance

Cons

- Significant impacts to existing environment during construction
- Maintenance and inspection requirements
- Property and ownership issues

J21 Option Analysis

4. Structural Weir (100 m)



J21 Option Analysis

4. Structural Weir (100 m)



J21 Option Analysis

4. Structural Weir (100 m)

Pros

- Standard design process
- Common construction process
- Predictable hydraulic performance
- Resolves property and ownership issues

Cons

- Greater impacts to existing environment during construction
- Increased maintenance and inspection requirements
- Approvals from Conservation Authority may be contentious
- Most Expensive lifecycle costs

J21 Summary of Preliminary Investigation

Points of Consideration

Factor	Description
Addresses Stakeholder Concerns	The proposed intervention is likely to satisfy Bass Lake stakeholder concerns and align with the Bass Lake Management Plan.
Environmental and Ecological Protection	How significant are the potential impacts to the existing ecosystem and natural conditions. This would also impact the complexity and duration of regulatory approval processes.
Cost Effective	How much improvement relative to existing condition can be expected relative to the required investment.
Timely	The proposed intervention is likely to be design and constructed by the end of 2020.
Risk	How likely the proposed intervention is to create liability to the Township with respect to protection of the safety and property of the public.

J21 Summary of Preliminary Investigation

Points of Consideration

Timely

- Failure of existing berm is possibly imminent
- Potential impacts to public health, safety, property, and the environment
 - Construct by Fall 2020

J21 Summary of Preliminary Investigation

Points of Consideration

Cost Effective

- Value for money
- Minimize *life-cycle* costs

J21 Summary of Preliminary Investigation

Points of Consideration

Stakeholder Satisfaction

- Addresses residents' concerns
 - Community buy-in

J21 Summary of Preliminary Investigation

Points of Consideration

Environmental Protection

- Minimize impact to the lake's habitat and ecosystem
 - Simplify regulatory approval process

J2j Summary of Preliminary Investigation

Points of Consideration

Risk Reduction

- Remove uncertainty over ownership and responsibility
 - Minimize risk of sudden or catastrophic failure
 - Minimize liability to the involved parties

J2j Next Steps...

Summary Report and Recommendations

1. Jp2g Summary Report detailing results of the desktop review, investigation, stakeholder consultation, and preliminary analysis to be submitted to the Township.

J2j Next Steps...

Summary Report and Recommendations

1. Jp2g Summary Report detailing results of the desktop review, investigation, stakeholder consultation, and preliminary analysis to be submitted to the Township.
2. Township staff to review report recommendations.

J2j Next Steps...

Summary Report and Recommendations

1. Jp2g Summary Report detailing results of the desktop review, investigation, stakeholder consultation, and preliminary analysis to be submitted to the Township.
2. Township staff to review report recommendations.
3. A new contract (if required) for the detailed design, tender, and construction oversight services for the preferred option is initiated and construction completed by end of 2020.



²⁷⁵
Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS
1150 Morrison Drive, Suite 410, Ottawa, ON K2H 8S9
T 613-828-7800, F 613-828-2600, www.jp2g.com

Appendix C – Stakeholder Submissions

A Bass Lake Outlet Control is a Beneficial Public Work

Background

Bass Lake is a spring fed lake with no inflow from other lakes, rivers or creeks. At the north end of the lake there is a major outlet comprising a long wetland and creek that flows to Lower Rideau Lake (part of the Rideau Canal system), entering just south of Rideau Ferry. Approximately 280 meters downstream in this outlet there is a man-made earthen berm that has served as a water control structure since the mid-1990s. It was developed by a private individual(s) on an ad hoc basis without regulatory approval. It lies on private land, with a small portion laying on an unopened original township road allowance.

Bass Lake is considered by Rideau Valley Conservation Authority (RVCA) to be part of the Lower Rideau Lake catchment area and it has a higher elevation (134 m) than the Lower Rideau Lake (125 m). The topography of the outlet wetland in front of the man-made earthen berm is no longer restricting outflow to any significant degree. Without a reliable natural or a man-made berm in the Outlet there will be a very dramatic lowering of the historical seasonal water level.

There is now an issue of lower water levels that may adversely affect the 230 Bass Lake property owners, downstream lakes and rivers, tourism, local business and property taxes. The vast majority of lake property owners have petitioned for the establishment of an effective lake water level management plan for Bass Lake. In order to deal with this problem on a comprehensive and consensus basis a new Bass Lake Property Owners Association (BLPOA) was recently formed in the Fall of 2018. It presently has 185 members and its primary mandate is to work with the Township of Rideau Lakes in the pursuit of a municipal project to establish an effective lake water level management plan for Bass Lake.

A past report by the RVCA “Rideau_Lakes Subwatershed Report 2014 – Lower Rideau Catchment” is an exhaustive evaluation of the lake’s status in 2014 and makes numerous recommendations relating to water quality, water levels, shoreline and wetland protection and partnerships to deal with such issues.

Purpose

This document seeks to support the rationale that resolving this Bass Lake issue would constitute a beneficial public work and as such warrants a collaborative project involving the leadership of the Township, and the participation of the BLPOA, the RVCA and the Ontario Ministry of Natural Resources & Forestry (OMNRF). The financial and technical resources of these government organizations should be used to assist in solving the issue of Bass Lake water levels that have been significantly lowered as a result of the rapid deterioration of the earthen berm at the lake’s outlet to the Lower Rideau.

Environmental Issues

Provincially Protected Wetlands

Bass Lake is small (less than 750 acres) and is mainly spring fed. It is not connected to the Rideau system except for the outlet to Lower Rideau Lake which is 10 metres lower in elevation. There are wetlands at both ends of the lake and by themselves are not provincially significant. In recent years, however, the Bass Lake wetlands have been “complexed “into the Big Rideau Wetland Complex thereby making it a Provincially Significant Wetland (PSW) and therefore is part of a regional system. This provincial designation requires that the PSW and buffer zone are to be protected. This should include avoiding reduced water levels or any activity on the Lake that has an adverse impact on the PSW.

Lake Eco-systems

A major and long term drop in lake water level will inflict adverse impacts on the lake’s ecosystems and nature’s filtration system. The habitat for small mouth bass and other fish species in the lakes five major bays and along the extensive shoreline shoals could be depleted and lost. Such a dramatic change will also eliminate various wildlife habitats and waterfowl nesting sites. This loss of these habitats would have regional impacts.

Blue-Green Algae Blooms

Major outbreaks of Blue-Green Algae blooms on Bass Lake were detected and reported in October/November of 2018. While nutrient concentration levels are the main factor, low water levels and higher water temperatures are a suspected contributing cause of these outbreaks, which thrive in areas where the water is shallow, slow moving and warm. Blooms can be a real threat to lake drinking water for those residents using the lake as a source, even with treated systems. Blooms can be toxic to fish, wildlife and people. The die-off of these blooms can lead to oxygen depletion and contribute to massive fish kills. Not only will this harm the Bass Lake fishery but any release into the Lower Rideau would have a downstream impact.

Downstream Impacts

Outflow from Bass Lake enters the Rideau system at Lower Rideau Lake. There is a clear recognition by the RVCA that there is a relationship, evidenced by the statement in the above noted report “*Consider the need for a community – driven lake management plan for Bass Lake and Lower Rideau Lake*”. Some impacts that may occur include:

- Downstream sedimentation from erosion created by uncontrolled run off from Bass Lake especially in the spring;
- Low water levels will expose more shoreline and subject it to increased erosion from wave action. This in turn will affect the downstream receiving lakes;
- Water level management issues on the Rideau system when no water escapes from Bass Lake because of low levels even during rainfall events;

Economic Impacts

If current water quality, rated “Poor “by the RVCA, is exacerbated by persistent lower water levels the result is likely to be an increase in dangerous algae blooms, further degradation of fish habitat and retreating shorelines. This will lead to numerous adverse regional economic impacts including but not limited to:

Property Taxes

There are fourteen (14) private access roads around Bass Lake that service the 230 properties located on the Bass Lake waterfront. All of these properties are developed with at least 55-60% being full time primary residences. The remainder are seasonal (May-Oct) properties. There are also two significant recreational businesses located in the North end of the Lake. They are the Bass Lake Lodge business with 10 Cottages and the adjacent Bass Lake Campground (65 lots). Property values have increased significantly in the last few years. The Province of Ontario uses a market value assessment methodology to determine property values for taxation purposes. Any decline in property values will have an impact on the municipal tax base.

Waterfront property owners on Bass Lake, both permanent or seasonal, are a significant force in our Township. The most recent assessments by Municipal Properties Assessment Corporation (MPAC) has determined that the total value of all properties on Bass Lake is \$84,000,000 which translates to a very significant tax revenue contribution of over \$800,000 to support local governance, programs and infrastructure for our County and Township.

The adverse impacts created by a drastic long-term lowering of the lake water level and decline in lake water quality on waterfront conditions would force a significant number of property owners around the lake to demand that their properties be reassessed by MPAC to reflect the negative impact on their property value.

Spending by Property Owners

A thriving lakefront community plays a key economic role in our Township. Seasonal residents nearing retirement are spending more time at their second homes with many choosing to relocate there permanently. The related household expenditures of our waterfront property owners amount to millions of dollars every year which is spent in the surrounding municipal districts. Should the issues involving Bass Lake not be resolved the incentive to own and upgrade property will be diminished. This will affect the tax base, local retail stores, restaurants, marinas, building contractors and suppliers.

Many small businesses in the Township provide essential services to Bass Lake owners. Some examples include: A large percentage of larger watercraft (60-75) are supported by local marinas or businesses who provide maintenance, winterization and storage services. In another example, the Road Associations/Groups around Bass Lake are responsible for the maintenance and capital improvements of their respective private access road. These essential activities comprise: periodic road gravel replenishment; seasonal road grading; snow plowing of roads and driveways,

sanding operations and improvement projects. The majority of the Bass Lake private roads each incur annual expenditures in the \$5,000 range, all of which support local businesses/contractors.

Tourism, Recreational & Rental Properties

Tourism which is important to economic growth will be negatively impacted – the newly re-opened Bass Lake Lodge attracts visitors from outside the region. In the first year of the re-opened operation the Bass Lake Lodge attracted several hundred guests. It is estimated that 80% came from more than 50 km away and 30% from the United States. This results in a significant amount of local spending on food, fuel, boat rentals (both on Bass Lake and the Rideau system), restaurants and at other local attractions. This activity is a strong contributor to the local tax base.

There are a number of rental properties on Bass Lake. If renters stop coming there will be an impact on local businesses such as marinas, local restaurants or other attractions in nearby towns and villages. This is also an area of concern for the Bass Lake Lodge and the adjacent campground.

Waterfront Property Owners & Lake Association

It is worthy to note that the Rideau Lakes Town Council recognize the importance of the lake property owners and their cumulative importance to the townships economic well-being and development. The newly elected Mayor indicated that the Township will be considering potential programs in 2019 related to lake associations. He affirmed that waterfront taxpayers are important to the community and generate significant funding for the Township.

Conclusion

In summary, Bass Lake and its waterfront community are a significant contributor to the local economy and the natural environment. The BLPOA's objectives are in line with those of RVCA and MNRF with respect to maintaining better water quality, healthier wetlands and the protection of wildlife species and habitat. The involvement of local and provincial authorities is necessary to achieve a healthy Bass Lake and restore acceptable and manageable water levels that will result in a benefit to current and future landowners, businesses, tourists, and the regional ecosystem. Such a partnership will assist in moving forward to implement the recommendations presented in the 2014 RVCA report.

The BLPOA has requested that the Township provide its leadership and authority to establish a municipal project in 2019 and work with our Lake Association to define a plan of action leading to a resolution of the long-standing issues we have faced at the Outlet to Bass Lake.

Interested parties are urged to consider this document *“A Bass Lake Outlet Control is a Beneficial Public Work”* when determining justification of the provision of funding and technical expertise.

Prepared By: BLPOA Board of Directors – January 2019

Peter and Catherine McGann
15 B3
Lombardy, ON
K0G 1L0

June 9th, 2019

Jp2g Consultants Inc,
1150 Morrison Drive, Suite 410
Ottawa, ON
K2H 8S9

Re: Notice of Consultation – Bass Lake

Dear Mr. Arends

I was pleased to be informed that the deadline for returning your questionnaire had been extended. The questionnaire itself perhaps did not allow for the full capture of all the issues and resident concerns. The additional time has specifically allowed me to look at this issue more strategically.

Any solution must be concerned to ensure that the majority needs of the local residents is met. Further, that there should be in the solution a maintenance of a water level which is capable of sustaining the current (pre berm breaching) natural habitat.

Bass Lake is an integral part of the Rideau River system, which has, as we are all aware, been granted the status of a world UNESCO site and therefore our local issue cannot be divorced from this larger fiduciary responsibility.

In addition, as recent local events have shown, we are approaching a period of time, because of more extreme weather, when those tasked with managing spring water levels must be provided with all the tools possible. The Ottawa River flooded again this spring. Those tasked with managing the water levels on the Rideau system need tools to control the flow of all water entering their system.

Bass Lake drains into the Lower Rideau. A requirement for a water control feature at Bass Lake should also include an ability to holdback some of the spring run off from entering the Lower Rideau. This would mean that Bass Lake may have temporary, higher water levels. Therefore, the replacement structure should have some form of mechanism to allow for higher than average spring run offs to be held back. The “needs of the many outweigh the needs of the few” concept.

The Dutch manage their water systems with great success. We must take this opportunity to invest in a small structure which gives RVCA an additional tool to manage the Rideau system. This is a world UNESCO site as previously stated.

Conversely, the consequences of our abnormally low water level last winter have shown themselves this spring in many forms:

1. The cold January temperatures meant that the ice reached the rock shelf and moved massive rocks unbalancing water side structures,
2. There are no small mouth bass nesting on the rock shelf areas,
3. Last fall saw a major algae plume,
4. Less boats have been launched than in decades because of the water level uncertainty,

It is therefore apparent that the human inspired destruction of the old berm is having a major impact on the local residents and our ecological system. The last thing anyone wants is this situation to translate into a loss in property value.

I look forward to meeting with you on June 22nd.

Regards



Peter McGann

A resident of Bass Lake in attendance at the public information session on June 22, 2019 noted that their family had owned property on Bass Lake for over 50 years and had developed their property according to the water levels experienced prior to 1995. Since the illegal construction of the earthen berm, they have documented flooding of private property, as shown below.



Resident-submitted photo showing private property flooding. Circa July, 2015

This resident has indicated that they are seeking a return of typical Bass lake water levels to their condition prior to the illegal berm construction. They have contacted the MNRF in Toronto and are prepared to initiate legal action against the Township if an outlet control is installed that causes inundation of private property.

BASS LAKE PROPERTY OWNERS ASSOCIATION (BLPOA)
Review & Critique
Jp2g Consultants Report – Bass Lake Outlet
Submitted to Township on 22 July 2019

References:

- A. Jp2g Consultants Report – Bass Lake Berm Investigation dated 19 July 2019
- B. BLPOA Board of Directors Meeting – Review Jp2g Consultants Report – 27 July 2019

PART ONE – EXECUTIVE SUMMARY

Introduction

This BLPOA Report is intended as a constructive review and feedback critique of the preliminary Jp2g Consultants report (Reference A) which was commissioned by the Township of Rideau Lakes and presented to the Municipal Services Committee on 22 July 2019. It has been prepared by the BLPOA Directors and Tech Advisers who represent the interests of 14 Road Groups/Associations and 183 registered waterfront properties on Bass Lake.

Once again, we wish to state our sincere appreciation for the excellent support provided by our Township Council and the CAO in proceeding with this Phase 1 Consultants study in support of formal requests made by the BLPOA over the past year.

Our BLPOA was established in the Fall 2018 at the behest of Town Council and the RVCA to finally achieve debate and a consensus voice from Bass Lake on significant issues involving the 230 Bass Lake property owners. Increasing concerns from waterfront property owners regarding the threat of a permanent lowering of water level on Bass Lake and its impacts on the lake's ecosystems; water quality and overall quality of life were definitely the driving force. The principal mandate of the BLPOA is to work with the Township of Rideau Lakes on a municipal project to establish an effective lake water level management plan for Bass Lake under the leadership of the Township, this includes supporting the work of the Rideau Valley Conservation Authority and Ontario Ministry of Natural resources. This mandate was clearly reinforced at our most recent Annual General Meeting held on 06 July 2019.

Lack of Consultant Consultation – BLPOA

To be honest, the lack of upfront consultation from Jp2g with our BLPOA in support of the Phase 1 study tasks has been quite disappointing. On one hand we do appreciate the desire for the community consultation to be fully inclusive and to ensure every waterfront property owner has an opportunity to express their concerns and opinions. In April 2019, The Jp2g Draft Consultation Plan was reviewed by the BLPOA and we responded by providing input to enhance the plan and assist with the identification of key stakeholders. We did provide our Primary and Alternate contacts for the BLPOA at that time. Throughout the consultant's Assessment and Community Consultation Phases of this project there was no attempt to engage the BLPOA for inputs on either the Survey Questions for Bass lake Outlet or the final determination of Options for the Bass Lake Outlet. The BLPOA did manage to play a supporting communication role using its membership email listing of 80% of Bass Lake residents which alerted and encouraged our members to actively participate on behalf of the Township and Jp2g during the protracted Survey Form process. A delegation of our Association also made a brief presentation at the Consultant's public community presentation of Survey results on 21 June 2019.

Request that the three key documents or reports that have consistently stated our concerns and recommendations to Town Council; RVCA, MNR, and our MPP be recognized in the final report. These same documents were made available to Jp2g Consultants with the Township RFP process/drop box of reference documents as well as by separate email to Jp2g Project Manager during the consultation phase. They are;

- BLPOA presentation to Rideau Lakes Municipal Services Committee – 09 Oct 2018
- BLPOA Scope of Work – Township RFP – 12 Nov 2018
- BLPOA Backgrounder Document – Bass Lake Outlet a Beneficial Public Work – January 2019

It appears that this upcoming period of 06-21 Aug for Public review & Stakeholder Feedback will be our only real opportunity to present our feedback and review. We request that our detailed BLPOA comments and recommendations will hopefully lead to a revised final version of the Jp2g Report for final presentation to Town Council in early September 2019 for their debate and decision on the way ahead.

Summary of Recommendations & Suggested Revisions

1. Insert our concise background statement or context rather than the term “Illegal” when describing origins of the earthen berm; (refer p.3)
2. Incorporate the most recent measurements of the Berm elevations taken by RVCA in Aug 2018; (refer p.3)
3. Clarify the traceability and reliability of the Chart depicting Water Level readings for period 2010-2016; (refer p.4)
4. Remove the repeated reference and declarations that a 1968 RVCA water level measurement of 133.8 MASL is anointed as the only historic datum point; (refer p.4)
5. Amend the Stakeholder Table to include previously provided BLPOA primary and alternate contacts; (refer p.5)
6. Reconsider the exclusion of our proposed option to “Construct a New Earthen Berm & Spillway”; (refer p.5 & 7)
7. Revise the math error and some statements in the Summary of Survey Responses; (refer p. 6)
8. Remove the incorrect photo images used to depict the existing berm’s appearance and material construction; (refer p.7)
9. Acknowledge BLPOA concerns regarding the applicability of the Rocky Ramp solution to the unique features of Bass Lake and its outlet; (refer p. 7)
10. The Consultants should further refine the information contained in Table 5-2 and provide stakeholders with a Level of Confidence (LOC) expressed as a percentage that any proposal submitted for each option will meet regulatory approval together with best estimates of cost for these options; (refer p.8)
11. Make mathematical corrections to Table 5-3 on Option 2 – Rehabilitate Existing Berm; and Reassess evaluation of Option 2 – if only new construction materials & methods are used. (refer p.8)
12. Refer to the critical importance of preserving our catchment areas Provincially Significant Wetlands, a vital consideration for all from a conservation perspective; (refer p. 9)

The comments and recommendations presented in this report are supported by all our BLPOA Board members and Tech Advisers. (listed below). **Please consider this submission as 18 responses to the call for Public Review and Feedback.**

SLATE OF DIRECTORS & OFFICERS and TECH ADVISERS

Bill St Jean	President BLPOA /Task Force	President Road Group B3
Zlata Burt	Treasurer	Road B12
Lorayne Bradshaw	Sec/Membership	Road B1
Demi Thompson	Director at Large	President Road Group B1
Claude Brett	Director/Task Force	President Road Group B2
Peter McGann	Director/Task Force	Road B3
Ron Coleman	Director at Large	President Road Group B3A
Dan Lemaire	Director at Large	President Road Group B4
John Dorsch	Director at Large	President Road Group B5A/B
Pat Kelly	Director/Task Force	Road B6A/B
Dale McCabe	Director at Large	President Road Group B7
Roger Cauley	Director/Task Force	President Road Group B8
Ron Hewitt	Director at Large	President Road Group B9
Margot Finn	Director at Large	President Road Group B10/11
John Bridle	Director/Task Force	President Road Group B12
Sidney Berry	Technical Advisor	Road B1
Don Kennedy	Technical Advisor	Road 5A
Rick Cunliffe	Technical Advisor	Road B4
David Sadler	Technical Advisor	Road B12

PART TWO – DETAILED BLPOA CRITIQUE/FEEDBACK

Reference Jp2g Report – para 1.2

“Earthen Berm constructed illegally in 1995”

Whenever the term “illegal” is used there should be a historical context provided for the benefit of all stakeholders not familiar with the origins of this man-made berm structure. In 1995, a major beaver dam which was effectively controlling lake water level in the 1990’s was intentionally destroyed and removed and the Bass Lake water level dropped dramatically to a level never before encountered. Advice was initially sought from the authorities and the berm was later urgently constructed without permits or approval of regulatory authorities. In Spring of 1996, RVCA issued a Notice of Violation and after several meetings in summer of 1996 the RVCA was prepared to withdraw any violations if it was agreed to remove the culverts, grates and regrade the top of berm to lower level of spillway. Once final grading was done instructions were to apply a suitable grass seed mixture to restore vegetative growth process to prevent erosion. It was stated by RVCA that the resultant dam made the effective water level no higher than the beaver dam and it should give more stable water level control than that provided by the beaver population. RVCA chose not to pursue the Notice of Violation.

Reference Jp2g Report – para 1.2 Table 1.2

Bass Lake Hydrology

Jp2g has referenced that the current berm elevation is 134.51 MASL based on an RVCA Measurements taken in 2010. It should be recorded that RVCA also took more recent readings at the request of the BLPOA in August 2018. Six (6) measurements were taken of the top of berm and the average reading was 134.21 MASL. It appears the elevation of the berm has decreased by 30 cms over this 8-year period 2010-2018.

Figure 1-3
Bass Lake Water Level Data – Township 2010-2016

This chart was provided with the RFP by RVCA, however it cannot be confirmed by what methods or by whom these measurements were recorded...quite probably an unknown resident/property owner. While the BLPOA is not contesting the general range of the water levels reported in this chart there are some troubling inconsistencies on methodology or reference points used. Some notable irregularities are very striking – (1) 2013 water level increased by 15cm in July/Aug. (2) 2015 water level increased by 10 cm in June 2015 and (3) wild swings of increased levels in fall months. This water level data is flawed since sampling rates and intervals are random. Without some method of normalization of the data presented it is spurious and not a realistic basis to make predictions.

This summer in June 2019, in consultation with RVCA staff, our BLPOA procured two staff gauges (one-meter length) and installed them in two controlled locations on Bass Lake. RVCA staff very kindly carried out site measurements using their Trimble GIS instrumentation on 30 July 2019 to calibrate our gauges.

Reference Jp2g Report – para 2.1
Existing Conditions

This para reports that the RVCA survey results of 2010 recorded the average elevation of the top of earthen berm to be 134.5 MASL If the results of last year's (2018) RVCA measurements are used then the elevation of top of berm is actually 134.21 MASL. The old crude Spillway is indeed obsolete. Since "No Trespassing" orders and RVCA restrictions instituted last July 2018 it has fallen into total disrepair since it cannot be maintained.

Reference Jp2g Report – para 2.2
Engineering Considerations

Regrettably, as part of this Phase 1 study there was no allocation of resources for consultation with any of the primary property owners in the Bass Lake outlet.

Reference Jp2g Report – para 2.2.6
Seasonal Target Water Level Range

It would have been an excellent opportunity to perform this important task as part of this exploratory fact-finding study.

Reference Jp2g Report – Table 2-1
Historic Water Levels for Consideration

Only 7 years of readings (no documentation to confirm source or accuracy) and recent readings recorded by BLPOA in 2019. The reference to a single Conservation Authority reading of 439 feet or 133.8 MASL in 1968 which in this Consultants Report somehow is crowned or labelled as the Historic Level or worst yet the pre-earthen 1996 berm level. Why not a reading from 1938 or 1993? No indication of date, time or seasonal condition prevailing at the time which essentially makes this single data point invalid as a major reference point. What about readings from the 1970's; 1980's, and 1990's. The BLPOA does not recognize this single data point being the historic water level.

Reference Jp2g Report – Para 3**Stakeholder Consultation****Table 3-1**

The BLPOA is dismayed that the Jp2g omitted to include the Contact Information that was provided to them and the Township as part of our thorough review and input to the draft Consultation Plan. Hard to understand why such a detail was not picked up in proofing the document. Please insert:
Primary Contact: Bill St Jean/president BLPOA; 613-283-3994 and bill.stjean@icloud.com;
Alternate Contact: Peter McGann/Director BLPOA; 613-283-9618 and pcmcgann@gmail.com;

Survey Result – Q2 - Role of Respondent

Results indicated that 62% of Respondents are identified as BLPOA members. Follow on discussion with our Directors and membership confirmed that many of our members only checked off the Residents box and missed the BLPOA box. Our Directors believe that the % of BLPOA Respondents was likely closer to 75%.

Survey Result – Q4 – Negative Impacts from High Water

Chart only adds up to 77%. Does this imply that 23% of Respondents skipped the question?

Survey Result – Q7 – How do you feel about the seasonal high-water level?

The recorded responses to this question are misleading. Our BLPOA is not aware of any public roads being impacted by high water level. Perhaps those who responded to this choice were thinking about public access on their respective private roads. Concerns about private road flooding is a local Road Group issue as culverts get crushed, blocked or fail for some other reason. It is likely a seasonal issue and is up to the local Road Group to deal with it.

Survey Result – Q8 – Choice “Rehabilitate Existing Berm”

This choice selection should better explained not have been used in the survey. It should have been “Construct a New Berm at the existing location.” If this terminology of rehabilitating an existing structure will somehow make the regulatory approval process less ominous then let’s acknowledge that the end result will be total replacement of the old structure down to bedrock with all new materials. The reason this is important is when the evaluation of Risk is considered by Jp2g later on in the Review of Options.

Survey Result – Q9 – Reasonable Budget

This important question should have been introduced with some very specific context. It is highly probable that majority of respondents felt that governments would provide substantial funding. A different answer would have been obtained if a cost sharing model was suggested involving a proposed contribution from property owners.

Survey Result – Q10 – Weighting of Evaluation Factors

This chart essentially confirms that the general consensus of the respondents wants a cost-effective timely solution that addresses the concerns of Stakeholders but above all considers the impacts to the existing ecosystems and natural conditions.

Reference Jp2g Report – Para 3.3 **Summary of Survey Responses**

The last sentence of Para 1 is incorrect according to Chart Q6. It should read either *“These findings are corroborated by the fact that only (23%) 43 % of respondents indicated a desire for (lower average water levels) higher average water levels, while 77 – 79 % of respondents thought that it should be maintained per the existing condition or raised higher.”*

The first sentence of para 2 states that *“The preferred solution for managing the Bass Lake outlet was to rehabilitate the existing berm”*. Again, there was no option to select *“Construct a New Berm”* which was the one clearly stated in the BLPOA Scope of Work Document provided with the RFP. From a BLPOA Task Force perspective – rehabilitating the existing berm is a non-starter. Aside from our Directors the majority of property owners are not completely familiar with the current day state of the degraded biomass and unapproved materials currently comprising the existing berm.

Last para of 3.3 states that *“It should, however, be noted that some respondents would prefer the lake to return to the level of 133.8 m (1.7 m lower than the top of the earthen berm) as specified in the 1968 RVCA Conservation Report – refer to Table 2-1 for a comparison of historic water levels from available data.”* First of all, the math error needs correction – It should read 0.7 m lower than top of earthen berm. This assertion is disingenuous and totally misleading which gives rise to following questions:

- What is the total number of “some respondents”?
- If the 133.8 MASL was such a noteworthy metric why was it not included in the consultants Stakeholder Survey so that there was equal opportunity for all to respond?
- Why is the 1968 uncorroborated water level elevation from 50+ years ago given so much mention in this report in the context of the existing 2019 situation and why should RVCA measurements recently made by RVCA be of lesser material value?

According to the Charts for Q7 and Q8, approx. 21 % expressed the view that average water level or seasonal high-water level should be lowered (no quantifications offered). We are confident that it certainly wouldn't be 70 cm or 2-3 feet lower than the averages for the past several decades.

Reference Jp2g Report – Para 3.4 **Stakeholder Submission**

While Jp2g did not request submission of specific impact examples from respondents many were likely submitted, either in words only or pictures. Why was this one example chosen to highlight?

Reference Jp2g Report – Para 4 **Alternative Solutions**

Option 1 – No Intervention

This Option would clearly not meet BLPOA objectives and mandate.

Option 2 – Rehabilitate Existing Berm

The BLPOA Scope of Work document which was referenced with the RFP listed the Option to “Construct a New Berm adjacent to existing location” as a preferred alternative. Why was it not included? In this initial phase of the Jp2g Assessment of Options there was no consultation with the BLPOA Executive/Directors and their membership which represents a voice for 80% of the lake.

The description of this Option opens with a completely scary statement “*The existing berm could be rehabilitated to match the original as-built condition, approximately as shown in Figure 4-1 below*”. This photo from the Spring 1996 should not have been chosen. This is what the berm looked like for the first few months before RVCA showed up and ordered several significant modifications before deeming it acceptable to remain in place. The culverts were installed in 1996 to assist with releasing water after instructions from RVCA and soon after they were ordered removed and the top graded to a much lower level. Unfortunately, this photo has given everyone the wrong impression of the berm’s actual state over the past 23 years.

The existing berm was never constructed with the proper clay, aggregate materials to meet a permit approval process. Remarkably it stood the test of time for 23 years. It’s old bio-mass has collapsed and it is leaking under and around its structure. Furthermore, there are hundreds of sand bags filling breaches across its height and width and old plastic pipes buried in the structure. A geotechnical engineer would most likely declare rehabilitation as not an option. What is wrong with Construct a New Berm - 50m span using all the right design specifications and using all the approved materials with a properly sized rock spillway. Is this option not supportable by the regulatory authorities?

If this terminology of Rehabilitating an existing structure will somehow make the approval process less ominous then let’s acknowledge that the end result will be total replacement of old structure down to bedrock with all new materials. The reason this is important is when the evaluation of Risk is considered by Jp2g later on in their Evaluation/Scoring tables.

Option 3 – Rocky Ramp

The BLPOA is certainly willing and anxious to learn as much as possible about the design features, operating effectiveness and overall benefits of a Rocky Ramp solution. We want to clearly understand why the consultants evaluated and ranked this alternative as the preferred solution for our Bass Lake outlet.

We understand the merits of its application to rivers, streams and other such waterways. We do have difficulty seeing how it would be a good fit for our specific lake hydrology and topography. We are:

- A small land locked lake with a very small catchment area;
- As stated in Para 1 of Consultants report – No real source of water inflow;
- Mostly subject to dealing with water level declines of 14-17 inches over the three seasons of Spring, Summer and Fall with minimal replenishment due to precipitation;
- Significant amounts of water loss due to evaporation in July/Aug.

So, a Rocky Ramp structure may only be truly in operation during the freshet period (April, May) once water level reaches a designed acceptable seasonal water level it will continue to decline with little or no replenishment over the Summer and Fall. Depending on what happens to the topography (water flow

resistance due to low level weirs, dense vegetation etc.,) of the wetland upstream of the existing berm location – little or no flow through Rocky Ramp.

Our BLPOA has been in contact recently with Douglas Nutall, Jp2g Consultants, to see if he would be willing to conduct a Q&A or mini seminar with selected members of our Board so we can better appreciate and understand the pros and cons of the Rocky Ramp design.

Reference Jp2g Report – Para 5 Evaluation

Table 5-2 Option Evaluation – Color Ratings

The Consultants should further refine the information contained in Table 5-2 and stakeholders a Level of Confidence (LOC) expressed as a percentage that any proposal submitted for each Option will meet regulatory approval together with best estimates of cost for both these options.

Table 5-3 Evaluation of Alternative Solutions

Table - Option 2 Rehabilitate Existing Berm

Why would anyone or agency agree to reconstruct/salvage the existing berm knowing its dilapidated condition and past history. Table 5-3 has significant arithmetical errors in the total's column (see corrected version below):

OPTION 2 – REHABILITATE EXISTING BERM			
Risk	0.25	30	0 (7.5)
Environment & Ecological Protection	1.0	25	25
Timely	0.75	10	10 (7.5)
Address Stakeholder Concerns	0.5	10	5
Cost Effective	0.75	25	25 (18.75)
Total			65 (63.75)

In the Consultants own explanation of the evaluation of Option 2 they assessed a Risk Factor of 0.25 after concluding the following *“However, due to the inherently unstable construction of the berm and risk of further deterioration after being rehabilitated, this option still carries some significant risk to the Township as they will become responsible for the operation and maintenance of an outlet control with no known expected service life”*. Accordingly, this same rationale may have led them to only assess a Addresses Stakeholders Concerns Factor of 0.5.

The BLPOA feels that an Option 2 calling for “Construction of a New Berm” that meets all of the rigorous requirements of regulatory approval process should be assigned a higher score for Risk – specifically 0.75 and a higher score factor for Addresses Stakeholder Concerns – specifically 0.75.

OPTION 2 – CONSTRUCT A NEW BERM			
Risk	0.75	30	22.5
Environment & Ecological Protection	1.0	25	25
Timely	0.75	10	7.5
Address Stakeholder Concerns	0.75	10	7.5
Cost Effective	0.75	25	18.75
Total			81.25

Reference Jp2g Report – Para 6 Recommendations

The BLPOA acknowledges that the Consultant has recommended the Rocky Ramp option as a preferred solution. We are certainly prepared to fully understand the rationale for this recommendation to ensure their opinion and evaluation is indeed the best course of action.

Bass Lake's Provincially Significant Wetlands

The majority of survey respondents considered ecological issues to receive high priority during the evaluation process as evidenced in the “**Summary of respondents' priorities for water level management.**” These two survey results encapsulate the wishes of the majority of stakeholders and hope that the project will move forward on this mandate.

The Rideau Lakes Township has done a good job supporting the BLPOA by facilitating Phase 1 of the engineering assessment but the major decisions concerning target water levels and construction specifications will be within the remit of the RVCA whose mandate is mainly concerned with ecological and flood control issues. Only a few words are mentioned about the importance of preserving wetland functionality. The Consultant's report refers to sensitive wetlands and this is a good point that should be expanded upon and emphasized.

In 1984 the Bass Lake wetlands were evaluated and did not achieve “Provincially Significant” status. This of course is in the era when Beaver dams controlled lake levels. In 1995/96 the earthen berm was built without approval and later in January 2000, post berm, the wetlands were again rated but this time they were complexed with approximately 40 non-contiguous wetlands including the Big Rideau and did achieve a score to make it Provincially Significant. This is important because post berm water levels would affect many components of the rating system including fish habitat, diversity of habitat and open water. It is vital that a water level control system be established to maintain or improve the health of the Provincially Significant Wetlands (PSW's) in accordance with the Wetland Conservation Strategy for Ontario 2017 to 2030.

RVCA Report: Rideau Lakes Subwatershed Report 2014

This report discusses Lake Planning and recommends consideration of a community driven lake management plan which includes a number of objectives including “Provide a baseline of data on water quality, land use activities fisheries management, etc. “and “ ... a simplified list of priorities that can be carried out by the community to protect the lake environment “. Since this is the process the BLPOA is undertaking the RVCA (and MNR) are obliged to be fully on board and assist us as much as possible. The Consultants could have referred to this study.

August 1 st. 2019

Re:- Township of Rideau Lakes Bass Lake Outlet Berm Investigation

General comment.

While the report of the Stakeholder Survey was interesting and informative it also raised concerns concerning the accuracy of the evidence and analysis used to support conclusions presented in **Table 5-2 Option evaluation**. It is hoped that you, the consultants, will see fit to review your report and take into consideration the comments below and make amendments as necessary.

One of my concerns is that the evaluations are too generalised to be of practical value in understanding the rationale underpinning the results in **Table 5-2**. It would be useful if you were to refine the evaluation elements of the table to provide some tangible numerical data based on your best estimates. For example, estimates of capital costs are of particular interest to enable a better understanding of the cost/ benefits trade-off. The table should additionally include a measure of your level of confidence expressed as a percentage probability (LOC xx%), for each option, that any proposal you submit will receive full regulatory approval.

Observations relating to the report.

Section 1-2, para. 2. The use of the word "ILLEGALLY" is a misnomer and misleading since it implies that legal action was taken when the current berm was constructed whereas no legal action either from the RVCA or any property holder actually occurred. This term should be removed from the document to avoid future confusion.

Section 1-2, table 1-2. What is the significance of the missing 12% in the sum of the Water Level Event Probability in column 1?

This table does not represent factual evidence upon which conclusions can be based with a reasonable level of confidence.

The assumed datum elevation of 134.51mASL is unsubstantiated and therefore invalid as a reference data point until the veracity of this value is established. Furthermore data for 2018 which is available was omitted from the evaluation of water levels. This omitted data may be more relevant to the current investigation than the other data presented in the report.

Figure 1-3. Conclusions from the Water Elevation Data presented will be flawed since the sampling intervals and periods are essentially random. Without some method of normalization of the data presented it is spurious and not a realistic basis to make meaningful predictions.

Table 2-1 Bass Lake Recorded Water Levels. The widely used reference to the water level recorded in the RVCA report of 1968 is not germane to the current situation. No indication of date, time or seasonal condition prevailing at the time of measurement was specified which makes this 133.8 mASL. This data point is a statistical outlier and should be discarded from the data table.

Personal Observations. Our property situated at the North Western extremity of Bass Lake adjacent to the lake outlet includes 350 feet of undeveloped shoreline with abundant natural habitat for wild life. We have owned this property (actually two adjacent properties) for approximately 10 years during which time we have observed considerable change in the population of various species of wildlife. Pairs of Canada Geese which used to have broods of 8- 12 chicks are reduced in numbers to two pairs this year with a total of 5 chicks. Black water snakes which used to bask in the sun on the shoreline, 5 - 7 at one time, have not been seen for three years. A Painted Turtle and one Snapping Turtle have been observed so far this year. For many seasons two Bass nests were productive but these have ceased to exist. The only thing that appears to be thriving is aquatic weeds which though small in size are now abundant whereas when we took up residence the lake bottom consisted mainly of silt overlaying rock strata. Although there is no established proof that these observed ecological effects are directly attributable to reduced lake water level I believe that further investigation is warranted to determine if water level is contributing factor.

Personal Conclusions.

It was noted that **Figure 3- 5** showed that 77% of respondents stated that water levels should be higher or maintained to match existing conditions. 79 of the respondents voted that seasonal high water levels in Bass Lake should be maintained to match existing condition. Ref. **Figure 3-6.**

The majority of respondents considered ecological issues to receive high priority during the evaluation process as evidenced in the **Summary of respondents' priorities for water level management.** I believe that these two survey results encapsulate the wishes of the majority of stakeholders and hope that the project will move forward on this mandate.



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Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS
1150 Morrison Drive, Suite 410, Ottawa, ON K2H 8S9
T 613-828-7800, F 613-828-2600, www.jp2g.com

Appendix D – Stakeholder Survey Data (see attachment)



Jp2g No. 18-5109A

August 30, 2019

Via e-mail

Mike Dwyer
Chief Administrative Officer
Township of Rideau Lakes, ON
613-928-2251 ext. 231
mdwyer@rideaulakes.ca

Attention: Mike Dwyer

Re: Bass Lake Outlet Investigation – Report Feedback and Revisions

1 INTRODUCTION

Jp2g Consultants Inc. was retained in early 2019 by The Township of Rideau Lakes to assess the existing outlet of Bass Lake; determine the full scope of resident and other stakeholder concerns; (both upstream and downstream); develop potential solutions; and provide an evaluation and recommendation of these possible solutions. In July 2019, Jp2g submitted a report to the Township detailing the assessment and consultation process as well as the recommended options to address the Bass Lake outlet issue. Following a period of public review and online feedback portal, the report was then revised and resubmitted to the Township. This follow-up report is intended to summarize the public feedback process, address common concerns, questions, or criticisms, and outline the changes made to the final report.

2 SUMMARY OF PUBLIC FEEDBACK AND JP2G COMMENT

2.1 Do you believe JP2G has fully captured the relevant background information in their report?

The majority of respondents (54%) did not think that the background information was satisfactory. Many commenters believe the water level data presented in the report to be unreliable or outdated and should therefore have not been included. Furthermore, the description of the berm as “illegal” was deemed inappropriate.

The time and budget constraints involved in the project precluded a detailed data collection phase and the scope of Jp2g’s contract did not include topographic survey or establishment of water levels of record. Therefore, the data provided initially by the Township was taken at face value, despite Jp2g not being able to independently verify the data sets. Note that detailed design or formal establishment of an acceptable water level range would likely require additional topographic survey and/or water level measurements, as well as a consultation/acceptance of a satisfactory level through the RVCA. Similarly, the description of the berm’s history provided in the initial project documents was used as opposed to independent verification of the berm’s initial condition. The term “illegal” was not intended to reflect any criminal prosecution, rather just that the berm had been constructed without due process and in contravention of regulations. Additional background information and context has been added to the report.



2.2 Do you believe the public consultation feedback summarized in the report accurately reflects the range of views and opinions of stakeholders?

43% of respondents did not think that the report accurately reflect the range of stakeholder opinions. The majority of comments took issue with the lack of consultation with BLPOA in creating the survey and the inclusion of the 133.8 m water level from RVCA circa 1968.

The methodology and execution of the analysis and consultation must not only be neutral and objective but must be seen to be as well. Therefore, the decision was made to create the consultation survey independently, with a broad scope of questions. For example, although no flooding of private or public roads was noted by BLPOA, the survey was nevertheless an appropriate forum to establish if this was an issue among stakeholders not represented by BLPOA. Similarly, if there were stakeholders on the lake not represented by BLPOA, it would not be fair to exclude them providing input on creating the survey if we were to provide that opportunity to BLPOA.

The RVCA data point from 1968 was provided in the project background and therefore included as an historical reference. It does not necessarily reflect the “preferred” water level for Bass Lake.

2.3 Do you believe that the option evaluation matrix and weighting developed by JP2G to assess the options was fair, balanced and prudent?

49% of respondents did not think the Jp2g assessment was fair, balanced, and prudent. The majority of comments expressed disappointment with the lack of consultation in creating the survey; confusion on the options presented; and frustration with errors in the report.

In finalizing the report in response to stakeholder feedback, additional detail was added to description of the proposed options and care was taken to avoid typographical errors. As noted in Section 2.2, the decision to not consult with stakeholders in creating the survey was deliberately made to avoid the appearance of undue influence by any one interest group.

2.4 Do you agree with JP2G’s recommendation in the report, being ‘Option 3 – Rocky Ramp Weir’?

Approximately half of the respondents (52%) did not agree with the recommended option of the Rocky Weir. The majority of comments indicated a preference for a new earthen berm or an outlet with active controls to manually adjust outflow from the lake.

Many of the comments seemed to be under the impression that a rocky weir would not provide an outlet control for the lake. Additional description of the rocky weir has been added to the report to clarify its functionality. Note that an outlet with active controls is an apparently popular option but was intentionally excluded from the analysis due to the associated higher security, inspection, and maintenance requirements.

2.5 If work is to be undertaken, what do you think would be a fair allocation of costs to parties involved/benefited?

It was found that the preferred funding model for an outlet control at Bass Lake would have the Province of Ontario and the Township of Rideau Lakes cover the majority of the cost (25-50 % each), with the remainder covered by local residents and perhaps businesses. Refer to the attached Response Summary document for a break down of responses.



2.6 Do you have other information or opinions you wish to share?

Many comments voiced frustration with the lack of action taken on this issue to date, noting impacts to wetlands, property values, and recreational use of the lake. A number of commenters took the opportunity to voice their support for the work done by BLPOA around this project. A few of the comments indicated their preferred water level, with one resident suggesting an absolute minimum surface elevation of 134.6 m and another suggesting an absolute maximum of 134.8 m.

3 CONCLUSION

Overall, the public feedback on the Outlet Investigation Report was decidedly mixed, with roughly half of respondents (45-55%) unhappy with the methodology or results. This is reflected in the comments as well, with several respondents indicating a frustration with the lack of specificity or perceived bias on the part of Jp2g. However, much of the frustration appears to have been due to a lack of clarity on the scope of Jp2g's contract. For example, many respondents indicated frustration that a final range of water levels has not yet been established, whereas this is anticipated to be completed during a detailed design phase. Similarly, data provided by the Township was presented neutrally but without independent verification, whereas many respondents seemed to think that additional survey and assessment would be taking place within the scope of the investigation report. Finally, it should be noted that rigorous consultation with any one stakeholder was intentionally avoided so as to maintain both the appearance and spirit of independence and objectivity. Unfortunately, this seems to have created the impression among some stakeholders that they have been ignored or undervalued.

A number of revisions to the final report have been made in response to public feedback, including additional details of the original berm as well as the proposed solutions. The wetlands around Bass Lake have also been added to the site description, and a number of small corrections or clarifications have been made according to specific feedback. Overall, Jp2g would like to acknowledge the significant public interest in this project and the valuable feedback provided. If you should have any questions or concerns, please do not hesitate to contact the undersigned. Trusting that this meets your requirements.

Yours truly,

Alex Sereda, P.Eng
Civil Engineer
Jp2g Consultants Inc.
alexs@jp2g.com

Stephen Arends, P.Eng.
Civil Project Manager
Jp2g Consultants Inc.
stephena@jp2g.com



Jp2g Consultants Inc.

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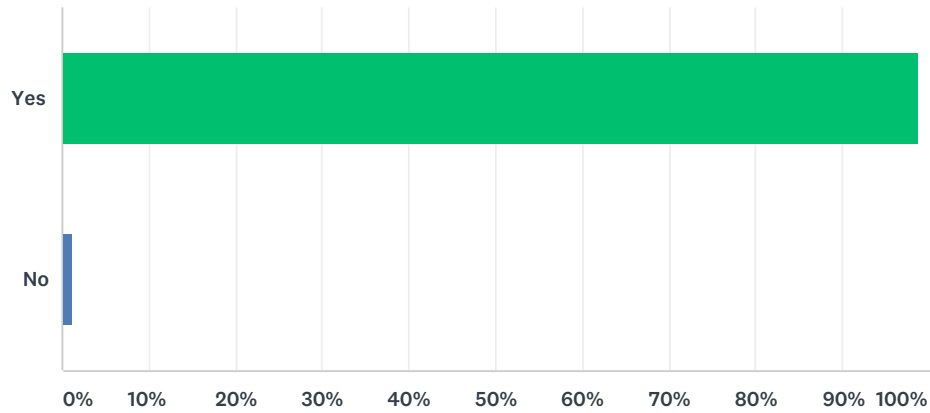
1150 Morrison Drive, Suite 410, Ottawa, ON K2H 8S9

T 613-828-7800, F 613-828-2600, www.jp2g.com

Schedule A – Public Feedback Survey Results

Q1 Are you a resident or property owner on Bass Lake?

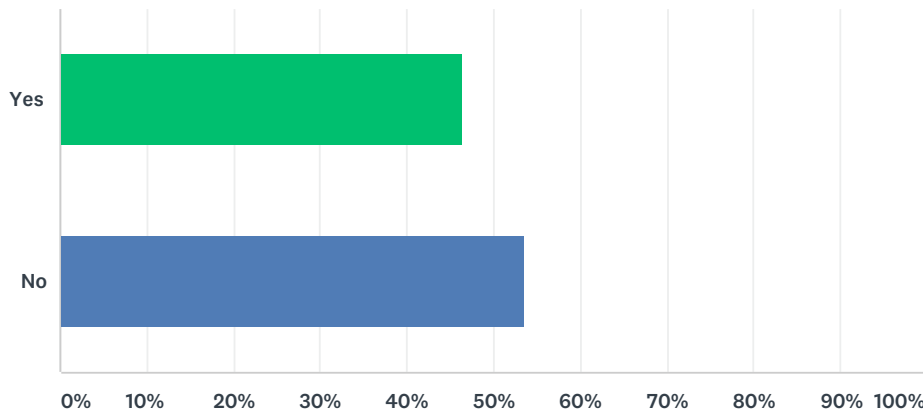
Answered: 82 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	98.78%	81
No	1.22%	1
TOTAL		82

Q2 Do you believe JP2G has fully captured the relevant background information in their report?

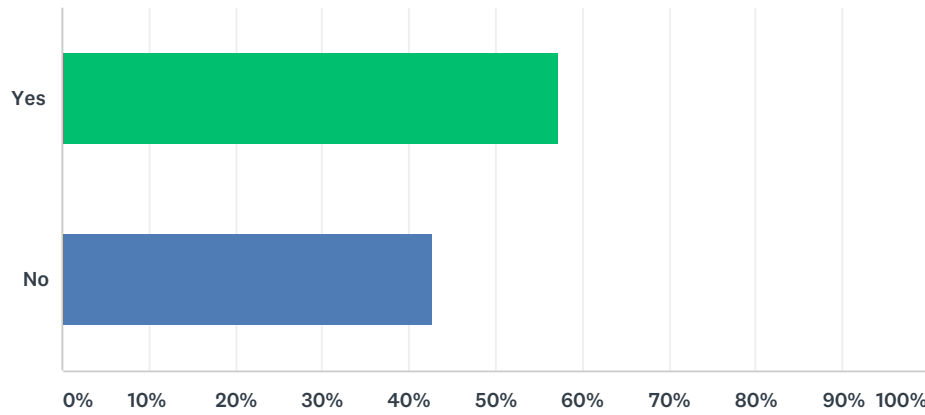
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ANSWER CHOICES	RESPONSES	
Yes	46.34%	38
No	53.66%	44
TOTAL		82

Q4 Do you believe the public consultation feedback summarized in the report accurately reflects the range of views and opinions of stakeholders?

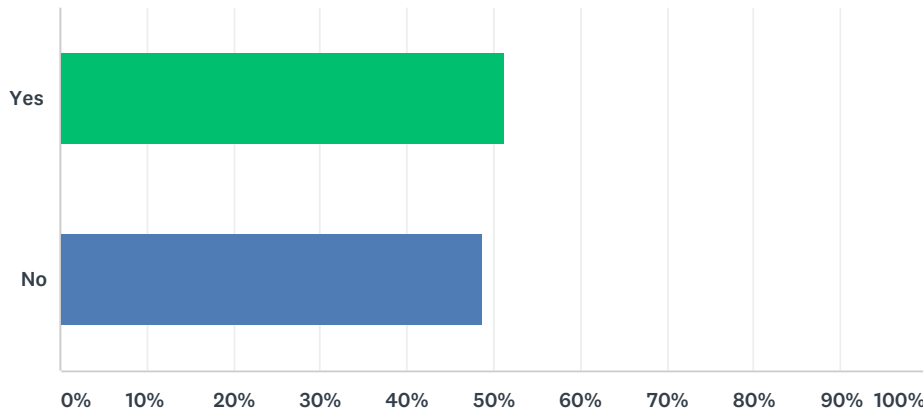
Answered: 82 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	57.32%	47
No	42.68%	35
TOTAL		82

Q6 Do you believe that the option evaluation matrix and weighting developed by JP2G to assess the options was fair, balanced and prudent?

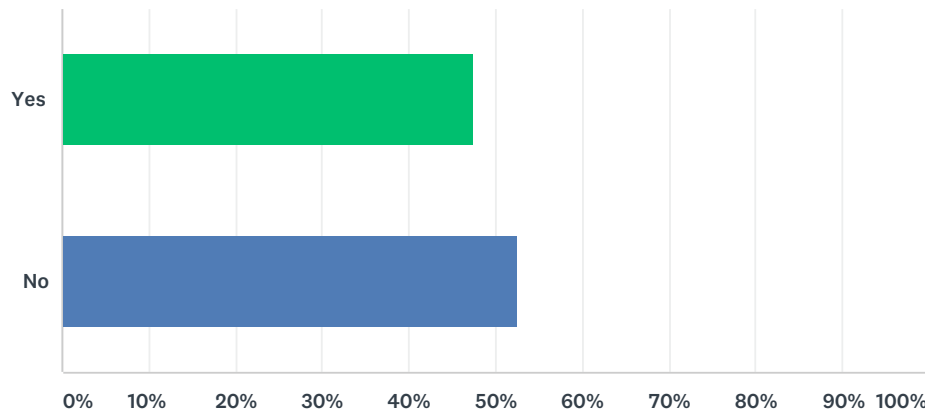
Answered: 82 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	51.22%	42
No	48.78%	40
TOTAL		82

Q8 Do you agree with JP2G’s recommendation in the report, being ‘Option 3 – Rocky Ramp Weir’?

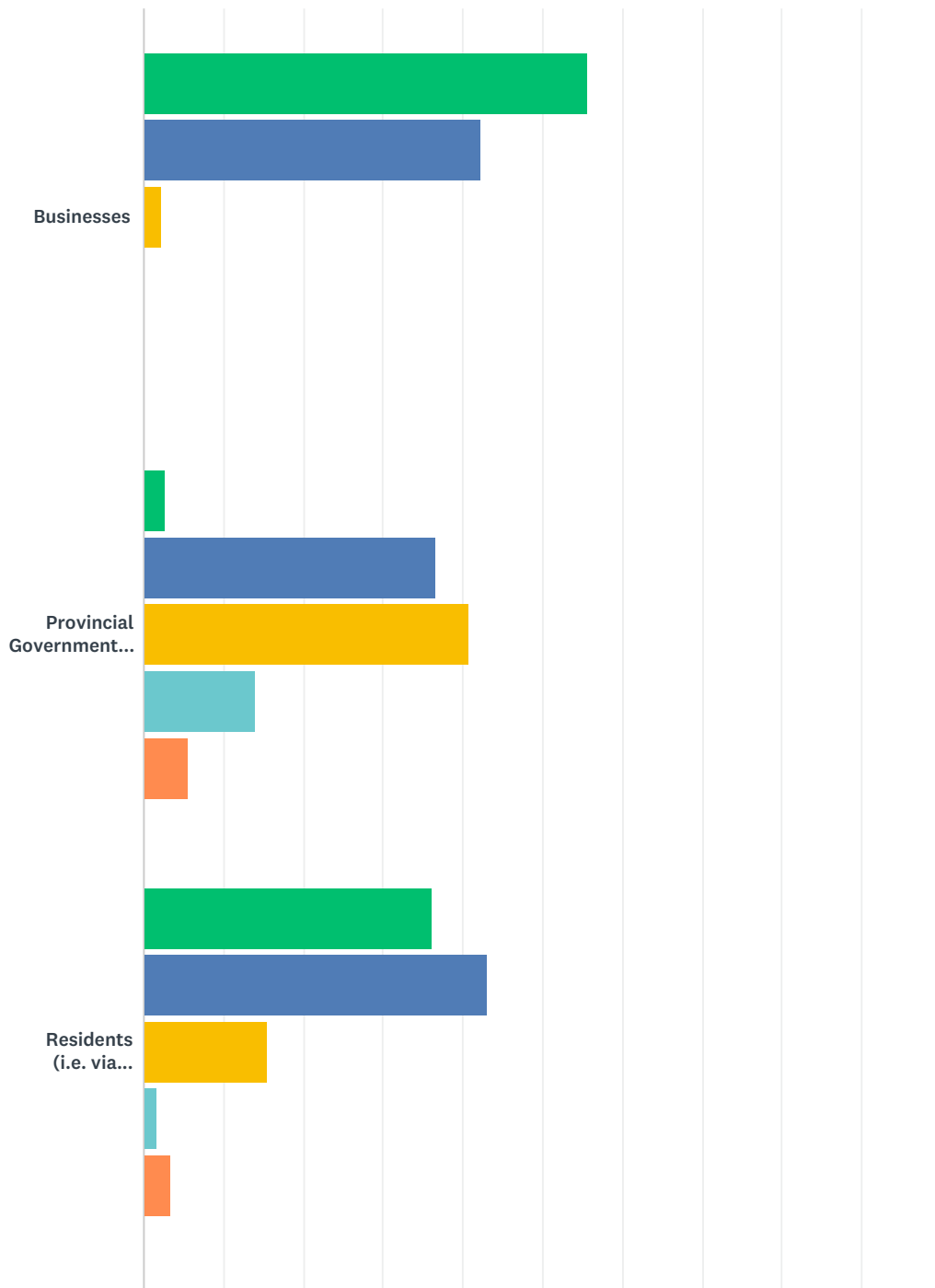
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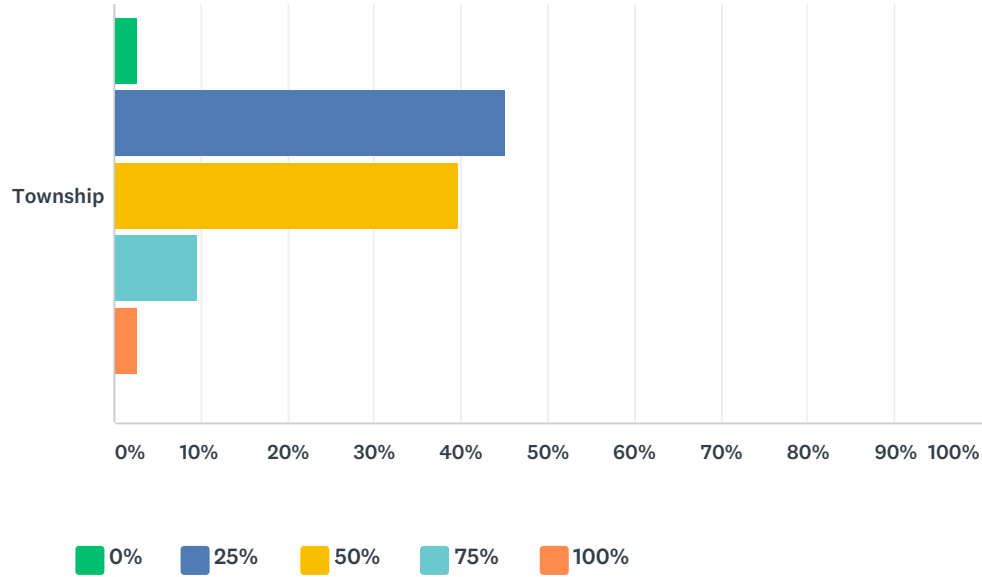


ANSWER CHOICES	RESPONSES	
Yes	47.56%	39
No	52.44%	43
TOTAL		82

Q10 The current earthen berm was built by a third party on private lands without approvals. Accordingly, ownership of the current berm and responsibility for water level control on Bass Lake is unclear. If work is to be undertaken, what do you think would be a fair allocation of costs to parties involved/benefited? Please Note: Conservation Authorities are funded via a municipal levy, so RVCA has not been separately identified as any share would be municipally funded.

Answered: 82 Skipped: 0





	0%	25%	50%	75%	100%	TOTAL
Businesses	55.56% 25	42.22% 19	2.22% 1	0.00% 0	0.00% 0	45
Provincial Government (MNR)	2.82% 2	36.62% 26	40.85% 29	14.08% 10	5.63% 4	71
Residents (i.e. via BLPOA)	36.21% 21	43.10% 25	15.52% 9	1.72% 1	3.45% 2	58
Township	2.74% 2	45.21% 33	39.73% 29	9.59% 7	2.74% 2	73