January 2, 2018

Mr. Stephen Giesbrecht
Borough Manager
P.O. Box 329
Petersburg Alaska 99833

Subject: Blind Slough Hydroelectric Project
Proposal for Facility Condition Assessment and Capital Improvement Plan

Dear Mr. Giesbrecht:

McMillen Jacobs Associates (McMillen Jacobs) is pleased to submit our proposal to conduct a condition assessment and develop a Capital Improvement Plan (CIP) for the Borough of Petersburg's (Borough's) existing Blind Slough Hydroelectric Project (Project). We have organized our letter proposal to include the following major elements:

- Project Understanding
- Workplan
- Budget and Schedule
- Key Staff

We have enclosed our standard Statement of Qualifications (SOQ) for dams and hydropower facilities for your consideration.

PROJECT UNDERSTANDING

We understand that the Borough has concerns about the general condition and remaining life of its existing Project, specifically the generation equipment. To address these concerns, the Borough intends to conduct a condition assessment of its existing Project to identify system deficiencies and corrective actions to provide a long-term, reliable Project operation. We also understand that the Borough is interested in determining the ultimate generation potential that could be achieved from the Project considering more expansive system modifications such as penstock upgrades as well as general equipment upgrades and associated capacity increases. We have prepared our proposed workplan to allow a sequential work effort, focusing first on determining the existing Project condition and deficiencies, followed by a more expansive review of potential system upgrades that would maximize the Project generation output. Our proposed workplan is presented in the next section of our proposal.

WORKPLAN

We have developed a workplan that provides an efficient execution of the proposed work tasks, affording the Borough the opportunity to review interim products, provide input on the work progress and direction, and develop a detailed CIP clearly identifying existing facility deficiencies, recommended modifications to address these deficiencies, and the estimated cost to implement. The CIP will include a suggested timeline that prioritizes the recommended plant improvements considering maintaining the hatchery water supply and minimizing the impact to generation.

Task 1 Data Collection and Review

Task 1 consists of collecting and reviewing the available data related to the existing Project. The data will include a review of the original construction drawings, generation history, and operation and maintenance logs from the Project. The data review is designed to develop a comprehensive understanding of the Project design basis, operation, and maintenance history. From this initial review, a list of questions and additional data request will be developed and provided to the Borough in preparation for the Task 2 work activities.

Deliverables:

- Bibliography of the data collected and used in the condition assessment.
- Identification of potential data gaps and approach to filling these gaps.
- List of questions to be discussed with the Project operator and manager during the Task 2 condition assessment.

Task 2 Field Site Visit, Operator and Manager Interviews, and Condition Assessment

With Task 2, the McMillen Jacobs team will conduct a site visit to inspect the existing Project, conduct operator and manager interviews, and complete the existing Project condition assessment. Our team will consist of our senior mechanical engineer, senior electrical engineer, and senior civil/structural engineer with the experience required to complete a thorough Project review and assessment. As part of this site visit, we will complete interviews with the Project operations staff. The interviews are designed to develop a firm understanding of the Project operation and maintenance history, identified deficiencies, and facility requirements.

A full inspection of the Project will be completed from the intake through the tailrace as part of this site visit. McMillen Jacobs will prepare site-specific forms that will be used to document the field observations and conditions encountered during the assessment. A photographic record will also be prepared.

Deliverables:

- Field visit attended by McMillen Jacobs' senior mechanical, electrical, and civil/structural staff.
- Pre-developed system condition assessment forms that will be completed in the field as part of the condition assessment.
- Interviews of the Project operators and managers.

Task 3 Generator Testing

The full scope of work of a generator condition assessment will be finalized after a site reconnaissance visit and gathering available information about the unit. Therefore, the evaluation will occur in two steps—Step 1) Engineering site visit and inspection, and Step 2) field testing of the unit (as recommended after the site visit)—requiring an anticipated 3-day outage. The initial site visit and inspection will determine critical information necessary to determine the need for and the selection of the appropriate testing to occur in Step 2. Prior to the site visit, we will request all available information, including any maintenance records that may exist.

Minimum unit field testing generally includes stator and rotor insulation testing (AC/DC hi-pot) and a core ELCID test, if possible. Field tests to be performed will be selected from the list recommended in the attached (excerpt) EPRI Handbook to Assess the Insulation Condition of Large Rotating Machines, Volume 16.

A condition assessment will generally consider the following eight factors:

1. The visual condition
2. The age
3. The installed technology level
4. The operating restrictions
5. Stator electrical tests
6. Rotor electrical tests
7. Stator core tests
8. The maintenance requirement

These eight condition parameters are evaluated based on testing and measurements, historical operations and maintenance (O&M) records, original design drawings, previous rehabilitation feasibility study reports if conducted, interviews with plant staff, and some limited inspections or previous inspections. McMillen Jacobs will provide a final recommendation and statement of the unit condition based on all the information available.

Visual inspection will be an important factor in determining generator condition, including the mechanical components as well as the insulation and core condition. However, if deemed necessary, insulation and core testing will provide the crucial information regarding the condition of these features of the generator.

We recommend an outage for initial site visit and inspection work, if possible. The project O&M staff would need to place the unit in a safe condition to allow the engineering inspection to be performed. This would require all necessary lock-out/tag-out (LOTO) preparation, including opening up the unit (removing end covers, etc.), disconnecting the leads or opening the generator breaker and ground, and

lightly cleaning the unit if needed using Simple Green solution on rags to wipe down the unit and allow visual inspection.

Inspection would include visual inspection of the following: generator frame, leads, winding end turns, jumpers, wedges, core, rotor poles, connections, and shaft. All sole plate anchors would be visually inspected and tightness checked. We also recommend an inspection of the generator bearings and shaft.

We recommend that the shaft/rotor connection area be tested by magnetic particle inspection and be performed under Step 2. Step 1 would allow a determination of what field testing is recommended and plan for the availability of the correct instrumentation and test devices. Step 2 should be performed by a testing firm that regularly performs the specific tests that will be recommended. McMillen Jacobs can assist in selecting the appropriate testing firm for Step 2.

The results of the field equipment testing will be summarized in a testing report. These reports will be presented as an appendix in the Task 4 report, and used to complete the condition assessment and related conclusions and recommendations.

Deliverables:

- Field testing of the existing generation equipment.
- Test reports documenting the field equipment testing results, which will be incorporated into the draft and final condition assessment report.

Task 4 Condition Assessment Report

The analysis, observations, and test results from Tasks 1 through 3 will be summarized in a condition assessment report. The report will be organized as presented in Table 1.

Table 1. Condition Assessment Report Draft Outline

Section	Description	Purpose
1	Introduction	Provides an overview of the Project purpose, objectives, authorization, and scope.
2	Project Description and Pertinent Data	Presents an overview of the Project, system components, operation, and pertinent data.
3	Condition Assessment	Summarizes the condition assessment for each component of the hydropower Project starting with the intake structure through the powerhouse and transmission line.
4	Conclusions and Recommendations	Outlines the conclusions from the data collection and analysis, condition assessment, and general findings of the existing system review along with recommendations for next steps.
5	References	Presents the references used in the completion of the work effort and development of the condition assessment report.

Section	Description	Purpose
Appendix A	Project Drawings	Contains the relevant as-constructed Project drawings.
Appendix B	Condition Assessment Forms	Contains the condition assessment forms used during the field review, operator and manager interview minutes, and photographs.
Appendix C	Equipment Test Report	Presents the test reports summarizing the test results of the existing generation equipment.
Appendix D	Existing Operation and Maintenance Data	Presents selected operation and maintenance data used in the analysis.

The report outline was developed to provide a logical, concise presentation of the work tasks, resulting in clear recommendations for the next steps related to potential facility upgrades. McMillen Jacobs will prepare a draft report for the Borough's review and comment. We anticipate that a review meeting will be held in Petersburg to present the report and discuss the conclusions and recommendations. The final report will then be prepared incorporating the Borough's comments.

Deliverables:

- Draft condition assessment report for Borough review.
- Review meeting at the Borough's office attended by our Project Manager, with technical staff participating by conference call and preparation of meeting minutes (budget included under Task 7.2, Meetings).

Final report incorporating the Borough's comments. One electronic copy and five hard copies will be provided to the Borough.

Task 5 Alternatives Development and Evaluation

Upon completion and approval by the Borough of the Task 4 condition assessment report, McMillen Jacobs will prepare alternatives for the existing Project rehabilitation and/or upgrade. The anticipated alternatives are listed in Table 2.

Table 2. Anticipated Alternatives

Alt. No.	Description	Purpose
1	No Action	Sets the baseline alternative that estimates the remaining facility life and risk of no action. Alternative 1 will represent the No Cost alternative for the purpose of comparing against other alternatives.
2	Address Critical System Facility Upgrades Only	Provides upgrades to those components that are determined to have a high potential for failure within a 5-year operating window and provides up to a 20-year operating life.
3	Complete Project Upgrade for Existing Generation Capacity	Provides upgrades for all system deficiencies and provides up to a 30-year operating life.

Alt. No.	Description	Purpose
4	Complete Project Upgrade to Maximize Generation Capacity	Implements system improvements designed to maximize the generation capacity of the Project, addresses all system deficiencies, and provides a minimum 30-year operating life.

The alternatives are designed to range from the minimum system upgrades to address critical infrastructure that could face imminent failure (Alternative 1), to complete system upgrade to maximize the Project's power production (Alternative 4). We anticipate that up to five conceptual level drawings will be prepared for each alternative to clearly illustrate the proposed alternative's components and features. Capital and operation and maintenance cost estimates will be prepared for each alternative. These estimates will then be used to determine the anticipated life cycle costs associated with the alternative. The alternatives will be evaluated using an evaluation matrix populated with a range of evaluation criteria including construction, regulatory and permitting, environmental impact during and post construction, impact to the existing hatchery operation, and cost. The analysis and conclusions will be summarized in a draft report submitted to the Borough for review and comment. The Federal Energy Regulatory Commission (FERC) requirements associated with each alternative will be clearly defined. A review meeting will be held at the Borough's office in Petersburg to present the alternatives analysis, conclusions, and recommendations. With the Borough's review comments incorporated, a final report will be issued with the recommended alternative identified for advancement.

Deliverables

- Draft alternatives report for Borough review.
- Review meeting at the Borough's office attended by our Project Manager, with technical staff participating by conference call and preparation of meeting minutes (budget included under Task 7.2, Meetings).
- Final report incorporating the Borough's comments. One electronic copy and five hard copies will be provided to the Borough.

Task 6 Capital Improvement Plan (CIP)

Based on the recommended alternative from Task 5, a detailed CIP will be developed. The CIP will provide a schedule that breaks down the recommended alternative into each work phase from initial planning, design, and permitting through final construction. A detailed schedule will be developed that illustrates the specific work sequence, required timeline, and cost. A multi-year CIP will be developed and provided to the Borough for review and comment. A conference call will be conducted with the Borough to review the CIP. The Borough's comments will then be incorporated and a final CIP issued to the Borough.

Deliverables:

- Draft CIP for Borough review and comment.
- Conference call with the Borough to review the draft CIP.

- Final CIP incorporating the Borough's comments. One electronic copy and five hard copies will be provided to the Borough.

Task 7 Project Administration and Meetings

Task 7.1 Project Administration

This task consists of the day-to-day administrative activities of our Project Manager and support staff in managing the Project. These activities include tracking the work budget and schedule, and preparing monthly progress reports.

Task 7.2 Meetings

Over the course of the work effort, we anticipate that a range of meetings will be conducted to ensure effective and efficient work execution, including the following:

- Bi-weekly Coordination Conference Calls using a Web-based format to present the work status, discuss technical issues, and coordinate efforts between the Borough and McMillen Jacobs. These meetings will be approximately 1 hour in length and be attended by the McMillen Jacobs technical team and the Borough staff. McMillen Jacobs will provide the agenda and action item list prior to each meeting.
- Monthly Project Status Conference Calls designed to review the schedule, budget, and work progress. These meetings are designed to facilitate communication between the Borough's and McMillen Jacob's Project Managers to ensure that the work effort is on schedule, budget, and interim work products are meeting the Borough's expectations. These meetings will be approximately 2 hours in length and will be conducted using a Web-based format.
- Submittal Review Meetings, which will occur for the draft condition assessment report and the draft alternatives report. These meetings will be held in the Borough's office in Petersburg and will be attended in person by McMillen Jacobs' Project Manager, with our technical team participating via conference call. A conference call will be held to review the draft CIP.

Following each formal meeting and call, McMillen Jacobs will prepare meeting minutes documenting the major discussion topics and will provide the minutes to the Borough for review and comment within 5 working days of the meeting.

BUDGET AND SCHEDULE

Estimated Budget

The enclosed Table 5 presents our estimated budget to complete Tasks 1 through 7 as outlined in our proposed workplan. The budget provides the estimated labor hours and direct expenses associated with each proposed work task. Our proposed hourly labor rates for each staff member are presented within the budget table along with the total hours for each staff member.

Schedule

The proposed milestone schedule is presented in Table 3. We anticipate that the condition assessment can be completed within 56 days of receiving Notice to Proceed (NTP), depending on the availability of the generator testing subconsultant and the ability to schedule an outage of the Project.

Table 3. Proposed Milestone Schedule

Task No.	Description	Task Duration (calendar days)	Days to completion following Notice to Proceed (calendar days)
	NTP	0	0
1	Data Collection and Review	21	21
2	Field Site Visit, Operator and Manager Interviews, and Condition Assessment	14	35
3	Generator Testing	14	35
4	Condition Assessment Report	21	56
5	Alternatives Development and Evaluation	35	91
6	Capital Improvement Plan (CIP)	21	102
7	Project Administration and Meetings	NA	NA

KEY STAFF

McMillen Jacobs' key staff were selected to provide the Borough with the specialized hydropower design, operation, and construction personnel required to efficiently conduct a condition assessment study. Our team has hands-on experience in working around existing hydropower facilities, ensuring that the Borough will be provided with a thorough condition assessment report that clearly identifies the system deficiencies and required corrective actions. The subsequent alternatives report will then present the range of alternatives, recommended alternative, and CIP that will provide the optimum configuration and life cycle cost. Table 4 presents our key team members and their unique qualifications for your Project. Full resumes are also enclosed. These key team members will be assisted, as required, by the full complement of in-house technical resources including engineering, regulatory and permitting, cost estimators, construction, and support staff.

Table 4. Key Staff Members

Name	Role	Qualifications
Mort McMillen	Principal-in-Charge	• Technical and management skills from planning through startup and operations • New and rehabilitation of hydro (4 to 140 MW) • Designed and/or constructed all components of hydro facilities including penstocks, spillways, powerhouses, etc. • Extensive Alaska experience
Don Jarrett	Project Manager and Senior Mechanical Engineer	• Past operations and maintenance manager for multiple hydroelectric projects • Extensive experience with hydro projects in Alaska • Project manager for multiple new and existing hydro projects • Completed over 20 hydro condition assessment reports
Matt Lawson	Senior Electrical Engineer	• 25 years of electrical and instrumentation design of hydro plants • Hands-on experience with field startup, commissioning, and operation of hydro plants
Matt Moughamian	Senior Civil Engineer	• 30 years of experience with design and construction of hydraulic structures, gates, valves, and penstocks • Extensive experience in Alaska with hydro projects
Kevin Jensen	Civil/Hydraulics Engineer	• 15 years of experience with hydraulic and hydrologic analysis supporting hydro projects • Supported the analysis and preliminary design of over 20 hydro studies • Experience in Southeast Alaska
Heidi Wahto	Regulatory/Permitting	• Native of Juneau, Alaska, bringing hands-on experience in Southeast Alaska • Completed numerous Federal Energy Regulatory Commission (FERC) licensing support projects in Alaska • Completed full range of permitting for multiple hydro projects in Alaska

SUMMARY

We appreciate the opportunity to provide this letter proposal for a condition assessment, alternatives assessment, and CIP development for your Blind Slough Hydroelectric Project. If you have questions on our proposal or require additional information, please do not hesitate to contact me at (208) 342-4214.

Sincerely,

Morton D. McMillen

Morton D. McMillen, P.E.
Executive Vice-President

cc: Mark Jensen, Borough Mayor, Petersburg Alaska
Don Jarrett, Senior Mechanical Engineer, McMillen Jacobs Associates
Mara McMillen, Chief Operating Officer, McMillen Jacobs Associates

Encls.