



WILSON OKAMOTO
CORPORATION
INNOVATORS • PLANNERS • ENGINEERS

10238-02
August 28, 2017

Alexander & Baldwin, LLC
822 Bishop Street
P.O. Box 3440
Honolulu, HI 96813-3440

SUBJECT: SUPPLEMENTAL PROPOSAL FOR PROFESSIONAL SERVICES
Planning
State of Hawaii Water Lease
Draft and Final Environmental Impact Statement (EIS)
East and Central Maui, Hawaii

Dear Sir/Madam:

Wilson Okamoto Corporation is pleased to provide this supplemental proposal to our existing proposal dated September 14, 2016, which was accepted on September 29, 2016. That proposal encompassed the preparation and processing of an Environmental Impact Statement Preparation Notice (EISPN) for the subject project and estimated the fee for preparing and processing the Draft and Final EIS. This supplemental proposal encompasses the scope of services and fee for preparing and processing the Draft and Final EIS.

Our services, including sub consultants, shall include:

Wilson Okamoto Corporation Services

- o Planning – Draft and Final EIS Preparation & Processing

Sub-consultant Services

- o Water Resources, Hydrology, Civil Engineering - Akinaka & Associates LTD.
Existing EMI System Documentation and Condition Assessment
Hydrology and Flood Hazard Assessment

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- o Marine Environment/Resource Impact Assessment -
Dr. Eric De Carlo Consultant
Research / Impact Evaluation / EIS Report Preparation
Marine Research Consultants Inc.
Water Chemistry / Marine Biota / Sediment / Remote Sensing Habitat Mapping
Sea Engineering Inc.
Marine Biology / Water Chemistry Field Investigations
Bathymetry / Oceanographic Assessment for EIS
- o Stream Evaluation - Trutta Environmental Solutions
Hawaiian Stream Habitat Evaluation Procedure (HSHEP) Models for East Maui Streams
- o Terrestrial Biota Impact Assessment- SWCA
EIS Report
Terrestrial Flora and Fauna Field Surveys
Megalagrion Damselflies / Mosquito-borne impacts to Native Birds
- o Economic Impact Assessment
Munekiyo Hiraga
Economic and Fiscal Impact Analysis Report
Plasch Econ Pacific, LLC
Agricultural Impact Assessment
- o Archaeological/Historic/Cultural Resources / Impacts
Cultural Surveys Hawai'i
Archaeological Literature Review and Field Inspection
Cultural Impact Assessment
Mason Architects
Intensive Level Architectural Inventory Survey
- o Social Impact Assessment - Earthplan

For the purposes of this Proposal, Alexander & Baldwin, LLC shall be referred to as the "CLIENT", Wilson Okamoto Corporation as the "CONSULTANT", and State of Hawaii Water Lease Draft and Final Environmental Impact Statement (EIS) shall be referred to as the "PROJECT". Wilson Okamoto Corporation General Terms and Conditions for Consultant Services are attached to this proposal as Attachment "A".

It is understood and agreed that CONSULTANT'S work on this Project and communications with CLIENT are confidential unless and until such time as disclosures are required by law or directed by CLIENT. The nature and extent of the disclosures to be made shall be coordinated with and approved by CLIENT.

CONSULTANT shall retain sub-consultants in consultation with and upon terms and conditions approved by CLIENT.

PROJECT DESCRIPTION

In May 2001, Alexander & Baldwin, Inc. and East Maui Irrigation Company, Ltd. (collectively "A&B") filed an application for the Sale of Lease at Public Auction with the Board of Land & Natural Resources (BLNR) seeking a long-term 30-year lease for the "right, privilege, and authority to enter and go upon" the Nahiku, Keanae, Honomanū, and Huelo license areas "for the purpose of developing, diverting, transporting, and using government-owned waters." Compliance with the requirements of Chapter 343, Hawaii Revised Statutes (HRS) is necessary prior to the BLNR's consideration of the long-term lease request. One "trigger" for compliance with Chapter 343, HRS environmental review is the use of state lands.

On June 9, 2016, A&B submitted an Environmental Impact Statement Scope of Work prepared by Munekiyo Hiraga (the BLNR EIS Scope Document) to the BLNR pursuant to an order issued by the BLNR on April 14, 2016. On July 8, 2016, the BLNR issued an order referring to the BLNR EIS Scope Document and stating that A&B "should proceed with the preparation of an environmental impact statement (EIS) in as expeditious manner as possible." CLIENT has retained CONSULTANT to proceed with the preparation of an EIS as directed by the BLNR.

To date, the CONSULTANT has prepared and filed the EISPN and has rendered consultation and coordination efforts toward the preparation of the Draft EIS.

SCOPE OF SERVICES

The proposed scope of services shall include the preparation and processing of the Draft and Final EIS. Services provided under the accepted proposal dated September 14, 2016 will terminate upon acceptance of this proposal. The remaining scope of service item under the accepted proposal, to prepare response letter to comments received on the EISPN, has been transferred to the scope of services in this proposal.

PHASE I – DRAFT EIS

Task A: Draft EIS – Pre-IIFS Decision

The Draft EIS for the water lease will be based on the amount of water allowed to be diverted from 27 streams in the license areas, as summarized in Table 3 of the BLNR EIS Scope Document. That amount will be determined, in part, by the CWRM's amendment to the Interim Instream Flow Standards (IIFS) for the streams named in the 27 petitions filed by the Native Hawaiian Legal Corporation (NHLC) in behalf of various petitioners. It is anticipated that the CWRM will issue their IIFS decision in the latter part of 2017. Pending that decision, portions of the Draft EIS that are not dependent on it can be prepared. These may include portions of the Draft EIS and sub-consultant studies pertaining to existing conditions. The scope of services includes:

1. Prepare responses to comment letter received on the EISPN.
2. Coordinate preparation of those portions of the various sub-consultant studies that are not dependent on the IIFS decision.
3. To the extent feasible prior to the IIFS decision, prepare appropriate portions of the Draft EIS based on the project objectives, available plans for diversified agriculture operations on Hawaiian Commercial & Sugar Co. (HC&S) land, and in consideration of comments received in response to the EISPN. Organize and present with appropriate text, tables and figures, the available information as a partial Draft EIS complying with applicable content requirements of Section 11-200-17, HAR.
4. Submit the partial Draft EIS to the CLIENT for review and comment and revise it accordingly.

Task B: Draft EIS – Post-IIFS Decision

Following the IIFS Decision, complete the Draft EIS and supporting studies based on the streamflow standards established in the IIFS Decision.

1. Coordinate completion and review of the various sub-consultant studies based on the IIFS decision.
2. Complete a preliminary Draft EIS incorporating the completed sub-consultant studies and complying with the Draft EIS content requirements of Section 11-200-17, HAR. Submit the preliminary Draft EIS to the Client for review and comment.
3. Revise the preliminary Draft EIS based on comments by the CLIENT.
4. Provide a revised preliminary Draft EIS to DLNR staff for review and comment, and revise accordingly.

5. Coordinate filing of the Draft EIS by DLNR with the OEQC for processing.
6. Prepare a mailing list and notification letter advising potentially interested agencies and organizations that the Draft EIS is available for review and where an electronic copy can be downloaded. The mailing list will be based on the OEQC's recommended Draft EIS consultation list with appropriate additions that may be identified through the community outreach process and EISPN review, and will be verified by OEQC prior to mailing. Following review by the CLIENT and DLNR, distribute the notification.

The Draft EIS will be available for downloading from OEQC's website. An additional file transfer protocol (ftp) for the project site could also be created for downloading the Draft EIS.

7. Prepare up to 5 (five) hard copies of the Draft EIS and ten (10) electronic copies on compact disc (CD) upon CLIENT'S request for distribution to reviewing parties who lack internet access and, therefore, request an alternative format.

PHASE III - FINAL EIS

1. Prepare draft responses to comments received during the Draft EIS comment period for CLIENT review. Based on comments received, prepare final letters and coordinate their distribution.
2. In consideration of comments received in response to the Draft EIS, prepare a Final EIS in compliance with the content requirements of Section 11-200-18, HAR. Submit the preliminary Final EIS to the CLIENT for review and comment.
3. Revise the preliminary Final EIS based on comments by the CLIENT.
4. Submit the revised preliminary Final EIS to DLNR staff for review and comment and revise the document accordingly.
5. Coordinate filing of the preliminary Final EIS with the DLNR and with the OEQC for publication in the Environmental Notice.
6. Prepare a mailing list and notification letter advising potentially interested agencies and organizations that the preliminary Final EIS has been filed for acceptance, is available for review and where an electronic copy can be downloaded. The mailing list will be based on the OEQC's recommended Draft EIS consultation list with appropriate additions that may be identified through the EISPN comment and Draft EIS review. The mailing list will be verified by OEQC prior to mailing. The preliminary Final EIS will be available for downloading from OEQC's website. An additional project ftp site could also be created for downloading the preliminary Final EIS. Following review by the CLIENT and DLNR, distribute the notification.

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7. Prepare up to 5 (five) hard copies of the Final EIS and ten (10) electronic copies on compact disc (CD) upon CLIENT'S request for distribution to reviewing parties who provided substantive comments on the Draft EIS but lack internet access and, therefore, have requested an alternative format.
8. Attend a public meeting at the BLNR on acceptance of the preliminary Final EIS.
9. Monitor BLNR's notice of acceptance to the OEQC for publication in the Environmental Notice.

Items to be provided by others

1. Information regarding the purpose and need and description of the proposed uses of the water, including available supporting technical information.
2. Information regarding existing stream diversion infrastructure that may be affected and their adequacy.

Items Excluded from Scope of Services

1. Preparation of an environmental document (EA, EIS, etc.) meeting federal National Environmental Policy Act (NEPA) requirements.
2. Preparation and processing of permits.

SCHEDULE OF SERVICES

The time schedule for the proposed scope of services should proceed according to the following time estimates, exclusive of review periods, significant changes, or other delays beyond the control of the CONSULTANT.

<u>Phase/Task</u>	<u>Estimated Time</u>
PHASE I – DRAFT EIS	
Task A: Draft EIS – Pre-IIFS Decision	To the extent feasible prior to the IIFS decision (anticipated in the latter half of 2017).
Task B: Draft EIS – Post-IIFS Decision	6 months after IIFS Decision.
PHASE II – FINAL EIS	3 months after Draft EIS Comment Period.

COMPENSATION FOR PROFESSIONAL SERVICES

For the services outlined above, the CLIENT shall compensate the CONSULTANT according to the terms and conditions of this Agreement. Sub-consultant fees are excluded from this proposal.

Fixed Fee

Compensation will be on a fixed fee basis for the preparation and processing of the Draft EIS. A detailed worksheet outlining this Fee proposal is included as Attachment “B”.

<u>Phase/Task</u>	<u>Amount</u>
PHASE I – Draft EIS	
Task A: Draft EIS – Pre-IIFS Decision	\$ 42,050.00
Task B: Draft EIS – Post-IIFS Decision	<u>\$ 101,450.00</u>
Fixed Fee Subtotal	\$ 143,500.00
Tax (4.166%)	\$ 5,978.21
Total Fixed Fee	<u>\$ 149,478.21</u>
SAY	<u>\$ 149,000.00</u>

Time and Expenses

Compensation will be on a time and expenses basis, with a budget amount for project coordination / sub-consultant coordination services with the CLIENT during Phase I, including continued participation in weekly EIS Project Team meetings.

In addition, a budget amount for the preparation and processing of the Final EIS and continuing project coordination / sub-consultant coordination services with the CLIENT during Phase II is also offered.

The hourly rates indicated in Attachment "C" will be applied to the actual number of hours expended by the respective personnel.

The CONSULTANT will keep the CLIENT informed monthly of the time expended and expenses incurred and shall advise the CLIENT of any additional or unforeseen costs. No costs in excess of the approved budget will be incurred or services rendered without the prior approval of the CLIENT. The budgeted amounts below include applicable taxes.

<u>Phase/Task</u>	<u>Estimated Cost</u>
PHASE I: Draft EIS	
1. Project Coordination (12 Months)	\$ 145,000.00
PHASE II: Final EIS	
1. Prepare responses to Draft EIS comments	\$ 20,000.00
2. Prepare and file Final EIS with DLNR, coordinate its publication by OEQC and attend the BLNR meeting(s) on its acceptance	\$ 40,000.00
3. Project Coordination	<u>\$ 35,000.00</u>
Phase II Total	\$ 95,000.00
Time and Expenses Budget Ceiling	\$ 240,000.00
<u>Cost Summary</u>	
PHASE I: Draft EIS (Fixed Fee)	\$ 149,000.00
Project Coordination (Time & Expenses Budget)	\$ 145,000.00

PHASE II: Final EIS (Time & Expenses Budget) \$ 95,000.00

Total WOC Labor (Fixed Fee and Time & Expenses Budget) \$ 389,000.00

Sub-Consultant Services

- Engineering Support Services \$ 175,000.00
 (Akinaka & Associates, Ltd. – See Attachment “D”)
- Cultural Impact Assessment \$ 204,407.92
 (Cultural Surveys Hawaii – See Attachment “E”)
- Archaeological Literature Review and Field Inspection \$ 86,887.09
 (Cultural Surveys Hawaii – See Attachment “F”)
- Architectural Inventory Survey \$ 16,732.00
 (Mason Architects – See Attachment “G”)
- HSHEP Modeling \$ 298,701.21*
 (Trutta Environmental Solutions– See Attachment “H”)
- HSHEP Field Surveys \$ 62,499.60*
 (Trutta Environmental Solutions– See Attachment “H”)
- Additional work for HSHEP (Damselfly and Mosquito) \$ 22,068.61*
 (Trutta Environmental Solutions– See Attachment “H”)
- Marine Environmental Resource Assessment \$ 398,962.75
 (Marine Research Consultants Inc. / Sea Engineering Inc.
 – See Attachment “I”)
- EIS Biological Support Services \$ 93,128.57*
 (SWCA Environmental Consultants – See Attachment “J”)
- Social Impact Assessment \$ 82,520.00
 (Earthplan – See Attachment “K”)
- Economic-Fiscal Impact Assessment \$ 142,160.00
 (Munekiyo-Hiraga – See Attachment “L”)

*GE Tax Included (not eligible for Subcontractor Deduction)

SUBTOTAL SUB-CONSULTANT SERVICES	\$1,583,067.75
CONTINGENCY BUDGET Additional HSHEP Field Surveys (Trutta Environmental Solutions - See Attachment "H")	\$ 140,000.00
TOTAL SUB-CONSULTANT (With Contingency Budget)	<u>\$1,723,067.75</u>
GRAND TOTAL - WOC Labor (Fixed Fee and Time & Expenses Budget) and Sub-Consultant Services (with Contingency Budget)	<u>\$2,112,067.75</u>

Reimbursable Expenses

A 15% service charge will be applied to all reimbursable expenses.

Travel, Airfare, Car Rental, Parking and Other Out-of-Pocket Costs	<u>\$ 5,000.00</u>
Total Reimbursable Expenses	\$ 5,000.00

ADDITIONAL SERVICES/AMENDMENTS

Additional services that are not part of this Agreement will be undertaken by the CONSULTANT by separate agreement and at the direction of the CLIENT.

Any significant increase or decrease in the scope of work, or significant time delays beyond the control of the CONSULTANT, shall be subject to a mutually agreed upon amendment to this fee proposal.

AGREEMENT

Your signature on the enclosed copy of this letter and its return to our office will constitute approval of the foregoing terms, and serve as our written notice to proceed.

This fee proposal is firm for a period of thirty (30) days. After September 27, 2017, the specific terms of this proposal are subject to change.

Please call Earl Matsukawa or myself if you have any questions.

Sincerely,

WILSON OKAMOTO CORPORATION

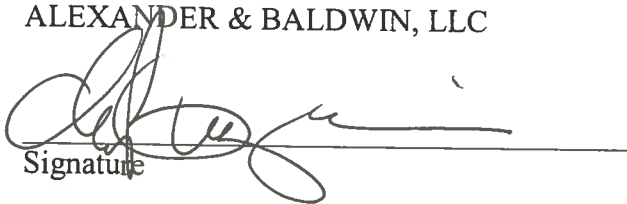

Gary T. Okamoto
President


Earl Matsukawa, AICP
Vice President, Director Planning

GO/EM/jm

AGREED AND ACCEPTED:

ALEXANDER & BALDWIN, LLC


Signature

9-1-17
Date

Printed Name

Title

ATTACHMENT A

General Terms and Conditions for Consultant Services

GENERAL TERMS AND CONDITIONS FOR CONSULTANT SERVICES
Wilson Okamoto Corporation

1. BILLING AND PAYMENT

Invoices will be issued every four weeks for work completed to date, payable upon receipt, unless otherwise agreed. Interest of 1-1/2% per month (but not exceeding the maximum rate allowable by law) will be payable on any amounts not paid within 30 days, payment thereafter to be applied first to accrued interest and then to the principal unpaid amount. Any attorney's fees or other costs incurred in collecting any delinquent amount shall be paid by the Client. If 60 days in arrears, the Consultant may, after giving seven days written notice to Client, suspend services under this Agreement until the Consultant has been paid in full all amounts due for services and expenses.

2. CLIENT'S RESPONSIBILITIES

Client shall provide all criteria and full information as to Client's specific requirements for the Project, designate a person to act with authority on Client's behalf in respect of all aspects of the Project, examine and respond promptly to our submissions, and give prompt written notice to the Consultant whenever any defect in the work is observed or becomes otherwise evident.

3. OUTSIDE AGENCIES

If Federal funds, foundation grants, or multi-agency involvement require a more than normal number of submissions, or if controversy unknown at this time results in a more than normal number of meetings, the fee and schedule will be renegotiated accordingly.

4. LIMITATION OF LIABILITY

In recognition of the relative risks and benefits of the Project to both the Client and the Consultant, the risks have been allocated such that the Client agrees, to the fullest extent permitted by law, to limit the liability of the Consultant and all of its officers, employees, agents and subconsultants (the Consultant Parties) for any and all claims, losses, costs, damages of any nature whatsoever or claims expenses from any cause or causes, including attorney's fees and costs and expert witness fees and costs, so that the total aggregate liability of the Consultant and the Consultant Parties shall not exceed the greater of \$2,112,067.75, or the aggregate amount of fees paid to Consultant under this Agreement, as the same may be amended. It is intended that this limitation apply to any and all liability or cause of action however alleged or arising, unless otherwise prohibited by law.

5. INSURANCE

The Consultant shall maintain during the performance of professional services, if reasonably available, (1) statutory Workers' Compensation Employer's Liability coverage; (2) Comprehensive General/Professional and (3) Automobile liability insurance coverage.

6. ACCESS TO SITE

Unless otherwise agreed and as required, Client will furnish right-of-entry on the land and into structures for the Consultant to carry out tasks consistent with the scope of work in the attached proposal, which right of entry shall include provisions for Consultant to provide certain insurance coverages and indemnify Client from any and all claims arising out of Consultant's and the Consultant Parties' actions on the land and in structures. The Consultant will take reasonable precautions to minimize any damage from use of any equipment but have not included in the fee the cost for restoration of any damage which may result from project operations.

10238-02 State of Hawaii Water Lease EIS
Rev. 8/2012

7. JOBSITE SAFETY

Neither the professional activities of the Consultant nor the presence of the Consultant or his or her employees and subconsultants at a construction site, shall relieve the General Contractor and any other entity of their obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending or coordinating all portions of the Work of construction in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. The Consultant and his or her personnel have no authority to exercise any control over any construction contractor or other entity or their employees in connection with their work or any health or safety precautions. The Client agrees that the General Contractor is solely responsible for jobsite safety, and warrants that this intent shall be made evident in the Client's agreement with the General Contractor. The Client also agrees that the Client, the Consultant, and subconsultants shall be indemnified and shall be made additional insureds under the General Contractor's general liability insurance policy.

8. SERVICES BY OTHERS

Specialized services by subconsultants or other technical entities such as land surveying, soils engineering, landscape architecture, archaeology, etc. may be required. When considered necessary, these firms or other consultants may be utilized with your approval, and the cost of such services will be included in our invoice with a 10-percent markup if we pay their billings on behalf of the Owner. We prefer to have the Client pay such bills directly with our written approval for payment. In certain instances as required by State law, applicable State general excise tax will be added to the total fee.

9. HAZARDOUS MATERIALS

It is acknowledged by both parties that the Consultant's scope of services does not include any services related to asbestos or hazardous or toxic materials. In the event the Consultant or any other party encounters asbestos or hazardous or toxic materials at the jobsite, or should it become known in any way that such materials may be present at the jobsite or any adjacent areas that may affect the performance of the Consultant's services, the Consultant may, at his or her option and without liability for consequential or any other damages, suspend performance of services on the project until the Client retains appropriate specialist consultant(s) or contractor(s) to identify, abate and/or remove the asbestos or hazardous or toxic materials, and warrant that the jobsite is in full compliance with applicable laws and regulations.

10. ASSIGNMENT

Neither party to this Agreement shall transfer, sublet or assign any rights under or interest in this Agreement (including but not limited to monies that are due or monies that may be due) without the prior written consent of the other party. This requirement, however, shall not apply to work or services performed by WOC Technical Services, Inc., a wholly owned subsidiary of Wilson Okamoto Corporation.

11. TERMINATION

This Agreement may be terminated by the Client or the Consultant upon giving the other party fourteen (14) calendar days prior written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof through no fault of the terminating party. The Client shall within thirty (30) calendar days of termination pay the Consultant for all services rendered and all costs incurred up to the date of termination, in accordance with the compensation provisions of this Agreement.

12. OPINIONS OF PROBABLE COST

In providing opinions of probable construction cost, the Client understands that the Consultant has no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing, and that the opinions of probable construction costs provided herein are to be made on the basis of the Consultant's qualifications and experience. The Consultant makes no warranty, expressed or implied, as to the accuracy of such opinions as compared to bid or actual costs. If prior to the Bidding or Negotiating Phase, the Client wishes greater assurance as to Project or Construction Cost, he shall employ an independent cost estimator. Services to modify the Contract Documents to bring the Construction Cost within any limitation established by the Client will be considered Additional Services and paid for as such by Owner at a fee to be agreed upon by Client and Consultant.

13. OWNERSHIP OF DOCUMENTS

All reports, plans, specifications, field data and notes and other documents, including all documents on electronic media, prepared by the Consultant as instruments of service shall remain the property of the Consultant. Consultant hereby grants to Client a nonexclusive license to reproduce Consultant's instruments of service for purposes of designing, administering, using and maintaining the Project, provided that Client shall comply with all obligations, including prompt payment of all sums due under the Agreement.

14. UNAUTHORIZED CHANGES

In the event the Client consents to, allows, authorizes or approves of changes to any plans, specifications or other construction documents, and these changes are not approved in writing by the Consultant, the Client recognizes that such changes and the results thereof are not the responsibility of the Consultant. Therefore, the Client agrees to release the Consultant from any liability arising from the construction, use or result of such changes. In addition, the Client agrees, to the fullest extent permitted by law, to indemnify and hold the Consultant harmless from any damage, liability or cost (including reasonable attorneys' fees and costs of defense) arising from such changes, except only those damages, liabilities and costs arising from the sole negligence or willful misconduct of the Consultant.

15. MEDIATION

In an effort to resolve any conflicts that arise during the design or construction of the Project or following the completion of the Project, the Client and the Consultant agree that all disputes between them arising out of or relating to this Agreement shall be submitted to nonbinding mediation unless the parties mutually agree otherwise.

16. ATTORNEY'S FEES

In the event the Client makes a claim against Wilson Okamoto Corporation, for any alleged error, omission or other act arising out of the performance of its professional services, and to the extent the Client fails to prove such claim, then the Client shall pay all costs, including attorney's fees, incurred by the Consultant in defending itself against the claim.

17. GOVERNING LAW

This Agreement shall be interpreted and enforced according to the laws of the State of Hawaii, unless agreed otherwise. If any part of this Agreement is found to be invalid by a court of competent jurisdiction, the remainder of the provisions shall remain in full force and effect and shall in no way be affected, impaired or invalidated.

10238-02 State of Hawaii Water Lease
Rev. 8/2012

ATTACHMENT B

Wilson Okamoto Corporation
Fixed Fee Worksheet – Phase I

Fee Proposal and Labor Requirements

State of Hawai'i Water Lease: Draft Environmental Impact Statement

WOC Job No.: 10238-01
August 24, 2017

Prepared By: Wilson Okamoto Corporation

PART I - WOC Labor

Task /	Team Member Hourly Rate	Project Team Man-Hours						TOTAL
		Director	Associate Project Manager	Senior Planner	Planner	CADD Technician	Man-hours	
Draft EIS								
DEIS Preparation (Pre-IIFS Decision)	75	75	50	50	50	10	260	\$42,050.00
DEIS Preparation (Post-IIFS Decision)	175	175	200	150	50	45	620	\$101,450.00
Subtotal Man-Hours		250	275	200	100	55	880	\$143,500.00
Subtotal PART I - WOC LABOR		\$56,250.00	\$47,575.00	\$24,600.00	\$10,400.00	\$4,675.00		\$5,978.21
State G.E. Tax & C&C of Honolulu Surcharge Tax						4.166%		
SUBTOTAL PART I - WOC LABOR WITH TAX								\$149,478.21

ATTACHMENT C

Wilson Okamoto Corporation
Current Rate Schedule

WILSON OKAMOTO CORPORATION
HOURLY RATE SCHEDULE

<u>PERSONNEL TITLE</u>	<u>HOURLY RATE</u>
CEO/PRESIDENT	\$260.00
FIRM PRINCIPAL/VICE PRESIDENT/DIRECTOR	\$225.00
ASSOCIATE DIRECTOR – ENGINEERING.....	\$214.00
SR. QUALITY CONTROL SPECIALIST – ENGINEERING	\$210.00
SR. PROJECT MANAGER.....	\$203.00
PROJECT MANAGER.....	\$182.00
ASSOCIATE PROJECT MANAGER/SR. ENGINEERS	\$173.00
SR. ENGINEERS.....	\$156.00
ENGINEERS	\$118.00
ENGINEER TECHNICIAN	\$ 89.00
ASSOCIATE DIRECTOR – PLANNING	\$203.00
SR. QUALITY CONTROL SPECIALIST – PLANNING	\$203.00
SR. PROJECT MANAGERS.....	\$169.00
ASSOC. PROJECT MANAGERS	\$143.00
SR. PLANNERS	\$123.00
PLANNERS	\$104.00
ASSOCIATE PLANNERS	\$ 72.00
MANAGERS – CADD	\$140.00
SR. CADD TECHNICIAN	\$104.00
CADD TECHNICIAN	\$ 85.00
GRAPHICS	\$111.00
ADMINISTRATIVE ASSISTANT	\$115.00

NOTE

- 1) FOR APPEARANCE AT FORMAL HEARINGS OR COURT TESTIMONY,
THE ABOVE RATES ARE TO BE INCREASED BY 50%.
- 2) THE APPLICABLE HAWAII STATE TAX WILL BE ADDED TO ALL
LABOR CHARGES
- 3) THE ABOVE RATES ARE SUBJECT TO PERIODIC ADJUSTMENTS.

ATTACHMENT D

Engineering Support Services
Akinaka & Associates, Ltd.



AKINAKA & ASSOCIATES, LTD.
Consulting Civil Engineers

1100 Alakea Street, Suite 1800, Honolulu, Hawaii 96813 * Telephone: (808) 836-1900 * Fax: (808) 836-8852

June 14, 2017

Mr. Earl Matsukawa, Vice President & Director
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Subject: Revised Fee Proposal

Project: Engineering Support for EIS East Maui Water Lease
Location: Maui, Hawaii
TMK: Various
Client: Wilson Okamoto Corporation
A&A Job No.: WOC17-01

Reference: 1) EISPN for the proposed lease for the Nahiku, Keanae, Honomanu
and Huelo License Areas ; and
2) State Water Lease EIS – Assessment Matrix

Gentlemen:

As requested by you (the Client), we, Akinaka & Associates, Ltd. (the Consultant), submit herewith for your approval and acceptance a revised fee proposal of our providing the engineering support necessary in preparation of the EIS for the proposed lease for the Nahiku, Keanae, Honomanu and Huelo License Areas (the Project) located in East Maui, Hawaii, and designated by various TMKs.

We propose that the following provisions govern our services, your obligations, our compensation, and other matters:

I. CONSULTANT SERVICES

A. Engineering Support

The scope of services is primarily intended to provide technical support for the EIS regarding the Surface Waters and Ground Waters in the HC&S Field

System, Upcountry and Nahiku Areas for the Project. See the attached manpower analysis sheet for an estimated breakdown of the items and services anticipated of our office for this project.

B. Time Estimates

Since the Consultant's services for the Project are determined by the Client's on-going needs, time estimates are not predictable, however, when requested by the Client, the Consultant will provide the requested services on a timely manner to facilitate the Client's needs.

II. CLIENT'S OBLIGATIONS

A. Information

The Client will provide the Consultant with such documents, data, and other information which the Client may possess or control and which the Consultant may reasonably require in the performance of services hereunder.

B. Coordination with other Consultants hired by the Client

The Consultant shall be able to coordinate directly with the other Consultants hired by the Client to obtain such data and information required by the Consultant to accomplish the Project. The Consultant shall not be responsible for the accuracy of the information provided, however, if discrepancies are noted by the Consultant, the Consultant shall notify the Client, who will be responsible for the resolution of such discrepancies.

III. COMPENSATION

A. Fees

The Client will pay the Consultant for the performance of services hereunder at a cost-plus basis. Labor costs shall be based on the following personnel classifications and associated hourly rates which are subject to change annually:

<u>Personnel Classification</u>	<u>Billable Rate (\$/hr)</u>
<u>Civil</u>	<u>(Includes tax)</u>
1. Principal	\$ 230.00
2. Sr. Civil Engineer	\$ 190.00
3. Civil Engineer	\$ 140.00

4. Jr. Civil Engineer	\$ 105.00
5. CADD Drafter	\$ 85.00
6. Typist	\$ 68.00

Cost for printing of large format color plotted exhibits will be paid for at the rate of \$1.00 per square foot.

All other costs such as air freight, air fare, car rental, parking fees, reproduction printing for the Project will be reimbursed to the Consultant. Invoices will accompany the Consultant's billing to the Client.

Attached is our estimated manpower analysis for the project. A budgetary ceiling of \$175,000.00 shall be used.

IV. OTHER PROVISIONS

A. Termination

Either the Client or the Consultant, if the other is in default of the other's obligations hereunder, may terminate this agreement upon ten (10) calendar days prior notice to the other. The Client may also terminate this agreement upon ten days prior written notice to the Consultant if the Client permanently abandons the Project. If this agreement is terminated other than for the default of the Consultant, the Client will pay the Consultant all or that portion of the services rendered by the Consultant to the date of termination, together with all reimbursable costs and expenses paid for or incurred by the Consultant to that date.

B. Limitations

In the performance of services hereunder, the Consultant will have to rely on, and will not be responsible for, the accuracy and completeness of documents, data, and other information prepared or supplied by others with respect to the Project.

C. Exclusions

Expressly excluded from the services to be performed by the Consultant hereunder are the following:

1. Engineering design and preparation of construction documents;
2. Archaeological or historical studies;
3. Environmental studies;
4. Soils Investigation/Geotechnical Investigation;

5. Traffic Impact Analysis Report;
6. Topographic Survey;
7. Special permits;
8. Verification of information obtained from public records or from entities or persons deemed reliable in the Consultant's reasonable judgment;
9. Field verification of existing features other than those within the scope.
10. Boundary stakeout and study;
11. Construction services;
12. Analysis of future growth opportunities;
13. Engineering other than specified;
14. Real estate transactions;
15. Land appraisal;
16. Land acquisition;
17. Preparation of subdivision maps;
18. Land Use Planning and Permitting;
19. Amendment to County General Plan;
20. Amendment to Community Development Plan;
21. Sustainable Design/LEED; or
22. All items not expressly specified in Consultant Services above.

D. Payments

Any amounts payable hereunder by the Client to the Consultant will be delinquent if not paid within thirty (30) calendar days after a written statement thereof has been mailed or delivered to the Client.

E. Miscellaneous

This agreement constitutes the entire agreement between the Client and the Consultant with respect to the Project; can be amended only in writing signed by both of them; cannot be assigned by either of them without the prior written consent of the other; will be construed under the laws of the State of Hawaii; and will bind each of them and their respective heirs, successors, legal representatives, and assigns.

F. Limitation of Liability

In recognition of the relative risks and benefits of the Project to both the Client and the Consultant, the risks have been allocated such that the Client agrees, to the fullest extent permitted by law, to limit the liability of the Consultant and Consultants officers, directors, partners, employees, shareholders, owners and subconsultants for any and all claims, losses,

Wilson Okamoto Corporation
June 14, 2017
Page 5

costs damages of any nature whatsoever or claims expenses from any cause or causes, including attorneys' fees and costs and expert-witness fees and costs, so that the total aggregate liability of the Consultant and Consultants officers, directors, partners, employees, shareholders, owners and subconsultants shall not exceed \$25,000, or the Consultant's total fee for services rendered on the Project, whichever is greater. It is intended that this limitation apply to any and all liability or cause of action however alleged or arising, unless otherwise prohibited by law.

We appreciate this opportunity to propose the provisions upon which we will be pleased to offer our services with respect to your Project.

Should you approve and accept our proposal, please sign, date, and return the enclosed copy of this letter which will be the official notice to proceed.

Very truly yours,


FOR Ken C. Kawahara
President

APPROVED AND ACCEPTED:

on _____, 20

Wilson Okamoto Corporation

By: _____
Its:

East Engineering Support for EIS East Maui Water Lease
 East Maui, Maui, HAWAII
 AKINAKA & ASSOCIATES, LTD.
 A&A JOB NO.: WOC 17-01
 MANPOWER ANALYSIS

DATE: 06/14/17

ITEM	PERSONNEL RATE (\$/HR)						TOTALS	
	Principal \$230.00	Sr. Eng'r \$190.00	Engineer \$140.00	Jr. Eng'r. \$105.00	Draft \$85.00	Typist \$68.00	MH	AMOUNT
A. Existing EMI System Documentation and Condition Assessment								
1. Site Investigation and Research	60	80	40	80	40	40	340	\$49,120
2. Project Management and Coordination	16	16	8	0	0	0	40	\$7,840
3. EMI System Inventory and Condition Assessment Report	30	40	24	40	20	16	170	\$24,848
4. Attendance at Meetings and other requested services	16	16	8	8	0	0	48	\$8,680
5. Hydrological Engineering Consultant Services								\$10,000
6. Reimbursable Items for Airfare, Car Rental & Parking								\$5,000
7. Reimbursable Items for Reproduction, Deliveries, Bulk Mail Freight & Postage								\$1,000
A. Subtotal - Existing EMI System Documentation and Condition Asses.								
	106	136	72	120	60	56	550	\$106,488
B. Hydrology and Flood Hazard Assessment for EIS								
1. Site Investigation and Research	16	24	16	16	0	0	72	\$12,160
2. Project Management and Coordination	8	8	8	0	0	4	28	\$4,752
3. Hydrology and Flood Hazard Assessment Report for the EMI EIS	16	30	30	16	24	8	124	\$17,844
4. Hydrological Engineering Consultant Services								\$10,000
5. Reimbursable Items for Airfare, Car Rental & Parking								\$3,000
6. Reimbursable Items for Reproduction, Deliveries, Bulk Mail Freight & Postage								\$500
7. Attendance at meetings as required by WOC or A & B.								\$2,000
B. Subtotal - Hydrology and Flood Hazard Assessment for EIS								
	40	62	54	32	24	12	224	\$50,266
C. Support to Respond to EISP/NEIS Comments								
1. Review and provide responses EISP/NEIS Comments	16	30	16	8	8	8	86	\$13,684
2. Hydrological Engineering Consultant Services								\$2,000
3. Reimbursable Items for Airfare, Car Rental & Parking								\$2,000
4. Reimbursable Items for Reproduction, Deliveries, Bulk Mail Freight & Postage								\$200
5. Attendance at meetings as required by WOC or A & B.								\$500
C. Subtotal - Support to Respond to EISP/NEIS Comments								
	16	30	16	8	8	8	86	\$18,384
TOTAL - TIME AND MATERIALS ALLOWANCE FEE								
	162	228	142	160	92	76	860	\$175,128.00
GRAND TOTAL - FEE PROPOSAL (ROUNDED)								
								\$175,000

ASSUMPTIONS:
 Fee shall be on a time and materials basis with rates as noted in this proposal.
 Scope of work shall be as discussed and noted in the emails from WOC dated March 3 and May 24, 2017

EXCLUSIONS:
 Technical Hydrological Studies
 Technical Drainage or Stream Studies

Scott A Kunioka

From: Ken C. Kawahara <kck@akinaka.com>
Sent: Friday, March 10, 2017 10:40 AM
To: sak@akinaka.com
Subject: FW: Water Lease for Nahiku, Keanae, Honomanu and Huelo License Areas
Attachments: Assessment-Subconsultant Matrix.pdf

Scott,
See below.
Thanks.
Ken

From: Earl Matsukawa [<mailto:ematsukawa@wilsonokamoto.com>]
Sent: Friday, March 03, 2017 2:47 PM
To: Ken Kawahara (kck@akinaka.com)
Subject: Water Lease for Nahiku, Keanae, Honomanu and Huelo License Areas

Hi Ken

Nice talking with you. Below is the link to the EIS Preparation Notice in the February 8th Environmental Notice. Attached is a preliminary matrix of EIS issues. Your role would be in the blue field – Surface Waters and Ground Waters in the HC&S and Upcountry, Nahiku columns. The License Area & Makai column will be addressed through a model that was used for the Interim Instream Flow Standards (IIFS) proceedings that assessed the hydrology of the streams in the License Area. This matrix is by no means definitive. So if you think impacts on coastal waters needs to be assessed, please provide input and call me if you have any questions.

http://oegc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Maui/2010s/2017-02-08-MA-5E-EISPN-East-Maui-Water-Lease.pdf

Earl Matsukawa, AICP
Vice President & Director



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Scott A Kunioka

From: Keola Cheng <KCheng@wilsonokamoto.com>
Sent: Wednesday, May 24, 2017 8:42 AM
To: 'kck@akinaka.com'
Cc: sak@akinaka.com; Earl Matsukawa
Subject: RE: East Maui - Meeting tomorrow

Hi Ken,

Thanks for attending yesterday's meeting – it was nice to meet with you and Scott!

Following up on what was discussed – A&B is looking to nail down an estimated total cost for the EIS doc/process, so it would be great if we could work to nail down some sort of pricing figure for your scope of work.

Based on what was discussed yesterday, I believe we are looking at several components on your end:

- Support in identifying/documenting existing conditions of the ditch / hydrology.
- Quant./Qualitative Assessment to serve the EIS Alternatives Analysis (looking @ hydrological impacts of the proposed lease/existing ditch operations as well as hypothetical alternative scenarios, as well as cost estimates – this would cover/touch upon the county water system as well)
- Support in responding to EISPN/EIS comments in regards to C.E. / Hydrology.

I believe that the above could be rolled into a single report/deliverable, which would be appended to the EIS document, and from which we could excerpt/summarize portions of into the EIS text.

Looking at your current proposal, perhaps we could budget it out on a T&M not to exceed basis – that might be the most simple way to get A&B a cost figure in the short term. Let me know what you think would work best, or if you need any additional info on my end.

Mahalo,

Keola M. Cheng
Planner



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State Water Lease EIS - Assessment Matrix

Topic	Proposed Action			Alternative Action			No Action		
	Lic. Area & Makai	Upcountry, Nahiiku	HC&S Field System	Lic. Area & Makai	Upcountry, Nahiiku	HC&S Field System	Lic. Area & Makai	Upcountry, Nahiiku	HC&S Field System
Climate	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
Geology	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
Topography	No impact	Mitigated with proper soil management	No impact	No impact	No impact	No impact	No impact	No impact	No impact
Soils	No impact	Mitigated with proper soil management	No impact	No impact	No impact	No impact	No impact	No impact	No impact
Surface Waters	>Historic flows in IFS streams reservoirs. No impact. Diverted irrigation water does not drain as surface flows.	>Historic surface recharge. water does not drain as surface flows.	>Historic recharge. Increased saline intrusion in wells	>IFS flows in ditches & reservoirs. No impact. Diverted irrigation water does not drain as surface flows.	>IFS flows in IFS streams reservoirs. No impact. Diverted irrigation water does not drain as surface flows.	>IFS recharge. >IFS saline intrusion in wells	>IFS streams restored (except for IFS water?)	>Only EMI flows in ditches and reservoirs. No impact. Diverted irrigation water does not drain as surface flows.	>Minimal recharge. Max saline intrusion in wells
Groundwater	>Historic recharge from streams	>Historic surface recharge. Negligible impact (?)	>Historic recharge. Increased saline intrusion in wells	>IFS recharge. >IFS saline intrusion in wells	>IFS surface recharge. Negligible impact (?)	>IFS recharge. >IFS saline intrusion in wells	>Max Recharge/Outflow	>Minimal recharge. Max saline intrusion in wells	>Minimal recharge. Max saline intrusion in wells
Coastal Waters	>Historic stream & groundwater outflow	No impact. Diverted irrigation water does not drain as surface flows.	No impact. Diverted irrigation water does not drain as surface flows.	No impact. Diverted irrigation water does not drain as surface flows.	No impact. Diverted irrigation water does not drain as surface flows.	No impact. Diverted irrigation water does not drain as surface flows.	>Max stream & groundwater outflow	No impact. Diverted irrigation water does not drain as surface flows.	No impact. Diverted irrigation water does not drain as surface flows.
Natural Hazards	No impact - Flooding occurs during freshets	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
Terrestrial Flora	>Historic groundwater effect on vegetation? Probably negligible	No impact or shift to less phony crops, landscaping	Change to diversified crops.	>IFS groundwater-effect on vegetation? Probably negligible	No impact or shift to less phony crops, landscaping	>IFS surface recharge. Change in vegetation	>Max groundwater - effect on vegetation? Probably negligible.	Unusable areas invaded by wild vegetation	Unusable areas invaded by wild vegetation
Terrestrial Fauna	>Historic shift in stream. Shift in species, diversity, abundance	>Historic shift in stream. Shift in species, diversity, abundance	>Historic change in stream. Shift in species, diversity, abundance	>IFS shift in stream. Shift in species, diversity, abundance	>Historic shift in stream. Shift in species, diversity, abundance	>IFS change in stream. Shift in species, diversity, abundance	>IFS stream restored. Shift in species? Or determined by IFS streams	Unusable land is habitat for drought tolerant species	Unusable land is habitat for drought tolerant species
Stream Ecosystem	>Historic surface & groundwater discharge. Impacted or determined by freshets - so no impact?	No impact. Diverted irrigation water does not drain as surface flows.	>Historic surface & groundwater discharge. Impacted or determined by freshets - so no impact?	>IFS surface & groundwater or restored/more flow. Marginal improvement over proposed	No impact. Diverted irrigation water does not drain as surface flows.	>IFS surface & groundwater or restored/more flow. Marginal improvement over proposed	>IFS stream restored. Marginal improvement over proposed	Runoff from uncultivated land increases sediment runoff	Runoff from uncultivated land increases sediment runoff
Coastal Ecosystem	No impact - condition of archaeological resources result of Freshets Aqueduct	No impact	Abandon/Demolish historic sugar-related structures	>IFS surface & groundwater or restored/more flow. Marginal improvement over proposed	Potential sedimentation from uncultivated land.	Potential sedimentation from uncultivated land.	>IFS surface & groundwater or restored/more flow. Marginal improvement over proposed	Potential sedimentation from uncultivated land.	Potential sedimentation from uncultivated land.
Historic/Archaeological Resources	No impact - condition of archaeological resources result of Freshets Aqueduct	No impact	Abandon/Demolish historic sugar-related structures	>IFS surface & groundwater or restored/more flow. Marginal improvement over proposed	Potential sedimentation from uncultivated land.	Potential sedimentation from uncultivated land.	>IFS surface & groundwater or restored/more flow. Marginal improvement over proposed	Potential sedimentation from uncultivated land.	Potential sedimentation from uncultivated land.
Cultural Resources	No impact - condition of archaeological resources result of Freshets Aqueduct	No impact	Abandon/Demolish historic sugar-related structures	>IFS surface & groundwater or restored/more flow. Marginal improvement over proposed	Potential sedimentation from uncultivated land.	Potential sedimentation from uncultivated land.	>IFS surface & groundwater or restored/more flow. Marginal improvement over proposed	Potential sedimentation from uncultivated land.	Potential sedimentation from uncultivated land.
Recreation, Hunting	No impact	NA	NA	NA	NA	NA	NA	NA	NA
Air Quality	No impact	No impact - Rural community, small scale ag emissions - cars & equipment	No burning post-sugar. Ag equipment emissions, dust	No impact	No impact - Rural community, small scale ag emissions - cars & equipment	No burning post-sugar. Ag equipment emissions, dust	No impact	Dust from uncultivated land	Dust from uncultivated land
Noise	>Historic stream sounds in IFS streams that become potential	No impact - Rural community, small scale ag operation noises	Post-sugar field noises change to diversified ag operations.	>IFS stream sounds in IFS streams that become potential	No impact - Rural community, small scale ag operation noises	Post-sugar field noises change to diversified ag operations	>Increase in stream sounds as flows are restored in IFS streams	>Increase in stream sounds as flows are restored in IFS streams	>Increase in stream sounds as flows are restored in IFS streams
Visual Resources	>Historic flows in streams & waterfalls viewed along Hana Hwy.	No impact - Rural, small scale ag	Post-sugar fields replaced with diversified ag operations	>IFS flows in streams & waterfalls along Hana Hwy.	No impact - Rural, small scale ag operations	Post-sugar fields in diversified ag and fallow land	>Restored IFS streams & waterfalls along Hana Hwy.	>Aid. unusable fallow former sugar fields	>Aid. unusable fallow former sugar fields

	Local streams restored - marginal economic impacts if IFS. Also impacts on stream	Economics of diversified agriculture	No impact	Local streams restored - marginal economic impacts if IFS. Also impacts on stream	Economics of diversified agriculture w/IFS	Economic impact of IFS on rural, small scale ag operations	Local streams restored - IFS streams fully restored. Also local streams restored.	Economic impact of fallow fields	Economic impact of no diverted water on rural, small-scale ag operations
Economics	Local streams restored - marginal economic impacts if IFS. Also impacts on stream	Economics of diversified agriculture	No impact	Local streams restored - marginal economic impacts if IFS. Also impacts on stream	Economics of diversified agriculture w/IFS	Economic impact of IFS on rural, small scale ag operations	Local streams restored - IFS streams fully restored. Also local streams restored.	Economic impact of fallow fields	Economic impact of no diverted water on rural, small-scale ag operations
Social/Demographics	Local streams restored - marginal demographic impacts with IFS. Also impacts on stream fishing/gathering?	Demographic changes as diversified ag grows, ag lifestyle/character	No impact?	Local streams restored - marginal demographic impacts with IFS. Also impacts on stream fishing/gathering?	Demographic changes w/ scaled down diversified ag, reduced ag lifestyle/character	Demographic changes with potential reduction in water to support community/ag	Local streams restored - IFS streams fully restored. Also local streams restored.	Demographic changes with no agriculture. Less of ag lifestyle, community character	Demographic changes with reduction in water to support community/ag
Public Services and Facilities Infrastructure and Utilities	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact

- Hydrobiologist
- Biologist
- Archaeologist (CSH)
- Cultural Impact (CSI)
- Ag Economist
- Social Impact/Demography

ATTACHMENT E

Cultural Impact Assessment
Cultural Surveys Hawaii

CULTURAL SURVEYS HAWAI'I

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL DOCUMENTATION SERVICES - SINCE 1982



May 31, 2017

Earl Matsukawa, AICP
Wilson Okamoto Corporation
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Phone: 808-946-2277
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Wailuku, Hawai'i 96793
Ph: (808) 242-9882
Fax: (808) 244-1994

Branch Offices:

Pāhoa, Hawai'i
Kona, Hawai'i
Lāwai, Kaua'i

Subject: Proposal for Cultural Impact Assessment for the East Maui Irrigation Water Lease Renewal Project, Honopou, Huelo, Mokuapapa, Waipioiki, Waipionui, Hanehoi, West Hanawana, East Hanawana, Pu'uomaile, Pāpa'a'ea, West Makaiwa, East Makaiwa, Honomanū, Ke'anae, Wailua Nui, Wailua Iki, Ko'olau, Pa'akea, Nāhiku, and Ko'olau Ahupua'a, Makawao and Hana District, Maui Island; TMK: [2] 1-2-004:005 & 007, 1-1-002:002 (por.), 1-1-001:044, 1-1-001:005, 2-9-014:001, 005, 011, 012 and 017

Dear Mr. Matsukawa:


Thank you for contacting Cultural Surveys Hawai'i, Inc. (CSH) regarding the East Maui Irrigation Water Lease Renewal project. CSH understands that the project is requiring the client to engage in the environmental review process set forth under Chapter 343. The applicant for the water lease is A&B and, in accordance with Hawaii Administrative Rules (HAR) of the Hawaii Department of Health (DOH), Section 11-200-4(b), the BLNR is the accepting authority for the proposed EIS because the BLNR is the agency initially receiving and agreeing to process the request for an approval of the water lease. The proposed action constitutes the issuance of one long term (30 years) Water Lease from the BLNR for the "right, privilege, and authority to enter and go upon" the Nahiku, Ke'anae, Honomanu, and Huelo license areas for the "purpose of developing, diverting, transporting and using government owned waters" through the existing EMI aqueduct System which supplies water to domestic and agricultural water users. The Water Lease will allow continued operation of the EMI Aqueduct System to deliver water to the Maui County Department of Water Supply (DWS) for domestic and agricultural water needs in Upcountry Maui, including users at the Kula Agricultural Park. It will allow the continued provision of water to approximately 26,600-acres of agricultural lands (formerly in sugarcane) in Central Maui owned by A&B and farmed and managed by Hawaiian Commercial & Sugar Company, a division of A&B.

Based on the information provided, CSH proposes to prepare a cultural impact assessment (CIA). The CIA will be in compliance with the State of Hawai'i environmental review process (Hawai'i Revised Statutes [HRS] Chapter 343), which requires consideration of a proposed project's effect on traditional cultural practices and features associated with the project area. The final document will provide information pertinent to the assessment of the proposed project's impacts to cultural practices through document research and cultural consultation efforts, and in consideration of the Office of Environmental Quality Control's (OEQC) Guidelines for Assessing Cultural Impacts (2012 Edition).

The proposed scope of work and associated costs follow. We are happy to address any questions or concerns about these recommendations. We will advise you of our anticipated schedule for this project upon receipt of your signed notice to proceed. A project manager will contact you at that time to arrange an acceptable schedule.

Please feel free to contact me by telephone at (808) 262-9972 on O'ahu or toll free at 1-800-599-9962, or by e-mail at hhammatt@culturalsurveys.com. Thank you for contacting CSH, we look forward to our continued work with Wilson Okamoto Corporation.

Sincerely,



Hallett H. Hammatt, PhD
President

Section 1: INFORMATION FROM CLIENT

The information below summarizes our understanding of this project. In order to ensure we have an accurate understanding, we ask that you verify the information below and let CSH know if anything needs to be changed. CSH will then reissue this proposal with the corrected information.

<p>CLIENT OF RECORD: The party below will be responsible for payment unless CSH is directed otherwise.</p> <p>Earl Matsukawa, AICP Wilson Okamoto Corporation 1907 South Beretania Street, Suite 400 Honolulu, HI 96826 Phone: 808-946-2277 Fax: 808-946-2253 Email: ematsukawa@wilsonokamoto.com</p>	<p>PROJECT LAND JURISDICTION: Check all that apply:</p> <p><input checked="" type="checkbox"/> County / State <input type="checkbox"/> Federal <input checked="" type="checkbox"/> Private <input type="checkbox"/> Department of Hawaiian Home Lands (DHHL) <input type="checkbox"/> Other:</p>
<p>PROJECT PROPONENT: Alexander and Baldwin, Inc.</p>	<p>IS THERE ANY FEDERAL INVOLVEMENT? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please specify type of involvement below. <input type="checkbox"/> Permits <input type="checkbox"/> Funding <input type="checkbox"/> Approvals <input type="checkbox"/> Oversight</p>
<p>PROJECT DESCRIPTION:</p> <p>Focusing on the CIA for the EIS for a long-term 30-year lease renewal for the “right, privilege, and authority to enter and go upon” the four license areas “for the purpose of developing, diverting, transporting, and using government-owned waters” from the 31 streams in the Nāhiku, Ke‘anae, Honomanū, and Huelo license areas.</p> <p>The project area consists of 388 separate intakes, 24 miles of ditches, 50 miles of tunnels, numerous dams, intakes, pipes, and flumes (Wilcox, 1996).</p> <p>Project Acreage: approx. 50,000 acres of land total; 33,000 acres owned by State of Hawaii; 17,000 acres owned by East Maui Irrigation Company Limited (EMI); oldest subsidiary of Alexander & Baldwin, Inc.</p> <p>Nāhiku License Area: (2) 1-2-04:05,07 (por.) = 10,111.220 Acres (approx.) Ke`anae License Area: (2) 1-1-02:02 (por.) = 10,768.000 Acres (approx.) Honomanū License Area: (2) 1-1-001:44 = 3,381.000 Acres (approx.) Huelo License Area: (2) 1-1-001:050, (2) 2-9-014:01, 05, 11,12,17 = 8,752.690 acres (approx.)</p>	

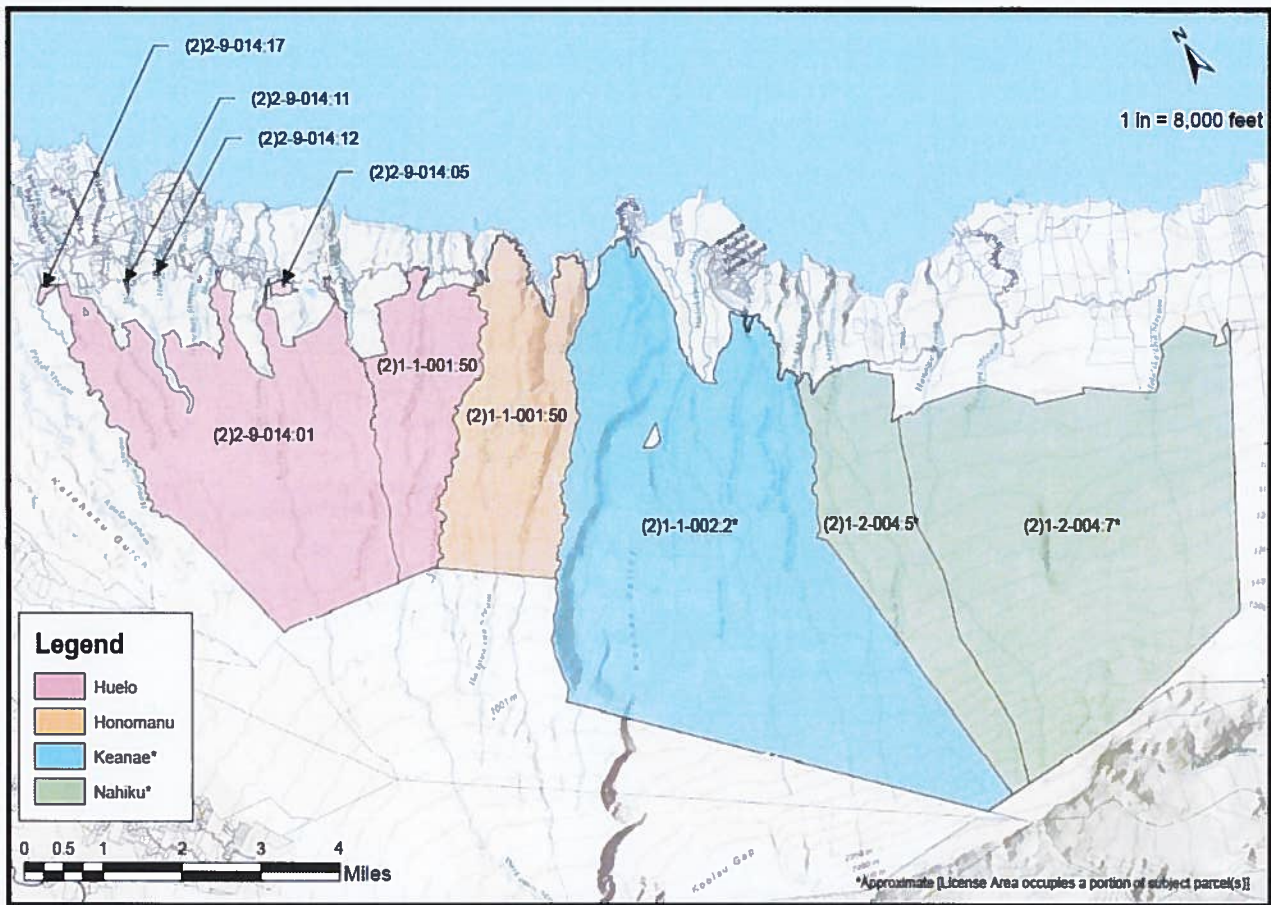


Figure 1: Most Recent Client Figure of Proposed Lease Renewal Area for the Huelo, Honomanu, Keanae, and Nahiku License Areas.

Cultural Impact Assessment

East Maui Irrigation Water Lease Renewal Project

Honopou, Huelo, Mokuapapa, Waipioiki, Waipionui, Hanehoi, West Hanawana, East Hanawana, Pu'uomaile, Pāpa'a'ea, West Makaīwa, East Makaīwa, Honomanū, Ke'anae, Wailua Nui, Wailua Iki, Ko'olau, Pa'akea, Nāhiku, and Ko'olau Ahupua'a,

Makawao and Hana District, Maui Island

TMK: [2] 1-2-004:005 & 007 por., 1-1-002:002 (por.),

1-1-001:044, 1-1-001:50, 2-9-014:001, 005, 011, 012 and 017

Section 2: CULTURAL IMPACT ASSESSMENT SCOPE OF WORK

This proposal is for a cultural impact assessment (CIA). This scope of work is based on information provided by the client.

CSH's Scope of Work for a Cultural Impact Assessment includes:

1. Examination of historical documents, Land Commission Awards, historic maps, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal and other resources or agricultural pursuits as may be indicated in the historic record.
2. A review of the existing archaeological information pertaining to archaeological sites within the study area to reconstruct traditional land use activities as may be indicated in the archaeological record.
3. To identify present uses of the cultural resources, practices, and beliefs associated with the parcel through interviews with persons knowledgeable about the present cultural practices in the project area and its surrounding area.
4. Preparation of a report on items 1-3 summarizing the information gathered related to traditional practices and land use. The report will assess the impact of the proposed undertaking on the cultural practices and features identified.

Assumptions

CSH has made the following assumptions when preparing this proposal:

1. Interviews will be conducted with up to twenty (20) knowledgeable community members.
2. A full transcription of the interviews will be included in the CIA report.
 - Transcriptions involve tape recording of interview sessions, transcription of interviews, review and authorization of oral history use by interviewees, summarization of the interview contents, and inclusion in the report.
 - Transcription is recommended for projects with high level of publicity, controversy, or located in archaeologically, culturally, or historically rich area.
3. Cost estimate in this proposal includes hours for one set of revisions from the client and project proponent for the draft and final reports.
4. Travel time to and from interviews are included in fieldwork hours and billed at standard rates.
5. There are instances where a CIA scope of work requires off island-based personnel. In these cases, travel costs will be incurred.
6. This proposal *does not* provide for any public meeting attendance; a change order may be requested if those services are later indicated
7. CIA takes approximately 8 to 12 months for large projects to provide a draft report to the client from the notice to proceed date. There are several factors that can extend this timeline, including:
 - Changes in project area or project descriptions may require informing interviewees of changes;
 - Delay in client providing clear project description;
 - High interest from community members requesting inclusion as interviewees

8. This proposal includes provisions for the following tasks and reimbursable expenses:

- Project Coordination and Management: includes hours for coordination, communications and management with client, vendors, subcontractors, SHPD, etc.;
- Background Study: Examination of historical documents, Land Commission Awards, historic maps, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal and other resources or agricultural pursuits as may be indicated in the historic record. A review of the existing archaeological information pertaining to archaeological sites within the study area to reconstruct traditional land use activities as may be indicated in the archaeological record.
- Travel Time: time allotted per day travel time to and from office and interviewee locations, or any off-island travel;
- Scoping for Knowledgeable Parties: hours to review in-house database of *kūpuna*, *kama'āina*, cultural practitioners, lineal and cultural descendants, Native Hawaiian Organizations, and community groups to prepare list of potential interviewees with cultural expertise and/or knowledge of the study area;
- Conduct & Transcribe Interviews: allotted hours to conduct interviews, transcribe interviews, and obtain interviewees' agreement with content of transcription.
- Draft Report: preparation of a report to include the results of the background study, interviews, and cultural impacts and recommendations for client's review;
- Final Report: incorporation of edits and changes from client into the report for submittal to OEQC;
- Graphics and GPS/GIS Work: allotted hours for the production of graphics for the background study, interview documentation, and other graphics needed for the draft and final report;
- Report Production: production and transmittal of draft and final reports for client and OEQC.
- Reimbursable expenses include:
 - *Makana*: Gifts such as *lei(s)*, books, and other appropriate items are given to express appreciation for their generosity in sharing knowledge and memories and for their time and involvement;
 - Postage: expense for scoping mailings and CDs with transcriptions to interviewees;
 - Honoraria: "gifting" for interviews rendered nominally without charge.

Section 3: ESTIMATE

Costs detailed below represent a best estimate based on information gathered at the time of submission. Services outlined in this document are offered on a time and materials basis and actual costs may vary.

Project Costs - Labor									
	People	Days	Hrs / Day	Est. Qty		Rate		Extended	
Task: Project Coordination & Management including Consultation with SHPD									
Project Manager	1	x	5	x	8	=	40	hrs x	\$ 135.00 = \$ 5,400.00
Project Director	1	x	5	x	8	=	40	hrs x	\$ 100.00 = \$ 4,000.00
General Staff	1	x	3	x	8	=	24	hrs x	\$ 70.00 = \$ 1,680.00
								Subtotal:	\$ 11,080.00
Task: Cultural Landscape Background Study									
Project Manager	1	x	2	x	8	=	16	hrs x	\$ 135.00 = \$ 2,160.00
Project Director	1	x	4	x	8	=	32	hrs x	\$ 100.00 = \$ 3,200.00
General Staff	1	x	40	x	8	=	320	hrs x	\$ 70.00 = \$ 22,400.00
								Subtotal:	\$ 27,760.00
Task: Travel									
Project Director	1	x	5	x	2	=	10	hrs x	\$ 100.00 = \$ 1,000.00
								Subtotal:	\$ 1,000.00
Task: Scoping for Knowledgeable Parties									
Project Manager	1	x	2	x	8	=	16	hrs x	\$ 135.00 = \$ 2,160.00
Project Director	1	x	5	x	8	=	40	hrs x	\$ 100.00 = \$ 4,000.00
General Staff	1	x	5	x	8	=	40	hrs x	\$ 70.00 = \$ 2,800.00
								Subtotal:	\$ 8,960.00
Task: Conduct & Transcribe Interviews									
Project Manager	1	x	11	x	8	=	88	hrs x	\$ 135.00 = \$ 11,880.00
Project Director	1	x	48	x	8	=	384	hrs x	\$ 100.00 = \$ 38,400.00
General Staff	1	x	85	x	8	=	680	hrs x	\$ 70.00 = \$ 47,600.00
								Subtotal:	\$ 97,880.00
Task: Draft Report									
Project Manager	1	x	4	x	8	=	32	hrs x	\$ 135.00 = \$ 4,320.00
Project Director	1	x	3	x	8	=	24	hrs x	\$ 100.00 = \$ 2,400.00
General Staff	1	x	40	x	8	=	320	hrs x	\$ 70.00 = \$ 22,400.00
								Subtotal:	\$ 29,120.00
Task: Final Report									
Project Manager	1	x	1	x	8	=	8	hrs x	\$ 135.00 = \$ 1,080.00
Supervisor	1	x	2	x	8	=	16	hrs x	\$ 85.00 = \$ 1,360.00
General Staff	1	x	4	x	8	=	32	hrs x	\$ 70.00 = \$ 2,240.00
								Subtotal:	\$ 4,680.00
Task: Graphics and GPS/GIS Work									
GIS Specialist	1	x	4	x	8	=	32	hrs x	\$ 100.00 = \$ 3,200.00
General Staff	1	x	10	x	8	=	80	hrs x	\$ 70.00 = \$ 5,600.00
								Subtotal:	\$ 8,800.00
Task: Report Production									
General Staff	1	x	1	x	6	=	6	hrs x	\$ 70.00 = \$ 420.00
								Subtotal:	\$ 420.00
Summary of Labor Costs									
Labor Subtotal.....									\$ 189,700.00
Tax at 4.166%.....									\$ 7,902.90
Labor Total.....									\$ 197,602.90

Continued Estimated Cost:

■ Project Costs - Expenses

Off-Island Travel Expenses

Item	People		Qty		Rate		Extended
Airfare			7	Tickets	x \$ 213.61	per Round-Trip Ticket	= \$ 1,495.29
Car Rental			5	Days	x \$ 52.08	per Day	= \$ 260.42
Parking	1	People	x 5	Days	x \$ 18.00	per Day	= \$ 90.00
Meals	1	People	x 7	Days	x \$ 30.00	per Day	= \$ 210.00
Lodging	1	Rooms	x 2	Nights	x \$ 156.25	per Night	= \$ 312.50
Subtotal:							\$ 2,368.20

Consumables and Other Small Ticket Items

Item	Extended
Makana for CIA Participation	\$ 1,000.00
Postage for scoping mailings, CDs for providing transcriptions to interviewees	\$ 300.00
Reproduction of Historic & Archival Photographs, Documents, and Maps	\$ 700.00
Subtotal:	
	\$ 2,000.00

Summary of Reimbursable Expenses

Expense Subtotal.....	\$ 4,368.20
10% Handling Fee.....	\$ 436.82
Honoraria.....	\$ 2,000.00
Expense Total.....	\$ 6,805.02

■ Summary of Costs

Project Costs

Total Labor, including General Excise Tax.....	\$ 197,602.90
Reimbursables including all fees and any applicable taxes.....	\$ 6,805.02
Total Project.....	\$ 204,407.92

Work not in Scope

Meeting attendance, additional consultation, or items above and beyond the scope of work outlined in this proposal will be billed at the standard rates:

- \$70.00/hour for General Staff (*includes Archaeologist, Editor, GIS Technician, and Archaeological Support Staff*)
- \$85.00/hour for Supervisor
- \$100.00/hour for Project Director
- \$100.00/hour for GIS Specialist
- \$135.00/hour for Project Manager/Principal Investigator
- \$150.00/hour for Principal

Section 4: SCHEDULE

Upon acceptance of this Proposal CSH will coordinate with client to schedule work.

Section 5: CLIENT RESPONSIBILITIES

Should client engage CSH for this work, we request delivery of all relevant most up-to-date project information to commence work including a project area map with defined project boundaries; verification of project information as stated on page 2 of this proposal; and any topographic maps, aerial photos, and other scientific/technical reports for the project, if available. CSH requests receiving graphics in ESRI shapefile or AutoCAD format when available.

Section 6: ENGAGEMENT


This proposal is valid for 6 months.

CSH will bill monthly for work completed. The final invoice for project completion is sent with the final report. Expenses are billed at cost plus a 10% handling fee. CSH reserves the right to charge 1.5% interest on any or all invoices more than 30 days past due.

If the terms of this proposal are satisfactory, please acknowledge your authorization by signing and dating a copy of this proposal and returning it to Paul Starzyk at pstarzyk@culturalsurveys.com. We will waive the down payment for this project.

If you have any questions regarding the scope of these services and data to be furnished, please contact me at (808) 262-9972 or by email at hhammatt@culturalsurveys.com. We look forward to working with you on this project.

Sincerely,



Hallett H. Hammatt, PhD

ACCEPTED:

Signature

Date

Printed Name

ATTACHMENT F

Archaeological Literature Review
and Field Inspection
Cultural Surveys Hawaii


CULTURAL SURVEYS HAWAII

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL DOCUMENTATION SERVICES - SINCE 1982



27 June, 2017

Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826
Phone: 808-946-2277
Fax: 808-946-2253
Email: ematsukawa@wilsonokamoto.com



O'ahu Island
P.O. Box 1114
Kailua, Hawai'i 96734
Ph: (808) 262-9972
Fax: (808) 262-4950

Maui Island
1860 Main Street
Wailuku, Hawai'i 96793
Ph: (808) 242-9882
Fax: (808) 244-1994

Branch Offices:
Pāhoa, Hawai'i
Kona, Hawai'i
Lāwai, Kaua'i

Subject: Proposal for Archaeological Literature Review and Field Inspection for the East Maui Irrigation Water Lease Renewal Project Honopou, Huelo, Mokupapa, Hanehoi, West Hanawana, East Hanawana, Pāpa'a'ea, West Makaīwa, East Makaīwa, Honomanū, Ke'anae, Wailua Nui, Wailua Iki, Ko'olau, Pa'akea, and Ko'olau Ahupua'a, Makawao and Hana District, Maui Island;

TMK: [2] 1-2-004:005 & 007, 1-1-002:002 (por.), 1-1-001:044, 1-1-001:005, 2-9-014:001, 005, 011, 012 and 017

Dear Mr. Matsukawa:


Thank you for contacting Cultural Surveys Hawai'i, Inc. (CSH) regarding a literature review and field inspection report for the East Maui Irrigation Water Lease Renewal project.

CSH understands that the project is requiring the client to engage in the environmental review process set forth under Chapter 343. The proposed action constitutes the issuance of one long term (30 years) Water Lease from the BLNR for the "right, privilege, and authority to enter and go upon" the Nahiku, Ke'anae, Honomanu, and Huelo license areas for the "purpose of developing, diverting, transporting and using government owned waters" through the existing EMI aqueduct System which supplies water to domestic and agricultural water users. The Water Lease will allow continued operation of the EMI Aqueduct System to deliver water to the Maui County Department of Water Supply (DWS) for domestic and agricultural water needs in Upcountry Maui, including users at the Kula Agricultural Park. It will allow the continued provision of water to approximately 26,600-acres of agricultural lands (formerly in sugarcane) in Central Maui owned by A&B and farmed and managed by Hawaiian Commercial & Sugar Company, a division of A&B. Based on the information provided and communication between our firms, CSH proposes to conduct an archaeological literature review and field inspection for this project.

The proposed scope of work and associated costs follow. We are happy to address any questions or concerns about these recommendations. If you find this cost estimate acceptable, a suitable project schedule can be worked out with a CSH project manager.

Please feel free to contact me by telephone at (808) 262-9972 on O'ahu or toll free at 1-800-599-9962, or by e-mail at hhammatt@culturalsurveys.com. Thank you for contacting CSH, we look forward to working with Wilson Okamoto Corporation and Alexander and Baldwin, Inc.

Sincerely,



Hallett H. Hammatt, PhD
President

Section 1: INFORMATION FROM CLIENT

The information below summarizes our understanding of this project. In order to ensure we have an accurate understanding, we ask that you verify the information below and let CSH know if anything needs to be changed. CSH will then reissue this proposal with the corrected information.

<p>CLIENT OF RECORD: The party below will be responsible for payment unless CSH is directed otherwise. Earl Matsukawa, AICP Wilson Okamoto Corporation 1907 South Beretania Street, Suite 400 Honolulu, HI 96826 Phone: 808-946-2277 Fax: 808-946-2253 Email: ematsukawa@wilsonokamoto.com</p>	<p>PROJECT LAND JURISDICTION: Check all that apply: <input checked="" type="checkbox"/> County / State <input type="checkbox"/> Federal <input checked="" type="checkbox"/> Private <input type="checkbox"/> Department of Hawaiian Home Lands (DHHL) <input type="checkbox"/> Other: _____</p>
<p>PROJECT PROPONENT: Alexander & Baldwin, Inc.</p>	<p>FEDERAL INVOLVEMENT? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please specify type of involvement below. <input type="checkbox"/> Permits <input type="checkbox"/> Funding <input type="checkbox"/> Approvals <input type="checkbox"/> Oversight</p>
<p>HISTORIC PRESERVATION REVIEW TRIGGER(S): N/A</p>	<p>HDOT INVOLVEMENT? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please specify type of involvement below. _____</p>
<p>PROJECT DESCRIPTION: Focusing on a Literature Review and Field Inspection for the EIS for a long-term 30-year lease renewal for the “right, privilege, and authority to enter and go upon” the four license areas “for the purpose of developing, diverting, transporting, and using government-owned waters” from the 31 streams in the Nāhiku, Ke‘anae, Honomanū, and Huelo license areas. The project area consists of 388 separate intakes, 24 miles of ditches, 50 miles of tunnels, numerous dams, intakes, pipes, and flumes (Wilcox, 1996). Project Acreage: approx. 50,0000 acres of land total; 33,012.91 acres owned by State of Hawaii; 17,000 acres owned by East Maui Irrigation Company Limited (EMI); oldest subsidiary of Alexander & Baldwin, Inc. Nāhiku License Area: (2) 1-2-04:05,07 (por.) = 10,111.220 Acres (approx.) Ke‘anae License Area: (2) 1-1-02:02 (por.) = 10,768.000 Acres (approx.) Honomanū License Area: (2) 1-1-001:44 = 3,381.000 Acres (approx.) Huelo License Area: (2) 1-1-001:050, (2) 2-9-014:01, 05, 11,12,17 = 8,752.690 acres (approx.)</p>	

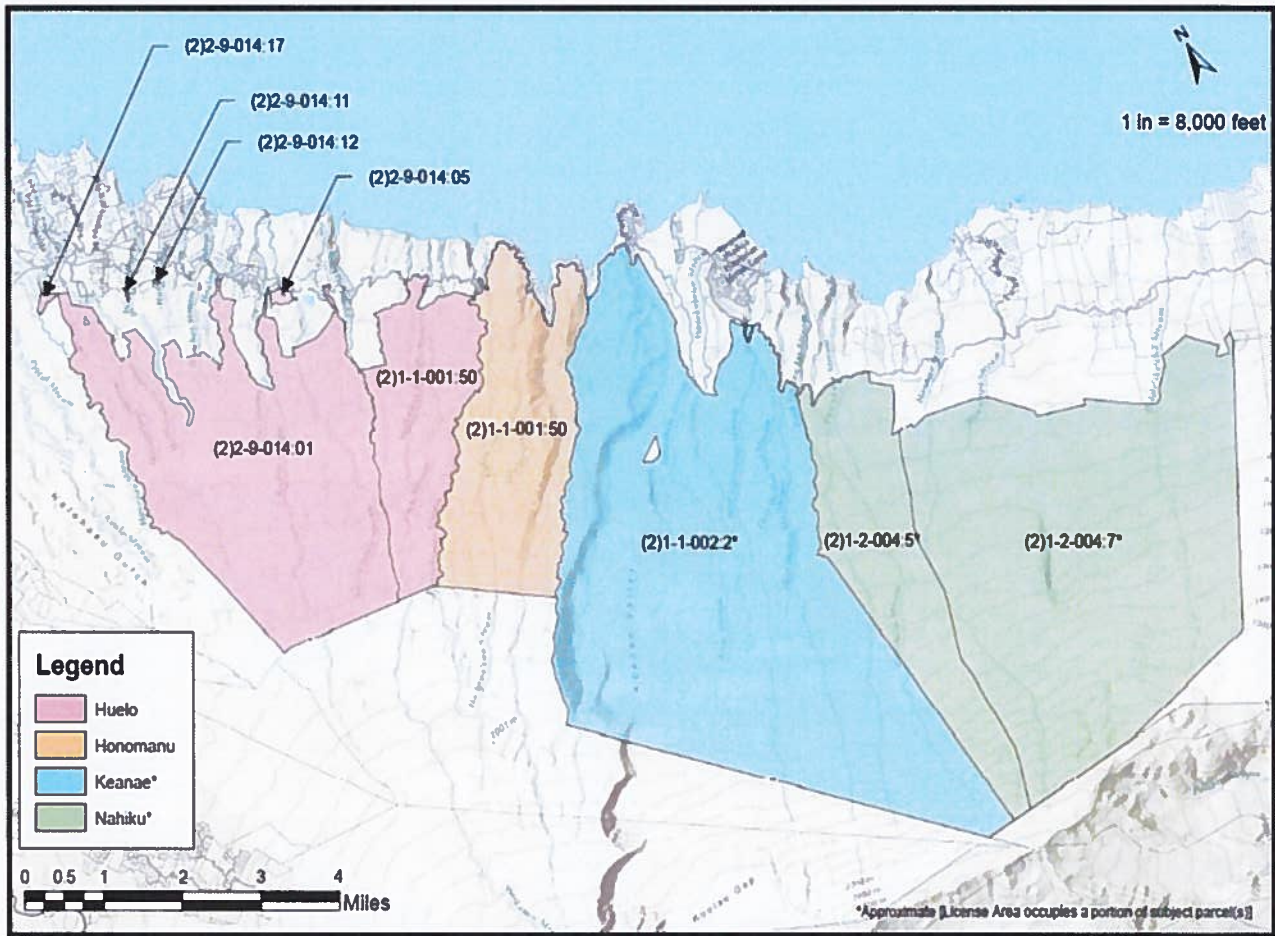


Figure 1: Most Recent Client Figure of Proposed Lease Renewal Area for the Huelo, Honomanu, Keanae, and Nahiku License Areas.

Archaeological Literature Review and Field Inspection
 East Maui Irrigation Water Lease Renewal Project
 Honopou, Mokupapa, Hanehoi, West Hanawana, East Hanawana, Pāpa‘a‘ea, West Makaīwa, East Makaīwa, Honomanū, Ke‘anae, Wailua Nui, Wailua Iki, Ko‘olau, and Ko‘olau Ahupua‘a, Makawao and Hana District, Maui Island
 TMK: [2] 1-2-004:005 & 007 por., 1-1-002:002 (por.), 1-1-001:044, 1-1-001:50, 2-9-014:001, 005, 011, 012 and 017

Section 2: ARCHAEOLOGICAL LITERATURE REVIEW AND FIELD INSPECTION SCOPE OF WORK

Please note that the following scope of work *does not satisfy* the Hawai'i state requirements for archaeological inventory surveys (Hawai'i Administrative Rules [HAR] §13-276); however, this scope of work can satisfy the requirement for consultation/documentation to determine if historic properties are present within the project area.

Field Inspection Strategy

1. CSH principal investigator Dr. Hallett Hammatt, will direct the archaeological literature review and field inspection project; a crew consisting of two project managers, one project supervisor and one archaeologist will complete the fieldwork under his supervision.
2. Fieldwork will include a field inspection of selected locations within the project area in order to make an assessment of potential historic properties associated with the EMI system or potentially affected by changes in water flow from the EMI system downstream.
3. Field methods will include GPS location of potential historic properties, photography of potential historic properties, observed portions of the EMI system, and general views of the landscape and natural environment that will be used to support the literature review document. Sketch maps, measurements, and written descriptions of potential historic properties may also be recorded as needed.
4. To support the field inspection, CSH may recommend the use of Light Detection and Ranging (LiDAR), which is a remote sensing method that uses light in the form of a pulsed laser to measure to the Earth. These light pulses—combined with other data recorded by the airborne system—generate precise, three-dimensional information about the shape of the Earth and man made features on the landscape. This survey method may be a cost-effective approach to observe and assess the relationship of the EMI system with potential historic properties and the natural landscape within one or more stream valleys that would be inaccessible to pedestrian survey. If approved by the client, CSH would subcontract a LiDAR specialist to perform this work and additional costs may be incurred.

5. Literature Review Strategy

1. Historical research to include study of archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of past land use. This research will be coordinated with the project's Cultural Impact Assessment (CIA) and architectural survey to prevent any duplication of effort and project costs.
2. Preparation of a report to present a synthesis of historical research and interpretation of the results of the field inspection in order to assess environmental impacts (or lack thereof) to historic properties in the lease area from a variety of factors including continued water diversion, changes in water flow, unrestricted public access, and natural factors (erosion/flooding).

Assumptions

CSH has made the following assumptions when preparing this proposal:

1. The cost estimate in this proposal is based on fieldwork conducted during standard work days. If the client requests fieldwork during nights, weekends, and holidays, work will be charged at a shift differential rate of 1.5x the normal rate for a given staff position. Night work is defined as any

work that occurs between the hours of 6 pm and 5 am. Holiday work is defined as any work that occurs during State and Federal observed holidays.

2. Travel time to and from project area will be added to fieldwork hours and billed at standard rates.
3. This proposal includes provisions for the following tasks and reimbursable expenses:
 - Project Coordination and Management: includes hours for coordination, communications and management with client, vendors, subcontractors, SHPD, etc.;
 - Background Research: includes study of archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near this project area.
 - Fieldwork: fieldwork per archaeologists (CSH Principal, two project managers, one supervisor and one general staff) for 5 days to conduct field inspection of selected locations of the project area;
 - Travel Expenses: includes travel expenses for Principal of firm and one project manager from our Oahu office.
 - Travel Time: three hours per day travel time to and from (office) and project site; and additional project manager and principal time to fly over from our Oahu office. Cost expenses also for 4WD vehicle rental.
 - Final Report: preparation of a report to include the results of the background research and fieldwork;
 - Graphics and GPS/GIS Work: hours for the production of graphics for the background research, fieldwork documentation, and other graphics needed for the draft and final report;
 - Report Production: production and transmittal of final report for client.

Work not in Scope

Additional meeting attendance, additional consultation, or items above and beyond the scope of work outlined in this proposal will be billed at the standard rates:

- \$70.00/hour for General Staff (*includes Archaeologist, Editor, GIS Technician, and Archaeological Support Staff*)
- \$85.00/hour for Supervisor
- \$100.00/hour for Project Director
- \$100.00/hour for GIS Specialist
- \$135.00/hour for Project Manager/Principal Investigator
- \$150.00/hour for Principal

Section 3: ESTIMATE

Costs detailed below represent a best estimate based on information gathered at the time of submission. Services outlined in this document are offered on a time and materials basis and actual costs may vary.

Project Costs - Labor

	<u>People</u>	<u>Days</u>	<u>Hrs / Day</u>	<u>Est. Qty</u>	<u>Rate</u>	<u>Extended</u>
Task: Project Coordination & Management						
Project Manager	1	x 3	x 8	= 24	hrs x \$ 135.00	= \$ 3,240.00
General Staff	1	x 1	x 8	= 8	hrs x \$ 70.00	= \$ 560.00
						Subtotal: \$ 3,800.00
Task: Background Research						
Project Manager	1	x 3	x 8	= 24	hrs x \$ 135.00	= \$ 3,240.00
General Staff	1	x 6	x 8	= 48	hrs x \$ 70.00	= \$ 3,360.00
						Subtotal: \$ 6,600.00
Task: Field Inspection						
Project Manager	2	x 5	x 10	= 100	hrs x \$ 135.00	= \$ 13,500.00
Supervisor	1	x 5	x 10	= 50	hrs x \$ 85.00	= \$ 4,250.00
General Staff	1	x 5	x 10	= 50	hrs x \$ 70.00	= \$ 3,500.00
						Subtotal: \$ 28,750.00
Task: Travel						
Project Manager	2	x 6	x 3	= 36	hrs x \$ 135.00	= \$ 4,860.00
Supervisor	1	x 5	x 3	= 15	hrs x \$ 85.00	= \$ 1,275.00
General Staff	1	x 5	x 3	= 15	hrs x \$ 70.00	= \$ 1,050.00
						Subtotal: \$ 9,885.00
Task: Draft Report						
CSH Principal, Dr. Hammatt	1	x 1	x 8	= 8	hrs x \$ 150.00	= \$ 1,200.00
Project Manager	1	x 13	x 8	= 104	hrs x \$ 135.00	= \$ 14,040.00
General Staff	1	x 10	x 8	= 80	hrs x \$ 70.00	= \$ 5,600.00
						Subtotal: \$ 20,840.00
Task: Final Report						
Project Manager	1	x 1	x 8	= 8	hrs x \$ 135.00	= \$ 1,080.00
Supervisor	1	x 1	x 8	= 8	hrs x \$ 85.00	= \$ 680.00
						Subtotal: \$ 1,760.00
Task: Graphics and GPS/GIS Work						
GIS Specialist	1	x 1	x 8	= 8	hrs x \$ 100.00	= \$ 800.00
General Staff	1	x 14	x 8	= 112	hrs x \$ 70.00	= \$ 7,840.00
						Subtotal: \$ 8,640.00
Task: Report Production						
General Staff	1	x 1	x 4	= 4	hrs x \$ 70.00	= \$ 280.00
						Subtotal: \$ 280.00
Summary of Labor Costs						
Labor Subtotal.....						\$ 80,555.00
Tax at 4.712%.....						\$ 3,795.75
Labor Total.....						\$ 84,350.75

Project Cost Continued:

Project Costs - Expenses						
Off-Island Travel Expenses						
Item	People		Qty		Rate	Extended
Airfare			2	Tickets	x \$ 213.61 per Rount-Trip Ticket	= \$ 427.22
4WD Rental			5	Days	x \$ 90.05 per Day	= \$ 450.26
Lodging	1	Rooms	x 4	Nights	x \$ 157.07 per Night	= \$ 628.27
Per-Diem	2	People	x 5	Days	x \$ 30.00 per Day	= \$ 300.00
Subtotal:						\$ 1,805.76
Consumables and Other Small Ticket Items						
Item						Extended
Field Consumables						\$ 500.00
Subtotal:						\$ 500.00
Summary of Reimbursable Expenses						
Expense Subtotal.....						\$ 2,305.76
10% Handling Fee.....						\$ 230.58
Expense Total.....						\$ 2,536.33
Summary of Costs						
Project Costs						
Total Labor, including General Excise Tax.....						\$ 84,350.75
Reimbursables including all fees and any applicable taxes.....						\$ 2,536.33
Total Project.....						\$ 86,887.09

Section 4: SCHEDULE

Upon acceptance of this proposal CSH will coordinate with client to schedule work.

Section 5: CLIENT RESPONSIBILITIES

Should client engage CSH for this work, we request delivery of all relevant project information to commence work including a project area map with defined project boundaries; verification of project information as stated on page 2 of this proposal; and any topographic maps, aerial photos, and other scientific/technical reports for the project, if available. CSH requests receiving graphics in ESRI shapefile or AutoCAD format when available.

Client will coordinate with current landowners/representatives/lessees to provide access to the site for the field inspection on a suitable schedule.

Section 6: ENGAGEMENT

This proposal is valid for 6 months.

CSH will bill monthly for work completed. Expenses are billed at cost plus a 10% handling fee. CSH reserves the right to charge 1.5% interest on any or all invoices more than 30 days past due.

If the terms of this proposal are satisfactory, please acknowledge your authorization by signing and dating a copy of this proposal and returning it to Paul Starzyk at pstarzyk@culturalsurveys.com together with your deposit check in the amount of \$ 8,600.00.

If you have any questions regarding the scope of these services and data to be furnished, please contact me at (808) 262-9972 or by email at hhammatt@culturalsurveys.com. We look forward to working with you on this project.

Sincerely,



Hallett H. Hammatt, PhD

ACCEPTED:

Signature

Date

Printed Name

ATTACHMENT G

Architectural Inventory Survey
Mason Architects



Mason Architects

August 21, 2017

Earl Matsukawa
Wilson Okamoto Corp.
1907 S. Beretania Street, #400
Honolulu, HI 96826

Re: Intensive Level Survey (ILS) for East Maui Irrigation (EMI) System, Maui.

Dear Earl,

Thank you for requesting this proposal for an Intensive Level Survey (ILS) in keeping with the ILS Plan we prepared for the East Maui Irrigation System, Maui. We understand that this work is in fulfillment of SHPD's request relating to the Environmental Impact Statement (EIS) that Wilson Okamoto Corporation (WOC) is preparing for Alexander and Baldwin, Inc. and the East Maui Irrigation Company, Limited (A&B)'s proposed lease of several areas on Maui for water rights (Log No. 2017.00026, Doc No. 1701GC08). The main components are summarized below. Please refer to our ILS Plan for more detail.

In keeping with the SHPD-approved ILS Plan, MAI will complete the following tasks:

- Survey a total of 20 sluice gates in the field to function as representative examples for the ILS;
 - Documentation of these representative sluice gates will be presented in Appendix B Data Sheets graphically, with descriptions, photographs, and drawings (as available) of 'typical' examples and any common variations (such as Sluice Gate Type A, Sluice Gate Type B, Sluice Gate Type C), along with the proposed modifications.
 - One photograph will be provided for each of the 20 representative sluice gate examples, along with an integrity assessment (Presented in Appendix C Data Sheets).
 - The other components of the EMI shown in the bullet point list below will be addressed in the ILS in two (less detailed) ways. First, they will be included in a written Data Summary section that explains how the overall EMI system functions, and the role each component has. Second, they will be included in a summary spreadsheet/table that includes thumbnail photos and brief, functions/descriptions (Appendix A).
 - Bridges
 - Control gates
 - Dams
 - Ditches
 - Flumes
 - Intakes
 - Siphons
 - Sluice gates
 - Stream diversions
 - Tunnels
 - Walkways
 - Weirs

- MAI will work with EMI Manager Mr. Garret Hew to obtain historical information about the system, existing color photographs of the resources, and explanations about how the system works. Mr. Hew will also assist with the selection of the 20 representative examples to be surveyed for the ILS, and with coordinating the fieldwork that is required. #
- We assume that the field work will require a maximum of 4 days. However, if the weather and field conditions are not cooperative or other conditions beyond our control affect the field work, such that the photographs and site visits cannot be accomplished within the days assumed, then reimbursement of additional direct costs (e.g. for additional time, travel and/or lodging) would be necessary.

We are proposing a cost of \$16,732 to cover our labor and travel expenses, and Hawaii State GET for this work.

Thank you for inviting this proposal. We always appreciate the opportunity to work with you.

Sincerely,

A handwritten signature in cursive script, appearing to read "Polly Cosson Tice".

Polly Cosson Tice

Mason Architects Inc.

Fee Proposal

EMI ILS

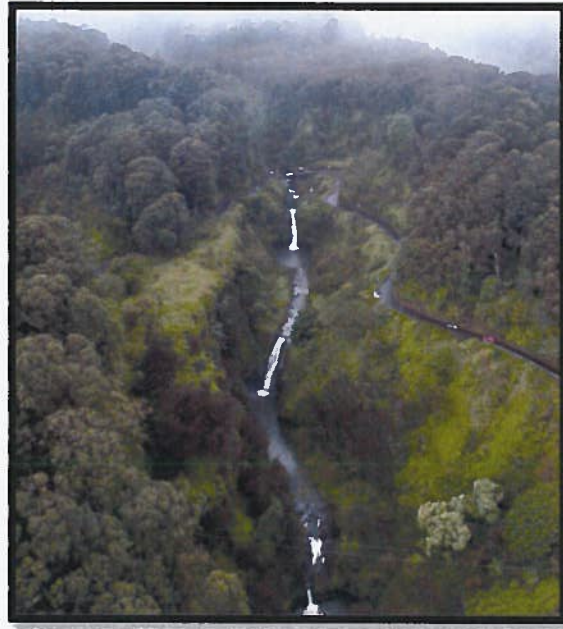
Maui, Hawaii

August 21, 2017

		Project Mgr.	Architectural Historian	Preservation Specialist
Written Documentation				
1.	Background research		16	
2.	Field work/large format photography (assumes up to 4 days on site)		40	
3.	Develop supporting sections of ILS: background/objective team, methodology, setting, historical overview, bibliography	3	6	
4.	Develop primary written sections of ILS:			
	Data summary (description of system)	1	18	
	(historic evaluation) recommendations	6	4	
5.	Develop Appendices:			
	Appendix A		8	
	Appendix B data sheets (sluice gate typology)	4	20	
	Appendix C - sluice gate photographs / integrity		8	
6.	Mapping		16	
7.	In-house review & pre-draft report submittal	4	8	
8.	Respond to Client/SHPD comments	1	8	
9.	Submit Draft to SHPD		2	
10.	Project Management and Coordination	4	4	
	Subtotal - hours	23	158	0
	Rates	\$114.00	\$76.50	\$74.00
	Subtotal by person	\$2,622.00	\$12,087.00	\$0.00
	MAI LABOR SUBTOTAL			\$14,709.00
	4.166% Tax on Labor			\$612.78
	MAI LABOR			\$15,321.78
MAI Travel Costs				
	Round trip airfare (1 architectural historian)	\$190	1	\$190
	Hotel	\$195	3	\$585
	Rental Car and gas per day (four wheel drive vehicle not included)	\$80	4	\$320
	Meals - architectural historian	\$65	4	\$260
	Subtotal Travel			\$1,355
	Subtotal, All Direct Costs			\$1,355
	GET on Direct Costs (4.166%)			\$55.77
	TOTAL (labor and direct costs and GET)			\$16,732.55

ATTACHMENT H
HSHEP Modeling, Field Surveys
and Damsefly & Mosquito Assessment
Trutta Environmental Solutions

Revised Proposal to Assess the Environmental Impact of Stream Diversions on 44 East Maui Streams using the Hawaiian Stream Habitat Evaluation Procedure (HSHEP) Model



April 21,
2017

Prepared for:

Earl Matsukawa, AICP
Vice President & Director
Wilson Okamoto Corporation

INTRODUCTION

The East Maui Irrigation (EMI) system supplies water to some 30,000 acres of sugarcane in Central Maui and serves more than 9000 Upcountry residents and farmers. Currently, water lease holders are being granted one year contracts. In an effort to obtain long-term water leases for 44 East Maui streams, East Maui Irrigation (owned by Alexander and Baldwin, Inc (A&B)), has contracted consulting firm Wilson Okamoto to develop an environmental impact statement on the 300 water diversions they manage. To understand the impact on stream habitat and stream animals, Trutta Environmental Solutions (TRUTTA) will combine the results of habitat and diversion assessments and biotic surveys with the Hawaiian Stream Habitat Evaluation Procedure (HSHEP) model to assess issues associated with the current stream diversions and potential impacts to optimizing water withdrawal including: loss of instream habitat from construction or diversion of stream flow, creation of barriers to stream animal upstream movement and entrainment of downstream drifting larvae.

Changes to the naturally occurring habitat brought about by man's modification of the environment may have a positive or negative affect on the quantity or distribution of a species' suitable habitat. The HSHEP model was designed to quantify how various man-made changes affect native Hawaiian stream animals. While suitable habitat is fundamental for a species persistence and is the focus of the HSHEP model, it is not the only thing that may affect species populations. We fully realize that other factors, such as pollution, disease, or competition with introduced species may also greatly influence the observed distribution and densities of native animals, yet understanding the natural distribution of animals without the presence of these additional factors is still important. Providing managers with the ability to assess change to native species habitat with respect to flow modifications, watershed development, or in-channel structures is important in understanding the positive or negative implications of various actions. The HSHEP model is intended to capture the major aspects of native stream animal ecology, the typical geomorphology of Hawaiian streams, and common modifications to the environment within a single model.

The HSHEP model for the East Maui streams will address two scenarios associated with the diversion systems. The first scenario is to assess suitable habitat with diversions, other major infrastructure and land-use conditions as they currently exist, and the second scenario is to assess suitable habitat with different possible flow releases or diversion modifications aimed at minimizing environmental impact while maximizing water availability. These two scenarios will allow for the comparison and quantification of the changes in suitable habitat for native stream animals as a result of the proposed modifications and can help decision-makers optimize water withdrawal and obtain a long-term water leases while upholding Hawaii's public trust doctrine.

The HSHEP model approach has been used extensively in Hawaii, including for instream flow determinations on East and West Maui streams (Parham et al. 2009, Parham 2013a), and Waimea River,

Kauai (Higashi and Parham 2016), for hydropower impact assessment on Wailua River, Kauai (Parham 2013b), flood mitigation impact assessment on the Ala Wai Streams, Oahu (Parham 2015b, c) and other stream assessments across the state. In addition, the integrated field surveys and HSHEP approach underwent and passed formal professional review by the US Army Corps of Engineers (USACE) for its application on the Ala Wai Streams Flood Mitigation Project (Parham 2015a).

The methods proposed for this project have been developed for, applied on, and critically reviewed for use in Hawaiian streams. Dr. Parham, Principal and Director of Research and Development for TRUTTA, is the creator of the HSHEP model and has applied the technique to Hawaiian streams to aid in the determination of instream flow issues and habitat impact assessment.

The proposed cost for this project is variable due to the unknown amount of field work that may be required to create an accurate and defensible HSHEP model. The proposed cost is **\$286,775** for all collection and organization of all available data, a preliminary and final HSHEP modeling runs, scenario testing, and all model documentation and report production. The cost for field surveys have been estimated to cost between **\$60,000 and \$200,000**. To help limit the cost of field work yet still produce a high quality HSHEP model, we have proposed a process to determine the most important field survey locations to avoid any unnecessary field work. As a result, we can collaborative determine the field survey efforts maximize results while minimizing costs to A&B.

GOAL AND OBJECTIVES

Goal

The primary goal of this project is to quantify the current impact of the stream diversions to native stream animals on 44 East Maui streams using the HSHEP model integrated with site-specific habitat, biota and diversion conditions. A secondary goal is to assess the impact of potential changes to the diversions made to optimize water withdrawal while minimizing ecological impact.

Objectives

The HSHEP Model project on the East Maui streams will focus on two main objectives: (1) assessing and quantifying suitable habitat using current conditions and (2) assessing and quantifying suitable habitat after potential changes aimed at optimizing water withdrawal.

To complete these objectives, the following steps will be taken:

1. *Preliminary HSHEP Model Assessment*: The HSHEP model will be set-up and run for all 44 streams and 300 diversions associated with the East Maui Irrigation System.
 - a. Set up all coding for all watersheds, streams, stream segments, and diversions in the system.
 - b. Gather all available pertinent data on all watersheds, streams, stream segments, and diversions in the system. Include diversion registration data.

-
- c. Organize and document the quality and completeness of the data for each watershed, stream, stream segment, and diversion in the system with respect to:
 - i. Instream habitat
 - ii. Diversion conditions
 - iii. Biotic conditions
 - d. Where information is missing from above data collection, assume conditions and document the absence of quality data in the data table.
 - e. Run the full HSHEP model for all 44 streams and 300 diversions.
 - f. Analyze the results and determine the most important sites which lack site-specific data required to survey to improve model confidence.
2. *Conduct Field Surveys to fill in missing information:*
- a. *Habitat Assessment:* Gather data on instream flow conditions and stream habitats for each stream diversion being studied using field data collected with the High Definition Stream Survey (HDSS) method with backpack video or aerial imagery from a drone.
 - b. *Diversion Assessment:* Conduct barrier assessments of each diversion being studied to determine type (barrier, side or bottom grate), capacity, and potential for modification.
 - i. This may be done by employees of EMI, or by TRUTTA.
 - ii. The majority of this will be replaced by information in the diversion registration data.
 - c. *Biotic Assessment:* Gather data on the populations of native stream animals using the High Definition Fish Surveys (HDFS) to document biota in survey segments above and below diversions.
 - d. *Field Survey Data Classification:* Organize and classify field survey data into categories for use in HSHEP model.
3. *Final HSHEP Model Assessment:* Update and run HSHEP model for whole system incorporating habitat, diversion and biota data gathered in the field.
4. *Analysis:* Document HSHEP model results to assess suitable habitat for native stream animals associated with two scenarios:
- a. Scenario 1: Quantify the amount and distribution of suitable habitat under current stream conditions.
 - b. Scenario 2: Quantify the amount and distribution of suitable habitat under potential changes to the diversions. This scenario would allow various flow releases or diversion modifications to be optimized to find the best way to minimize environmental impact, maximize water availability, and minimize modification costs.
5. *Documentation:* Document the overall impact assessment of the diversions in a written report.
-

Overall, this set of objectives seeks to conduct the HSHEP on available data first to determine where and how much field work is needed and is aimed at limiting the costly field surveys to only high priority locations. Having a working version of the HSHEP model early in the overall project cycle will also provide A&B greater ability to test various water management scenarios to determine the optimal solution.

TRUTTA QUALIFICATIONS TO ENSURE A SUCCESSFUL PROJECT

Dr. Parham, Principal of and Director of Research and Development for TRUTTA, is the creator of the HSHEP model and has applied the technique to Hawaiian Streams to aid in the determination of instream flow issues and habitat impact assessment. Dr. Parham will serve as Principal Investigator on this project and lead all technical aspects of the project. The original HSHEP model was developed on the East Maui Streams and has been used across the state in stream impact assessment projects. The modeling and field methods proposed for this project have been developed on, used in, and critically reviewed for use in Hawaiian streams.

Parham, J.E., G.R. Higashi, R.T. Nishimoto, S. Hau, D.G.K. Kuamo'o, L.K. Nishiura, T.S. Sakihara, T.E. Shimoda and T.T. Shindo. 2009. The Use of Hawaiian Stream Habitat Evaluation Procedure to Provide Biological Resource Assessment in Support of Instream Flow Standards for East Maui Streams. Division of Aquatic Resources and Bishop Museum. Honolulu, HI. 104 p.

Parham, J.E. 2017. An Assessment of the Environmental Impact of the HELCO Wailuku Hydroelectric Plants on Native Stream Animals with Respect to Instream Habitat, Barriers to Migration, and Entrainment using the GIS Model-based Hawaiian Stream Habitat Evaluation Procedure. Submitted to SSFM, Inc. Honolulu, HI. 91 p.

Parham, J.E. 2015. Ala Wai Flood Control Project Impact to Native Stream Animal Habitat and Possible Habitat Mitigation Options. Submitted to CH2MHill. Honolulu, HI. 58 pages.

Parham, J.E. 2013. Quantification of the impacts of water diversions in the Nā Wai 'Ehā streams, Maui on native stream animal habitat using the Hawaiian Stream Habitat Evaluation Procedure. Commission on Water Resource Management. Honolulu, HI. 113p.

Parham, J.E. 2013. Assessment of the environmental impact of the Upper and Lower Waiahi Hydroelectric Plants on the native stream animals with respect to habitat changes, barriers to migration, and entrainment using the GIS model-based Hawaiian Stream Habitat Evaluation Procedure. Kaua'i Island Utility Cooperative. 309 p.

The HSHEP model approach has been extensively reviewed with each application of the model. In 2015, The overall HSHEP approach and methodology underwent formal professional review by the USACE and was approved for use on the Ala Wai Flood Control Project. The HSHEP method for the Ala Wai watershed streams followed the accepted approach and methods can be found in the document:

Parham, J.E. 2015. The Hawaiian Stream Habitat Evaluation Procedure (HSHEP) model: Intent, Design, and Methods for Project Impact Assessment to Native Amphidromous Stream Animal Habitat. Submitted to Civil and Public Works Branch, U.S. Army Corps of Engineers, Honolulu District, HI. 178 pages.

One of the strengths of the HSHEP model is that it integrated with the Division of Aquatic Resources' (DAR) Aquatic Surveys Database. This allows the model to use all the available information on stream animal habitat and distribution in predicting their instream occurrences. The DAR Aquatic Surveys Database contains data from over 13,000 survey locations and over 90,000 species observations. The database includes results from state surveys as well as those from federal, university, and private researchers. More than 370 different literature sources support the data contained within the DAR Aquatic Surveys Database. Dr. Parham is the lead designer and developer of the State's stream database.

Parham, J.E., D.G.K. Kuamo'o, and G.R. Higashi. 2002-2010. Hawai'i Division of Aquatic Resources Aquatic Surveys Database. A database to store historical and current fisheries surveys in nearshore, estuarine, and stream environments. Versions 1-4. Hawai'i Division of Aquatic Resources.

Kuamo'o, D.G.K., G.R. Higashi, and **J.E. Parham.** 2007. Structure of the Division of Aquatic Resources Survey Database and use with a Geographic Information System. In: *Biology of Hawaiian Streams and Estuaries*, N.L. Evenhuis & J.M. Fitzsimons, eds. Bishop Museum Bulletin in Cultural and Environmental Studies 3:315-322.

Dr. Parham was the lead author of the 7 volume, 3,834 page Atlas of Hawaiian Watersheds and Their Aquatic Resources. The Atlas was an outcome from the creation of the DAR Aquatic Surveys Database and was used support the development of the statewide HSHEP models. The Atlas project as a joint project among Bishop Museum, DAR, and the U.S. Fish and Wildlife Service (USFWS).

Parham, J.E., G.R. Higashi, E.K. Lapp, D.G.K. Kuamo'o, R.T. Nishimoto, S. Hau, D.A. Polhemus, J.M. Fitzsimons, and W.S. Devick. 2008. *Atlas of Hawaiian Watersheds and their Aquatic Resources: Island of Kaua'i*. Bishop Museum and Division of Aquatic Resources, Department of Land and Natural Resources, State of Hawai'i. 614 p.

Parham, J.E., G.R. Higashi, E.K. Lapp, D.G.K. Kuamo'o, R.T. Nishimoto, S. Hau, D.A. Polhemus, J.M. Fitzsimons, and W.S. Devick. 2008. *Atlas of Hawaiian Watersheds and their Aquatic Resources: Island of O'ahu*. Bishop Museum and Division of Aquatic Resources, Department of Land and Natural Resources, State of Hawai'i. 672 p.

Parham, J.E., G.R. Higashi, E.K. Lapp, D.G.K. Kuamo'o, R.T. Nishimoto, S. Hau, D.A. Polhemus, J.M. Fitzsimons, and W.S. Devick. 2008. *Atlas of Hawaiian Watersheds and their Aquatic Resources: Island of Molokai'i*. Bishop Museum and Division of Aquatic Resources, Department of Land and Natural Resources, State of Hawai'i. 420 p.

Parham, J.E., G.R. Higashi, E.K. Lapp, D.G.K. Kuamo'o, R.T. Nishimoto, S. Hau, D.A. Polhemus, J.M. Fitzsimons, and W.S. Devick. 2008. *Atlas of Hawaiian Watersheds and their Aquatic Resources: Island of Maui*. Bishop Museum and Division of Aquatic Resources, Department of Land and Natural Resources, State of Hawai'i. 866 p.

Parham, J.E., G.R. Higashi, E.K. Lapp, D.G.K. Kuamo'o, R.T. Nishimoto, S. Hau, D.A. Polhemus, J.M. Fitzsimons, and W.S. Devick. 2008. *Atlas of Hawaiian Watersheds and their Aquatic Resources: Island of Hawai'i*. Bishop Museum and Division of Aquatic Resources, Department of Land and Natural Resources, State of Hawai'i. 1,262 p.

While the HSHEP model is a powerful tool in critically assessing impacts to native stream animals from a range of possible actions, it is also important to effectively collect field data in Hawaiian streams to document instream habitat, stream biota, and barriers to fish passage to support an accurate HSHEP model. In addition to his extensive stream habitat modeling experience in Hawaii, Dr. Parham is the creator and lead developer of the High Definition Stream Survey (HDSS) technique for rapid habitat documentation used on projects for DLNR-Engineering, DAR and the Commission on Water Resource Management (CWRM). Dr. Parham is also the creator and lead developer of the High Definition Fish Survey (HDFS) technique for rapid biotic surveys used in Hawaiian streams with the DAR, CWRM, and the USFWS. Finally, Dr. Parham is the lead author of the Hawaiian Stream Barrier Assessment Methodology supported by the DAR and the USFWS.

The HDSS, HDFS and Barrier Assessment methods have proved highly effective in Hawaiian streams and supported by State and Federal biologists and water managers. Some recent projects using the methods include:

Higashi, G.R. and J.E. Parham. 2016. Impacts of Water Releases on Stream Habitat and Stream Biota of Waimea River, Kauai using the High Definition Stream Survey (HDSS) and High Definition Fish Survey (HDFS) Techniques: Project Report. Submitted to Commission on Water Resources Management. Honolulu, HI. 50 p

Parham, J.E. 2015. Fish Biomass Estimates from High Definition Fish Survey (HDFS) Videos in the Ala Wai Watershed Streams, Oahu. Submitted to Division of Aquatic Resources, Department of Land & Natural Resources, State of Hawaii and US Fish and Wildlife Service, Department of the Interior, Honolulu, HI. 14 pages.

Parham, J.E. 2015. Stream Habitat Mapping of Manoa Stream, Oahu using High Definition Stream Surveying (HDSS) Techniques. Submitted to Engineering Division, Department of Land & Natural Resources, State of Hawaii, Honolulu, HI. 78 pages.

Parham, J.E. and G.R. Higashi. 2015. Fish Surveys of the Ala Wai Watershed Streams. Bishop Museum & Division of Aquatic Resources. Honolulu, HI. 50 p.

Parham J.E. and G.R. Higashi. 2012. Tier 2 Barrier Survey Methodology and Forms: Assessing Restrictions to Passage of Amphidromous Species in Hawaiian Streams – V1.2. Division of Aquatic Resources and US Fish and Wildlife Service. 38 p.

Dr. Parham not only has broad experience in stream research and modeling across Hawaii, he is very familiar with the East Maui Streams specifically. In addition to the creation and application of the HSHEP model for the instream flow determination in 17 East Maui Streams, he co-authored the results of 4 years of post-water return monitoring surveys in East Maui Streams.

Higashi, G. R., **J.E. Parham**, S. Hau and E.K. Lapp. 2014. Monitoring Changes in Habitat, Biota, and Connectivity Resulting from Water Returns in the East Maui Streams of East Wailua Iki, West Wailua Iki, and Waiohue Streams.

He also co-authored the DAR survey reports for the East Maui streams of Kolea, Waikamoi, Puohokamoa, Punalau, Honomanu, Nua'ailua, Ohi'a, West Wailua Iki, East Wailua Iki, Kopili'ula, Waiahue, Paakea Gulch, Hanawi, Makapipi, Waihe'e, Pi'inaau, Waiehu, Honopou, Waiokamilo, Hanehoi, and Wailuanui Streams.

METHODS

The HSHEP model is designed to function with a range of data available for the streams in question. The model can run on 100% available or assumed (best professional judgement) data. An issue with this is captured in the general modeling caveat "junk in equals junk out." Thus, it is likely that some site-specific data on instream habitat, biota, or diversions will need to be collected to support the East Maui HSHEP model. Where possible, data from recent surveys will be used to provide site-specific data, but where little or no recent data exists, field surveys should be conducted to more accurately define current conditions. The plan to run a preliminary HSHEP model on only available data seeks to determine the specific field surveys required for an accurate and defensible model and to minimize conducting costly field survey where they are not absolutely needed.

The following are description of the major methods (HSHEP, HDSS, Barrier Assessment, and HDFS) proposed in this project.

Available Data Assessment

To better understand what data is current available and what may need to be collect from field surveys, we would set up a new HSHEP model covering all 44 streams in East Maui. All available data on the ditch diversions, watersheds, streams and biota would be cataloged to document what and where suitable information exists to populate the HSHEP model. In addition to the prior work of Dr. Parham in collaboration with colleagues at the DAR on 17 of the East Maui stream (Table 1), the USGS and

CWRM have collected substantial information on the East Maui streams. We will also use the EMI diversion registration information where possible in lieu of a new barrier assessment.

Additionally, since the Interim Instream Flow Standards (IIFS) were designated for East Maui streams, some work on modifying diversions or changing flow conditions has already occurred. Some of this was documented in the 2014 DAR monitoring report. For example, diversion modifications to allow fish passage were conducted by EMI in conjunction with DAR (Figure 1) and habitat and biota data and images were collected at various flows by DAR (Figure 2). The status of these modifications and any other changes would need to be included in the update HSHEP model.

Table 1. Streams and their corresponding DAR Watershed ID.

Number	Stream Name	Watershed ID
1	Kolea	64003
2	Waikamoi	64004
3	Puohokamoa	64006
4	Haipuaena	64007
5	Punalau	64008
6	Honomanu	64009
7	Nuaailua	64010
8	Ohia	64012
9	W. Wailuaiki	64015
10	E. Wailuaiki	64016
11	Kopiliula	64017
12	Waiohue	64018
13	Paakea Gluch	64019
14	Waiaaka	64020
15	Kapaula Gluch	64021
16	Hanawi	64022
17	Makapipi	64023

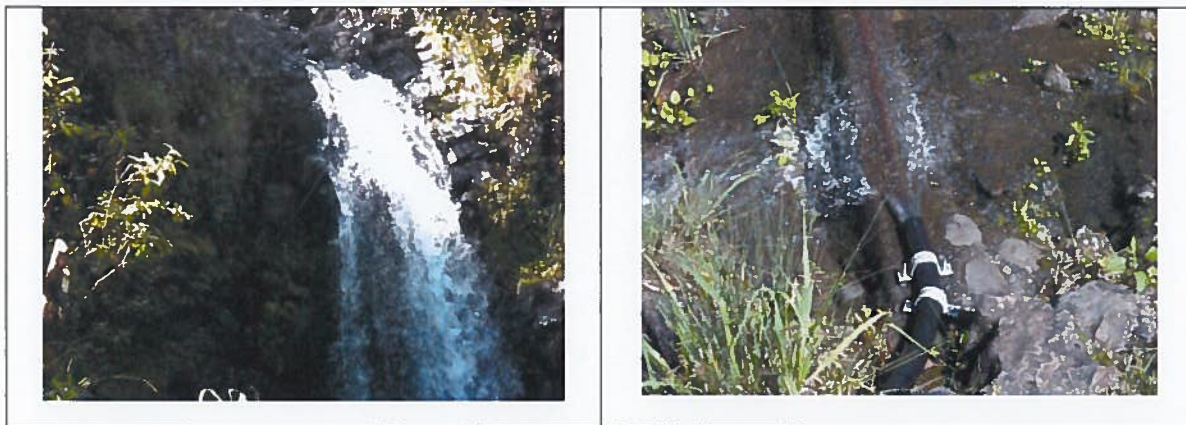


Figure 1: Modification by EMI to West Wailua Iki diversion to improve passage by providing a wetted pathway over the diversion dam.



Figure 2. Digital Images of the upstream view of Site 4 on upper East Wailua Iki during different survey dates and water releases (Figure 23 in DAR monitoring Report, Higashi et al. 2014).

HSHEP Models

The HSHEP model is an outgrowth of a history of collaboration among biologists at Hawaii Division of Aquatic Resources (DAR) and researchers at various universities, agencies, museums, and private companies. The collaborative effort focused on understanding the different aspects of the ecology and management of amphidromous stream animals (Fitzsimons and Nishimoto 2007). The HSHEP model is an attempt to quantify how various man-made changes affect native Hawaiian stream animals. The HSHEP model is intended to capture the major aspects of native stream animal ecology, the typical geomorphology of Hawaiian streams, and common modifications to the environment within a single model. Additional factors outside of habitat can be modeled with the HSHEP approach, but need additional modeling steps that are best addressed on a case-by-case basis at this point. The HSHEP model provides water managers the ability to assess change to native species habitat with respect to flow modifications, watershed development, or in channel structures and is important in understanding the positive or negative implications of various actions.

The HSHEP model follows the overall Habitat Evaluation Procedure (HEP) model concepts developed by the U.S. Fish and Wildlife Service (USFWS) to evaluate the quantity and quality of habitat available for a species of concern (USFWS 1980 a,b, USFWS 1981). In general, a Habitat Evaluation Procedure (HEP) model has several characteristics:

1. It is a habitat-based assessment method.
2. It assumes that habitat quality and quantity are related to the number of animals using a habitat over the long term.
3. It uses measurable attributes of habitat quality and quantity to create relationships between habitat suitability and animal occurrence and density.
4. It converts suitability relationships into standardized Habitat Suitability Indices (HSI) that encompass the range of observed habitat conditions.
5. The HSI values range from 0 (unsuitable habitat) to 1 (most suitable habitat).
6. It multiplies the habitat quality (value from the HSI) with the habitat quantity (area) to determine overall Habitat Units (HU) within the area of concern.

As a result of the model design, HEP impact analyses are intended to allow the user to:

1. provide defined suitability-based estimates of HU within a study area,
2. provide impact assessments of the changes of HU within the study area under different management scenarios,
3. provide objective comparable unit measures for multi-site comparisons,
4. quantify changes in HU to be annualized and comparable with other cost/benefit analyses,
5. create plots of the distribution of HU in map-based formats (GIS analyses) to address issues of habitat fragmentation or connectivity.

The HEP user manual describes a HEP model like this, “HEP is a convenient means of documenting and displaying, in standard units, the predicted effects of proposed actions.” USFWS designed HEP to be a legally defensible, standardized format for impact assessment in natural resource settings (USFWS 1980

a). While HEP models have been developed and used for impact assessment nationally for hundreds of species of birds, mammals, and fish, this is the first HEP model to assess changes in stream animal habitat in Hawaii.

Traditional HEP procedures have been joined with multi-spatial modeling efforts for Hawaiian streams (Parham 2002, Kuamo’o et al. 2006, Parham 2008). The multi-spatial models address issues of scale in understanding differences in habitat availability and species distributions. For example, the presence or density of amphidromous animals is influenced by the location of the sample site within a stream. Similar habitats found near the ocean may have different species assemblages than habitats found further inland. Additionally, characteristics of different watersheds and their streams influence the observed species assemblages. For example, streams with terminal waterfalls have different species assemblages than streams without terminal waterfalls. By assessing suitability at multiple spatial scales, different aspects of amphidromous animal ecology can be more appropriately modeled (Figure 3). As a result of the combination of the HEP method with multi-scale analysis, management issues can be addressed on a site, stream segment, whole stream, or region level. The HSHEP model is intended to be useful to assess the impacts of stream channel modification, flow alteration, land use change, climate change, stream restoration, and barrier modifications.

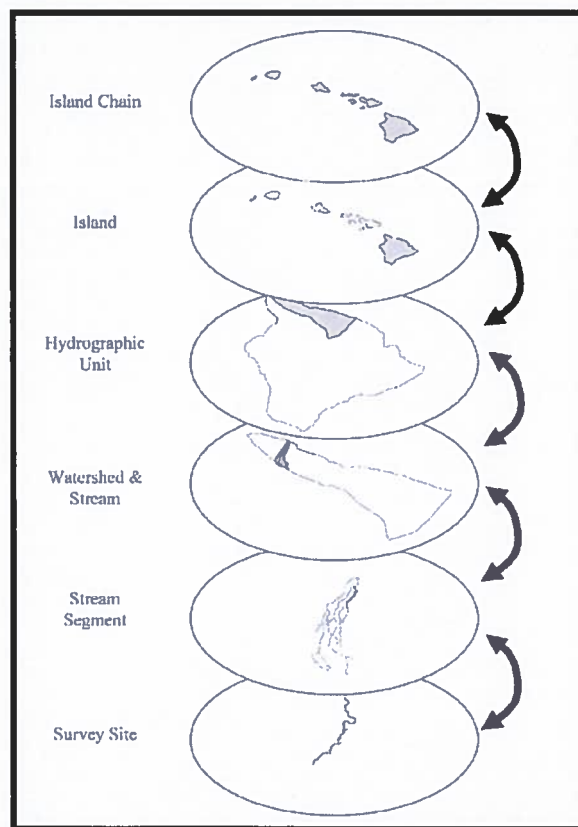


Figure 3: Spatially-nested hierarchy of the DAR Aquatic Surveys Database and predictive levels within the HSHEP model.

The HSHEP Model uses published information for species distributions at the watershed and reach scale and combines it with local data from the habitat and biotic surveys. Stream animals' distribution and habitat use are documented using information stored in the DLNR-DAR Aquatic Surveys Database (2009). This represents over 13,000 survey locations and over 90,000 species observations. The database includes results from state surveys as well as those from federal, university, and private researchers. More than 370 different literature sources support the data contained within the DAR Aquatic Surveys Database. The HSHEP model leverages the data within the DAR Aquatic Surveys Database to develop quantitative measures of habitat use for native stream animals. For this project, the HSHEP model was created for the typical group of native freshwater fish and macroinvertebrates found in Hawaiian streams (Table 2).

Table 2: Highlighted Species habitat evaluated within Wailuku River for this project.

Organism Type and Family	Scientific name	Hawaiian name
Freshwater fish (family Gobiidae)	<i>Awaous stamenius</i> *	'O'opu nākea
	<i>Lentipes concolor</i> *	'O'opu alamo'o
	<i>Stenogobius hawaiiensis</i> *	'O'opu naniha
	<i>Sicyopterus stimpsoni</i> *	'O'opu nōpili
Freshwater fish (family Eleotridae)	<i>Eleotris sandwicensis</i> *	'O'opu akupa
Freshwater shrimp (Crustacean) (family Atyidae)	<i>Atyoida bisulcata</i> *	'Ōpae kala'ole
Freshwater prawn (Crustacean) (family Palaemonidae)	<i>Macrobrachium grandimanus</i> *	'Ōpae 'oeha'a
Freshwater snail (Mollusk) (family Neritidae)	<i>Neritina granosa</i> *	Hīhīwai

*Identified as "Species of Greatest Conservation Need" in the Hawaii Statewide Aquatic Wildlife Conservation Strategy (Meadows et al. 2005).

The selection of the highlighted set of amphidromous stream animals is appropriate in this case for several reasons.

- These species have been observed within the East Maui Watersheds.
- All of these species have a diadromous life history, meaning that they migrate from the freshwater stream to the ocean and back again (McDowall 2007). This potentially exposes the migrating animals to barriers in the stream pathway, entrainment into water diversion systems, and elimination of suitable habitat resulting from structures associated with the ditch system and its diversion.

- The DAR Aquatic Surveys Database has distribution and habitat use information for each of these species.
- The HSHEP model has habitat suitability indices developed for each of these species.

The HSHEP model can produce post map-based outputs (Figure 4) and spreadsheet-based outputs (Table 3) to allow the results to be analyzed and used in various ways. The spreadsheet-based output contains numerous linked tables for inputs, outputs and overall summaries to allow the user to quantify the impact of various changes within the modeled system both quickly and systematically.

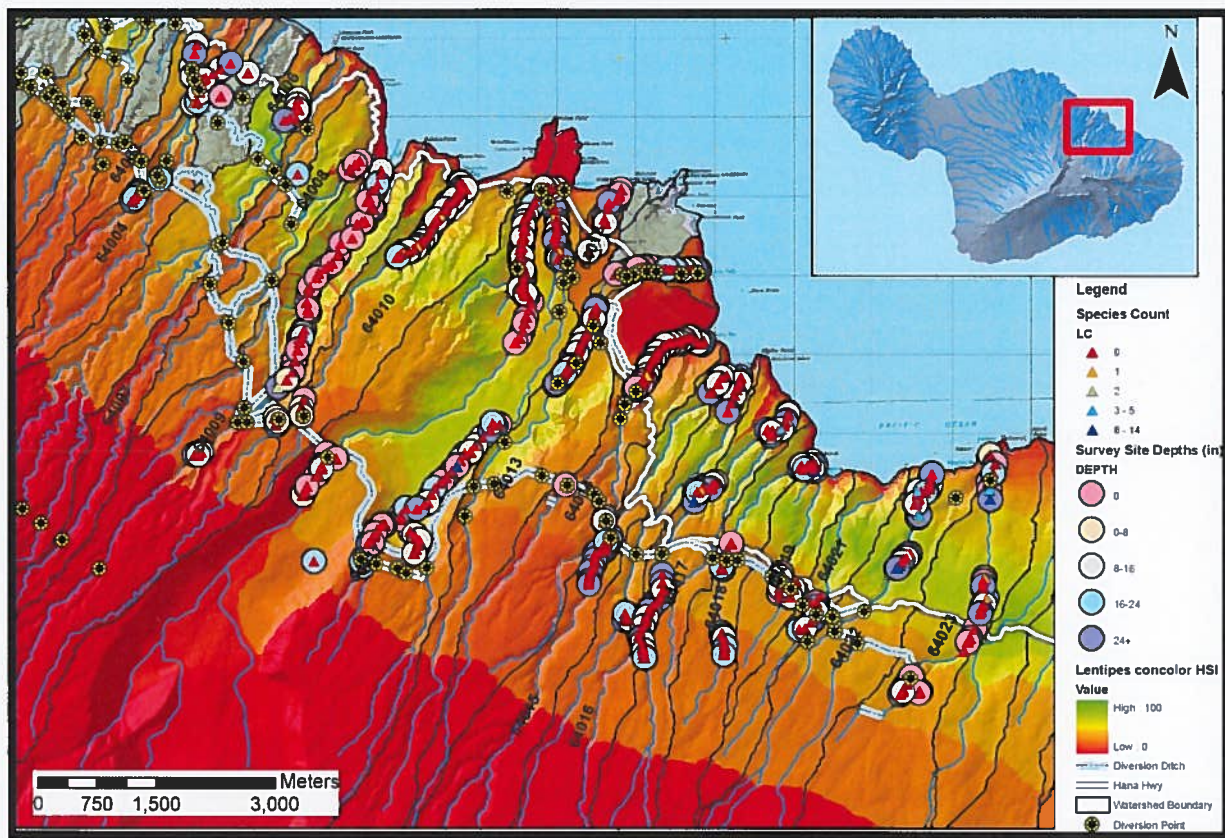


Figure 4: Example map output from HSHEP model for 17 East Maui Streams. Predicted Habitat Suitability Index (HSI) for *Lentipes concolor*. Map includes survey site depths and count of *Lentipes concolor* observed at each site. Diversions, diversion ditches, Hana Highway, and watershed boundaries and codes are included for reference.

Table 3. Example spreadsheet output from the HSHEP for 17 East Maui streams. Summary of the amount of habitat units for *Lentipes concolor* (LC). Habitat Units (HU) are relative measures of stream habitat where each unit length of stream is multiplied by its suitability (range of 0 to 1) for a species resulting in a comparable measure of the linear amount of suitable stream habitat. HU have measures of stream size and watershed wetness incorporated into the value which reflect comparative stream width and as a result linear measures of habitat area presented. All linear measures are in meters.

Stream Name	Watershed ID	LC Habitat Units (HU) in Stream	LC HU after flow diversion (FD)	LC HU after FD + Upstream Migration Barriers (UpMB)	LC HU after FD + UpMB + Downstream Migration Barriers (DownMB)	LC HU Lost	LC HU Lost Rank	% LC HU lost of stream total	% LC HU lost of stream total Rank	% LC HU lost to FD	% LC HU lost to FD Rank
Kolea	64003	1,136	925	449	354	783	13	68.9%	7	18.6%	11
Waikamoi	64004	3,558	1,877	148	33	3,524	3	99.1%	2	47.2%	3
Puohokamoa	64006	5,094	2,732	929	803	4,291	1	84.2%	3	46.4%	4
Haipuaena	64007	1,682	841	442	398	1,284	10	76.3%	5	50.0%	2
Punalau	64008	2,257	1,772	612	450	1,807	6	80.1%	4	21.5%	9
Honomanu	64009	3,844	1,155	77	8	3,836	2	99.8%	1	69.9%	1
Nuaailua	64010	1,711	1,711	1,506	1,465	246	15	14.4%	15	0.0%	14
Ohia	64012	78	78	78	78	0	16	0.0%	16	0.0%	14
W. Wailuaiki	64015	2,255	1,489	842	712	1,543	9	68.4%	8	34.0%	5
E. Wailuaiki	64016	2,589	1,931	956	761	1,827	5	70.6%	6	25.4%	7
Kopiliula	64017	3,871	3,082	1,898	1,661	2,209	4	57.1%	10	20.4%	10
Waiohue	64018	1,895	1,447	765	628	1,266	11	66.8%	9	23.7%	8
Paakea Gluch	64019	1,732	1,695	1,298	1,219	513	14	29.6%	14	2.1%	13
Kapaula Gluch	64021	2,272	1,936	1,240	1,100	1,172	12	51.6%	12	14.8%	12
Hanawi	64022	3,173	3,173	1,869	1,609	1,564	7	49.3%	13	0.0%	14
Makapipi	64023	2,728	1,992	1,319	1,184	1,544	8	56.6%	11	27.0%	6

The latest description of the HSHEP model can be found in:

Parham, J.E. 2015. The Hawaiian Stream Habitat Evaluation Procedure (HSHEP) model: Intent, Design, and Methods for Project Impact Assessment to Native Amphidromous Stream Animal Habitat. Submitted to Civil and Public Works Branch, U.S. Army Corps of Engineers, Honolulu District, HI. 178 pages.

Habitat Assessment

The focus of the habitat assessment to support the HSHEP model would be to document instream conditions both above and below stream diversions. We would focus on collecting water depth, habitat type, substrate, and stream width measures as these can be converted into suitability criteria and estimates of overall habitat area. If possible, targeted intermediate water releases could be conducted at the diversion site to better estimate the change in habitat with respect to changes in discharge. In addition to the habitat measures described below, stream discharge would be measured both upstream and downstream of the diversion to document the proportion of the flow diverted and flowing downstream.

To assess habitat availability, the High Definition Stream Survey™ (HDSS) method will be used to collect, classify, and analyze the data required for this project. In general, the HDSS approach follows a standardized series of steps that promotes rapid, systematic collection and processing of large amounts of stream conditions information (Figure 5). The specifics of the data collected may vary with the project's requirements, but following the general HDSS process ensures a successful project.

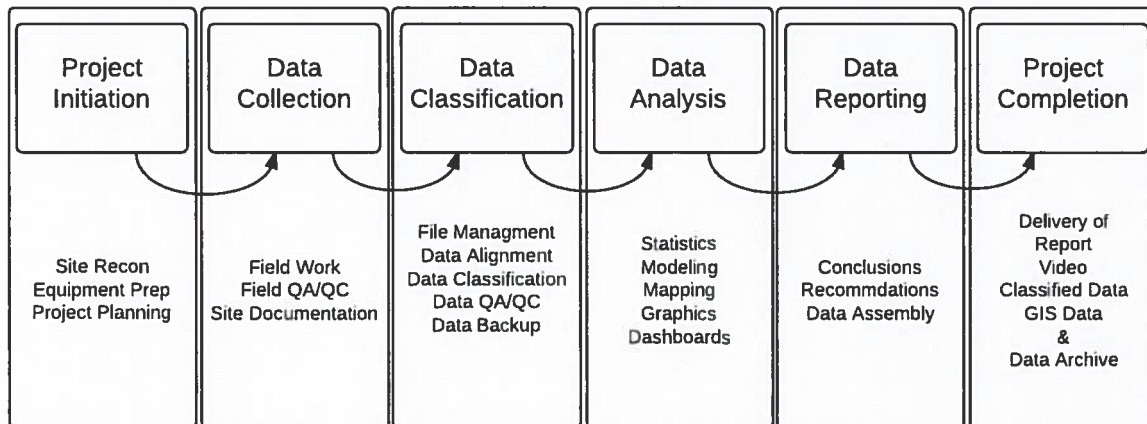


Figure 5: The standardized HDSS project flow chart.

Due to the narrow and shallow streams being surveyed, our backpack-mounted HDSS system will be the primary data collection platform used during the surveys to collect habitat data. (Figure 3). In some cases where it is impossible to hike the stream channel due to waterfalls or other obstructions, we would collect aerial imagery using a camera mounted on a drone. Although the two data collection methods gather slightly different imagery, the overall HDSS method can be used on either imagery type. The field surveys will be completed under the guidance of TRUTTA to ensure safety and maximize the quality of data being collected. Data collection is contingent on water flow, so field work timing will be adjusted to avoid rain and high stream flows as much as possible.



Figure 4: Dr. Parham using Backpack HDSS on Iao Stream, Maui. The GPS-linked video cameras are image stabilized to dampen the bounces associated with walking in a stream.

The backpack-mounted HDSS system has the following capabilities:

- 4-channel video recording (4 utilized for this project)
- recorded on four 64 GB SDXC cards in an array of four video streams in four separate files
- 4 above-water cameras
 - forward facing
 - streambank left
 - streambank right
 - down-looking for substrate classification
- Garmin GPS receiver with GLONASS capabilities and WAAS differential correction
- 1 to 3 meter ultimate accuracy
- optimized for speeds less than 1 mph

After the data is collected in the field it will be post-processed using HDSS Video Coder Software, Microsoft Access, Microsoft Excel, and ArcGIS. Data will be classified for approximately each meter of

the stream longitudinally. Given the primary goal of quantifying habitat, the following variables will be classified:

- Water Depth
- Habitat Type (riffle, run, pool, side pool, plunge pool, cascade, or falls)
- Primary Substrate Size Class (using Modified Wentworth Substrate Classification System compatible with the DAR's animal habitat surveys – fine, sand, gravel, cobble, boulder, and bedrock)
- Percent wetted stream width
- Presence of stream channel modifications

Water Depth

The Depth category is intended to capture the thalweg depth for the main flow of the stream channel. The thalweg can be considered the center of the main flow and is usually the deepest depth across the stream channel. The wading poles (which can be seen in the down-looking video) are set at 1 ft. at the first black joint and 2 ft. at the second joint for reference for the classifier (Figure 7). In deeper sections, verbal documentation of depths by the surveyors may be noted for reference. The water depth will be classified according to the following categories: Dry, < 1 inch, 1-3 inches, 3-6 inches, 6-12 inches, 12-24 inches, 24-36 inches (2-3 ft. deep), 36+ inches (>3 ft. deep), and Unknown.

Habitat Type

Habitat type is one of the primary measures in describing instream habitat and will be classified as (riffle, run, pool, side pool, plunge pool, cascade, pocket water, or falls) from the assembled HDSS video primarily concentrated on the forward view. For example, Figure 7 shows an example of a run. Habitat types change depending on amount of water in a river.

In general, the habitat types classified from the HDSS videos are compatible with those habitat types used by DAR in their habitat and fish surveys. One additional class will be added, Pocket Water which represents a mix of riffle, run, and small pool habitat commonly found in the mid to upper reaches of the stream. Transitions from one habitat type to the other will be visually determined by an experienced classifier.

Substrate

Substrate is a typical classification variable in habitat suitability studies, but it is mostly controlled by high flow events. The high flow events have enough power to move boulders and scour out pools. For example, Figure 7 shows cobble substrate. Other substrate types included are fine sediment, sand, gravel, boulders and bedrock.

Stream Width

The stream width will also be determined by visual classification using the HDSS video. The width will be measured to better determine the area of the habitat units observed from the imagery.

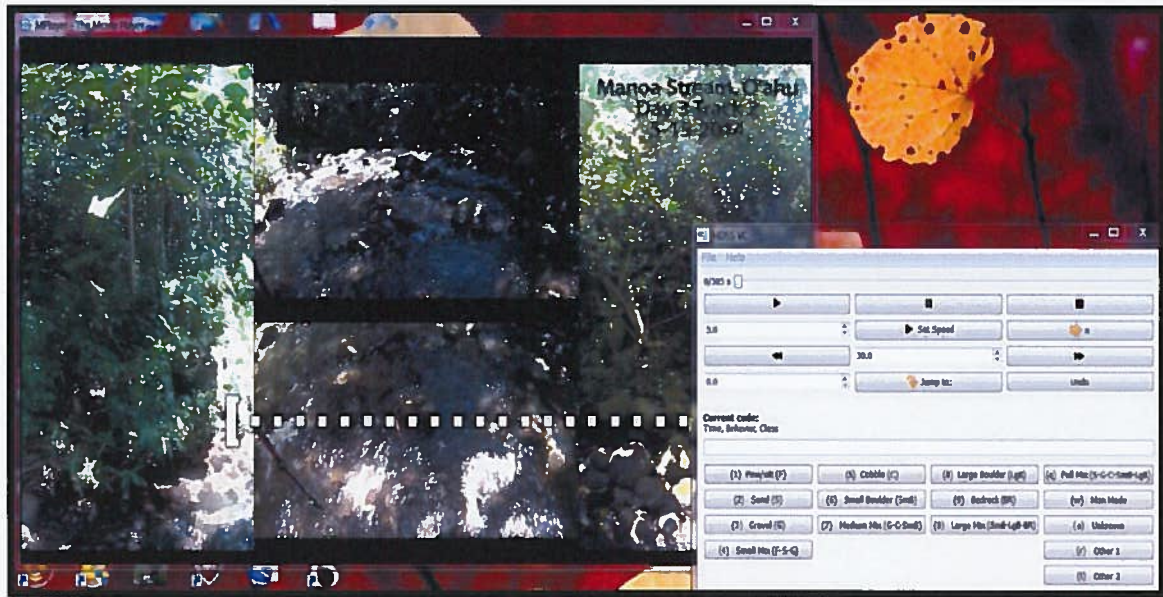


Figure 6: HDSS Video Coder V2.0 software used for systematic classification of video of streambank and stream bottom conditions. The software is easily customizable to allow appropriate classification systems to be used on a project. This example is from a US. Army Corps of Engineers Flood Control project on Oahu, HI.



Figure 7: An example of the HDSS video from Manoa Stream, Oahu.

Diversion Assessments

**Note: much of the barrier assessment will be replaced using data in the EMI diversion registration documentation. While this may not be as complete as a full barrier assessment, it should be a cost-effective way to document primary features associated with each diversion.*

To document the site-specific conditions at stream diversions, the DAR barrier assessment methodology will be followed. The barrier assessment method has standardized field sheets that allow the type, size, potential for modification and other factors to be systematically documented for each diversion. To convert the field information into data usable for the HSHEP model, the impacts of barriers and entrainment in stream diversion are determined by classifying the diversion into a type and then estimating the effects based on the type. For example, the main barrier types (Figure 8) are:

Stream mouth barriers – These barriers are the result of no water flow in the terminal stream segment. These barriers have two possible conditions, either open or closed. If baseflows are zero in the terminal segment, then a barrier is considered closed. If any flow is calculated to be present in the terminal segment then the barrier is considered open.

Side Diversion – This type of diversion removes water from the stream through a side intake structure. The water in a natural stream channel flows downstream past the diversion and a portion is removed by the intake. These side diversions typically have a small dam to help increase the amount of water diverted. Both ditch and auwai diversion can fall into this group. Downstream and upstream entrainment is modeled with respect to the amount of water diverted. Upstream entrainment may be lower because animals moving upstream are moving against the current and this may lead them upstream as opposed to downstream into the diversion. With that said, at high diversion rates, some animals will get entrained.

Bottom Grate Diversion – This diversion type removes water from a grate covered channel that usually spans the stream channel bottom. Bottom grate diversions are typically found on larger stream diversions and are sized to remove 100% of baseflow. Downstream and upstream entrainment rates are modeled with respect to the portion of base flow diverted. Upstream entrainment is higher than with side diversion as upstream moving animals are easily trapped in the diversion as they try to pass over the bottom grate.

Entrainment rate calculation for diversions - The primary barrier issue modeled with diversions is entrainment of migrating animals. Entrainment is directly related to the proportion of water removed by the diversion. When 100% of baseflow is diverted, the entrainment is modeled at 80%. This would represent the entrainment of all animals drifting downstream in the baseflow and a portion of the animals at higher flows that overtop the diversion. At diversion rates lower than total baseflow removal, the entrainment value is a portion of baseflow (Q_{70}) remaining after the diversion compared to natural baseflow (Q_{70}) multiplied by the maximum entrainment rate.

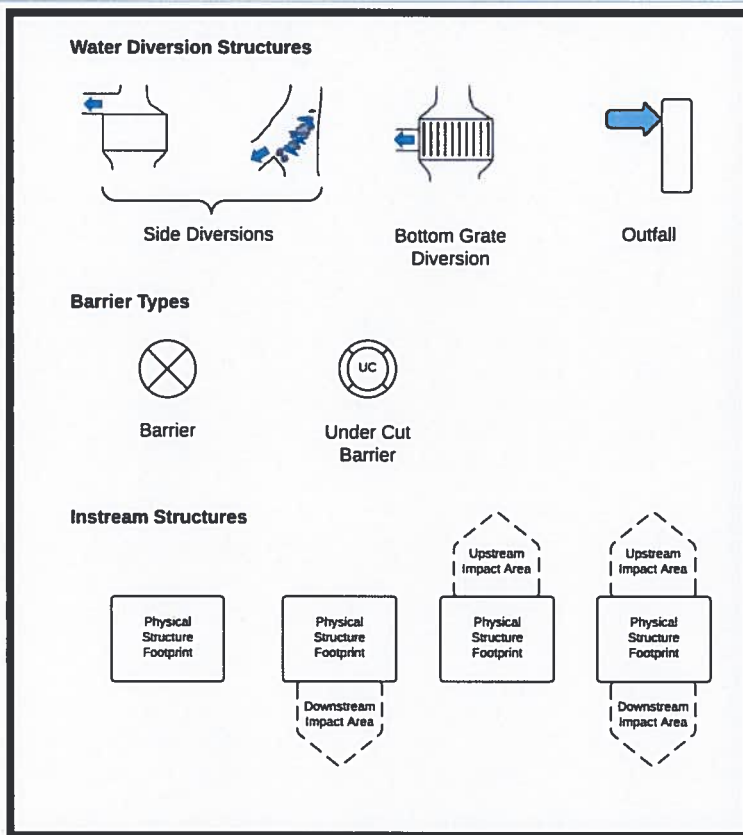


Figure 8: Modification graphics used in the HSHEP box models for each stream. Specifics used to model each type of modification would be project specific.

Step 3: Biotic Surveys

High-Definition Fish Surveys (HDFS)

The High Definition Fish Survey (HDFS) approach will be used to document biota in the survey segments. HDFS utilizes pole-mounted, high-definition, underwater video cameras to capture images of fish or other aquatic animals at a specific location (Figure 9). The underwater cameras are geo-referenced so that specific time and place information is recorded in conjunction with all video observations.

In general, the HDFS sample could be considered a point or timed sample. The cameras are moved into position, slowly lowered to the bottom, and then remain in position for approximately 30 seconds to capture a sample of animals at that location (Figure 10). In some locations, the camera is moved slowly to the next position without removing it from the water. During the timed samples, each 30-second sample observes approximately one square meter of instream habitat. This process is repeated at sites distributed evenly throughout the available habitat.

To document the animals observed in the videos, the HDSS Video Coder software (Figure 6) with a list of potential animal species was used. Additional species, if observed, are listed as Other1, 2, or 3 and then identified after the classification process. This allows a single standard classification approach to be used for all survey video. The potential Hawaiian Stream species list included:

Native Fishes: O'opu nakea (*Awaous stamenius*), O'opu naniha (*Stenogobious hawaiiensis*), O'opu nopili (*Sicyopterus stimponi*), O'opu alamo'o (*Lentipes concolor*) O'opu akupa (*Eleotris sandvicensis*), Aholehole (*Kuhlia xenura*), Mullet (*Mugil cephalus*)

Native Crustaceans and Mollusks: Opae oeha'a (*Macrobrachium grandimanus*), Opae kala'ole (*Atyoida bisulcata*), Hihiwai (*Neritina granosa*), Hapawai (*Neritina vespertina*)

Introduced Fishes: Armored Catfish (*Hypostomus c.f. watawata*), Bristlenose Catfish (*Ancistrus c.f. temmincki*), Bronze Corydoras (*Corydoras aeneus*), Liberty Molly (*Poecilia sp. hybrid complex*), Green Swordtail (*Xiphophorus hellerii*), Guppy (*Poecilia reticulata*), Mosquitofish (*Gambusia affinis*), Blackchin Tilapia (*Sarotherodon melanotheron*), Convict Cichlid (*Amatitlania nigrofasciata*), Smallmouth Bass (*Micropterus dolomieu*), Carp (*Cyprinus carpio*), Goldfish (*Carassius auratus*), Dojo (*Misgurnus anguillicaudatus*), White Cloud Mountain Minnow (*Tanichthys albonubes*)

Introduced Crustaceans, Mollusks, and Amphibians: Tahitian prawn (*Macrobrachium lar*), Grass Shrimp (*Neocaridina denticulata sinensis*), Crayfish (*Procambarus clarkii*), Cane Toad (*Bufo marinus*), Bull Frog (*Rana catesbeiana*)

During classification, a start code will be inserted when the camera is in position. Next, all individuals of all species will be recorded, and then a stop code. For each sample, the habitat type will also be recorded. This process allows only high-quality underwater video samples to be used and linked with the appropriate GPS data for that location.

To develop density estimates for stream animals, the total time for each site will be recorded. The total time is then divided by 30 seconds to estimate the area observed in m² as on average 1 m² is observed in each 30 seconds of observation. The total number of each species observed within each habitat type for the different areas surveyed will be divided by the area of that habitat type to get the species density within each habitat type.



Figure 9: Underwater geo-referenced video camera with external video light used for the HDFS observations.



Figure 10: Example of HDFS surveys in Manoa stream, Oahu.

	
<p>Native fish, <i>Awaous staminius</i>, in a stream pool in I'ao Stream, Maui.</p>	<p>Native fish, <i>Sicyopterus stimpsoni</i>, on boulder substrate in I'ao Stream, Maui.</p>
	
<p>Native species, <i>Kuhlia xenura</i>, in the lower reach of I'ao Stream, Maui.</p>	<p>Introduced swordtails, <i>Xiphophorus hellerii</i>, in I'ao Stream, Maui.</p>
	
<p>Introduced Blackchin tilapia, <i>Sarotherodon melanotheron</i>, over gravel substrate in Palolo Stream, Oahu.</p>	<p>Introduced armored catfish, <i>Hypostomus c.f. watawata</i> in Waiawa Stream, Oahu.</p>

Figure 11: Examples of stream animals observed during HDFS projects on various Hawaiian Streams.

TASKS

Task 1 – Project Initiation

Assemble available data.

Task 2 – Preliminary HSHEP Model Development

Develop and run HSHEP based on available data to help guide field surveys.

Task 3 – Field Data Collection

Conduct all field surveys (HDSS, HDFS and diversion assessments).

Task 4 – Data Classification

Classify and organize field data for use in HSHEP model.

Task 5 – Final HSHEP Model

Run HSHEP model to assess suitable habitat for native stream animals associated with two main scenarios.

- Scenario 1: Quantify the amount and distribution of suitable habitat under current conditions in the watershed.
- Scenario 2: Quantify the amount and distribution of suitable habitat after potential changes to diversions.

Task 6 - Data Reporting and Project Completion

Write final report and deliver project.

DELIVERABLES

The project deliverables are as follows:

- A copy of the processed HDSS, HDFS, and aerial imagery collected for the survey.
- A continuous dataset of habitat types, water depth, and substrate where collected.
- Maps and graphic summaries of the data collected.
- Quantification of the amount of Habitat Units for each species in each stream based on the HSHEP model.
- Written report of the process and results for the East Maui streams.

TIMELINE

This project is proposed to be completed within a 12-month time frame beginning with the contract award date. We anticipate being able to deliver the final product within 8 months but include several extra months to account for possible delays from weather, flows, equipment, or any other unforeseen issue during the survey. The timeline for project completion is as follows (there will be some overlap in tasks as they are not all mutually exclusive):

Month 1 - 3:

- Assemble and organize available data (Task 1). Include diversion registration information here.
- Develop and run preliminary HSHEP model for East Maui streams. (Task 2)
- Present results to A&B to determine final field survey sites (Task 3)

Month 3 - 6:

- Complete HDSS surveys and diversion assessments (if applicable) and HDFS field surveys of the streams being studied. (Task 3)
- Classify and organize the field data for us in the HSHEP model. (Task 4)

Month 6 - 7:

- Complete run of HSHEP model with field data incorporated for scenarios 1 and 2. (Task 5)
- Quantify the impact of the various diversion on the amount and distribution of native stream animal habitat. (Task 5)

Month 7 - 8:

- Document modeling effort and results associated with Tasks 1 through 5 in a report (Task 6)

COSTS

The proposed cost to complete the project varies depending on the amount of fieldwork required to accurately document the impact of the stream diversions. Thus, we have developed the cost based on the completion of the assembly of all available data and the HSHEP modeling effort and then arrange for possible fieldwork required. The final amount of fieldwork needed can be determined based on the results of the preliminary HSHEP modeling and discussions A&B.

In all cases, certain tasks must be completed for this project. These include:

- Task 1 – Project Initiation
- Task 2 – Preliminary HSHEP Model Development
- Task 5 – Final HSHEP Model
- Task 6 - Data Reporting and Project Completion

For simplicity, these four tasks will be grouped under the heading **HSHEP Modeling** in the further cost discussion.

The field survey data collection and organization tasks will be grouped under the heading **Field Survey** in the cost discussion and includes:

- Task 3 – Field Data Collection
- Task 4 – Data Classification

HSHEP Modeling Costs

**Note: The modeling cost have decrease with the availability of the diversion registration information. By using the diversion registration information as the barrier assessment, we decrease the workload in several ways. (1) we decrease the initial data search effort as this information is readily available, (2) we decrease the modeling effort in the first HSHEP model run as less information needs to be estimated and can be directly input from the diversion registration information, and (3) greatly decrease the 2nd model run as the barrier information will already be included in the first model run.*

The development of an HSHEP model for the East Maui streams is a large task. There are 44 streams in approximately 300 diversions that need to be accounted for in the model. Given these parameters, there are most likely more than 4,000 different stream segments that will need to be coded and linked to appropriate data. Data will need to be gathered on watershed conditions, stream discharge, stream reach conditions, diversions, aquatic biota, and other factors from a range of sources. The data will then be organized and assessed for its quality to determine if field surveys may be needed. Additionally, after set-up for the box model for each of the 44 streams and their diversions, additional modeling linkages between streams will need to be set so that overall water output can be determined instantly when

changes in flow, passage, or entrainment are modified at any diversion. The HSHEP model allows for such a design but data checking and validation will be more complex than on a single stream model.

Project costs are calculated with a fully loaded rate of \$105 for a Modeling Analyst and \$225 for Dr. Parham. Project Management is a standard 10% of Labor costs and travel (including airfare, hotel, and per diem) to discuss the results is included for several trips.

Table 4: Cost Breakdown for HSHEP Modeling

Task 1				
Hours / Diversion	# Diversions		Rate	Total
1.5	300	\$	105.00	\$ 47,250.00
1.0	300	\$	225.00	\$ 67,500.00
Task 2				
	hours		Rate	Total
	180	\$	105.00	\$ 18,900.00
	180	\$	225.00	\$ 40,500.00
Task 5				
	hours		Rate	Total
	20	\$	105.00	\$ 2,100.00
	80	\$	225.00	\$ 18,000.00
Task 6				
	hours		Rate	Total
	160	\$	105.00	\$ 16,800.00
	160	\$	225.00	\$ 36,000.00
				\$ 247,050.00
	10% Project Management			\$ 24,705.00
			Labor Subtotal	\$ 271,755.00
			Travel	\$ 15,000.00
			Total	\$286,755.00

Field Survey Costs

**Note: The majority of the barrier assessment effort will be replaced with data from the diversion registration information. This will remove approximately one part of the field effort at an individual site (barrier assessment, habitat survey, fish survey). Additionally, if we plan on one EMI employee to be tasked with assisting on the field surveys by provide a vehicle, access to the sites, and some help with field work, this should reduce the overall field cost per site by 40%. The changes are reflected in the following description.*

Our estimate a field survey costs include everything that would need to be done at an individual diversion location. This includes travel quantification of instream habitat, stream discharge, and biotic surveys both above and below the diversion. In addition to the field surveys, the cost includes the time for analysis and processing of all the field data into a usable form for inclusion in the HSHEP model. The “typical” site used in this estimate is neither the hardest or easier, but represents the conditions at an average East Maui diversion site.

Based on past surveys, we estimate that it will take 14 man-hours to complete the fieldwork and 21 man-hours to complete all the video and data assembly, and analysis. This means we will complete one site in the field with the two-man crew in a single day and then have several days processing for an analyst to process the field data. EMI will supply an employee with a vehicle to drive to the sites for the field survey work. The EMI employee will get access and help with the field work. TRUTTA will supply the field work leader and survey equipment.

We estimate a range of approximately \$6,000 per site for a minimum of 10 sites to approximately \$4,000 per site for 50 or more sites with the cost scaling between those two number of sites. The range is a result of fixed costs (travel, equipment, logistic management) being proportionally greater on fewer number of sites.

It is important to note that these costs represent the maximum cost per site, it is possible and even likely that some sites may have suitable available information for some variables (instream habitat, , or biotic surveys) and thus the effort would be lower on the sites and therefore the cost would be lower.

One factor that could increase the cost of a survey site would be the necessity of helicopter transportation to access the site. Our costs currently include no helicopter costs. We would need to adjust these costs accordingly if sites require helicopter transportation. The cost and use of helicopters will be discussed and agreed upon by all parties prior to any use.

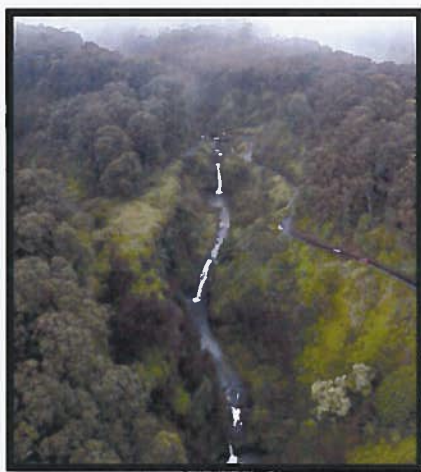
Given the number of variables for the field survey costs, it seems likely that the field survey effort will cost somewhere between approximately \$60,000 and \$200,000. Given that there are 300 diversions the cost could be much greater, but based on our preliminary inspection of available data it seems unlikely that many of these diversions will require a full survey. Part of the design of this proposed project is to complete a preliminary HSHEP model based on the available data to allow us to more exactly determine the field survey needs without doing any work that does not substantially improve the model results. This design is likely the best way to minimize cost on the overall project for A&B while ensuring that HSHEP modeling results are both accurate and defensible given the highly contentious nature of water diversion issues on Maui.

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Proposal to Include the Habitat Requirements
of Three Protected Damselfly Species and One
Mosquito Species in the Hawaiian Stream
Habitat Evaluation Procedure (HSHEP) Model
for the Environmental Impact of Stream
Diversions on 44 East Maui Streams



June 21, 2017

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Trutta Environmental Solutions, LLC



INTRODUCTION

The East Maui Irrigation (EMI) system supplies water to some 30,000 acres of agricultural land in Central Maui and serves more than 9,000 Upcountry residents and farmers. Currently, water lease holders are being granted one year contracts. In order to obtain long-term water leases for 44 East Maui streams, East Maui Irrigation (owned by Alexander and Baldwin, Inc (A&B)), has contracted consulting firm Wilson Okamoto to develop an environmental impact statement on the 300 water diversions they manage. To understand the impact on stream habitat and stream animals, Trutta Environmental Solutions (TRUTTA) has proposed to combine the results of habitat and diversion assessments and biotic surveys with the Hawaiian Stream Habitat Evaluation Procedure (HSHEP) model to assess issues associated with the current stream diversions. The current HSHEP proposal includes the native amphidromous fishes and macroinvertebrates found in Hawaiian streams. TRUTTA was recently asked by Wilson Okamoto to include three protected damselflies and the mosquito responsible for carrying avian malaria to the list of species habitats modeled. This proposal cost (\$21,186) reflects the additional cost to include these four species into the earlier HSHEP model proposal.

METHODS

Adding additional aquatic species habitat requirements to the HSHEP model is theoretically straightforward. The model is designed to handle multiple species and if the species' habitat requirements are appropriately defined, the model output will document the amount and distribution of available habitat.

The species to be added to the results of the HSHEP model for the East Maui streams are:

1. Endangered flying earwig Hawaiian damselfly (*Megalagrion nesiotes*)
2. Endangered orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*)
3. Endangered Pacific Hawaiian damselfly (*Megalagrion pacificum*)
4. Introduced mosquito which vectors avian malaria (*Culex quinquefasciatus*)

SWCA, Inc. has agreed to create the habitat suitability metrics for each species for the variables within the HSHEP model. TRUTTA will model the results and describe the amount and distribution of suitable habitat for the aquatic larval phase for each species. SWCA will integrate these results with the terrestrial based analysis of these species suitable habitat into the overall environmental impact for each species related to the stream diversions.

The following are the variables included in the Hawaiian Stream Habitat Evaluation Protocol (HSHEP) model that could be used to integrate the habitat requirements for the aquatic larval phases of protected damselflies and the mosquito into the overall stream modeling results.

At the site scale:

- Water Depth
- Stream velocity (either in direct m/s or in descriptive slow, fast, etc)
- Bottom substrate (based on the modified Wentworth particle size scale used by DAR)
- Substrate embeddedness
- Water quality (temp, DO, pH, sp. conductivity)

At the reach scale:

- Elevation
- Distance Inland
- Downstream barriers (presence of waterfalls downstream)

Watershed or area scale (mostly based on The Atlas of Hawaiian Streams and Their Aquatic Resources information):

- Species occurrence
- Land cover rating
- Shallow water rating
- Stewardship rating
- Watershed size rating
- Wetness rating
- Reach Diversity rating

Species Interaction:

- Presence of Competitors
- Presence of Predators

Plus, one additional metric currently not used in the HSEHP model

- Proximity of suitable instream habitats to suitable terrestrial habitats

As agreed upon, SWCA would provide the suitability metrics for each variable for each species of concern and a short justification of the metric. It can be expected that a number of these variables may not be important to describing habitat suitability of the damselflies or mosquitoes and may be excluded from the suitability model. TRUTTA would take the suitability metrics as defined by SWCA and model them using consistent methodology as used for the native fishes and macroinvertebrates. Additionally, the metric creation would need to be relatively early in the project timeline so that TRUTTA would have time to integrate the information into the HSHEP model.

TASKS INCLUDED IN THIS PROPOSAL:

1. Receive, verify, and integrate the habitat suitability metrics provided by SWCA, Inc. into the HSHEP model.
2. Run the HSHEP model for each species
3. Document the results of the HSHEP model for each species in table, spreadsheet, and map form.
4. Provide written summary of the documented results for the aquatic larval phases of each species.

ESTIMATED COST FOR INCLUSION OF THE SPECIES INTO THE HSHEP MODEL:

Estimated per species

Hours	Rate	Total
Task 1		
2	\$105	\$210
1	\$225	\$225
Task 2		
4	\$105	\$420
4	\$225	\$900
Task 3		
12	\$105	\$1,260
4	\$225	\$900
Task 4		
0	\$105	\$0
4	\$225	\$900
	subtotal	\$4,815
	10% project management cost	\$481.50
	Total per species	\$5,296.50
	Total for all 4 species	\$21,186.00

Project costs are calculated with a fully loaded rate of \$105 for a Modeling Analyst and \$225 for Dr. Parham. Project Management is a standard 10% of Labor costs.

TASKS OUTSIDE OF THIS PROPOSAL:

1. If additional variables need to be created, we must make sure that we have appropriate availability data in the HSHEP model to accurately account for the new variable. Creation of new variables, their modeling rules, and results are in addition to the work described in this proposal.
2. Field work to verify the presence or density of these insects. If species-specific sampling is required then additional cost may be incurred.

ATTACHMENT I

Marine Environmental Resource Assessment
Marine Research Consultants Inc. / Sea
Engineering Inc.

SCOPE OF WORK – EMI EIS
MARINE ENVIRONMENTAL RESOURCE ASSESSMENT
MARINE RESEARCH CONSULTANS INC.
SEA ENGINEERING INC.

The proposed scope of work for the marine environmental assessment of the designated survey area of East Maui is designed to provide a comprehensive depiction of the existing conditions offshore of stream discharges in terms of two major components: 1) physical/chemical composition of marine waters, including the forcing factors that affect the composition, and 2) characterization of physical marine habitats and biotic communities that occur within the survey area. The proposed methods for evaluating both of these components will be directed at providing the linkage between East Maui streams and the ocean. The value of determining these linkages is to gain the information to be able to assess possible changes to marine ecosystem structure in response to changes in rates and volumes of stream discharge.

Survey Areas

With 38 streams within the project area, it is not feasible to evaluate all sites. We propose to select three representative streams that presently have no diversion of water and represent background conditions, and three streams that presently have diversions occurring. Such an experimental set-up will hopefully provide an indication of the effect of diversion on the characterization of the offshore marine habitats. In addition, it will be attempted to investigate each of these streams during different climatic conditions of rainfall to provide insights into both the baseline conditions and the variance expected for diverted and undiverted stream systems.

Water/Sediment Chemistry

We propose to conduct two types of water chemistry analyses. The first will consist of collection of a set of water chemistry samples along transects originating at the most accessible landward sampling points within the streams, and extending offshore to a distance deemed to be beyond the influence of land (e.g. open ocean waters). Along the transect, samples will be collected at the surface, mid-water, and just above the sea floor, and analyzed for all constituents listed in the State of Hawaii Water Quality Standards (total N and P, nitrate-N, ammonium-N, pH, salinity, temperature, dissolved oxygen, turbidity), as well as several other constituents that are good indicators of inputs from land (phosphate-P, silica, total suspended solids). Typically, 10-12 sampling points will be located along a transect, with sampling points more concentrated in the nearshore areas where effects from stream discharge area likely to be greatest. This method of sampling will provide gradients of change with respect to input of materials from shore, and is amenable to application of mixing models which can provide quantitative estimates of the input and fate of material delivered to the ocean from land.

The second proposed type of assessment would entail collection of a matrix of towed salinity/temperature/oxygen horizontal profiles using instrumentation capable of collecting multiple data records per second. The envisioned matrix would involve series of instrument tows radiating from the point of stream discharge in a series of varying directions seaward. Coupling the results of these

tows with a precision positioning system (HyPack) would provide data to construct contour maps representing patterns of distribution of materials in the ocean emanating from land. Such maps could serve as a basis for evaluation of changes in distribution of materials as a function of changes in stream flow.

In addition to evaluation of water chemistry, it is also proposed to collect marine sediments along a transect emanating from stream mouths to the open ocean. Evaluation of sediments will provide information on the contribution that dissolution of terrigenous sediment may have on nutrient cycling in the marine environment.

It is proposed that marine-stream data collection would occur twice within the project period. Hopefully these two increments would occur during different climatic conditions of rainfall and stream discharge.

Marine Habitat Structure

As the survey area encompasses a coastal area on the order of 15 miles in length, it is not feasible to conduct traditional in-situ surveys of the entire region. Rather, we propose to employ several state-of-the-art methods that involve coupling remote sensing imaging data with in-situ ground-truthing to produce habitat maps of the entire region of interest. In brief this approach involves rapidly collecting a number of overlapping photographs within a small geo-located area of reef (e.g., 2m x 2m) that can be seamlessly joined to form a single "orthomosaic" image. A relatively large number of these images can be generated within a relatively small amount of field time. Subsequent to fieldwork, these images can be evaluated using standard point-count techniques to provide a quantitative estimate of biotic and abiotic benthic coverage. When applied to commercially available hyperspectral aerial images of the subject area, the assemblage of quantified data points representing various bottom compositions can be used to train software to produce habitat maps of the entire region of study. An advantage of using these mapping methods is that they provide a permanent photographic record of the region of interest that can be used for future comparative purposes. In addition, the map products are the only way to feasibly characterize a large area in a relatively short time-frame.

The combination of these methods should provide a unique set of products that can be used to represent the interactions between stream discharge and the marine environmental setting, which will provide important information to the EIS.

Description of Oceanographic and Coastal Environment

A description of the oceanographic and coastal environment, based on existing available information, will be prepared for inclusion in the project EIS. This will include a description of wave and current regimes acting along the shoreline, littoral currents and seasonal patterns, prevailing deep-water wave climate, extreme deep-water wave height, discussion of shoreline composition, analysis of existing bathymetric data, and coastal hazard analysis to include exposure to hurricanes and tsunamis. The bathymetric maps produced from this effort will be the foundation for much of the analytical work completed for the marine environment.

Understanding the existing oceanographic and coastal environment is critical for evaluating current and future impacts of these streams on the marine ecosystem.

Wave Climate Analysis

In order to identify the primary components of the wave climate affecting the project coastline, wave data available from the National Oceanographic and Atmospheric Administration (NOAA) and the U.S. Army Corps of Engineers Wave Information Study (WIS) will be compiled and analyzed. These data provide a greater than 30 year wave record, and can be statistically analyzed to determine the frequency of occurrence of different wave heights and directions along the coast. Coastal processes in this region are dominated by wave energy, as this coastline is exposed to both tradewind waves and north pacific swell. This wave environment is typified by large and extreme waves occurring during much of the year. Understanding the magnitude and frequency of these events at the stream mouths and along the entire region's coastline is a key aspect of evaluating stream flow impacts to the marine ecosystem.

Impacts Assessment

Results of the water chemistry and marine biology surveys, and the project area habitat maps will be compiled onto regional bathymetric maps. These environmental condition maps will allow for comparison between the flowing and diverted stream sites, and analysis of individual streams under varying climatic conditions. This comparison will allow for conceptual model development for these two flow regimes. The flow regime concepts will be analyzed to assess existing conditions at the test streams and extrapolate conditions at the remaining streams.

Potential impacts to marine water chemistry/sediment arising from changes to stream diversions and flow rates can be evaluated based on the stream models and their variability under different climatic conditions.



MARINE RESEARCH CONSULTANTS, INC.
1039 Waakaua Pl. Honolulu, Hawaii 96822

**EAST MAUI IRRIGATION EIS
MARINE ENVIRONMENTAL ASSESSMENTS**

	Planning/Prep			Fieldwork			Data Analysis			TOTAL
	RATE	day	cost	RATE	day	cost	RATE	day	cost	cost
Task 1. Water Chemistry										
Trip 1	\$1,600.00	0.5	\$800.00	\$3,000.00	3.0	\$9,000.00	\$ 2,400.00	2.0	\$4,800.00	\$ 14,600.00
Trip 2	\$1,600.00	0.5	\$800.00	\$3,000.00	3.0	\$9,000.00	\$ 2,400.00	1.5	\$3,600.00	\$ 13,400.00
Trip 3	\$1,600.00	0.5	\$800.00	\$3,000.00	3.0	\$9,000.00	\$ 2,400.00	1.5	\$3,600.00	\$ 13,400.00
Trip 4	\$1,600.00	0.5	\$800.00	\$3,000.00	3.0	\$9,000.00	\$ 2,400.00	1.5	\$3,600.00	\$ 13,400.00
Sub-total		1.5	\$2,400.00		9.0	\$27,000.00		6.5	\$12,000.00	\$41,400.00
Task 2. Marine Biota										
Trip 1	\$1,600.00	0.5	\$800.00	\$3,000.00	3.0	\$9,000.00	\$ 2,400.00	2.0	\$4,800.00	\$ 14,600.00
Trip 2	\$1,600.00	0.5	\$800.00	\$3,000.00	3.0	\$9,000.00	\$ 2,400.00	2.0	\$4,800.00	\$ 14,600.00
Trip 3	\$1,600.00	0.5	\$800.00	\$3,000.00	3.0	\$9,000.00	\$ 2,400.00	2.0	\$4,800.00	\$ 14,600.00
Trip 4	\$1,600.00	0.5	\$800.00	\$3,000.00	3.0	\$9,000.00	\$ 2,400.00	2.0	\$4,800.00	\$ 14,600.00
Sub-total		1.5	\$2,400.00		9.0	\$27,000.00		8.0	\$14,400.00	\$43,800.00
Task 2. Sediment										
Trip 1	\$800.00	0.5	\$400.00	\$1,500.00	3.0	\$ 4,500.00	\$ 1,000.00	2.0	\$ 2,000.00	\$ 6,900.00
Trip 2	\$800.00	0.5	\$400.00	\$1,500.00	3.0	\$ 4,500.00	\$ 1,000.00	2.0	\$ 2,000.00	\$ 6,900.00
Trip 3	\$800.00	0.5	\$400.00	\$1,500.00	3.0	\$ 4,500.00	\$ 1,000.00	2.0	\$ 2,000.00	\$ 6,900.00
Trip 4	\$800.00	0.5	\$400.00	\$1,500.00	3.0	\$ 4,500.00	\$ 1,000.00	2.0	\$ 2,000.00	\$ 6,900.00
Sub-total		1.5	\$1,200.00		9.0	\$13,500.00		8.0	\$6,000.00	\$20,700.00
Task 4. Remote Sensing Habitat Mapping	\$1,000.00	10.0								\$ 10,000.00
Task 5. Report preparation										
Principal Investigator	\$1,600.00	8.0	\$12,800.00							\$ 12,800.00
Associate Investigator	\$800.00	10.0	\$8,000.00							\$ 8,000.00
Associate Investigator (E. DeCarlo)	\$1,500.00	8.0	\$12,000.00							\$ 12,000.00
Sub-total			\$20,800.00							\$ 32,800.00
Task 5. Impact Assessment Alternatives	\$1,600.00	5.0	\$ 8,000.00							\$ 8,000.00
Reimbursable expenses										
RT airfare (HNL-OGG)	\$ 200.00	16								\$ 3,200.00
Water Chemistry Analyses	\$ 110.00	300								\$ 33,000.00
Per diem	\$ 300.00	48								\$ 14,400.00
Sub-total										\$ 50,600.00
SUBTOTAL MRC										
										\$ 207,300.00
GET (4.16%)										\$ 8,623.68
TOTAL MRC										\$ 215,923.68
SUBTOTAL SEI (see attached itemization)										
										\$ 175,728.75
GET (4.16%)										\$ 7,310.32
TOTAL MRC										\$ 183,039.07
TOTAL PROJECT COST										\$ 398,962.75



Sea Engineering, Inc.

Makai Research Pier 41-305 Kalanianaʻole Hwy Waimanalo Hawaii 96795-1820
 Phone (808) 259-7966 / FAX (808) 259-8143 E-mail: sei@seaengineering.com Website: www.seaengineering.com

FEE PROPOSAL

For: East Maui Water EIS

Date: 5/7/2015
 Prepared by: ME/CC

Labor:	Tasks	Labor Hours / Rates					Hrs Subtotal	TOTAL
		Project Engineer	Sr. Ocean Engineer	Ocean Engineer	Junior Ocean Engineer	Admin		
		\$203.70	\$172.22	\$142.63	\$110.79	\$68.81		
	Field Mob/Demob (4hr, 10 trips)			5	32			\$4,258
	Marine Biology Field Investigations (4 trips, 3 10hr days, 1 8hr transit)			152	152		304	\$38,520
	Water Chemistry Field Investigations (4 trips, 3 10hr days, 1 8hr transit)				152		152	\$16,840
	Contingency trips (2)			16	16		32	\$4,055
	Data Processing - Marine Biology (1 day per site)			24	24		48	\$6,082
	Data Processing - Water Chemistry (1 day per event)			48	48		96	\$12,164
	Map Preparation - (1 days per site)			24	24		48	\$6,082
	Bathymetry Basemap			8	24		32	\$3,800
	Wave Hindcast		8		40		48	\$5,809
	Description of Oceanographic Setting for EIS		4	24	16		44	\$5,885
	Impacts Assessment		8		40		48	\$5,809

Total Hours	0	20	301	568	0	852	
Total Labor Cost	\$0.00	\$3,444.40	\$42,931.63	\$62,928.72	\$0.00	\$109,304.75	\$109,304.75
							with tax \$114,455.19

Expenses:	Amount/Unit	Rate	Subtotal
Marine Biology Per Diem (4 nights, 4 trips)	16 each @	300.00	2 \$9,600.00
Water Chemistry Per Diem (4 nights, 4 trips)	16 each @	300.00	1 \$4,800.00
Airfare	16 each @	200.00	1 persons \$3,200.00
Boat	24 each @	1,500.00	1 \$36,000.00
Other			\$ -
Total Expenses			\$53,600.00

Subtotal expenses	\$53,600.00
10% burden on expenses	\$5,360.00
Total expenses	\$58,960.00
with tax	\$61,738.20

Equipment:	Amount/Unit	Rate	Subtotal
3028 DGPS/Hypack	24 each @	275.00	\$6,600.00
3034 Scuba tanks	72 each @	12.00	\$864.00
			\$0.00
Total Equipment			\$7,464.00

Total equipment	\$7,464.00
with tax	\$7,815.70

Grand total	\$175,728.75
with tax	\$183,039.07

ATTACHMENT J

EIS Biological Support Services
SWCA Environmental Consultants



Sound Science. Creative Solutions.®

Honolulu Office
Bishop Square ASB Tower
1001 Bishop Street, Suite 2800
Honolulu, Hawaii 96813
Tel 808.548.7922 Fax 808.548.7923
www.swca.com

May 24, 2017

Earl Matsukawa
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Re: East Maui Water Lease Environmental Impact Statement Biological Support

Dear Mr. Matsukawa:

SWCA Environmental Consultants (SWCA) appreciates the opportunity to provide you with our scope of work and cost estimate for environmental services for biological support on the East Maui Water Lease Environmental Impact Statement. SWCA is an environmental consulting firm with recognized technical excellence in natural and cultural resources and planning. We have more than 800 professionals in 31 offices throughout the U.S. The field work and technical report for this project will be conducted and prepared by SWCA's Honolulu staff, which has extensive experience in Hawaiian natural resources work.

The cost to complete the proposed tasks, as described in the attached scope of work, under a time-and-materials, not-to-exceed contract is \$89,404. SWCA appreciates the opportunity to provide natural resources consulting services to the Wilson Okamoto Corporation. Should you have any questions regarding our scope of work or cost estimate, please contact me at (808) 548-7922, or via email at ahrenkrantz@swca.com.

Sincerely,

A handwritten signature in black ink that reads "A Ehrenkrantz". The signature is written in a cursive, flowing style.

Amanda Ehrenkrantz
Project Manager and Wildlife Ecologist

SCOPE OF WORK

SWCA Environmental Consultants (SWCA) understands that the Wilson Okamoto Corporation (Wilson Okamoto) is preparing an environmental impact statement (EIS) for the East Maui Water Lease. This long-term (30-year) lease located on state lands would approve use of the existing aqueduct system that supplies water to domestic and agricultural water users. The water lease would enable the lessee to maintain and repair existing access roads and trails and would allow continued operation of the aqueducts. The water would be collected from the Huelo, Honomanu, Keanae and Nahiku watersheds (referred to as the License Area) and delivered to users in 30,000 acres of former sugar cane lands in Central Maui (referred to as the Service Area). Wilson Okamoto has invited SWCA to support the biological sections (flora and fauna) of the EIS. The scope of work outlined below involves flora and fauna field surveys and technical reporting. The scope of work is divided into four tasks, as described below.

TASK 1. COMMUNICATION AND COORDINATION

The work under this task consists of project management and communication with Wilson Okamoto, East Maui Irrigation (EMI), and state and federal agencies, as needed. This task include conversations with representatives of the U.S. Fish and Wildlife Service Pacific Region and Department of Land and Natural Resources Division of Forestry and Wildlife to discuss the potential for state- and federally listed species to occur. Internal coordination and safety are also included in this task.

TASK 2. PRE-FIELD INVESTIGATIONS

Under this task, literature review and vegetation mapping exercises will be conducted. These will be completed prior to field work in order to inform the field surveys.

An extensive literature review will be conducted of published articles, government reports, and scholarly reports that will inform the field biologists of any existing data gaps or topics of note. A list of federally listed and state-listed species (i.e., special status species) with the potential to occur on Maui will be reviewed. The results of the literature review will be summarized in the technical report (see Task 4).

SWCA will conduct a computer-based vegetation mapping effort. The ultimate goal of this effort will be to quantify the existing area of each vegetation cover type in the License Area. Vegetation types will not be quantified in the Service Area. We will review existing literature and contact local experts to determine if an accurate dataset exists (such as that completed by the Hawaii Natural Heritage Program in 1990). For efficiency, we will rely on existing datasets as much as possible. SWCA will spend no more than 40 labor hours finding and obtaining this dataset and making any necessary augmentations. If a sufficient dataset does not exist, SWCA will work with Wilson Okamoto to determine the appropriate level of effort needed to create one.

TASK 3. TERRESTRIAL FLORA AND FAUNA FIELD SURVEYS

Task 3 consists of terrestrial flora and fauna field surveys, which will take place in the License Area and Service Area. Field surveys are necessary to identify general flora and fauna found in these areas and to identify the potential for special status species to occur in those areas. These surveys will not include the aquatic or coastal ecosystems.

A field crew of two biologists will conduct the field surveys in five 10-hour days (including travel to and from Oahu). These surveys will include the following:

- Vehicle and pedestrian surveys of the License Area, including along the EMI canal system
- A helicopter overflight of the License Area
- Vehicle surveys of the Service Area

To achieve the goal of characterizing the flora and fauna in each vegetation cover type, flora and fauna observations will be recorded. Each observation will be linked to a vegetation cover type and, if beneficial, the location of the observation. Because much of the License Area is inaccessible by foot or vehicle, the helicopter overflight will provide

the biologists with insight into the vegetation characteristics of that area. During this flight, the results of the vegetation cover mapping exercise will be verified. The Service Area will be surveyed by vehicle to cover this large area efficiently. It is assumed that ATVs will not be needed for field access into the License Area or Service Area.

This scope does not include acoustic surveys for presence of the Hawaiian hoary bat nor does it include species-specific surveys.

TASK 4. REPORTING

Following field surveys, a technical report will be produced that will include the following:

- A summary of the findings of the literature review
- A description of vegetation mapping and field survey methods and results
- A characterization of the flora and fauna in the License Area and Service Area, organized by vegetation cover
- A list and brief description of the terrestrial special status species with the potential to occur in the License Area and Service Area, including identification of the vegetation cover type in which each species is most likely to occur
- An analysis of impacts that may occur to terrestrial flora, fauna, and special status species as a result of the implementation of the No Action alternative, the Proposed Action, and one other action alternative. This analysis may or may not quantify the acres of each vegetation types affected by the alternatives, depending on the results of the vegetation mapping exercise.

A draft report will be submitted to Wilson Okamoto for one round of review and edits, after which the report will be finalized. SWCA will assist Wilson Okamoto in responding to agency and public comments regarding terrestrial flora and fauna when the Draft EIS has been submitted for comment.

TASK 5. LITERATURE SEARCH FOR MEGALAGRION DAMSELFLIES AND MOSQUITO-BORNE IMPACTS TO NATIVE BIRDS

SWCA will conduct literature research on natural history and distribution of listed Megalagrion damselfly species that are protected under the Endangered Species Act and are known to occur on Maui. This literature search will be conducted with the purpose of informing the Hawaiian Stream Habitat Evaluation Protocol (HSHEP) model. SWCA would provide the suitability metrics for each variable for each species of concern and a short justification of the metric. If exiting literature does not provide sufficient information, SWCA will rely on information from a proxy species and/or provide expert opinion to quantify the suitability metric. Expert opinion will be based on input from s person, or persons, that are acknowledged in the field as experts on the species.

The same approach will be used for providing information on suitability metrics for mosquito species known to carry diseases that impact native forest birds, primarily avian malaria.

Focus for this task will be on the following metrics:

At the site scale:

- Water Depth
- Stream velocity (either in direct m/s or in descriptive slow, fast, etc)
- Bottom substrate (based on the modified Wentworth particle size scale used by DAR)
- Substrate embeddedness

- Water quality (temp, DO, pH, sp. conductivity)

At the reach scale:

- Elevation
- Distance Inland
- Downstream barriers (presence of waterfalls downstream)

Watershed or area scale (mostly based on The Atlas of Hawaiian Streams and Their Aquatic Resources information.):

- Species occurrence
- Land cover rating
- Shallow water rating
- Stewardship rating
- Watershed size rating
- Wetness rating
- Reach Diversity rating

Species Interaction:

- Presence of Competitors
- Presence of Predators

One additional metric currently not used in the HSEHP model

- Proximity of suitable instream habitats to suitable terrestrial habitats, if applicable

SCHEDULE

SWCA is prepared to initiate this scope of work immediately upon receiving a signed contract. Because the suitability metrics for the HSHEP model is to part of the scope of work of another contractor, the first task SWCA will complete under this contract, will be providing the necessary information on the suitability metrics. We understand Wilson Okamoto aims to have a Draft EIS out for public review by the first quarter of 2018; assuming no delays caused by access issues, inclement weather, etc., we will work with Wilson Okamoto to develop a schedule to support this goal.

COST ESTIMATE

SWCA proposes a time-and-materials, not-to-exceed contract. The total cost for the proposal is \$89,404. This cost estimate remains valid for 1 calendar year from the date this proposal is submitted. Should the project not begin until after such date, a revised cost estimate will be submitted. We have attempted to be conservative in preparation of the budget with regard to the level of effort required so that the overall cost estimates are reasonable for your planning purposes. SWCA will not proceed with any work in excess of the time-and-materials budget without prior authorization to proceed from Wilson Okamoto.

Table 1. Scope of Work Cost Estimate

TASK	FEE
Task 1. Communication and coordination	\$ 8,830
Task 2. Pre-field investigations	\$ 10,300
Task 3. Field surveys	\$ 30,405
Task 4. Reporting	\$ 30,425
Task 4. Megalagrion and mosquito research	\$ 9,443
Project total	\$ 89,404

ASSUMPTIONS

For budgeting purposes, the following assumptions are made. Some of these items are beyond SWCA's control, and others could significantly affect project schedule and cost:

- All communications regarding the project will occur via email or conference call; no in-person meetings will be required.
- There will be no more than four 1-hour meetings with Wilson Okamoto. No agency meetings will be necessary.
- For vegetation mapping, no more than 20 labor hours for a biologist and 20 labor hours for a geographic information system (GIS) technician will be needed to find and obtain existing vegetation datasets in an appropriate digital format.
- Wilson Okamoto will provide SWCA with the boundary of the License Area, Service Area, and canal locations as shape files or in another acceptable digital format.
- Wilson Okamoto will provide SWCA with final drafts of the Proposed Action and other alternatives prior to field surveys and analysis, including applicant-committed conservation measures. Shapefiles of the locations of the actions proposed in each alternative will also be provided, if appropriate.

- No more than 50 hours each for two biologists will be required for field surveys, including travel to and from Oahu.
- No more than 4 helicopter flight hours will be necessary for the overflight of the License Area.
- EMI will provide access to the canal locations and canal access routes.
- Weather conditions, road construction, landowner restrictions, force majeure, or any other factor(s) outside of SWCA's control will not prevent field crews from accessing the project location for the duration of the project or impede the efficient mobilization and deployment of crews.
- SWCA will be able to work our preferred schedule for the field effort.
- This scope of work does not include time and materials to complete Endangered Species Action Section 7 or Section 10 consultation, should it be necessary.
- This scope does not include costs to determine or delineate waters of the U.S., if any are present on-site.
- A single draft report will be submitted that will contain a description of the existing flora and fauna along with an analysis of potential impacts that may result from implementation of each alternative.
- A total of three alternatives will be analyzed in the report (No Action and two action alternatives).
- Once impacts analysis has begun, there will be no changes to the alternatives.
- One (1) draft and one (1) final version of the report will be required. All reports will be transmitted electronically; no hard copies will be provided.
- Addressing Wilson Okamoto comments on the draft report will not exceed 8 labor hours.
- Addressing agency and public comments on the content provided by the report will not exceed 8 labor hours.

ATTACHMENT K

Social Impact Assessment
Earthplan



May 31, 2017

Earl Matsukawa
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Dear Earl:

Subject: Proposed A&B Long-Term Lease for the Nahiku, Keanae, Honomanu, Huelo License Areas
Proposal to Prepare a Social Impact Assessment for the EIS

Thank you for considering Earthplan for the preparation of a social impact assessment, hereafter referred to as SIA, for the Environmental Impact Statement, or EIS, on the proposed A&B Long-Term Lease for the Nahiku, Keanae, Honomanu, Huelo license areas.

The social environment comprises people's values, lifestyles and formal and informal interactions. Social impact analysis explores how proposed actions in the physical environment may affect the social environment within the EIS framework.

The proposed long-term water lease can affect the social environment on many levels, ranging from the practical provision of drinking water and water for current and future agricultural uses, to economic opportunities or constraints, and to historic and dichotomous values of urban and rural lifestyles. The SIA needs to explore the full range of social impacts. Given the proposed action's complexity and controversy, the SIA needs to present a thorough and balanced analysis that reflects the full span of the affected social environment. This proposal is intended to produce such an SIA.

Proposed Scope of Work

I propose the following scope of work:

1. Profile Of The Existing Community --This information will provide baseline data for the Primary Study Area, which will preliminarily comprise Upcountry Maui, Paia / Haiku and East Maui. The Secondary Study Area will comprise Maui County and Maui Island.

Research on the Primary Study Area will include population and housing trends, and selected demographic information. Sources will include the U.S Bureau of Census and Maui County information, as well as other pertinent data. We will also provide a description of Primary Study Area communities as available.

2. Major Forces for Change -- This scope item is crucial in understanding current and future social context and community expectations for the future. We propose to extend the baseline data by identifying possible community changes independent of the proposed actions. Earthplan will identify major State and Maui County plans and policies that guide change in the Primary Study Area, identify key development changes, and identify relevant public improvements in the vicinity.
3. Preliminary Community Issues and Concerns about the Proposed Actions -- This scope item is intended to identify and analyze community reactions to the proposed action. We stress that issues are community reactions. Issues deal with feelings and do not necessarily constitute actual social impacts.

To study community issues, we propose to conduct up to 15 focus groups with the following approach:

- a. To provide a comfortable setting and encourage dialogue among peers, each group will comprise like-minded individuals who have common interests and share values to some extent. Possible groupings may include the following. *The actual focus groups and their composition will be determined during the study.*

Community organizations

- Upcountry organizations
- Paia / Haiku combined community organization
- East Maui community organizations

High school students

- King Kekaulike
- Hana

Proposal to Wilson Okamoto Corporation re: Proposal to Prepare a Social Impact Assessment for the Environmental Impact Statement on Proposed Long-Term Lease for the Nahiku, Keanae, Honomanu, Huelo License Areas

May 31, 2017, Page 3 of 5

Business groups

- Central / Upcountry
- Paia / Haiku
- East Maui

Agriculture and food gathering

- Ranchers
- Central Maui and Upcountry diversified agriculture
- East Maui diversified agriculture, including kalo
- East Maui shoreline and stream gatherers

A&B employees (former and current)

Environmental interests

- b. Each group will be asked the same questions for comparative analysis.
- c. Each group will comprise twelve to 15 people. Sessions will be 1.5 to two hours.

4. Potential Social Impacts of the Proposed Actions – This section will identify potential social impacts, including the following topics. Note that social impact topics will be refined during the study.

- a. The relationship of the proposed actions to public plans and policies and community expectations for the future
- b. Impacts on directly or indirectly affected social groups
 - Residential water customers
 - Business water customers (potable and non-potable, includes agricultural users)
 - Stream dependent food cultivation and gathering
 - Appropriate public services
 - Other

Project Team

Earthplan is well-qualified to conduct a social impact assessment on the proposed A&B long-term lease for the Nahiku, Keanae, Honomanu, Huelo license areas. We have conducted over 60 social impact assessments on a wide range of projects and plans. Further, we conducted several studies on Maui, prepared the SIA for the Kamehameha Schools / Bishop Estate Waiahole Ditch Water Application, and facilitated scoping meetings on this EIS.

On this project, I will be project manager, focus group facilitator, and principal writer and analyst. Assistance will be provided by research assistants Michael P. Mays and Bonnie

Proposal to Wilson Okamoto Corporation re: Proposal to Prepare a Social Impact Assessment for the Environmental Impact Statement on Proposed Long-Term Lease for the Nahiku, Keanae, Honomanu, Huelo License Areas

May 31, 2017, Page 4 of 5

Seraphine. In addition, Sara Verga Cruciana will provide coordination and administrative services that support focus group activities.

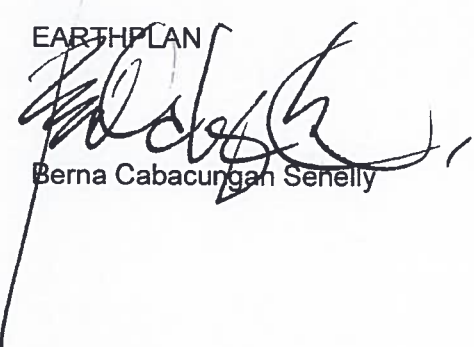
Proposed Fees

I propose that the report be prepared for a fixed fee of \$69,000. Reimbursable expenses are travel-related and estimated at \$13,520. Receipts will be submitted with billings. No other expenses are anticipated, although we request that you consider other expenses not currently anticipated if the need arises. Additional report services will be based on hourly rates cited in Attachment A, which shows the basis for proposed fixed fees and reimbursable expenses.

I hope that this proposal meets your needs and look forward to hearing from you. Again, thank you for considering Earthplan for participation in this project.

Sincerely,

EARTHPLAN



Berna Cabacungan Senelly

Proposal to Wilson Okamoto Corporation re: Proposal to Prepare a Social Impact Assessment for the Environmental Impact Statement on Proposed Long-Term Lease for the Nahiku, Keanae, Honomanu, Huelo License Areas
May 31, 2017, Page 5 of 5

Fee and Expense Estimate

<i>Team member</i>	B. Senely	M. Mays	B. Seraphine	S. Verga	Subtotal
<i>Hourly rate</i>	\$100.00	\$75.00	\$25.00	\$25.00	
Profile of Existing Community					
Census research	20	0	60	0	\$3,500.00
Research communities' characteristics	10	50	0	0	\$4,750.00
Analysis and writing	60	0	10	0	\$6,250.00
Major Forces For Change					
Research, analysis and writing	60	0	0	0	\$6,000.00
Preliminary Community Issues					
Focus group framework / design	20	0	0	0	\$2,000.00
Initial contact and preliminary logistics (15 groups; 2 hours each)	30	0	0	0	\$3,000.00
Coordinate logistics and follow up (15 groups; 2 hours each)	0	0	0	30	\$750.00
Facilitate focus groups (15 groups; 4 hours each)	60	60	0	60	\$12,000.00
Documentation	5	15	60	15	\$3,500.00
Analysis and writing	80	10	0	0	\$8,750.00
Potential Social Impacts					
Relationship to public policies and plans	30	0	0	0	\$3,000.00
Identify and research user groups	20	60	0	0	\$6,500.00
Analysis and writing	80	10	10	0	\$9,000.00
TOTAL SET FEE					\$69,000.00

Expenses	Estimate
Airfare DFW - Kahului (2 trips; \$1,500 each)	\$3,000.00
Airfare HNL - Kahului (2 people, 2 round trips each, \$250 per trip)	\$1,000.00
Lodging (3 people, 14 days each, \$200 per night)	\$8,400.00
Car rental (14 days, \$80 per day)	\$1,120.00
TOTAL ESTIMATED EXPENSES	\$13,520.00

ATTACHMENT L

Economic-Fiscal Impact Assessment
Munekiyo-Hiraga

May 24, 2017

Via email to: ematsukawa@wilsonokamoto.com

Mr. Earl Matsukawa, AICP
Vice President and Director of Planning
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawai'i 96826

SUBJECT: Proposal and Agreement for Consulting Services Related to Preparation of an Agricultural Impact Report and Economic and Fiscal Impact Analysis Report for East Maui Water Lease

Dear Mr. Matsukawa:

Thank you for the opportunity to submit this proposal for the preparation of an Agricultural Impact Report and Economic and Fiscal Impact Analysis Report in support of the Environmental Impact Statement (EIS) for the East Maui Water Lease. The proposal and agreement outline assumptions, scope of services, and basis of compensation for these two (2) reports.

I. BACKGROUND

Wilson Okamoto Corporation (Client) is preparing an EIS on behalf of Alexander & Baldwin, Inc. (A&B) and East Maui Irrigation Company, Limited (EMI), collectively referred to as "A&B". The Chapter 343, Hawai'i Revised Statutes (HRS) EIS is required prior to the Board of Land and Natural Resources acting on A&B's lease application for the "right, privilege, and authority to enter and go upon" the Nahiku, Ke'anae, Honomanu, and Huelo license areas "for the purpose of developing, diverting, transporting, and using government-owned waters". The purpose of the water lease is to allow A&B the ability to continue to provide water to enable approximately 30,000 acres of fields in Central Maui to remain in agriculture and to continue to supply water to County of Maui for the Upcountry Water System, Nahiku community, and the Kula Agricultural Park.

A decision is currently pending from the Commission on Water Resource Management (CWRM) on a petition to amend the Interim Instream Flow

Standards (IIFS) for 27 streams within the license areas. The decision on the IIFS will inform the alternatives assessed in the EIS. However, Client has advised that, at a minimum, the EIS is anticipated to assess the following three (3) alternatives:

- A. Preferred Alternative – a water lease up to the amount available for diversion based on the IIFS decision
- B. Less than IIFS Alternative – a water lease for some amount less than the amount available for diversion based on the IIFS decision
- C. No Action Alternative - the State does not issue a water lease; A&B may continue to divert water that originates from A&B/EMI-owned lands

Client has requested Munekiyo Hiraga's (MH) assistance in preparing an Agricultural Impact Report and Economic and Fiscal Impact Report to support the EIS process. The findings of the Agricultural Impact Report will inform the Economic and Fiscal Impact Report. The two (2) reports will be prepared through a partnership with Plasch Econ Pacific, LLC (PEP), who will be a subconsultant to MH. See **Exhibit "A"**. PEP will take the lead in preparing the Agricultural Impact Report, with assistance from MH in data collection, drafting sections that are common to both reports, GIS analysis, and preparing the report maps. MH will take the lead in preparing the Economic and Fiscal Impact Assessment, with PEP assisting in supplying some of the multipliers, estimating some of the economic and fiscal impacts related to agriculture, and conducting other analysis as needed.

II. ASSUMPTIONS AND QUALIFICATIONS

This proposal has been prepared with certain assumptions and qualifications which are intended to provide a basis for defining scope and budget amounts. Should there be a deviation from the assumptions noted, MH will discuss said deviations with Client to determine whether a contract amendment in the form of scope and budget ceiling amendments are warranted. The following assumptions have been utilized in the formulation of this proposal:

- A. As further outlined in Section V of this proposal, a not-to-exceed budget ceiling utilizing a Time and Materials (T&M) basis of compensation is proposed for this assignment and is based on our past experience in handling similar undertakings for other projects. As such, monthly billings will reflect actual labor and direct costs expended for the project. In the event that we are able to complete the scope of work identified herein

within the proposed budget ceiling, MH will not bill for payment of the remaining funds in the approved budget.

- B. The economic impact analysis model will be based on multipliers from *The Hawaii State Input-Output Study: 2012 Benchmark Report* (August 2016) published by the State of Hawai'i, Department of Business, Economic Development, and Tourism and other sources.
- C. The fiscal impact analysis model will assess impacts to the general funds of the State of Hawai'i and County of Maui. Impacts to special State and County funds will be excluded from the analysis.
- D. The fiscal impact analysis model will be based on the most recently available adopted State and County budgets at the time of report preparation. In the event that the most recently available budget for the State and County are from different years, the budgets for the year with data available for both the State and County will be utilized to ensure consistency across the analysis.
- E. Client and/or A&B will provide the following information for use in the analyses:
 - 1. Information on the proposed agricultural uses envisioned for the 30,000 acres under each alternative assessed in the EIS.
 - 2. Information on the amount of water supplied to the Upcountry Maui Water System, Nahiku community, and Kula Agricultural Park under existing conditions and under each alternative in the EIS.
 - 3. Under the No Action Alternative, in order to meet the domestic and agricultural needs in Upcountry Maui as well as the agricultural water needs for Central Maui, alternative water sources may be needed. The EIS Preparation Notice identifies the potential alternative sources including desalinization of seawater or brackish groundwater or drilling of new fresh groundwater wells. The cost of developing alternative water sources has economic and fiscal impact implications. As such, Client and/or A&B shall provide information regarding the feasibility and cost of the alternative source development under the No Action Alternative.
- F. This proposal assumes that there will be occasional coordination meetings with Client and A&B. However, participation in public meetings or

hearings related to the water lease or EIS is not included in the scope of services for this proposal.

- G. Aside from the preparation of the Agricultural Impact Report and Economic and Fiscal Impact Analysis Report, no other technical analysis or report preparation services are addressed by this proposal.

III. SCOPE OF SERVICES

MH shall provide services as set forth in **Exhibit "B"**. Work tasks beyond those set forth in **Exhibit "B"** shall be deemed additional services subject to MH's submission of a separate proposal for services.

IV. TIME SCHEDULE

MH is available to initiate work on this assignment following the receipt of an executed copy of this proposal. Inasmuch as the formulation of the EIS alternatives is dependent on the CWRM decision on the IIFS, MH will work with Client and A&B to formulate a schedule for preparation of draft and final reports in accordance with the overall EIS schedule established by Client.

V. BASIS OF COMPENSATION

Due to uncertainties in issues and concerns which may be raised during the permitting process, it is difficult to define a lump-sum basis of compensation for the proposed scope of work. For this reason, a T&M basis of compensation, with a not-to-exceed budget ceiling, shall be utilized for this assignment. Accordingly, monthly billings will reflect actual labor and direct costs expended for the project.

MH's current hourly rates are listed below:

Principal	\$282.00/hour
Manager	\$232.00/hour
Senior Associate	\$220.00/hour
Associate	\$175.00/hour
Analyst	\$150.00/hour
Computer Graphics	\$98.00/hour
Wordprocessing	\$80.00/hour

Labor rates may be adjusted by MH after December 31, 2017. The State of Hawai'i General Excise Tax (GET) of 4.166% will be added to labor and other direct costs.

Based on the assumptions set forth and the scope of work outlined in **Exhibit "B"**, we propose a budget ceiling of \$142,160.00. The basis for the budget ceiling is detailed in **Exhibit "C"**.

Payments on invoices are due to MH within 35 days of the invoice date. A monthly service charge of 1.5% may be added to all amounts past due.

VI. BUDGET QUALIFICATIONS AND PROJECT DELAYS

As outlined previously, the budget ceiling set forth in Section V of this proposal represents a best estimate of costs based on MH's previous experience with projects of similar scope. However, as each project possesses unique conditions and circumstances, actual labor and direct costs expended will vary from project to project. Accordingly, the budget ceiling may not be reached if work proceeds in a smooth and timely manner. On the other hand, the budget ceiling may be exceeded if significant technical and/or agency concerns arise which require additional analysis. The following conditions, in particular, may result in the need for additional agricultural impact and/or economic-fiscal analysis services to be performed for the project:

- A. Revisions to EIS alternatives after work has commenced.
- B. Significant concerns raised by agencies during review of the Draft EIS.

Should there be significant concerns/comments or revisions to the project scope, which result in the need for additional analysis, a budget ceiling amendment may be warranted to address the concerns/comments or any revisions and accompanying delays. Any request for a budget ceiling amendment will be coordinated with and approved by Client.

VII. TERMINATION

Either Client or MH may terminate this Agreement upon seven (7) days' written notice. If terminated, Client agrees to pay MH for services rendered and reimbursable costs incurred up to the date of termination.

VIII. ASSIGNMENT

Neither Client nor MH shall transfer or assign any rights under or interest in this agreement without prior written consent of the other party.

IX. LIMITATION ON LIABILITY

It is understood that the compensation to MH under this proposal is based upon all terms and conditions, including without limitation the limitation on liability of MH contained in this proposal.

- A. It is expressly agreed that MH shall not be liable under this proposal, or in connection with the services and material furnished hereunder, to any party other than Client and that there is no third party beneficiary under this proposal.
- B. MH shall be liable to Client under this proposal, or in connection with the services and material furnished hereunder, under any theory whatsoever including without limitation contract or tort, **only** for MH's willful misconduct or willful and material breach of this agreement.
- C. In no case whatsoever shall MH's total aggregate liability to Client under this proposal, or in connection with the services and material furnished hereunder, exceed the total compensation paid by Client to MH under this proposal not including amounts paid by MH to third parties on behalf of Client.
- D. MH is not responsible for and in no case whatsoever shall MH have any liability for claims relating to land surveying services, engineering design services and architectural design services performed by others, including but not limited to the following:
 - 1. Any matter relating to geotechnical engineering or subsurface conditions.
 - 2. Any matter relating to civil engineering, or civil engineering designs or calculations.
 - 3. Any matter relating to structural engineering, or structural designs or calculations.
 - 4. Any matter relating to architectural designs or services, including without limitation conformity with building codes and construction supervision.

Mr. Earl Matsukawa, AICP
May 24, 2017
Page 7

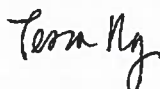
X. ACCEPTANCE OF PROPOSAL

This proposal shall be valid for thirty (30) days. Should Client decide to proceed with this agreement after thirty (30) days, MH may submit a new proposal which may incorporate adjustments to scope, costs and time schedule.

If the terms and conditions of this proposal are acceptable and agreed to, please sign in the space provided below and return one (1) copy to our office. Receipt of the signed copy shall constitute written authorization to proceed with the scope of services in accordance with the provisions set forth herein.

Thank you again for the opportunity to submit this proposal. If there are any questions, or if additional information is needed, please do not hesitate to contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP
Vice President

TMN:la
Enclosures

K:\Prop\17\WOC EMauiWaterLease.docx

ACCEPTED AND AGREED:

By _____

Title _____

Date _____

EXHIBIT A
PROPOSAL FROM PLASCH ECON PACIFIC, LLC

Plasch Econ Pacific LLC

Bruce Steven Plasch, Ph.D., President

ECONOMIC CONSULTING: Economic Development • Land Economics • Feasibility & Valuations • Benefits & Impacts

May 22, 2017

Ms. Tessa Munekiyo Ng
MUNEKIYO HIRAGA, INC.
735 Bishop Street, Ste 238
Honolulu HI 96813

Re: East Maui Water Lease: Agricultural, Economic and Fiscal Impacts

Dear Tessa:

Further to our recent communications, Plasch Econ Pacific LLC (**PEP**) is pleased to submit this proposal to assist Munekiyo Hiraga, Inc. (**MH**) with the following two impact assessments for the proposed East Maui Water Lease (the Project): (1) Agricultural Impacts, and (2) Economic and Fiscal Impacts. Under the lease, the State of Hawai'i would allow Alexander & Baldwin, Inc. (**A&B**) and the East Maui Irrigation Company, Ltd. (**EMI**) to divert East Maui surface water to Central Maui and other areas. The analysis will be part of an Environmental Impact Statement being prepared by Wilson Okamoto Corporation for A&B and EMI.

SCOPE OF ANALYSIS

Water-Lease Alternatives

The analysis of agricultural, economic and fiscal impacts will address three water-lease alternatives:

— **Preferred Alternative**

For this alternative, the State would lease water to A&B/EMI up to the maximum amount allowed based on the Interim Instream Flow Standards (IIFS) for East Maui. Due to voluntary decisions by A&B/EMI and the IIFS, less water will be available from the EMI ditch system than has been the case in the recent past. Additionally, water rates could differ from past rates due to: the reduced amount of diverted water, a likely change in the volume of groundwater pumped, less power generated by HC&S for pumping water, and other factors.

— **Reduced Water Alternative**

For this alternative, the State would lease less water to A&B/EMI than the IIFS would allow. This alternative could also affect water rates, particularly if other water sources must be developed.

— **No Action Alternative**

For this alternative, the State would not issue a water lease to A&B/EMI. However, water would continue to be diverted from the East Maui lands owned by A&B/EMI. This alternative would provide less water than the other alternatives, and could also affect water rates, particularly if other water sources must be developed.

Farm/Community Areas

The impact analysis will address four farm/community areas:

— **Central Maui**

This area comprises the former sugarcane lands of HC&S, most of which are now planned for diversified crops, a dairy, and cattle ranching. If insufficient water is available from EMI, then farming may have to be reduced or more expensive groundwater may be required to irrigate fields.

— **The Kula Agricultural Park**

EMI supplies water to the County's Kula Ag Park. About 445 acres are farmed by 26 tenants on 31 lots. If insufficient water is available from EMI, then farming may have to be reduced or more expensive water from other sources may be required to irrigate crops.

— **Upcountry Maui**

EMI supplies a portion of the water distributed by the County's Upcountry Water System to about 35,000 customers, including farms and ranches, residents, businesses, Kamehameha Schools, the Department of Hawaiian Home Lands, and government facilities. If insufficient water is available from EMI, then new water sources may be required and/or farming may have to be reduced.

— **Nahiku and East Maui Farms**

EMI supplies water to the Nahiku community, and some of the water from East Maui streams is diverted for taro farms and other agricultural operations. If insufficient water is available from EMI for Nahiku, then new water sources may be required. An increase in stream flows could allow an increase in taro and other agricultural production in East Maui.

Agricultural Impact Assessment

The Agricultural Impact Assessment will be a joint document prepared by PEP and MH. PEP will take the lead, and MH will assist with data collection, drafting sections that are common to both assessments (Ag Impacts and Economic/Fiscal Impacts), GIS analysis, and preparing the report maps.

Subject to further refinements in scope and the availability of information, the analysis will cover the following subjects:

- **Executive Summary**
- **Introduction**
 - Content and purpose
 - Methodology
 - Organization
- **Project Description**
 - Water license areas
 - Lease alternatives
- **Recent and Existing Conditions**
 - Water Systems
 - + East Maui Irrigation System
 - Physical description
 - Volume of recent water diversions
 - ▷ State lands
 - ▷ A&B/EMI lands
 - + Wailuku Water Co.
 - Physical description
 - Volume of recent water diversions
 - + Groundwater system for irrigation
 - Physical descriptions
 - Recent volume of water pumped
 - + Upcountry water system
 - Physical description
 - Water volumes
 - + Summary of water sources and deliveries by area and use
 - + Agricultural water rates and factors determining the rates

- Central Maui
 - + Location and acreage of agricultural lands
 - + General agronomic conditions (soil quality, solar radiation, etc.)
 - + Important Agricultural Lands
 - + Recent sugarcane
 - Acreage
 - Water use, by source
 - + HC&S agricultural plans (assuming water is available)
 - Acreage, by agricultural activity
 - Water use, by agricultural activity
- Kula Ag Park (similar to the assessment for Central Maui)
- Upcountry Maui (similar to the assessment for Central Maui)
- East Maui (similar to the assessment for Central Maui)
- **Preferred Alternative: Agricultural Impacts**
 - Water
 - + Volume of water from existing sources
 - + Water from new sources (unlikely for the Preferred Alternative)
 - Development costs
 - O&M costs
 - + Total availability of water, all sources
 - + Water allocations, by area
 - + Anticipated agricultural water rates
 - Central Maui
 - + Anticipated agricultural activity given availability and cost of water
 - Acreage, by agricultural activity
 - Water use, by agricultural activity
 - Feasibility, by agricultural activity
 - Economic impacts: production, sales, land rents, employment, payroll, etc.
 - + Indirect/offsite impacts: sales, employment, payroll, etc.
 - + Fiscal impacts
 - County: property taxes, support expenditures
 - State: taxes (excise, income, etc.), support expenditures
 - Kula Ag Park (similar to the assessment for Central Maui)

- Upcountry Maui (similar to the assessment for Central Maui)
- East Maui (similar to the assessment for Central Maui)
- **Reduced Water Alternative: Agricultural Impacts** (similar to the assessment for the Preferred Alternative)
- **No Action Alternative: Agricultural Impacts** (similar to the assessment for the Preferred Alternative)
- **Summary Comparisons of Agricultural Impacts**

Economic and Fiscal Impact Assessment

The Economic and Fiscal Impact Assessment will be a joint document prepared by MH and PEP. MH will take the lead, and PEP will assist by supplying economic and fiscal multipliers, estimating some of the economic and fiscal impacts (e.g., those related to agriculture), drafting or rewriting some sections, and conducting other analysis as needed.

Subject to further refinements in scope and the availability of information, the analysis is expected to cover the following subjects:

- **Executive Summary**
- **Introduction** (similar to that for the Agricultural Impact Assessment)
- **Project Description** (similar to that for the Agricultural Impact Assessment)
- **Recent and Existing Conditions** (similar to that for the Agricultural Impact Assessment, with the addition of socioeconomic conditions)
- **Economic Impacts of Water Improvements** (if any)
 - Expenditures and Sales
 - + Construction expenditures (taxed at 4%)
 - + Indirect sales
 - Consumption expenditures by families supported by the construction activity (taxed at 4%)
 - Other indirect sales (taxed at 0.5%)
 - Employment and Payroll
 - + Construction
 - + Indirect
- **Economic Impacts of Operations**
 - Estimated Sales
 - + Direct sales
 - + Indirect sales

- Consumption expenditures by families supported by operations (taxed at 4%)
- Other indirect sales (taxed at 0.5%)
- Employment and Payroll
 - + Direct employment and payroll
 - + Indirect employment and payroll
- Population and Housing
 - + Residents and homes supported by direct employment
 - + Residents and homes supported by indirect employment
- **Impacts on County Finances**
 - Change in the tax base
 - Development activity
 - + Revenues, taxes and impact fees
 - + Support expenditures, infrastructure
 - + Support expenditures, services
 - + Net revenues
 - Operations
 - + Revenues
 - + Debt service on support infrastructure
 - + Support expenditures on services
 - + Net revenues
- **Impacts on State Finances** (similar to the impacts on County finances above)
- **Community Benefits**

Meetings and Site Visits

It is assumed that most team meetings to gather information and discuss the analysis will occur on O'ahu. However, a 2-day site visit to Maui is anticipated.

ADDITIONAL SERVICES

Additional services may include:

- Preparing responses to comments by government agencies, community groups, environmental groups, etc.
- Attending community meetings and hearings
- Preparing and presenting testimony

INFORMATION REQUEST

PEP requests that Project team members provide the following information:

- **Water**
 - Volumes of recent and planned EMI water diversions and uses
 - Similar information for other water systems used to irrigate HC&S lands
 - Water rates and how they are calculated
- **HC&S**
 - Agricultural plans for HC&S lands, including agricultural uses, acreage, land rents, water uses, production, sales, employment, payroll, feasibility, etc.

PRODUCTS

PEP will submit a draft report of the Agricultural Impacts, followed by a final report. The reports will be delivered via e-mail as pdf files. MH will prepare draft and final reports of the Economic and Fiscal Impacts.

QUALIFICATIONS

As indicated in the attached, I have a strong background in economics, finance, and quantitative analysis, and have been an economic consultant in Hawai'i since 1971. Also, I have extensive experience in economic development (including agriculture), land and resource economics, feasibility studies, market analysis, public policy analysis, and the economic impacts of projects, and community benefits and costs of projects.

I have conducted agricultural impact assessments for the James Campbell Company, Kamehameha Schools, the Dole Food Company Hawai'i, Castle & Cooke, Amfac/JMB, C. Brewer, A&B-Hawai'i, Kapalua Land Co., Maui Land & Pineapple, the State of Hawai'i, the City & County of Honolulu, and others. Also, I have conducted economic and fiscal impact assessments for projects by the James Campbell Company, Amfac/JMB, Haseko ('Ewa), Princeville, the State of Hawai'i, the City & County of Honolulu, and others. Many of these assessments have been for projects on Maui.

PROPOSED FEES AND PAYMENTS

Services will be charged at PEP's standard rates of \$350 per hour for the principal and \$175 per hour for the research assistant, plus expenses and excise tax. Anticipated expenses include airfare, car rental, parking, etc.

The services specified above under Scope of Analysis, and excluding the Additional Services, will be subject to a maximum of \$80,000. Although a change in the maximum amount is not anticipated, it may be increased subject to your prior approval.

Ms. Tessa Munekiyo Ng
May 22, 2017
Page 8

A retainer of \$12,000 is requested, which will be followed by periodic invoices for services and expenses. Late payments will be charged interest at 1% per month.

SCHEDULE

PEP's services will be completed to accommodate your schedule and submittal dates.

If you have any questions, please give me a call. I look forward to working with you and other team members on this Project.

Sincerely,

Bruce S. Plasch
Bruce S. Plasch
President

The terms set forth are acceptable.

Date

BRUCE S. PLASCH, PH.D.

Plasch Econ Pacific LLC

Bruce Plasch is owner and President of PEP, an economic consultancy that specializes in the economies of Hawaii and the Pacific basin.

Areas of Expertise

- **Economic Development:** community, regional and island development; comparative advantages of economic activities; exports, import substitution, support activities; tourism, recreation, ocean activities, agriculture, forestry, aquaculture, energy, commercial and industrial activities; infrastructure requirements; government support services and incentives; economic models and forecasts.
 - **Land and Housing Economics:** development forces and patterns, forecasts, values and rents.
 - **Resource and Environmental Economics:** resource pricing, incentives and disincentives, valuation of externalities, and carrying capacity studies.
 - **Market Assessments:** market forces, market potential, prices, absorption rates.
 - **Project Feasibility:** profitability, project financing, cash-flow analysis.
 - **Valuations:** leases, businesses, contracts, lost earnings.
 - **Economic Benefits and Impacts:** employment, community benefits, demographic impacts, government revenues and expenditures.
 - **Policy Analyses:** planning reports, position papers, analysis.
 - **Expert Witness Testimony:** government commissions, legislative bodies, contested-case hearings, court trials.
-

Education

- Ph.D. (1971) and M.S. (1966), Engineering-Economic Systems, Stanford University, specializing in economics, finance, and quantitative analysis.
 - B.S. (1965), University of California, supplemented with an additional year of liberal arts.
-

Professional Experience

- Hawaii-based economic and financial consultant since 1971.
 - Assistant Professor (economics and statistics), University of Hawaii, 1970 to 1973.
-

Contact

- **Mailing Address:** 1655 Kamole Street, Honolulu, HI 96821.
- **Office:** (808) 373-9364 • **Fax:** (808) 373-9590 • **E-mail:** bplasch@hawaii.rr.com

EXHIBIT B
SCOPE OF SERVICES

EXHIBIT B

**AGRICULTURAL IMPACT REPORT AND ECONOMIC AND FISCAL
IMPACT ANALYSIS REPORT FOR EAST MAUI WATER LEASE**

SCOPE OF SERVICES

Munekiyo Hiraga (MH) shall undertake the following scope of services in accordance with the terms and conditions set forth in our letter proposal dated May 24, 2017.

I. AGRICULTURAL IMPACT REPORT

A. Research and Analysis for Agricultural Impact Report

1. Conduct research and Geographic Information System (GIS) mapping analysis related to proposed agricultural uses in Central Maui.

B. Prepare Agricultural Impact Report

1. Collaborate with Plasch Econ Pacific, LLC to prepare sections of draft and final Agricultural Impact Report.
2. Prepare maps for inclusion in Agricultural Impact Report.

II. ECONOMIC AND FISCAL IMPACT ANALYSIS REPORT

A. Prepare Economic Impact Analysis Model

1. Utilize *The Hawaii State Input-Output Study: 2012 Benchmark Report* (August 2016) and other sources to prepare an Excel spreadsheet model to calculate direct, indirect, and induced impacts for the three (3) EIS alternatives.
2. Coordinate with Client to obtain pertinent information for use in the analysis.

B. Prepare Fiscal Impact Analysis Model

1. Prepare an Excel spreadsheet model to calculate the net fiscal impact of the project on the State of Hawai'i and County of Maui general funds. The model will estimate net changes in property taxes, general excise taxes, and income taxes, as well as changes in government costs of the three (3) EIS alternatives.
2. Coordinate with Client to obtain pertinent information for use in the analysis.

C. Draft Economic and Fiscal Impact Report

1. Prepare a Draft Economic and Fiscal Impact Analysis Report in support of the Environmental Impact Statement (EIS) for Client review.
2. The Economic and Fiscal Impact Report will address impacts related to agricultural uses in Central Maui, the Upcountry Water System, Nahiku Community, and Kula Agricultural Park, as well as to the four (4) license areas, as may be applicable.

D. Final Economic and Fiscal Impact Report

1. Coordinate the review of the Draft Economic and Fiscal Impact Analysis Report with Client and project team.
2. Prepare Final Economic and Fiscal Impact Report which will be included as an Appendix in the Draft EIS.

E. Respond to Comments on Draft EIS

1. As may be requested, respond to questions/comments on the Draft EIS pertaining to economic and fiscal impacts.

EXHIBIT C.
DETAILED MAN-HOUR AND COST