



NOTICE TO CONSULTANTS  
REQUEST FOR PROPOSAL/QUALIFICATIONS  
AND CONTRACT  
FOR

**Archeological and Paleontological Monitoring  
Services**

**Water Reclamation Facility Lift Station and Offsite  
Pipelines Construction**

October 08, 2020

A handwritten signature in blue ink, appearing to read "Rob Livick", is written over a horizontal line.

Rob Livick, PE/PLS - City Engineer





## **NOTICE TO CONSULTANTS**

### **City of Morro Bay Requesting Proposals for Archeological and Paleontological Monitoring Services: Water Reclamation Facility Lift Stations and Offsite Pipelines Construction**

NOTICE IS HEREBY GIVEN the City of Morro Bay (the "City"), located in the County of San Luis Obispo, State of California, is requesting proposals from firms desiring to perform archaeological and paleontological monitoring services necessary for the construction of the Water Reclamation Facility Lift Stations and Offsite Pipelines Project (i.e., Conveyance Facilities Project).

The City of Morro Bay Public Works Department must receive all proposals by 2:00 p.m. on Friday, October 30, 2020.

The City will not consider proposals received after that date and time. Submit proposals to the City of Morro Bay Public Works Department in a sealed envelope plainly marked with the proposal title, consultant name and address, and time and date of the proposal submittal deadline.

Proposals shall be emailed to Rob Livick, PE/PLS – City Engineer ([rlivick@morrobayca.gov](mailto:rlivick@morrobayca.gov)).

#### **General Work Description:**

The WRF overall project includes construction of a new one million gallon per day (mgd) advanced treatment facility on South Bay Boulevard north of Highway 1, two new lift stations, approximately 3.5 miles of pipelines and wells to inject the purified water into the groundwater aquifer, which can be extracted for reuse through the City's existing infrastructure. The current schedule for the overall project includes construction beginning in 2019 and project completion by 2023.

The Conveyance Facilities Project component of the City's WRF involves constructing multiple pipelines to serve the WRF from the proposed influent lift stations. The pipelines include two parallel sewer force mains which convey raw sewage by a lift station located at the existing wastewater treatment plant location sourced from the City's collection system. The conveyance facilities also include the treated effluent (brine) disposal line from the WRF to the ocean outfall and a purified water line from the WRF to the injection wells.

Supporting documentation is available on the WRF website at the links below:

- Conveyance Facilities Drawings (Part 1): [https://morrobaywrf.com/wp-content/uploads/3a\\_Vol3.Drawings22x34.pdf](https://morrobaywrf.com/wp-content/uploads/3a_Vol3.Drawings22x34.pdf)
- Conveyance Facilities Drawings (Part 2): [https://morrobaywrf.com/wp-content/uploads/3b\\_Vol3.Drawings22x34.pdf](https://morrobaywrf.com/wp-content/uploads/3b_Vol3.Drawings22x34.pdf)
- Conveyance Facilities Specifications: [https://morrobaywrf.com/wp-content/uploads/5\\_2020\\_0041-Final\\_SAA.pdf](https://morrobaywrf.com/wp-content/uploads/5_2020_0041-Final_SAA.pdf)
- Draft EIR: <https://morrobaywrf.com/wp-content/uploads/Draft-Environmental-Impact-Report-EIR-March-2018.pdf>
- Final EIR: <https://morrobayca.sharepoint.com/:b:g/WRF/EeLLzx4e86FOr3fFwKUDUbeBBN6GUzKQe4Hsx9ulqCI38Q?e=Luylwq>
- California State Historic Preservation Office (SHPO) Programmatic Agreement: [https://morrobayca.sharepoint.com/:b:g/WRF/EQdVM77oKBVCsYXP\\_OB8Bb4B1ch\\_HYSFDvQdDA589QmpYg?e=86jrfC](https://morrobayca.sharepoint.com/:b:g/WRF/EQdVM77oKBVCsYXP_OB8Bb4B1ch_HYSFDvQdDA589QmpYg?e=86jrfC)
- Preliminary Presence/Absence Testing Report and Monitoring Plan for Construction Phase 2 of the Morro Bay Water Reclamation Facility Project (Phase 2 Monitoring Plan): Exhibit B

For a copy of the RFP or additional supporting information, contact Rob Livick, PE/PLS – City Engineer at (805) 772-6569 / [rlivick@morrobayca.gov](mailto:rlivick@morrobayca.gov). The telephone number for the Public Works Department is (805) 772-6261.

## **DESCRIPTION OF WORK**

### **1. INTRODUCTION**

This project is intended to implement the City of Morro Bay Water Reclamation Facility EIR and the SHPO Programmatic Agreement. The City of Morro Bay is requesting proposals from qualified firms with experience in archeological and paleontological monitoring services during construction to provide for the following project:

#### **Water Reclamation Facility Lift Stations and Offsite Pipelines**

The proposal should identify a prime consultant and subconsultants as required.

### **2. GENERAL PROJECT DESCRIPTION**

The existing Morro Bay-Cayucos wastewater treatment plant is located at 160 Atascadero Road in Morro Bay and is jointly owned and operated by the City of Morro Bay (City) and the Cayucos Sanitary District. The wastewater treatment plant was originally built in 1954 in a low-lying area near the confluence of Morro Creek with the Pacific Ocean, and it provides wastewater treatment services to the City and to the unincorporated community of Cayucos approximately six miles to the north. The wastewater treatment plant was built before modern state and federal water quality standards, and does not meet federal Clean Water Act (CWA) standards for full secondary treatment.

The WRF Project includes construction of a new one million gallon per day (mgd) advanced treatment facility. This Project will be designed to treat an annual average flow of 0.97 million gallons of wastewater per day (mgd) through preliminary, secondary, tertiary, and advanced treatment. The Water Reclamation Facility (WRF) will produce purified water that meets indirect potable reuse standards for a groundwater replenishment reuse application, per California Code of Regulations Title 22 purified water requirements.

Source waters from the City's wastewater collection system will be pumped to the WRF site from the City's wastewater treatment plant located on Atascadero Road just northeast of Morro Rock. This raw wastewater will be pumped via dual force main pipelines parallel to Highway 1. Advanced treated purified water produced at the WRF will be conveyed three miles to injection wells for indirect potable reuse (IPR).

In this phase of implementation, archeological and paleontological monitoring services are required during construction of the WRF lift station and offsite pipelines at specific areas outlined in the Project Programmatic Agreement with the SHPO.

The selection of consultant will be based strictly on qualifications, expertise, and cost effectiveness of the proposed personnel and firm, in that order. The selected firm will provide a qualified Archeologist and Paleontologist to perform the monitoring scope of work. Once a final fee is negotiated with the selected Consultant, based on a mutually agreed upon Scope of Work, the fee will be submitted to the City Manager or Council for approval.

The WRF Project EIR (Environmental Sciences Associates, 2018) and the Phase 2 Monitoring Plan (Far Western, 2020) provide the archeological and paleontological monitoring plan requirements for culturally sensitive areas for the Conveyance Facilities Project that will require monitoring during construction. While only the specific areas identified in the Phase 2 Monitoring Plan will be monitored by the archaeological and paleontological monitor, the entire alignment will

be monitored by the Native American monitor. The Native American Monitors will be required to abide by the “Native American Heritage Commission Guidelines for Native American Monitors/Consultants.” The hourly rate for routine tribal monitoring activities shall be provided by all tribes at a rate of \$100 per hour. The consultant is required to include the following Native American representatives as a member of their team. Contact information for these tribes is provided below.

Contact	Tribe	Address	Phone	Email
Mona Tucker	<i>yak tityu tityu</i> – Northern Chumash Tribe	660 Camino Del Rey Arroyo Grande, CA, 93420	(805) 748-2121	<a href="mailto:olivas.mona@gmail.com">olivas.mona@gmail.com</a>
Patti Dunton	Salinan Tribe of Monterey and San Luis Obispo Counties	7070 Morro Rd. #A Atascadero, CA 93422	(805) 464-2650	<a href="mailto:salinantribe@aol.com">salinantribe@aol.com</a>
Fred Collins	Northern Chumash Tribal Council	P. O. Box 6533 Los Osos, CA 93412	(805) 801-0347	<a href="mailto:fcollins@northernchumash.org">fcollins@northernchumash.org</a>

### **3. SCOPE OF ARCHEOLOGICAL AND PALEONTOLOGICAL MONITORING SERVICES**

A. The consultant is encouraged to prepare a straightforward, concise proposal that specifically relates to the project. The City desires to retain the services of a qualified cultural resources monitor to complete the archeological and paleontological monitoring services during construction for the construction of the WRF Lift Stations and Offsite Pipelines Project excluding the cultural site CA-SLO-16 as outlined in the Phase 2 Monitoring Plan. The archeological and paleontological monitoring will be limited to only those areas specifically identified in Section V of the Phase 2 Monitoring Plan. Within the scope of work and as defined in the EIR and the SHPO Programmatic Agreement, the cultural resources monitor(s) are to be a qualified archeologist and paleontologist competent in monitoring activities and identification of archeological and paleontological resources as appropriate. Each consultant is required to include members of the Salinan and Northern Chumash tribes as subconsultant to their team to provide Native American monitoring. The scope of services will include the following items:

- Archeological and Paleontological monitoring services during construction
  - Monitoring shall be limited to those areas specially identified in the Phase 2 Monitoring Plan
- Native American monitoring services during construction along the entire pipeline alignment
- Construction Worker Cultural and Paleontological Resources Sensitivity Training, which includes, but is not limited to:
  - Coordination with Native American representatives and organizations
  - Proper procedures in the event of archeological resources discovery or human remains.
  - Safety precautions to be taken when working with cultural resource monitors.
  - Recognition of the types of paleontological resources potentially encountered during construction
- Performing surveys, collecting data, and preparing reports.

- Coordination on the efforts of the Native American subconsultants during monitoring activities.
- Continual on-call availability throughout construction.

**Phase 1 – Pre-Construction Activities:**

**TASK 1.1 – PROJECT TEAM COORDINATION**

This task includes coordination with the City of Morro Bay, the WRF Program Management Team and Construction Manager (Carollo Engineers, Inc.), and the Contractor (TBD) as needed. Meetings include, but are not limited to three (3) meetings with the City staff and the Contractor. Project team coordination also includes regular management of the team’s subconsultants.

**TASK 1.2 – CONSTRUCTION WORKER CULTURAL AND PALEONTOLOGICAL RESOURCES SENSITIVITY TRAINING (EIR-CUL-6, TESTING REPORT AND MONITORING PLAN)**

This task includes the development and presentation of the cultural resources sensitivity training and education program presented by the lead archaeologist and the Native American representatives prior to the commencement, and for the duration of the construction activities for all construction workers. Prior to any soil-disturbing construction activities, the archeological monitor will conduct a five- to 10-minute oral archaeological awareness training for the construction crew, including all equipment operators and personnel involved in the mass excavation activities. The Native American monitor will also likely offer comments on their concerns. Given the nature of the mass excavation activities, an equipment operator may be the first individual to identify potential archaeological material should it be encountered, particularly if an archaeological monitor is not present. Archaeological sensitivity training is a key element of the archaeological monitoring program. The archaeological sensitivity training will include details about the archaeological sensitivity of the general area, legal requirements related to protecting cultural resources, review of the kinds and types of artifacts and features that may be encountered, and information about what should occur if construction activities unearth archaeological materials. Pamphlets with images of various local archaeological artifacts and midden soils, along with brief descriptions of their cultural and legal significance, will be given to all construction crew members as part of awareness training. Crew will be provided with contact information and appropriate protocol in the event of the discovery of an archeological resource. In general, for any monitoring-based mitigation program to be effective, all on-site construction personnel shall be required to complete training in artifact and archaeological feature identification. The training presentation must be simple and accessible, as well as universal and mandatory. This training will be repeated and/or revised as needed (e.g., new construction phases, new workers). The Construction Manager will be responsible for ensuring that any new workers receive the training.

**Phase 2 – Construction Monitoring and Mitigation Site Monitoring and Regulatory Reporting:**

**TASK 2.1 – MITIGATION AND MONITORING DURING CONSTRUCTION (EIR CUL-7, EIR CUL-8, EIR CUL-11, SHPO PROGRAMMATIC AGREEMENT, TESTING REPORT AND MONITORING PLAN)**

This task includes the archaeological and paleontological monitoring through the construction duration of the Conveyance Facilities Project. Archaeological monitor shall follow guidelines in attached in the Phase 2 Monitoring Plan and shall be limited to the areas specifically requiring monitoring per the Phase 2 Monitoring Plan. The scope specially excludes monitoring near Morro Creek, CA-SLO-16. Mitigation for this area, as identified in the Phase 2 Monitoring Plan, shall be performed by a separate archeological firm directly contracted to the City and managed by the Construction Manager. Construction monitoring shall be specifically included for areas CA-SLO-239, CA-SLO-2022, CA-SLO-2232H as outlined in the Phase 2 Monitoring Plan.

**TASK 2.2 COORDINATION WITH TRIBAL MONITORS (EIR-CUL-8, SHPO PROGRAMMATIC AGREEMENT, TESTING REPORT AND MONITORING PLAN)**

The project area lies within lands claimed by both Northern Chumash and Salinan groups. Consultation with these tribes has been done by the City throughout preparation of the EIR, negotiation of the Programmatic Agreement with SHPO, and construction of the WRF. This task includes the coordination with both the Northern Chumash and Salinas Tribe of Monterey and San Luis Obispo Counties throughout the construction excluding areas near Morro Creek (CA-SLO-16). As with archaeological monitors, Native American monitors will be required to fill out a daily log. Both the archaeological and Native American monitor daily logs will be provided to the Construction Manager. The Construction Manager will organize the daily logs on the WRF intranet site (SharePoint) so that the daily logs can be shared with the all interested Native American groups involved with the project. Access to the daily logs will be limited to only those tribes that specifically request access. The Native American monitor daily logs will include the name and tribal affiliation of the monitor and be included in the monitoring report.

**TASK 2.3 ON-CALL CULTURAL RESOURCES MONITORING**

This task includes on-call archaeological and paleontological resources monitoring in the event culturally sensitive remains are encountered during construction for areas not specially identified in the in the Phase 2 Monitoring Plan.

**TASK 2.4 REPORTING**

This task includes weekly status reports submitted to the City from the lead archaeologist detailing monitoring activities and any discoveries. Weekly report shall include both archaeological and Native American daily monitoring logs, photos, figures, and maps as appropriate. If no archaeological materials are identified during construction monitoring, an Archaeological Resources Monitoring Report will be prepared and submitted to the City for review within 30 days of completion of monitoring activities. The final Monitoring Report will be submitted to both the City and to the Central Coast Information Center at the University of California, Santa Barbara.

**4. DELINEATION OF RESPONSIBILITIES**

**A. Responsibilities of the Consultant**

1. The Consultant will be responsible for undertaking the services identified above, or as negotiated with the City, upon execution of the contract by both parties. Services provided will be under the direction, seal and signature of the appropriate professional engineers registered in the State of California in active standing with the California Board for Professional Engineers and Land Surveyors.
2. All invoices will be submitted to the City with a brief description of services rendered.

**B. Responsibilities of the City**

1. Providing construction management for the Conveyance Facilities Project
2. Pay all invoices submitted in accordance with the Contract requirements.

**5. TENTATIVE Project Schedule**

Start work	December 15, 2020
Construction near Morro Creek	TBD

**6. Selection Process**

A. Proposals evaluation based on the following applicable criteria:

1. Experience record of the qualified Archaeologist and Paleontologist.
2. Demonstration of understanding project characteristics
3. Individual or project team within the Consultant's organization directly responsible for the work
4. Adequate staff to perform the work within the time allowed
5. Past performance of the Consultant on work previously performed for local public agencies and/or related parties
6. Knowledge of local conditions, where appropriate
7. Cost effectiveness of Consultant
8. Ability to conform to the City's attached Professional Services Contract

B. City of Morro Bay staff will assemble all proposals received for evaluation by a selection committee. The selection committee may evaluate all proposals as submitted or it may interview the most qualified Consultants based on the evaluation criteria. Fees for services will be subject to negotiation after consultant selection.

## **GENERAL TERMS AND CONDITIONS**

---

### **1. PROPOSAL REQUIREMENTS**

**REQUIREMENT TO MEET ALL PROVISIONS:** Each individual or firm submitting a proposal shall meet all of the terms and conditions of the Request for Proposals (RFP) specifications package. By virtue of its proposal submittal, proposing consultant acknowledges agreement with and acceptance of all provisions of the RFP specifications.

**PROPOSAL SUBMITTAL:** Each proposal shall submit on the form(s) provided in the specifications and accompanied by any other required submittals or supplemental materials. Enclose proposal documents in a sealed envelope addressed to the City of Morro Bay Public Works Department, 595 Harbor, Morro Bay, California, 93442. In order to guard against premature opening, clearly label the proposal with the proposal title, name of consultant, and date and time of proposal deadline. The City will not accept FAX submittals.

**INSURANCE CERTIFICATE:** Each proposal must include a current certificate of insurance showing:

- The insurance carrier and its A.M. Best rating of at least A-
- Scope of coverage, occurrence based and limits, with a single limit of at least \$1M
- Deductibles and self-insured retention, neither of more than \$25,000

The purpose of this submittal is to assess the adequacy of the proposing consultant's insurance coverage during proposal evaluation; as discussed under paragraph 12 below, endorsements are not required until contract award.

**PROPOSAL WITHDRAWAL AND OPENING:** A proposing consultant may withdraw its proposal, without prejudice, prior to the time specified for the proposal opening, by submitting a written request to the Public Works Director for its withdrawal, in which event the proposal will be returned to the consultant unopened. The City will not consider proposals received after the time specified or at any place other than that stated in the "Notice Requesting Proposals." The City will open and declare all proposals in public. Proposing consultants or their representatives are invited to be present at the opening of the proposals.

**SUBMITTAL OF ONE PROPOSAL ONLY:** No individual or business entity of any kind shall be allowed to make or file, or to be interested in more than one proposal, except an alternative proposal when specifically requested in writing by the City. However, an individual or business entity which has submitted a sub-proposal to a proposing consultant submitting a proposal, or who has quoted prices on materials to such proposing consultant, is not thereby disqualified from submitting a sub-proposal or from quoting prices to other proposing consultants submitting proposals.

**COMMUNICATIONS:** All timely requests for information submitted in writing will receive a written response from the City. The City does not encourage telephone communications with City staff but will allow them. However, any such oral communication shall not be binding on the City. [Refer to this Request for Proposal's Special Terms and Conditions, Paragraph 7.]

## **2. CONTRACT AWARD AND EXECUTION**

### **PROPOSAL RETENTION AND AWARD:**

The City reserves the right to retain all proposals for a period of 60 days for examination and comparison. The City also reserves the right to waive non-substantial irregularities in any proposal, to reject any or all proposals, to reject or delete one part of a proposal and accept the other, except to the extent that proposals are qualified by specific limitations. The special terms and conditions of these specifications include proposal evaluation and contract award criteria.

### **COMPETENCY AND RESPONSIBILITY OF PROPOSING CONSULTANT:**

The City reserve full discretion as to determine the competence and responsibility, professionally and/or financially, of the proposing consultants. Proposing consultants will provide, in a timely manner, all information the City deem necessary to make such a decision.

### **CONTRACT REQUIREMENT:**

The proposing consultant to whom award is made (Consultant) shall execute a written contract with the City within ten (10) calendar days after notice of the award has been sent by mail to it at the address given in its proposal. The contract shall be in substantially the form of Exhibit "A" adopted by the City and incorporated in these specifications.

### **INSURANCE REQUIREMENTS:**

The Consultant shall provide insurance policies and endorsements of insurance policies in the form, coverages, and amounts specified in the Consultant Services Agreement within ten (10) calendar days after notice of contract award as a precondition to contract execution. The insurance policies shall extend to all sub consultants or each sub consultant shall supply their own policy.

### **BUSINESS LICENSE:**

The Consultant must have a valid City of Morro Bay business license prior to execution of the contract. Additional information regarding the City's business license program is available at the City of Morro Bay City Hall at 595 Harbor Street, Morro Bay, CA, 93442, (805) 772-6200.

## **3. CONTRACT PERFORMANCE**

### **ABILITY TO PERFORM:**

The Consultant warrants that it possesses, or has arranged through subcontracts, all capital and other equipment, labor, materials, and licenses necessary to carry out and complete the work hereunder in compliance with any and all federal, state, county, city, and special district laws, ordinances, and regulations.

### **LAWS TO BE OBSERVED:**

The Consultant shall keep itself fully informed of and shall observe and comply with all applicable state and federal laws and San Luis Obispo County and City of Morro Bay ordinances, regulations and adopted codes during its performance of the work.

### **PAYMENT OF TAXES:**

The contract prices shall include full compensation for all taxes that the Consultant is required to pay. Consultant shall be responsible to pay all taxes required to be paid by Consultant under Federal, State or Local law.

**SAFETY PROVISIONS:**

The Consultant shall conform to the rules and regulations pertaining to safety established by OSHA and the California Division of Industrial Safety.

**PUBLIC AND EMPLOYEE SAFETY:**

Whenever the Consultant's operations create a condition hazardous to the public or City employees, it shall, at its expense and without cost to the City, furnish, erect and maintain such fences, temporary railings, barricades, lights, signs and other devices and take such other protective measures as are necessary to prevent accidents or damage or injury to the public and City employees.

**PRESERVATION OF CITY PROPERTY:**

The Consultant shall provide and install suitable safeguards, approved by the City, to protect City property from injury or damage. If City property is damaged as a result of the Consultant's operations, it shall be replaced or restored at the Consultant's expense and to a condition as good as when the Consultant began work.

**CONSULTANT NON-DISCRIMINATION:**

In the performance of this work, the Consultant agrees that it will not engage in, nor permit such subconsultants as it may employ, to engage in prohibited discrimination in employment of persons because of age (40 or older), race, color, sex (including childbirth and nursing), marital status, national origin or ancestry, disability or medical condition, sexual orientation, gender identity or expression, veteran status of past military service, or religion of such persons.

**DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM:**

The selected applicant's proposal will comply with all the requirements prescribed in the City's DBE program or demonstrate a good faith effort to do so. Documented adequate good faith efforts are required. A non-certified DBE may meet the City's goal through use of DBE subcontractors or suppliers.

**TERMS AND CONDITIONS OF CONTRACT:**

The successful firm will be required to enter into a contract substantially in the form attached and abide by all of the terms and conditions. As part of the Proposal, all firms shall specify and submit all conflicts with or exceptions to the terms and conditions. The City will view all firms not submitting such conflicts or exceptions to be in agreement with all of the terms and conditions therein.

## **SPECIAL TERMS AND CONDITIONS - REQUEST FOR PROPOSALS**

The City intends to hire a qualified consultant or consultant team to provide the following services and products that are appropriate for the desired goal.

### **1. Proposal Content**

- Your proposal must include the following information:
  - Proposal submittal summary (Executive Summary)

### **2. Qualifications**

- Experience of your firm in performing similar services; Project understanding and examples of recent projects on which your firm has worked which you believe had similar scope to that being proposed,
- The firm's capabilities and expertise in planning, engineering, design, and construction of water, wastewater and stormwater projects,
- Resumes of the individuals assigned to this project, including any sub-consultants.
- Name(s) and specific experience of the individual or individuals at your firm that you propose as Project Manager or other substantial roles,
- Standard hourly billing rates for the assigned staff, including any sub-consultants.

### **3. Work Program**

- Description of your approach to completing the work,
- Tentative schedule for completing the work, including estimated staff hours and rate schedule,
- Services or data to be provided by the City,
- Any other information that would assist us in making this contract award decision.

### **4. Submittal Forms**

- Certificate of insurance,
- References from at least three entities or organizations for whom you have provided similar services (use form in proposal package or equal),
- Statement and explanation of any instances regarding past governmental agency bidding or contract disqualifications or removal from a project.

### **5. Proposal Length and Copies**

- One PDF copy emailed to [rlivick@morrobayca.gov](mailto:rlivick@morrobayca.gov) (Rob Livick, PE/PLS City Engineer).
- The following is a list of the maximum number of pages for various components of the proposal.
  - Letter of Transmittal: 1 page
  - Firm overview: 4 pages
  - Approach and Scope of Services Discussion: 5 pages maximum
  - Proposed schedule showing personnel assignments and estimated hours: 2 pages
  - Figures and Illustrations 6 pages maximum
  - Appendices (no page limit)
  - Resumes of Key Personnel, limited to two pages each (as needed)
- List and examples of applicable experience in the past 5 years

- Statement that confirms review of the Agreement of Services, identification of any provisions disagreed with, and changes considered by the City.
- Estimated fees and costs with this proposal.

**6. Consultant Information**

Proposing consultant shall submit a statement identifying contact information.

**7. Proposal Evaluation and Selection**

Proposals will be ranked by a City review committee. The requests for proposals will utilize the following qualifications-based ranking criteria:

<b>Criteria</b>	<b>Points</b>
Understanding of the Scope of Work (e.g. completeness of proposal; demonstrated grasp of work to be completed under this contract; expressed understanding of the project scope, objectives, and complexity).	15
Past performance and related experience of firm (e.g. previous experience in performing similar projects, results of reference checks, administrative information)	15
Expertise of technical and professional team members assigned to the project.	25
Proposed project approach (e.g. conceptual and technical approach in preparing the plan, including assurance of the consultant’s ability to provide deliverables in a timely fashion and with high quality).	25
Recent experience in successfully performing similar services	10
Cost effectiveness of proposed project approach	10
Ability to conform to City contract requirements	Pass/Fail
<b>Total</b>	<b>100</b>

The City reserves the right to request clarification of information submitted, and to request additional information of one or more applicants prior to the selection for interviews. Based on the results of the review and ranking process, utilizing the stated evaluation criteria, the 3-4 top ranked firms may be invited back (at no cost to the City) for interviews.

If interviewed, each interview will last approximately one hour. Approximately thirty minutes will be devoted to the firm’s presentation of its proposal and its various elements, and the remainder a question and answer format between the Interview Committee and the consultant. Upon completion of all interviews, the Interview Committee will deliberate and rank the consultants, and designate the most qualified consultant for award of contract. The other firm’s will be notified, and if negotiations are not successful with the top-ranked firm, or if that firm does not execute a contract agreeable to the City within 45 days of the notification, the City will cease discussions, and begin negotiations with the second highest ranked firm, etc., until a satisfactory contract is agreed upon; or the City may decide to reject all proposals and re-advertise the RFP.

**8. Proposal Review and Award Schedule**

The following is an outline of the anticipated schedule for proposal review and contract award:

Issue RFP	October 08, 2020
Receive proposals	October 30, 2020
Finalist Interviews – As needed	Tentative: Week of November 09, 2020

Complete proposal evaluation, negotiate terms and finalize staff recommendation	November 27, 2020
Award contract	December 08, 2020
Execute contract	December 09, 2020
Start work	December 15, 2020
Complete Project	June 01, 2020

**9. Contract Award**

Subject to the reservations set forth in Paragraph 9 of the General Terms and Conditions of these specifications, the City will award the contract to the most qualified, responsible, responsive proposing consultant, using the proposal evaluation and selection criteria.

Following the award of contract, the consultant will negotiate with the City a compensation and payment schedule tied to accomplishing key tasks. The proposed compensation and payment schedule shall be tabulated in spreadsheet form, presenting each task complete with the level of effort from each team member. The proposed compensation schedule shall include a per meeting cost associated with staff level meetings as well as advisory Committees, City Council, Board meetings. The City must be able to determine and differentiate the costs associated with reviewing the tertiary treatment options, and other recommended alternatives. The Consultant shall monitor costs throughout the project. The “not to exceed fee” for this project will not be increased unless the scope of work is amended to include additional consulting services. Any increase in fees for additional consulting services must be confirmed in writing by the City prior to undertaking extra work.

**10. Failure to Accept Contract**

The following will occur if the Consultant whose proposal is accepted fails or refuses to enter into the contract: the City may negotiate with the next most qualified proposing consultant.

**11. Questions**

Questions about the project or request for proposals, [rlivick@morrobayca.gov](mailto:rlivick@morrobayca.gov). The City of Morro Bay offices are open from 8:00 AM to 5:00 PM, weekdays.

**12. Ownership of Materials**

All original drawings, including electronic, plan documents, computer models and other materials prepared by or in possession of the Consultant as part of the work or services under these specifications shall become the permanent property of the City. The Consultant shall deliver any or all of these materials and documents to the City upon demand.

**13. Release of Reports and Information**

Any reports, information, data, or other material given to, prepared by or assembled by the Consultant as part of the work or services under these specifications shall be the property of City and shall not be made available to any individual or organization by the Consultant without the prior written approval of the City.

**14. Copies of Reports and Information**

If the City request additional copies of reports, drawings, specifications, or any other material in addition to what the Consultant is required to furnish in limited quantities as part of the work or services under these specifications, the Consultant shall provide such additional copies as are requested, and City shall compensate the Consultant for the costs of duplicating of such copies at the Consultant's direct expense.

**15. Accuracy of Scope of Consultant Services**

The City finds the Scope of Consultant Services for this project to be accurate and to contain no affirmative misrepresentation or any concealment of fact. Although the effect of ambiguities or defects in the Scope will be as determined by law, any patent ambiguity or defect shall give rise to a duty of proposing consultant to inquire prior to proposal submittal. To the extent that the Scope of Consultant Services constitute performance parameters, the City shall not be liable for costs incurred by the successful proposing consultant to achieve the project's objectives or standards beyond the amounts provided therefore in the proposal. If, after entering into the contract, any dispute arises as a result of any actual or alleged ambiguity or defect in the Scope of Consultant Services, or any other matter whatsoever, Consultant shall immediately notify the City in writing, and the Consultant and all sub-consultants shall continue to perform, irrespective of whether or not the ambiguity or defect is major, material, minor or trivial, and irrespective of whether or not a contract amendment has been granted by City. Failure to provide the hereinbefore-described written notice within one working day of Consultant's becoming aware of the facts giving rise to the dispute shall constitute a waiver of the right to assert the causative role of the defect or the ambiguity in the Scope of Consultant Services concerning the dispute.

**PROPOSAL SUBMITTAL FORM: Subconsultant LISTING**

Describe briefly the work scope of each sub-consultant. Attach additional pages if required.

**Subconsultant**

Company Name	
Contact Individual	
Telephone & FAX number	
Street Address	
City, State, Zip Code	
Description of services to be provided.	

**Subconsultant**

Company Name	
Contact Individual	
Telephone & FAX number	
Street Address	
City, State, Zip Code	
Description of services to be provided	

**Subconsultant**

Company Name	
Contact Individual	
Telephone & FAX number	
Street Address	
City, State, Zip Code	
Description of services to be provided	

**REFERENCES**

---

Number of years engaged in providing the services included within the scope of the consultant services under the present business name:\_\_\_\_\_.

Describe fully the last three contracts performed by your firm that demonstrate your ability to provide the services included with the scope of the consultant services. Attach additional pages if required. The City reserve the right to contact each of the references listed for additional information regarding your firm's qualifications.

**Reference No. 1**

Customer Name	
Contact Individual	
Telephone & FAX number	
Street Address	
City, State, Zip Code	
Description of services provided including contract amount, when provided and project outcome	

**Reference No. 2**

Customer Name	
Contact Individual	
Telephone & FAX number	
Street Address	
City, State, Zip Code	
Description of services provided including contract amount, when provided and project outcome	

**Reference No. 3**

Customer Name	
Contact Individual	
Telephone & FAX number	
Street Address	
City, State, Zip Code	
Description of services provided including contract amount, when provided and project outcome	





EXHIBIT A

CITY OF MORRO BAY  
AGREEMENT FOR Consultant SERVICES

THIS AGREEMENT is made, by and between, the City of Morro Bay, a municipal corporation (“City”) and \_\_\_\_\_, a California corporation, and/or [insert individual’s name] dba [insert business name if not a corporation] (“Consultant”). In consideration of the mutual covenants and conditions set forth herein the parties agree as follows:

1. TERM

This Agreement shall commence on XXXX \_\_\_\_ 2020, and shall remain and continue in effect until tasks described herein are completed, but in no event later than December 31, 2022, unless sooner terminated pursuant to the provisions of this Agreement.

2. SERVICES

Consultant shall perform the tasks described and set forth in Exhibit A, attached hereto and incorporated herein as though set forth in full. Consultant shall complete the tasks according to the schedule of performance which is also set forth in Exhibit A.

3. PERFORMANCE

Consultant shall at all times faithfully, competently and to the best of their ability, experience, and talent, perform all tasks described herein. Consultant shall employ, at a minimum, generally accepted standards and practices utilized by persons engaged in providing similar services as are required of Consultant hereunder in meeting its obligations under this Agreement.

4. CITY MANAGEMENT

City’s Public Works Director shall represent City in all matters pertaining to the administration of this Agreement, review and approval of all products submitted by Consultant, but not including the authority to enlarge the Tasks to Be Performed or change the compensation due to Consultant. City’s City Manager shall be authorized to act on City’s behalf and to execute all necessary documents which enlarge the Tasks to Be Performed or change Consultant’s compensation, subject to Section 5 hereof.

5. PAYMENT

(a) City agrees to pay Consultant monthly, in accordance with the payment rates and terms and the schedule of payment as set forth in Exhibit A, attached hereto and incorporated herein by this reference as though set forth in full, and based upon actual time spent on the above tasks. That amount shall not exceed {INSERT AMOUNT IN THE FOLLOWING FORMAT}. Seventy Two Hundred Dollars and no cents (\$7,200.00) for the total term of the Agreement unless additional payment is approved as provided in this Agreement.

(b) Consultant shall not be compensated for any services rendered in connection with its performance of this Agreement which are in addition to those set forth herein, unless such additional services are authorized in advance and in writing by the City Manager. Consultant shall be compensated for any additional services in the amounts and in the manner as agreed to by City Manager and Consultant at the time City's written authorization is given to Consultant for the performance of said services. The City Manager may approve additional work not to exceed ten percent (10%) of the amount of the Agreement, but in no event shall such sum exceed {INSERT AMOUNT 10% OF THE ABOVE TOTAL, IN THE FOLLOWING FORMAT}Seven Hundred Twenty Dollars (\$720.00). Any additional work in excess of this amount shall be approved by the City Council.

(c) Consultant will submit invoices monthly for actual services performed. Invoices shall be submitted on or about the first business day of each month, or as soon thereafter as practical, for services provided in the previous month. Payment shall be made within thirty (30) days after receipt of each invoice as to all non-disputed fees. If City disputes any of Consultant's fees, then it shall give written notice to Consultant within fifteen (15) days of receipt of an invoice of any disputed fees set forth on the invoice.

#### 6. SUSPENSION OR TERMINATION OF AGREEMENT WITHOUT CAUSE

(a) City may at any time, for any reason, with or without cause, suspend or terminate this Agreement, or any portion hereof, by serving upon Consultant at least ten-days' (10-days') prior written notice. Upon receipt of said notice, Consultant shall immediately cease all work under this Agreement, unless the notice provides otherwise. If City suspends or terminates a portion of this Agreement, then such suspension or termination shall not make void or invalidate the remainder of this Agreement.

(b) In the event this Agreement is terminated pursuant to this Section, City shall pay to Consultant the actual value of the work performed up to the time of termination. Upon termination of the Agreement pursuant to this Section, Consultant will submit an invoice to City pursuant to Section 3.

#### 7. DEFAULT OF CONSULTANT

(a) Consultant's failure to comply with the provisions of this Agreement shall constitute a default. In the event Consultant is in default for cause under the terms of this Agreement, City shall have no obligation or duty to continue compensating Consultant for any work performed after the date Consultant is notified of default and can terminate this Agreement immediately by written notice to Consultant. If such failure by Consultant to make progress in the performance for work hereunder arises out of causes beyond Consultant's control, and without fault or negligence of Consultant, then it shall not be considered a default.

(b) If the City Manager or his/her delegate determines that Consultant is in default in the performance of any of the terms or conditions of this Agreement, then he/she shall cause to be served upon Consultant a written notice of the default. Consultant shall have ten (10) days after service upon it of said notice in which to cure the default by rendering a satisfactory performance. In the event that Consultant fails to cure its default within such period of time, City shall have the right, notwithstanding any other provision of this Agreement, to terminate this Agreement without further notice and without prejudice to any other remedy to which it may be entitled at law, in equity or under this Agreement.

## 8. OWNERSHIP OF DOCUMENTS

(a) Consultant shall maintain complete and accurate records with respect to sales, costs, expenses, receipts, and other such information required by City that relate to the performance of services under this Agreement. Consultant shall maintain adequate records of services provided in sufficient detail to permit an evaluation of services. All such records shall be maintained in accordance with generally accepted accounting principles and shall be clearly identified and readily accessible. Consultant shall provide free access to the representatives of City or its designees at reasonable times to such books and records; shall give City the right to examine and audit said books and records; shall permit City to make transcripts therefrom as necessary; and shall allow inspection of all work, data, documents, proceedings, and activities related to this Agreement. Such records, together with supporting documents, shall be maintained for a period of three (3) years after receipt of final payment.

(b) Upon completion of, and full payment by City for services performed pursuant to, this Agreement, all final work product such as documents, designs, drawings, maps, models, computer files, surveys, notes, and other documents prepared in the course of providing the services to be performed pursuant to this Agreement shall become the sole property of City and may be used, reused, or otherwise disposed of by City without the permission of Consultant. With respect to computer files, Consultant shall make available to City, as a service in addition to those set forth herein, at Consultant's office and upon reasonable written request by City, the necessary computer software and hardware for purposes of accessing, compiling, transferring, and printing computer files.

## 9. INDEMNIFICATION

(a) Indemnification for Professional Liability. When the law establishes a professional standard of care for Consultant's Services, to the fullest extent permitted by law, Consultant shall indemnify, protect, defend and hold harmless City and any and all of its officials, employees and agents ("Indemnified Parties") from and against any and all losses, liabilities, damages, costs and expenses, including reasonable attorney's fees and costs to the extent same are caused by any negligent act, error or omission of Consultant, its officers, agents, employees or subconsultants (or any entity or individual that Consultant shall bear the legal liability thereof) in the performance of professional services under this agreement. City agrees to hold harmless and indemnify Consultant from and against all claims, liabilities, losses, damages, and costs, including but not limited to attorney's fees, arising out of or in any way connected with the modification, misinterpretation, misuse or reuse by others of the computer files or any other document provided by Consultant under this Agreement.

(b) Indemnification for Other Than Professional Liability. Other than in the performance of professional services and to the full extent permitted by law, Consultant shall indemnify, defend and hold harmless City, and any and all of its employees, officials and agents from and against any liability (including liability for claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, whether actual, alleged or threatened, including attorneys' fees and costs, court costs, interest, defense costs, and expert witness fees), where the same arise out of, are a consequence of, or are in any way attributable to, in whole or in part, the performance of this Agreement by Consultant or by any individual or entity for which Consultant is legally liable, including but not limited to officers, agents, employees or subconsultants of Consultant.

(c) General Indemnification Provisions. Consultant agrees to obtain executed indemnity agreements with provisions identical to those set forth here in this section from each and every subconsultant or any other person or entity involved by, for, with or on behalf of Consultant in the performance of this agreement. In the event Consultant fails to obtain such indemnity obligations from others as required here, Consultant agrees to be fully responsible according to the terms of this section. Failure of City to monitor compliance with these requirements imposes no additional obligations on City and will in no way act as a waiver of any rights hereunder. This obligation to indemnify and defend City as set forth here is binding on the successors, assigns or heirs of Consultant and shall survive the termination of this agreement or this section.

#### 10. INSURANCE

Consultant shall maintain prior to the beginning of and for the duration of this Agreement insurance coverage as specified in Exhibit B attached to and part of this agreement.

#### 11. INDEPENDENT Consultant

(a) Consultant is and shall at all times remain as to City a wholly independent Consultant. The personnel performing the services under this Agreement on behalf of Consultant shall at all times be under Consultant's exclusive direction and control. Neither City nor any of its officers, employees, or agents shall have control over the conduct of Consultant or any of Consultant's officers, employees, or agents, except as set forth in this Agreement. Consultant shall not at any time or in any manner represent that it or any of its officers, employees, or agents are in any manner officers, employees, or agents of City. Consultant shall not incur or have the power to incur any debt, obligation, or liability whatever against City, or bind City in any manner.

(b) No employee benefits shall be available to Consultant in connection with the performance of this Agreement. Except for the fees paid to Consultant as provided in the Agreement, City shall not pay salaries, wages, or other compensation to Consultant for performing services hereunder for City. City shall not be liable for compensation or indemnification to Consultant for injury or sickness arising out of performing services hereunder.

#### 12. LEGAL RESPONSIBILITIES

Consultant shall keep itself informed of State and Federal laws and regulations which in any manner affect those employed by it or in any way affect the performance of its service pursuant to this Agreement. Consultant shall at all times observe and comply with applicable legal requirements in effect at the time the drawings and specifications are prepared. City, and its officers and employees, shall not be liable at law or in equity occasioned by failure of Consultant to comply with this Section.

#### 13. UNDUE INFLUENCE

Consultant declares and warrants that no undue influence or pressure is used against or in concert with any officer or employee of City in connection with the award, terms or implementation of this Agreement, including any method of coercion, confidential financial arrangement, or financial inducement. No officer or employee of City will receive compensation, directly or indirectly, from Consultant, or from any officer, employee or agent of Consultant, in connection with the award of this Agreement or any work to be conducted as a result of this Agreement.



17. ASSIGNMENT

Consultant shall not assign the performance of this Agreement, nor any part thereof, nor any monies due hereunder, without prior written consent of City.

18. LICENSES

At all times during the term of this Agreement, Consultant shall have in full force and effect, all licenses required of it by law for the performance of the services described in this Agreement.

19. GOVERNING LAW

City and Consultant understand and agree that the laws of the State of California shall govern the rights, obligations, duties, and liabilities of the parties to this Agreement and also govern the interpretation of this Agreement. Any litigation concerning this Agreement shall take place in the municipal, superior, or federal district court with jurisdiction over City.

20. ENTIRE AGREEMENT

This Agreement contains the entire understanding between the parties relating to the obligations of the parties described in this Agreement. All prior or contemporaneous agreements, understandings, representations, and statements, oral or written, are merged into this Agreement and shall be of no further force or effect. Each party is entering into this Agreement based solely upon the representations set forth herein and upon each party's own independent investigation of any and all facts such party deems material.

21. CONTENTS OF PROPOSAL

Consultant is bound by the contents of the proposal submitted by Consultant, Exhibit A hereto.

22. AUTHORITY TO EXECUTE THIS AGREEMENT

The person or persons executing this Agreement on behalf of Consultant warrants and represents he/she has the authority to execute this Agreement on behalf of Consultant and has the authority to bind Consultant to the performance of its obligations hereunder.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed the day and year first above written.

CITY OF MORRO BAY

Consultant (2 signatures required)

By: \_\_\_\_\_  
[Authorized City Representative or Mayor]

By: \_\_\_\_\_  
(Signature)

Attest:

\_\_\_\_\_  
(Typed Name)

\_\_\_\_\_  
Dana Swanson, City Clerk

Its: \_\_\_\_\_  
(Title)

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Typed Name)

Its: \_\_\_\_\_  
(Title)

Approved As To Form:

\_\_\_\_\_  
Joseph W. Pannone, City Attorney

## **EXHIBIT A - INSURANCE REQUIREMENTS**

*Prior to the beginning of and throughout the duration of the Agreement, Consultant will maintain insurance in conformance with the requirements set forth below. Consultant will use existing coverage to comply with these requirements. If that existing coverage does not meet the requirements set forth here, Consultant agrees to amend, supplement or endorse the existing coverage to do so. Consultant acknowledges that the insurance coverage and policy limits set forth in this section constitute the minimum amount of coverage required. Any insurance proceeds available to City in excess of the limits and coverage required in this agreement and which is applicable to a given loss, will be available to City.*

*Consultant shall provide the following types and amounts of insurance:*

Commercial General Liability Insurance using Insurance Services Office “Commercial General Liability” policy from CG 00 01 or the exact equivalent. Defense costs must be paid in addition to limits. There shall be no cross liability exclusion for claims or suits by one insured against another. Limits are subject to review but in no event less than \$1,000,000 per occurrence.

Business Auto Coverage on ISO Business Auto Coverage from CA 00 01 including symbol 1 (Any Auto) or the exact equivalent. Limits are subject to review, but in no event to be less than \$1,000,000 per accident. If Consultant owns no vehicles, this requirement may be satisfied by a non-owned auto endorsement to the general liability policy described above. If Consultant or Consultant’s employees will use personal autos in any way to perform the Scope of Services, then Consultant shall provide evidence of personal auto liability coverage for each such person.

Property Damage Insurance in an amount of not less than \$1,000,000 for damage to the property of each person on account of any one occurrence.

Workers Compensation on a state-approved policy form providing statutory benefits as required by law with employer’s liability limits.

Excess or Umbrella Liability Insurance (Over Primary) if used to meet limit requirements, shall provide coverage at least as broad as specified for the underlying coverages. Any such coverage provided under an umbrella liability policy shall include a drop down provision providing primary coverage above a maximum \$25,000 self-insured retention for liability not covered by primary but covered by the umbrella. Coverage shall be provided on a “pay on behalf” basis, with defense costs payable in addition to policy limits. Policy shall contain a provision obligating insurer at the time insured’s liability is determined, not requiring actual payment by the insured first. There shall be no cross liability exclusion precluding coverage for claims or suits by one insured against another. Coverage shall be applicable to City for injury to employees of Consultant, subContractors or others involved in the Work. The scope of coverage provided is subject to approval of City following receipt of proof of insurance as required herein. Limits are subject to review but in no event less than \$1,000,000 per occurrence.

Professional Liability or Errors and Omissions Insurance as appropriate shall be written on a policy form coverage specifically designated to protect against acts, errors or omissions of the Consultant and “Covered Professional Services” as designated in the policy must specifically include work performed under this agreement. The policy limit shall be no less than \$2,000,000 per claim and in the aggregate. The policy must “pay on behalf of” the insured and must include a provision establishing the insurer’s duty to defend. The policy retroactive date shall be on or

before the effective date of this agreement.

*Insurance procured pursuant to these requirements shall be written by insurer that are admitted carriers in the state California and with an A.M. Bests rating of A- or better and a minimum financial size VII.*

General conditions pertaining to provision of insurance coverage by Consultant. Consultant and City agree to the following with respect to insurance provided by Consultant:

1. Consultant agrees to have its insurer endorse the third party general liability coverage required herein to include as additional insureds the City of Morro Bay and its officials, employees and agents, using standard ISO endorsement No. CG 2010 with an edition prior to 1992. Consultant also agrees to require all Consultants, and sub-Contractors to do likewise.
2. No liability insurance coverage provided to comply with this Agreement shall prohibit Consultant, or Consultant's employees, or agents, from waiving the right of subrogation prior to a loss. Consultant agrees to waive subrogation rights against City regardless of the applicability of any insurance proceeds, and to require all Consultants and sub-Contractors to do likewise.
3. All insurance coverage and limits provided by Consultant and available or applicable to this agreement are intended to apply to the full extent of the policies. Nothing contained in this Agreement or any other agreement relating to the City or its operations limits the application of such insurance coverage.
4. None of the coverages required herein will be in compliance with these requirements if they include any limiting endorsement of any kind that has not been first submitted to City and approved of in writing.
5. No liability policy shall contain any provision or definition that would serve to eliminate so-called "third party action over" claims, including any exclusion for bodily injury to an employee of the insured or of any Consultant or subcontractor.
6. All coverage types and limits required are subject to approval, modification and additional requirements by the City, as the need arises. Consultant shall not make any reductions in scope of coverage (e.g. elimination of contractual liability or reduction of discovery period) that may affect City's protection without City's prior written consent.
7. Proof of compliance with these insurance requirements, consisting of certificates of insurance evidencing all of the coverages required and an additional insured endorsement to Consultant's general liability policy, shall be delivered to City at or prior to the execution of this Agreement. In the event such proof of any insurance is not delivered as required, or in the event such insurance is canceled at any time and no replacement coverage is provided, City has the right, but not the duty, to obtain any insurance it deems necessary to protect its interests under this or any other agreement and to pay the premium. Any premium so paid by City shall be charged to and promptly paid by Consultant or deducted from sums due Consultant, at City's option.
8. It is acknowledged by the parties of this agreement that all insurance coverage required to be provided by Consultant or any sub-Contractor, is intended to apply first and on a primary, noncontributing basis in relation to any other insurance or self-insurance available to City.

9. Consultant agrees to ensure that subcontractors, and any other party involved with the Scope of Services who is brought onto or involved in the Scope of Services by Consultant, provide the same minimum insurance coverage required of Consultant. Consultant agrees to monitor and review all such coverage and assumes all responsibility for ensuring that such coverage is provided in conformity with the requirements of this section. Consultant agrees that upon request, all agreements with subcontractors and others engaged in the Scope of Services will be submitted to City for review.
10. Consultant agrees not to self-insure or to use any self-insured retentions or deductibles on any portion of the insurance required herein and further agrees that it will not allow any Consultant, subContractor, Architect, Engineer or other entity or person in any way involved in the performance of the Scope of Services to self-insure its obligations to City. If Consultant's existing coverage includes a deductible or self-insured retention, the deductible or self-insured retention must be declared to the City. At the time the City shall review options with the Consultant, which may include reduction or elimination of the deductible or self-insured retention, substitution of other coverage, or other solutions.
11. The City reserves the right at any time during the term of the contract to change the amounts and types of insurance required by giving the Consultant ninety (90) days advance written notice of such change. If such change results in substantial additional cost to the Consultant, the City will negotiate additional compensation proportional to the increase benefit to City.
12. For purposes of applying insurance coverage only, this Agreement will be deemed to have been executed immediately upon any party hereto taking any steps that can be deemed to be in furtherance of or towards performance of this Agreement.
13. Consultant acknowledges and agrees that any actual or alleged failure on the part of City to inform Consultant of non-compliance with any insurance requirements in no way imposes any additional obligations on City nor does it waive any rights hereunder in this or any other regard.
14. Consultant will renew the required coverage annually as long as City, or its employees or agents face an exposure from operations of any type pursuant to this agreement. This obligation applies whether or not the agreement is canceled or terminated for any reason. Termination of this obligation is not effective until City executes a written statement to that effect.
15. Consultant shall provide proof that policies of insurance required herein expiring during the term of this Agreement have been renewed or replaced with other policies providing at least the same coverage. Proof that such coverage has been ordered shall be submitted prior to expiration. A coverage binder or letter from Consultant's insurance agent to this effect is acceptable. A certificate of insurance and/or additional insured endorsement as required in these specifications applicable to the renewing or new coverage must be provided to City within five days of the expiration of the coverages.

16. The provisions of any workers' compensation or similar act will not limit the obligations of Consultant under this agreement. Consultant expressly agrees not to use any statutory immunity defenses under such laws with respect to City, its employees, officials and agents.
17. Requirements of specific coverage features or limits contained in this section are not intended as limitations on coverage, limits or other requirements nor as a waiver of any coverage normally provided by any given policy. Specific reference to a given coverage feature is for purposes of clarification only as it pertains to a given issue, and is not intended by any party or insured to be limiting or all-inclusive.
18. These insurance requirements are intended to be separate and distinct from any other provision in this agreement and are intended by the parties here to be interpreted as such.
19. The requirements in this Section supersede all other sections and provisions of this Agreement to the extent that any other section or provision conflicts with or impairs the provisions of this Section.
20. Consultant agrees to be responsible for ensuring that no contract used by any party involved in any way with the Scope of Services reserves the right to charge City or Consultant for the cost of additional insurance coverage required by this agreement. Any such provisions are to be deleted regarding City. It is not the intent of City to reimburse any third party for the cost of complying with these requirements. There shall be no recourse against City for payment of premiums or other amounts with respect thereto.
21. Consultant agrees to provide immediate notice to City of any claim or loss against Consultant arising out of the work performed under this agreement. City assumes no obligation or liability by such notice, but has the right (but not the duty) to monitor the handling of any such claim or claims if they are likely to involve City.

EXHIBIT B

**Presence/Absence Testing Report  
and Monitoring Plan  
for Construction Phase 2  
of the Morro Bay Water Reclamation  
Facility Project,  
San Luis Obispo County, California**

*By:*  
Philip Kaijankoski

September 2020 DRAFT

*USGS Topographic Quadrangle:*  
Morro Bay North  
Morro Bay South

*Total Project Acreage:*  
206.2 acres

*Sites:*  
CA-SLO-16  
CA-SLO-239  
CA-SLO-2022  
CA-SLO-2232H

**Submitted to:**  
Rob Livick  
Public Works Director  
City of Morro Bay  
595 Harbor Street  
Morro Bay, CA 93442



FAR WESTERN ANTHROPOLOGICAL RESEARCH GROUP, INC.  
2727 Del Rio Place, Suite A, Davis, California, 95618  
<http://www.farwestern.com> 530-756-3941

**Presence/Absence Testing Report  
and Monitoring Plan  
for Construction Phase 2  
of the Morro Bay Water Reclamation  
Facility Project,  
San Luis Obispo County, California**

*By:*

Philip Kaijankoski, M.A., RPA  
September 2020 DRAFT

*Submitted to:*

Rob Livick  
Public Works Director  
City of Morro Bay  
595 Harbor Street  
Morro Bay, CA 93442

## SUMMARY

The City of Morro Bay (City) is constructing a new Water Reclamation Facility and associated facilities. Federal funding requires compliance with the National Historic Preservation Act. In 2019, Far Western Anthropological Research Group, Inc., prepared an archaeological survey, research design, and treatment plan for the project (Kaijankoski et al. 2019). It presented a plan for preconstruction subsurface testing using hydraulic continuous coring and hand augering in the Area of Direct Impact (ADI) within or adjacent to previously recorded archaeological sites and in areas of elevated buried site sensitivity.

In May, June, and August 2020 the vast majority of subsurface testing was successfully completed for Construction Phase 2 of the project (new collection system including pipelines and pump stations). Fifty-six hydraulic continuous cores and 22 hand augers were drilled within the ADI. This document presents testing results, recommendations for additional work (testing private property; data recovery mitigation; construction monitoring), and an archaeological monitoring plan for Construction Phase 2.

Large portions of Construction Phase 2 are not archaeologically sensitive (Kaijankoski et al. 2019) and therefore were not tested, with no further archaeological treatment or monitoring recommended. Several areas deemed sensitive were tested with negative results, also needing no further work. Testing results were positive at 14 locations, often in disturbed contexts. Recovered materials included shell midden, non-human faunal bone, and flaked stone tools and debitage. Archaeological monitoring and/or mitigation is required in these areas (Table 1). A portion of the ADI on private property could not be accessed so testing will be done prior to construction once the City acquires the property; potential data recovery or monitoring will depend on findings. Archaeological deposits associated with site CA-SLO-16 were identified in the ADI. This intact, buried, and stratified shell midden appears to represent a single temporal component and is therefore undoubtedly eligible for the National Register of Historic Places. As avoidance is not feasible, Construction Phase 2 will have an adverse effect on this historic property requiring extensive mitigation through data recovery during construction over the course of approximately 60 days. A brief plan and immediate course of action for this mitigation work is presented.

Regardless of the recommendations for archaeological monitoring, it is assumed that the local Native American community will request to monitor all construction. It is recommended that a qualified local archaeologist be on call to assess any potential discovery made by Native American monitors.

Table 1. Positive Findings and Recommendations for Additional Work.

RECOMMENDATION/ LOCATION	ARCHAEOLOGICAL SENSITIVITY		TESTED? HAND AUGER (HA) NO. HYDRAULIC CORE (C) NO.	RESULTS	RECOMMENDATIONS
	BURIED SITE SENSITIVITY	PREVIOUSLY RECORDED SITES (CA-SLO)			
<i>ARCHAEOLOGICAL MITIGATION</i>					
Pipeline Station 27 to 37	Highest to Moderate	-16	HA1-6, C20-21, C45-50	Intact site deposit in HA1-3, C21, C47-48 and C50; disturbed site deposit in C46 and C49	Eligible for National Register. Adverse effects from project construction to be mitigated through extensive data recovery excavations.
<i>ARCHAEOLOGICAL CONSTRUCTION MONITORING</i>					
Pipeline Station 22 to 24	High	-	C5-C7	Thin layer of dense redeposited shell midden in C5 and C7	Not eligible for National Register due to lack of integrity. Archaeological construction monitoring for human remains
Pipeline Station 53 to 61	Lowest	-239	C26-27, 51-54	Disturbed site deposit in C26-27, likely originating from SLO-239 on higher terrace to south. Trace amount of disturbed shellfish in C51-54	Not eligible for National Register due to lack of integrity. Archaeological construction monitoring for human remains
Pipeline Station 147 to 150	Lowest	-2232H	HA20-22	Possible sparse intact Native American site deposit in HA20	Not eligible for National Register. Archaeological construction monitoring for human remains
Replacement Portion of LS2 Force Main	Lowest	-239	No, due to existing pipeline	-	Archaeological construction monitoring
<i>PENDING ADDITIONAL TESTING</i>					
New Addition to LS2 Force Main	Highest, High	-239	Trenching or coring after property acquired by City	-	Likely will require archaeological construction monitoring (if disturbed site present) and/or mitigation (if intact site is present)

**TABLE OF CONTENTS**

**SUMMARY ..... i**

**I. INTRODUCTION..... 1**

    Project Description ..... 3

        Phase 2 Collection System..... 3

**II. SITE CONTEXT ..... 4**

    Previously Recorded Resources ..... 4

        CA-SLO-16 ..... 5

        CA-SLO-239 ..... 7

        CA-SLO-2022 ..... 7

        CA-SLO-2332H ..... 7

    Buried Site Sensitivity Assessment ..... 8

**III. TESTING METHODS..... 11**

    Prefield Work ..... 11

    Subsurface Testing ..... 11

        Stratigraphic Identification and Soil Description ..... 23

        Native American Monitoring ..... 23

    Laboratory Processing ..... 23

        Radiocarbon Dating ..... 23

**IV. TESTING RESULTS AND RECOMMENDATIONS ..... 25**

    CA-SLO-16 (Station 27 to 37) ..... 25

    CA-SLO-16 Mitigation Plan ..... 27

    CA-SLO-239 (Station 53 to 61) ..... 28

        Additional Testing Required ..... 29

    CA-SLO-2022 (Station 138 to 143) ..... 29

    CA-SLO-2232H (Station 147 to 150) ..... 29

**V. ARCHAEOLOGICAL MONITORING PLAN..... 30**

    Determining Activities Requiring Monitoring ..... 30

    Construction Crew Archaeological Awareness Training ..... 30

    Archaeological Monitoring Guidelines ..... 31

    Archaeological Discovery ..... 31

        Treatment of Human Remains ..... 32

    Native American Coordination ..... 33

    Health, Safety, And Security ..... 34

    Reporting ..... 34

    Scheduling ..... 34

**VI. REFERENCES CITED ..... 35**

**APPENDICES**

- Appendix A. Core and Auger Soil Descriptions.
- Appendix B. Catalogue.
- Appendix C. Radiocarbon Dating Results.
- Appendix D. Construction Monitoring Contact Table.

**LIST OF FIGURES**

Figure 1. City of Morro Bay’s New Water Reclamation Facility Project Area of Potential Effects, Construction Phases, and Previously Recorded Archaeological Sites. ....2

Figure 2. Age of Surface Landforms in the Project Area and Surrounding Vicinity..... 9

Figure 3. Buried Site Sensitivity Assessment of the Project Area and Surrounding Vicinity. .... 10

Figure 4. Fieldwork Photos. .... 15

Figure 5. Test Locations and Results..... 16

**LIST OF TABLES**

Table 1. Positive Findings and Recommendations for Additional Work. .... ii

Table 2. Previously Recorded Sites Within the Study Area. .... 4

Table 3. Core Summary..... 12

Table 4. Hand Auger Summary..... 14

Table 5. Radiocarbon Dating Results. .... 24

Table 6. Testing Summary by Project Component..... 26

Table 7. Summary of Positive Findings. .... 27

Table 8. Site CA-SLO-16 Mitigation Summary. .... 28

## I. INTRODUCTION

The City of Morro Bay (City) is constructing a new Water Reclamation Facility (WRF) just east of the City limits in San Luis Obispo County, California (Figure 1). Other project components to be constructed within the City include pipelines, pump stations, and injection wells, and decommissioning the existing wastewater treatment plant. Federal funding for the project requires compliance with Section 106 of the National Historic Preservation Act, along with the California Environmental Quality Act (CEQA), as amended (Public Resources Code, Section 21000 et seq., revised 2005), which mandate federal and California public agencies to consider the effects of projects on historic properties. The US Environmental Protection Agency (EPA) is the federal lead and the City is the state lead agency, with permitting by the California Coastal Commission, California Department of Transportation (Caltrans), and State Water Resources Control Board.

In 2019, Far Western Anthropological Research Group, Inc., (Far Western) prepared an archaeological survey, research design, and treatment plan for the project (Kaijankoski et al. 2019). The treatment plan required preconstruction subsurface testing in the project impact area within or adjacent to previously recorded archaeological sites and in areas of elevated buried site sensitivity. For positive test results, the treatment plan outlined steps to be taken for evaluation and, if necessary, mitigation and monitoring.

In December 2019, a Programmatic Agreement was established among the City, the EPA, and the State Historic Preservation Officer (SHPO). Due to construction timelines, the Agreement divided the project construction components into four phases (Figure 1):

- Phase 1 – New WRF currently under construction.
- Phase 2 – New collection system components including pump stations and conveyance pipelines; construction beginning in fall 2020.
- Phase 3 – New distribution system and wells to inject recycled water from the WRF into the Morro Valley groundwater aquifer; design in progress with construction date to be determined.
- Phase 4 – Demolition of the existing wastewater treatment plant once Phases 1–3 are constructed.

In May, June, and August 2020 the vast majority of archaeological subsurface testing was successfully completed for Construction Phase 2. Fifty-six hydraulic continuous cores and 22 hand augers were drilled within the Area of Direct Impact (ADI). A portion of the ADI for the new LS-2 force main (~300 meters), sensitive for buried resources and near a site deposit, could not be tested as it lies on private property with no approved access. In accordance with the project's Programmatic Agreement (Stipulation III.A.5), testing trenching or coring at 25-meter intervals will be done prior to construction after the City acquires the property and will be documented in an addendum report.

This document presents relevant background information, testing methods and results; testing, mitigation, and monitoring recommendations; and a monitoring plan for Construction Phase 2. This investigation was directed by Far Western Principal Investigator and Geoarchaeologist Philip Kaijankoski, M.A., RPA, who has 20 years of experience in cultural resources management projects in California, with assistance from Principal Investigator Patricia Mikkelsen, M.A., RPA, who has extensive experience in the Morro Bay region.

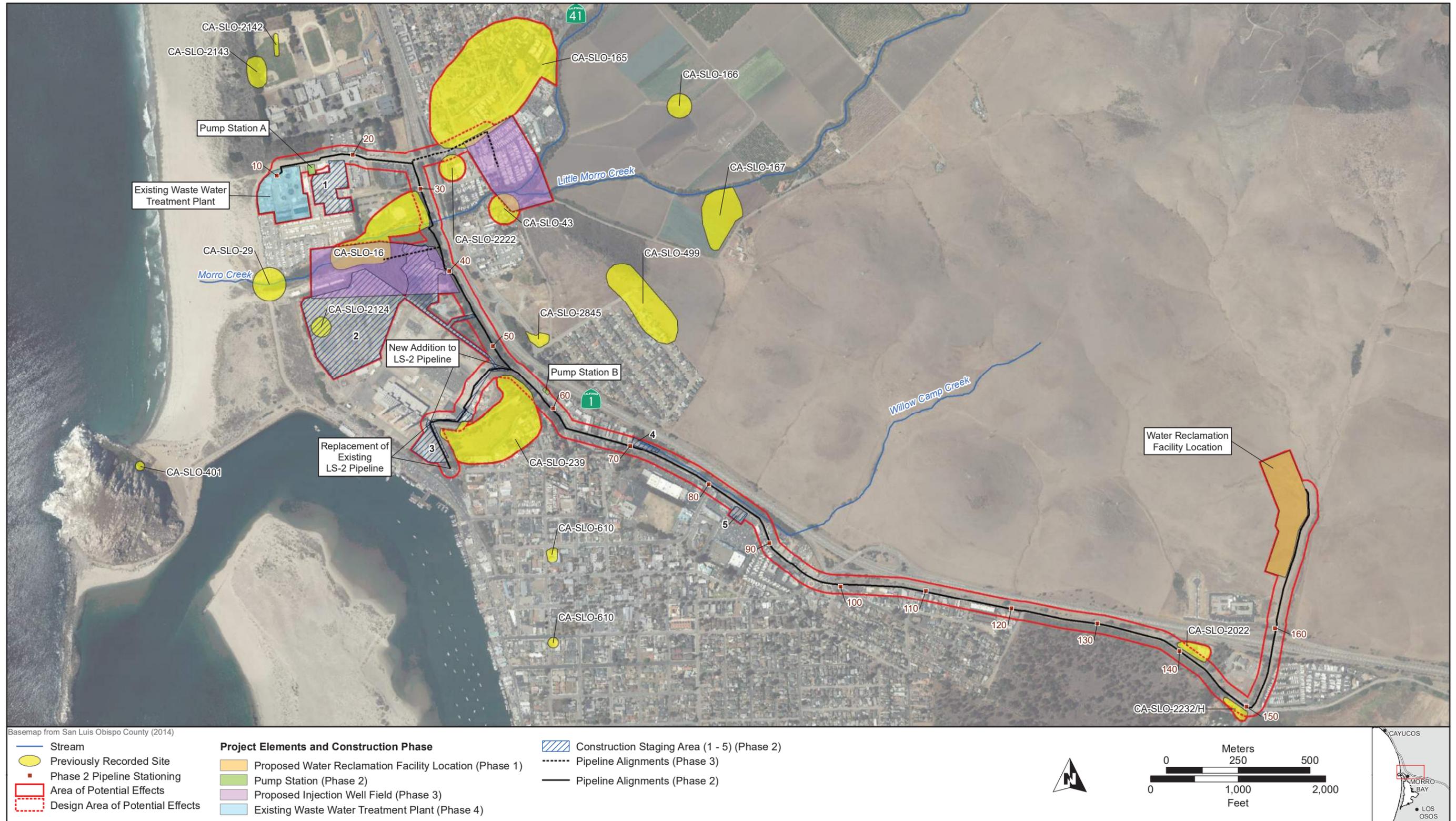


Figure 1. City of Morro Bay's New Water Reclamation Facility Project Area of Potential Effects, Construction Phases, and Previously Recorded Archaeological Sites.

## PROJECT DESCRIPTION

Once completed, the project will provide wastewater treatment services for the City. The new WRF will be constructed in an unincorporated portion of San Luis Obispo County adjacent to the City, while the remaining proposed infrastructure is largely within City limits. The Area of Potential Effects (APE) encompasses all project components as currently designed covering 159.3 acres. Per SHPO guidelines, an expanded APE includes the full boundaries of eight archaeological sites that are within or adjacent to the APE; CA-SLO-16, -43, -165, -239, -2022, -2124, -2222, and -2232/H—expanding the APE to 206.2 acres (see Figure 1). A description of all project components is presented in Kaijankoski et al. (2019) and is not repeated here. The following describes only the Phase 2 collection system.

### Phase 2 Collection System

The Phase 2 collection system includes new conveyance pipelines and two new pump stations. Currently, all of the City's wastewater is conveyed to the existing treatment plant. In the future, a portion of the City's wastewater would continue to flow to a collection point near the existing treatment plant where new conveyance facilities and a pump station would be built to connect the existing wastewater infrastructure to the new WRF site. Pump Station A will be located within the City's existing Corporation Yard on Atascadero Road. A portion of the City's wastewater would be conveyed from the City's existing Pump Station No. 2 to Pump Station B to be constructed north of the building at 1320 Main Street on city-owned property. To connect Pump Station No. 2 to Pump Station B, an existing force main (LS-2) will be partially replaced in the existing alignment and another portion built within a new alignment located on Dynergy Morro Bay, LLC, property (see Figure 1). Three new pipelines will run between Pump Station A and the WRF site, including two force mains to convey raw wastewater, and a waste discharge pipeline to convey brine or high wet weather flows to the ocean outfall. For a portion of the pipeline alignment, the trench section contains a fourth pipeline that will be used to convey recycled water from the WRF to the anticipated groundwater injection well location. From Pump Station A, the proposed alignment for these pipelines travels east along Atascadero Road, turns south along the bike path immediately west of the State Route (SR) 1 southbound on-ramp, and then proceeds south along the eastern perimeter of Lila Keiser Park. It continues to follow the existing parkway/bike path across Morro Creek and then runs parallel to SR 1 for approximately 0.6 kilometers (0.4 mile) before intersecting an unnamed road that joins Main Street immediately south of the SR 1 underpass. From there it continues southeast along the Main Street right-of-way until it joins and follows Quintana Road. Continuing in a southeast direction on Quintana Road, the pipeline passes through street crossings of Kennedy Way, Morro Bay Boulevard, then Kings Avenue, Bella Vista Drive, and La Loma Avenue. The proposed alignment then heads northeast along South Bay Boulevard, crosses under SR 1, and continues along Teresa Road where it heads north towards the proposed WRF site. Four small pipeline segments will be constructed in the Caltrans right-of-way at the following locations (from northwest to southeast): Atascadero Road SR 1 southbound onramp, north of Main Street, Morro Bay Boulevard, and South Bay Boulevard.

These pipelines will be installed with traditional open trench construction, boring, or a pipe bridge. Pipeline depth will also vary considerably, with the top of the pipelines situated anywhere from one to five meters below surface. In general, the pipeline will be shallower (<3 meters [10 feet]) where open trench construction is used, and deeper for bores. The pipelines will be bored at the crossing with Willow Camp Creek and the traffic circle at Morro Bay Boulevard and Quintana Road. Boring locations will require a 30-x-15-meter (100-x-50-foot) construction area with a deep boring pit. However, the exact boring method has yet to be determined. The crossing of Morro Creek will be accomplished with a pipe bridge to avoid the sensitive riparian area.

## II. SITE CONTEXT

The environmental and cultural contexts of the project area, in addition to regional research issues applicable to sites in this area are discussed at length in the Archaeological Survey, Research Design, and Treatment Plan for the project (Kaijankoski et al. 2019) and are not repeated here. Discussed below are previously recorded sites in the project vicinity, followed by a summary of the buried site sensitivity assessment for the project. These topics are reiterated here as they are the primary factors that determined subsurface testing locations.

### PREVIOUSLY RECORDED RESOURCES

Based on records searches in 2016 and 2019 at the Central Coast Information Center, University of California, Santa Barbara, 25 previously recorded archaeological resources are located within the project area or within a one-half mile radius (Table 2). Below is a summary of the four sites immediately adjacent to the Construction Phase 2 ADI. Original site records are presented in the Archaeological Survey Report (Kaijankoski et al. 2019) and updated site records will be included in the final project mitigation and monitoring report.

Table 2. Previously Recorded Sites Within the Study Area.

PRIMARY NO. (P-40-)	TRINOMIAL (CA-SLO-)	AGE	WORK PERFORMED	ATTRIBUTES	NOTES	IN DESIGN APE?
000016	16	P	Other	Lithic scatter, burials, habitation debris	-	Pipeline, injection well field
000029	29	P	Survey	Lithic scatter, other – shell mound	-	No
000043	43	P	Survey	Habitation debris – shell midden	Site excavated in 1900 for University of California Museum of Anthropology. Uncertain if or where collections exist.	One-third in injection well field
000165	165	P	Survey, testing, excavation	Habitation debris, burials	Site has undergone numerous archaeological investigations; most occurred north of SR 41. Far Western conducted data recovery investigations in 1996 for a Caltrans project; National Register-eligible with SHPO concurrence.	SE corner – pipeline, injection well field
000166	166	P	Survey	Lithic scatter, shell midden	On a low rise between Morro and Little Morro Creeks.	No
000167	167	P	Survey	Lithic scatter, habitation debris	Extensive village; 1991 update notes site has been recorded as SLO-172 and-167.	No
000213	213	P	Survey	Bedrock milling feature, habitation debris – midden	Midden deposit of concentrated abalone shell; dirt road and trail through site.	No
000239	239	P	Survey, excavation	Lithic scatter, burials, hearths/pits, habitation debris	Site excavated in 1900 for University of California Museum of Anthropology, then in May 1961 by Central California Archaeology Foundation.	Adjacent to pipeline, in staging
000401	401	P	Survey	Bedrock milling feature	Recorded by Dills in 1970 at base of Morro Rock.	No
000499	499	P	Survey	Lithic scatter, bedrock milling feature, habitation debris	-	No
000610	610	P	Survey	Habitation debris	Shell midden.	No
001183	1183	P	Survey	Lithic scatter, habitation debris	Recent construction uncovered a prehistoric deposits with burials (Rose 2020).	No

Table 2. Previously Recorded Sites Within the Study Area *continued*.

PRIMARY No. (P-40-)	TRINOMIAL (CA-SLO-)	AGE	WORK PERFORMED	ATTRIBUTES	NOTES	IN DESIGN APE?
001184	1184	P	Survey	Lithic scatter	-	No
001303	1303	P	Testing, excavation	Lithic scatter, habitation debris	-	No
001379	1379	P	Survey	Lithic scatter, bedrock milling feature	-	No
001528	1528	P	-	Habitation debris – shell	-	No
001529	1529	P	-	Lithic scatter, habitation debris	-	No
002022	2022	P	Survey	Lithic scatter, habitation debris	Shell midden containing food remains and lithic debris in a dark clayey silt anthropic soil.	Adjacent to pipeline
002124	2124	P	Testing, excavation	Habitation debris	-	Staging
002142	2142	P	Testing, excavation	Lithic scatter, habitation debris, burials	-	No
002143	2143	P	Testing, excavation	Lithic scatter, habitation debris	-	No
002222	2222	P	Testing	Habitation debris, human remains	Water-saturated midden buried under several meters of artificial fill and sediments.	Adjacent to pipeline
002232	2232H	H	Survey, testing	Historic-era debris	Historic-era debris associated with structure on early maps. Subsurface testing near pipeline negative (Lee 2006).	Adjacent to pipeline
002823	2823/H	P/H	Survey	Historic-era ranch, habitation debris	Recorded during Far Western’s survey for WRF project (Ruby et al. 2016).	No
002845	2845	P	Survey	Lithic scatter, habitation debris	Recorded during Far Western’s survey for WRF project (Ruby 2017).	No

Note: P – Prehistoric; H – Historic; National Register – National Register of Historic Places; SHPO – State Historic Preservation Office; WRF – Water Reclamation Facility.

### CA-SLO-16

This aboriginal cemetery and likely village is located just south of Morro Creek and was described as a large mounded dune within a marshy area (Singer 1991). It was originally recorded by Harley J. Walker in 1948, who indicated that between 49 and 59 human burials were removed during excavations by private collectors as well as archaeologists affiliated with the Santa Barbara Museum of Natural History, although no records of the work are available. A site record update by Patton in 1952 additionally indicates the presence of shell midden and mortars, and notes that “burials were tightly flexed” with no additional information concerning the location or number of burials.

In 1972, while working for Pacific Gas and Electric Company (PG&E) on a power plant storage facilities project, archaeologist Roberta Greenwood conducted an augering program to identify the site’s boundaries since most of the site was covered with recently deposited fill (Greenwood 1973). She observed that the overburden ranged from 0.3 to 2.4 meters (1.0 to 7.9 feet) thick above the cultural deposit that ranged in thickness from 0.3 to 2.7 meters (1 to 9 feet). She estimated site boundaries at 213 by 91 meters (700 by 300 feet) with at least 40 looters’ holes present. A site record update in 1972 by an unknown author, probably Greenwood, provides a sketched profile of five test borings placed within the site by PG&E to depths reaching 3.4 meters (11.2 feet). It depicts the cultural deposit mostly buried beneath overburden. Greenwood

strongly recommended that an archaeological investigation be initiated to preserve and stabilize the buried deposits (Greenwood 1973), but no further work appears to have been conducted by PG&E (Singer 1991).

In 1999, archaeologist John Parker surveyed the site and identified a buried shell midden exposed in both the north and south cutbanks of Morro Creek. On the south cutbank, buried shell midden was exposed along a 150-meter-long section, while on the north it was exposed along 90 meters. It was capped by artificial fill and recent alluvium ranging from 0.3 to 2.0 meters (1.0 to 6.6 feet) to in thickness. In all areas, exposed midden was a minimum of 1.2 meters thick yet often extended below the base of the cutbank. In the site record update, Parker also noted that a member of the Northern Chumash Council observed human remains eroding from the Morro Creek bank in 1996, and that the remains were apparently collected and reinterred nearby.

In 1997, a City employee observed a single human burial exposed in the cutbank of Morro Creek, directly under the proposed location of the pedestrian bridge leading to Lila Keiser Park. Two years later, based on this observation, archaeologist Clay Singer visited the location. While the streambank was densely vegetated and the burial not identified, Singer surmised it was likely still present. The site record was updated to document the reported burial and Singer's field visit, although the site boundary was not expanded to encompass this location despite it being approximately 150 meters (500 feet) east of the boundary as currently defined by the Information Center.

In 1999, the City constructed the bike path and water pipelines between Main Street and Atascadero Road, which included the pedestrian bridge over Morro Creek. While it is not clear exactly what happened, apparently this work was monitored by an archaeologist although a report was not filed at the Information Center. This is based on Clay Singer's notes recently provided to the author by Mona Tucker of the Northern Chumash Tribe. During fieldwork for the current project, Patti Dunton of the Salinan Tribe of San Luis Obispo County provided field notes from her monitoring of this project. This included photographs of a reburial location immediately west of the southwest foundation of the bike bridge. Apparently, this reburial was the burial observed in the creek bank two years earlier. Ms. Dunton also shared the location and photographs of a shell midden encountered in the northeast corner of the Lila Keiser Park adjacent to the ADI.

In April 2000, Parker was retained by the City to assess damage caused to the site by unpermitted sheet piling construction for creek bank stabilization along the north bank of Morro Creek in Lila Keiser Park (Parker 2000). A 17-meter-long section of sheet piles had been driven into the ground between Morro Creek and the western baseball field, within the site. Parker then excavated a test trench on the east and west ends of the proposed extension of this sheet pile wall to depths of 2.6 and 3.0 meters, respectively. Shell midden was exposed in the east trench (exact depth unknown) but was not in the deeper west trench. Apparently, the sheet pile installation was terminated as a result of these findings.

In 2002, Parker conducted a pedestrian survey of Lila Keiser Park, documenting buried shell midden in the north bank of Morro Creek at depths of roughly 75 centimeters below surface (cmbs), extending to the base of the cutbank. He also identified several areas where marine shellfish was exposed at the surface, which he suspected was the result of a buried shell midden brought to the surface during installation of light poles, fencing, and irrigation lines (Parker 2002). The following year, he monitored mechanical auguring for six light pole foundations at Lila Keiser Park (Parker 2003). In two of these holes (1 and 2), dense shell midden was identified between 2.4 and 3.6 meters (7.9 to 11.8 feet) below surface and sampled for processing. Sparse shell midden was also identified in Pole 5 between 3.0 and 3.2 meters (9.8 and 10.5 feet) below surface. While many of Parker's (2002, 2003) findings were outside of the recorded site boundary, the site record was not updated accordingly. Given the deeply buried nature of this site, little evidence was found during survey for the current project. However, the locations of prior positive findings were compiled, a comprehensive site map created, site boundaries expanded, and the site record updated (Kajankoski et al. 2019).

## CA-SLO-239

This site is a remnant of a once-extensive village that covered at least 10 acres on an elevated terrace southeast of the PG&E power plant. It encompassed an extensive and deep cultural deposit dating to at least 5,000 years ago which included an aboriginal cemetery and many isolated burials, as well as at least one house floor. The southern and eastern boundaries have never been fully delineated (Nicchitta and Farquhar 2015).

The site has been greatly impacted by development and is currently characterized by a large open pit where the densest habitation area was once located. A parking lot and several buildings were built on the site by the US Navy during World War II. After the war, PG&E acquired the property for its power plant and removed the buildings. The site suffered heavy damage in 1961–1962 during grading for a parking lot, as well as use as a borrow pit.

The site has been the focus of archaeological excavations, both reported and unreported, likely dating to the nineteenth century. In 1900, archaeologist Philip M. Jones investigated the site, and his notes and collections were placed with the Lowie Museum of Anthropology (now Phoebe A. Hearst Museum) at the University of California, Berkeley.

During PG&E's power plant construction in 1961–1962, at least 48 human burials were exposed. Archaeologist John Clemmer (1962) was allowed to salvage materials disturbed by the heavy equipment and conduct limited excavations which exposed an intact house floor with postholes. The site record was updated in 1991 when archaeologist Clay Singer visited the site and noted that the pit where most of the site once stood was 12 meters below the surface of the surrounding "ring" which still contained midden. In 1999, archaeologist John Parker visited the site and documented additional disturbances, including more use as a construction borrow pit as well as looters' pits. His site record update noted that although the borrow pit destroyed much of the richest portion of the site, substantial intact cultural deposits still ring the pit, described as dark gray/black midden soil densely packed with marine shell, chipped stone, and fire-affected rock.

In 2015, Albion Environmental, Inc., conducted a Phase II study for a portion of the site about 300 meters south of the current APE for a proposed residential development (Nicchitta and Farquhar 2015). Albion excavated several test units, recovering a sparse artifact assemblage within disturbed sediments. They concluded that the tested area did not contain characteristics that would qualify it for listing in the California Register of Historical Resources (California Register).

During survey of this site for the current project, observations were largely consistent with prior recordation, although site boundaries were expanded slightly to encompass a high-density shell midden that appears to be in secondary context at the base of the road leading down from the terrace which contains intact site deposits.

## CA-SLO-2022

This resource is a midden deposit consisting of shell fragments and lithics recorded by Ethan Bertrando in 2000. It is located within the Chorro Valley, uphill from an unnamed drainage. It is visible in the roadcut along Quintana Road as it descends in elevation to South Bay Boulevard.

## CA-SLO-2332H

This site was recorded by Bertrando in 2003 as a historic-era refuse scatter including shellfish, window pane glass, and whiteware. Topographic maps from 1900 indicate the presence of a building in this location. In 2006 subsurface testing was conducted at this site (Lee 2006), which consisted of excavation of a series of shovel test pits including four near the ADI in Quintana Road. The test pits near the ADI were excavated to a depth of 30 to 45 cmbs and screened through 1/4-inch mesh with negative results.

The archaeological survey report for this project (Kaijankoski et al. 2019) describes a possible Native American component to this site including human remains. This was based on personal communication with Ron Rose of Cultural Resources Management Services who monitored recent construction of a housing complex in this area. However, Mr. Rose recently provided the location of this find and that it was associated with site SLO-1183 over a 100 meters (330 feet) south of the ADI (Ron Rose, personal communication, 2020).

## **BURIED SITE SENSITIVITY ASSESSMENT**

Buried site sensitivity of the project area was assessed as part of the archaeological survey report (Kaijankoski et al. 2019). It was based on the age of surface landforms coupled with other factors that would have attracted human occupation (i.e., distance to water). The project area is situated on a variety of landforms that date from the pre-Quaternary (>2.5 million years) to the Recent Holocene (600–100 BP; Figure 2). Generally, the eastern and central portions have Low or Very Low sensitivity for deeply buried sites due to the ancient age of the surface landforms (Figure 3). However, cultural deposits can be situated at the surface of these ancient landforms as demonstrated by sites SLO-2022 and SLO-2232H located on a Pleistocene landform near Chorro Creek.

Conversely, buried site sensitivity of the northwestern project area is much higher due both to the proximity to Morro Creek and the youthful age of landforms. This sensitivity is confirmed by the three documented buried sites—SLO-16, portions reported to be buried roughly 2.4 to 3.6 meters (7.9 to 11.8 feet) below surface; SLO-2222 buried at 2.2 meters (7.2 feet) below surface (Singer 2003); and SLO-2124 buried at 2.9 to 3.4 meters (9.5 to 11.2 feet) below surface (Parker 2001). These sites date to the Middle and Late Periods, indicating that a large portion of the archaeological record in this area is likely buried beneath alluvium and sand dunes.

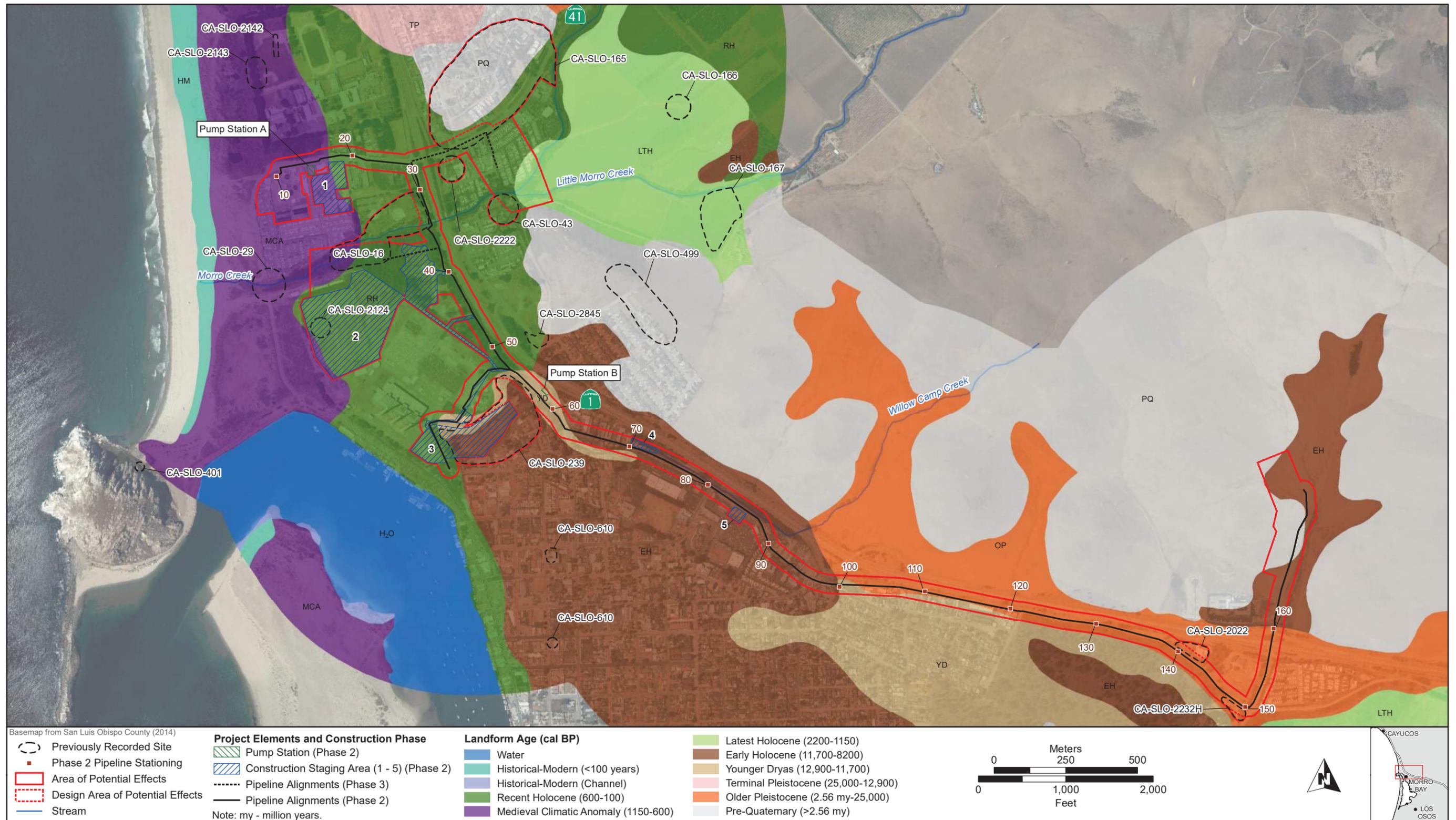


Figure 2. Age of Surface Landforms in the Project Area and Surrounding Vicinity.

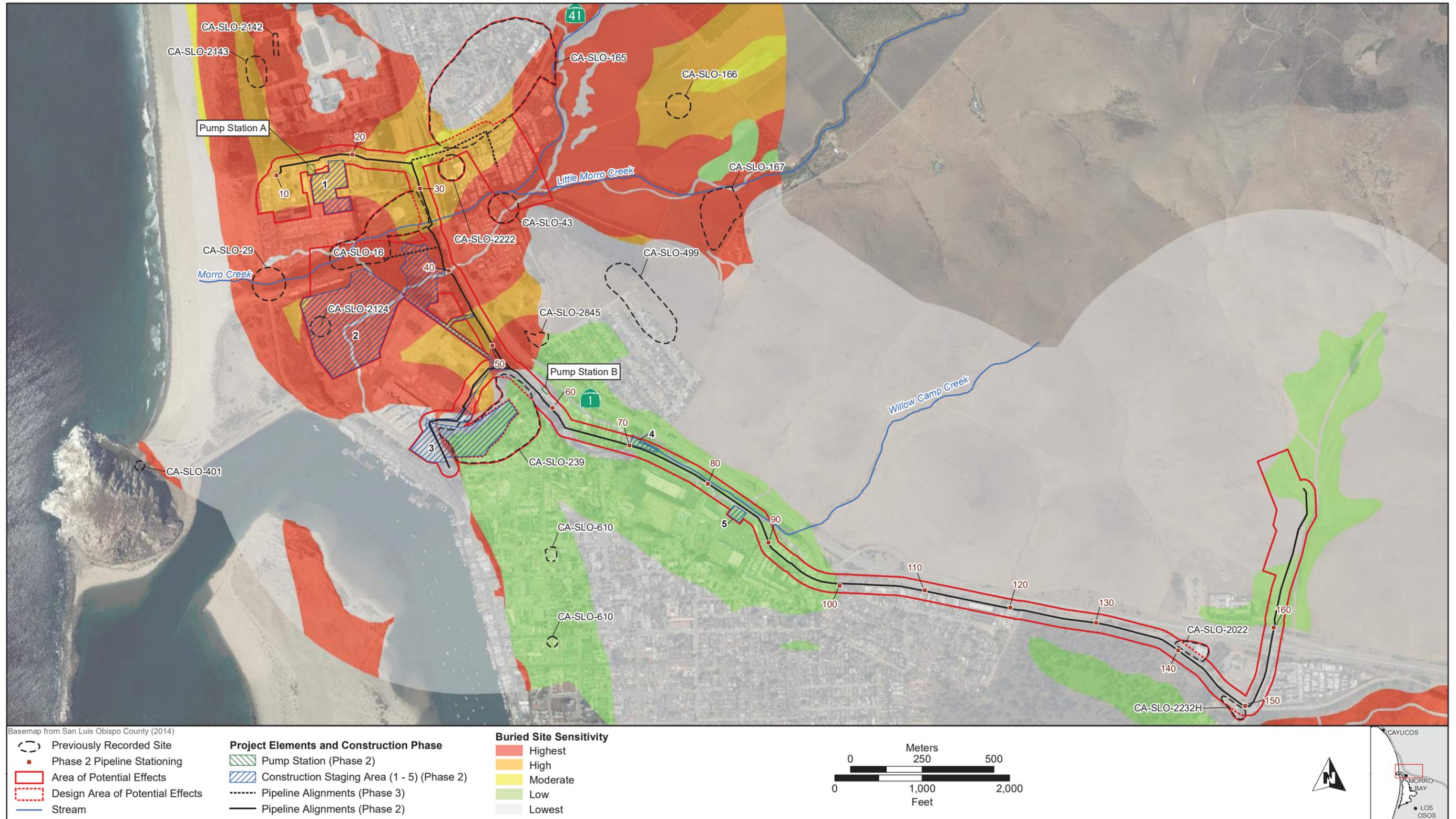


Figure 3. Buried Site Sensitivity Assessment of the Project Area and Surrounding Vicinity.

### III. TESTING METHODS

The objective of this investigation was to test for the presence or absence of Native American archaeological sites within the Construction Phase 2 ADI. Testing was conducted near previously recorded sites or in areas of elevated buried site sensitivity. As the collection system will be built primarily in paved roadways where there are numerous existing underground utilities, testing was completed by hydraulic continuous coring at regular 25-meter intervals drilled to the maximum depth of project impacts. If coring was not feasible due to underground utilities or other access constraints, testing was completed by hand augering.

#### PREFIELD WORK

Prefield activities included obtaining a boring permit from the San Luis Obispo County Environmental Health Division and encroachment permits from Caltrans and the City of Morro Bay. A site visit was made to review and mark out core locations followed by initiating an Underground Service Alert to check for underground utilities.

#### SUBSURFACE TESTING

From May 25 to June 5 and August 18 to 20, 2020, Philip Kaijankoski, with two crew members, oversaw the drilling of 56 hydraulic continuous cores and 22 hand augers followed by sediment processing (Figures 4 and 5). Cores were drilled with a rubber track-mounted Geoprobe 7822DT and Geoprobe 8040. Samples from subsurface deposits were recovered and stored in clear plastic liners 1.5 meters (5.0 feet) long and either 5.0 centimeters (2.0 inches) or 7.6 centimeters (3.0 inches) in diameter. Each liner was placed in a dual-walled push tube that was hydraulically driven to the appropriate depth to capture a continuous core sample for the desired interval. The liners were then extracted from the push tube and labeled to indicate the location, depth interval, and orientation (i.e., top or bottom). If a core had poor sediment recovery a second attempt with different equipment was attempted immediately adjacent (labelled C#.1). The majority of cores were drilled to three meters (10 feet) below surface, the maximum depth of impact for the pipeline constructed in open trenches, although C26 encountered refusal at a shallower depth (Table 3). Cores at the proposed pump stations were drilled to the maximum depth of project impacts, specifically 10.7 meters (35 feet) at Pump Station A and 6.1 meters (20 feet) at Pump Station B.

All cores were taken to a temporary field lab where they were opened, visually examined for archaeological materials, described, photographed, and subsampled. To determine the presence or absence of archaeological materials all surface and buried soils, in addition to select disturbed surficial deposits, were wet-screened through 1/8-inch mesh and sorted for archaeological materials (Table 3). Although relatively small, the core samples can reliably determine the presence or absence of archaeological materials and the nature and extent of subsurface deposits. Detailed core descriptions are provided in Appendix A.

Hand augering was conducted in two areas where there were numerous existing underground utilities: adjacent to the Caltrans right-of-way in Leila Keiser Park and along the edge of the Quintana Road near sites SLO-2022 and SLO-2332H (Figure 5; Table 4). Hand augers were excavated in approximately 15-centimeter-levels as deep as possible. As augers were excavated, sediment from each level was placed sequentially on a tarp to achieve a soil profile, with the depth of any soil change noted. Once excavation of an auger was complete the exposed profile was documented and select stratigraphic contexts collected for processing. This included intact surface soil (A) horizons without visible archaeological remains and select disturbed surficial deposits which were wet-screened through 1/8-inch mesh to determine the presence or absence of archaeological materials. Dense intact archaeological deposits (shell midden) at SLO-16 (HA1-3) were collected for flotation processing at the Far Western laboratory in Davis, California to determine the presence and amount of charred plant remains and small fish bone.

Table 3. Core Summary.

CORE	MAXIMUM DEPTH		SAMPLES PROCESSED
	METERS	FEET	
1	3.0	10	None
2	3.0	10	Wet-screened buried surface (2Ab horizon) 1.4–1.5 meters (4.5–5.0 feet) and ephemeral buried surface (3AC horizon) 2.0–2.4 meters (6.5–8.0 feet).
3	3.0	10	Wet-screened buried surface (2Ab horizon) 1.5–1.8 meters (5.0–6.0 feet).
4	3.0	10	Wet-screened buried surface (2Ab horizon) 1.7–2.4 meters (5.5–8.0 feet).
5	3.0	10	Wet-screened thin shell midden within artificial fill (Ap horizon) at 0.2 meters (0.5 feet) and buried surface (2Ab horizon) 1.5–2.1 meters (5.0–7.0 feet).
6	3.0	10	Wet screened buried surface (2Ab horizon) 1.5–2.1 meters (5.0–7.0 feet).
7	3.0	10	Wet-screened thin shell midden within artificial fill (Ap horizon) at 0.2 meters (0.5 feet), buried surface (2AC horizon) 1.5–1.8 meters (5.0–6.0 feet), and ephemeral buried surface (3AC horizon) 2.7–3.0 meters (9.0–10.0 feet).
8	3.0	10	Wet-screened buried wetland surface (3Ag horizon) 1.7–2.1 meters (5.5–7.0 feet).
9	3.0	10	None – poor sample recovery.
10	3.0	10	None
11	3.0	10	Wet-screened ephemeral buried wetland surface (3AC horizon) 1.7–2.0 meters (5.5–6.5 feet).
12	3.0	10	Wet screened buried surface (3Ab horizon) 1.7–1.8 meters (5.5–6.0 feet).
13	3.0	10	Wet-screened ephemeral buried surface (3AC horizon) 1.4–1.5 meters (4.5–5.0 feet).
14	3.0	10	Wet-screened ephemeral buried surface (3AC horizon) 2.4–3.0 meters (8.0–10.0 feet).
15	3.0	10	Wet-screened buried surface (3Ab horizon) 1.8–2.1 meters (6.0–7.0 feet) and ephemeral buried surface (4AC horizon) 2.6–3.0 meters (8.5–10.0 feet).
16	3.0	10	Wet-screened buried surfaces (3Ab and 4Ab horizons) 1.7–1.8 meters (5.5–6.0 feet) and 2.7–3.0 meters (9.0–10.0 feet).
17	3.0	10	Wet-screened buried surface (3Ab horizon) 1.5–2.1 meters (5.0–7.0 feet).
18	3.0	10	Wet-screened buried surface (3Ab horizon) 1.7–2.0 meters (5.5–6.5 feet).
19	3.0	10	Wet-screened buried surface (2Ab horizon) 1.7–2.1 meters (5.5–7.0 feet).
20	3.0	10	Wet-screened mixed artificial fill (Ap horizon) 0.0–1.4 meters (0.0–4.5 feet) and buried surface (2Ab horizon) 1.4–1.7 meters (4.5–5.5 feet). Poor sample recovery from 1.5 to 3.0 meters (5.0–10.0 feet).
20.1	2.9	9.5	Wet-screened mixed artificial fill (Ap horizon) 0.0–1.2 meters (0.0–4.0 feet) and buried surfaces (2Ab and 3Ab horizons) 1.2–1.5 meters (4.0–5.0 feet) and 2.4–2.9 meters (8.0–9.5 feet).
21	1.5	5	Wet-screened mixed artificial fill (Ap horizon) 0.0–1.4 meters (0.0–4.5 feet) and buried surface (2Ab horizon) 1.4–1.5 meters (4.5–5.0 feet). Poor recovery.
21.1	3.0	10	Wet-screened mixed artificial fill (Ap horizon) 0.0–1.2 meters (0.0–4.0 feet) and buried surfaces (2Ab and 3Ab horizons) 1.2–1.4 meters (4.0–4.5 feet) and 2.4–2.9 meters (8.0–9.5 feet)
22	6.1	20	Wet-screened buried surface (2Ab horizon) 1.2–1.8 meters (4.0–6.0 feet) and transitional buried surface (2AC horizon) 1.8–2.1 meters (6.0–7.0 feet).
22.1	10.7	35	Wet-screened mixed artificial fill (Ap horizon) 0.0–1.8 meters (0.0–6.0 feet) and truncated surface (AC horizon) 1.8–3.0 meters (6.0–10.0 feet).
23	6.1	20	Wet-screened mixed artificial fill (Ap horizon) 0.0–1.5 meters (0.0–5.0 feet), buried surface (2Ab horizon) 1.5–1.8 meters (5.0–6.0 feet), and transitional buried surface (2AC horizon) 1.8–2.1 meters (6.0–7.0 feet).
23.1	10.7	35	Wet-screened mixed artificial fill (Ap horizon) 0.0–2.1 meters (0.0–7.0 feet) and truncated surface (AC horizon) 2.1–3.0 meters (7.0–10.0 feet).
24	7.3	24	Wet-screened buried surfaces (2Ab and 3Ab horizons) 0.8–1.5 meters (2.5–5.0 feet) and 1.8–2.4 meters (6.0–8.0 feet).
25	7.6	25	Wet-screened buried surface (2Ab horizon) 1.5–2.7 meters (5.0–9.0 feet).
26	1.5	5	Wet-screened mixed artificial fill (Ap horizon) 0.0–1.5 meters (0.0–5.0 feet). Refusal at 1.5 meters (5.0 feet).
27	3.0	10	Wet-screened mixed artificial fill with midden (Ap1 horizon) 0.0–1.5 meters (0.0–5.0 feet), mixed artificial fill (Ap2 horizon) 1.5–2.1 meters (5.0–7.0 feet), and ephemeral buried dune surface (2AC horizon) 2.1–3.0 meters (7.0–10.0 feet).
28	3.0	10	Wet-screened buried wetland deposit (2Ab horizon) 2.3–2.7 meters (7.5–9.0 feet).
29	3.0	10	Wet-screened buried surface (2Ab horizon) 2.4–2.7 meters (8.0–9.0 feet).

Table 3. Core Summary *continued*.

CORE	MAXIMUM DEPTH		SAMPLES PROCESSED
	METERS	FEET	
30	3.0	10	Wet-screened mixed artificial fill (Ap1 horizon) 0.0–0.6 meters (0.0–2.0 feet) and buried surface (2Ab horizon) 2.9–3.0 meters (9.5–10.0 feet).
31	3.0	10	Wet-screened fill (Ap1 horizon) 0.0–0.6 meters (0.0–2.0 feet).
32	3.0	10	Wet-screened fill (Ap1 horizon) 0.0–0.6 meters (0.0–2.0 feet).
33	3.0	10	Wet-screened buried surface (2Ab horizon) 2.4–3.0 meters (8.0–10.0 feet).
34	3.0	10	None
35	3.0	10	None
36	3.0	10	Wet-screened buried surface (3Ab horizon) 2.9–3.0 meters (9.5–10.0 feet).
37	3.0	10	None
37.1	3.0	10	None
38	3.0	10	None
39	3.0	10	Wet-screened buried surface (2Ab horizon) 2.4–2.7 meters (8.0–9.0 feet).
40	3.0	10	Wet-screened buried surface (2Ab horizon) 2.4–2.7 meters (8.0–9.0 feet).
41	3.0	10	None
42	3.0	10	None – entire core mixed gravelly fill.
43	3.0	10	None
44	3.0	10	Wet-screened buried surface (2A horizon) 1.8–2.4 meters (6.0–8.0 feet).
45	3.0	10	Wet-screened mixed artificial fill (Ap horizon) 0.0–1.5 meters (0.0–5.0 feet) and buried surface (2Ab horizon) 1.5–3.0 meters (5.0–10.0 feet).
45.1	3.0	10	Wet-screened modern surface (AC horizon) 0.0–0.6 meters (0.0–2.0 feet) and buried surface (2Ab horizon) 1.4–1.8 meters (4.5–6.0 feet).
46	3.0	10	Wet-screened mixed artificial fill with shell midden (Ap horizon) 0.0–2.4 meters (0.0–8.0 feet) and buried surface (2Ab horizon) 2.4–3.0 meters (8.0–10.0 feet).
47	1.8	6	Wet-screened loose artificial fill (Ap horizon) 0.0–1.4 meters (0.0–4.5 feet) and buried surface (2Ab horizon) 1.4–1.8 meters (4.5–6.0 feet).
47.1	3.0	10	Wet-screened loose artificial fill (Ap horizon) 0.0–1.4 meters (0.0–4.5 feet) and buried surface (2Ab horizon) 1.4–2.1 meters (4.5–7.0 feet).
48	3.0	10	Wet-screened gravelly artificial fill (Ap1 horizon) 0.0–0.6 meters (0.0–2.0 feet), loose artificial fill (Ap2 horizon) 0.6–1.4 meters (2.0–4.5 feet), and buried surface (2Ab horizon) 1.4–1.8 meters (4.5–6.0 feet).
49	3.0	10	Wet-screened mixed fill (Ap1 horizon) 0.0–0.6 meters (0.0–2.0 feet) and mixed fill with midden (Ap2 horizon) 0.6–3.0 meters (2.0–10.0 feet).
50	3.0	10	Wet-screened mixed artificial fill (Ap horizon) 0.0–0.8 meters (0.0–2.5 feet) and buried surface horizons (2Ab1, 2Ab2, and 2Ab3 horizons) 0.8–1.4 meters (2.5–4.5 feet), 1.4–2.0 meters (4.5–6.5 feet), and 2.0–2.4 meters (6.5–8.0 feet).
51	3.0	10	Wet-screened mixed artificial fill deposits (Ap1 and Ap2 horizons) 0.0–1.8 meters (0.0–6.0 feet) and 1.8–2.0 meters (6.0–6.5 feet) and surface (AC horizon) 2.0–3.0 meters (6.5–10.0 feet).
52	3.0	10	Wet-screened mixed artificial fill deposit (Ap horizon) 0.0–0.6 meters (0.0–2.0 feet), surface (AC horizon) 0.6–1.8 meters (2.0–6.0 feet), and unweathered alluvium (C horizon) 1.8–3.0 meters (6.0–10.0 feet).
53	3.0	10	Wet-screened mixed artificial fill deposit (Ap horizon) 0.0–0.6 meters (0.0–2.0 feet), surface (AC horizon) 0.6–1.8 meters (2.0–6.0 feet), and unweathered alluvium (C horizon) 1.8–3.0 meters (6.0–10.0 feet).
54	3.0	10	Wet-screened mixed artificial fill deposit (Ap horizon) 0.0–1.7 meters (0.0–5.5 feet), surface (AC horizon) 1.7–2.3 meters (5.5–7.5 feet), and unweathered alluvium (C horizon) 2.3–3.0 meters (7.5–10.0 feet).
55	3.0	10	Wet-screened mixed artificial fill deposits (Ap1 and Ap2 horizons) 0.0–1.4 meters (0.0–4.5 feet) and 1.4–2.1 meters (4.5–7.0 feet), and surface (A horizon) 2.1–3.0 meters (7.0–10.0 feet).
56	3.0	10	Wet-screened mixed artificial fill deposits (Ap1 and Ap2 horizons) 0.0–1.4 meters (0.0–4.5 feet) and 1.4–2.0 meters (4.5–6.5 feet), and surface (A horizon) 2.0–2.4 meters (6.5–8.0 feet).

Note: Additional core designated #.1 – drilled immediately adjacent if sediment recovery was poor or shallow refusal encountered in first attempt.

Table 4. Hand Auger Summary.

HAND AUGER	MAXIMUM DEPTH		SAMPLES PROCESSED
	METERS	FEET	
1	3.1	10.2	Flotation-processed buried surface with shell midden (2Ab horizon) 2.0–2.5 meters (6.6–8.2 feet).
2	3.1	10.2	Flotation-processed buried surface with shell midden (3Ab horizon) 1.5–2.2 meters (4.9–7.1 feet) and ephemeral buried surface with shell midden (4AC horizon) 2.7–3.1 meters (8.9–10.0 feet).
3	3.1	10.2	Flotation-processed buried surface with shell midden (3Ab horizon) 1.5–2.3 meters (4.9–7.5 feet) and ephemeral buried surface with shell midden (4AC horizon) 2.7–3.1 meters (8.9–10.0 feet).
4	0.9	3.0	None – utility encountered.
5	0.9	3.0	None – utility encountered.
6	4.1	13.5	None.
7	1.5	4.9	Wet-screened modern surface deposits (A1 and A2 horizons) 0.0–0.3 meters (0.0–1.0 feet) and 0.3–1.0 meters (1.0–3.3 feet).
8	0.6	2.0	Wet-screened ephemeral buried surface (2AC horizon) 0.4–0.6 meters (1.3–2.0 feet).
9	0.5	1.6	Wet-screened modern surface deposit (A horizon) 0.0–0.5 meters (0.0–1.6 feet).
10	0.8	2.6	None.
11	0.5	1.6	None.
12	0.9	3.0	None.
13	0.5	1.6	None.
14	2.0	6.6	Wet-screened surface deposit (A horizon) 1.3–1.6 meters (4.3–5.2 feet).
15	1.8	5.9	None – all disturbed.
16	1.8	5.9	Wet-screened surface deposit (A horizon) 0.3–1.0 meters (1.0–3.3 feet).
17	1.7	5.6	Wet-screened surface deposit (A horizon) 0.3–1.3 meters (1.0–4.3 feet).
18	1.4	4.6	Wet-screened truncated surface deposit (A horizon) 0.3–0.5 meters (1.0–1.6 feet).
19	1.5	4.9	Wet-screened truncated surface deposit (A horizon) 0.3–0.6 meters (1.0–2.0 feet).
20	1.5	4.9	Wet-screened disturbed/rocky artificial fill (Ap horizon) 0.0–0.9 meters (0.0–3.0 feet) and potentially intact surface (A horizon) 0.9–1.2 meters (3.0–4.0 feet).
21	0.6	2.0	None – all disturbed and refusal at shallow depth.
22	1.9	6.2	Wet-screened surface deposit (A horizon) 0.5–1.5 meters (1.6–4.9 feet).



Drilling Core 2 in pipeline alignment within Atascadero Road, view to the southwest.



Drilling Core 10 within pipeline alignment in Atascadero Road, view to the southwest.



Drilling Core 27 within pipeline alignment north of Main Street, view to the southwest. Site CA-SLO-239 is situated on elevated terrace in background.



Drilling Core 48 within Pipeline alignment near site CA-SLO-16 south of Morro Creek, view to the southeast.



Excavating Hand Auger 2 at site CA-SLO-16 adjacent to Caltrans right-of-way fence in Leila Keiser Park, view to the northeast. Pipeline alignment will be immediately adjacent between fence and State Route 1 southbound onramp.



Hand augering along northeast side of Quintana Road immediately adjacent to site CA-SLO-2022, view to the southeast. Site is situated on level landform on far left and exposed in road cut immediately below white fence.

Figure 4. Fieldwork Photos.

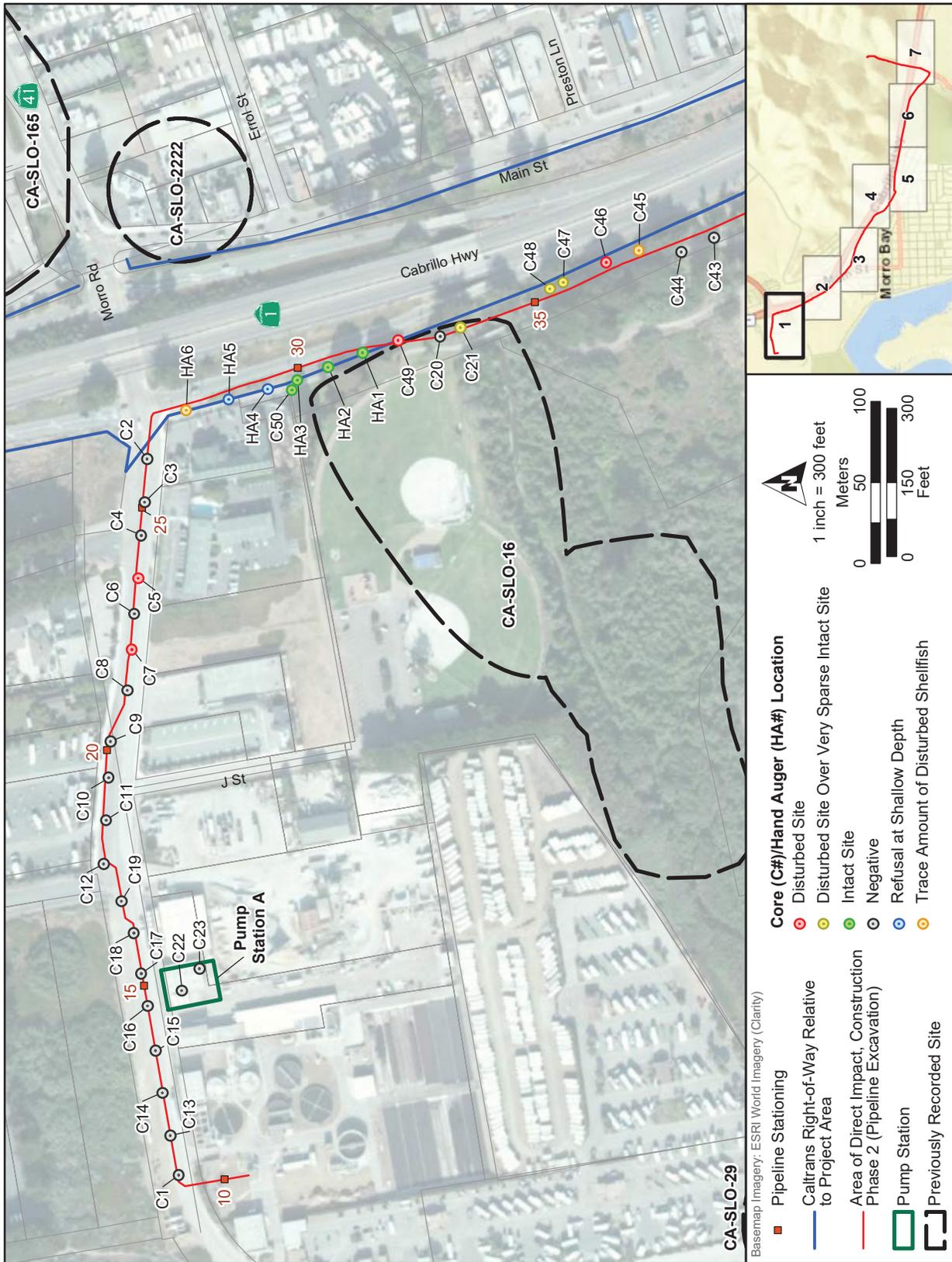


Figure 5. Test Locations and Results (1 of 7).

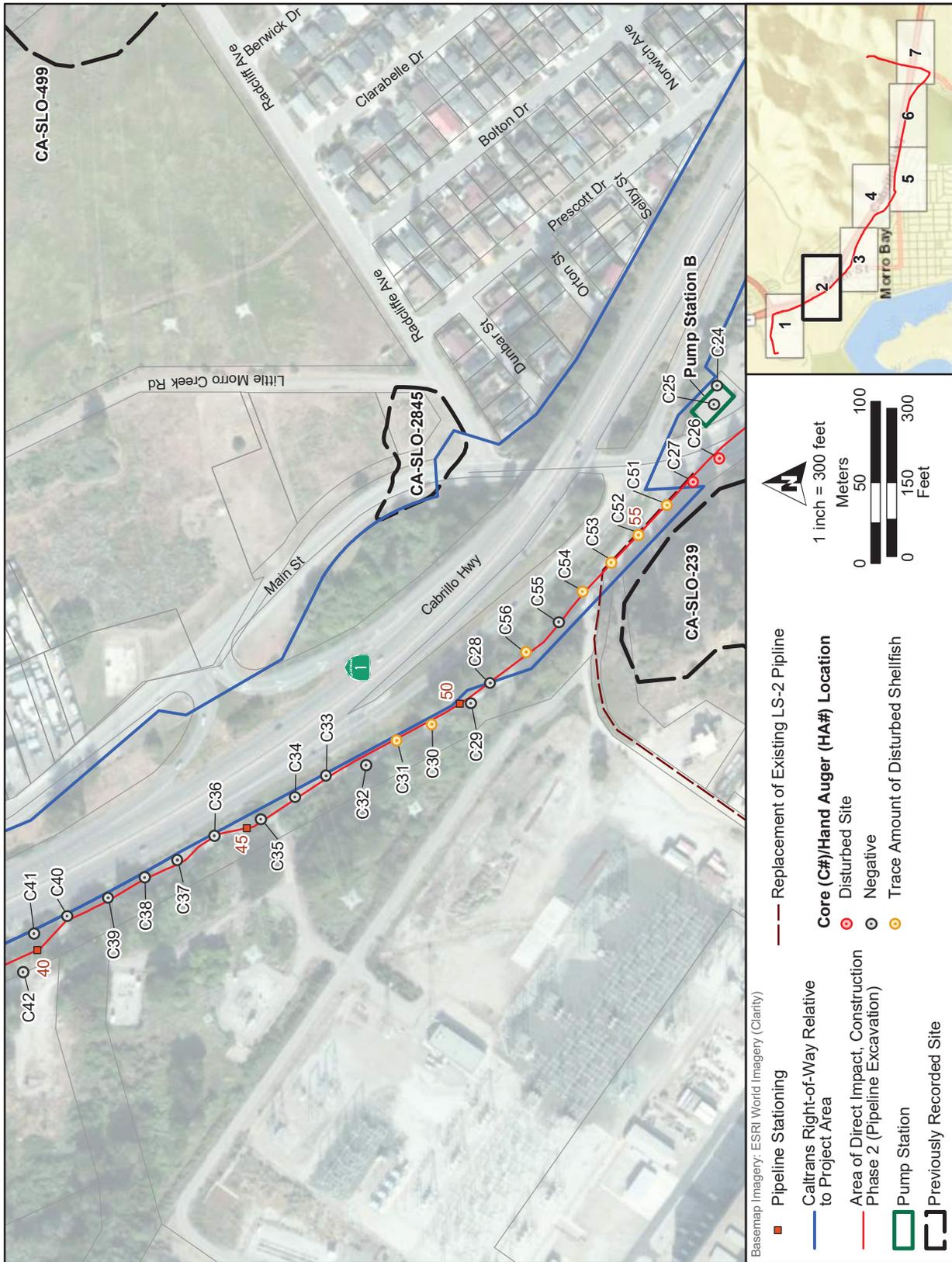


Figure 5. Test Locations and Results (2 of 7).

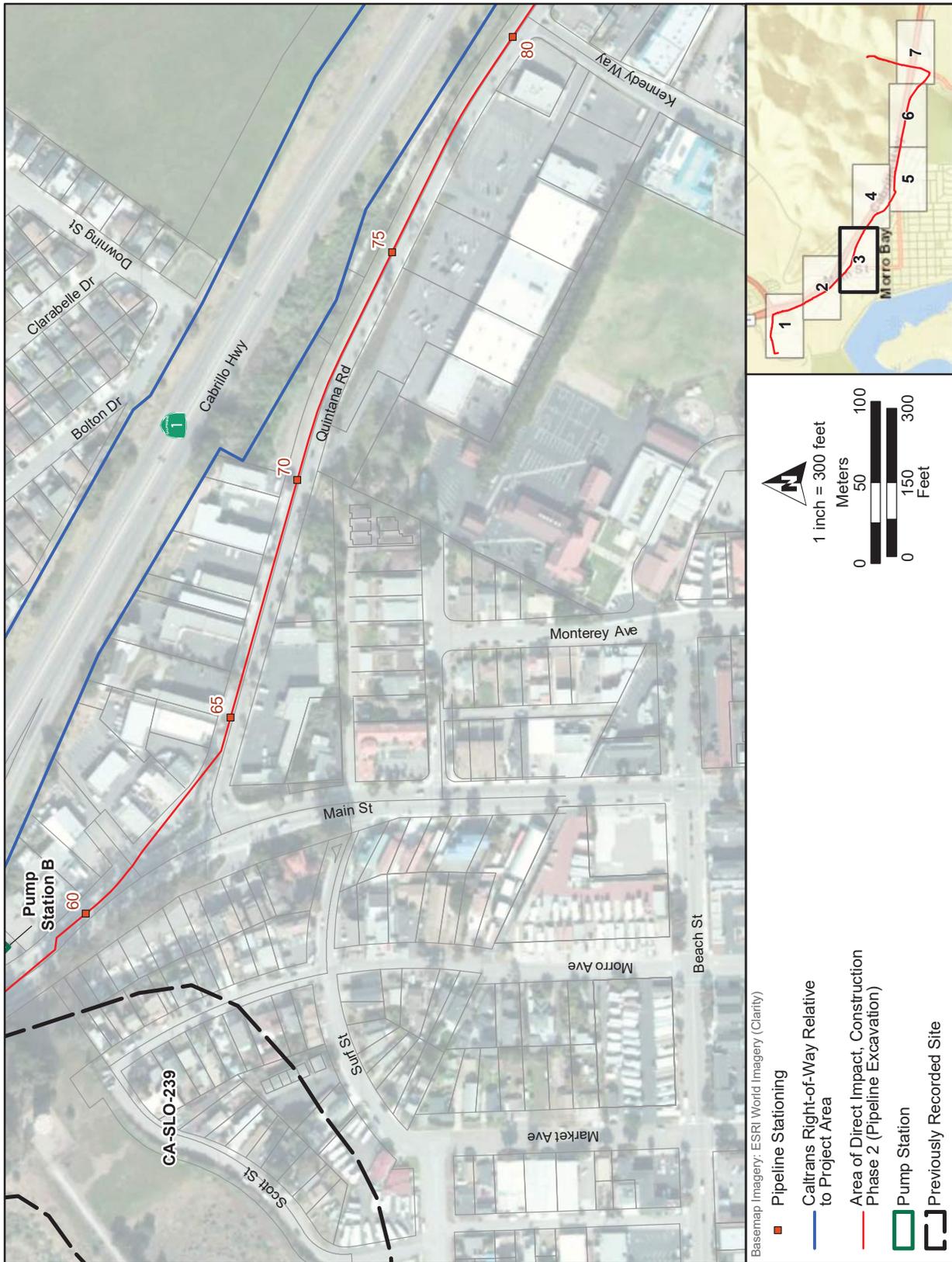


Figure 5. Test Locations and Results (3 of 7).



Figure 5. Test Locations and Results (4 of 7).

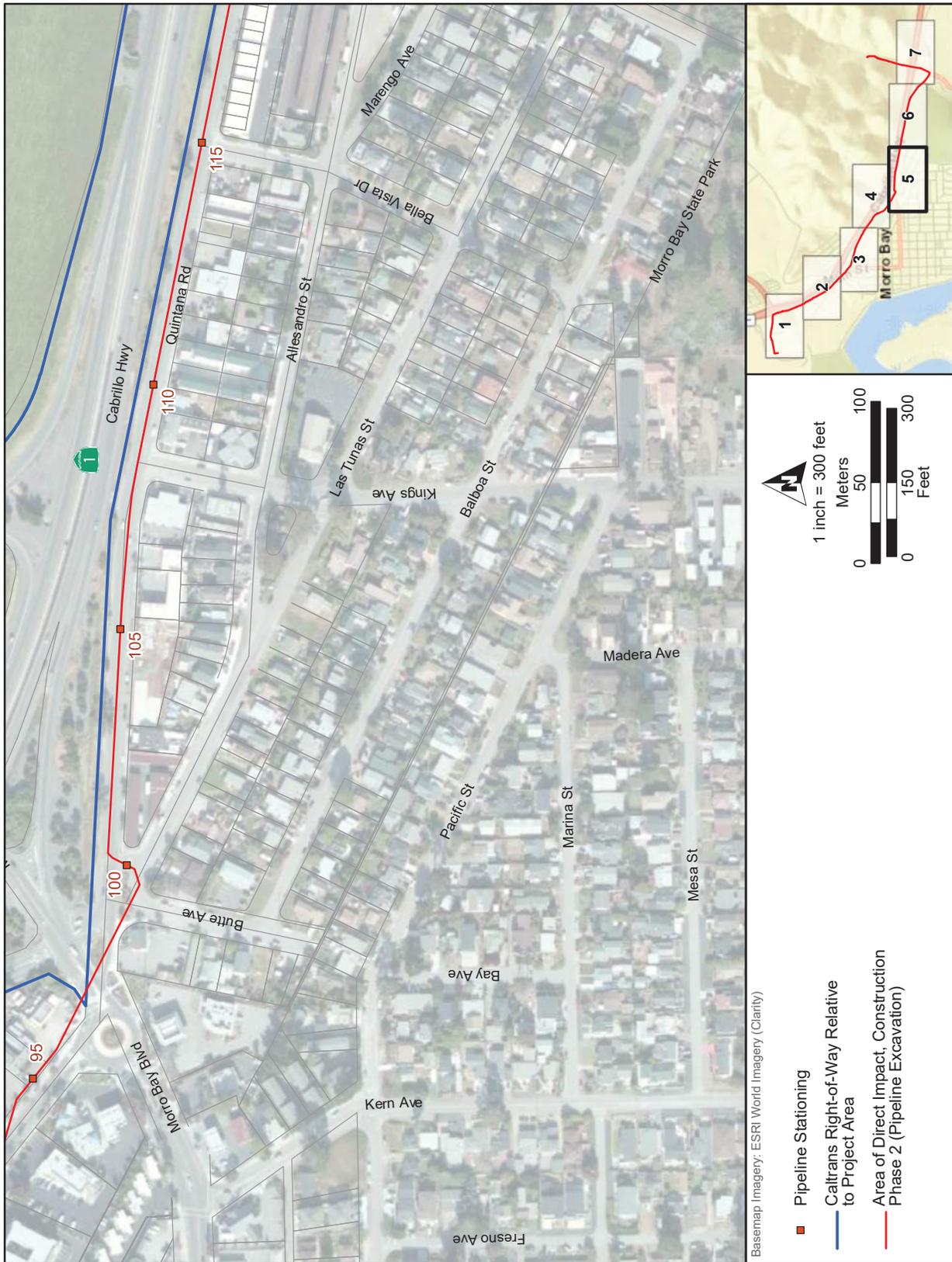


Figure 5. Test Locations and Results (5 of 7).

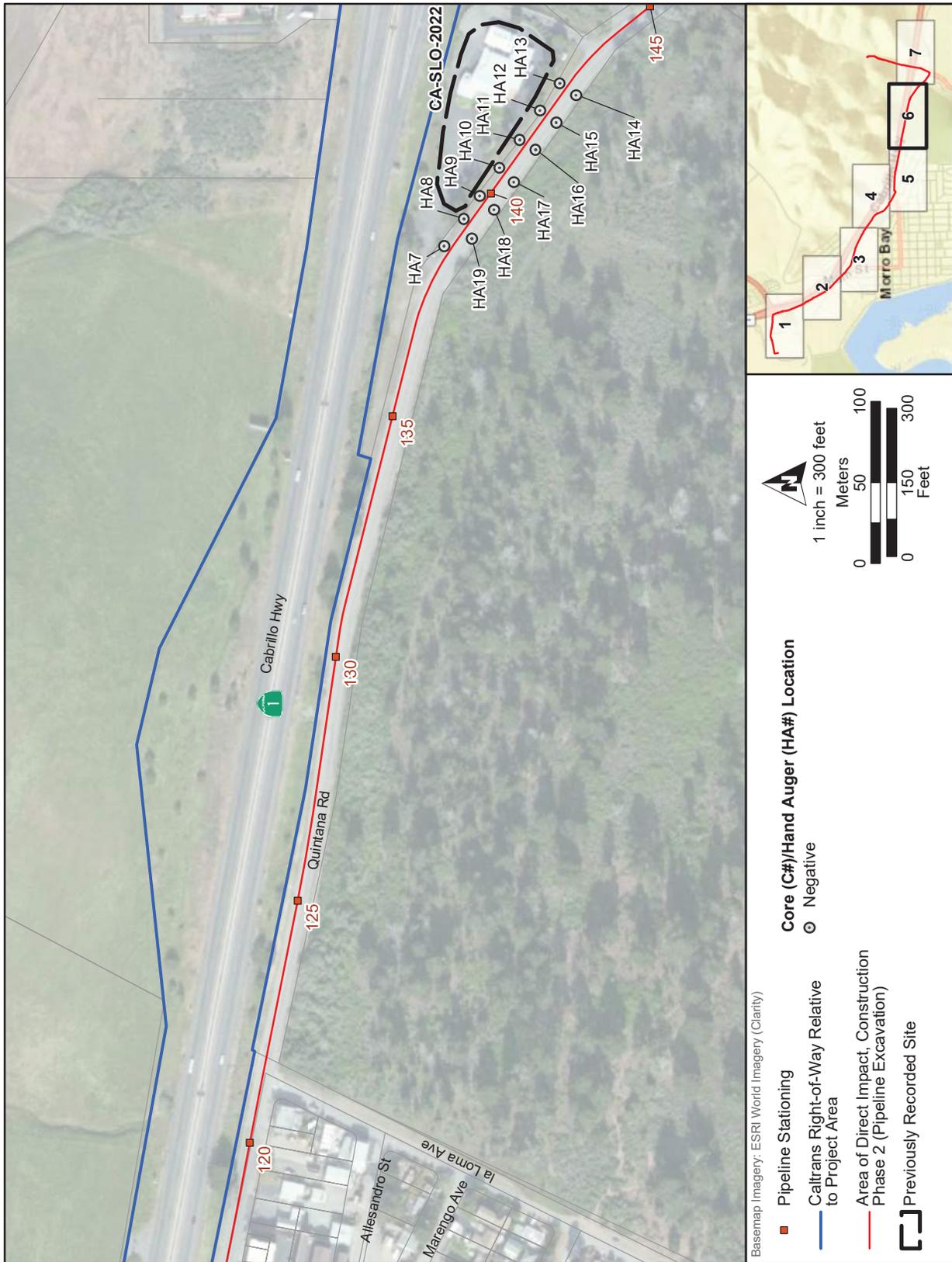


Figure 5. Test Locations and Results (6 of 7).



Figure 5. Test Locations and Results (7 of 7).

## Stratigraphic Identification and Soil Description

Natural and/or cultural stratigraphy was identified whenever possible by carefully examining the deposits exposed in the cores and augers. Stratigraphic units (strata) were identified on the basis of physical composition, superposition, relative soil development, and/or textural transitions (i.e., upward-fining sequences) characteristic of discrete depositional cycles. Each stratum exposed in a core was assigned a Roman numeral beginning with the oldest or lowermost stratum and ending with the youngest or uppermost stratum. Buried soils (also called paleosols), representing formerly stable terrestrial ground surfaces, were identified based on color, structure, horizon development, bioturbation, lateral continuity, and the nature of the upper boundary (contact) with the overlying deposit, as described by Birkeland et al. (1991), Holliday (1990), Retallack (1988), and Waters (1992), among others.

Master horizons describe in-place weathering characteristics and are designated by upper-case letters. These are sometimes preceded by Arabic numerals when the horizon is associated with a different stratum (i.e., 2Cu); Number 1 is understood but not shown. The upper part of a complete soil profile is usually called the A horizon, with a B horizon being the zone of accumulation in the middle of a profile, and the C horizon representing the relatively unweathered parent material in the lower part of a profile. Lower-case letters are used to designate subordinate soil horizons. Combinations of these numbers and letters indicate the important characteristics of each major stratum and soil horizon; they are consistent with those outlined by Birkeland et al. (1991), Schoeneberger et al. (2012), and the USDA Soil Survey Staff (2014).

## Native American Monitoring

A Native American monitor was present in the field during hand augering but was not necessary for hydraulic coring as virtually no soil is exposed during this process. However, a monitor was at the field lab as cores were opened. As the project area lies within lands claimed by both Northern Chumash and Salinan groups, monitors rotated between these two groups. They included Patti Dunton, Deanna Perry, and Randy Zimmerman representing the Salinan Tribe of San Luis Obispo and Monterey Counties, and Matthew Goldman and Kelsey Shaffer from the *yak tityu* Northern Chumash Tribe. Monitors prepared logs which were shared daily with all Native American individuals who expressed interest in the project.

## LABORATORY PROCESSING

Recovered archaeological materials were transferred to the Far Western laboratory for processing and cataloguing in a Microsoft Access digital database. Cataloguing procedures followed a standardized format, with all materials grouped by core/hand auger, site (if appropriate), soil horizon, and depth below surface. Artifacts were separated into broad artifact classes (e.g., flaked stone, ground stone, faunal remains) and then into more specific artifact descriptions within each class (e.g., projectile point, debitage). All tools received individual catalogue designations while bulk categories, such as bone, shell, and debitage, were assigned a group or lot number. In general, artifacts were weighed and measured (maximum length, width, and thickness), with raw material type and condition (e.g., whole, proximal fragment, distal fragment) noted. The catalogue is presented in Appendix B.

## Radiocarbon Dating

Eight samples of organic material were selected from archaeological deposits for radiocarbon analysis. This includes two shell and wood charcoal pairs from a stratified shell midden in HA3 at site SLO-16, and two shell samples from a possible prehistoric archaeological deposit in HA20 near site SLO-2332H. Additionally, two shell samples collected from the road cutbank at site SLO-2022 were submitted to determine the relationship between the materials recovered in HA20 and site SLO-2022 that was cut during construction of

Quintana Road. These samples were submitted to Direct Accelerator Mass Spectroscopy (AMS) in Bothell, Washington for radiometric analysis, with a date acquired on each using the AMS method (Appendix C).

A high-precision calibration program known as CALIB ver. 7.0.4 was used to convert conventional radiocarbon ages into calibration years (cal BP) according to Reimer et al. (2013). Similarly, the age of marine shell samples was corrected to compensate for the effects of ancient carbon using a Delta R factor of  $260 \pm 40$ , which is the average reservoir factor for the entire California coast. Results are reported as the calculated median probability before present (cal BP; Telford et al. 2004) rounded to the nearest five. By convention, zero years before present (0 BP) equals AD 1950 (Table 5).

Table 5. Radiocarbon Dating Results.

SITE CA-SLO-	PROVENIENCE	HORIZON	DEPTH (METERS)	SAMPLE DESCRIPTION	CONVENTIONAL RADIOCARBON AGE (BP)	MEDIAN PROBABILITY (CAL BP)	2-SIGMA (CAL BP)	LAB NUMBER
16	HA3	3Ab	1.5–2.3	Wood Charcoal	2074 ± 22	2040	2120–1990	D-AMS 038511
16	HA3	3Ab	1.5–2.3	Shell – Clam	2566 ± 53	1920	2085–1785	D-AMS 038513
16	HA3	4AC	2.7–3.1	Wood Charcoal	2416 ± 25	2430	2601–2355	D-AMS 038512
16	HA3	4AC	2.7–3.1	Shell – Clam	2643 ± 46	2010	2140–1875	D-AMS 038514
2022	Cutbank	-	-	Shell – Clam	4122 ± 47	3825	3970–3675	D-AMS 038517
2022	Cutbank	-	-	Shell – Clam	4807 ± 34	4745	4860–4575	D-AMS 038518
2332H	HA20	A	0.9–1.2	Shell – Clam	5441 ± 49	5540	5655–5430	D-AMS 038515
2332H	HA20	A	0.9–1.2	Shell – Clam	3886 ± 47	3525	3660–3390	D-AMS 038516

Note: HA – Hand Auger; Conventional radiocarbon age provided from the lab; minimum/maximum cal BP given at 2-sigma probability; Delta R Marine correction factor of  $260 \pm 40$  applied to all marine shell dates; Calibrated dates rounded to nearest 5.

#### IV. TESTING RESULTS AND RECOMMENDATIONS

Archaeological testing is summarized by pipeline stationing or other project component in Table 6, with pertinent results for the conveyance pipelines described by archaeological site and pipeline stationing in this section. Testing results were positive at 14 locations in a variety of contexts (Table 7). Each core or hand auger was assigned to one of the following six categories (Figure 5):

1. *Intact site deposits* retain their stratigraphic integrity. This context should be assumed eligible for the National Register and impacts mitigated through data recovery during construction.
2. *Disturbed site deposits* have been removed from their original context and thus lack integrity. While this context is recommended not eligible for the National Register, archaeological construction monitoring for human remains is recommended.
3. *Disturbed site deposits over very sparse intact site deposits* will require a combination of archaeological construction monitoring and/or limited data recovery during construction. This context was identified at four locations. Site SLO-16 (C21, 47-48) will be treated during the larger mitigation effort. Near site SLO-2232H (HA20) it is uncertain if a prehistoric archaeological deposit is present so only construction monitoring is recommended.
4. *Trace amount of disturbed shellfish* encountered in artificial fill are considered non-archaeological. Shellfish is common in this area from bay dredging sediments used for artificial fill and cleaning out power plant water intake pipes, and is also dropped by birds as was observed during field investigations. This shellfish cannot be demonstrated to be cultural in origin and does not warrant either mitigation or archaeological construction monitoring. The exception is near site SLO-239 where monitoring is recommended.
5. *Refusal at shallow depth* by hand augers when encountering an underground utility so it is unknown what underlies the ADI. Recommendations for treatment are provided based on surrounding findings.
6. *Negative* findings do not require further treatment (archaeological monitoring or mitigation).

#### CA-SLO-16 (STATION 27 TO 37)

A complex archaeological deposit was identified between Stations 27 and 37 associated with site SLO-16. In Hand Auger (HA)2 and HA3, a dense, stratified shell midden containing a variety of materials was identified at depths of 1.5 to 2.3 meters (4.9–7.5 feet) and again at 2.7 to 3.1 meters (8.9 to 10 feet; Table 6). However, in HA1 and C50 only the upper midden was encountered. Paired samples of wood charcoal and shellfish from both the upper and lower shell midden in HA3 was radiocarbon-dated. The upper midden (3Ab horizon) returned dates of 1920 and 2040 cal BP, while the lower midden yielded dates of 2010 and 2430 cal BP. In both paired samples the wood charcoal was older than the shell, likely reflecting inaccuracies in the Delta R correction factor and/or the “old wood” effect. Regardless, it appears that the upper and lower midden are separated in time by only a few hundred years during the Middle Period (2600–1000 cal BP).

The northern boundary of the intact site is unknown as HA4 and HA5 encountered refusal at a shallow depth when an underground utility was encountered and only trace amounts of disturbed shellfish were recovered from HA6. The southern boundary of this site in the ADI is better defined. In C49 disturbed site deposits overlying a storm drain was identified and C20 was negative. On either side

Table 6. Testing Summary by Project Component.

PROJECT COMPONENT/ PIPELINE STATIONING	ARCHAEOLOGICAL SENSITIVITY			TESTED?	RESULTS	RECOMMENDED ARCHAEOLOGICAL TREATMENT
	BURIED SITE SENSITIVITY	PREVIOUSLY RECORDED SITES (CA-SLO-)				
<i>CONVEYANCE PIPELINE</i>						
10 to 22	Highest, High	-		C1, C8-C19	Negative	None
22 to 24	High	-		C5-C7	Very thin layer of dense redeposited shell midden (0.2 meters [0.5 feet] below surface) in C5 and C7; potential for human bone	Not eligible for National Register due to lack of integrity. Archaeological construction monitoring for human remains
24 to 27	High to Moderate	-		C2-C4	Negative	None
27 to 37	Highest to Moderate	16		HA1-6, C20-21, C45-50	Intact site deposit in HA1-3, C21, C47-48 and C50; disturbed site deposit in C46 and C49	Eligible for National Register. Adverse effects from project construction to be mitigated through extensive data recovery excavations.
37 to 53	Highest, High	-		C28-45, C55-56	Trace amounts of disturbed shellfish recovered in Cores 30, 31, 45, and 56. Artificial fill ranged from 1.5 to 3 meters (5 to 10 feet) thick	None
53 to 61	Lowest	239		C26-27, C51-54	Disturbed site deposit in C26-27, likely originating from SLO-239 on higher terrace to south. Trace amount of disturbed shellfish in C51-54	Not eligible for National Register due to lack of integrity. Archaeological construction monitoring for human remains
61 to 138	Low, Lowest	-		No - no nearby site, no buried sensitivity	-	None
138 to 143	Lowest	2022		HA7-19	Negative	None
143 to 147	Lowest	-		No - no nearby site, no buried sensitivity	-	None
147 to 150	Lowest	2232H		HA20-22	Possible sparse intact site deposit in HA20	Not eligible for National Register. Archaeological construction monitoring
150 to 161	Low, Lowest	-		No - no nearby site, no buried sensitivity	-	None
Pump Station A	High	-		C22-23	Negative	None
Pump Station B	Lowest	239		C24-25	Negative; encountered ancient landform	None
Replacement Portion of LS2 Force Main	Lowest	239		No, due to existing pipeline	-	Archaeological construction monitoring due to proximity to SLO-239
New addition to LS-2 Force Main	Highest, High	239		Trenching or coring after property acquired by City	-	Likely will require archaeological construction monitoring (if disturbed site present) and/or mitigation (if intact site is present)

Note: C - Core; HA - Hand Auger.

Table 7. Summary of Positive Findings.

CORE (C)/ HAND AUGER (HA)	SOIL HORIZON	DEPTH		CONTEXT	CONSTITUENTS
		METERS	FEET		
C5	Ap	0.2	0.5	Disturbed	Flake stone debitage (n=1), shellfish (7.3g)
C7	Ap	0.2	0.5	Disturbed	Flake stone debitage (n=1), shellfish (3.3g)
C21.1	Ap	0–1.2	0–4	Disturbed	Shellfish (6.1g)
-	3Ab	2.4–2.9	8–9.5	Very Sparse Intact	Monterey chert core (n=1)
C26	Ap	0–1.5	0–5	Disturbed	Shellfish (11.2g)
C27	Ap1	0–1.5	0–5	Disturbed	Shellfish (3.1g)
-	Ap2	1.5–2.1	5–7	Disturbed	Flaked stone debitage (n=1), 2 faunal bone fragments (n=2; 0.1g), shellfish (15.1g)
C46	Ap	0–2.4	0–8	Disturbed	Shellfish (10.7g)
C47.1	Ap	0–1.4	0–4.5	Disturbed	Shellfish (38.1g)
-	2Ab	1.4–2.1	4.5–7	Very Sparse Intact	Shellfish (12.1g)
C48	Ap1	0–0.6	0–2	Disturbed	Shellfish (1.9g)
-	Ap2	0.6–1.4	2–4.5	Disturbed	Faunal bone fragment (n=1; 0.2g); shellfish (20.8g)
-	2Ab	1.4–1.8	4.5–6	Very Sparse Intact	Shellfish (0.6g)
C49	Ap2	0.6–3.0	2–10	Disturbed	Flaked stone debitage (n=4), faunal bone (n=2; 0.1g), fishbone (n=1), shellfish (14.7g)
C50	2Ab2	2–2.4	6.5–8	Intact	Faunal bone fragments (n=2, 0.1g), shellfish (0.5g)
HA1	2Ab	2.0–2.5	6.6–8.2	Intact	Flaked stone debitage (n=15), faunal bone (n=23, 0.6g), fishbone (n=15, 0.6g), shellfish (12.3g)
HA2	3Ab	1.5–2.2	4.9–7.1	Intact	Flaked stone debitage (n=45), faunal bone (n=12, 3.4g), fishbone (n=129, 1.1g), shellfish (231.2g)
-	4AC	2.7–3.1	8.9–10	Intact	Flaked stone debitage (n=2), faunal bone (n=32, 0.8g), fishbone (n=74, 0.5g), shellfish (53g)
HA3	3Ab	1.5–2.3	4.9–7.5	Intact	Flaked stone debitage (n=13), faunal bone (n=10, 0.9g), fishbone (n=38, 0.4g), shellfish (32.1g)
-	4AC	2.7–3.1	8.9–10	Intact	Flaked stone debitage (n=4), faunal bone (n=104, 14.9g), fishbone (n=3, 0.2g), shellfish (3.7g)
HA20	Ap	0–0.9	0–3	Disturbed	Shellfish (0.4g)
-	A	0.9–1.2	3–4	Very Sparse Intact(?)	Faunal bone fragment (n=1; 0.6g); shellfish (1.2g)

Note: Trace disturbed shellfish not listed, nor are findings from cores with poor recovery (i.e., C21 and C47).

of Morro Creek, disturbed site deposits overlying a very sparse intact site were documented in C21, C47 and C48. This was followed by disturbed site deposits in C46 and trace amounts of disturbed shellfish in C45. Notably, the extent of positive findings to the south roughly matches the currently delineated southern edge of site SLO-16 to the west (see Figure 5).

### CA-SLO-16 MITIGATION PLAN

Mitigation of project impacts to site SLO-16 under both Section 106 of the National Historic Preservation Act and the California Environmental Quality Act will be required as the site can be considered significant and avoidance not feasible. A mix of intact and disturbed site deposits was identified in the ADI. All work will be conducted in accordance with the project's archaeological treatment plan (Kaijankoski et al. 2019) and needs to be approved by Caltrans since this portion of the ADI lies within their right-of-way immediately adjacent to the tested area. A Native American monitor will be present to observe all archaeological excavations.

Methods and extent of excavation will ultimately be determined once the deposits are exposed during construction excavation and initial hand excavations. Given access constraints (depth of site,

shoring requirements, Caltrans right-of-way, bike path, and underground utilities) mitigation likely cannot be completed prior to construction. Therefore, mitigation will require extensive support and collaboration from the project construction contractor who will need to secure the area and provide mechanical excavation equipment, operators, and support equipment (e.g., shoring, dewatering, traffic control).

The focus of archaeological mitigation will be on intact deposits and potential temporal components, with extensive exposures using hand tools and processing archaeological deposits through 1/8-inch screens. We need to obtain a large sample of the archaeological deposit and determine the presence/absence of human remains. To ensure that no human remains are present within the pipeline trench, slow, careful mechanical clearing with an excavator outfitted with a flat blade under the direction of the project archaeologist will be done through the entire cultural deposit within the ADI. A location for deep reburial of human remains that may be encountered in the ADI should be considered prior to construction, although ultimately the Most Likely Descendent will need to approve of this (see *Treatment of Human Remains*, page 32). Uncollected archaeological deposits will need to be permanently reburied on-site in accordance with the wishes of local Native American groups; landscaping is often a good location for this. Lastly, portions of the site not impacted by the project should be designated Environmentally Sensitive Areas to be avoided by the project and be protected during construction with orange fencing or other measures. This includes the southwest corner of the pedestrian bridge where a human grave was reportedly reburied during bike path construction.

An estimated timeline for mitigation is provided in Table 8. However, once a project contractor has been appointed it is recommended that a meeting be held between the contractor, Caltrans, City representatives, consulting Native Americans, and Far Western archaeologists to discuss the archaeological findings, the nature and sequence of construction activities in this area, and proposed approach to mitigation. A short mitigation work plan can then be prepared and submitted to all interested parties for review.

Table 8. Site CA-SLO-16 Mitigation Summary.

FIGURE 5 CIRCLE COLOR	CORE (C) NO. HAND AUGER (HA) NO.	ARCHAEOLOGICAL CONTEXT	RECOMMENDED MITIGATION	ESTIMATED DURATION
Green	C50, HA1, 2, 3	Intact site deposit	Extensive mitigation with hand excavation; mechanically clear remaining soil in trench by slowly scraping with flat-bladed excavator searching for human remains.	~30 days
Yellow	C21, 47, 48	Disturbed site deposit over sparse intact site	Hand excavate units to determine extent and condition of deposit; sample intact site deposit. If potential for human remains, slowly scrape with flat-bladed backhoe.	~14 days
Red	C49	Disturbed site deposit	Test units or trenches to determine presence of human remains	~5 days
Blue	HA4, 5	Unknown if site is present in this area	Test excavations for presence/absence followed by hand excavated units and mechanical clearing as necessary	~14 days
Gray	C20	Negative	Is surrounded by positive results so will be part of the yellow/red testing	-

### CA-SLO-239 (STATION 53 TO 61)

Two cores (C26 and C27) drilled in the northwest portion of this pipeline segment both contained a small amount of disturbed archaeological deposits (shellfish, faunal bone, flaked stone debitage). Due to lack of integrity this deposit is recommended not eligible for the National Register. This material almost certainly originated from site SLO-239 located on the topographically higher terrace to the south (see Figure 4). Furthermore, the southeastern extent of these disturbed site deposits are unknown. Additionally, adjacent

Cores 51-54 contained trace amounts of disturbed shellfish. Therefore archaeological construction monitoring is recommended along the boundary of site SLO-239 between stations 53 to 61.

### **Additional Testing Required**

A recent addition to the LS-2 force main measures approximately 300 meters in length near the northwestern boundary of SLO-239. The area also has an elevated buried site sensitivity. This project component could not be tested as it lies on private property with no permission to access. The City is currently acquiring the property through eminent domain. In accordance with the Programmatic Agreement (Stipulation III.A.5), the component will be tested once access is secured, likely immediately prior to construction. This would involve approximately 12 trenches or cores spaced at 25-meter intervals over a two day period. If disturbed deposits associated with SLO-239 are identified, monitoring for human remains will be recommended and an addendum to this test report prepared. If intact archaeological deposits are identified, they will be immediately evaluated and mitigated in accordance with the Treatment Plan and documented in the final report.

### **CA-SLO-2022 (STATION 138 TO 143)**

Testing was conducted between Stations 138 and 143 due to the presence of site SLO-2022 that is visible in the roadcut immediately northeast of the ADI. Quintana Road is cut into the hillside that this site is situated upon as it descends in elevation to South Bay Blvd. Additionally, this area has the lowest buried site sensitivity due to the ancient age of the surface landform. Thirteen hand augers (HA7–19) were excavated split evenly between each side of the road adjacent to the ADI. Results were all negative despite processing samples from most augers (see Table 3). Therefore, no archaeological construction monitoring or mitigation is recommended for this segment. However, it is recommended that site SLO-2022 be designated an Environmentally Sensitive Area and be protected during construction with orange fencing or other measures.

### **CA-SLO-2232H (Station 147 TO 150)**

Stations 147 to 150 are adjacent to site SLO-2232H, where a prehistoric component was reported to have been recently discovered during construction of a housing complex to the south. After testing for this project was complete, communications with the archaeologist overseeing the housing complex work revealed that the prehistoric deposit (including human remains) encountered is in fact associated with site SLO-1183 and located more than 100 meters (330 feet) south of the ADI.

Access constraints (numerous underground utilities) only allowed for three hand augers (HA20–22) to be excavated along the south side of the road. HA21 and HA22 were negative, while a possible sparse prehistoric site deposit was identified in HA20. This consisted of shellfish (0.4g) in a disturbed context at a depth of 0.0–0.9 meters (0–3 feet) below surface. This was underlain by presumably intact soil extending to the base of the auger at 1.2 meter (4 feet) containing a small amount of shellfish (1.2 grams) and a single piece of faunal bone. Two pieces of shellfish were submitted for radiocarbon dating and returned dates of 3525 and 5540 cal BP and are thus prehistoric in age. Notably, two pieces of radiocarbon-dated shellfish from site SLO-2022 just up the hill returned similar dates of 3825 and 4745 cal BP. As such, it is possible that the materials recovered in HA20 originated from site SLO-2022 and were pushed downhill when Quintana Road was cut through the site. This very sparse deposit of uncertain integrity is recommended not eligible for the National Register. However, archaeological construction monitoring for human remains is warranted for this pipeline segment.

## V. ARCHAEOLOGICAL MONITORING PLAN

This archaeological monitoring program is designed to meet mitigation measures CUL-5, -6, -7, -8, -9, and -14 in the Environmental Impact Report (ESA 2018) for Construction Phase 2: CUL-5, Development of a Cultural Resources Monitoring and Mitigation Program; CUL-6, Construction Worker Cultural Resources Sensitivity Training; CUL-7, Archaeological Resources Monitoring; CUL-8, Native American Monitoring; CUL-9, Inadvertent Discovery; and CUL-14, Inadvertent Discovery of Human Remains.

Based on results of extensive testing, archaeological construction monitoring is only recommended in select pipeline segments (see Table 4). However, it is assumed that the local Native American community will request to monitor all Phase 2 ground disturbance. Therefore, when an archaeological monitor is not present it is recommended that a local archaeologist be on call to assess any discovery made by the Native American monitor.

### DETERMINING ACTIVITIES REQUIRING MONITORING

Portions of the WRF Project Construction Phase 2 conveyance pipelines are sensitive for intact archaeological deposits and will be mitigated during construction and all trench excavations will be cleared, leaving only pipe construction and backfilling which would not require monitoring (see Table 7). Other segments have sparse, limited, or disturbed prehistoric deposits warranting archaeological construction monitoring due to the potential for human remains. Pipeline construction in these areas will entail open trench excavation to a maximum depth of 3.0 meters (10.0 feet) below surface. Portions of the conveyance pipelines and Pump Station B that had negative test results do not warrant archaeological construction monitoring (see Table 4). Archaeological construction monitoring may be necessary at Pump Station A depending on deeper coring results. Lastly, archaeological construction monitoring is recommended for replacement of the existing LS2 Force Main given the proximity to site SLO-239.

### CONSTRUCTION CREW ARCHAEOLOGICAL AWARENESS TRAINING

Prior to any soil-disturbing construction activities, the archeological monitor will conduct a five- to 10-minute oral archaeological awareness training for the construction crew, including all equipment operators and personnel involved in the mass excavation activities. The Native American monitor will also likely offer comments on their concerns. Given the nature of the mass excavation activities, an equipment operator may be the first individual to identify potential archaeological material should it be encountered, particularly if an archaeological monitor is not present. Archaeological sensitivity training is a key element of the archaeological monitoring program.

The archaeological sensitivity training will include details about the archaeological sensitivity of the general area, legal requirements related to protecting cultural resources, review of the kinds and types of artifacts and features that may be encountered, and information about what should occur if construction activities unearth archaeological materials. Pamphlets with images of various local archaeological artifacts and midden soils, along with brief descriptions of their cultural and legal significance, will be given to all construction crew members as part of awareness training. Crew will be provided with contact information and appropriate protocol in the event of the discovery of an archeological resource (Appendix D). In general, for any monitoring-based mitigation program to be effective, all on-site construction personnel shall be required to complete training in artifact and archaeological feature identification. The training presentation must be simple and accessible, as well as universal and mandatory. This training will be repeated and/or revised as needed (e.g., new construction phases, new workers). The Construction Manager will be responsible for ensuring that any new workers receive the training.

## ARCHAEOLOGICAL MONITORING GUIDELINES

The archaeological monitoring program will follow these general principles:

1. The archaeological Principal Investigator and archaeological monitor(s) will meet the Secretary of Interior's professional qualification standards for prehistoric archeology.
2. An Archaeological monitor will be present for all ground-disturbing activities in the pipeline segments and project components where archaeological construction monitoring is recommended in Table 6.
3. It is assumed that the local Native American community will request to monitor all Construction Phase 2 ground disturbance. In areas where archaeological construction monitoring is not recommended, a local archaeologist will be on call to quickly assess any discovery made by the Native American monitor.
4. The need for more than one archaeological and Native American monitors may be necessary if work is being conducted in a variety of locations.
5. The City Project Manager will provide the construction schedule (location, day, time, and nature of work) to the archaeological and Native American monitors within a reasonable time frame.
6. The archaeological monitor(s) will have the experience and demonstrated ability to recognize all types of archaeological materials and features, including human remains, which may be discovered. In addition, the archaeologist must be able to perform basic archaeological "triage"—distinguish between an association of materials that may constitute an archaeological site and therefore merit further consideration, versus displaced or single items that can be merely noted.
7. Native American monitors should be from groups listed on the Native American Heritage Commission list of interested individuals, be knowledgeable of the project, have prior experience monitoring construction activities, and be familiar with cultural materials commonly found in the Morro Bay region.
8. Should the need arise to record or collect samples and artifacts/ecofacts for assessment of a monitoring discovery, the archaeological monitor shall immediately consult with the archaeological Principal Investigator.
9. The archaeological and Native American monitors will document monitoring activities in a daily log including the location and activities monitored, as well as any discoveries and actions taken.
10. The archaeological monitor will take periodic digital photographs of the project work to be included in the daily log. Should archaeological materials or features be encountered, they will be photographed and recorded.

## ARCHAEOLOGICAL DISCOVERY

If previously unidentified archaeological materials are uncovered or any potential human remains identified during project implementation, all soil disturbing activities within 100 feet of the find shall halt. The archaeological monitor will be empowered to temporarily redirect construction crews and heavy equipment until the resource is evaluated. The archaeological monitor will immediately contact the archaeological Principal Investigator, who will in turn immediately contact the City Project Manager if the resource appears to be potentially significant. If the discovery is made on portions of the project on state owned lands, the Caltrans project archaeologist will be alerted immediately. The Principal Investigator will

coordinate with the City Project Manager to make a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological resource. Should construction unexpectedly encounter human remains, Health and Safety Code Section 7050.5 should be followed, and the City Project Manager and Caltrans project archaeologist (if on state owned lands) shall be consulted regarding appropriate treatment of the human remains under CEQA, as further discussed below.

If no archaeological monitor is present at the time of discovery, the Construction Manager will immediately contact the City Project Manager and the archaeological Principal Investigator, and direct the cessation of all soil disturbing activities within 100 feet of the discovery and protect the find from further disturbance. A Secretary of the Interior-qualified archaeologist will inspect the find within 24 hours of discovery. The archaeological Principal Investigator will determine whether a significant archeological resource is present and whether the resource will be adversely affected by the project.

Should the archaeological Principal Investigator determine that the project could damage a potentially significant archaeological resource (as defined pursuant to the CEQA Guidelines), and protection in-place is not feasible, the City Project Manager will be consulted in the development of a data recovery plan that considers the nature and potential significance of the find following the Archaeological Research Design and Treatment Plan for the project (Kajankoski et al. 2019). In general, data recovery will emphasize expanding the area of exposure for identified resources, both horizontally and vertically as necessary, to identify temporally discrete components. An archeological data recovery program required by this measure could suspend construction of the project for up to four weeks. At the direction of the City Project Manager, suspension of construction can be extended beyond four weeks only if such a suspension is the only feasible means to reduce to a less-than-significant level potential effects on a significant archeological resource as defined in CEQA Guidelines Sect. 15064.5 (a) and (c).

### **Treatment of Human Remains**

If human remains are found at any time during the project, they will be treated with the utmost respect and dignity. The remains will be uncovered sufficiently to identify them as human. If they are so identified they will be secured and protected by stabilizing or covering them. It should be noted that it will often be necessary for the archeological monitor to conduct minimal hand excavation to determine if the remains are single or displaced items or part of an intact burial before securing the area of discovery.

With the discovery of human remains, CEQA Guidelines Section 15064.5, and all provisions of California Health and Safety Code Sections 7054 and 7050.5 and Public Resources Code Sections 5097.9 through 5097.991, as amended per Assembly Bill 2641, will be followed. Either the archaeological Principal Investigator, City Project Manager, or Caltrans archaeologist (if on state owned property) will contact the San Luis Obispo County Coroner immediately. All construction work within 100 feet of the remains will be halted until further notice.

If the remains are believed to be Native American, the Coroner must contact the Native American Heritage Commission (Commission) within 24 hours. The Commission must then designate a Most Likely Descendant (MLD). The designated descendant will meet with the City's and Caltrans (if necessary) representatives to inspect the remains and make recommendations on the treatment of the remains and associated funerary objects. Until that time, the remains will be left in place and adequately secured.

By law (Public Resources Code Section 5097.98), the Commission must "immediately" notify an MLD following contact by the Coroner of the discovery of Native American human remains. Failure of the City's and/or Caltrans representative to receive recommendations regarding the treatment of the human remains within 72 hours of the Coroner notification of the Commission shall require the City and/or Caltrans to rebury the Native American human remains in accordance with the requirements of Public Resources Code Section 5097.98. The Commission, however, is a busy government agency fielding calls from the entire state during a Monday through

Friday work week. Therefore, if human remains are discovered on a Friday or holiday, the City should expect the MLD notification process to take longer than 72 hours. If an MLD makes recommendations regarding the human remains, the City and/or Caltrans representatives, archaeological Principal Investigator, and MLD shall have up to six days after the discovery to make all reasonable efforts to develop an agreement regarding the human remains. Should the City and/or Caltrans fail to receive recommendations regarding the treatment of the human remains within 72 hours of the Coroner notification of the Commission or should the City and/or Caltrans choose to reject the recommendations of the MLD, then the following protocols may be followed regarding the treatment of human remains within the project area. If the human remains are encountered in an area where, through project redesign or some other means, further disturbance can be avoided, the remains will be preserved in place.

If the human remains cannot be avoided or protected in place, qualified archaeologists, including an osteologist, will expose and remove them in a manner consistent with professional archaeological methods. A consulting Native American will be provided the opportunity to monitor this activity if requested by the MLD. This work will be carried out in a professional manner and the human remains will be treated with dignity and respect. Initially the human remains will be exposed, mapped, and, if allowed by the MLD, photo documented. This will include determining whether the remains represent one or a few displaced human bone(s) or an articulated human burial. The human remains will be described in the field by an osteologist using standard, non-destructive techniques, including measurement; observation of age, gender, health, and posture; and hand illustration. Destructive analysis (e.g., radiocarbon dating, isotope analysis, or DNA extraction) will not be conducted unless there is permission from the MLD.

If the human remains represent a burial, then cultural material likely intentionally placed with the interment will be designated associated funerary objects (this assessment will be based on the specifics of the archaeological context in question and previously documented regional prehistoric patterns, in consultation with the MLD). If it is uncertain whether an object is associated with the burial (as can be the case with burials within prehistoric midden deposits), then a conservative approach will be taken so that only likely or clearly associated remains will be designated as funerary objects in consultation with the MLD. Associated funerary objects (i.e., which items were interred with the individual) will be described, measured, and illustrated, but additional destructive analyses will not occur without permission of the MLD. Once the human remains and associated funerary objects have been removed from the project area, they will be housed temporarily in a pre-determined, safe, and secure storage location until they can be reburied in accordance with the wishes of the MLD and requirements of Public Resources Code Section 5097.98.

## **NATIVE AMERICAN COORDINATION**

The project area lies within lands claimed by both Northern Chumash and Salinan groups. Native American consultation was conducted as part of the Archaeological Survey Report (Kaijankoski et al. 2019). Seventeen Native American individuals identified by the Commission over the past four years were contacted. While many individuals and/or groups have expressed interest in the project, three have specifically asked to serve as Native American monitors during construction—Mona Tucker of the *yak tityu* Northern Chumash Tribe, Patti Dunton (responding for Fredrick Segobia) of the Salinan Tribe of Monterey and San Luis Obispo Counties, and Fred Collins of the Northern Chumash Tribal Council.

The City made the decision to appoint Mr. Collins as Native American monitor for Construction Phase 1 (the new WRF). The City has decided to rotate monitoring activities equally between the *yak tityu* Northern Chumash Tribe, Salinan Tribe of Monterey and San Luis Obispo Counties, and the Northern Chumash Tribal Council for Construction Phase 2. The archaeological Principal Investigator and archaeological monitor(s) will coordinate the activities of the Native American monitors.

As with archaeological monitors (see *Archaeological Monitoring Guidelines*, page 31, item 9), Native American monitors will be required to fill out a daily log. The archaeological and Native American monitor daily logs will be shared with all three Native American groups participating on Construction Phase 2. The Native American monitor daily logs will include the name and tribal affiliation of the monitor and be included in the monitoring report.

## **HEALTH, SAFETY, AND SECURITY**

The archaeological Principal Investigator, archaeological monitor, and Native American monitor will work under the general construction contractor's health and safety plan (HSP), with particular attention paid to COVID-19 guidelines. This will include following whatever appropriate hazard mitigation procedures (for example, appropriate personal protection equipment and air monitoring) are required for fieldwork. If deemed necessary, a separate HSP will be prepared prior to fieldwork. The HSP will include information concerning the specific risks posed by the project, and the specific measures to be taken to avoid personal injury. If the archaeological Principal Investigator believes that unexpected hazards exist on a site, he or she has the authority to discontinue all archaeological activities until it can be demonstrated that no hazards exist.

Should a discovery be made, there is a concern for site security and public safety as archaeological excavations often generate considerable public interest. Specially, there may be a need for additional security measures including site fencing, trench plates, and/or a security guard to be on-site during non-excavation hours to avoid destruction and/or theft of archaeological material.

## **REPORTING**

The archaeological Principal Investigator will submit weekly status reports to the City detailing monitoring activities and any discoveries. The weekly status reports will include both archaeological and Native American daily monitoring logs, photos, and maps (as appropriate).

If no archaeological materials are identified during construction monitoring, an Archaeological Resources Monitoring Report will be prepared and submitted to the City for review within 30 days of completion of monitoring activities. The final Monitoring Report will be submitted to both the City and to the Central Coast Information Center at the University of California, Santa Barbara.

If archaeological remains are identified during monitoring and cannot be avoided, they will be evaluated and mitigated (if warranted) in accordance with the Archaeological Research Design and Treatment Plan (Kaijankoski et al. 2019:Appendix E).

## **SCHEDULING**

An archaeological monitor and Native American monitor shall be present according to a schedule agreed upon by the archaeological Principal Investigator and City Project Manager prior to the beginning of construction. The archaeological Principal Investigator will review all anticipated soil disturbing activities with the construction contractor to determine which could potentially expose archaeological deposits and when these activities will be taking place. A tentative schedule will be prepared for monitoring, with the understanding that it is flexible depending on construction progress and findings. Archaeological sensitivity training for the construction crew will take place immediately prior to construction and will be given to any incoming construction workers.

If there are no findings, an Archaeological Resources Monitoring Report for Construction Phase 2 will be prepared and submitted to the City for review within 30 days of completion of monitoring activities. If any archaeological evaluations and/or data recovery investigations are conducted for the project, they will be included in a project-wide technical report for Construction Phases 1, 2, and 3 and submitted to the City within 12 months of completion of all fieldwork.

## VI. REFERENCES CITED

Birkeland, Peter W., Michael N. Machette, and Kathleen M. Haller

- 1991 Soils as a Tool for Applied Quaternary Geology. *Utah Geological and Mineral Survey Miscellaneous Publication 91-3*, Salt Lake City, Utah.

Clemmer, John

- 1962 *Archaeological Notes on a Chumash House Floor at Morro Bay*. On file, Central Coast Information Center, University of California, Santa Barbara.

Environmental Science Associates (ESA)

- 2018 *Morro Bay Water Reclamation Facility Final Environmental Impact Report*. June 2018. Environmental Science Associates, Los Angeles, California. Prepared for the City of Morro Bay.

Greenwood, Roberta S.

- 1973 *Archaeological Investigation Area of Fuel Oil Tank No. 6 Morro Bay Power Plant*. Prepared for Pacific Gas and Electric Company. On file, Central Coast Information Center, University of California, Santa Barbara.

Holliday, Vance T.

- 1990 Pedology in Archaeology. In *Archaeological Geology of North America*, edited by Norman P. Lasca and Jack Donahue, pp. 525–540. Centennial Special Volume 4. Geological Society of America, Boulder, Colorado.

Kajjankoski, Philip, Laurel Engbring, and Patricia Mikkelsen

- 2019 *Archaeological Survey Report, Research Design, and Treatment Plan for the Morro Bay Water Reclamation Facility Project, San Luis Obispo County, California*. Far Western Anthropological Research Group, Inc., Davis. Prepared for the City of Morro Bay.

Lee, Sean

- 2006 *Extended Phase I Archaeological Investigations for the Black Hills Villas Project in the City of Morro Bay, San Luis Obispo County, California*. Prepared for Colmer Construction Company, Calabasas, California. Central Coast Archaeology, Cayucos, California.

Nicchitta, Sarah, and Jennifer Farquhar

- 2015 *Phase II Archaeological Evaluation of CA-SLO-239 for the Proposed Development of 1147 and 1149 West Avenue*. Albion Environmental, Inc. Submitted to City of Morro Bay, Morro Bay, California.

Parker, John

- 2000 *Cultural Resources Review of Damage Caused to Prehistoric Site CA-SLO-16 by the City of Morro Bay*. Submitted to the City of Morro Bay, Morro Bay, California. On file, Central Coast Information Center, University of California, Santa Barbara.
- 2001 Site Record Update, CA-SLO-2124. On file, Central Coast Information Center, University of California, Santa Barbara.

Parker, John *continued*

- 2002 *Cultural Resource Evaluation of Lila Keiser Park, City of Morro Bay, Site CA-SLO-16*. Submitted to the City of Morro Bay, Morro Bay, California. On file, Central Coast Information Center, University of California, Santa Barbara.
- 2003 *Archaeological Monitoring and Mitigation Report for Drilling of Light Pole Anchors at the Lila Keiser Park East Ball Field, Archaeological Site CA-SLO-16*. Submitted to City of Morro Bay, Morro Bay, California. On file, Central Coast Information Center, University of California, Santa Barbara.

Reimer, Paula, Edouard Bard, Alex Bayliss, Warren Beck, Paul Blackwell, Christopher Ramsey, Caitlin Buck, Hai Cheng, Lawrence Edwards, Michael Friedrich, Pieter Grootes, Thomas Guilderson, Haflidi Haflidason, Irka Hajdas, Christine Hatté, Timothy Heaton, Dirk Hoffmann, Alan Hogg, Konrad Hughen, Felix Kaiser, Bernd Kromer, Sturt Manning, Mu Niu, Ron Reimer, David Richards, Marian Scott, John Southon, Richard Staff, Christian Turney, and Johannes van der Plicht

- 2013 IntCal13 and Marine13 Radiocarbon Age Calibration Curves 0–50,000 Years cal BP. *Radiocarbon* 55(4):1869–1887.

Retallack, Greg J.

- 1988 Field Recognition of Paleosols, Special Paper 216. In *Paleosols and Weathering through Geologic Time: Principles and Applications*, edited by Juergen Reinhardt and Wayne R. Sigleo. Geological Society of America, Boulder, Colorado.

Rose, Ron

- 2020 Personal communication regarding recent archaeological excavations at site CA-SLO-1183 and -2332H by Cultural Resource Management Services, July 24, 2020.

Ruby, Allika

- 2017 *First Supplemental Archaeological Survey Report for the South Bay Boulevard Morro Bay Water Reclamation Facility Project, San Luis Obispo County, California*. Far Western Anthropological Research Group, Inc., Davis, California.

Ruby, Allika, Nathan Stevens, and Patricia Mikkelsen

- 2016 *Archaeological Survey Report for the Morro Bay New Water Reclamation Facility Project, San Luis Obispo County, California*. Far Western Anthropological Research Group, Inc., Davis, California. Submitted to City of Morro Bay, Morro Bay, California.

Schoeneberger, P. J., D. A. Wysocki, E. C. Benham, and W. D. Broderson

- 2012 *Field Book for Describing and Sampling Soils*. National Soil Survey Center, Natural Resources Conservation Service. US Department of Agriculture, Lincoln, Nebraska.

Singer, Clay

- 1991 *Cultural Resources Survey and Impact Assessment for the City of San Luis Obispo Desalination Project at Morro Bay, San Luis Obispo County, California*. On file, Central Coast Information Center, University of California, Santa Barbara.

Singer, Clay *continued*

- 2003 *Archaeological Testing at the Morro Bay Chevron Station, 1798 Main Street in the City of Morro Bay, San Luis Obispo County, California*. C. A. Singer & Associates, Inc. On file, Central Coast Information Center, University of California, Santa Barbara.

Telford, R., E. Heegaard, and H. Birks

- 2004 The Intercept is a Poor Estimate of a Calibrated Radiocarbon Age. *The Holocene* 14:296–298.

US Department of Agriculture Soil Survey Staff (USDA Soil Survey Staff)

- 2014 *Web Soil Survey*. Natural Resources Conservation Service, United States Department of Agriculture. <http://websoilsurvey.nrcs.usda.gov>, accessed September 2018.

Waters, Michael R.

- 1992 *Principles of Geoarchaeology: A North American Perspective*. The University of Arizona Press, Tucson, Arizona.

**APPENDIX A**

**CORE AND AUGER SOIL DESCRIPTIONS**

## Appendix A: Core Descriptions

### GLOSSARY OF STRATA AND SOIL TERMS AND KEY FOR DESCRIPTIONS

**STRATUM.** A distinct deposit or unrelated layer identified on the basis of physical composition, superposition, relative soil development, and/or textural transitions (i.e., upward-fining sequences) characteristic of discrete depositional cycles. Strata are assigned a Roman numeral beginning with the oldest or lowermost stratum (e.g., I - bedrock) and ending with the youngest or uppermost stratum (e.g., IV – modern soil).

**SOIL HORIZON.** A layer of soil, approximately parallel to the surface, which has distinct characteristics produced by soil-forming processes. These are the major soil horizons:

---

O horizon	The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.
A horizon	The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).
E horizon	This eluvial horizon is light in color, lying beneath the A horizon and above the B horizon. It is made up mostly of sand and silt, having lost most of its clay and iron oxides through reduction, chelation, and translocation.
B horizon	The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these.
C horizon	The relatively unweathered material immediately beneath the solum. Included are sediment, saprolite, organic matter, and bedrock excavatable with a spade. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a number precedes the letter C.
R layer	Consolidated rock not excavatable with a spade. It may contain a few cracks filled with roots or clay or oxides. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon. Major horizons may be further distinguished by applying prefix Arabic numbers to designate differences in parent materials as they are encountered (e.g., 2B, 2BC, 3C) or by applying suffix numerals to designate minor changes (e.g., B1, B2). Thereafter, these lower-case letters may be appended (e.g., 2B2tkb): a Highly decomposed organic material This symbol is used with O to indicate the most highly decomposed organic materials, which have a fiber content of less than 17 percent (by volume) after rubbing.
b	Buried genetic horizon. This symbol is used in mineral soils to indicate identifiable buried horizons with major genetic features that were developed before burial. Genetic horizons may or may not have formed in the overlying material, which may be either like or unlike the assumed parent material of the buried soil. This symbol is not used in organic soils, nor is it used to separate an organic layer from a mineral layer.
c	Concretions or nodules. This symbol indicates a significant accumulation of concretions or nodules. Cementation is required. The cementing agent commonly is iron, aluminum, manganese, or titanium. It cannot be silica, dolomite, calcite, or more soluble salts.
d	Physical root restriction. This symbol indicates noncemented, root-restricting layers in naturally occurring or human-made sediments or materials. Examples are dense basal till, plowpans, and other mechanically compacted zones.
e	Organic material of intermediate decomposition. This symbol is used with O to indicate organic materials of intermediate decomposition. The fiber content of these materials is 17 to 40 percent (by volume) after rubbing.
g	Strong gleying. This symbol indicates either that iron has been reduced and removed during soil formation or that saturation with stagnant water has preserved it in a reduced state. Most of the affected layers have chroma of 2 or less, and many have redox concentrations. The low chroma can represent either the color of reduced iron or the color of uncoated sand and silt particles from which iron has been removed. The symbol g is not used for materials of low chroma that have no history of wetness, such as some shales or E horizons. If g is used with B, pedogenic change in addition to gleying is implied. If no other pedogenic change besides gleying has taken place, the horizon is designated Cg.
h	Illuvial accumulation of organic matter. This symbol is used with B to indicate the accumulation of illuvial, amorphous, dispersible complexes of organic matter and sesquioxides if the sesquioxide component is dominated by aluminum but is present only in very small quantities. The organos sesquioxide material coats sand and silt particles. In some horizons these coatings have coalesced, filled pores, and cemented the horizon. The symbol h is also used in combination with s as "Bhs" if the amount of the sesquioxide component is significant but the color value and chroma, moist, of the horizon are 3 or less.
i	Slightly decomposed organic material. This symbol is used with O to indicate the least decomposed of the organic materials. The fiber content of these materials is 40 percent or more (by volume) after rubbing.

## Appendix A: Core Descriptions

k	Accumulation of carbonates. This symbol indicates an accumulation of alkaline earth carbonates, commonly calcium carbonate.
m	Cementation or induration. This symbol indicates continuous or nearly continuous cementation. It is used only for horizons that are more than 90 percent cemented, although they may be fractured. The cemented layer is physically root restrictive. The predominant cementing agent (or the two dominant cementing agents) may be indicated by adding defined letter suffixes, singly or in pairs. The horizon suffix km indicates cementation by carbonates; qm, cementation by silica; sm, cementation by iron; ym, cementation by gypsum; kqm, cementation by lime and silica; and zm, cementation by salts more soluble than gypsum.
n	Accumulation of sodium. This symbol indicates an accumulation of exchangeable sodium.
o	Residual accumulation of sesquioxides. This symbol indicates a residual accumulation of sesquioxides.
p	Tillage or other disturbance. This symbol indicates a disturbance of the surface layer by mechanical means, pasturing, or similar uses. A disturbed organic horizon is designated Op. A disturbed mineral horizon is designated Ap even though it is clearly a former E, B, or C horizon.
q	Accumulation of silica. This symbol indicates an accumulation of secondary silica.
r	Weathered or soft bedrock. This symbol is used with C to indicate cemented layers (moderately cemented or less cemented). Examples are weathered igneous rock and partly consolidated sandstone, siltstone, or shale. The excavation difficulty is low to high.
s	Illuvial accumulation of sesquioxides and organic matter. This symbol is used with B to indicate an accumulation of illuvial, amorphous, dispersible complexes of organic matter and sesquioxides if both the organic-matter and sesquioxide components are significant and if either the color value or chroma, moist, of the horizon is 4 or more. The symbol is also used in combination with h as "Bhs" if both the organic-matter and sesquioxide components are significant and if the color value and chroma, moist, are 3 or less.
ss	Presence of slickensides. Slickensides result directly from the swelling of clay minerals and shear failure, commonly at angles of 20 to 60 degrees above horizontal. They are indicators that other vertic characteristics, such as wedge-shaped peds and surface cracks, may be present.
t	Accumulation of silicate clay. This symbol indicates an accumulation of silicate clay that either has formed within a horizon and subsequently has been translocated within the horizon or has been moved into the horizon by illuviation, or both. At least some part of the horizon should show evidence of clay accumulation either as coatings on surfaces of peds or in pores, as lamellae, or as bridges between mineral grains.
u	User defined. This symbol must be defined with each use. It has been used in the past as a symbol for "unweathered," but this may be redundant for C and R horizons.
w	Development of color or structure. This symbol is used with B to indicate the development of color or structure, or both, with little or no apparent illuvial accumulation of material. It should not be used to indicate a transitional horizon.
x	Fragipan character. This symbol indicates a genetically developed layer that has a combination of firmness and brittleness and commonly a higher bulk density than the adjacent layers. Some part of the layer is physically root-restrictive.
y	Accumulation of gypsum. This symbol indicates an accumulation of gypsum.
z	Accumulation of salts more soluble than gypsum. This symbol indicates an accumulation of salts that are more soluble than gypsum.

---

**MUNSELL COLOR and COLOR NAME.** Scientific description of color determined by comparing soil to a Munsell Soil Color Chart For example, dark yellowish brown is denoted as 10YR3/4m in which the 10YR refers to the hue or proportions of yellow and red, 3 refers to value or lightness (0 is black and 10 is white), 4 refers to chroma (0 is pure black and white and 20 is the pure color), and m refers to the moist condition rather than the dry (d) condition. (Available from Macbeth Division of Kollmorgen Corp. 2441 N. Calvert St., Baltimore, MD 21218).

**STRUCTURE.** The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates, which is described on the basis of grade, size, and type. The principal forms of soil structure are--platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans). Abbreviations include:

## Appendix A: Core Descriptions

GRADE	SIZE (MILLIMETERS)	TYPE
1 – weak	vf—very fine (<1 to < 10 mm)	gr—granular. Spheroidal shaped aggregates with faces that do not conform to adjoining ped faces.
2 – moderate	f—fine (1 to 20 mm)	sbk—sub-angular blocky. Approximately equidimensional blocks with planar faces that conform to adjoining ped faces, with rounded face intersections.
3 – strong	m—medium (2 to 50 mm)	abk—angular blocky. Approximately equidimensional blocks with planar faces that conform to adjoining ped faces, with sharp face intersections.
m – massive	c—coarse (5 to 100 mm)	pr—prismatic. Particles are arranged about a vertical line, and ped is bounded by planar, vertical faces that conform to adjoining faces; with flat top.
sg—single-grain	vc—very coarse (>10 to >100 mm)	cpr—columnar. Particles are arranged about a vertical line, and ped is bounded by planar, vertical faces that conform to adjoining faces; with rounded top.
		pl—platy. Particles arranged around a horizontal plane.

**CONSISTENCE.** This is a measure of the adherence of the soil particles to the fingers, the cohesion of soil particles to one another, and the resistance of the soil mass to deformation. Because this property varies with moisture content, different classifications are given for soils that are dry, moist, or wet. Terms commonly used to describe consistence are:

---

*DRY CONSISTENCE*

- lo Noncoherent; does not hold together in a mass.
- so Soft. Weakly coherent; easily crushes to powder or single grain under gentle pressure between thumb and forefinger.
- sh Slightly hard. Easily broken between thumb and forefinger.
- h Hard. Can be broken in the hands without difficulty, but difficult to break between thumb and forefinger.
- vh Very hard. Can be broken in the hands with difficulty.
- eh Extra hard. Cannot be broken in hands.

*MOIST CONSISTENCE*

- lo Loose. Noncoherent; does not hold together in a mass.
- vfr Very friable. Weakly coherent; easily crushed under gentle pressure and can be pressed into a lump.
- fr Friable. Crushes easily under gentle to moderate pressure between thumb and forefinger but resistance is no distinct.
- fi Firm. Crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
- vfi Very firm. Crushes under strong pressure; barely crushes between thumb and forefinger
- efi Extremely firm. Crushes under very strong pressure; cannot be crushed between thumb and forefinger.

*WET CONSISTENCE AND PLASTICITY:*

- so Nonsticky. Practically no adherence when pressure released.
  - ss Slightly sticky. After pressure, soil adheres to both thumb and forefinger but comes off one rather cleanly; does not stretch appreciably.
  - s Sticky. When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.
- Weakly coherent; easily crushed under gentle pressure and can be pressed into a lump.
- 

Plasticity is measured by rolling the wet soil between the thumb and forefinger and observing whether or not a wire or thin rod can be formed as follows:

Plastic	When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Hard	When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft	When dry, breaks into powder or individual grains under very slight pressure.
Cemented	Hard and brittle; little affected by moistening.

---

## Appendix A: Core Descriptions

**TEXTURE.** Particle size classification of a soil, generally given in terms of the USDA system which uses the term "loam" for a soil having equal properties of sand, silt, and clay. The basic textural classes, in order of their increasing proportions of fine particles are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sand clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine. Abbreviations for these include:

C—clay	S—sand	Si—silt
CL—clay loam	SC—sandy clay	SiC—silty clay
L—loam	SCL—sandy clay loam	SiCL—silty clay loam
LS—loamy sand	SL—sandy loam	SiL—silt loam

**CLAY FILM.** A coating of oriented clay on the surface of a sand grain, pebble, soil aggregate, or ped. Clay films also line pores or root channels and bridge sand grains. Frequency classification is based on the percent of the ped faces and/or pores that contain films: Thickness classification is based on visibility of sand grains: thin--very fine sand grains stand out; moderately thick--very fine sand grains impart microrelief to film; thick--fine sand grains enveloped by clay and films visible without magnification. Synonyms: clay skin, clay coat, argillan, illuviation cutan. Abbreviations include:

AMOUNT	VISIBILITY	LOCATION
0—very few (<5%)	f—faint. Evident only on close examination with 10X magnification and cannot be identified positively in all places with greater magnification. The contrast with the adjacent material in color, texture, and other properties is small.	pf—clay films occur on ped faces. Where the structure grade is weak or the soil is structureless, ped faces are indistinct or absent.
1—few (5-25%)		po—clay films line tubular or interstitial pores.
2—common (25-50%)	d—distinct. Can be detected without magnification, although magnification or tests may be needed for positive identification. The feature contrasts enough with the adjacent material that a difference in color, texture, or other properties is evident.	br—oriented clay occurs as bridges holding mineral grains together; probably an initial step that occurs before clay films coat grains and is best observed in coarse-textured soils.
3—many (50-90%)		co—colloid coats mineral grains.
4—continuous (90-100%)	p—prominent. Conspicuous without magnification when compared with a surface broken through the soil. Color, texture, or some other property or combination of properties contrasts sharply with properties of the adjacent material, or the feature is thick enough to be conspicuous.	cobr—films coating and bridging sand grains; probably more common than coats or bridges alone.

**CONTACT.** Describes the lower boundary of each stratum or soil horizon, indicating the thickness of the transition and general shape or topography as follows:

TRANSITION	SHAPE
a—abrupt (less than 2 cm thick)	s—smooth. Boundary is parallel to surface of the soil.
c—clear (2 to 5 cm)	w—wavy. Boundary undulations are wider than their depth.
g—gradual (5 to 15 cm thick)	i—irregular. Boundary undulations are deeper than their width.
d—diffuse (more than 15 cm thick)	b—broken. Parts of boundary are unconnected to others.

**Appendix A. Core and Auger Soil Descriptions**

Core or Hand Auger No.	Min. Depth (feet)	Max. Depth (feet)	Min. Depth (meters)	Max. Depth (meters)	Soil Horizon	Color Type-Munsell Designation	Color Name (Munsell or General)	Structure Type	Gravel %	Gravel Size	Gravel Shape	Consistency Moist	Texture 1	Clay Film Amount	Clay Film Visibility	Clay Film Location	Contact Transition
Core 1	0.0	7.0	0.00	2.13	Ap												a
Core 1	7.0	10.0	2.13	3.05	2C	10YR 6/1	gray	sg	0			lo	S	-	-	-	-
Core 2	0.0	4.5	0.00	1.37	Ap												a
Core 2	4.5	5.0	1.37	1.52	2Ab	10YR 2/1	black	m	0			fr	L	-	-	-	c
Core 2	5.0	6.5	1.52	1.98	2C	10YR 5/3	brown	m	0			fr	L	-	-	-	c
Core 2	6.5	8.0	1.98	2.44	3AC	10YR 3/1	very dark gray	m	0			fi	L	-	-	-	g
Core 2	8.0	10.0	2.44	3.05	3C	10YR 5/3	brown	m	0			fr	L	-	-	-	-
Core 3	0.0	5.0	0.00	1.52	Ap												a
Core 3	5.0	6.0	1.52	1.83	2Ab	10YR 2/1	black	m	0			fr	L	-	-	-	c
Core 3	6.0	10.0	1.83	3.05	2C	10YR 5/3	brown	m	0			fr	L	-	-	-	c
Core 4	0.0	5.5	0.00	1.68	Ap												a
Core 4	5.5	8.0	1.68	2.44	2Ab	10YR 3/1	very dark gray	m	0			fr	L	-	-	-	d
Core 4	8.0	10.0	2.44	3.05	2C	10YR 5/3	brown	m/sg	0			fr	CL	-	-	-	-
Core 5	0.0	5.0	0.00	1.52	Ap												a
Core 5	5.0	7.0	1.52	2.13	2Ab	10YR 3/1	very dark gray	m	0			fr	CL	-	-	-	d
Core 5	7.0	10.0	2.13	3.05	2C	10YR 4/3	brown	m	0			fr	CL	-	-	-	-
Core 6	0.0	5.0	0.00	1.52	Ap												a
Core 6	5.0	7.0	1.52	2.13	2Ab	10YR 3/2	very dark brown	m	0			fi	CL	-	-	-	d
Core 6	7.0	10.0	2.13	3.05	2C	10YR 4/3	brown	m	0			fi	CL	-	-	-	-
Core 7	0.0	5.0	0.00	1.52	Ap												a
Core 7	5.0	6.0	1.52	1.83	2AC	10YR 3/1	very dark gray	m	0			fi	CL	-	-	-	d
Core 7	6.0	9.0	1.83	2.74	2C	10YR 4/3	brown	m	0			fi	CL	-	-	-	c
Core 7	9.0	10.0	2.74	3.05	3AC	10YR 2/1	black	m	0			fr	L	-	-	-	-
Core 8	0.0	4.5	0.00	1.37	Ap												a
Core 8	4.5	5.5	1.37	1.68	2C	10YR 5/3	brown	m	>10	S	SR	vfr	SL	-	-	-	c
Core 8	5.5	7.0	1.68	2.13	3Ag	Gley 1 2.5/N	black	m	0			fr	L	-	-	-	g
Core 8	7.0	10.0	2.13	3.05	3Cox	10YR 4/2	dark grayish brown	m	0			fr	CL	-	-	-	-
Core 9	0.0	2.5	0.00	0.76	Ap												c
Core 9	2.5	5.0	0.76	1.52	2C	10YR 4/3	brown	m	>10			fr	L	-	-	-	g
Core 9	5.0	10.0	1.52	3.05	3Cox	10YR 4/2	dark grayish brown	m	0			fr	CL	-	-	-	-
Core 10	0.0	3.5	0.00	1.07	Ap												c
Core 10	3.5	6.0	1.07	1.83	2C	10YR 4/3	brown	m	0			fr	L	-	-	-	g
Core 10	6.0	7.5	1.83	2.29	3AC	10YR 3/1	very dark gray	m	0			fr	L	-	-	-	d
Core 10	7.5	10.0	2.29	3.05	3C	10YR 4/3	brown	m	0			fr	L	-	-	-	-
Core 11	0.0	3.0	0.00	0.91	Ap												a
Core 11	3.0	5.5	0.91	1.68	2C	10YR 4/3	brown	m	0			fr	CL	-	-	-	g
Core 11	5.5	6.5	1.68	1.98	3AC	10YR 3/1	very dark gray	m	0			fr	CL	-	-	-	d
Core 11	6.5	10.0	1.98	3.05	3C	10YR 5/3	brown	m	0			fr	L	-	-	-	-

**Appendix A. Core and Auger Soil Descriptions**

Core or Hand Auger No.	Min. Depth (feet)	Max. Depth (feet)	Min. Depth (meters)	Max. Depth (meters)	Soil Horizon	Color Type-Munsell Designation	Color Name (Munsell or General)	Structure Type	Gravel %	Gravel Size	Gravel Shape	Consistency Moist	Texture 1	Clay Film Amount	Clay Film Visibility	Clay Film Location	Contact Transition
Core 12	0.0	0.5	0.00	0.15	Ap												a
Core 12	0.5	5.5	0.15	1.68	2C	10YR 4/3	brown	m	0			fr	L	-	-	-	c
Core 12	5.5	6.0	1.68	1.83	3Ab	10YR 3/1	very dark gray	m	0			fr	CL	-	-	-	g
Core 12	6.0	10.0	1.83	3.05	3C	10YR 4/2	dark grayish brown	m	0			fr	CL	-	-	-	-
Core 13	0.0	2.5	0.00	0.76	Ap												a
Core 13	2.5	4.5	0.76	1.37	2C	10YR 7/1	light gray	sg	0			lo	S	-	-	-	a
Core 13	4.5	5.0	1.37	1.52	3AC	10YR 3/1	very dark gray	m	0			vfr	S	-	-	-	c
Core 13	5.0	10.0	1.52	3.05	3C	10YR 6/1	gray	sg	0			lo	S	-	-	-	-
Core 14	0.0	2.0	0.00	0.61	Ap												a
Core 14	2.0	7.0	0.61	2.13	2C	10YR 7/1	light gray	sg	0			lo	S	-	-	-	a
Core 14	7.0	8.0	2.13	2.44	3C	10YR 5/2	grayish brown	m	0			fr	CL	-	-	-	a
Core 14	8.0	10.0	2.44	3.05	4AC	10YR 3/3	dark brown	m	0			vfr	LS	-	-	-	-
Core 15	0.0	2.0	0.00	0.61	Ap												a
Core 15	2.0	6.0	0.61	1.83	2C	10YR 7/1	light gray	sg	0			lo	S	-	-	-	a
Core 15	6.0	7.0	1.83	2.13	3Ab	10YR 3/1	very dark gray	m	0			fr	L	-	-	-	g
Core 15	7.0	8.5	2.13	2.59	3C	10YR 4/2	dark grayish brown	m	0			fr	CL	-	-	-	a
Core 15	8.5	10.0	2.59	3.05	4AC	10YR 3/3	dark brown	sg	0			vfr	LS	-	-	-	-
Core 16	0.0	3.0	0.00	0.91	Ap												a
Core 16	3.0	5.5	0.91	1.68	2C	10YR 7/1	light gray	sg	0			lo	S	-	-	-	a
Core 16	5.5	6.0	1.68	1.83	3Ab	10YR 3/1	very dark gray	m	0			fr	L	-	-	-	g
Core 16	6.0	9.0	1.83	2.74	3C	10YR 5/3	brown	m	0			fr	CL	-	-	-	a
Core 16	9.0	10.0	2.74	3.05	4Ab	10YR 2/1	black	m	0			fr	SL	-	-	-	-
Core 17	0.0	4.0	0.00	1.22	Ap												a
Core 17	4.0	5.0	1.22	1.52	2C	10YR 7/1	light gray	sg	0			lo	S	-	-	-	a
Core 17	5.0	7.0	1.52	2.13	3Ab	10YR 3/1	very dark gray	m	0			fr	CL	-	-	-	d
Core 17	7.0	10.0	2.13	3.05	3C	10YR 4/3	brown	m	0			fr	CL	-	-	-	-
Core 18	0.0	2.5	0.00	0.76	Ap												a
Core 18	2.5	5.5	0.76	1.68	2C	10YR 7/1	light gray	sg	0			lo	S	-	-	-	a
Core 18	5.5	6.5	1.68	1.98	3Ab	10YR 3/1	very dark gray	m	0			fr	CL	-	-	-	d
Core 18	6.5	10.0	1.98	3.05	3C	10YR 4/3	brown	m	0			fr	CL	-	-	-	-
Core 19	0.0	5.5	0.00	1.68	Ap												a
Core 19	5.5	7.0	1.68	2.13	2Ab	10YR 3/1	very dark gray	m	0			fr	CL	-	-	-	d
Core 19	7.0	10.0	2.13	3.05	2C	10YR 4/3	brown	m	0			fr	CL	-	-	-	-
Core 20	0.0	4.5	0.00	1.37	Ap												a
Core 20	4.5	5.5	1.37	1.68	2Ab	10YR 3/1	very dark gray	m	0			fr	L	-	-	-	g
Core 20	5.5		1.68	0.00	2C	10YR 5/3	brown	m	0			fr	L	-	-	-	-
Core 20.1	0.0	4.0	0.00	1.22	Ap												a
Core 20.1	4.0	5.0	1.22	1.52	2Ab	10YR 2/1	black	sbk	0			fr	L	-	-	-	c

**Appendix A. Core and Auger Soil Descriptions**

Core or Hand Auger No.	Min. Depth (feet)	Max. Depth (feet)	Min. Depth (meters)	Max. Depth (meters)	Soil Horizon	Color Type-Munsell Designation	Color Name (Munsell or General)	Structure Type	Gravel %	Gravel Size	Gravel Shape	Consistency Moist	Texture 1	Clay Film Amount	Clay Film Visibility	Clay Film Location	Contact Transition
Core 20.1	5.0	8.0	1.52	2.44	2C	10YR 5/3	brown	m	0			fr	L	-	-	-	a
Core 20.1	8.0	9.5	2.44	2.90	3Ab	10YR 3/1	very dark gray	m	0			fr	L	-	-	-	c
Core 21	0.0	4.5	0.00	1.37	Ap												a
Core 21	4.5	5.0	1.37	1.52	2Ab	10YR 3/3	dark brown	m	0			fr	CL	-	-	-	c
Core 21.1	0.0	4.0	0.00	1.22	Ap												a
Core 21.1	4.0	4.5	1.22	1.37	2Ab	10YR 3/3	dark brown	m	0			fr	CL	-	-	-	c
Core 21.1	4.5	8.0	1.37	2.44	2C	10YR 5/3	brown	m	0			fr	L	-	-	-	c
Core 21.1	8.0	9.5	2.44	2.90	3Ab	10YR 3/1	very dark gray	m	0			fr	L	-	-	-	c
Core 21.1	9.5	10.0	2.90	3.05	3C	10YR 5/2	grayish brown	sg	50	S	SA-WR	vfr	SL	-	-	-	-
Core 22	0.0	4.0	0.00	1.22	Ap												
Core 22	4.0	6.0	1.22	1.83	2Ab	10YR 3/2	very dark gray	m	0			fr	CL	-	-	-	c
Core 22	6.0	7.0	1.83	2.13	2AC	10YR 3/3	dark brown	m	0			fr	S/CL	-	-	-	g
Core 22	7.0	20.0	2.13	6.10	2Cox	10YR 5/6	yellowish brown	sg	0			fr	S	-	-	-	-
Core 22.1	0.0	6.0	0.00	1.80	Ap		variable										a
Core 22.1	6.0	10.0	1.80	3.05	AC	10YR 4/2	dark grayish brown	m	0			vfr	LS	-	-	-	d
Core 22.1	10.0	30.0	3.05	9.14	C	10YR 4/4	dark yellowish brown	m	0			lo	S	-	-	-	a
Core 22.1	30.0	35.0	9.14	10.67	2Cox	10YR 3/6	dark yellowish brown	m	0			vfi	CL	-	-	-	-
Core 23	0.0	5.0	0.00	1.52	Ap												a
Core 23	5.0	6.0	1.52	1.83	2Ab	10YR 3/2	very dark gray	m	0			fr	CL	-	-	-	c
Core 23	6.0	7.0	1.83	2.13	2AC	10YR 3/3	dark brown	m	0			fr	S/CL	-	-	-	g
Core 23	7.0	20.0	2.13	6.10	2Cox	10YR 5/6	yellowish brown	sg	0			fr	S	-	-	-	-
Core 23.1	0.0	7.0	0.00	2.13	Ap												a
Core 23.1	7.0	10.0	2.13	3.05	AC	10YR 3/2	very dark grayish brown	m	0			vfr	LS	-	-	-	d
Core 23.1	10.0	25.0	3.05	7.62	C	10YR 4/4	dark yellowish brown	m	0			vfr	LS	-	-	-	a
Core 23.1	25.0	30.0	7.62	9.14	2Bt	10YR 5/4	yellowish brown		0			vfi	CL	-	2 d	cobr	g
Core 23.1	30.0	35.0	9.14	10.67	2C	10YR 5/4	yellowish brown	m	0			fr	LS	-	-	-	-
Core 24	0.0	2.5	0.00	0.76	Ap												a
Core 24	2.5	5.0	0.76	1.52	2Ab	10YR 3/1	very dark gray	m	>10	m		fr	CL	-	-	-	c
Core 24	5.0	6.0	1.52	1.83	2AC	10YR 4/1	dark gray	m	50	S	SA	fi	CL	-	-	-	a
Core 24	6.0	8.0	1.83	2.44	3Ab	10YR 3/1	very dark gray		>10	S	SA	vfi	CL	-	-	-	g
Core 24	8.0	13.0	2.44	3.96	3Bt	10YR 4/1	dark gray		25	S	SA	vfi	CL	-	2 d	pf, cobr	d
Core 24	13.0	22.0	3.96	6.71	3Cox	5YR 3/3	dark reddish brown	m	0			fi	SL/S	-	-	-	a
Core 24	22.0	24.0	6.71	7.32	4BCox	7.5YR 4/6	strong brown	m	0			efi	SL	-	2 d	cobr	-
Core 25	0.0	5.0	0.00	1.52	Ap												a
Core 25	5.0	9.0	1.52	2.74	2Ab	10YR 3/1	very dark gray		>10	S	SA	vfi	CL	-	-	-	g
Core 25	9.0	13.0	2.74	3.96	2Bt	10YR 4/1	dark gray		25	S	SA	vfi	CL	-	2 d	pf, cobr	d
Core 25	13.0	21.5	3.96	6.55	2Cox	5YR 3/3	dark reddish brown	m	0			fi	SL/S	-	-	-	a
Core 25	21.5	25.0	6.55	7.62	3BCox	7.5YR 4/6	strong brown	m	0			efi	SL	-	2 d	cobr	-

**Appendix A. Core and Auger Soil Descriptions**

Core or Hand Auger No.	Min. Depth (feet)	Max. Depth (feet)	Min. Depth (meters)	Max. Depth (meters)	Soil Horizon	Color Type-Munsell Designation	Color Name (Munsell or General)	Structure Type	Gravel %	Gravel Size	Gravel Shape	Consistency Moist	Texture 1	Clay Film Amount	Clay Film Visibility	Clay Film Location	Contact Transition
Core 26	0.0	5.0	0.00	1.52	Ap												
Core 27	0.0	5.0	0.00	1.52	Ap1												a
Core 27	5.0	7.0	1.52	2.13	Ap2												a
Core 27	7.0	10.0	2.13	3.05	2AC	10YR 3/4	dark yellowish brown	sg	0			vfr	S	-	-	-	-
Core 28	0.0	7.5	0.00	2.29	Ap												a
Core 28	7.5	9.0	2.29	2.74	2Ab	10YR 2/1	black	m	<10	S		vfr	SCL	-	-	-	g
Core 28	9.0	10.0	2.74	3.05	2BC	10YR 4/2	dark grayish brown	sbk	25	S-L	SR	vfi	SCL	-	1 f	cobr	-
Core 29	0.0	8.0	0.00	2.44	Ap												a
Core 29	8.0	9.0	2.44	2.74	2Ab	10YR 2/1	black	m	<10	S		vfr	SCL	-	-	-	g
Core 29	9.0	10.0	2.74	3.05	2BC	10YR 4/2	dark grayish brown	sbk	25	S-L	SR	vfi	SCL	-	1 f	cobr	-
Core 30	0.0	2.0	0.00	0.61	Ap1												c
Core 30	2.0	9.5	0.61	2.90	Ap2												a
Core 30	9.5	10.0	2.90	3.05	2Ab	10YR 2/1	black	m	0			fi	SCL	-	-	-	-
Core 31	0.0	2.0	0.00	0.61	Ap1												c
Core 31	2.0	8.0	0.61	2.44	Ap2												a
Core 31	8.0	10.0	2.44	3.05	2C	10YR 4/3	brown	sg	75	S-M	WR	vfr	SL	-	-	-	-
Core 32	0.0	2.0	0.00	0.61	Ap1												c
Core 32	2.0	10.0	0.61	3.05	Ap2			m	0			lo	SiL	-	-	-	-
Core 33	0.0	8.0	0.00	2.44	Ap												a
Core 33	8.0	10.0	2.44	3.05	2Ab	10YR 2/1	black	m	0			fr	SCL	-	-	-	-
Core 34	0.0	6.0	0.00	1.83	Ap												a
Core 34	6.0	10.0	1.83	3.05	2C	10YR 4/3	brown	sg	50	S-M	SR, WR	lo	SL	-	-	-	-
Core 35	0.0	8.0	0.00	2.44	Ap												a
Core 35	8.0	10.0	2.44	3.05	2C	10YR 4/3	brown	sg	50	S-M	SA, WR	lo	SL	-	-	-	-
Core 36	0.0	6.0	0.00	1.83	Ap												a
Core 36	6.0	9.5	1.83	2.90	2C	10YR 4/3	brown	sg	50	S-M	SA, WR	lo	SL	-	-	-	a
Core 36	9.5	10.0	2.90	3.05	3Ab	10YR 2/1	black	m	0			fr	SCL	-	-	-	-
Core 37	0.0	6.0	0.00	1.83	Ap												c
Core 37	6.0	9.8	1.83	2.99	2C	10YR 4/3	brown	sg	50	S-M	SA, WR	lo	SL	-	-	-	c
Core 37	9.8	10.0	2.99	3.05	3Ab	10YR 4/1	dark gray	m	0			fr	SCL	-	-	-	-
Core 37.1	0.0	6.0	0.00	1.83	Ap												a
Core 37.1	6.0	9.0	1.83	2.74	2C	10YR 4/3	brown	sg	75	S-M	SA, WR	lo	SL	-	-	-	c
Core 37.1	9.0	10.0	2.74	3.05	3C	10YR 4/2	dark grayish brown	m	0			vfr	CL	-	-	-	-
Core 38	0.0	8.0	0.00	2.44	Ap												c
Core 38	8.0	10.0	2.44	3.05	2C	10YR 4/3	brown	sg	50	S-M	SA, WR	lo	SL	-	-	-	-
Core 39	0.0	8.0	0.00	2.44	Ap												a
Core 39	8.0	9.0	2.44	2.74	2Ab	10YR 2/1	black	m	0			vfr	SCL	-	-	-	c
Core 39	9.0	10.0	2.74	3.05	2C	10YR 4/2	dark grayish brown	m	0			fr	CL	-	-	-	-

**Appendix A. Core and Auger Soil Descriptions**

Core or Hand Auger No.	Min. Depth (feet)	Max. Depth (feet)	Min. Depth (meters)	Max. Depth (meters)	Soil Horizon	Color Type-Munsell Designation	Color Name (Munsell or General)	Structure Type	Gravel %	Gravel Size	Gravel Shape	Consistency Moist	Texture 1	Clay Film Amount	Clay Film Visibility	Clay Film Location	Contact Transition
Core 40	0.0	8.0	0.00	2.44	Ap												a
Core 40	8.0	9.0	2.44	2.74	2Ab	10YR 2/1	black	m	0			fr	SCL	-	-	-	-
Core 40	9.0	10.0	2.74	3.05	2C	10YR 4/3	brown	sg	50	S-M	SA, WR	lo	SL	-	-	-	-
Core 41	0.0	5.0	0.00	1.52	Ap												a
Core 41	5.0	10.0	1.52	3.05	2C		variable	sg	75	S-M	SA-WR	lo	SL	-	-	-	-
Core 42	0.0	10.0	0.00	3.05	Ap												
Core 43	0.0	4.5	0.00	1.37	Ap												a
Core 43	4.5	10.0	1.37	3.05	2C	10YR 4/3	brown	sg	50	S-M	SA-R	lo	SL	-	-	-	-
Core 44	0.0	6.0	0.00	1.83	Ap												a
Core 44	6.0	8.0	1.83	2.44	2Ab	10YR 2/2	very dark brown	sbk	0			fi	L	-	-	-	c
Core 44	8.0	10.0	2.44	3.05	2C	10YR 4/4	dark yellowish brown	m	>10	S	SA	vfr	SIL	-	-	-	-
Core 45	0.0	5.0	0.00	1.52	Ap												a
Core 45	5.0	10.0	1.52	3.05	2Ab	10YR 2/2	very dark brown	sbk	0			fi	L	-	-	-	-
Core 45.1	0.0	2.0	0.00	0.61	AC	10YR 5/6	brown										c
Core 45.1	2.0	4.5	0.61	1.37	C	10YR 6/3	pale brown	m	0			vfr	S/SL	-	-	-	a
Core 45.1	4.5	6.0	1.37	1.83	2Ab	10YR 2/2	very dark brown	m	0			fr	L	-	-	-	c
Core 45.1	6.0	10.0	1.83	3.05	2C	10YR 4/4	dark yellowish brown	m	0			fr	L	-	-	-	-
Core 46	0.0	8.0	0.00	2.44	Ap												a
Core 46	8.0	10.0	2.44	3.05	2Ab	10YR 3/1	very dark gray	m	0			fr	L	-	-	-	-
Core 47	0.0	4.5	0.00	1.37	Ap												a
Core 47	4.5	6.0	1.37	1.83	2Ab	10YR 2/1	black	m	0			fr	L	-	-	-	-
Core 47.1	0.0	4.5	0.00	1.37	Ap												a
Core 47.1	4.5	7.0	1.37	2.13	2Ab	10YR 3/1	very dark gray	m	0			fr	L	-	-	-	g
Core 47.1	7.0	10.0	2.13	3.05	2C	10YR 4/2	dark grayish brown	m	0			fr	L	-	-	-	-
Core 48	0.0	2.0	0.00	0.61	Ap1												c
Core 48	2.0	4.5	0.61	1.37	Ap2												a
Core 48	4.5	6.0	1.37	1.83	2Ab	10YR 2/2	very dark brown	sbk	0			fi	L	-	-	-	d
Core 48	6.0	10.0	1.83	3.05	2C	10YR 4/3	brown	m	0			fr	L	-	-	-	-
Core 49	0.0	2.0	0.00	0.61	Ap1	10YR 4/3	dark grayish brown	m	>10	S-M		fr	L	-	-	-	g
Core 49	2.0	10.0	0.61	3.05	Ap2	10YR 3/2	very dark grayish brown	m	25	S-M	A-SR, WR	fr	L	-	-	-	-
Core 50	0.0	2.5	0.00	0.76	Ap	10YR 4/2	dark grayish brown	m	<10-25	S		lo	S/L	-	-	-	a
Core 50	2.5	4.5	0.76	1.37	2Ab1	10YR 2/1	black	m	0			fi	L	-	-	-	c
Core 50	4.5	6.5	1.37	1.98	2Ab2	10YR 2/1	black	m	0			fr	L	-	-	-	c
Core 50	6.5	8.0	1.98	2.44	2Ab3	10YR 3/2	very dark grayish brown	m	0			fi	L	-	-	-	c
Core 50	8.0	10.0	2.44	3.05	2C	10YR 4/4	dark yellowish brown	m	0			vfr	L	-	-	-	-
Core 51	0.0	6.0	0.00	1.83	Ap1		variable										a
Core 51	6.0	6.5	1.83	1.98	Ap2		white										a
Core 51	6.5	10.0	1.98	3.05	AC	10YR 4/4	dark yellowish brown	m	0			fi	S/SL	-	-	-	-

**Appendix A. Core and Auger Soil Descriptions**

Core or Hand Auger No.	Min. Depth (feet)	Max. Depth (feet)	Min. Depth (meters)	Max. Depth (meters)	Soil Horizon	Color Type-Munsell Designation	Color Name (Munsell or General)	Structure Type	Gravel %	Gravel Size	Gravel Shape	Consistency Moist	Texture 1	Clay Film Amount	Clay Film Visibility	Clay Film Location	Contact Transition
Core 52	0.0	2.0	0.00	0.61	Ap												a
Core 52	2.0	6.0	0.61	1.83	A	10YR 3/1	very dark gray		0			fi	SL	-	-	-	d
Core 52	6.0	10.0	1.83	3.05	C	10YR 4/3	brown		0			fr	SL	-	-	-	-
Core 53	0.0	2.0	0.00	0.61	Ap												a
Core 53	2.0	6.0	0.61	1.83	A	10YR 3/2	very dark grayish brown		0			vfi	SL	-	-	-	d
Core 53	6.0	10.0	1.83	3.05	C	10YR 4/3	brown	m	0			fr	S	-	-	-	-
Core 54	0.0	5.5	0.00	1.68	Ap												a
Core 54	5.5	7.5	1.68	2.29	A	10YR 3/2	very dark grayish brown	m	0			fi	LS	-	-	-	d
Core 54	7.5	10.0	2.29	3.05	C	10YR 5/4	yellowish brown	sg	0			lo	S	-	-	-	-
Core 55	0.0	4.5	0.00	1.37	Ap1												a
Core 55	4.5	7.0	1.37	2.13	Ap2												a
Core 55	7.0	10.0	2.13	3.05	A	10YR 2/2	very dark brown		0			vfi	CL	-	-	-	-
Core 56	0.0	4.5	0.00	1.37	Ap1												a
Core 56	4.5	6.5	1.37	1.98	Ap2												a
Core 56	6.5	8.0	1.98	2.44	A	10YR 2/1	black		0			fi	SCL	-	-	-	d
Core 56	8.0	10.0	2.44	3.05	C	10YR 3/1	very dark gray		>10	S	SR	fi	CL	-	-	-	-
Hand Auger 1	0.0	3.3	0.00	1.00	Ap	10YR 3/2	very dark grayish brown	m	25	S	SA-R	fr	L	-	-	-	c
Hand Auger 1	3.3	6.6	1.00	2.00	A	10YR 4/3	brown	m	0			fr	L	-	-	-	c
Hand Auger 1	6.6	8.2	2.00	2.50	2Ab	10YR 2/1	black	m	0			fr	L	-	-	-	c
Hand Auger 1	8.2	10.0	2.50	3.05	2C	10YR 4/3	brown	m	0			fr	CL	-	-	-	-
Hand Auger 2	0.0	2.0	0.00	0.60	Ap	10YR 4/3	brown	m	25	S-M	SA-R	fr	L	-	-	-	c
Hand Auger 2	2.0	3.4	0.60	1.05	2A1	10YR 3/2	very dark grayish brown	m	0			fr	CL	-	-	-	c
Hand Auger 2	3.4	3.8	1.05	1.15	2A2	10YR 3/2	very dark grayish brown	m	0			fr	L	-	-	-	c
Hand Auger 2	3.8	4.9	1.15	1.50	2A3	10YR 4/3	brown	m	0			fr	L	-	-	-	c
Hand Auger 2	4.9	7.1	1.50	2.15	3Ab	10YR 2/1	black	m	0			vfr	L	-	-	-	c
Hand Auger 2	7.1	8.9	2.15	2.70	3C	10YR 4/3	brown	m	0			vfr	CL	-	-	-	c
Hand Auger 2	8.9	10.0	2.70	3.05	4AC	10YR 4/3	brown	m	0			fi	CL	-	-	-	-
Hand Auger 3	0.0	1.6	0.00	0.50	Ap	10YR 4/3	brown	m	25	S-M	SA-R	fr	L	-	-	-	c
Hand Auger 3	1.6	4.9	0.50	1.50	2A	10YR 2/2	very dark brown	m	0			fi	CL	-	-	-	c
Hand Auger 3	4.9	7.5	1.50	2.30	3Ab	10YR 2/1	black	m	0			fr	SL	-	-	-	c
Hand Auger 3	7.5	8.9	2.30	2.70	3C	10YR 3/4	brown	m	0			vfr	SL	-	-	-	c
Hand Auger 3	8.9	10.0	2.70	3.05	4AC	10YR 4/1	dark gray	m	0			fr	SCL	-	-	-	-
Hand Auger 4	0.0	0.0															
Hand Auger 5	0.0	0.0															
Hand Auger 6	0.0	2.0	0.00	0.61	Ap	10YR	yellowish brown	m	25	S-M	A-R	fr	L	-	-	-	c
Hand Auger 6	2.0	3.8	0.61	1.15	2Ab		dark brown	m	0			fr	L	-	-	-	g
Hand Auger 6	3.8	8.2	1.15	2.50	3Ab		very dark grayish brown	m	0			fr	SCL	-	-	-	g
Hand Auger 6	8.2	12.1	2.50	3.70	3C		brown	m	0			fr	SL	-	-	-	c

**Appendix A. Core and Auger Soil Descriptions**

Core or Hand Auger No.	Min. Depth (feet)	Max. Depth (feet)	Min. Depth (meters)	Max. Depth (meters)	Soil Horizon	Color Type-Munsell Designation	Color Name (Munsell or General)	Structure Type	Gravel %	Gravel Size	Gravel Shape	Consistency Moist	Texture 1	Clay Film Amount	Clay Film Visibility	Clay Film Location	Contact Transition
Hand Auger 6	12.1	13.3	3.70	4.05	4AC		dark brown	m	0			fi	CL	-	-	-	-
Hand Auger 7	0.0	1.0	0.00	0.30	A1	10YR	very dark brown	gr	<10	S-M	SA-SR	fr	L	-	-	-	g
Hand Auger 7	1.0	3.3	0.30	1.00	A2	10YR	black		<10	S		fi	CL	-	-	-	g
Hand Auger 7	3.3	4.3	1.00	1.30	Btk	10YR	dark brown		<10	S		fi	CL	2	d	pf	g
Hand Auger 7	4.3	4.9	1.30	1.50	C	10YR	yellowish brown	m	25	S-M	SA-SR	fi	L	-	-	-	-
Hand Auger 8	0.0	1.3	0.00	0.40	Ap												c
Hand Auger 8	1.3	2.0	0.40	0.60	2AC	10YR	dark brown		>10-50			fi	CL	-	-	-	-
Hand Auger 9	0.0	1.6	0.00	0.50	A(?)	10YR	dark brown		>10-25			fi	L	-	-	-	-
Hand Auger 10	0.0	1.0	0.00	0.30	Ap	10YR	dark brown	m	<10	S		fi	L	-	-	-	g
Hand Auger 10	1.0	2.0	0.30	0.60	BC		brown		<10	S		vfi	CL	-	-	-	g
Hand Auger 10	2.0	2.6	0.60	0.80	C		yellowish brown		50	S-M		efi	L	-	-	-	-
Hand Auger 11	0.0	1.6	0.00	0.50	C	10YR	brown		50	S-M	A-SR	efi	CL	-	-	-	-
Hand Auger 12	0.0	3.0	0.00	0.92	Ap												c
Hand Auger 13	0.0	0.7	0.00	0.20	Ap												c
Hand Auger 13	0.7	1.5	0.20	0.45	C	10YR	yellowish brown		25-50			vfi	CL	-	-	-	-
Hand Auger 14	0.0	4.3	0.00	1.30	Ap												c
Hand Auger 14	4.3	5.2	1.30	1.60	A	10YR	dark brown		<10	S		fr	L	-	-	-	g
Hand Auger 14	5.2	6.6	1.60	2.00	C	10YR	yellowish brown		0			fi	CL	-	-	-	-
Hand Auger 15	0.0	5.9	0.00	1.80	Ap												c
Hand Auger 16	0.0	1.0	0.00	0.30	Ap	10YR	dark brown										c
Hand Auger 16	1.0	3.3	0.30	1.00	A	10YR	black										g
Hand Auger 16	3.3	5.2	1.00	1.60	Btk		variable										g
Hand Auger 16	5.2	5.9	1.60	1.80	C	10YR	yellowish brown										-
Hand Auger 17	0.0	1.0	0.00	0.30	Ap	10YR	pale brown										c
Hand Auger 17	1.0	4.3	0.30	1.30	A	10YR 2/1	black		0			fr	CL	-	-	-	g
Hand Auger 17	4.3	5.6	1.30	1.70	Btk		variable		0			vfi	CL	2	d	pf	-
Hand Auger 18	0.0	1.0	0.00	0.30	Ap												c
Hand Auger 18	1.0	1.6	0.30	0.50	A	10YR 2/1	black										c
Hand Auger 18	1.6	3.3	0.50	1.00	Btk		variable										c
Hand Auger 18	3.3	4.6	1.00	1.40	C	10YR	yellowish brown		0			fi	CL	-	-	-	-
Hand Auger 19	0.0	1.0	0.00	0.30	Ap												c
Hand Auger 19	1.0	2.0	0.30	0.60	A	10YR 2/1	black										c
Hand Auger 19	2.0	4.3	0.60	1.30	Btk		variable										c
Hand Auger 19	4.3	4.9	1.30	1.50	C	10YR	yellowish brown		0			fi	CL	-	-	-	-
Hand Auger 20	0.0	3.0	0.00	0.90	Ap												c
Hand Auger 20	3.0	3.9	0.90	1.20	A	10YR	dark brown	m	0			fr	SCL	-	-	-	g
Hand Auger 20	3.9	4.9	1.20	1.50	C	10YR	pale brown	m	0			vfr	SL	-	-	-	-
Hand Auger 21	0.0	2.0	0.00	0.60	Ap												c

**Appendix A. Core and Auger Soil Descriptions**

Core or Hand Auger No.	Min. Depth (feet)	Max. Depth (feet)	Min. Depth (meters)	Max. Depth (meters)	Soil Horizon	Color Type-Munsell Designation	Color Name (Munsell or General)	Structure Type	Gravel %	Gravel Size	Gravel Shape	Consistency Moist	Texture 1	Clay Film Amount	Clay Film Visibility	Clay Film Location	Contact Transition	
Hand Auger 22	0.0	1.6	0.00	0.50	Ap													
Hand Auger 22	1.6	4.9	0.50	1.50	A	10YR 2/1	black		0			fi	CL	-	-	-	-	d
Hand Auger 22	4.9	5.6	1.50	1.70	Bk	10YR	dark gray		0			fi	CL	-	-	-	-	d
Hand Auger 22	5.6	6.2	1.70	1.90	C	10YR	brown		0			fi	L	-	-	-	-	-

**APPENDIX B**

**CATALOGUE**

## Appendix B: Catalogue Key

Phase	Project Phase
Resource	Site Trinomial, Primary Number, Agency Number, or other Site/Isolate Name
Acc No	NoAcc - No Accession Number
Cat No	Catalogue Number
Prov Type	Provenience Type (e.g. unit, sample, trench)
Prov Name	Provenience Name
Sample	Sample Name of Prov Name
Horizon	Horizon
Top Depth	Top depth in centimeters below surface
Bottom Depth	Bottom depth in centimeters below surface
Depth Type	Unit of measure for top depth and bottom depth values
Mesh	Screen mesh size in inches
Class	Class designation: BOT - Botanical Remains FAU - Faunal Remains FLS - Flaked Stone (prehistoric) GDS - Ground Stone (prehistoric) INH - Indefinite use historic (historical) SOL - Soil/Sediment
Description	Description
CND	Condition: RIM - Rim fragment WHL - Whole
MTL	Material: BON - Bone/enamel CCS - Cryptocrystalline silicate FRN - Franciscan Chert GLS - Glass GRN - Granite MNT - Monterey Chert OBS - Obsidian SHL - Shell
CT	Count of Description. A count of "0" indicates that the item was uncounted, likely due to high material fragmentation (e.g. shell, charcoal)
WT	Weight in grams
Comments	Any additional information
FWCatID	Unique Far Western Catalogue Number

Appendix B: Catalogue

Phase	Resource	Acc No	Cat No	Prov Type	Prov Name	Sample	Horizon	Top Depth	Bottom Depth	Depth Type	Mesh	Class	Description	CND	MTL	CT	WT	Comments	FWCatID
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	1	Sample (non-unit)	Core 45	Sample 12	2Ab	5	10 feet	-	-	SOL	Soil sample	-	-	1	-		391088
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	2	Sample (non-unit)	Core 45	Sample 13	Ap	0	5 feet	-	-	SOL	Soil sample	-	-	1	-		391089
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	3	Sample (non-unit)	Core 45.1	Sample 14	AC	0	2 feet	-	-	SOL	Soil sample	-	-	1	-		391090
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	4	Sample (non-unit)	Core 45.1	Sample 15	2Ab	4.5	6 feet	-	-	SOL	Soil sample	-	-	1	-		391091
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	5	Sample (non-unit)	Core 46	Sample 16	Ap	0	8 feet	-	-	SOL	Soil sample	-	-	1	-		391092
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	6	Sample (non-unit)	Core 46	Sample 17	2Ab	8	10 feet	-	-	SOL	Soil sample	-	-	1	-		391093
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	7	Sample (non-unit)	Core 47	Sample 18	Ap	0	4.5 feet	-	-	SOL	Soil sample	-	-	1	-		391094
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	8	Sample (non-unit)	Core 47	Sample 19	2Ab	4.5	6 feet	-	-	SOL	Soil sample	-	-	1	-		391095
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	9	Sample (non-unit)	Core 47.1	Sample 20	Ap	0	4.5 feet	-	-	SOL	Soil sample	-	-	1	-		391096
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	10	Sample (non-unit)	Core 47.1	Sample 21	2Ab	4.5	7 feet	-	-	SOL	Soil sample	-	-	1	-		391097
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	11	Sample (non-unit)	Core 48	Sample 22	Ap1	0	2 feet	-	-	SOL	Soil sample	-	-	1	-		391098
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	12	Sample (non-unit)	Core 48	Sample 23	Ap2	2	4.5 feet	-	-	SOL	Soil sample	-	-	1	-		391099
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	13	Sample (non-unit)	Core 48	Sample 24	2Ab	4.5	6 feet	-	-	SOL	Soil sample	-	-	1	-		391100
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	14	Sample (non-unit)	Core 49	Sample 25	Ap1	0	2 feet	-	-	SOL	Soil sample	-	-	1	-		391101
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	15	Sample (non-unit)	Core 49	Sample 26	Ap2	2	10 feet	-	-	SOL	Flotation sample	-	-	1	-		391102
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	16	Sample (non-unit)	Core 50	Sample 27	Ap	0	2.5 feet	-	-	SOL	Soil sample	-	-	1	-		391103
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	17	Sample (non-unit)	Core 50	Sample 28	2Ab1	2.5	4.5 feet	-	-	SOL	Soil sample	-	-	1	-		391104
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	18	Sample (non-unit)	Core 50	Sample 29	2Ab2	4.5	6.5 feet	-	-	SOL	Soil sample	-	-	1	-		391105
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	19	Sample (non-unit)	Core 50	Sample 30	2Ab3	6.5	8 feet	-	-	SOL	Soil sample	-	-	1	-		391106
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	20	Sample (non-unit)	Core 21.1	Sample 45	Ap	0	4 feet	-	-	SOL	Soil sample	-	-	1	-		391121
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	21	Sample (non-unit)	Core 21.1	Sample 46	2Ab	4	4.5 feet	-	-	SOL	Soil sample	-	-	1	-		391122
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	22	Sample (non-unit)	Core 21.1	Sample 47	3Ab	8	9.5 feet	-	-	SOL	Soil sample	-	-	1	-		391123
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	23	Sample (non-unit)	Core 21.1	Sample 48	3Ab	8	8 feet	-	-	SOL	Soil sample	-	-	1	-		391124
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	24	Sample (non-unit)	Core 21	Sample 49	Ap	0	4.5 feet	-	-	SOL	Soil sample	-	-	1	-		391125
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	25	Sample (non-unit)	Core 21	Sample 50	2Ab	4.5	5 feet	-	-	SOL	Soil sample	-	-	1	-		391126
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	26	Sample (non-unit)	Core HA01	Sample 80	2Ab	200	250 cmts	-	-	SOL	Flotation sample	-	-	1	5000		391156
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	27	Sample (non-unit)	Core HA02	Sample 81	3Ab	150	215 cmts	-	-	SOL	Flotation sample	-	-	1	4200		391157
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	28	Sample (non-unit)	Core HA02	Sample 82	4AC	270	305 cmts	-	-	SOL	Flotation sample	-	-	1	3600		391158
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	29	Sample (non-unit)	Core HA03	Sample 83	3Ab	150	230 cmts	-	-	SOL	Flotation sample	-	-	1	5200		391159
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	30	Sample (non-unit)	Core HA03	Sample 84	4AC	270	305 cmts	-	-	SOL	Flotation sample	-	-	1	3200		391160
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	31	Sample (non-unit)	Core 49	Sample 26	Ap2	2	10 feet	-	-	BOT	Light fraction	-	-	1	-		391173
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	32	Sample (non-unit)	Core HA01	Sample 80	2Ab	200	250 cmts	-	-	BOT	Light fraction	-	-	1	6.5		391174
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	33	Sample (non-unit)	Core HA02	Sample 81	3Ab	150	215 cmts	-	-	BOT	Light fraction	-	-	1	5.3		391175
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	34	Sample (non-unit)	Core HA02	Sample 82	4AC	270	305 cmts	-	-	BOT	Light fraction	-	-	1	3.2		391176
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	35	Sample (non-unit)	Core HA03	Sample 83	3Ab	150	230 cmts	-	-	BOT	Light fraction	-	-	1	3.4		391177
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	36	Sample (non-unit)	Core HA03	Sample 84	4AC	270	305 cmts	-	-	BOT	Light fraction	-	-	1	3.9		391178
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	37	Sample (non-unit)	Core 45	Sample 12	2Ab	5	10 feet	1/8	FAU	Shell	Shell	-	SHL	0	0.6		391183
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	38	Sample (non-unit)	Core 45	Sample 13	Ap	0	5 feet	1/8	FAU	Shell	Shell	-	SHL	0	1.6		391184
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	39	Sample (non-unit)	Core 45.1	Sample 14	AC	0	2 feet	1/8	FAU	Shell	Shell	-	SHL	0	1.7		391185
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	40	Sample (non-unit)	Core 46	Sample 16	Ap	0	8 feet	1/8	FAU	Shell	Shell	-	SHL	0	10.7		391186
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	41	Sample (non-unit)	Core 47	Sample 18	Ap	0	4.5 feet	1/8	FAU	Shell	Shell	-	SHL	0	9.7		391187
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	42	Sample (non-unit)	Core 47	Sample 19	2Ab	4.5	6 feet	1/8	FAU	Bone	Bone	-	BON	1	0.1		391188
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	43	Sample (non-unit)	Core 47	Sample 20	2Ab	4.5	6 feet	1/8	FAU	Shell	Shell	-	SHL	0	2.3		391189
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	44	Sample (non-unit)	Core 47.1	Sample 20	Ap	0	4.5 feet	1/8	FAU	Shell	Shell	-	SHL	0	38.1		391190
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	45	Sample (non-unit)	Core 47.1	Sample 21	2Ab	4.5	7 feet	1/8	FAU	Shell	Shell	-	SHL	0	12.1		391191
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	46	Sample (non-unit)	Core 48	Sample 22	Ap1	0	2 feet	1/8	FAU	Shell	Shell	-	SHL	0	1.9		391192
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	47	Sample (non-unit)	Core 48	Sample 23	Ap2	2	4.5 feet	1/8	FAU	Bone	Bone	-	BON	1	0.2		391193

Appendix B: Catalogue

Phase	Resource	Acc No	Cat No	Prov Type	Prov Name	Sample	Horizon	Top Depth	Bottom Depth	Depth Type	Mesh	Class	Description	CND	MTL	CT	WT	Comments	FWCatID
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	48	Sample (non-unit)	Core 48	Sample 23	Ap2	2	4.5 feet	1/8	FAU	Shell		-	SHL	0	20.8		391194
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	49	Sample (non-unit)	Core 48	Sample 24	2Ab	4.5	6 feet	1/8	FAU	Shell		-	SHL	0	0.6		391195
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	50	Sample (non-unit)	Core 49	Sample 26	Ap2	2	10 feet	1/8	FLS	Deblitage		-	FRN	1	0.2		391196
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	51	Sample (non-unit)	Core 49	Sample 26	Ap2	2	10 feet	1/8	FLS	Deblitage		-	CCS	1	0.1		391197
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	52	Sample (non-unit)	Core 49	Sample 26	Ap2	2	10 feet	1/8	FLS	Deblitage		-	MNT	2	0.1		391198
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	53	Sample (non-unit)	Core 49	Sample 26	Ap2	2	10 feet	1/8	FAU	Bone		-	BON	2	0.1		391199
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	54	Sample (non-unit)	Core 49	Sample 26	Ap2	2	10 feet	1/8	FAU	Fish bone		-	BON	1	0.1		391200
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	55	Sample (non-unit)	Core 49	Sample 26	Ap2	2	10 feet	1/8	FAU	Shell		-	SHL	0	14.7		391201
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	56	Sample (non-unit)	Core 50	Sample 30	2Ab3	6.5	8 feet	1/8	FAU	Bone		-	BON	2	0.1		391202
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	57	Sample (non-unit)	Core 50	Sample 30	2Ab3	6.5	8 feet	1/8	FAU	Shell		-	SHL	0	0.5		391203
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	58	Sample (non-unit)	Core 21.1	Sample 45	Ap	0	4 feet	1/8	FAU	Shell		-	SHL	0	6.1		391213
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	59	Sample (non-unit)	Core 21.1	Sample 47	3Ab	8	9.5 feet	1/8	FLS	Core	WHL	MNT	1	83.8			391214
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	60	Sample (non-unit)	Core 21	Sample 49	Ap	0	4.5 feet	1/8	FAU	Shell		-	SHL	0	1.6		391215
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	61	Sample (non-unit)	Core HA01	Sample 80	2Ab	200	250 cmts	1/8	FLS	Deblitage		-	OBS	1	0.1		391317
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	62	Sample (non-unit)	Core HA01	Sample 80	2Ab	200	250 cmts	1/8	FLS	Deblitage		-	CCS	9	0.3		391318
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	63	Sample (non-unit)	Core HA01	Sample 80	2Ab	200	250 cmts	1/8	FLS	Deblitage		-	FRN	1	0.1		391319
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	64	Sample (non-unit)	Core HA01	Sample 80	2Ab	200	250 cmts	1/8	FLS	Deblitage		-	MNT	4	0.2		391320
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	65	Sample (non-unit)	Core HA01	Sample 80	2Ab	200	250 cmts	1/8	FAU	Bone		-	BON	23	0.6		391321
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	66	Sample (non-unit)	Core HA01	Sample 80	2Ab	200	250 cmts	1/8	FAU	Fish bone		-	BON	7	0.2		391322
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	67	Sample (non-unit)	Core HA01	Sample 80	2Ab	200	250 cmts	1/16	FAU	Fish bone		-	BON	8	0.4		391323
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	68	Sample (non-unit)	Core HA01	Sample 80	2Ab	200	250 cmts	1/8	FAU	Shell		-	SHL	0	12.3		391324
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	69	Sample (non-unit)	Core HA02	Sample 81	3Ab	150	215 cmts	1/8	FLS	Deblitage		-	MNT	26	1.4		391328
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	70	Sample (non-unit)	Core HA02	Sample 81	3Ab	150	215 cmts	1/8	FLS	Deblitage		-	CCS	19	0.6		391329
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	71	Sample (non-unit)	Core HA02	Sample 81	3Ab	150	215 cmts	1/8	FAU	Bone		-	BON	12	3.4		391330
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	72	Sample (non-unit)	Core HA02	Sample 81	3Ab	150	215 cmts	1/8	FAU	Fish bone		-	BON	29	0.5		391331
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	73	Sample (non-unit)	Core HA02	Sample 81	3Ab	150	215 cmts	1/16	FAU	Fish bone		-	BON	100	0.6		391332
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	74	Sample (non-unit)	Core HA02	Sample 82	4Ac	270	305 cmts	1/8	FLS	Deblitage		-	MNT	2	0.2		391464
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	75	Sample (non-unit)	Core HA02	Sample 82	4Ac	270	305 cmts	1/8	FAU	Bone		-	BON	32	0.8		391465
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	76	Sample (non-unit)	Core HA02	Sample 82	4Ac	270	305 cmts	1/8	FAU	Fish bone		-	BON	12	0.2		391466
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	77	Sample (non-unit)	Core HA02	Sample 82	4Ac	270	305 cmts	1/16	FAU	Fish bone		-	BON	62	0.3		391467
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	78	Sample (non-unit)	Core HA02	Sample 82	4Ac	270	305 cmts	1/8	FAU	Shell		-	SHL	0	53		391468
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	79	Sample (non-unit)	Core HA03	Sample 83	3Ab	150	230 cmts	1/8	FLS	Deblitage		-	MNT	11	0.3		391469
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	80	Sample (non-unit)	Core HA03	Sample 83	3Ab	150	230 cmts	1/8	FLS	Deblitage		-	CCS	2	1		391470
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	81	Sample (non-unit)	Core HA03	Sample 83	3Ab	150	230 cmts	1/8	FAU	Bone		-	BON	10	0.9		391471
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	82	Sample (non-unit)	Core HA03	Sample 83	3Ab	150	230 cmts	1/8	FAU	Fish bone		-	BON	6	0.2		391472
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	83	Sample (non-unit)	Core HA03	Sample 83	3Ab	150	230 cmts	1/16	FAU	Fish bone		-	BON	32	0.2		391473
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	84	Sample (non-unit)	Core HA03	Sample 83	3Ab	150	230 cmts	1/8	FAU	Shell		-	SHL	0	32.1		391474
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	85	Sample (non-unit)	Core HA03	Sample 84	4Ac	270	305 cmts	1/8	FLS	Deblitage		-	MNT	4	0.2		391475
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	86	Sample (non-unit)	Core HA03	Sample 84	4Ac	270	305 cmts	1/8	FAU	Bone		-	BON	104	14.9		391476
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	87	Sample (non-unit)	Core HA03	Sample 84	4Ac	270	305 cmts	1/8	FAU	Fish bone		-	BON	1	0.1		391477
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	88	Sample (non-unit)	Core HA03	Sample 84	4Ac	270	305 cmts	1/16	FAU	Fish bone		-	BON	2	0.1		391478
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	89	Sample (non-unit)	Core HA03	Sample 84	4Ac	270	305 cmts	1/8	FAU	Shell		-	SHL	0	3.7		391479
Geotech Testing 2020 FW	CA-SLO-0016	NoAcc	90	Sample (non-unit)	Core HA02	Sample 81	3Ab	150	215 cmts	1/8	FAU	Shell		-	SHL	0	231.2		391558
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	1	Sample (non-unit)	Core 26	Sample 31	Ap	0	5 feet	-	SOL	Soil sample		-	-	1	-		391107
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	2	Sample (non-unit)	Core 27	Sample 32	Ap1	0	5 feet	-	SOL	Soil sample		-	-	1	-		391108
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	3	Sample (non-unit)	Core 27	Sample 33	Ap2	5	7 feet	-	SOL	Soil sample		-	-	1	-		391109
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	4	Sample (non-unit)	Core 27	Sample 34	2Ac	7	10 feet	-	SOL	Soil sample		-	-	1	-		391110

Appendix B: Catalogue

Phase	Resource	Acc No	Cat No	Prov Type	Prov Name	Sample	Horizon	Top Depth	Bottom Depth	Depth Type	Mesh	Class	Description	CND	MTL	CT	WT	Comments	FWCatID
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	5	Sample (non-unit)	Core 26	Sample 31	Ap	0	5 feet	1/8	FAU	Shell	Shell	-	SHL	0	11.2		391204
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	6	Sample (non-unit)	Core 26	Sample 31	Ap	0	5 feet	1/8	INH	Glass	Glass	-	GLS	2	1.1	one colorless; one grc	391205
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	7	Sample (non-unit)	Core 27	Sample 32	Ap1	0	5 feet	1/8	FAU	Shell	Shell	-	SHL	0	3.1		391206
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	8	Sample (non-unit)	Core 27	Sample 32	Ap1	0	5 feet	1/8	INH	Glass	Glass	-	GLS	1	0.1	amber	391207
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	9	Sample (non-unit)	Core 27	Sample 33	Ap2	5	7 feet	1/8	FLS	Debitage	Debitage	-	FRN	1	0.2		391208
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	10	Sample (non-unit)	Core 27	Sample 33	Ap2	5	7 feet	1/8	FAU	Bone	Bone	-	BON	2	0.1		391209
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	11	Sample (non-unit)	Core 27	Sample 33	Ap2	5	7 feet	1/8	FAU	Shell	Shell	-	SHL	0	15.1		391210
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	12	Sample (non-unit)	Core 27	Sample 33	Ap2	5	7 feet	1/8	INH	Glass	Glass	-	GLS	1	0.3	colorless	391211
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	13	Sample (non-unit)	Core 51	Sample E	Ap1	0	182.88 cmts	1/8	FAU	Shell	Shell	-	SHL	0	4.2		394331
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	14	Sample (non-unit)	Core 51	Sample F	Ap2	182.88	198.12 cmts	1/8	FAU	Shell	Shell	-	SHL	0	0.1		394332
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	15	Sample (non-unit)	Core 52	Sample H	Ap	0	60.96 cmts	1/8	FAU	Shell	Shell	-	SHL	0	0.1		394333
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	16	Sample (non-unit)	Core 53	Sample K	Ap	0	60.96 cmts	1/8	FAU	Shell	Shell	-	SHL	0	0.1		394334
Geotech Testing 2020 FW	CA-SLO-0239	NoAcc	17	Sample (non-unit)	Core 54	Sample N	Ap	0	167.64 cmts	1/8	FAU	Shell	Shell	-	SHL	0	0.2		394335
Geotech Testing 2020 FW	CA-SLO-2022	NoAcc	1	Sample (non-unit)	Cutbank	-	-	-	-	-	FAU	Shell	Shell	-	SHL	0	8.9		391225
Geotech Testing 2020 FW	Non-site	NoAcc	1	Sample (non-unit)	Core 28	Sample 01	2Ab	7	9 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391077
Geotech Testing 2020 FW	Non-site	NoAcc	2	Sample (non-unit)	Core 29	Sample 02	2Ab	8	9 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391078
Geotech Testing 2020 FW	Non-site	NoAcc	3	Sample (non-unit)	Core 30	Sample 03	Ap1	0	2 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391079
Geotech Testing 2020 FW	Non-site	NoAcc	4	Sample (non-unit)	Core 30	Sample 04	2Ab	9.5	10 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391080
Geotech Testing 2020 FW	Non-site	NoAcc	5	Sample (non-unit)	Core 31	Sample 05	Ap1	0	2 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391081
Geotech Testing 2020 FW	Non-site	NoAcc	6	Sample (non-unit)	Core 32	Sample 06	Ap1	0	2 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391082
Geotech Testing 2020 FW	Non-site	NoAcc	7	Sample (non-unit)	Core 33	Sample 07	2Ab	8	10 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391083
Geotech Testing 2020 FW	Non-site	NoAcc	8	Sample (non-unit)	Core 36	Sample 08	3Ab	9.5	10 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391084
Geotech Testing 2020 FW	Non-site	NoAcc	9	Sample (non-unit)	Core 39	Sample 09	2Ab	9	10 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391085
Geotech Testing 2020 FW	Non-site	NoAcc	10	Sample (non-unit)	Core 40	Sample 10	2Ab	8	9 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391086
Geotech Testing 2020 FW	Non-site	NoAcc	11	Sample (non-unit)	Core 44	Sample 11	2Ab	6	8 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391087
Geotech Testing 2020 FW	Non-site	NoAcc	12	Sample (non-unit)	Core 24	Sample 35	2Ab	2.5	5 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391111
Geotech Testing 2020 FW	Non-site	NoAcc	13	Sample (non-unit)	Core 24	Sample 36	3Ab	6	6 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391112
Geotech Testing 2020 FW	Non-site	NoAcc	14	Sample (non-unit)	Core 24	Sample 37	3Ab	6	8 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391113
Geotech Testing 2020 FW	Non-site	NoAcc	15	Sample (non-unit)	Core 25	Sample 38	2Ab	5	9 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391114
Geotech Testing 2020 FW	Non-site	NoAcc	16	Sample (non-unit)	Core 25	Sample 39	2Ab	9	9 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391115
Geotech Testing 2020 FW	Non-site	NoAcc	17	Sample (non-unit)	Core 23	Sample 40	Ap	0	5 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391116
Geotech Testing 2020 FW	Non-site	NoAcc	18	Sample (non-unit)	Core 23	Sample 41	2Ab	5	6 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391117
Geotech Testing 2020 FW	Non-site	NoAcc	19	Sample (non-unit)	Core 23	Sample 42	2AC	6	7 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391118
Geotech Testing 2020 FW	Non-site	NoAcc	20	Sample (non-unit)	Core 22	Sample 43	2Ab	4	6 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391119
Geotech Testing 2020 FW	Non-site	NoAcc	21	Sample (non-unit)	Core 22	Sample 44	2AC	6	7 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391120
Geotech Testing 2020 FW	Non-site	NoAcc	22	Sample (non-unit)	Core 20.1	Sample 51	Ap	0	4 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391127
Geotech Testing 2020 FW	Non-site	NoAcc	23	Sample (non-unit)	Core 20.1	Sample 52	2Ab	4	5 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391128
Geotech Testing 2020 FW	Non-site	NoAcc	24	Sample (non-unit)	Core 20.1	Sample 53	3Ab	8	9.5 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391129
Geotech Testing 2020 FW	Non-site	NoAcc	25	Sample (non-unit)	Core 20.1	Sample 54	3Ab	8	8 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391130
Geotech Testing 2020 FW	Non-site	NoAcc	26	Sample (non-unit)	Core 20	Sample 55	Ap	0	4.5 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391131
Geotech Testing 2020 FW	Non-site	NoAcc	27	Sample (non-unit)	Core 20	Sample 56	2Ab	4.5	5.5 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391132
Geotech Testing 2020 FW	Non-site	NoAcc	28	Sample (non-unit)	Core 02	Sample 57	2Ab	4.5	5 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391133
Geotech Testing 2020 FW	Non-site	NoAcc	29	Sample (non-unit)	Core 02	Sample 58	3AC	6.5	8 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391134
Geotech Testing 2020 FW	Non-site	NoAcc	30	Sample (non-unit)	Core 03	Sample 59	2Ab	5	6 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391135
Geotech Testing 2020 FW	Non-site	NoAcc	31	Sample (non-unit)	Core 04	Sample 60	2Ab	5.5	8 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391136
Geotech Testing 2020 FW	Non-site	NoAcc	32	Sample (non-unit)	Core 05	Sample 61	Ap	0	5 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391137
Geotech Testing 2020 FW	Non-site	NoAcc	33	Sample (non-unit)	Core 05	Sample 62	2Ab	5	7 feet	-	SOL	Soil sample	Soil sample	-	-	1	-		391138

Appendix B: Catalogue

Phase	Resource	Acc No	Cat No	Prov Type	Prov Name	Sample	Horizon	Top Depth	Bottom Depth	Depth Type	Mesh	Class	Description	CND	MTL	CT	WT	Comments	FWCatID
Geotech Testing 2020 FW	Non-site	NoAcc	34	Sample (non-unit)	Core 06	Sample 63	2Ab	5	7	feet	-	SOL	Soil sample	-	-	1	-		391139
Geotech Testing 2020 FW	Non-site	NoAcc	35	Sample (non-unit)	Core 07	Sample 64	Ap	0	5	feet	-	SOL	Soil sample	-	-	1	-		391140
Geotech Testing 2020 FW	Non-site	NoAcc	36	Sample (non-unit)	Core 07	Sample 65	2AC	5	6	feet	-	SOL	Soil sample	-	-	1	-		391141
Geotech Testing 2020 FW	Non-site	NoAcc	37	Sample (non-unit)	Core 07	Sample 66	3AC	9	10	feet	-	SOL	Soil sample	-	-	1	-		391142
Geotech Testing 2020 FW	Non-site	NoAcc	38	Sample (non-unit)	Core 08	Sample 67	3AG	5.5	7	feet	-	SOL	Soil sample	-	-	1	-		391143
Geotech Testing 2020 FW	Non-site	NoAcc	39	Sample (non-unit)	Core 11	Sample 68	3AC	5.5	6.5	feet	-	SOL	Soil sample	-	-	1	-		391144
Geotech Testing 2020 FW	Non-site	NoAcc	40	Sample (non-unit)	Core 12	Sample 69	3Ab	5.5	5	feet	-	SOL	Soil sample	-	-	1	-		391145
Geotech Testing 2020 FW	Non-site	NoAcc	41	Sample (non-unit)	Core 19	Sample 70	2Ab	5.5	6	feet	-	SOL	Soil sample	-	-	1	-		391146
Geotech Testing 2020 FW	Non-site	NoAcc	42	Sample (non-unit)	Core 18	Sample 71	3Ab	5.5	6.5	feet	-	SOL	Soil sample	-	-	1	-		391147
Geotech Testing 2020 FW	Non-site	NoAcc	43	Sample (non-unit)	Core 17	Sample 72	3Ab	5	7	feet	-	SOL	Soil sample	-	-	1	-		391148
Geotech Testing 2020 FW	Non-site	NoAcc	44	Sample (non-unit)	Core 16	Sample 73	3Ab	5.5	6	feet	-	SOL	Soil sample	-	-	1	-		391149
Geotech Testing 2020 FW	Non-site	NoAcc	45	Sample (non-unit)	Core 16	Sample 74	4Ab	9	10	feet	-	SOL	Soil sample	-	-	1	-		391150
Geotech Testing 2020 FW	Non-site	NoAcc	46	Sample (non-unit)	Core 16	Sample 75	4Ab	9	9	feet	-	SOL	Soil sample	-	-	1	-		391151
Geotech Testing 2020 FW	Non-site	NoAcc	47	Sample (non-unit)	Core 15	Sample 76	3Ab	6	7	feet	-	SOL	Soil sample	-	-	1	-		391152
Geotech Testing 2020 FW	Non-site	NoAcc	48	Sample (non-unit)	Core 15	Sample 77	4AC	8.5	10	feet	-	SOL	Soil sample	-	-	1	-		391153
Geotech Testing 2020 FW	Non-site	NoAcc	49	Sample (non-unit)	Core 14	Sample 78	4AC	8	10	feet	-	SOL	Soil sample	-	-	1	-		391154
Geotech Testing 2020 FW	Non-site	NoAcc	50	Sample (non-unit)	Core 13	Sample 79	3AC	4.5	5	feet	-	SOL	Soil sample	-	-	1	-		391155
Geotech Testing 2020 FW	Non-site	NoAcc	51	Sample (non-unit)	Core HA07	Sample 85	A1	0	30	cmbs	-	SOL	Soil sample	-	-	1	-		391161
Geotech Testing 2020 FW	Non-site	NoAcc	52	Sample (non-unit)	Core HA07	Sample 86	A2	30	100	cmbs	-	SOL	Soil sample	-	-	1	-		391162
Geotech Testing 2020 FW	Non-site	NoAcc	53	Sample (non-unit)	Core HA08	Sample 87	2AC	40	60	cmbs	-	SOL	Soil sample	-	-	1	-		391163
Geotech Testing 2020 FW	Non-site	NoAcc	54	Sample (non-unit)	Core HA09	Sample 88	A	0	50	cmbs	-	SOL	Soil sample	-	-	1	-		391164
Geotech Testing 2020 FW	Non-site	NoAcc	55	Sample (non-unit)	Core HA14	Sample 89	A	130	160	cmbs	-	SOL	Soil sample	-	-	1	-		391165
Geotech Testing 2020 FW	Non-site	NoAcc	56	Sample (non-unit)	Core HA16	Sample 90	A	30	100	cmbs	-	SOL	Soil sample	-	-	1	-		391166
Geotech Testing 2020 FW	Non-site	NoAcc	57	Sample (non-unit)	Core HA17	Sample 91	A	30	130	cmbs	-	SOL	Soil sample	-	-	1	-		391167
Geotech Testing 2020 FW	Non-site	NoAcc	58	Sample (non-unit)	Core HA18	Sample 92	A	30	50	cmbs	-	SOL	Soil sample	-	-	1	-		391168
Geotech Testing 2020 FW	Non-site	NoAcc	59	Sample (non-unit)	Core HA19	Sample 93	A	30	60	cmbs	-	SOL	Soil sample	-	-	1	-		391169
Geotech Testing 2020 FW	Non-site	NoAcc	60	Sample (non-unit)	Core HA20	Sample 94	Ap	0	90	cmbs	-	SOL	Soil sample	-	-	1	-		391170
Geotech Testing 2020 FW	Non-site	NoAcc	61	Sample (non-unit)	Core HA20	Sample 95	A	90	120	cmbs	-	SOL	Soil sample	-	-	1	-		391171
Geotech Testing 2020 FW	Non-site	NoAcc	62	Sample (non-unit)	Core HA21	Sample 96	A	50	150	cmbs	-	SOL	Soil sample	-	-	1	-		391172
Geotech Testing 2020 FW	Non-site	NoAcc	63	Sample (non-unit)	Core 30	Sample 03	Ap1	0	2	feet	1/8	FLS	Debltage	-	CCS	1	0.1		391179
Geotech Testing 2020 FW	Non-site	NoAcc	64	Sample (non-unit)	Core 30	Sample 03	Ap1	0	2	feet	1/8	FAU	Shell	-	SHL	0	1.3		391180
Geotech Testing 2020 FW	Non-site	NoAcc	65	Sample (non-unit)	Core 31	Sample 05	Ap1	0	2	feet	1/8	FAU	Shell	-	SHL	0	1		391181
Geotech Testing 2020 FW	Non-site	NoAcc	66	Sample (non-unit)	Core 31	Sample 05	Ap1	0	2	feet	1/8	INH	Glass	-	GLS	1	0.2	colorless	391182
Geotech Testing 2020 FW	Non-site	NoAcc	67	Sample (non-unit)	Core 23	Sample 42	2AC	6	7	feet	1/8	GDS	Mortar	RIM	GRN	1	122.2		391212
Geotech Testing 2020 FW	Non-site	NoAcc	68	Sample (non-unit)	Core 05	Sample 61	Ap	0	5	feet	1/8	FLS	Debltage	-	MNT	1	0.1		391216
Geotech Testing 2020 FW	Non-site	NoAcc	69	Sample (non-unit)	Core 05	Sample 61	Ap	0	5	feet	1/8	FAU	Shell	-	SHL	0	7.3		391217
Geotech Testing 2020 FW	Non-site	NoAcc	70	Sample (non-unit)	Core 07	Sample 64	Ap	0	5	feet	1/8	FLS	Debltage	-	MNT	1	0.3		391218
Geotech Testing 2020 FW	Non-site	NoAcc	71	Sample (non-unit)	Core 07	Sample 64	Ap	0	5	feet	1/8	FAU	Shell	-	SHL	0	3.3		391219
Geotech Testing 2020 FW	Non-site	NoAcc	72	Sample (non-unit)	Core HA20	Sample 94	Ap	0	90	cmbs	1/8	FAU	Shell	-	SHL	0	4		391220
Geotech Testing 2020 FW	Non-site	NoAcc	73	Sample (non-unit)	Core HA20	Sample 94	Ap	0	90	cmbs	1/8	INH	Glass	-	GLS	1	1.1	amber	391221
Geotech Testing 2020 FW	Non-site	NoAcc	74	Sample (non-unit)	Core HA20	Sample 95	A	90	120	cmbs	1/8	FAU	Bone	-	BON	1	0.6		391222
Geotech Testing 2020 FW	Non-site	NoAcc	75	Sample (non-unit)	Core HA20	Sample 95	A	90	120	cmbs	1/8	FAU	Shell	-	SHL	0	1.2		391223
Geotech Testing 2020 FW	Non-site	NoAcc	76	Sample (non-unit)	Core HA20	Sample 95	A	90	120	cmbs	1/8	INH	Glass	-	GLS	1	0.2	colorless	391224
Geotech Testing 2020 FW	Non-site	NoAcc	77	Sample (non-unit)	Core 56	Sample T	Ap1	0	137.16	cmbs	1/8	FAU	Shell	-	SHL	0	0.1		394336

**APPENDIX C**

**RADIOCARBON DATING RESULTS**

## Appendix C: Radiocarbon Results Summary

Resource	Cat No	Prov Name	Level/Sample	Horizon	Top Depth	Bottom Depth	Depth Type	FW C14 ID	Lab Facility	Lab Number	Sample Description	Sample Weight (g)	Delta 13C	Conventional 14C Age (BP)	14C Error	Median Probability (cal BP)	2-Sigma Range (cal BP)	2-Sigma Relative Area	Calibration Method
Non-site	101	Core HA03	Sample 83	3Ab	150	230	cmb	2468	DirectAMS	D-AMS 038511	Charcoal - Wood	0.0106	-	2074	22	2042	2118-1990	1	calb 7.04 IntCal13 (Reimer et al. 2013)
Non-site	102	Core HA03	Sample 84	4AC	270	305	cmb	2469	DirectAMS	D-AMS 038512	Charcoal - Wood	0.0116	-	2416	25	2432	2494-2353	0.87	calb 7.04 IntCal13 (Reimer et al. 2013)
Non-site	172	Core HA03	Sample 83	3Ab	150	230	cmb	2470	DirectAMS	D-AMS 038513	Shell - Clam	0.3	-	2566	53	1922	2084-1784	1	calb 7.04 Marine13 (Reimer et al. 2013); 260±40
Non-site	177	Core HA03	Sample 84	4AC	270	305	cmb	2471	DirectAMS	D-AMS 038514	Shell - Clam	0.1	-	2643	46	2012	2140-1877	1	calb 7.04 Marine13 (Reimer et al. 2013); 260±40
Non-site	147	Core HA20	Sample 95	A	90	120	cmb	2472	DirectAMS	D-AMS 038515	Shell - Clam	0.4	-	5441	49	5540	5656-5428	1	calb 7.04 Marine13 (Reimer et al. 2013); 260±40
Non-site	147	Core HA20	Sample 95	A	90	120	cmb	2473	DirectAMS	D-AMS 038516	Shell - Clam	0.1	-	3886	47	3525	3650-3392	0.99	calb 7.04 Marine13 (Reimer et al. 2013); 260±40
CA-SLO-2022	1	Cutbank	-	-	-	-	-	2474	DirectAMS	D-AMS 038517	Shell - Clam	0.3	-	4122	47	3824	3970-3674	1	calb 7.04 Marine13 (Reimer et al. 2013); 260±40
CA-SLO-2022	1	Cutbank	-	-	-	-	-	2475	DirectAMS	D-AMS 038518	Shell - Clam	1.7	-	4807	34	4746	4858-4674	1	calb 7.04 Marine13 (Reimer et al. 2013); 260±40



Report: **1600-038511-038518**

20 July 2020

Customer: 1600  
 Laura Harold  
 Far Western Anthropological Research Group, Inc.  
 2727 Del Rio Place, Suite A  
 Davis, CA 95618  
 USA

Samples submitted for radiocarbon dating have been processed and measured by AMS. The following results were obtained:

DirectAMS code	Submitter ID	Sample type	Fraction of modern		Radiocarbon age	
			pMC	1 $\sigma$ error	BP	1 $\sigma$ error
D-AMS 038511	2468	charcoal	77.25	0.21	2074	22
D-AMS 038512	2469	charcoal	74.03	0.23	2416	25
D-AMS 038513	2470	shell	72.66	0.36	2566	40
D-AMS 038514	2471	shell	71.96	0.27	2643	30
D-AMS 038515	2472	shell	50.80	0.22	5441	35
D-AMS 038516	2473	shell	61.65	0.24	3886	31
D-AMS 038517	2474	shell	59.86	0.23	4122	31
D-AMS 038518	2475	shell	54.97	0.23	4807	34

Results are presented in units of percent modern carbon (pMC) and the uncalibrated radiocarbon age before present (BP). All results have been corrected for isotopic fractionation with an unreported  $\delta^{13}\text{C}$  value measured on the prepared carbon by the accelerator. The pMC reported requires no further correction for fractionation.

**APPENDIX D**

**CONSTRUCTION MONITORING CONTACT TABLE**

**Appendix D. Morro Bay Water Reclamation Facility Project Construction  
Phase 2 Archaeological Monitoring Contact Table**

NAME	TITLE	ASSOCIATION	PHONE	ROLE
Rob Livick	Director	City of Morro Bay Public Works	(805) 772-6261	Project Lead for City; ensure EIR mitigation measures are met.
Eric Casares	Project Manager	City of Morro Bay	(559) 490-4361; (559) 240-2739 (mobile)	Provide accurate construction schedule to archaeological and Native American monitors within a reasonable time frame; assist in determining which construction activities require monitoring and when monitoring is no longer necessary; consult with archaeological Principal Investigator in the event of a discovery; contact Corner if human remains discovered.
Krisstin Haddick	Caltrans Project Archaeologist	Caltrans District 5	(805) 549-3193	Oversee any monitoring and/or discoveries made within portions of Construction Phase 2 in the Caltrans Right-of-way.
To be determined	Construction Manager			Provide accurate construction schedule (location, day, time, and nature of work) within reasonable time frame to City Project Manager; ensure monitors can safely observe construction activities; provide on-site assistance in the event of a discovery; contact City Project Manager and archaeological Principal Investigator in the event of a discovery when no monitor is present.
To be determined	Archaeological Principal Investigator			Consult with City Project Manager in determining which construction activities require monitoring and when monitoring is no longer necessary; Coordinate archaeological monitoring; consult with City Project Manager in event of a discovery; contact Corner if human remains discovered; submit weekly status reports to the City; prepare archaeological resources monitoring report at completion of monitoring for Construction Phase 1.
To be determined	Archaeological Monitor(s)			Observe construction activities requiring monitoring in accordance with monitoring plan, prepare daily logs to be included in weekly updates, photograph activities and resources, halt construction to observe potential resources, maintain contact with the Principal Investigator
To be determined	Native American Coordinator	To be determined		Coordinate Native American monitoring – oversee contracts, maintain contact, schedule monitor, resolve disputes in consultation with City Director and City Manager.
To be determined	Native American Monitor			Observe construction activities requiring monitoring in accordance with Monitoring Plan, prepare daily logs to be included in weekly updates submitted by Archaeological Principal Investigator
-	County Coroner	San Luis Obispo County	(805) 781-4513	Determine if human remains are Native American in origin and if so contact the Native American Heritage Commission.
-	-	Native American Heritage Commission	(916) 373-3710	Appoint a Most Likely Descendant for the project if human remains are determined to be Native American in origin.
To be determined	Most Likely Descendant	To be determined		Identified by the Native American Heritage Commission. Provides recommendations for disposition of Native American remains and associated materials, in consultation with City Director and Project Manager and Principal Investigator.