

**CONTRACT FOR CONSULTANT SERVICES BETWEEN
THE CITY OF WATSONVILLE AND SWT ENGINEERING**

THIS CONTRACT, is made and entered into this _____, by and between the **City of Watsonville**, a municipal corporation, hereinafter called "City," and **SWT ENGINEERING**, hereinafter called "Consultant."

WITNESSETH

WHEREAS, the City needs to obtain certain professional, technical and/or specialized services of an independent contractor to assist the City in the most economical manner; and

WHEREAS, Consultant has the requisite skill, training, qualifications, and experience to render such services called for under this Contract to City.

Table of Contents

SECTION 1. SCOPE OF SERVICES	2
SECTION 2. TERM OF CONTRACT	2
SECTION 3. SCHEDULE OF PERFORMANCE	2
SECTION 4. COMPENSATION	2
SECTION 5. METHOD OF PAYMENT	2
SECTION 6. INDEPENDENT CONSULTANT	2
SECTION 7. ASSIGNABILITY	2
SECTION 8. INDEMNIFICATION	2
SECTION 9. INSURANCE	3
SECTION 10. NON-DISCRIMINATION	4
SECTION 11. TERMINATION	4
SECTION 12. COMPLIANCE WITH LAWS	4
SECTION 13. GOVERNING LAW	4
SECTION 14. PRIOR CONTRACTS AND AMENDMENTS	4
SECTION 15. CONFIDENTIAL INFORMATION	4
SECTION 16. OWNERSHIP OF MATERIALS	5
SECTION 17. COVENANT AGAINST CONTINGENT FEES	5
SECTION 18. WAIVER	5
SECTION 19. CONFLICT OF INTEREST	5
SECTION 20. AUDIT BOOKS AND RECORDS	5
SECTION 21. NOTICES	6
SECTION 22. EXHIBITS:	6

o-0-o

THE PARTIES HEREBY AGREE AS FOLLOWS:

SECTION 1. SCOPE OF SERVICES.

Consultant shall perform those services as specified in detail in Exhibit "A," entitled "SCOPE OF SERVICES" which is attached hereto and incorporated herein.

SECTION 2. TERM OF CONTRACT.

The term of this Contract shall be from July 1, 2021 to June 30, 2024, inclusive.

SECTION 3. SCHEDULE OF PERFORMANCE.

The services of Consultant are to be completed according to the schedule set out in Exhibit "B," entitled "SCHEDULE OF PERFORMANCE," which is attached hereto and incorporated herein. Consultant will diligently proceed with the agreed Scope of Services and will provide such services in a timely manner in accordance with the "SCHEDULE OF PERFORMANCE."

SECTION 4. COMPENSATION.

The compensation to be paid to Consultant including both payment for professional services and reimbursable expenses as well as the rate and schedule of payment are set out in Exhibit "C" entitled "COMPENSATION," which is attached hereto and incorporated herein.

SECTION 5. METHOD OF PAYMENT.

Except as otherwise provided in Exhibit "C," each month, Consultant shall furnish to the City a statement of the work performed for compensation during the preceding month. Such statement shall also include a detailed record of the month's actual reimbursable expenditures.

SECTION 6. INDEPENDENT CONSULTANT.

It is understood and agreed that Consultant, in the performance of the work and services agreed to be performed by Consultant, shall act as and be an independent Consultant and not an agent or employee of City, and as an independent Consultant, shall obtain no rights to retirement benefits or other benefits which accrue to City's employees, and Consultant hereby expressly waives any claim it may have to any such rights.

SECTION 7. ASSIGNABILITY.

Consultant shall not assign or transfer any interest in this Contract nor the performance of any of Consultant's obligations hereunder, without the prior written consent of City, and any attempt by Consultant to so assign this Contract or any rights, duties or obligations arising hereunder shall be void and of no effect.

SECTION 8. INDEMNIFICATION.

Consultant has the expertise and experience necessary to perform the services and duties agreed to be performed by Consultant under this Contract, and City is relying upon the skill and knowledge of Consultant to perform said services and duties. Consultant shall defend, indemnify and hold harmless City, its officers and employees, against any loss or liability arising out of or resulting in any way from work performed

under this Contract due to the willful or negligent acts (active or passive) or errors or omissions by Consultant or Consultant's officers, employees or agents.

SECTION 9. INSURANCE.

A. **Errors and Omissions Insurance.** Consultant shall obtain and maintain in full force throughout the term of this Contract a professional liability insurance policy (Errors and Omissions), in a company authorized to issue such insurance in the State of California, with limits of liability of not less than One Million Dollars (\$1,000,000.00) to cover all professional services rendered pursuant to this Contract.

B. **Auto and Commercial General Liability Insurance.** Consultant shall also maintain in full force and effect for the term of this Contract, automobile insurance and commercial general liability insurance with an insurance carrier satisfactory to City, which insurance shall include protection against claims arising from bodily and personal injury, including death resulting therefrom, and damage to property resulting from any actual occurrence arising out of the performance of this Contract. The amounts of insurance shall not be less than the following:

(1) Commercial general liability insurance, or equivalent form, with a combined single limit of not less than \$1,000,000.00 per occurrence. If such insurance contains a general aggregate limit, such limit shall apply separately to each project Consultant performs for City. Such insurance shall (a) name City, its appointed and elected officials, and its employees as insureds; and (b) be primary with respect to insurance or self-insurance programs maintained by City and (c) contain standard separation of insured's provisions.

(2) Business automobile liability insurance, or equivalent form, with a combined single limit of not less than \$1,000,000.00 per occurrence. Such insurance shall include coverage for owned, hired and non-owned automobiles.

C. **Workers' Compensation Insurance.** In accordance with the provisions of Section 3700 of the Labor Code, Consultant shall be insured against liability for Workers' Compensation or undertake self-insurance. Consultant agrees to comply with such provisions before commencing performance of any work under this Contract.

D. **Proof of Insurance to City before Notice to Proceed to Work.** Consultant shall satisfactorily provide certificates and endorsements of insurance to the City Clerk before Notice to Proceed to Work of this Contract will be issued. Certificates and policies shall state that the policy shall not be canceled or reduced in coverage without thirty (30) days written notice to City. Approval of insurance by City shall not relieve or decrease the extent to which Consultant may be held responsible for payment of damages resulting from services or operations performed pursuant to this Contract. Consultant shall not perform any work under this Contract until Consultant has obtained the required insurance and until the required certificates have been submitted to the City and approved by the City Attorney. If Consultant fails or refuses to produce or maintain the insurance required by these provisions, or fails or refuses to furnish City required proof that insurance has been procured and is in force and paid for, City shall have the right at City's election to forthwith terminate this Contract immediately without

any financial or contractual obligation to the City. As a result of such termination, the City reserves the right to employ another consultant to complete the project.

E. Written notice. Contractor shall provide immediate written notice if (1) any insurance policy required by this Contract is terminated; (2) any policy limit is reduced; (3) or any deductible or self insured retention is increased.

SECTION 10. NON-DISCRIMINATION.

Consultant shall not discriminate, in any way, against any person on the basis of age, sex, race, color, creed, national origin, or disability in connection with or related to the performance of this Contract.

SECTION 11. TERMINATION.

A. City and Consultant shall have the right to terminate this Contract, without cause, by giving not less than ten (10) days written notice of termination.

B. If Consultant fails to perform any of its material obligations under this Contract, in addition to all other remedies provided by law, City may terminate this Contract immediately upon written notice.

C. The City Manager is empowered to terminate this Contract on behalf of City.

D. In the event of termination, Consultant shall deliver to City copies of all work papers, schedules, reports and other work performed by Consultant and upon receipt thereof, Consultant shall be paid in full for services performed and reimbursable expenses incurred to the date of termination.

SECTION 12. COMPLIANCE WITH LAWS.

Consultant shall comply with all applicable laws, ordinances, codes and regulations of the federal, state and local governments. Consultant shall obtain and maintain a City of Watsonville business license during the term of this Contract.

SECTION 13. GOVERNING LAW.

City and Consultant agree that the law governing this Contract shall be that of the State of California. Any suit brought by either party against the other arising out of the performance of this Contract shall be filed and maintained in the Municipal or Superior Court of the County of Santa Cruz.

SECTION 14. PRIOR CONTRACTS AND AMENDMENTS.

This Contract represents the entire understanding of the parties as to those matters contained herein. No prior oral or written understanding shall be of any force or effect with respect to those matters covered hereunder. This Contract may only be modified by a written amendment.

SECTION 15. CONFIDENTIAL INFORMATION.

All data, documents, discussions, or other information developed or received by or for Consultant in performance of this Contract are confidential and not to be disclosed

to any person except as authorized by the City Manager or his designee, or as required by law.

SECTION 16. OWNERSHIP OF MATERIALS.

All reports, documents or other materials developed or received by Consultant or any other person engaged directly by Consultant to perform the services required hereunder shall be and remain the property of City without restriction or limitation upon their use.

SECTION 17. COVENANT AGAINST CONTINGENT FEES.

The Consultant covenants that Consultant has not employed or retained any company or person, other than a bona fide employee working solely for Consultant, to solicit or secure the Contract, and that Consultant has not paid or agreed to pay any company or person, other than a bona fide employee working solely for Consultant, any fees, commissions, percentage, brokerage fee, gift, or any other consideration contingent on or resulting from the award or making of this Contract, for breach or violation of this covenant, the City shall have the right to annul this Contract without liability, or in its discretion, to deduct from the contract price or consideration or otherwise recover, the full amount of such fee, commission, percentage fee, gift, or contingency.

SECTION 18. WAIVER.

Consultant agrees that waiver by City or any one or more of the conditions of performance under this Contract shall not be construed as waiver of any other condition of performance under this Contract.

SECTION 19. CONFLICT OF INTEREST.

A. A Consultant shall avoid all conflict of interest or appearance of conflict of interest in performance of this Contract. Consultant shall file a disclosure statement, if required by City Council Resolution, which shall be filed within thirty (30) days from the effective date of this Contract or such Resolution, as applicable.

B. No member, officer, or employee of the City, during their tenure, or for one (1) year thereafter, shall have any interest, direct or indirect, in this Contract or the proceeds thereof and Consultant agrees not to allow, permit, grant, transfer, or otherwise do anything which will result in such member, officer, or employee of the City from having such interest.

SECTION 20. AUDIT BOOKS AND RECORDS.

Consultant shall make available to City, its authorized agents, officers and employees, for examination any and all ledgers and books of account, invoices, vouchers, canceled checks and other records or documents evidencing or related to the expenditures and disbursements charged to the City, and shall furnish to City, its authorized agents and employees, such other evidence or information as City may require with respect to any such expense or disbursement charged by Consultant.

SECTION 21. NOTICES.

All notices shall be personally served or mailed, postage prepaid, to the following addresses, or to such other address as may be designated by written notice by the parties:

CITY

City Clerk
275 Main Street, Suite 400
Watsonville, CA 95076
(831) 768-3040

CONSULTANT

SWT Engineering
800-C South Rochester Avenue
Ontario, CA 91761
909-390-1328

SECTION 22. EXHIBITS:

Exhibit A: Scope of Services
Exhibit B: Schedule of Performance
Exhibit C: Compensation

WITNESS THE EXECUTION HEREOF, on the day and year first hereinabove written.

CITY

CONSULTANT

CITY OF WATSONVILLE

BY _____
Matthew D. Huffaker, City Manager

BY  _____
Michael Cullinane P.E. , Project Manager

ATTEST:

BY _____
Beatriz Vázquez Flores, City Clerk

APPROVED AS TO FORM:

BY _____
Alan J. Smith, City Attorney

EXHIBIT "A"

SCOPE OF SERVICES

1. Potential to integrate the Phase IV Liner Development with the Phase III Closure construction which will provide the City of Watsonville with a significant cost savings.
2. SWT Engineering brings a wealth of Solid Waste project experience to provide a cost-effective Phase IV area development design.
3. SWT will develop a clear and concise set of bid documents that will allow contractors to provide quality bids, reduce potential construction delays, and help protect City of Watsonville from potential claims.
4. SWT Team has the resources to expedite project design and permitting of the Phase IV Development Design and Permitting.
5. SWT's plans and specifications will get ahead of expected and possible construction issues to allow for expeditious construction.

See Attached: RFP Proposal

EXHIBIT "B"

SCHEDULE OF PERFORMANCE

Services shall commence immediately upon execution of this Contract. All services performed under the provisions of this Contract shall be completed in accordance with the following schedule:

See Attached RFP Proposal.

- Design Development and construction of Phase IV will be completed and integrated with the Phase III Closure construction by June 30, 2024.

EXHIBIT "C"

COMPENSATION

- a. Total Compensation. The total obligation of City under this Contract shall not exceed \$399,138.
- b. Basis for Payment. Payment(s) to Consultant for services performed under this contract shall be made as follows and shall [not] include payment for reimbursable expenses:
- c. Payment Request. Consultant shall submit a request for payment for services on a monthly basis by letter to Director, or said Director's designated representative. Such request for payment shall cover the preceding monthly period during the term hereof, shall note the City's purchase order number for this contract, shall contain a detailed listing of the total number of items or tasks or hours for which payment is requested, the individual dates on which such services were rendered, and invoices for reimbursable expenses, if any. Upon receipt in the Office of Director of said payment request, Director shall cause payment to be initiated to Consultant for appropriate compensation.

**REQUEST FOR PROPOSALS
CONSULTING SERVICES FOR WATSONVILLE LANDFILL
PHASE IV DEVELOPMENT DESIGN, PERMITTING, CONSTRUCTION
SUPPORT, AND CQA SERVICES**



Prepared for:
City of Watsonville
Public Works & Utilities Department
250 Main Street
Watsonville, CA 95076

Presented by:
The SWT Team

SWT Engineering
800-C South Rochester Avenue
Ontario, CA 91761
909-390-1328



Hushmand Associates Inc,
250 Goddard
Irvine, CA 92618
949-777-1266



1.0 COVER LETTER AND EXECUTIVE SUMMARY

OFFICES

SWT is a privately held corporation established in the State of California in 2007 and is operated by Messrs. Michael A. Cullinane, P.E., and Richard M. Genzel, P.E. The legal name and addresses of SWT Engineering (SWT) are as follows:

Northern California Office:

864 Grant Avenue, Suite A
Novato, California 94945,
(415) 717-0910

Satellite Office:

1145 Legion Court
Dixon, California 95620,
(858) 382-4633

Corporate Office:

SWT Engineering, Inc.
800-C South Rochester Avenue
Ontario, California 91761
(909) 390-1328



Montana Office:

151 Business Center Loop, Suite A
Kalispell, Montana 59901
(415) 717-0910

CONTACT INFORMATION

Michael A. Cullinane, Project Manager
800-C South Rochester Avenue
Ontario, California 91761
Email: mac@swteng.com
Phone: (909) 390-1328
Cell: (951) 760-0283

Brian Reyes, Assistant Project Manager
800-C South Rochester Avenue
Ontario, California 91761
Email: bmr@swteng.com
Phone: (909) 390-1328
Cell: (707) 853-2575

Ben Hushmand, Geotechnical Engineer
250 Goddard
Irvine, California 92618
Email: ben@haieng.com
Phone: (949) 777-1266
Cell: (949) 394-8973



INTRODUCTION

SWT is pleased to present the following proposal to the City of Watsonville to provide Consulting Services for Phase IV Development Design, Permitting, Construction Support, and Construction Quality Assurance (CQA) Services. This Executive Summary briefly discusses the highlights of the proposal sections, which can be found in Sections 1.0 through 8.0 of this proposal.

ORGANIZATIONAL STRUCTURE

- ◆ SWT's experience and historical work with similar agencies has allowed us to establish this team with a subconsultant who is uniquely fitted to meet the needs of the City of Watsonville. This Team has "shown through doing" that we are qualified and have the staff and resources to provide cost-effective, timely services.
- ◆ SWT has teamed with Hushmand Associates, Inc. (HAI) to provide geotechnical and CQA services as the Central Coast Regional Water Quality Control Board does not allow the Liner Design engineering

firm to perform CQA services. We have found that the CQA support of the design makes for a very successful project approach.

QUALIFICATIONS

- ◆ Throughout this proposal, the SWT Team shows that we provide unmatched qualifications, experience, regulatory knowledge, managerial and technical skills, to successfully complete this project for the City of Watsonville.
- ◆ SWT will use its tremendous amount of experience working with the Central Coast Regional Water Quality Control Board staff in obtaining an expedited approval at the Phase IV Design Report. As you will see in Section 4 of this proposal SWT has completed the majority the liner development projects in the Central Coast Region.

APPROACH TO THE SCOPE OF WORK

- ◆ Potential to integrate the Phase IV Liner Development with the Phase III Closure construction which will provide the City of Watsonville with a significant cost savings.
- ◆ SWT brings a wealth of Solid Waste project experience to provide a cost-effective Phase IV area development design.
- ◆ SWT will develop a clear and concise set of bid documents that will allow contractors to provide quality bids, reduce potential construction delays, and help protect City of Watsonville from potential claims.
- ◆ SWT Team has the resources to expedite project design and permitting of the Phase IV Development Design and Permitting.
- ◆ SWT's plans and specifications will get ahead of expected and possible construction issues to allow for expeditious construction. For example, designing the Leachate Collection and Removal System (LCRS) rock around locally sourced material.

REFERENCES

- ◆ SWT is very proud of the consulting services that we provide, and we hope that you will have the opportunity to contact our references. As engineers we have trouble touting our own accomplishments, but we believe our clients appreciate/praise the outstanding service SWT provides.

COMMITMENT

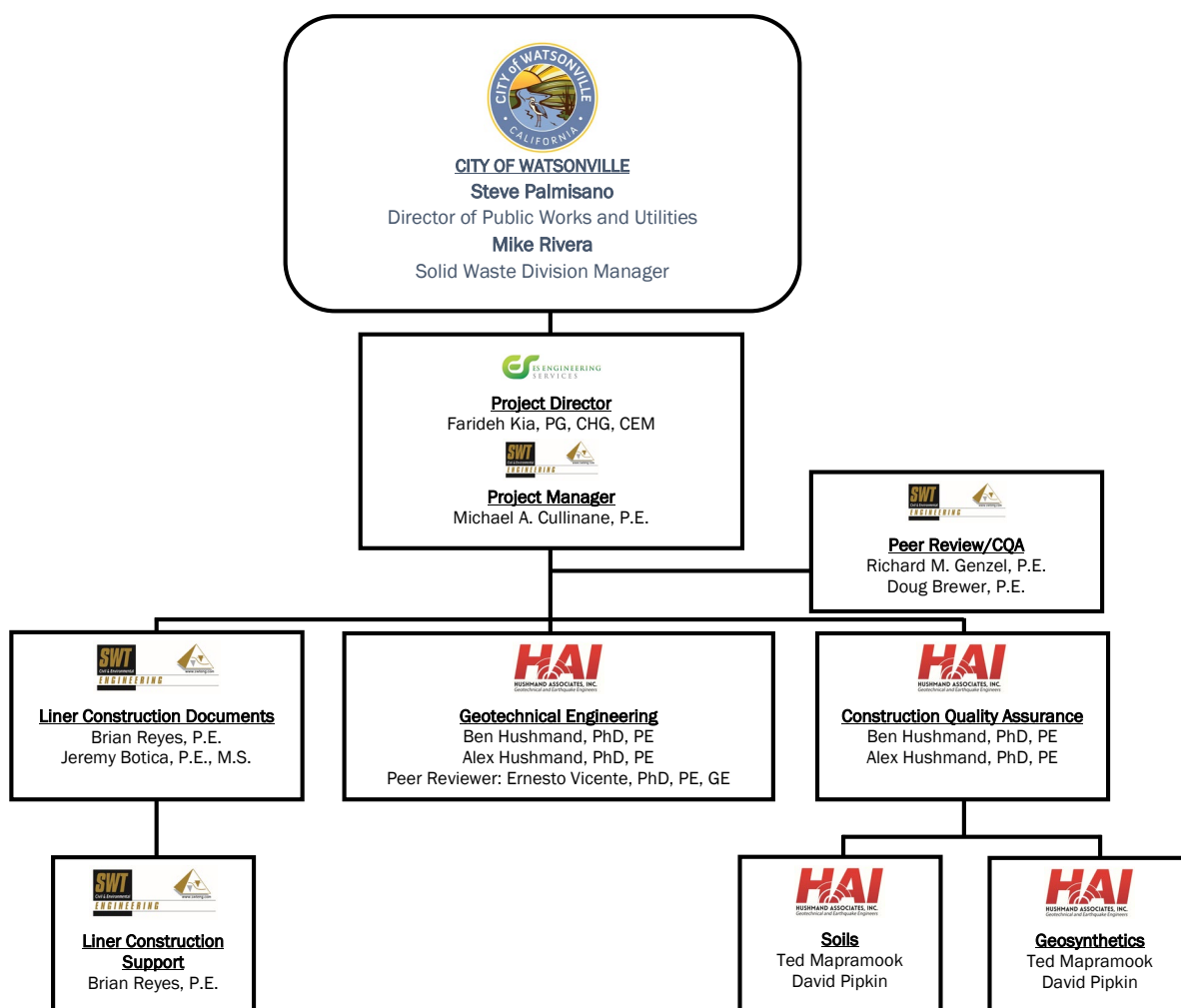
- ◆ City of Watsonville has SWT's ownership commitment to provide this project with the necessary staff of professional and knowledgeable personnel to service this project at the highest industry standards of quality.

2.0 PROPOSED TEAM INFORMATION

The SWT Team proposes staff that will provide the City of Watsonville with highly experienced personnel in the Solid Waste Industry, as identified in Section 2. Attachment A includes full resumes of personnel for the SWT Team. SWT and Hushmand Associates Inc. (SWT Team) are committed to the City of Watsonville and have a proven history of delivering successful engineering and construction projects. The SWT Team provides a group of professional staff, second to none, who have performed these types of services for numerous similar projects, which will bring the City of Watsonville a wealth of experience along with innovative solutions.

The SWT Team is comprised of solid waste engineering firms that will provide the City of Watsonville with highly experienced and professional personnel to complete all aspects of this City of Watsonville Landfill project. SWT staff and our subconsultant are committed to the City of Watsonville and have a history of successfully completing engineering and permitting, engineering support, and CQA services/projects. The following SWT project experience/qualifications provided in Sections 3.0 and 4.0 have been completed by the staff proposed for this City of Watsonville Landfill project, not corporate experience.

The following is a team organizational chart with each team member's role.



The SWT Team understands the importance of this project and has committed the necessary resources to achieve the City of Watsonville's goal to expeditiously complete the Design and Construction of the Design, Permitting, Construction Support, and CQA Services for Phase IV Development project.

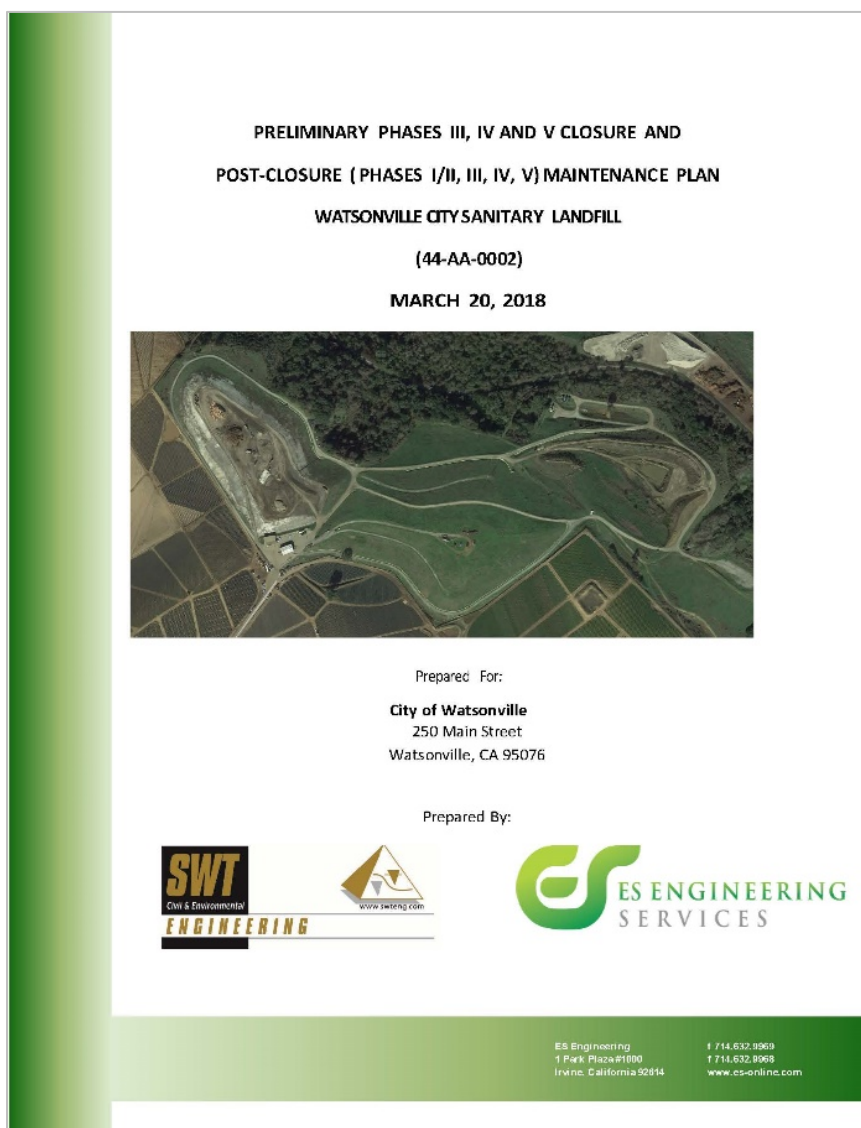
SWT Team Commitment

Key personnel and their roles are outlined on the organization chart on the previous page. SWT Principal, Mr. Michael A. Cullinane, P.E. will act as the Project Manager/Principal-in-Charge for this City of Watsonville Landfill project. Mr. Cullinane will engage and organize activities between the geotechnical consultant and support staff.

SWT has selected an experienced geotechnical subconsultant (HAI), who has performed services for all of the items required to complete this project. Our Project Team's organization and overall size allows us to accommodate variations in the workload while still providing the high-quality work product historically delivered to our clients in a timely manner.

The SWT Team organization chart on the previous page presents SWT's proposed project organization, identifying each team member for this City of Watsonville Landfill project, and role for the City of Watsonville Landfill Liner and (proposed) Final Cover Project.

Messrs. Reyes and Botica are Registered Engineer Professionals with over 18 years of combined experience in the solid waste industry and will diligently complete the needed design and construction support for this City of Watsonville Landfill project.



3.0 KEY RESUMES

To provide a clear and brief proposal, abbreviated (2 page) resumes for key project personnel are provided. For full resumes of key personnel and additional supporting staff, refer to Attachment A of this proposal.

MICHAEL A. CULLINANE, P.E., PRINCIPAL



Mr. Cullinane has more than 30 years of experience managing the development of municipal solid waste landfill expansions, permitting, design, construction support, closures, and civil improvement projects. He has successfully managed hundreds of landfill projects from small to larger scale (over \$40 million overall budget), with outstanding results. His experience has included the design of over 50 Subtitle D liner systems expansion construction projects. Mr. Cullinane has made presentations to members of the Solid Waste Management of Association of America (SWANA) on issues raised by Subtitle D liner design regulations and is a specialist in landfill

development as a resource, while balancing the demands of effective landfill operations, regulatory agency requirements, and owner's goals. Mr. Cullinane has been a Design Engineer or Principal-in-Charge for over 25 Final or Partial Final Closure Plan construction projects. His Final Closure experience started in the early 90s with the first Subtitle D Closure of the Orange County 300-acre Coyote Canyon Landfill. Since that time, Mr. Cullinane has completed numerous Evapotranspiration (ET) soil cover closures and has been an integral part in its evolution/implementation. Mr. Cullinane is recognized as one of the leading solid waste engineers in California with an outstanding reputation within both the regulatory, public and private sector.

Education

BS - Civil Engineering (California State Polytechnic University, Pomona, CA, 1984)

AS - Engineering Emphasis (Mount San Antonio College, Walnut, CA, 1981)

Registrations

Registered Civil Engineer, (CA, AZ, MT, HI, TX)

Qualified California Industrial General Permit Trainer of Record (00175)

Memberships

American Society of Civil Engineers (ASCE)

National Society of Professional Engineers (NSPE)

Solid Waste Association of North America (SWANA)

Project Experience

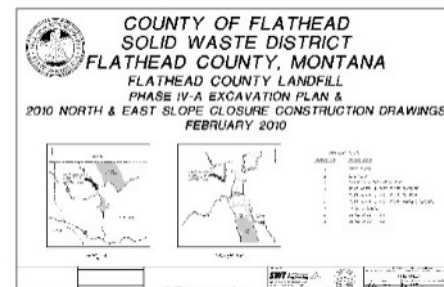
Mr. Cullinane has significant project experience of over 35 years as a Civil Engineer, and the last 30 years in the solid waste industry. The following four sites were selected as examples of the numerous projects Mr. Cullinane has managed. These projects included groundwater protection (liner) development excavation which was used to complete Partial Final Cover construction.

Tajiguas Sanitary Landfill, Goleta, California

Project Manager responsible for various projects including containment system design, fill sequencing and operational plans, construction documents, regulatory compliance, and construction support. Mr. Cullinane has been the Project Engineer for all Groundwater Protection Expansion constructed at the site, including Phases II (IA, IB, IC, IIA, IIB, IIC, IIIA-B, IIIB, IIIC-D, and IIIE) and IIIF, which is currently under construction. He was the Project Manager/Engineer of Record for the Phase 2-3 Partial Final Closure (PFC) project, which used the Phase IIIC – D Liner Excavation for the ET cover soil to complete the PFC. Mr. Cullinane was also the Project Manager/Engineer for all the major stormwater control facilities on-site, which include concrete lined North Basin with skimmer, perimeter concrete lined storm channel, and membrane lined South Basin.

Flathead County Landfill, Kalispell, Montana

Mr. Cullinane and SWT Engineering, since it was founded, have and are providing engineering services to the Flathead Soil Waste Management District. Mr. Cullinane is engineer of record for the last two liner projects completed in the last 11 years along with the most current liner phase which is proposed to start construction early 2021. Phase IV-A liner project (2010 North and South Slope) included a 13-acre partial final closure, where cell development excavation was hauled directly to the closure slopes. This partial final closure was a monolithic soil cover system. The project was completed on schedule and under construction bid budget. Mr. Cullinane, at his previous company, was also the project manager for the landfill expansion and the construction of the first two lined cell phases. Mr. Cullinane provided engineering support for various aspects at the facility along with supporting the construction of the new entrance facility including scales and scale house, automated lane, landfill cells, and gas systems expansion.



Vasco Road Landfill, Livermore, California

Mr. Cullinane has performed consulting services to Republic Services in support of the ongoing development for numerous facilities including the Vasco Road Landfill. Mr. Cullinane was the Principal-in-Charge of the design and permitting of the past three groundwater protection systems (liners) and two partial final closure plans. The services also included engineering support during construction. SWT, with Mr. Cullinane as a project manager has completed the design and permitting of the 2019 partial final closure plan, however Republic Services has postponed its construction but wanted to have a "shovel ready" closure project.

DU-12 2011/12	2011 Partial Final Closure	22 acres
DU-12B 2015	2015 Partial Final Closure	15 acres
DU-13A 2018		
Future		
DU-13 2021/2022	2019 Partial Final Closure	19 acres

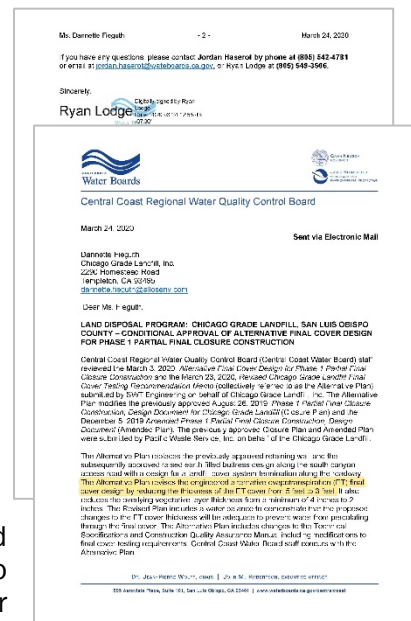
All 5 projects (Liners and Closure) have been completed on schedule without any claims and were promptly approved by the Regional Water Quality Control Board. SWT has updated the Preliminary Closure Plan to reduce the facility's closure costs based on these Partial Final Closures.

Chicago Grade Landfill, San Luis Obispo County, California

The Chicago Grade Landfill (CGL) was acquired by Allos Environmental in 2018. Since that time, SWT under Mr. Cullinane's project management has revised master excavation sequencing to reduce capital costs of site development, completed three groundwater protection projects (Liner), and a Partial Final Closure (PFC). This was the first PFC site and was approximately 15 ac (4 ac deck and 11 ac slopes).

Module 6(B) to Module 6(A) LCRS liner interconnect	Summer 2108
Module 6(B) Phase 1	Summer 2019
Module 6(B) Phase 2 and Phase 1 Partial Final Closure Project	Spring 2020

The liner and PFC project at the CGL are very similar to the City of Watsonville Landfill project as the excavated material from the liner development was selectively excavated by closure final cover specification requirements. SWT did not prepare the initial PFCP, but in review proposed to amend the approved plan from a 5-foot-thick ET cover to 3 feet, which was approved by the Regional Water Quality Control Board (RWQCB). Not only was this a significant cost savings to the project but also allowed for more area be closed as there was not adequate amount of cover soil to meet the thicker requirement.



BRIAN REYES, P.E., PROJECT ENGINEER



Mr. Reyes is a Project Engineer with 8 years of experience in municipal solid waste disposal facility design, public works, and civil engineering project infrastructure design, construction management, and construction quality assurance. Mr. Reyes has assisted in landfill liner development projects, closure design development, construction document preparation (drawings and technical specifications) agency correspondence and design of stormwater drainage systems including engineering calculations for hydrology. He has become an expert in the field of developing NONA Technical Studies in compliance with the California Stormwater IGP. Mr. Reyes has performed construction observation and monitoring to ensure projects were constructed in reasonable compliance with the approved Specifications and Construction Drawings.

EDUCATION

BS - Civil Engineering (California State Polytechnic University, Pomona, CA)

REGISTRATIONS

Registered Civil Engineer, 89895 – California

Registered Civil Engineer, 72271 – Montana

MEMBERSHIPS

American Society of Civil Engineers (ASCE)

Solid Waste Association of North America (SWANA)

PROJECT EXPERIENCE

Flathead County Landfill, Kalispell, MT – Mr. Reyes is a Project Engineer who assisted in completion of groundwater protection systems and closure project at the landfill. Mr. Reyes assisted in the development of the new Entrance Facility Construction Drawings (3 Phases) at the landfill, which included underground utilities electrical, sewer, water, fiber/telecom, instrument logic, stormwater conveyance systems, gravel pad improvements, and pre-engineered steel building for site activities. Recently, he was the Design Engineer for the new wash water pad and lined basin Construction Project which included design of a reinforced concrete wash pad with grade beams and steel driving surface for heavy equipment, and design of a HDPE textured geomembrane lined retention basin and conveyance system.

Mr. Reyes is currently developing the next phase of groundwater protection liner system at the Flathead County Landfill, Phase V. This included preparation of the design report, CQA Plan, technical specifications, and construction drawings. The groundwater protection system utilizes an encapsulated geosynthetic clay liner as part of the composite liner system.

Tajiguas Landfill, Santa Barbara County, California

Developed liner construction drawings for Phases 3B, 3C, 3D, and 3E including liner details, leachate collection and recovery system design, base and side slope liner system details, leachate collection and recovery system, and interim stormwater protection system design. Provided construction engineering support for each liner phase.

Mid-Valley Sanitary Landfill, San Bernardino County, California

Developed liner construction drawings for Unit 4 Phases 1 and assisted in Unit 1 Phase 1 closure including liner details, leachate collection and recovery system design, base and side slope liner system details, LCRS sump, leachate pumping system, storage, containment and load-out systems.

Lincoln County Landfill, Libby, MT – Mr. Reyes is a Project Engineer working with the county to develop conceptual expansion options to supply 30+ additional years of capacity. Recently he has assisted the County with refuse fill sequence planning and landfill access road development.

Watsonville Sanitary Landfill, City of Watsonville, California

Final Closure/Post-Closure Maintenance Plan - Developed Phase III Closure grading plan and details for final closure/post-closure maintenance plan. Prepared closure/post-closure cost estimate.

Prepared final closure construction drawings and specifications including grading, drainage, Linear Low-density Polyethylene (LLDPE) Geomembrane cap closure system, liner terminations, and LFG collection system for Phase 2 and 3 closures (phased to 3 total construction drawings and specification sets).

Olinda Alpha Landfill Phase 1 and Phase 2 Partial Final Closure Construction Design Drawings

Assisted in preparation of final closure construction drawings and specifications, including grading, drainage and access roads; hydrology and hydraulic calculations, drainage channel design, Landfill Gas System Design for Phase 1, a 65-acre Monolithic Soil Final Closure Construction Project and Phase 2, an ET Monolithic Soil Final Closure Construction Project.

Frank R. Bowerman Landfill, Orange County, California

Assisted in the Phase VIIIB-1 and VIIIB-2 Liner Construction Drawings and Specifications along with hydrology reports with hydrology and hydraulic calculations for both liner projects.

Landers Sanitary Landfill, Landers, California

Assisted in the development of the sites Notice of Non-Applicability (NONA) performing hydrology and hydraulic calculations to demonstrate that industrial stormwater will not be discharged off site.

Integrated Waste Management Facility, Santa Maria, California

Assisted in the preparation Drainage Study Overview including hydrology and hydraulic calculations the existing and proposed conditions of the landfill to determine the best distribution of the landfill tributary areas to maintain historical flows to the downstream drainage areas.

Prima Deshecha Landfill, Orange County, California

Assisted in the design of West Liner Construction Drawings, drainage study, visual screening, and connection with the new La Pata Road extension project running through the site.

Santa Maria Regional Landfill, Santa Maria, California

Assisted in the development of the sites Notice of Non-Applicability (NONA) performing hydrology and hydraulic calculations to demonstrate that industrial stormwater will not be discharged off site.

CONSTRUCTION MANAGEMENT EXPERIENCE**Tajiguas Sanitary Landfill, Santa Barbara County, CA**

Construction Manager for the construction of the Phase IIIC liner project at the Tajiguas Sanitary Landfill (Santa Barbara County, CA). Phase IIIC was a \$2.5 million expansion of the existing liner system. Mr. Reyes was onsite full-time to handle daily activities, bi-weekly construction meetings, and worked closely with Geosyntec Consultants who provided CQA services for the project. This project was brought in on time and under the construction bid.

CQA officer and Assistant Construction Manager for the Phase IIID liner project at the Tajiguas Sanitary Landfill. Mr. Reyes performed both functions on this approved alternative liner project. This project was completed on time and under budget. The final CQA Report was submitted prior to final completion of the work by the contractor and was approved for waste disposal when the contractor completed the work.

Flathead County Landfill, Kalispell, MT

Assisted in Construction Management for the Leachate Transfer System Upgrade System Construction project that included observing excavation of unsuitable material, placement of engineered backfill, installation of a submersible pump and all necessary piping and electrical components. Mr. Reyes was responsible for preparation and/or review of construction documents including submittals, daily construction reports, weekly progress meetings, and daily interface with contractor and client during field operations.

55th Way Landfill, Long Beach, CA

Assistant CQA Officer for the 55th Way Landfill Closure Construction Project that included excavating subgrade, installation of liner closure cap, furnishing and installing LFG collection system, and constructing drainage pipes.

JEREMY BOTICA, P.E., M.S., PROJECT MANAGER



Mr. Botica is a Project Manager with over ten years of experience in municipal solid waste disposal facility design, public works, and civil engineering project infrastructure design. Mr. Botica has assisted in landfill liner development projects, closure design development, construction document preparation, design of grading, drainage systems, access roads, operational fill sequencing, and waterline projects for solid waste disposal sites. He has provided engineering calculations for hydrology studies

and storm drain plans and prepared grading and drainage plans for landfill closure and civil infrastructure projects. In addition, he has prepared closure/post-closure cost estimates and Non-Water Release Corrective Action Plans for multiple sites.

EDUCATION

B.S. - Geospatial Engineering (California State Polytechnic University, Pomona, CA, 2009)

M.S. - Environmental Engineering (California State University Fullerton, CA, 2013)

REGISTRATION

Registered Professional Engineer - California

PROJECT EXPERIENCE

Big Bear Sanitary Landfill, San Bernardino County, CA

Assisted in the preparation of the final closure construction drawings including grading, drainage and access roads, and hydrology and hydraulics calculations. Assisted in the development of final cover sections for mono-fill slope final cover and alternative final cover (LLDPE geomembrane) for benches, perimeter and access roads, and top deck areas.

Davenport Park (55th Way Landfill), Long Beach, California

Designed a re-closure for the site to the existing adjacent park to expand and provide the community with a beneficial re-use of the area. Worked with CalRecycle on a matching grant to help with construction funding for the City of Long Beach. Implemented a landfill gas collection system and closure geomembrane with a drainage geocomposite and drainage features.

El Sobrante Sanitary Landfill, Corona, California

Designed a site truck wheel wash for transfer and garbage trucks to drive through and clean off any mud collected during wet weather days prior to leaving the site. Also establishing the site to comply with stormwater requirements to meet a non-discharging site.

Project managed the Phase C1 and C2 Partial Final Closure Construction documents, from construction plans and technical specifications, to the CQA qualifications, bid support, contractor RFI's, and project completion.

Mr. Botica also developed conceptual and construction level designs for multiple site NONA design basins throughout the site and on adjacent Waste Management owned properties.

Integrated Waste Management Facility, Santa Maria, California

Assisted in updating the Master Phasing Plan for the facility, stockpiling configurations, drainage control features, and site life calculations based on projected waste inflow. Also assisting in the redesign of the entrance road, site offices, and scales area planning development.

Managed the re-design of the 2019 Master Development of the site to work in multiple canyons to avoid oil wells and stay within the original limits of the accept bio mitigation areas.

Prima Deshecha Landfill, Orange County, California

Assisted in the initial design of Phase A1, and Phase A2 Liner Construction Drawings, Design Report, drainage study, master development phasing, and connection with the new La Pata Road extension project running through the site. Managed the completed Phase A Liner Construction Plans, design report, hydrology/hydraulics, and technical specifications for the site to supply capacity for 8+ years.

Santa Maria Regional Landfill, Santa Maria, California

Managed annual Capacity Analysis for the site. Assisted with updating the JTD to reflect an increased height adjustment in Cell 1 and a reduction of height in Cell 2 to keep the existing ultimate capacity. Currently working on conceptual Cell 1 Expansion design into the NHIS area to help with 4+ years of expansion prior to the proposed IWMF-Los Flores development.

Tajiguas Sanitary Landfill, Santa Barbara County, California

Mr. Botica has a substantial amount of experience at the TSL, which includes assisting in the development of liner construction drawings for Phases 2C, 3A, 3B, 3C, and 3D liner areas at the TSL, including liner details, leachate collection and recovery system design, base/slope liner system details, leachate collection and recovery system, and interim storm water protection system design.

Mr. Botica was the Phase 2 & 3 Closure Design Engineer, providing cost-effective Construction Plans, Completed Design Report including hydrology and hydraulics for the closure, JTD updates, and CPCMP.

Victorville Sanitary Landfill, San Bernardino County, California

Assisted in the preparation of the Entrance Road and Scale Facilities Drawings and Specifications, including grading, drainage, hydraulic, and septic designs. In addition to conceptual NONA designs to help the site with NPDES.

West Miramar Sanitary Landfill, San Diego, California

Assisted in the development of the closure cost estimate and recycled waterline design of the site's existing composting process. Assist in JTD updates and modifications for the site as they arise.

Non-Water Release Corrective Action Plans (NWRCAP) and Updates

Lead and assisted in the preparation and completion of multiple Non-Water Release Corrective Action Plans (NWRCAP), including compiling data on current landfill configurations, impacts due to tsunamis, 1,000-year storm precipitation events, sub-surface fires, wildfires, 500-year flooding, and all the mitigation and costs associated with such events.

The following are some of the NWRCAP's that Mr. Botica has worked on: Barstow Sanitary Landfill, Bradley Sanitary Landfill, Central Disposal Site Landfill, Chateau Fresno Landfill, Chestnut Avenue Sanitary Landfill, French Camp Landfill, Forward Landfill, Keller Canyon Landfill, Landers Sanitary Landfill, Lompoc Sanitary Landfill, Newby Island Sanitary Landfill, Ox Mountain Sanitary Landfill, Prima Deshecha Landfill, Salton City Solid Waste Site, San Timoteo Sanitary Landfill, Santa Maria Regional Landfill, Tajiguas Sanitary Landfill, Tri Cities Landfill, Vasco Road Landfill, West Contra Costa Sanitary Landfill, and West Miramar Sanitary Landfill.

Closures/Post-Closure Estimates

Mr. Botica develops and updates the closure and post closure cost estimates and the required backup documentation for multiple sites to meet the regulatory standards for the amount that facility Operators have to pledge for closure and 30-year post closure requirements.

The following are some of the Closure/Post Closure Cost Estimates that Mr. Botica has worked on: Barstow Sanitary Landfill, Benton Crossing Landfill, Bradley Sanitary Landfill, Colton Sanitary Landfill, Coyote Canyon Landfill, Forward Landfill, Foxen Canyon Landfill, Frank R. Bowerman Landfill, Keller Canyon Landfill, Landers Sanitary Landfill, Milliken Sanitary Landfill, Olinda Alpha Landfill, Ox Mountain Sanitary Landfill, Prima Deshecha Landfill, San Timoteo Sanitary Landfill, Santa Maria Regional Landfill, Tajiguas Sanitary Landfill, Toland Road Landfill, Tri Cities Landfill, Vasco Road Landfill, Walker Landfill, Watsonville Landfill, West Contra Costa Sanitary Landfill, and West Miramar Sanitary Landfill.



BEN HUSHMAND, Ph.D., P.E. PRESIDENT, PRINCIPAL ENGINEER

PROFESSIONAL EXPERIENCE

Dr. Hushmand has more than 35 years of experience in geotechnical and environmental design, research, testing, and applications, specializing in soil dynamics and analysis and design of soil-structure systems. He has managed and acted as lead engineer in some of the most challenging national and private projects of the last two decades involving seismic hazard evaluations and geotechnical investigations for large public works, including transportation, port and marine, water resources, industrial, and commercial projects; design and seismic evaluation of critical facilities such as schools and hospitals, police stations, 911 centers, and traffic management centers; dynamic load response evaluation of bridges, dams, and underground structures; development of large databases for load carrying capacity of highway bridges and culverts; liquefaction potential evaluations for dams and marine structures; soil-structure interaction problems of foundations and retaining structures; site-specific seismicity evaluations; physical modeling similitude studies of engineering and geologic systems at normal and elevated gravity; and large scale subsurface exploration and geotechnical design of buried structures.

Dr. Hushmand has worked on many projects studying the dynamic behavior of shallow foundations, piles, gravity base offshore platforms, dams, bridges, retaining walls, and liquefiable soils. He has specialized expertise related to experimental and computer modeling studies of the dynamic response of ports, bridges, landfills, earth structures and shallow and deep foundations. His broad and extensive background in dynamic testing has been recognized internationally, and he is one of a select cadre of renowned experts in this field.

RELEVANT PROJECT EXPERIENCE

Seismic Monitoring and Cover Design, Oil Landfill Superfund Site, Monterey Park, CA – In support of the general closure studies of the Oil landfill, two seismic stations were installed to record landfill behavior during earthquakes and analyze recorded landfill response to estimate

dynamic properties of municipal solid waste. These properties were used in seismic design of the cover system. Cover system, surface drainage and grading alternatives were evaluated along with slope stability and settlement analysis. Static and seismic slope stability analyses and finite element seismic deformation analyses were performed to estimate landfill slope displacements during the site design earthquake event.

Static and Seismic Slope Stability Analysis of Cell 1 Height Increase - Santa Maria Regional Landfill, Santa Maria, Santa Barbara County, CA – Reviewed available reports and data, performed a site-specific seismic hazard evaluation and slope stability analyses for static and seismic loading conditions based on pseudo-static slope stability analyses or estimating seismically-induced permanent displacements, estimated landfill subgrade settlement due to increased cell height based on elastic solution. Stability analyses were performed to assess static and seismic stability of landfill slopes for the proposed waste height increase within Cell 1 of the landfill. The northern boundary of the landfill is adjacent to the Santa Maria River and near the Santa Barbara/San Luis Obispo County line. The City had a plan to increase elevation of the lined Cell 1 from

Registration

- Civil Engineer, CA No. C44777
- 40-Hour OSHA Trained, 29 CFR 1910.120 (e)(2)/8 CCR 5192
- Radiation Safety and Use of Nuclear Gauges Certificate

Education

- Ph.D. Civil (Geotechnical & Earthquake Engineering, California Institute of Technology (Caltech), 1984
- M.S., Civil Engineering, California Institute of Technology, 1978
- B.S., Structural Engineering, Sharif Univ. of Technology, Tehran, Iran, 1977

Professional Organizations & Academic Credentials

- International Society of Soil Mechanics and Foundation Engineers (ISSMFE)
- American Society of Civil Engineers (ASCE)
- Earthquake Engineering Research Institute (EERI)
- Seismological Society of America (SSA)
- Member Technical Review Committee, National Science Foundation (NSF)
- Adjunct Faculty, Caltech 1990-2004
- Visiting Faculty, USC 1985-1989
- Member Soil Dynamics Committee, ASCE 1984-2000

Year of Experience:

- Over 35 Years
- 30 Years with HAI

the approved elevation of 362.5 feet to the maximum allowable elevation of 410 feet based on slope stability evaluations and regulatory considerations. A site-specific Probabilistic Seismic Hazard Analysis (PSHA) was performed to obtain the design Peak Ground Acceleration (PGA) and Acceleration Response Spectrum (ARS) of the project site corresponding to the Maximum Probable Earthquake (MPE) event. The PSHA was performed for the selected faults and an earthquake scenario using the latest attenuation relationships and the site faulting and seismicity data. The selected attenuation relationships were based on the Next Generation Attenuation (NGA) relationships (NGA West 2). Two critical cross sections were selected to evaluate static and seismic stability of the landfill slopes for the maximum allowable waste height within Cell 1.

Cell Redesign and Bioreactor Evaluation Kettleman Hills Facility Municipal Solid Waste Landfill Unit B-19, Kettleman City, Kings County, CA - Performed analyses to evaluate stability of slopes for the Class II/III municipal solid waste (MSW) and industrial waste landfill unit B-19 (Landfill B-19) at Waste Management, Inc. (WMI) Kettleman Hills Facility (KHF) due to proposed fill plan modifications. The scope of work included evaluating static and seismic stability of the waste slopes for a proposed Landfill B-19 new fill plan and optimizing the fill plan configuration and perimeter stability soil buttress design based on the results of detailed analyses performed in several iterations. Landfill was proposed to be partially transformed to a bioreactor waste storage unit and therefore, HAI evaluated physical and strength properties of waste in the bioreactor unit and its effects on slope stability. The finite element program QUAD4M was used for site response and landfill seismic deformation analyses. This commonly used finite element program provides a tool for maximizing waste capacity and optimizing its design.

Frank R. Bowerman Landfill – Phase VIII Buttress and Liner Design and Construction, Irvine, Orange County, CA - Under a subcontract with SWT Engineering Inc. (SWT), provided peer review of the geological and hydrogeological investigation and geotechnical evaluation performed by Geosyntec Consultants, Inc. in support of design and construction of the Phase VIIIA/B Buttress and Liner Project (Phase VIII BLP) at the Frank R. Bowerman (FRB) Landfill, in Orange County, California. The purpose of the project was to develop the Phase VIIIA/B disposal area as a California Class III (Municipal Solid Waste, MSW) landfill facility similar to previously permitted and developed phases at the FRB Landfill. HAI peer-reviewed Geosyntec's report documenting the results of the above-noted work, including field investigations, data processing, and engineering evaluations. The report was an integral part of the design package and was submitted by OC Waste & Recycling, the project owner, to the Santa Ana Regional Water Quality Control Board (RWQCB) for review and approval.

Time-Critical Removal Action, Cap Design & Construction for Installation Restoration Site 5, MCAS Miramar, San Diego, CA – Project Manager for design and CQA services provided during design and construction of the landfill final cover. From top to bottom the alternative landfill cover included a 3-ft thick evapotranspiration (ET) soil layer, a 250-mil thick double-sided geocomposite layer; a 60-mil thick microspike high density polyethylene (HDPE) geomembrane layer; and a 2-ft thick foundation layer consisted of a 6-inch thick upper layer of 3/8-inch minus sand and 1.5 ft of consolidated waste. A unique challenge for design of the final cover was to protect the landfill eastern and northeastern slopes from erosion and slope failure due to the presence of San Clemente Creek passing by the landfill and potential flooding. Along the creek, the cover included a 12-inch thick filter gravel wrapped in 12 oz/yd² filter/cushion non-woven geotextile on top of geocomposite layer and a 30-inch thick riprap layer.

- ◆ **Geotechnical Engineering Evaluation, Marine Corps Air Station (MCAS), Landfill Sites 2 and 17, Remedial Action Plan, El Toro, CA**
- ◆ **Missoula Landfill Expansion – Phase I and Supplemental Analysis, Missoula, Montana**
- ◆ **Phase 11 Stability Berm and Phase 11a Liner and LCRS, El Sobrante Landfill, Corona**
- ◆ **Phase B2 Final Cover, El Sobrante Landfill, Corona, CA**
- ◆ **Phase II Liner Construction, Las Pulgas Landfill, MCB Camp Pendleton, CA**
- ◆ **Phase 1C Liner Construction, Lancaster Landfill & Recycling Center, Lancaster, CA**
- ◆ **Phase 1B Liner Construction, Lancaster Landfill & Recycling Center, Lancaster, CA**
- ◆ **LF-2, Cell No. 4 Base Liner Termination, Fink Road Landfill, Patterson, CA, 2005**
- ◆ **Phase 1A Liner Construction, Lancaster Landfill & Recycling Center, Lancaster, CA, 2004**
- ◆ **Antelope Valley Landfill, Cell IV - Step 5, Antelope Valley, CA, 2005**

4.0 EXPERIENCE AND QUALIFICATIONS

SWT has unmatched qualifications and experience in the solid waste industry to deliver the scope of services outlined in the Request for Proposal to provide Consulting Services for City of Watsonville Landfill Liner Design and CQA. SWT has successfully permitted, designed, and delivered numerous groundwater protection (liner) construction projects over the past 13 years. SWT is one of the leading design firms for liner projects in California, which gives us a unique perspective on options for improvements on the current design and providing cost benefits. This is an extremely important project as it will provide the ability to restart disposal operations, as well as meet the new Waste Discharge Requirements (WDRs) requirements. SWT understands the operational considerations for the landfill and will assure they are addressed in each phase of the designs.

Supporting this contract, SWT selected a geotechnical sub-consultant that has the experience and background, as well as the appropriate staff and laboratory facilities to effectively support this project. The SWT Team's overall experience and familiarity with similar projects means having no learning curve and a Team that is ready to begin immediately.

One of SWT's major assets to City of Watsonville is SWT's ability to expedite the approval for both the Liner Development and Design Report/Permitting simultaneously.

Team Member Teaming Experience

HAI is a geotechnical and material testing firm with more than 30 years of experience in providing design and construction support services for municipal and hazardous waste landfill projects for the public and private sectors. HAI has extensive experience providing QA/QC services for a variety of landfill projects throughout California and Hawaii including cell construction & expansion, covers, and post-closure maintenance. HAI performs comprehensive QA/QC services including geosynthetic liner installation monitoring and testing, field density testing and oversight of mass grading, geologic inspection of slope cuts and landfill floor subgrade, field permeability testing, and comprehensive laboratory testing of geo-materials and concrete.

HAI has a team of engineers and geologists, hydrologists, landfill gas experts, and field and laboratory specialists with unparalleled design and construction experience. HAI geo-professionals are licensed to practice in the State of California. HAI has an in-house soils and material testing laboratory validated by the USACE, and certified by Caltrans, the Department of the State Architect (DSA), the City of Los Angeles (Testing Agency No. 10185), CCRL, and the AASHTO Materials Reference Laboratory (AMRL) R-18 Program.

Commitment to our Clients

SWT was founded to offer quality, effective consulting services to the solid waste industry while providing a product that meets or exceeds the client's expectations. SWT supports our client's best interests and saves money while completing the specific project goals in a timely and professional manner. This commitment is demonstrated on each and every project that SWT provides consulting services. Based on this approach, SWT has been very fortunate that the majority of our projects are repeat business/clients. We are looking forward to this opportunity to continue our relationship with the City of Watsonville.

Experienced Senior Technical Staff

SWT has extensive experience in the design, construction, and permitting of landfill liners, and closures, throughout the western United States. Experience includes government-owned and private landfill facilities throughout the California Counties of Alameda, Calaveras, Contra Costa, Imperial, Orange, San Bernardino, San Diego, San Joaquin, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Tuolumne, Mendocino, and Ventura.

SWT has a significant amount of experience in the central coast area with the agencies but also with the local general contractors and liner subcontractors, which continues to result in our clients obtaining excellent construction bids.

Cost-Effectiveness/Integrated Approach

The SWT Team can provide significant cost savings to City of Watsonville on this project due to our extensive knowledge of solid waste management systems. This experience will enable SWT to work on City of Watsonville's behalf in providing engineering services. There is potential to integrate the Phase IV Liner Development with the Phase III Closure which will provide the City of Watsonville with a significant cost savings. SWT has been fortunate to have provided similar design, CQA, and engineering support on numerous successfully completed projects for other Counties, which allow us to get ahead of issues and say, "we have typically already seen it".

Michael A. Cullinane, P.E. of SWT has been the Project Manager or Project Engineer responsible for the permitting, design, and construction engineering support for over 100 similar projects within California. He has also integrated numerous projects that combine liner development construction with partial final closure construction, which has saved the clients millions of dollars.

One of the more unique points about the following SWT Qualifications and Experience is that it comes from the SWT staff that will be supporting the City of Watsonville Landfill project and not large corporation experience/credentials.

The following measles chart shows SWTs extensive Liner and Closure Experience. Succeeded by five projects (project sheets), which SWT provided services similar to the City of Watsonville Landfill project, with reference contact information provided in Section 6.0.

We believe these select projects illustrate the proposal and project tasks including Conceptual and Project Design, Design Reports and Bidding Support, Project CQA and Construction Support and related Record Drawing Preparation, and the necessary Permit Document.

SWT ENGINEERING STAFF LANDFILL EXPERIENCE

	Engineering Design and Master Development Planning	Solid Waste Planning/Permitting	Site Assessment/Remediation/Operations Support	CEQA Support	Storm Water Management/NPDES	Civil Engineering Design	Storm Water Control Systems/Hydrology/Hydraulics	Construction Management	Construction Support Services	Regulatory Agency Liaison		Engineering Design and Master Development Planning	Solid Waste Planning/Permitting	Site Assessment/Remediation/Operations Support	CEQA Support	Storm Water Management/NPDES	Civil Engineering Design	Storm Water Control Systems/Hydrology/Hydraulics	Construction Management	Construction Support Services	Regulatory Agency Liaison		Engineering Design and Master Development Planning	Solid Waste Planning/Permitting	Site Assessment/Remediation/Operations Support	CEQA Support	Storm Water Management/NPDES	Civil Engineering Design	Storm Water Control Systems/Hydrology/Hydraulics	Construction Management	Construction Support Services	Regulatory Agency Liaison
CALIFORNIA											SAN BERNARDINO COUNTY, CA (Continued)											REPUBLIC SERVICES (Continued)										
BAKERSFIELD, CA (City)											Phelan Sanitary Landfill											Newby Island Landfill										
City of Bakersfield Landfill											San Timoteo Sanitary Landfill											Otay Landfill										
CALRECYLGE											Trona Sanitary Landfill											Ox Mountain Landfill										
Berry Street Site											Victorville Sanitary Landfill											Ramona Landfill										
Brawley Site											Yermo Sanitary Landfill											Rice Road Transfer Station										
Duck Pond Site											Yucalpa Sanitary Landfill											SEC Transfer Station										
Greenville Site											SAN DIEGO, CA (City)											Sunshine Canyon City										
National City Site											South Chollas Landfill											Sunshine Canyon County										
IMPERIAL COUNTY, CA											West Miramar Landfill											Sycamore Landfill										
Brawley Solid Waste Site											SAN DIEGO COUNTY											Vasco Road Landfill										
Calexico Solid Waste Site											Bonsall Sanitary Landfill											WCCL Organic Materials Processing Facility										
Hotville Solid Waste Site											Encinitas Landfill											SANTA CLARA, CA										
Hot Spa Solid Waste Site											Gillespie Sanitary Landfill											Premiere LVTs										
Imperial Solid Waste Site											Jamacha Sanitary Landfill											VULCAN MATERIALS COMPANY										
Ocotillo Solid Waste Site											Poway Landfill											24th Street Landfill (Arizona)										
Palo Verde Solid Waste Site											Valley Center Landfill											Carol Canyon Rock, Asphalt & Ready Mix										
Picacho Solid Waste Site											Viejas Sanitary Landfill											Pleasanton Asphalt, Sand & Gravel										
Salton City Solid Waste Site											SANTA BARBARA COUNTY, CA											Reliance Rock										
KERN COUNTY, CA											Ballard Canyon Landfill											Sun Valley Rock and Asphalt										
Kern Valley Landfill											Foxen Canyon Landfill											WASTE CONNECTIONS										
LOS ANGELES, CA (City)											Santa Maria Landfill											Avenal Landfill										
Lopez Canyon Landfill											Tajiguas Landfill											Chiquita Canyon Landfill										
MENDOCINO COUNTY, CA											TOULUMNE COUNTY, CA											Cold Canyon Landfill										
Laytonville Landfill											Groveland Landfill											WASTE MANAGEMENT										
South Coast Landfill											Jamestown Landfill											Altamont Landfill										
ORANGE COUNTY, CA											VENTURA COUNTY, CA											Antelope Valley Landfill										
Coyote Canyon Landfill											Arnold Road Dump											Cathedral City Transfer Station										
Frank R. Bowerman Landfill											Camavillo Site											Central Valley Transfer Station										
Olinda Alpha Landfill											County Yard Site											Davis Street Transfer Station										
Prima Deshecha Landfill											Fillmore City/County											Kirby Canyon Landfill										
Santiago Canyon Landfill											Grade Road Site											Lancaster Landfill										
PLACER COUNTY, CA											Ojai County											Tri-Cities Landfill										
Eastern Regional Landfill											Otto Hopkins											OUT-OF-STATE SITES										
McCourtney Road											Oxnard Dump/Mandalay Bay											NEW MEXICO										
SAN BENITO COUNTY, CA											Piru Dump											Caja Del Rio Landfill (Santa Fe)										
John Smith Road Landfill											Santa Susana Site											Wagon Mount Landfill (Wagon Mound)										
SAN BERNARDINO, CA (City)											Saticoy County											HAWAII										
Waterman Landfill											Somis Dump											South Hilo Landfill										
SAN BERNARDINO COUNTY, CA											Thousand Oaks County											Central Maui Landfill										
29 Palms Sanitary Landfill											Tierra Rejada Landfill											MONTANA										
Adelanto Sanitary Landfill											Toland Road Landfill (VRSD)											Flathead County Landfill										
Barstow Sanitary Landfill											PRIVATE SITES											All 12 County Small Volume Transfer Stations (SVTS)										
Big Bear Sanitary Landfill											GREGORY CANYON LTD											Missoula Landfill										
Colton Sanitary Landfill											Proposed Gregory Canyon Landfill											High Plains Landfill										
Heaps Peak Sanitary Landfill											LOS ANGELES COUNTY, CA											NEVADA										
Heaps Peak Transfer Station											BKK Landfill											Henderson Transfer Station										
Inland Compost Facility											REPUBLIC SERVICES											Cheyenne Transfer Station										
Landers Sanitary Landfill											Allied Imperial Landfill											OREGON										
Lenwood-Hinckley Sanitary Landfill											Bonanza Springs Landfill											Coffin Butte Landfill										
Mild Valley Sanitary Landfill											Chestnut Avenue Closed Landfill																					
Milliken Sanitary Landfill											Forward Landfill																					
Morongo Valley Sanitary Landfill											Keller Canyon Landfill																					
Needles Sanitary Landfill											Mussel Rock Transfer Station																					
Newberry Springs Sanitary Landfill																																

SWT LINER AND CLOSURE PROJECT EXPERIENCE

The following listed are for closure and liner projects SWT has completed in last 10 years.

Note: All projects in **blue** color are located within the Central Coast RWQCB jurisdiction.

Closure/Liner Projects	Construction Management and/or CQA	Engineering Support	Design & Specs and Permitting
Santa Maria Regional Landfill, Santa Maria, CA - 2020 Membrane Lined MSW Expansion, Design, Engineering and Construction Management Support	✓	✓	✓
Flathead County Landfill, Montana – 2020 Membrane Lined Pond, Design, Specifications, CQA Report, Ancillary Facilities – Equipment Wash Pad	✓	✓	✓
Chicago Grade Landfill, San Luis Obispo County, CA – 2020 Phase 1 Partial Final Closure Design, Specifications, Engineering Support for 17 acres of slope and top deck areas	✓	✓	✓
Chicago Grade Landfill, San Luis Obispo County, CA – 2020 Module 6B(2) -Phase 2 Slope Liner Design, Specifications, Engineering Support	✓	✓	✓
Tajiguas Sanitary Landfill, Santa Barbara County, CA – 2019 Phase 3 Part 2 Partial Final Closure – Membrane Closure Cap, Design, Specifications, in conjunction with Slope Liner Project		✓	✓
Vasco Road Landfill, Alameda County, CA – 2019 Partial Final Closure Design, Specifications and Engineering Support – for 13 acres of Closure at this MSW Landfill site	✓	✓	✓
El Sobrante Landfill, Riverside County, CA – 2019 Phase C2 Partial Final Closure Design, Specifications and Engineering Support – for 9 acres of Closure		✓	✓
Tajiguas Sanitary Landfill, Santa Barbara County, CA – 2019 Phase 3E– Slope Liner Design, Specifications, in conjunction with Partial Final Closure Project (See Phase 3 Part 2 Partial Final Closure)		✓	✓
Chicago Grade Landfill, San Luis Obispo County, CA – 2018 Module 6B(2) -Phase 1 Base and Slope Liner Design, Specifications, Engineering Support	✓	✓	✓
Chicago Grade Landfill, San Luis Obispo County, CA – 2018 Module 6A to 6B LCRS and Liner Interconnect Design, Specifications, Engineering Support	✓	✓	✓
El Sobrante Landfill, Riverside County, CA – 2018 Phase C1 Partial Final Closure Design, Specifications and Engineering Support – for 26 acres of Closure		✓	✓
Tajiguas Sanitary Landfill, Santa Barbara County, CA – 2018 Phase 3 Part 1 Partial Final Closure – ET Cover, design, Specifications. Engineering Support, Design/Specs		✓	✓

Closure/Liner Projects	Construction Management and/or CQA	Engineering Support	Design & Specs and Permitting
Mid-Valley Sanitary Landfill, San Bernardino County, CA - 2018 Unit 4 Phase 1 Liner Design, Specifications, and Engineering Support; Ancillary Facilities – Access Road Improvement, Leachate Loadout Containment Area, multiple Sedimentation Basins, Stormwater Improvements		✓	✓
Tajiguas Sanitary Landfill, Santa Barbara County, CA – 2018 Phase 3C– Slope Liner Design with low-permeability berm, Specifications, Ancillary Facilities - Stormwater Improvements		✓	✓
Prima Deshecha Landfill, Orange County, CA – 2018 Design Zone 4 – Phase A Liner and Entrance Road/Ancillary Facilities, stockpiling, buttresses, and drainage Improvements Project for 75 Acre expansion			✓
Vasco Road Landfill, Livermore, CA – 2018 Disposal Unit 13A Liner Design, Specifications, and Engineering Support; Ancillary Facilities – Stormwater Improvements	✓	✓	✓
Victorville Sanitary Landfill, San Bernardino, CA – 2018 Phase 1B Stage 3 Liner Design, Specifications, and Engineering Support; Ancillary Facilities – Leachate Loadout Containment Area, Stormwater Improvements, and Stormwater Basin in support of an Industrial General Permit (IGP) Notice of Non-Applicability (NONA).		✓	✓
55th Way Landfill, Los Angeles County, CA – 2017 Cover Improvement project with Membrane Closure Cap, Design, Specifications, Engineering Support and Construction Management	✓	✓	✓
Landers Sanitary Landfill, San Bernardino County, CA - 2017 Phase 1A Liner Design, Specifications, and Engineering Support; Ancillary Facilities – Access Road Improvement		✓	✓
Tajiguas Sanitary Landfill, Santa Barbara County, CA – 2017 Phase 3D – Slope Liner Design, Specifications, Engineering Support, and Construction Management	✓	✓	✓
West Contra Cost Sanitary Landfill, Contra Costa County, CA – 2017 Top Deck Re-Closure and Drainage/Basin Improvements with design specifications, engineering support, and construction management	✓	✓	✓
Frank R. Bowerman Landfill, Orange County, CA - 2016 Phase VIIIB-2 Liner Design, Specifications, and Engineering Support; Ancillary Facilities – Perimeter Channel, Sedimentation Basin		✓	✓
Olinda Alpha Landfill, Orange County, CA - 2016 Phase 2 Partial Final Closure Design, Specifications, and Engineering Support; Ancillary Facilities – LFG Improvements, Access Road Improvement, multiple Sedimentation Basins, Waterline Extension and Pumping Improvements, Stockpile Relocation		✓	✓
Tajiguas Sanitary Landfill, Santa Barbara County, CA – 2016 Phase 2 Partial Final Closure – ET Cover, design, Specifications. Engineering Support, Design/Specs		✓	✓

Closure/Liner Projects	Construction Management and/or CQA	Engineering Support	Design & Specs and Permitting
Frank R. Bowerman Landfill, Orange County, CA - 2015 Phase VIII B-1 Liner Design, Specifications, and Engineering Support; Ancillary Facilities – Perimeter Channel		✓	✓
Ox Mountain Sanitary Landfill, Half Moon Bay, CA – 2015, 2018 Partial Final Closure Design, Specifications, and Engineering Support.		✓	✓
Vasco Road Landfill, Alameda County, CA – 2015 Partial Final Closure Design, Specifications and Engineering Support – for 14 acres of Closure at this MSW Landfill site		✓	✓
Mid-Valley Sanitary Landfill, San Bernardino County, CA - 2014 Unit 3 Phase 6 & 7 Liner Design, Specifications, and Engineering Support; Ancillary Facilities – Stormwater Improvements		✓	✓
Olinda Alpha Landfill, Orange County, CA - 2014 Phase 1 Partial Final Closure Design, Specifications, and Engineering Support; Ancillary Facilities – Access Road Improvement		✓	✓
South Chollas Landfill, San Diego County, CA – 2014 Re-Closure Improvements, Operations Yard/ Drainage/ Paving/ LFG/ Structural Design, Specifications and Engineering Support for the site	✓	✓	✓
Tajiguas Sanitary Landfill, Santa Barbara County, CA – 2014 Phase 3B – Floor and Slope Liner design, Specifications, Ancillary Facilities – H2S Scrubbing Pad Development and Stormwater Improvements		✓	✓
Vasco Road Landfill, Livermore, CA – 2014 Disposal Unit 12B Liner Design, Specifications, and Engineering Support; Ancillary Facilities – Stormwater Improvements		✓	✓
Mid-Valley Sanitary Landfill, San Bernardino County, CA - 2013 Unit 1 Phase 1 Partial Final Closure Design, Specifications, and Engineering Support; Ancillary Facilities – Access Road Improvement		✓	✓
Prima Deshecha Landfill, Orange County, CA – 2013 WMU-2 Partial Final Closure and Clean Closure Design, Specifications, and Engineering Support, with Refuse Removal in support of the Avenida La Pata Roadway Extension.		✓	✓
Frank R. Bowerman Landfill, Orange County, CA - 2012 Phase VIII C Liner Design, Specifications, and Engineering Support; Ancillary Facilities – Perimeter Channel		✓	✓
Vasco Road Landfill, Livermore, CA – 2012 Disposal Unit 12 Liner Design, Specifications, Construction Management and Engineering Support – for 9.5 acres of Liner at this MSW Landfill site	✓	✓	✓
Tajiguas Sanitary Landfill, Santa Barbara County, CA - 2012 Phase 3A liner design, specifications, Ancillary Facilities – Perimeter Channel and Detention Berm	✓	✓	✓

Closure/Liner Projects	Construction Management and/or CQA	Engineering Support	Design & Specs and Permitting
Barstow Sanitary Landfill, Santa Bernardino County, CA - 2011 Phase 1A liner design, specifications, and Engineering Support, Ancillary Facilities – Perimeter Channel		✓	✓
Forward Landfill, San Joaquin County, CA - 2011 Phase 1B Partial Final Closure Design, Specifications, Construction Management and Engineering Support – for 23 acres of this MSW Landfill site	✓	✓	✓
Tajiguas Sanitary Landfill, Santa Barbara County, CA - 2011 Phase 2C liner design, specifications, Ancillary Facilities - Leachate and subdrain pump ports, In-and Out-of Channel Basin, Liner Access Road	✓	✓	✓
Flathead County Landfill, Montana - 2011 Phase IV Liner and 2014 Phase IV-B Design, Specifications, Construction Management and Engineering Support – Design of Liner Improvements, Ancillary Facilities – Access Road and Drainage Channel	✓	✓	✓
Vasco Road Landfill, Alameda County, CA – 2011 Partial Final Closure Design, Specifications, Construction Management and Engineering Support – for 22 acres of Closure at this MSW Landfill site	✓	✓	✓
Big Bear Sanitary Landfill, San Bernardino County, CA - 2010 Final Closure Design, Specifications, Engineering Support and CQA for Closure/Ancillary Facilities Project – Sediment Basins/Leachate Storage Tanks/collection systems		✓	✓
Flathead County Landfill, Montana - 2010 Partial Final Closure Design, Specifications and Engineering Support – Design of LFG System Improvements, Ancillary Facilities – Access Road and Repair of Lined Stormwater Ponds	✓	✓	✓
Holtville Solid Waste Site - Imperial County, CA - 2010 Final Closure Design, Specifications Engineering Support and CQA /Ancillary Facilities - Access Road at Transfer Station/drainage channels	✓	✓	✓
Avenal Regional Landfill, Kings County, CA - 2010 Phase 2 Liner, Ancillary Facilities – Access Road, Scale house, Scales, Approaches and Facilities, Perimeter Drainage System, Sediment Basins	✓	✓	✓



List of Type II Projects Experience

Project Name	Year	Project Description
WM Existing bridge over Ternescal wash Corona	2020	Evaluation of subsurface conditions and material properties to provide scour analysis of the existing bridge.
WMEI Sobrante Landfill, Phase 12 and 14 Berm Corona	2019	CQA services during construction of the Phase 12 and 14 stability berm
WM EI Sobrante Landfill, Phase 12 Liner and Leachate Collection and Removal System (LCRS) Corona	2019-2020	CQA services during construction of the Phase 12 Liner and Leachate Collection and Removal System (LCRS)
WM EI Sobrante Landfill Electrical Distribution Modification Corona	2019	CQA services during trench excavation and backfilling for electrical distribution modification
WM Cells E8 (6th Partial) and E9 (2nd Partial) Kapolei, HI	2019	CQA services during construction of the Cells E8 and E9
WM EI Sobrante Landfill, Phase C2 Partial Final Closure Corona	2019-2020	CQA services during construction of the Phase C2 final cover
WM Maintenance shop for Azusa landfill Azusa	2018	Evaluation of subsurface conditions and material properties for design recommendations
WMEI Sobrante Landfill, Phase 2A-1 Liner Leachate Collection and Removal System (LCRS) Lancaster	2018	CQA services during construction of the Phase 2A-1 Liner and Leachate Collection and Removal System (LCRS)
WM Phases A2 and B2 Landfill B-17 Kettleman Hills Facility Kettleman Hills	2018	CQA services during construction of the Phases A2 and B2 Landfill B-17 Kettleman Hills Facility
WM Additional Inbound Scale (4th Scale) at EI Sobrante Landfill Facility Corona	2018	Evaluation of subsurface conditions and material properties for design recommendations
WM EI Sobrante Landfill Access Road Stormwater Corona	2018	CQA services during construction of access road
WM Cells E5/E7 and Cell E6/West Berm Waimanalo Gulch Sanitary Landfill Kapolei, HI	2018	CQA services during construction of the Cells E5/E7 and Cell E6 and west stability berm
WM Units-Closure Care Kettleman Hills Facility Kettleman Hills	2018	Installation of permanent survey monuments
WM EI Sobrante Landfill, Phase C1 Partial Final Closure Corona	2018	CQA services during construction of the Phase C1 final cover
WM Liner Repair at Bradley Landfill and Recycling center Sun Valley	2017	CQA services during the liner repair work
WM EI Sobrante Landfill Maintenance Facility – Backbone Utility Corona	2017	CQA services during construction of Maintenance Facility
WM EI Sobrante Landfill Bremer Property Backfill Corona	2017	CQA services during backfilling of Bremer property area



Project Name	Year	Project Description
WM El Sobrante Landfill Corona Clay Drainage Improvements Corona	2017	CQA services during construction for drainage improvements
WM Slope Stability Analysis of Simi Valley Landfill Failure Simi Valley	2017	Assessment of geologic conditions slope stability analysis of the Simi Valley Landfill
WM El Sobrante Landfill Rentrac Basin Corona	2017	CQA services during construction of Rentrac basin
WM El Sobrante Landfill, Two-Phase Investigation for Cells 11B through 17 Expansion (phase I & II) Corona	2016	Evaluation of subsurface conditions and material properties for excavatability, particle size distribution, and material quality and quantity prior to construction of the proposed landfill Cells 11B through 17 as part of the future landfill expansion
Waste Management (WM) El Sobrante Landfill – Phase 11 Stability Berm and Phase 11A Liner and Leachate Collection and Removal System (LCRS) Corona	2015	CQA services during construction of the Phase 11A landfill expansion and phase 11 stability berm
FML Linings, Inc. Needles Ponds & Pit Needles	2015	CQA monitoring and testing during construction of the liner system of two (2) water containments and a temporary drying pit
AECOM Site 3 Landfill Cover Construction, Edwards Air Force Base Lancaster	2014	Geotechnical recommendations for the design and construction of a 32-acre ET cover and its associated drainage control system
WM Nu-Way Arrow Landfill, Construction Quality Assurance Services Inwindale	2006-2014	Field monitoring and testing services during placement of engineered fill
Noreas, Inc. / US Navy Time-Critical Removal Action (TCRA) and Cap Construction for Installation Restoration (IR) Site 5 Miramar	2013	CQC services during construction of the landfill final cover
WM El Sobrante Landfill, Phase B2 Final Cover Corona	2013	CQA services during construction of the Phase B2 final cover
CH2M Las Pulgas Landfill, Phase I and Phase II Liner Construction, MCAS Camp Pendleton	2012	CQA monitoring and in-situ and laboratory testing services during construction of Phase I and Phase II landfill liner and leachate removal and collection system (LCRS)
Los Angeles County Sanitation Districts (LACSD) Puente Hills Landfill, Nike Ridge Water Tank Pad Mudslide and Retaining Wall Movement Whittier	2011	Evaluation of a mudslide and investigation of the movement /rotation of the southwest retaining wall
Geosyntec Twentynine Palms Landfill, Southern Expansion, Marine Corps Air	2011	CQA services consisting of periodic field observation and confirmatory testing; and review of contractor and manufacturer's submittals and conformance testing



Project Name	Year	Project Description
Ground Combat Center (MCAGCC) Twentynine Palms		
WM Kettleman B-18 Slope Stability Evaluation Kettleman	2010	Slope stability analyses for expansion of Class I/II (hazardous and designated wastes) Landfill Unit B-18
WM Lancaster Landfill & Recycling Center Lancaster	2010	CQA monitoring and testing for construction of Phase-1A, 1B, 1C and 2B liner systems
ERRG Sierra Sun Tower Generating Station, Class II Surface Impoundment Lancaster	2010	CQA monitoring and testing services during construction of a Class II Surface Impoundment (Cells A and B)
LACSD Puente Hills Landfill Water Storage Tank Slope Repairs Whittier	2009	Construction monitoring for remediation of a slope that experienced localized mudslide
ENV America Inc. Geotechnical Evaluation of Mining and Reclamation Plan, Azusa Rock Quarry Azusa	2009	Geological and static and seismic slope stability evaluations for permanent reclaimed slopes of the mine
WM Kettleman B-18 Ground Motion Evaluation Kettleman	2008	Site-specific deterministic and probabilistic seismic hazard analysis, and developed site-specific earthquake ground motions for landfill expansion design
Haley & Aldrich Inc. Brandford Landfill Property Pacoima	2007	Confirm feasibility of the preliminary Site Development Plan for the entire property, including the landfill portion and perimeter areas
LACSD Landfills Gas Perimeter Probe Replacements LA County	2007	Replacement (installation and abandonment) of Landfill Gas Perimeter Probes at various LACSD's landfills
City of Burbank Public Works, Burbank Landfill Erosion Burbank	2006	Geotechnical investigation and field observations and materials testing during implementation of erosion-related mitigative measures for the slope along the Burbank Landfill Access Road
Haley & Aldrich, Inc. The Atkinson Brick Company Property Compton	2006	Seismic and geological hazards evaluation such as potential for liquefaction and seismic-induced ground settlements, and static settlements
Shaw Environmental/Infrastructure (currently CB&I) Fink Road Landfill, LF-2, Cell No. 4 Stanislaus County	2005	Construction quality assurance (CQA) services during installation of the base liner for the Class III, separate landfill unit LF-2, Cell No. 4 area
Golder Associates Inc. El Sobrante Landfill, Sunshine Canyon Landfill, Phase IV-A Los Angeles County	2004	CQA monitoring during construction of landfill cell
GC Environmental Inc. Concrete Pad and Access Road for a Landfill Gas Collection and Treatment System La Habra	2004	Foundation and grading recommendations for design and construction of the concrete pad and access road



Project Name	Year	Project Description
County of San Bernardino Solid Waste Management Division Heaps Peak Disposal Site San Bernardino County	2004	Review of liquid monitoring, stability analysis, and feasibility studies for liquid management and stability enhancement, heaps peak disposal site
Southwest Division Naval Facilities Engineering Command, Tetra Tech/Foster Wheeler Environmental Corporation Geotechnical Characterization and Seismic Evaluation, Landfill Sites 1 and 2 Former Naval Air Station (NAS) Alameda	2004	Geologic/geotechnical evaluations, seismic hazard analyses, evaluation of seismic ground motions, site response, slope stability analysis including seismically-induced permanent displacement analysis, liquefaction analyses, and development of mitigation alternatives
WM Antelope Valley Landfill, Cell IV - Step 5 Palmdale	2004	CQA monitoring and testing for construction of the Cell IV - Step 5 liner system
WM Cell Redesign and Bioreactor Evaluation Kettleman Hills Facility Municipal Solid Waste Landfill Unit B-19 Kettleman	2003	Ground motion evaluation, static and seismic slope stability analysis, and optimized fill plans
Burtec Waste Industries, Inc. San Timoteo Sanitary Landfill San Bernardino County	2003	CQA services for verification of screening operations layer soils, and observations of placing screened operations layer soils on landfill bottom and slopes
Wilson Geosciences / Sapphos Environmental Victoria Golf Course (Former BKK Landfill) Carson	2003	Settlement analyses for landfill final cover design, final grading plan, and foundation evaluations for light poles
Avocet Engineering Camp Roberts Landfill (CRL) San Luis Obispo County	2002	Geotechnical and seismic evaluation and QA/QC during construction the landfill for grading and landfill liner installation
Santa Barbara County Public Works Department Tajiguas, Gaviota, Landfill Expansion Santa Barbara County	2001	Seismic hazard evaluation and seismic design, material property characterization, liner system evaluation, slope stability analysis including seismically-induced permanent displacement analysis
Sycamore Landfill San Diego County	1999	Evaluation of gravel recovery potential at Sycamore Landfill and to analyze cut slopes in gravelly formation underlying the site
TRC / Environmental Solutions El Sobrante Landfill Expansion Riverside County	1994	Seismic hazard analysis, ground motion evaluation, slope stability analysis, geotechnical/ geosynthetic laboratory testing, liner design, and development of subgrade preparation and fill plans

TAJIGUAS SANITARY LANDFILL, COUNTY OF SANTA BARBARA, CALIFORNIA

SWT has completed numerous tasks over the past 10 years under Master Service Agreements (A&E Multi Discipline) for the County of Santa Barbara and is currently providing design support for a potential capacity increase.



The Tajiguas Sanitary Landfill is an active Class III municipal solid waste landfill, owned and operated by the County of Santa Barbara, Resource Recovery and Waste Management Division (RRWMD). The Tajiguas Sanitary Landfill has been in operation since 1967 for disposal of municipal solid waste.

Project Experience:

SWT Engineering has been providing engineering consulting services to RRWMD since SWT's inception and SWT staff has been providing services for the past 20 years. [We have completed numerous projects successfully for RRWMD, which includes all Closure and Groundwater Protection at the Tajiguas Sanitary Landfill.](#)

In 2015, SWT was contracted with RRWMD to re-design the Phase 2 and 3 Partial Final Closure documents as the previous design completed by another consultant significantly exceeded the Closure budget anticipated. SWT redesigned the Partial Final Closure and obtained new permits. The construction bids for the revised plans came in below RRWMD budget. The Phase 2 Closure work has been completed along with part of Phase 3. The Phase 3 portion of the closure was delayed implementing a cost savings that has to be recognized during the project. As part of the SWT design, excavation soil from liner development phase was used to complete the ET cover portion of the closure. SWT was able to save Santa Barbara County millions of dollars on the Phase 2 closure with a redesign and updated the specifications to not require screening with an allowance for a De Minimis amount to be oversized.

Over the past 13 years, SWT has completed 7 groundwater protection projects, which have included design, permitting, and engineering support for Phases IIA, B, IIIA, B, C, D and E. For Phase IIID slope liner, SWT also provided construction management and CQA services. All 7 of these groundwater protection projects came in below the Engineers Cost Estimate.

Also, these projects were completed under budget and without any claims from the contractor. SWT staff has also performed design and provided construction engineering support for the Phase I and IB Liner construction projects.



Some of the specific key liner facts included, Phase IIA Liner Construction Project, including Plans, Project Specifications, Design Report Preparation, and Bidding Support. The project was bid in March 2008. The low bidder came within less than 1 percent of the Engineer's Cost Estimate of \$6.6 million. SWT performed Construction Engineering Support, and Construction Management, with Construction Quality Assurance being performed by team members during the summer of 2008. SWT prepared the Phase IIB liner plans, which were bid and constructed in 2009. This was primarily a slope liner construction consisting of two different liner systems. The first was a Geocomposite Clay Liner (GCL) and the second was a prescriptive Subtitle D standard. This design was used to enhance the slope stability for the area adjacent to the Pila Creek, which has limited buttressing. This

project was completed under budget and without any claims from the contractor. SWT performed conceptual design for re-permitting across an existing impacted creek; provided liaison between RRWMD and permitting agencies and provided the Solid Waste Facility Permit (SWFP) revision. Additional Liner Projects and Design Reports prepared by SWT for RRWMD include Phases IIB, IIC, and IIIA Liner Projects, Out of Channel Basin Construction Project and Perimeter Drainage Channel Design. SWT staff has also performed design and construction engineering support for the Phase I and IB Liner construction projects.

Projects	
Phase IIA B, IIIA, B, C, D and E Liner Project – Design	Phase IIIB Liner Project –Engineering Support\CM
Non-Water Release Corrective Action Plan	Out of Channel Basin Construction Project
Revised Landfill Footprint – Conceptual Design	Perimeter Drainage Channel Design
Agency Permitting/CEQA Support	Construction Management – Liners
Operations Support	Phase IIIE CQA Slope Liner Projects
Services	
◆ Conceptual/Permit Level Design	◆ Closure/Post-Closure Cost Estimating
◆ CEQA Support Services	◆ Construction Level Design Documents
◆ Permitting/Regulatory Liaison	◆ Planning Documents/Calculations
◆ Operations Support	◆ Engineering Feasibility
◆ JTD Drawing Update	◆ Cost Benefit Analysis
◆ Record Drawings Review	◆ Construction and Bidding Support
Contact Information	
Owner:	County of Santa Barbara
Contact:	Travis Spier, P.E. - (805) 882-3628

CHICAGO GRADE LANDFILL, SAN LUIS OBISPO COUNTY, CALIFORNIA

Allos Environmental acquired the Chicago Grade Landfill (CGL) in 2018 which has been accepting municipal solid waste (MSW) since 1970, comprised of commercial-hauled waste, self-hauled waste and transfer trailers which include a mixture of green waste, tires, metals, commingled recyclable residuals, C&D, putrescible, and general municipal waste.

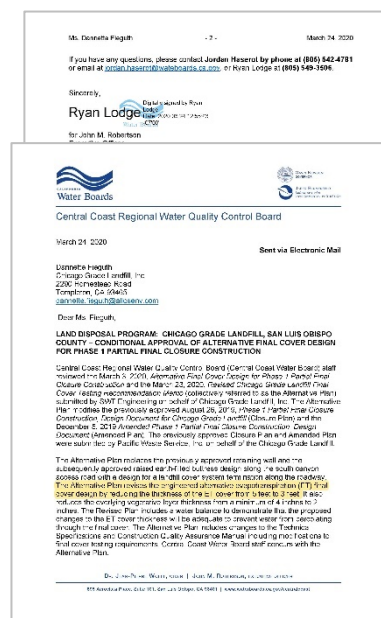
Project Experience

SWT has provided engineering consulting services and liner and closure design services to CGL, for multiple projects over the last 3 years including the Module 6(B) to Module 6(A) LCRS Liner Interconnect, Module 6(B)2 Phases 1 and 2 Liner Construction, and Phase 1 Partial Final Closure Projects. SWT performed Construction Management (CM), Engineering Support, and CQA for the Module 6(B) to Module 6(A) LCRS Liner Interconnect Project during the summer of 2018 and CM work for the Module 6(B)2 Phase 2 and Phase 1 Partial Final Closure Projects in Spring 2020.



The liner and PFC project at the CGL are very similar to the City of Watsonville Landfill project as the excavated material from the liner development was selectively excavated by closure final cover specification requirements. SWT did not prepare the initial Partial Final Closure Plan (PFCP), but in review proposed to amend the approved plan from a 5-foot-thick ET cover to 3 feet, which was approved by the RWQCB. Not only was this a significant cost savings to the project but also allowed for more area to be closed as there was not adequate amount of cover soil to meet the thicker requirement. These two projects were completed under the original contract budget and both on schedule.

The CM/CQA work included: pre-construction meeting and bi-weekly construction meetings to maintain project coordination and communications; performed field observation services to evaluated construction activity conformance with the Plans and Specifications; review and consult with the City and Contractor on technical issues that arise during construction; reviewed contractor change order requests; reviewed contractor submittals; responded to contractor Requests for Information (RFIs); reviewed and commented on product manufacturer information; inspected and detailed GCL placement, pressure/leak detection checks for



geomembrane liner, geotextile bonding and coverage checks, HDPE piping and gravel placement, attended final job-walks and assisted the Site Representative with the preparation of a punch list; assisted the Site Representative with the preparation of a final construction report; and coordinated receipt, review, and drafting of the Contractor's record drawings developed during construction and assist in preparation of the final "Record Drawings".

Design/Engineering Support/CQA/Construction Management Projects	
Module 6(B) to Module 6(A) LCRS Liner Interconnect Project – Engineering Support/CM/CQA \$150,000, <1 Acre, Key Personnel: Cole Duncan	Module 6(B)2 - Phase 1 Liner Construction Project – Engineering Support/CM \$1.0 M, 8 Acres, Key Personnel: Michael Cullinane
Module 6(B)2 - Phase 2 Liner Construction Project – Engineering Support/CM \$1.1 M, 5 Acres, Key Personnel: Jeremy Botica	Phase 1 Partial Final Closure Construction Project – Engineering Support/CM \$1.7 M, 15 Acres, Key Personnel: Jeremy Botica
Services	
◆ Conceptual/Permit Level Design	◆ Closure/Post-Closure Cost Estimating
◆ Permitting/Regulatory Liaison	◆ Construction Level Design Documents
◆ Operations Support	◆ Planning Documents/Calculations
◆ PCPCMP Update/Support	◆ Engineering Feasibility
	◆ Cost Benefit Analysis
Contact Information	
Owner:	Chicago Grade Landfill, Inc.
Contact:	Dannette Fieguth - (805) 466-2985

FLATHEAD COUNTY LANDFILL, KALISPELL COUNTY, MONTANA

The Flathead County Landfill is an active Class III municipal solid waste landfill, owned and operated by the County of Flathead. The Flathead County Landfill has been in operation since 1971 for disposal of municipal solid waste on approximately 46 acres (of the 275-acre site) are currently used for waste landfill.

Project Experience

SWT has completed numerous construction management projects successfully for the County, which include work for liner projects, partial closures, drainage improvements, and entrance facility improvements, and miscellaneous improvements at the Landfill. SWT has been providing on-call engineering services to the Flathead County Solid Waste District since 2007 and was recently awarded the on-call contract through 2025. Below are examples of the types of projects completed under these on-call contracts.



SWT has recently completed bid documents and provided CM and CQA for the new entrance facility at the Flathead County Landfill which includes:

- Two new scales;
- New scale house;
- Entrance road improvements;
- Implementation of automated lanes; and
- New scale software.

SWT has performed construction management and engineering support for the following construction projects at the Flathead County Landfill: Phase IV-A Liner, Phase IV-B Liner, Phase I Closure, Phase V Roadway Excavation, Leachate Lift Station, Entrance Facility, and a new CFC Building.

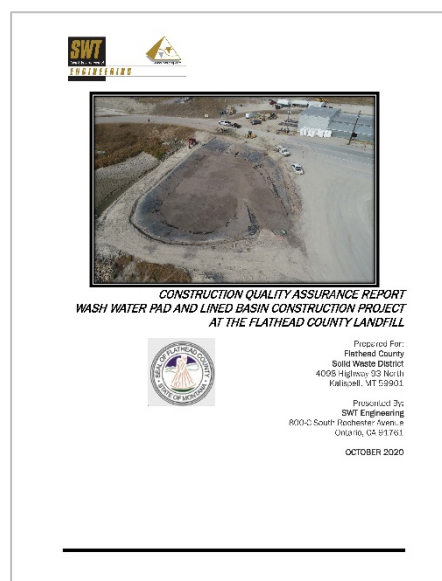
The CM work included: pre-construction and bi-weekly construction meetings to maintain project coordination and communications; perform field observation services to evaluate construction activity with the Plans and Specifications; review and consult with the County and Contractor on technical issues that arise during construction; review contractor changes order requests; review contractor submittals; and respond to contractor Requests for Information on two additional projects at the landfill. SWT completed the CFC Building Construction Project, which is a prefabricated engineered steel building design with concrete foundations and slab, 10-mil visquine vapor barrier and passive extractions system, and miscellaneous utility improvements. The Wash Water Pad and Lined Basin Construction project consists of construction of a reinforced concrete wash pad with grade beams and steel

Flathead 2015-2020		
Task Order #	Description	Amount
15-1	General Engineering Support	\$20,000.00
15-2	Expansion Phase 5	\$15,808.80
15-3	Additional CM Phase IVB	\$6,000.00
15-4	Aerial Topo 2015	\$8,696.10
15-5	Update Strategic Plan	\$25,000.00
15-6	Additional Leachate Tank	\$37,288.00
15-7	Annual Volumetric Analysis	\$8,000.00
15-8	NSPS Tier 2 Study	\$8,151.70
15-9	GHG Reporting	\$4,073.30
15-10	Creston Container Site Expansion	\$8,347.80
15-11	Lakeside Container Site Expansion	\$61,776.55
15-12	Engineering Support New Leachate Tank	\$87,371.00
15-13	Aerial Topo 2016	\$7,567.35
15-14	Annual Volumetric Analysis 2016	\$8,500.00
15-15	CM CQA Leachate Lift System Imp. Project	\$129,607.00
15-16	Operation Maintenance Manual, Leachate	\$7,602.00
15-17	Phase V Expansion Plans and Specs	\$29,904.00
15-18	Greenhouse Gas Report 2017	\$5,543.30
15-19	Phase V Expansion CM	\$57,878.00
15-20	Aerial Topo 2017	\$7,777.00
15-21	Annual Volumetric Analysis 2017	\$8,500.00
15-22	Parking Lot Addition	\$17,941.27
15-23	Building & Site Demolition	\$8,813.13
15-24	Coram Container Site Expansion	\$15,899.67
15-25	Title V Renewal	\$5,810.22
15-26	Aerial Topo 2018	\$5,061.50
15-27	Greenhouse Gas Screening Determination 2017	\$2,920.25
15-28	New Scale House Facility	\$36,000.00
15-29	2018 Annual Volumetric Analysis	\$8,500.00
15-30	Container Site Project	\$11,484.43
15-31	Engineering Services for Leachate Tank Venting	\$5,000.00
15-32	Scale House Entrance Rd. & Green Box Relocation	TBD
15-33	Prepare Updated RFP for Groundwater	\$2,000.00
15-34	Review Semi Annual Groundwater Monitoring Report	\$7,000.00
15-35	Prepare RFP for Routine & Non-Routine O&M Services - LCRS System	\$7,500.00
15-36	Prepare RFP for Software/Hardware for Scale House	
15-37	Prepare Annual GHG Report	\$4,031.35
	Total	\$691,353.72

driving surface for heavy equipment. The project also includes deployment of approximately 28,000 SF of 80-mil HDPE textured geomembrane for a lined retention basin. SWT performed planning, design, bid support services, CM and Construction QA/QC for both projects as well.

Flathead 2008-2015					
Original contract April 13, 2008-March 2013					
Extended by Board Amendment two additional years through March 2015					
Task Order	Description	Amount	Task Order	Description	Amount
1	General Engineering Support	\$55,000.00	34	Green House Reporting	\$4,679.00
2	SOQ Gas to Energy	\$5,000.00	35	Post Closure Maintenance Plan	\$0.00
3	Soil Management Plan	\$10,000.00	36	Junk Vehicle Crusher Pad	\$9,698.00
4	Strategic Plan	\$220,000.00	37	Olney Container Site	\$30,098.10
5	Gem Unit	\$10,000.00	38	2012 Aerial Survey	\$8,307.00
6	Flare Testing	\$5,412.00	39	2012 Volumetric Report	\$8,000.00
7	Gas to Energy	\$7,500.00	40	Pond Repair	\$16,000.00
8	Annual Compliance SCS	\$4,700.00	41	Storm Water Conveyance Pumping Pond	\$11,000.00
9	Volumetric Analysis 2008	\$7,500.00	42	Essex Container Site	\$61,989.45
10	Leachate Pipes	\$5,000.00	43	Green Waste Response Letter	\$5,000.00
11	Methane Monitoring	\$5,000.00	44	Eliminate Liner Pond 3	\$5,000.00
12	NMOC Report	\$2,600.00	45	Green Waste ADC Demonstration	\$5,000.00
13	Volumetric Analysis 2009	\$7,500.00	46	Green House Report	\$5,130.00
14	Transfer Air Permit	\$4,150.00	47	Develop RFP for Collection-Recycling	\$24,414.00
15	Phase IVA	\$75,978.00	48	ADC Demonstration	\$8,000.00
16	Update CPCMP Costs 2009	\$0.00	49	Air Space Value	\$4,500.00
17	Permit Modifications	\$12,500.00	50	2013 Aerial Survey	\$7,380.00
18	2010 N & E Closure Bid Docs	\$84,136.00	51	2013 Volumetric Report	\$8,000.00
19	Green House Gas Report SCS	\$3,608.00	52	North Pond Repair	\$16,000.00
20	Carbon Testing SCS	\$6,488.00	53	Phase IV-B Liner	\$83,542.00
21	Engineering Support_CM_CQA 2010	\$252,373.00	54	Review Ultimate Fill Plan	\$7,500.00
22	Basin Pipe Repair	\$16,000.00	55	Green House Reporting 2014	\$5,168.00
23	Annual Volumetric Analysis 2010	\$7,500.00	56	Scoping Green Box System	\$4,951.00
24	Update Phase IV-A Bid Docs_GCL Demonstration	\$27,926.00	57	CMCQA Phase IVB Groundwater Project	\$205,765.00
25	Bid Support IVA Liner	\$10,000.00	58	Comprehensive Planning-Green Boxes	\$70,597.80
26	Prepare Administrative Admt	\$2,500.00	59	Green Box Support_Eng Scv	\$19,364.10
27	Phase IV GWP CM_CQA	\$198,218.00	60	Green Box Support_Const Scv	\$11,705.40
28	Aerial Topography 2011	\$8,307.00	61	2014 Aerial Survey	\$5,460.00
29	Green House Reporting 2011	\$5,965.00	62	2014 Volumetric Report	\$8,000.00
30	Annual Volumetric Report_2011	\$8,000.00	63	Redo RFP Contract	\$3,276.00
31	Prepare Title V Permit App_2011	\$1,252.65	64	Green House Reporting 2015	\$5,168.00
32	Somers Green Box	\$9,844.80	65	Phase V Expansion Study	\$12,217.80
33	NMOC 5 yr Report	\$3,555.00	66	Big Fork Container Site	\$50,875.65
Total					\$1,083,513.45

SWT in the past 5 years has also completed construction documents, CM and CQA for improvements to two rural transfer station facilities - one which is a relocation and the other an expansion and upgrade.



SWT has completed the design, permitting, CQA and construction engineering support for all groundwater protection projects at the Flathead County Landfill over the past 15 years (Phases IV-A, IV-B and currently V). The Phase IV-A is similar to the City of Watsonville Landfill Liner and Closure project. Flathead County Landfill Phase IV-A and 2010 North & East slope closure construction project included 5.6 acres of base liner construction along with the closure 11.6 acres of slope. SWT engineers estimate was \$1,986,550 and the contractor bid was \$ 1,924,500, which was within 3.1% of the engineers estimate. SWT prides itself in providing accurate estimates so the clients can appropriately budget projects. The final construction cost was \$330,000 under the contractors bid. SWT is typically able to bring construction in or under the bid amount by precision and clarity in quantities and through substantial experience finding construction cost savings during construction. This project was also completed on schedule without any construction claims.

Construction Management Projects	
Phase IV-A Liner Project – Engineering/CQA/CM \$2.0 M, 6.0 Acres, Key Personnel: Richard Genzel	Leachate Lift Station Project – Engineering/CQA/CM \$700 K, >1 Acre, Key Personnel: Brian Reyes
Phase I Partial Final Closure – Engineering/CQA/CM \$1.0 M, 12.0 Acres, Key Personnel: Richard Genzel	Entrance Facility Project – Engineering/CM \$2.5 M, 8.0 Acres, Key Personnel: Brian Reyes
Phase IV-B Liner Project – Engineering/CQA/CM \$2.5 M, 8 Acres, Key Personnel: Michael Cullinane	CFC Building Project – Engineering/CM \$360 K, >1 Acre, Key Personnel: Brian Reyes
Services	
◆ Conceptual/Permit Level Design	◆ Closure/Post-Closure Cost Estimating
◆ Permitting/Regulatory Liaison	◆ Construction Level Design Documents
◆ Operations Support	◆ Planning Documents/Calculations
◆ Engineering Feasibility	◆ Cost Benefit Analysis
◆ Stormwater Compliance Support	
Contact Information	
Owner:	Flathead County
Contact:	David Prunty - (406) 758-5911

EL SOBRANTE LANDFILL

El Sobrante Landfill (ESL) is an active Class III municipal solid waste (MSW) landfill owned and operated by USA Waste of California, Inc. The Landfill is located in Corona, Riverside County, California. The Landfill lies in a rural area and occupies a side canyon in the central portion of Temescal Canyon. It began operation in 1986, currently has a permitted waste footprint of approximately 468 acres, and is operated in accordance with the permit requirements of Calif. Dept. of Resources Recycling & Recovery (CalRecycle) through the Local Enforcement Agency (LEA), i.e., Riverside County Health Dept.; California Regional Water Quality Control Board (RWQCB), Santa Ana Region; and South Coast Air Quality Management District.



Project Experience

HAI has provided geotechnical investigation and CQA services for several landfill expansion and final closure projects at ESL since 1994. CQA services included monitoring & testing during liner and final evapotranspirative (ET) cover construction; pipeline installation; road, scale and maintenance shop construction. HAI performed a two-phase geotechnical investigation to evaluate subsurface conditions and material properties for excavatability, particle size distribution, and material quality and quantity prior to construction of the proposed landfill Cells 11B through 17 as part of the future landfill expansion. The scope



of work included conducting field geologic mapping; performing seismic refraction surveys; conducting air-track drill holes, excavating core holes to collect rock core samples for laboratory testing; compiling geotechnical information on a geotechnical base map; and preparing a report to help with construction bid preparation for new cells.

CQA services includes reviewing contractor submittals; geologic mapping & documenting prepared subgrades; reviewing manufacturer's quality control (QC) documentation for various geosynthetic materials; performing CQA conformance sampling and testing of geosynthetic

(GCL, geotextile, geomembrane, geonets and geocomposites), aggregate base, and asphalt pavement materials; monitoring, sampling, testing, and documenting installation of the geosynthetics, placement of the CCL, LCRS gravel, and soil operations layer over the liner system, installation of the piping system and grouted riprap channel, and construction of concrete structures; performing field density and permeability testing; attending weekly construction progress meetings; and preparing the final CQA report.

Construction Quality Assurance Projects

Phase C1 Partial Final Closure Construction, CQA Services \$2.4 M, 25 Acres, Key Personnel: Alex Hushmand	Phase C2 Partial Final Closure Construction, CQA \$1.1 M, 10 Acres, Key Personnel: Alex Hushmand
Phase 11 Stability Berm, Phase 11A Liner and Leachate Collection and Removal System (LCRS) - CQA Services \$9 M, 25 Acres, Key Personnel: Ben Hushmand	Phase 12 Liner & Leachate Collection and Removal System (LCRS) – CQA Services; \$19 M, 28 Acres, Key Personnel: Ben Hushmand, Ernesto Vicente

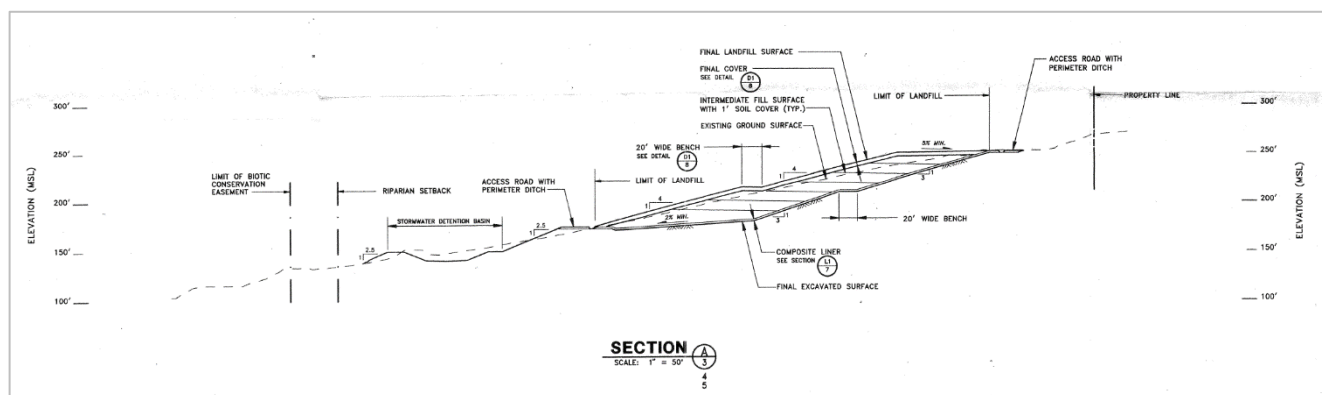
Contact Information

Owner:	Waste Management, Inc.	Contact:	Scott Sumner, P.E. - (714) 328-8816
--------	------------------------	----------	-------------------------------------

5.0 PROJECT APPROACH

LINER

SWT found, in its initial review of the Phase IV Liner Development, that the groundwater protection (liner) component of the project is very straight forward. The initial review of the Phase IV develop configuration will need to be modified to comply with regulatory refuse stability requirements. As you can see Cross Section B-B from the EMCON 2005 conceptual design the floor at Cross Section B-B is graded outward without any buttressing. As outlined in Section 7.1, SWT will developed an updated cell configuration.



A key project approach, that would provide significant cost savings for the City of Watsonville in the Phase IV Liner Development, would be using a portion of the Phase IV cell excavation as cover material to implement the Phase III Closure soil elements (foundation and vegetative cover fills).

As outlined in Section 7.1, SWT will conceptually design the Phase IV excavation configuration and determine if the cell development project(s) should be constructed in one or two sequences. As part of the conceptually design analysis, we will compare the proposed Phase IV excavation quantities with the required soil element needs of the Phase III Closure construction project. Based on our preliminary evaluation, there will be more than adequate material in the Phase IV development area to complete the Phase III Closure soil elements (approximately 60,000 cubic yards [CY]). Therefore, that portion of the Phase IV excavation cost could be allocated to the Phase III Closure project. Since SWT has already completed the 80% construction level documents for the Phase III closure project, we can readily incorporate the Phase IV Liner Development into one composite construction bid document. The economy of scale for having both projects in one bid document should provide the City of Watsonville cost savings. Additionally, combining the Phase III Closure project and Phase IV Liner Development will also provide tertiary cost savings for construction, engineering support, and CQA services, as those costs can be bundled. Similar material submittals can be combined, and it will reduce costly contractor/subcontractor mobilizations.

As you can see in Section 3 and 4, SWT has completed the majority of the groundwater protection system projects (liners) built within the jurisdiction of the Central Coast's RWQCB. Therefore, we have the ability to expedite the approval process and gain approval as the board staff has confidence in SWT Design Reports.

SWT will also evaluate other smaller potential cost savings such as potentially implementing a gravity-flow leachate conveyance system to the existing holding tank north of the proposed Phase IV area.

6.0 REFERENCES

		
County of Santa Barbara	Flathead County, Montana	Allos Environmental Chicago Grade Landfill
Travis Spier, P.E. Operations Manager 130 E Victoria St. Santa Barbara, CA 93110	David Prunty Public Works Director 4098 Highway 93 North, Kalispell, MT 59901	Dannette Fieguth Site Manager 2290 Homestead Rd, Templeton, CA 93465
2007-Present	2007-Present	2018-Present
Office: (805) 681-5626 Cell: (805) 729-6996	Office: (406) 758-5911 Cell: (406) 253-8841	Office: (805)-466-2985 (ext 12) Cell: (805) 423-5286

7.0 SCOPE OF WORK

The scope of work for developing construction level plans and specifications, providing appropriate Geotechnical review and analysis, obtaining approval of the design from the applicable regulatory agencies, and assisting City of Watsonville through the bidding process construction engineering support and CQA services for the excavation and liner design project at the City of Watsonville Landfill.

7.1 Preliminary Phase IV Development Configuration Study

- ◆ Develop preliminary Excavation Grading Plan(s) for Phase IV including;
 - 2:1 cut slopes to maximize Phase IV airspace
 - Perimeter and cell access roads
 - Stormwater control/diversion options
- ◆ Develop Refuse Fill Grading Plan(s) for Phase IV;
 - 3:1 waste fills with stability benches
 - Evaluate developing phase four in one or two stages

Determine soil-to-refuse (daily, intermediate and final cover Phase III) ratios for sustained operational life. With this information SWT will be able to estimate the major capital cost components with expanding the existing facility which will include a groundwater protection system (liner), leachate collection and disposal system (LCRS), excavation quantities and ultimate closure acreages.

- ◆ Evaluate Leachate Sump Options
 - Gravity or Pumped Sump
- ◆ Provide preliminary earthwork numbers
 - Excavation (minus estimated borrow material since current site topo)
 - Waste Fill

7.2 Prepare Construction Documents for the Phase IV Liner Development Design Project

The construction bid documents will be prepared in a format that will allow City of Watsonville to solicit competitive bids for the Phase IV Liner Development Design Project. SWT will attend a kick-off meeting and two additional progress meetings. The construction document package will include the following:

- ◆ Construction Plans and Details;
- ◆ Technical Specifications, based on the Standards Specification for Public Works Construction (“Greenbook”) or Caltrans; and,
- ◆ Bid schedule.

7.2.1 Prepare Phase IV Liner Development Construction Drawings

The construction drawings will include the following sheets showing the proposed design features for the Phase IV Liner Development Design Project:

- ◆ Cover Sheet;
- ◆ Site Location and Map;
- ◆ One (1) each Excavation and Liner Subgrade Drawing;
- ◆ One (1) each Excavation and Liner Drawings;
- ◆ Stockpile Plan and Erosion Control
- ◆ Four Excavation and Liner Design Project Detail Sheets;
- ◆ One (100'-Scale) Erosion Control Plan Sheet;
- ◆ One Erosion Control Plan Detail Sheet; and,
- ◆ Cross-Sections.

SWT will utilize the most current topography provided by City of Watsonville the drawing X-REFs for existing Borrow Area, and the Phase IV Liner Development. Drainage Swales will be developed for the east and west sides of the Phase IV Liner Development; Subgrade excavation for the base liner, and side slopes will be developed. The south tributary drainage area will be directed via a drainage bench in the excavation slope south of the proposed liner area. These drawings will be utilized for liner construction, based on liner section hike-ups.

Details will include base, slope, bench, liner termination and liner join; LFG Migration Collector detail and location per plan; LCRS Header and Lateral Swale, bench collectors, wrapped gravel collectors; and LCRS.

Drawing Format

Plan sheets will consist of a subgrade plan for the liner excavation areas. SWT will also prepare the Liner and Miscellaneous Civil improvement plans, which will show the grading and drainage and Liner civil improvement components (bench crossings, down drains, storm drain outlets, v-ditches, access roads). Detail sheets will also be provided and will include cross sections and improvement details, which will be enlarged and cross-referenced on the plan sheets. A stockpile plan for the anticipated Excavation Soil Volume will be developed in close proximity to the Phase IV Liner Development. The drawings will be prepared in a digital format by AutoCAD (Release 2019) to a scale of 1" = 50' (minimum). PDF and digital copies of the drawing files will be supplied to City of Watsonville with representative hard copy drawings of their content. It is estimated that approximately 12-14 sheets will be necessary to present the Phase IV Liner Development Design Project.

Plan Review

SWT will develop the 65-percent complete construction design drawings and technical specifications with senior review for constructability and value engineering conducted by Principal-in-Charge, Michael A.

Cullinane, P.E. SWT will submit two copies of the construction drawings and specifications to City of Watsonville for review and comment at the 65-percent complete design stage.

SWT will develop the 65-, 90-, and 100-percent complete Final Construction Design Drawings for City of Watsonville to review.

Deliverables

- ◆ Two copies of 65-, 90-, and 100-percent final level sets of the construction plans, cross sections, and details.
- ◆ One original mylar set of signed and stamped by a licensed Civil Engineer (licensed in the State of California) of the 100-percent final construction plans and details and one copy in digital format (AutoCAD and PDF format).
- ◆ Signed and stamped Final Plans.

7.2.2 Prepare Excavation and Liner Construction Project Technical Specifications/Engineer's Cost Opinion/Bid Schedule

Technical Specifications for the Phase IV Liner Development Construction Project will also be prepared and submitted as part of the 65-, 90-, and 100-percent complete submittal of the construction design drawings. SWT will also include material quantities and the Engineer's Cost Opinions. The Specifications will also include the Central Coast RWQCB requirements. The Technical Specifications will be provided to City of Watsonville for inclusion into their standard bid documents. The Special Provisions will be suitable for competitive bidding of the Phase IV Liner Development Construction Project.

SWT will develop the 65-, 90-, and 100-percent complete Excavation and Liner Construction technical specifications, along with Bid Schedule and Engineer's Cost Opinions, for City of Watsonville to review. SWT will complete the Technical Specifications based on Standard format in conjunction with City of Watsonville requirements and review comments, which will be incorporated into the final contract documents for the Phase IV Liner Development Construction Project.

Deliverables

- ◆ Specifications, including CQA Plan, (65-, 90-, and signed and stamped 100-percent) by a licensed engineer (licensed in the State of California).
- ◆ Bid Schedule and associated Engineer's Cost Opinions (90-, and 100-percent) will be submitted with the 90-percent and Final Plan and Specification submittal.

7.2.3 Prepare Phase IV Liner Development Design Calculations

SWT will prepare design calculations to support the configuration of the refuse disposal area containment system. These calculations include the following:

- ◆ Cushion geotextile calculations;
- ◆ Leachate conveyance capacity calculations to demonstrate that the specified drainage layer satisfies minimum performance standard;
- ◆ Leachate piping strength and conveyance capacity calculations to demonstrate that the leachate collection and transfer pipes are properly sized;
- ◆ Earthwork calculations; and,
- ◆ Slope stability analysis for the proposed liner/refuse designs.

Deliverables:

- ◆ The design calculations will be submitted to City of Watsonville at the 65- and 90-percent submittals and included in the Design Report Package discussed in Task 7.4.

7.2.4 Geotechnical Designs Services for the Phase IV Liner Development Design Project

The landfill extension design will be based on static and seismic slope stability analysis results, site geotechnical and settlement evaluations, and regulatory considerations. In preparation of this proposal HAI reviewed a few sections of the “Joint Technical Document (JTD) for the City of Watsonville Landfill,” prepared by ES Engineering Services (formerly GC Environmental, Inc.) dated June 2018. The JTD summarizes information from a geotechnical investigation performed for the landfill site in 1996 by EMCON, and additional seismic characterization and static and seismic slope stability analyses performed by CB&I (June 2015) and Aptim Environmental & Infrastructure, Inc. (Aptim, March 2018), respectively. The results of the geotechnical investigation report (EMCON, 1996), Seismic Characterization Report (CB&I, 2015), and Phase III Slope Stability Analyses Report (Aptim, 2018) will be used in stability evaluation of the landfill slopes. Additionally, analyses will be performed to evaluate stability of the prescriptive final cover system for the landfill presented in the JTD prepared by ES Engineering Services. The scope of work for this proposal does not include any subsurface investigation or laboratory testing for slope stability analyses and landfill cell design, but will include laboratory geotechnical engineering testing and field inspection and testing services for CQA scope of work.

SWT is teamed with HAI to provide the geotechnical design services outlined below.

7.2.4.1 Review of Available Data and Selection of Critical Cross Sections

We will perform a review of the published regional and local geology data. Geologic hazards such as active and potentially active faults, landsliding, rockfalls, subsidence, and flooding, will be discussed on a reconnaissance level. The Landfill JTD (ES, 2018), Geotechnical Engineering Investigation Report (EMCON 1996), Seismic Characterization Report (CB&I, 2015), and Phase III Slope Stability Analyses Report (Aptim, 2018) will be thoroughly reviewed and the recommended material properties will be used in our analyses. We will select 4 to 6 cross sections of the proposed landfill extension based on an initial review of its geometry and request SWT to provide us with AutoCAD drawings of these sections for further evaluation. We will select 3 to 5 critical cross sections out of the initial selected sections and perform detailed static and seismic slope stability analyses.

7.2.4.2 Site-Specific Seismic Hazard Evaluation

Title 27 requires the use of the maximum probable earthquake (MPE) for seismic stability analysis of Class III landfills. Additionally, Title 27 requires that further analyses should be performed to demonstrate the integrity of critical landfill infrastructure during the maximum probable earthquake (MPE) if the pseudo-static slope stability analysis indicates a factor of safety less than 1.5.

The recent Phase III seismic slope stability analyses by Aptim were performed for the highly conservative Maximum Credible Earthquake (MCE) design event. HAI will perform a site-specific seismic hazard evaluation to develop site design response spectra for two probabilistic design events: 1) the 475 return period event (~10% probability of exceedance in 50 years), and 2) the 950 return period event (~10% probability of exceedance in 100 years). The site design earthquake will be selected based on a comparison of the probabilistic 475-year and 950-year return period events with the deterministic MCE event for the project site and our judgement. The earthquake ground motions will be developed using the latest information on the activity and segmentation of mapped faults and the latest version of the next generation attenuation (NGA) GMPEs developed for the Western U.S. (NGA-West 2) in 2013/2014. We will also compare the estimated earthquake ground motions to those estimated for the site from the US Geological Survey 2008 and 2014 national seismic hazard model and the UCERF3 model for California.

7.2.4.3 Slope Stability Analysis

Iterative slope stability analyses will be performed for the critical waste slopes within Phase IV extension area, under both static and seismic conditions to evaluate optimum berm and final waste slopes design based on acceptable static and seismic stability criteria.

Conventional two-dimensional limit-equilibrium slope stability analyses will be performed for the excavation slopes, and for intermediate and final waste fill slopes. The results of the slope stability analyses (printed and graphical input and output files) will be presented in an appendix to the report, and summary tables and plots with conclusions will be presented in the main text. Computer program SLIDE (Version 6) will be used to calculate the factors of safety against potential failure. The program uses two-dimensional (2-D) limiting equilibrium theory to provide general solutions to slope stability problems. Both circular and non-circular potential sliding surfaces can be pre-specified or randomly generated. Modified Janbu (for wedges/blocks) as well as Bishop (circular) methods of analysis, which normally provide conservative results, will be initially used for conducting extensive searches for the most critical potential slip surface in the early phases of this study. The most critical identified potential slip surfaces will also be verified using more “rigorous” methods of analyses such as Spencer or Morgenstern and Price methods. Spencer method satisfies both force and moment equilibrium of the sliding mass and is therefore a more rigorous method of slope stability analysis.

Probably the most important potential failure mechanism considered are wedges (block failure) sliding through the waste mass and along the proposed landfill bottom/sideslope liner interface as well as weak and adversely oriented (out-of-slope) clay/claystone beddings within the bedrock formation, if any. Further, potential failure planes will be assumed to run along the weakest interface in the lining system and then through the landfill mass to the surface.

Final fill configuration will be evaluated for various cross sections and potential failure scenarios, including gross and veneer, and along critical landfill liner interfaces, for static and pseudo-static slope stability factors of safety and yield accelerations.

7.2.4.4 Seismic Stability or Seismically Induced Permanent Displacement Analyses

Pseudo-static slope stability analyses will be performed to evaluate factor of safety for seismic stability of the landfill slopes. Title 27 requires that further analysis should be performed to estimate seismically-induced slope displacements and demonstrate the integrity of critical landfill infrastructure during the design earthquake if the pseudo-static slope stability analysis indicates a factor of safety less than 1.5.

Seismically-induced permanent displacements will be evaluated based on simplified Newmark-type double-integration analyses (e.g. Bray and Travarasrou, 2007) using the results of previously computed:

- ◆ Yield accelerations of potential sliding landfill masses (from pseudo-static analyses), as well as,
- ◆ The input ground motion design spectral acceleration parameters selected based on the fundamental period of the sliding mass, and the site design earthquake magnitude determined from hazard de-aggregation for the site.

If results of the seismic deformation analyses indicate that landfill slope permanent displacement is less than the maximum acceptable limit of 6 to 12 inches, then the landfill configuration is considered to be seismically stable based on the RCRA Subtitle D (Part 258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities (U.S. EPA, 1995).

7.2.4.5 Final Cover Stability Evaluation

Slope stability analyses will be performed to evaluate stability of the prescriptive final cover system under both static and seismic conditions.

7.2.4.6 Preparation of Draft and Final Reports

The report will discuss the site-specific seismic hazard analysis, slope stability for the proposed landfill extension area and final cover system, seismic deformation analyses, and the landfill subgrade settlement. An electronic copy of the report will be provided to SWT.

7.3 Prepare Phase IV Liner Development Design Report and CQA Plan

SWT will prepare a Design Report (DR) of the design plans and specifications, including a CQA Plan, for the proposed construction area incorporating the following information:

- ◆ Design approach;
- ◆ Design criteria;
- ◆ Design calculations;
- ◆ Construction drawings;
- ◆ Construction specifications;
- ◆ Construction Quality Assurance Plan;
- ◆ Stability analysis and geotechnical information; and,
- ◆ Interim refuse grades and phase capacity.

The final DR will be transmitted to City of Watsonville. SWT will schedule a Design Report Review Meeting with the Central Coast RWQCB for submittal of the DR (up to two meetings with the regulatory agency are anticipated).

Deliverables:

- ◆ Two copies of the draft DR.
- ◆ Two copies of the final DR incorporating City of Watsonville and Central Coast RWQCB comments.
- ◆ One copy of the final DR in Word format for Windows and PDF format on flash drive.

7.4 Provide Bid Process Engineering Support

SWT will provide engineering support during the bid process, including attending both the Pre-Bid meeting/Job Walk, provide assistance with preparing addendums, and evaluating submitted bids.

7.5 Construction Engineering Support Services

Consult with City of Watsonville

SWT staff will be available to discuss any technical or construction issues that may come up during construction. As this project has various components, the primary objective is to construct the groundwater protection system and gain additional disposal airspace and ultimately obtain Agency approval.

Review Contractor Submittals, Requests for Information, and Change-Order Requests

As requested by City of Watsonville or the CM, SWT will review the Contractor's requests for information and will provide additional clarification as needed. The SWT Project Engineer or other appropriate staff will review Contractor submittals (including manufacturer information), as necessary, to assist the CM with verification of compliance with Technical Specifications. Change-Order requests will also be reviewed with the CM, and Engineering support recommendations will be provided to City of Watsonville for approval or denial of Contractor requests.

Project Coordination and Communication

The SWT Project Engineer will be available to discuss project progress with City of Watsonville and the CM on an as-needed basis and will attend Construction meetings on a bi-weekly basis, with field review after

each meeting, to assure appropriate project coordination and communication between the Contractor, City of Watsonville, CM, CQA testing, and engineering support staff.

Final Job Walk and Punch List

At City of Watsonville's direction, the SWT Project Engineer will attend the final job walk and assist the CM with development of a punch list that identifies additional work the Contractor needs to complete to meet the Technical Specifications and comply with its Contract with the County.

Final Construction Report

SWT will identify changes from project Plans & Specifications that were approved and will provide the information for integration into the Final Construction Report prepared by CM and CQA Consultants. The Report will also include all CQA test results, observations, and certifications. The report will clearly identify deviations in plan view and will include a discussion of the rationale for those changes. SWT will submit Contractor RFI's and Engineer's response to each RFI.

Coordinate Receipt of Contractor's Record Drawings

The SWT Project Engineer will collect and review the Contractor's Record Drawings to identify their adequacy and to identify any additional information that should be included.

Deliverable(s)

- ◆ Review of the Final Construction CQA Report.

7.6 CQA Services

The following lists the key tasks for Phase IV liner construction CQA services:

- ◆ Mobilization, Demobilization, Health & Safety Plan/AHA's
- ◆ CQA Monitoring Personnel [full time on-site during subgrade preparation and liner installation, includes cost for field truck and required testing equipment (e.g nuclear densitometer)]
- ◆ CQA Manager (on-site once weekly during subgrade preparation and liner installation for inspection of the work product and project progress, and for attending weekly construction meeting)
- ◆ Grain size particle analysis, moisture/density relationships, and laboratory permeability tests
- ◆ Geosynthetics material testing (to be managed by Project Contractor)
- ◆ CQA Report (the final CQA report, including all documentation required by the CQA Plan, will be submitted within 30 days following the completion of construction)

The overall goals of the project CQA services Scope of Work are as the following:

- ◆ Certify that the landfill cell liner and leachate collection and removal system (LCRS) construction was completed in accordance with the approved plans, technical specifications and CQA Plan,
- ◆ Observe and document construction of each component of the landfill liner and LCRS system,
- ◆ Observe, test, and document test locations and corresponding test results for various landfill liner components,
- ◆ Observe and document survey of top of the landfill subgrade and other landfill liner layers (e.g. top of the geomembrane or GCL liner),
- ◆ Document geosynthetics preconstruction material data information and testing required in the drawings, technical specifications, and CQA Plan,
- ◆ Coordinate work efforts and testing with the landfill construction manager, design engineer, and liner installer. Follow details of the observation, testing, and reporting requirements included in the technical specifications and CQA Plan.

7.7 Project Administration/Coordination and Meetings

SWT will provide project administration services including project schedule development, tracking, and updating, budget tracking, invoicing, and activity reporting, as requested. The SWT Project Manager will also coordinate activities with City of Watsonville and the regulatory agencies, at the City's direction. This task also includes budget for a face-to-face kick-off and two meetings at City of Watsonville's Offices and two meetings with the Central Coast RWQCB staff, as well as two rounds of responding to comments (including plan edits) from the agencies. The SWT Project Manager will also coordinate activities of staff as well as interface with City of Watsonville and the regulatory agencies, at the City's direction.

Deliverables

- ◆ Project Tracking
- ◆ Meeting Minutes, when required
- ◆ Coordination with City of Watsonville staff

8.0 SCHEDULE/COST ESTIMATE/CONCLUSION/COMMITMENT

SCHEDULE

The proposed project schedule for Phase IV Development Design, Permitting, Construction Support, and Construction Quality Assurance (CQA) Services is provided in Table 1.

COST

SWT and HAI have developed preliminary budget estimate spreadsheets for the project based on requests (see Tables 2 and 3). Table 2 is a breakdown of SWT services and Table 3 is a breakdown of HAI services. Based on discussion regarding project approach and finalizing schedule, the cost estimate can be refined.

The cost for CQA services was estimate for an assumed construction duration of five (5) weeks. We have also provided an optional weekly cost of CQA services if construction period exceeds five (5) weeks. Engineering Support budget assumes half of the Engineering Support Total Budget will be allocated from the Phase III Closure Construction Project.

CONCLUSION

SWT Teams Benefits to City of Watsonville Public Works & Utilities Department

- ◆ SWT Team can integrate the Phase IV Liner Development into the existing Phase III Closure construction documents to provide the City with significant construction cost savings.
- ◆ Unmatched Experienced Project Staff, with the ability simultaneously complete liner and closure plans.
- ◆ Experience at numerous sites providing similar services as the City of Watsonville Landfill Liner and Final Cover Design and CQA project.
- ◆ Comprehensive and Innovative Project Approach with Value-Added Creative Solutions.
- ◆ Regulatory Agency Creditability with ability to facilitate Amendment/Modification Approvals.
- ◆ Geotechnical Subconsultant which will provide effective CQA services.
- ◆ History of Successfully Completing Similar Projects, on schedule, and under budget without any construction issues.

COMMITMENT

SWT Engineering in conjunction with Hushmand Associates Inc, collectively the SWT Team, appreciates the opportunity to submit this proposal to provide Consulting Services for the Design and Construction of Liner at the City of Watsonville Landfill.

The SWT Team is committed to providing City of Watsonville with professional, knowledgeable services maintaining the highest industry standards of quality for the work performed on this project. The SWT Team's commitment is to provide City of Watsonville with quality value engineering while protecting the interest of the City of Watsonville and providing cost-efficient services for this contract.

WHY SELECT THE SWT TEAM?

Unmatched Qualifications and Technical Skills.

Experienced Geotechnical Consultant.

Exceptional Understanding and Comprehensive Approach.

SWT is one of the Leaders in providing Solid Waste Services to Municipalities in California.

TABLES

TABLE 1 - PROJECT SCHEDULE
REQUEST FOR PROPOSALS CONSULTING SERVICES FOR
PHASE IV DEVELOPMENT DESIGN, PERMITTING, CONSTRUCTION SUPPORT, AND CQA SERVICES
AT THE CITY OF WATSONVILLE LANDFILL

		4-WEEKS	8-WEEKS	12-WEEKS	16-WEEKS	20-WEEKS	24-WEEKS	28-WEEKS	32-WEEKS	36-WEEKS	40-WEEKS
NOTICE TO PROCEED	◊										
PRELIMINARY DESIGN CONFIGURATION STUDY											
CITY REVIEW											
FINALIZE DESIGN CONFIGURATION											
DESIGN 60%											
CITY REVIEW											
DESIGN 80%											
DESIGN REPORT											
CITY REVIEW											
FINALIZE DESIGN REPORT											
SUBMIT TO RWQCB											
DESIGN 100%											
CITY REVIEW											
START BID PROCESS											◊

TABLE 2 - FEE ESTIMATE
PHASE IV DEVELOPMENT DESIGN, PERMITTING, AND CONSTRUCTION SUPPORT (SWT)
CITY OF WATSONVILLE

	Principal	Project Engineer	Engineer II / Designer	Technician	Project Coordinator	TOTAL LABOR	5% Expenses*	FEE ESTIMATE
Hourly Rate\\$/	\$262.00	\$184.00	\$150.00	\$78.00	\$134.00			
7.1 Preliminary Phase IV Development Configuration Study						SWT Budget Allocation Under Separate Contract		
7.2 Prepare Construction Documents for the Phase IV Liner Development Design Project								
7.2.1 Prepare Phase IV Liner Development Construction Drawings	24	80	120	120		\$48,368	\$2,418	\$50,786
7.2.2 Prepare Excavation and Liner Construction Project Technical Specifications/Engineer's Cost Opinion/Bid Schedule	8	60	32	40	10	\$22,396	\$1,120	\$23,516
7.2.3 Prepare Phase IV Liner Development Design Calculations	4	20	40			\$10,728	\$536	\$11,264
7.2.4 Geotechnical Designs Services for the Phase IV Liner Development Design Project (HAI)						See Table 2A for Geotechnical Analysis/Design Cost Estimate		
7.2.4.1 Review of Available Data and Selection of Critical Cross Sections								
7.2.4.2 Site Specific Seismic Hazard Evaluation								
7.2.4.3 Slope Stability Analysis								
7.2.4.4 Seismic Stability or Seismically Induce Permaneant Displacement Analysis								
7.2.4.5 Final Cover Stability Evaluation								
7.2.4.6 Preparation of Draft and Final Reports								
7.3 Prepare Phase IV Liner Development Design Report and CQA Plan	8	64	20		10	\$18,212	\$911	\$19,123
7.4 Provide Bid Process Engineering Support	12	24	8		8	\$9,832	\$492	\$10,324
7.5 Construction Engineering Support Services (10 week)	20	60	20			\$19,280	\$964	\$20,244
7.6 CQA Services (HAI)						See Table 2B/C for CQA Services Cost Estimate		
7.7 Project Administration/Coordination and Meetings	24	50			20	\$18,168	\$908	\$19,076
TOTAL HOURS	100	358	240	160	48			
ESTIMATED FEE	\$26,200	\$65,872	\$36,000	\$12,480	\$6,432	\$146,984	\$7,349	\$154,333

Notes/Assumptions:

1. See Table 2A-2C for Geotechnical Analysis and CQA Services Cost Estimate Table. Including weekly CQA Cost Estimates if the project duration is greater that 5 weeks
2. Engineering Support budget assumes half of the Engineering Support Total Budget will be allocated from the Phase III Closure Contrsruction Project.

TABLE 3A - ITEMIZED COST ESTIMATE (TASK 7.2.4 – Analysis/Design Services)

ITEM	LABOR COST	OTHER COSTS	EXTENSION
Data Review & Selection of Critical Cross Sections (Task 1)	\$3,660		\$3,660.00
Site-Specific Seismic Hazard Evaluation (Task 2)	\$4,740		\$4,740.00
Static and Pseudo-Static Slope Stability Analysis (Task 3)	\$6,660		\$6,660.00
Seismically-Induced Permanent Displacement Analyses (Task 4)	\$4,510		\$4,510.00
Final Cover Stability Evaluation (Task 5)	\$1,910		\$1,910.00
Preparation of Draft and Final Reports (Task 6)	\$6,420	\$120	\$6,540.00
Specifications and CQA Plan Preparation Support (Task 7)	\$3,900		\$3,900.00
		TOTAL	\$31,920.00

TABLE 3B - ITEMIZED COST ESTIMATE (Project Duration 5 Weeks - TASK 7.6, CQA Services)

ITEM	LABOR COST	OTHER COSTS	EXTENSION
Review of Project Plans, Specifications, and CQA Plan; Planning and Preconstruction Meeting; Project Management	\$4,390	\$950	\$5,340.00
CQA Field Services (CQA Monitor, 25 days, 8 hrs per day; CQA Manager weekly site visit & construction progress meetings)	\$28,200	\$10,700	\$38,900.00
Geotechnical Lab Testing	\$2,800		\$2,800.00
Draft & Final Reports	\$7,870	\$490	\$8,360.00
		TOTAL	\$55,400.00

TABLE 3C – WEEKLY COST (Project Duration > 5 Weeks – TASK 7.6, CQA Services)

ITEM	LABOR COST	OTHER COSTS	EXTENSION
Review of Project Plans, Specifications, and CQA Plan; Planning and Preconstruction Meeting; Project Management	\$180		\$180.00
CQA Field Services (CQA Monitor, 25 days, 8 hrs per day; CQA Manager weekly site visit & construction progress meeting)	\$5,640	\$1,880	\$7,520.00
Geotechnical Lab Testing		\$215	\$215.00
Draft & Final Reports	\$605		\$605.00
		TOTAL	\$8,520.00

ATTACHMENT A
FULL RESUMES



Mr. Cullinane has more than 30 years of experience managing the development of municipal solid waste landfill expansions, permitting, design, construction support, closures, and civil improvement projects. He has successfully managed hundreds of landfill projects from small to larger scale over \$40 million overall budget, with outstanding results. His experience has included the design of over 50 Subtitle D liner systems expansion construction projects. Mr. Cullinane has made presentations to members of the Solid Waste Management of Association of America (SWANA) on issues raised by Subtitle D liner design regulations, and is a specialist in landfill development as a resource, while balancing the demands of effective landfill operations, regulatory agency requirements, and owner's goals. Mr. Cullinane is recognized as one of the leading solid waste engineers in California with an outstanding reputation within both the regulatory, public and private sector.

EDUCATION

BS - Civil Engineering (California State Polytechnic University, Pomona, CA, 1984)

AS - Engineering Emphasis (Mount San Antonio College, Walnut, CA, 1981)

REGISTRATIONS

Registered Civil Engineer, (CA, AZ, MT, HI, TX)

Registered Professional in Sediment and Erosion Control, 2004

Registered Professional in Storm Water Quality, 2005

Qualified California Industrial General Permit Trainer of Record (00175)

MEMBERSHIPS

American Society of Civil Engineers (ASCE)

National Society of Professional Engineers (NSPE)

Solid Waste Association of North America (SWANA)

PROJECT EXPERIENCE

LANDFILL EXPANSION/MASTER PLANNING

City of Santa Maria Utilities Department, California

Mr. Cullinane has worked on numerous solid waste projects for the City, including engineering design and permitting for the current IWMF project configuration. He has also worked closely with City staff on the current conceptual design modification. Mr. Cullinane also provided solid waste services for the Santa Maria Regional Landfill which included supporting the defense of the third-party lawsuit regarding storm water. SWT was able to develop one of the first Notice of Non-Applicability (NONA) Technical Studies to remove the facility from the Stormwater IGP, which forced the third-party to drop their suit against the City.

Tajiguas Sanitary Landfill, Goleta, California

Mr. Cullinane has provided engineering support management for three landfill expansion permit projects at the Tajiguas Landfill. This includes two disposal capacity expansion permits; the first was steepening the front face of the landfill to gain additional capacity. The second expansion permit was to expand the facility into the back canyon of the site. The third permit was not to expand the facility, but to reconfigure the facility across Pila Creek. This provided for more economical disposal alternatives along with the ability to provide a location for a large out-of-channel basin. As part of this reconfiguration permit, Mr. Cullinane supported the resource agencies permitting which included the Army Corps of Engineers, Fish and Game, Fish and Wildlife along with the Regional Water Quality Control Board, LEA and CalRecycle.

Project Manager responsible for various projects including containment system design, fill sequencing and operational plans, construction documents, regulatory compliance, and construction support. Mr. Cullinane has been the Project Engineer for all Groundwater Protection Expansion constructed at the site, including Phases II (IA, IB, IC, IIA, IIB, IIC, IIIA-B, IIIB, IIIC-D, and IIIE) and IIIF, which is currently under construction. He was the Project Manager/Engineer of Record for the Phase 2-3 Partial Final Closure project. Mr. Cullinane was the Project Manager/Engineer for all the major stormwater control facilities on-site, which include concrete lined North Basin with skimmer, perimeter concrete lined storm channel, and membrane lined South Basin.

Flathead County Landfill, Kalispell, Montana

Mr. Cullinane and SWT Engineering are providing engineering services to the Flathead Landfill. This support included evaluating landfill consumption and soil usage from 2006 to present operating years. Letter reports evaluating the operational efficiency have been prepared for the District's use each year. In addition, the closure cost estimate has been updated and certified. Mr. Cullinane, at his previous company, was also the project manager for the landfill expansion and the construction of two lined cell phases. Mr. Cullinane provided engineering support for various aspects at the facility along with supporting the construction of the landfill cells and gas systems.

Prima Deshecha Landfill, Orange County, California

Project Manager responsible for the preparation of the Zone 4 - Phase A1 and A2 Design Reports which were submitted to the RWQCB and local enforcement agencies for approval. Mr. Cullinane provided engineering support in the preparation of an updated excavation and fill design plan for the Zone 4 area of the Prima Deshecha Landfill. He has also assisted with the evaluation of the selected alternative waste containment system designs for applicability including an assessment of the impact compatibility to other waste containment system components.

Mr. Cullinane, at his previous company was Project Manager for the design and providing engineering support during the construction of Zone 1-Phase A, C1, and B composite liner systems at this municipal landfill facility. These construction projects have included excavation of stockpile and native overburden materials and construction of engineered fills to support the new lined cells. The Phase B construction also includes landslide remediation and biological mitigation projects involving numerous agencies.

Historically SWT staff was project manager for the six phases of the lined cells (Phases A, A1, C, B, B1/A2, and C2) at the Prima Deshecha Landfill.

Frank R. Bowerman Landfill, Orange County, California

Since establishing SWT, Mr. Cullinane has been the Project Manager and Engineer of Record for Phases VIIC, VIIB1, and VIIB2; the last three groundwater protection projects completed in the past 10 years at FRB. These projects were completed without any contractor claims, under the construction bid and timeframe. The Phase VIIB project was almost \$40 million of construction cost with over 2 million cost savings from the original bid amount. Mr. Cullinane, at his previous company, acted as the principal-in-charge or project manager for various projects at the Frank R. Bowerman (FRB) Landfill. This included updating the Master Plan for the facility along with six cell development projects at the facility starting with Phase IIIA in the early 1990s before Subtitle D took effect. These cell developments have permitted the use of alternative liners; of which, four different liner systems were used for these cell constructions. In addition, an alternative final closure demonstration construction was completed with the VD cell development in order to use the excavated material as a closure cap. Once approved, this will have the potential for a significant cost savings for the County of Orange for closures. In addition, Mr. Cullinane has assisted the County in planning and budget projects for the development of the facility.

NPDES - Industrial General Permit (IGP)

Not only is Mr. Cullinane a Trainer of Record (ToR) for QISP's he's is leading expert in IGP compliance in the solid waste industry. He has been the certifying engineer for five completed NONA technical studies and eventual elimination of the facilities having to comply with the IGP. One of the studies and filings was for the City of Santa Maria for the existing solid waste facility. He and his staff are currently working on two more facilities to bring in to NONA status with the IGP.

West Miramar Landfill in San Diego, California

Engineering Task Manager for design of Subtitle D liner system in support of the Mr. Cullinane has been the Project Manager or Principal-In-Charge for all of the lined cells at the Miramar Landfill. This

work has included at least five individual lined cells and has included an alternative liner design element. This alternative liner design element was proposed so that on-site material from the aggregate processing plant could be used to construct the low-permeability soil layer. The Miramar site was phased to continue to allow storm water to drain to the current desilting basin. Provided design construction support for the first lined cell. The initial cell development included the current leachate holding system, while the latter development included the development of the permanent leachate collection and holding system. Mr. Cullinane has also provided engineering support for the duration of construction for the various cells.

Toland Road Landfill, Ventura County, California

Project Manager for engineering and design services for the Phase 3 expansion. Project involved implementation of strategies to expand Phase 2 of the site during design of Phase 3.

Mid-Valley Sanitary Landfill, San Bernardino County, California

Mr. Cullinane is a Project Manager for the Mid-Valley Sanitary Landfill Unit 4 Phase 1 Expansion Project. This project included a new access road, a leachate collection and storage system, drainage conveyance and treatment systems, and a composite liner system. As this is a very unique liner system; a triple composite liner on the floor, 2 slopes to allow for on-site soil usage, and a double composite liner system for the upper two slopes and with extra effort the contractor was able to achieve the prescriptive standard. This saved the County over one million dollars on the Phase 1 construction most likely \$2 to \$3 million overall. The design and construction cost of this project was approximately \$30 million. Mr. Cullinane is Project Manager responsible for the design upgrades for the existing Unit 3 LCRS Pumping and Storage System in response to comments received from the Santa Ana RWQCB. Mr. Cullinane worked on the preparation of the operations and maintenance manual and the preparation of maintenance reporting documents for requested monitoring and reporting protocols.

Prepared construction documents and a design report for reconstruction of the Unit 3 Storm Water Basin and Storm Water Pump System.

Mr. Cullinane, at his previous company also designed Construction Drawings, prepared Construction Documents, Specifications, Design Reports, and provided Engineering Support for each of the five liner construction projects (80 acres of lined area) at the Mid-Valley Sanitary Landfill.

Avenal Regional Landfill, Kings County, California

Project Manager for the design of the new Site Entrance Road and Scale House Facilities, access road and perimeter channel and storm drain improvements; Design of Phase II Liner Construction Documents including Project Specifications, Design Report Preparation, and Construction Engineering Support for each of the construction projects; Conceptual design and Fatal Flaw Analysis for Expansion Design. Mr. Cullinane also performed design and construction engineering support for the Phase 1 Liner construction project.

Kirby Canyon Recycling and Disposal Facility, San Jose, California

Project Manager for the permitting and design of the first Subtitle D design at this site. Four separate construction phases were developed for the Subtitle D lined cell. Provided construction management for the first two phases completed. Also developed fill sequencing within the lined cells.

Gregory Canyon Landfill, San Diego County, California

Mr. Cullinane has been the Task Manager for the engineering of the proposed Gregory Canyon Landfill in north San Diego County. Mr. Cullinane has been involved with the facility since its conceptual design which included excavation and fill plans and ultimate fill plans, along with phased development. This site has several unique elements. One of which was the determination of the relocation of the existing transformer poles within the landfill footprint. The design also included

large MWD water lines that run adjacent to the facility and feed the County of San Diego. In particular, the stormwater drainage system was designed as a dual system onsite and offsite storm water system along with a potential flare rupture in the water line. The facility is in its final stages of the permitting process.

Crazy Horse Landfill, Salinas, California

Project Manager responsible for the expansion design, construction drawings and grading plans, and construction management services for the expansion of the Crazy Horse Landfill in Salinas, California. This included the design of the first Subtitle D liner system at the site. Responsibilities included regulatory compliance, operations assistance, fill sequencing and winterization plans. In addition to the design of the first lined cell, provided construction management and CQA for liner installation. Worked with the Regional Water Quality Control Board (RWQCB) in establishing new Waste Discharge Requirements (WDRs) for the site.

Rock Creek Landfill, Calaveras County, California

Project Manager for the design of a Class III Subtitle D liner system and Class II leachate impoundment at the Rock Creek Landfill. Project involved development of an alternative petition for use of GCL versus clay for bottom and side slopes.

Miramar Landfill, San Diego, California

Mr. Cullinane has functioned as the project manager or principal-in-charge for six Subtitle D cells at the Miramar facility. The first lined cell at the site, which was completed in the early 1990s. The first lined cell, which included a temporary leachate storage system. This leachate storage system was moved with subsequent cells as they were developed. The permanent leachate collection and holding system was completed with the fourth cell construction. This included an automated pumping system to store the leachate on the adjacent ridgeline for easy access and disposal. In addition to managing the design, Mr. Cullinane provided engineering support during the construction. To date the construction of these cells has exceeded \$10 million in successful construction. As part of the permitting of the facility, Mr. Cullinane was the engineering task manager and prepared the plans for the current landfill expansion. Each cell development at the site had a design report prepared for submittal to the Regional Water Quality Control Board. Currently the City is bidding Cell E which will be the final landfill cell in the facility.

LANDFILL CLOSURE DESIGNS

Kern Valley Landfill, Kern County, California

Engineering Task Manager for final closure design. Project involved development of final cover design, final grading plans, hydrology/sedimentation studies, groundwater/leachate control systems and landfill gas control plans.

Various Abandoned/Illegal Landfill and Burn Dumps, California

Engineering Task Manager for various projects for the ongoing contract with the California Integrated Waste Management Board's (CIWMB) (now known as CalRecycle) for the clean-up of disposal sites throughout California where the Board has assumed closure responsibilities. Projects included closure cap design, final grading and drainage design, and engineering support during site closure construction.

Ballard Canyon Landfill, Santa Barbara County, California

Project Manager for preparation of construction plans and specifications for the closure of the final cover system was an alternative to the prescriptive cover design that utilized a 60-mil thick high-density polyethylene (HDPE) flexible membrane cover (FMC) in place of the low hydraulic-conductivity soil material utilized in a prescriptive cover.

Milliken Sanitary Landfill, San Bernardino County, California

Project Manager for preparation of construction documents for closure of East Mound of the Milliken Landfill. Responsibilities included preparation of final grading, drainage, and erosion control plans.

The Milliken Landfill closure was one of the first approved evapotranspiration soil covers approved in the state. The West Mound, which is the main landfill, was closed in two phases. The first phase included the north and east slopes, while the remainder was closed in the final phase. This work included modification of the gas collection system, final drainage and erosion control system along with roads and benches. Also a moisture monitoring system was included as part of the construction for ongoing monitoring of the effectiveness of the cover system, which was also used to gain final approval from the Santa Ana Regional Water Quality Control Board.

Big Oak Flat Landfill, Tuolumne County, California

Project Manager for preparation of construction plans and specifications for site closure. The final cover system consisted of a two-foot thick foundation layer composed of re-worked existing cover soils, a 60-mil thick geomembrane liner, a series of geonet drainage strips, a 16-ounce non-woven geotextile, and a one-foot thick vegetation layer composed of re-worked existing cover soils.

Mountain View Landfill, Mountain View, California

Project Manager for the design and implementation of closure plans for the Mountain View Landfill. Project includes closure of three separate landfill sites, including final cover design, implementation of corrective action measures, and construction management.

Berry Street Mall, Roseville, California

Project Manager for design and implementation of closure plans for clay cap installation and borrow sites.

This closure, completed as part of the California Integrated Waste Management Board's 2136 Program, was completed in the early 1990s and has performed excellently for the past decade with little or no maintenance.

Santa Maria Airport Landfills, Santa Maria, California

Project Manager for the closure of two inactive landfill sites at the Santa Maria Airport. This project involved preparation of a Post-Closure Maintenance Plan, final grading and drainage design, and preparation of construction documents.

Inactive Landfill Site Closure, Whittier, California

Project Manager for closure of a small inactive landfill site at the Rose Hills Memorial Park in Whittier, California. Responsible for design of final cover system, hydrology/sedimentation studies, and final grading plan.

Crazy Horse Landfill, Salinas, California

Project Engineer for Design of Partial Closure and Post-Closure Maintenance Plan for Crazy Horse Landfill, Salinas, California.

San Bernardino County – Various Sites

Over the past several years, Mr. Cullinane has been the Principal-In-Charge or Project Manager on numerous closures for the County of San Bernardino Solid Waste Management Department. This included the closure of numerous desert sites (Phelan Landfill, Newberry Springs Landfill, Apple Valley Landfill, Barstow Landfill, Hesperia Landfill, Lucerne Landfill and Yermo Landfill). These landfills used an evapotranspiration cover which included three to four feet of native soil with the implementation of erosion control and drainage features. Due to their sitings, storm water control was a major component of the closures to minimize flash flood impacts to these desert sites.

ADDITIONAL SOLID WASTE EXPERIENCE

Colton Landfill, San Bernardino County, California

Project Engineer for design of site drainage improvements, erosion control devices, construction management, and bidding assistance.

Operating Industries, Inc. Monterey Park, California

Project Engineer for the design and preparation of cost estimates for various sewer and water system alternatives. Also responsible for miscellaneous on-site civil work consisting of North Slope grading plans, hydrology and hydraulic studies, erosion control, storm drain designs and survey.

Ventura County, California – Two Conceptual Landfills

Project Engineer for site planning, entrance road alignment, grading, drainage and cost evaluation of two conceptual landfills.

MAC/BAS LLC

From 2004 until 2006, Mr. Cullinane was the principal at MAC/BAS LLC which completed numerous industrial and construction SWPPPs. This included preparing SWPPPs for all of the landfill sites in San Bernardino County, for the Allied (San Diego Landfill System) sites and numerous construction SWPPPs. In addition, MAC/BAS supplied the storm water quality control for contractors and agencies which included preparation of DAMPS, SWDRs, and SUSUMPS and other agency required storm water quality analysis.

In addition, Mr. Cullinane prepared and presented training classes to San Diego Landfill staff in the requirements and preparation of storm water reporting.

Mr. Reyes is a Project Engineer with 7 years of experience in municipal solid waste disposal facility design, public works, and civil engineering project infrastructure design, construction management, and construction quality assurance. Mr. Reyes has assisted in landfill liner development projects, closure design development, construction document preparation (drawings and technical specifications) agency correspondence and design of stormwater drainage systems including engineering calculations for hydrology studies and prepared industrial stormwater management plans with construction level documents for no-discharge stormwater retention basin projects. He has become an expert in the field of developing NONA Technical Studies in compliance with the California Stormwater IGP. Mr. Reyes has performed construction observation and monitoring to ensure projects were constructed in reasonable compliance with the approved Specifications and Construction Drawings.

EDUCATION

BS - Civil Engineering (California State Polytechnic University, Pomona, CA)

REGISTRATIONS

Registered Civil Engineer, 89895 – California

MEMBERSHIPS

American Society of Civil Engineers (ASCE)

Solid Waste Association of North America (SWANA)

PROJECT EXPERIENCE

Flathead County Landfill, Kalispell, MT – Mr. Reyes is a Project Engineer who assisted in completion of groundwater protection systems and closure project at the landfill. Mr. Reyes assisted in the development of the new Entrance Facility Construction Drawings (3 Phases) at the landfill, which included underground utilities electrical, sewer, water, fiber/telecom, instrument logic, stormwater conveyance systems, gravel pad improvements, and pre-engineered steel building for site activities. Recently, he was the design engineer for the new wash water pad and lined basin Construction Project which included design of a reinforced concrete wash pad with grade beams and steel driving surface for heavy equipment, and design of a HDPE textured geomembrane lined retention basin and conveyance system.

Lincoln County Landfill, Libby, MT – Mr. Reyes is a Project Engineer working with the county to develop conceptual expansion options to supply 30+ additional years of capacity. Recently he has assisted the County with refuse fill sequence planning and landfill access road development.

Watsonville Sanitary Landfill, City of Watsonville, California

Final Closure/Post-Closure Maintenance Plan - Developed Phase III Closure grading plan and details for final closure/post-closure maintenance plan. Prepared closure/post-closure cost estimate.

Mid-Valley Sanitary Landfill, San Bernardino County, California

Developed liner construction drawings for Unit 4 Phases 1 and assisted in Unit 1 Phase 1 closure including liner details, leachate collection and recovery system design, base and side slope liner system details, LCRS sump, leachate pumping system, storage, containment and load-out systems.

Tajiguas Landfill, Santa Barbara County, California

Developed liner construction drawings for Phases 3B, 3C, 3D, and 3E including liner details, leachate collection and recovery system design, base and side slope liner system details, leachate collection and recovery system, and interim stormwater protection system design. Provided construction engineering support for each liner phase.

Prepared final closure construction drawings and specifications including grading, drainage, Linear Low-density Polyethylene (LLDPE) Geomembrane cap closure system, liner terminations, and LFG collection system for Phase 2 and 3 closures (phased to 3 total construction drawings and specification sets).

Olinda Alpha Landfill Phase 1 and Phase 2 Partial Final Closure Construction Design Drawings

Assisted in preparation of final closure construction drawings and specifications, including grading, drainage and access roads; hydrology and hydraulic calculations, drainage channel design, Landfill Gas System Design for Phase 1, a 65-acre Monolithic Soil Final Closure Construction Project and Phase 2, is an ET Monolithic Soil Final Closure Construction Project.

Ox Mountain Landfill, Half Moon Bay, California – Phase 1 Partial Final Closure

Assisted in preparation of final closure construction drawings and specifications, including grading, drainage and access roads; hydrology and hydraulic calculations for this Final Closure Construction Project. Linear Low- Density Polyethylene (LLDPE) Geomembrane with a below liner Seep and Landfill Gas Collection System, toe of slope Infiltration Galleries, and above liner drainage system was utilized for the Landfill Final Cover System

South Coast Landfill Closure, Mendocino County, California

Assisted in preparation of final closure construction drawings and specifications, including grading, drainage and access roads; hydrology and hydraulic calculations for this Final Closure Construction Project. Linear Low- Density Polyethylene (LLDPE) Geomembrane with a passive Landfill Gas System, and above liner drainage system was utilized for the Landfill Final Cover System

Frank R. Bowerman Landfill, Orange County, California

Assisted in the Phase VIII B-1 and VIII B-2 Liner Construction Drawings and Specifications along with hydrology reports with hydrology and hydraulic calculations for both liner projects.

Landers Sanitary Landfill, Landers, California

Assisted in the development of the sites Notice of Non-Applicability (NONA) performing hydrology and hydraulic calculations to demonstrate that industrial stormwater will not be discharged off site.

Los Flores Landfill, Santa Barbara County, California

Assisted in the preparation Drainage Study Overview including hydrology and hydraulic calculations the existing and proposed conditions of the landfill to determine the best distribution of the landfill tributary areas to maintain historical flows to the downstream drainage areas.

Prima Deshecha Landfill, Orange County, California

Assisted in the design of West Liner Construction Drawings, drainage study, visual screening, and connection with the new La Pata Road extension project running through the site.

Santa Maria Sanitary Landfill, Santa Maria, California

Assisted in the development of the sites Notice of Non-Applicability (NONA) performing hydrology and hydraulic calculations to demonstrate that industrial stormwater will not be discharged off site.

South Chollas Landfill. San Diego, CA

Assisted in the development of the closure deficiencies, which include drainage and grading re-designs, landfill gas system upgrades (elimination, replacement, or design of sumps, headers, laterals, and wells), and paving designs.

CONSTRUCTION MANAGEMENT EXPERIENCE

Tajiguas Landfill, Santa Barbara County, CA

Construction Manager for the construction of the Phase IIIC liner project at the Tajiguas Sanitary Landfill (Santa Barbara County, CA). Phase IIIC was a \$2.5 million expansion of the existing liner system. Mr. Reyes was full-time onsite and handled the daily activities and bi-weekly construction meetings. Mr. Reyes worked closely with Geosyntec Consultants who provided CQA services for the Phase IIIC liner project. This project was brought in on time and under the construction bid.

CQA officer and assistant construction manager for the Phase IIID liner project at the Tajiguas Sanitary Landfill (Santa Barbara County, CA). Mr. Reyes performed both functions on this approved alternative liner project. This project was completed on time and under budget. The final CQA Report was

submitted prior to final completion of the work by the contractor and was approved for waste disposal when the contractor completed the work.

Flathead County Landfill, Kalispell, Montana

Assisted in Construction Management for the Leachate Transfer System Upgrade System Construction project that included observing excavation of unsuitable material, placement of engineered backfill, installation of a submersible pump and all necessary piping and electrical components. Mr. Reyes was responsible for preparation and/or review of construction documents including submittals, daily construction reports, weekly progress meetings, and daily interface with contractor and client during field operations.

55th Way Landfill, Long Beach, CA

Assistant CQA officer for the 55th Way Landfill Closure Construction Project that included excavating subgrade, installation of liner closure cap, furnishing and installing LFG collection system, and constructing drainage pipes.

Mr. Botica is a Project Manager with over ten years of experience in municipal solid waste disposal facility design, public works, and civil engineering project infrastructure design. Mr. Botica has assisted in landfill liner development projects, closure design development, construction document preparation, design of grading, drainage systems, access roads, operational fill sequencing, and waterline projects for solid waste disposal sites. He has provided engineering calculations for hydrology studies and storm drain plans and prepared grading and drainage plans for landfill closure and civil infrastructure projects. In addition, he has prepared closure/post-closure cost estimates and Non-Water Release Corrective Action Plans for multiple sites.

EDUCATION

B.S. - Geospatial Engineering (California State Polytechnic University, Pomona, CA, 2009)

M.S. - Environmental Engineering (California State University Fullerton, CA, 2013)

REGISTRATION

Registered Professional Engineer - California

PROJECT EXPERIENCE

Avenal Regional Landfill, Kings County, CA

Assisted in the development of liner construction drawings for Phase 2A, including liner details, leachate collection and recovery system design, base/slope liner system details, and interim stormwater protection system design.

Big Bear Sanitary Landfill, San Bernardino County, CA

Assisted in the preparation of the final closure construction drawings including grading, drainage and access roads, and hydrology and hydraulics calculations. Assisted in the development of final cover sections for mono-fill slope final cover and alternative final cover (LLDPE geomembrane) for benches, perimeter and access roads, and top deck areas.

Davenport Park (55th Way Landfill), Long Beach, California

Designed a re-closure for the site to the existing adjacent park to expand and provide the community with a beneficial re-use of the area. Worked with CalRecycle on a matching grant to help with construction funding for the City of Long Beach. Implemented a landfill gas collection system and closure geomembrane with a drainage geocomposite and drainage features.

El Sobrante Sanitary Landfill, Corona, California

Designed a site truck wheel wash for transfer and garbage trucks to drive through and clean off any mud collected during wet weather days prior to leaving the site. Also establishing the site to comply with stormwater requirements to meet a non-discharging site.

Project managed the Phase C1 and C2 Partial Final Closure Construction documents, from construction plans and technical specifications, to the CQA qualifications, bid support, contractor RFI's, and project completion.

Mr. Botica also developed conceptual and construction level designs for multiple site NONA design basins throughout the site and on adjacent Waste Management owned properties.

Flathead County Landfill, Kalispell, Montana

Assisted in Design of Phase IV-A and IV-B Liner Construction Drawings and Specifications, including liner details, leachate collection and recovery system design, base and side slope liner system details, leachate collection and recovery system (LCRS), and interim stormwater protection system design. Also assisted in site operational upgrades, including drainage channel collection and stormwater basin modifications and re-designs, access road expansions, and developmental expansion planning.

Frank R. Bowerman Landfill, Orange County, California

Assisted in various projects at the Frank R. Bowerman Landfill. Included updating the Master Phasing Plan for the facility, Phase VII-C Liner Construction Plans, Phase V-D Stockpiling configuration, and Site Life calculations based on different waste inflow.

Landers Sanitary Landfill, Landers, California

Assisted in the development of the expansion drawings at the site for the JTD, including phasing plans, hydrology study, hydraulic drainage calculations, capacity analysis, and access to the site. Also worked on designing the site to conform to the storm water requirements to be a non-discharging site.

Los Flores Landfill, Santa Barbara County, California

Assisted in updating the Master Phasing Plan for the facility, stockpiling configurations, drainage control features, and site life calculations based on projected waste inflow. Also assisting in the redesign of the entrance road, site offices, and scales area planning development.

Managed the re-design of the 2019 Master Development of the site to work in multiple canyons to avoid oil wells, and stay within the original limits of the accept bio mitigation areas.

Missoula Landfill, Missoula, Montana

Led a team in completing the License Expansion Document (LED) for the site, which included designs for the master phasing, drainage, LCRS, and access. Also worked on the site life calculations, hydrology, LED Report, figures, and appendices.

Olinda Alpha Landfill, Orange County, California

Assisted with the East Channel Master Planning/Develop Middle East Perimeter Drainage Channel and Access Road. Provided master planning hydrology/hydraulics and preliminary design for the East Perimeter Channel for the Olinda Alpha Landfill. Developed Construction Drawings for the Middle East Perimeter Drainage Channel and Access Road; assisted in the drawings for the repair of a portion of the Lower East Channel to eliminate hydraulic jump potential.

Otay Sanitary Landfill, San Diego, California

Project managed a multi-phase rolling closure plan for the site that could be approved of and implemented over time as the site has budget. Preparing 60% design plans, and specifications for agency approvals, while helping update the Post Closure Maintenance Plans to reflect this future closure.

Ox Mountain Sanitary Landfill, Half Moon Bay, California

Assisted with the 5-year development plans for the site from 2010 through the present, including the fill sequencing, remaining capacity calculations, and the development plan report.

Prima Deshecha Landfill, Orange County, California

Assisted in the initial design of Phase A1, and Phase A2 Liner Construction Drawings, Design Report, drainage study, master development phasing, and connection with the new La Pata Road extension project running through the site. Managed the completed Phase A Liner Construction Plans, design report, hydrology/hydraulics, and technical specifications for the site to supply capacity for 8+ years.

San Timoteo Sanitary Landfill, Redlands, California

Assisted in the development of the master expansion design and drainage. Also assisted in the small liner project on the back of the site connecting to the existing unlined cells.

Santa Maria Regional Landfill, Santa Maria, California

Managed annual Capacity Analysis for the site. Assisted with updating the JTD to reflect an increased height adjustment in Cell 1 and a reduction of height in Cell 2 to keep the existing ultimate capacity. Currently working on conceptual Cell 1 Expansion design into the NHIS area to help with 4+ years of expansion prior to the proposed IWMF-Los Flores development.

South Chollas Landfill, San Diego, California

Designed and developed the closure deficiencies, which included drainage and grading re-designs, landfill gas system upgrades (elimination, replacement, or design of sumps, headers, laterals, and wells), and paving designs.

Tajiguas Sanitary Landfill, Santa Barbara County, California

Mr. Botica has a substantial amount of experience at the TSL, which includes assisting in the development of liner construction drawings for Phases 2C, 3A, 3B, 3C, and 3D liner areas at the TSL, including liner details, leachate collection and recovery system design, base/slope liner system details, leachate collection and recovery system, and interim storm water protection system design.

Mr. Botica, was the Phase 2 & 3 Closure Design Engineer, providing cost-effective Construction Plans, Competed Design Report including hydrology and hydraulics for the closure, JTD updates, and CPCMP.

Vasco Road Landfill, Livermore, California

Assisted in the development of the Disposal Unit DU-12 Liner Design Construction Drawings, Design Report for the groundwater protection system, stockpiling plans, perimeter drainage, erosion control plans, and LCRS system.

Victorville Sanitary Landfill, San Bernardino County, California

Assisted in the preparation of the Entrance Road and Scale Facilities Drawings and Specifications, including grading, drainage, hydraulic, and septic designs. In addition to conceptual NONA designs to help the site with NPDES.

West Contra Costa Sanitary Landfill, Richmond, California

Developed the Top Deck Drainage and Grading Plans with hydrology and hydraulic calculations to get the composting areas to divert to a separate desilting basin on site. Provided construction drawings, details, cost estimate, bid schedule, technical specifications, and bid/construction support throughout the project.

West Miramar Sanitary Landfill, San Diego, California

Assisted in the development of the closure cost estimate and recycled waterline design of the site's existing composting process. Assist in JTD updates and modifications for the site as they arise.

Non-Water Release Corrective Action Plans (NWRCAP) and Updates

Lead and assist in the preparation and completion of multiple Non-Water Release Corrective Action Plans (NWRCAP), including compiling data on current landfill configurations, impacts due to tsunamis, 1,000-year storm precipitation events, sub-surface fires, wildfires, 500-year flooding, and all the mitigation and costs associated with such events.

The following are some of the NWRCAP's that Mr. Botica has worked on: Barstow Sanitary Landfill, Bradley Sanitary Landfill, Central Disposal Site Landfill, Chateau Fresno Landfill, Chestnut Avenue Sanitary Landfill, French Camp Landfill, Forward Landfill, Keller Canyon Landfill, Landers Sanitary Landfill, Lompoc Sanitary Landfill, Ox Mountain Sanitary Landfill, Prima Deshecha Landfill, Salton City Solid Waste Site, San Timoteo Sanitary Landfill, Santa Maria Regional Landfill, Tajiguas Sanitary Landfill, Tri Cities Landfill, Vasco Road Landfill, West Contra Costa Sanitary Landfill, and West Miramar Sanitary Landfill.

Stormwater Pollution Prevention Plans (SWPPP)

Lead and assisted in the preparation and completion of multiple Stormwater Pollution Prevention Plans (SWPPP), including compiling data on current landfill configurations, identifying all potential sources of pollution which may affect the quality of storm water discharges from the construction site, and designing solutions to help site's get under the requirements.

The following are some of the SWPPP's that Mr. Botica has worked on: Barstow Sanitary Landfill, Mid-Valley Sanitary Landfill, San Timoteo Sanitary Landfill, Santa Maria Regional Landfill, Tajiguas Sanitary Landfill, Vasco Road Landfill, Victorville Sanitary Landfill, and currently working on additional facilities.

Closures/Post-Closure Estimates

Mr. Botica develops and updates the closure and post closure cost estimates and the required backup documentation for multiple sites to meet the regulatory standards for the amount that facility Operators have to pledge for closure and 30-year post closure requirements.

The following are some of the Closure/Post Closure Cost Estimates that Mr. Botica has worked on: Barstow Sanitary Landfill, Benton Crossing Landfill, Bradley Sanitary Landfill, Colton Sanitary Landfill, Coyote Canyon Landfill, Forward Landfill, Foxen Canyon Landfill, Frank R. Bowerman Landfill, Keller Canyon Landfill, Landers Sanitary Landfill, Milliken Sanitary Landfill, Olinda Alpha Landfill, Ox Mountain Sanitary Landfill, Prima Deshecha Landfill, San Timoteo Sanitary Landfill, Santa Maria Regional Landfill, Tajiguas Sanitary Landfill, Toland Road Landfill, Tri Cities Landfill, Vasco Road Landfill, Walker Landfill, Watsonville Landfill, West Contra Costa Sanitary Landfill, and West Miramar Sanitary Landfill.

Mr. Genzel is a Registered Civil Engineer with more than 41 years of experience in municipal solid waste disposal facility design, public works, and civil engineering project infrastructure design. Mr. Genzel is the Principal Engineer for SWT Engineering for landfill liner development projects, closure design development, construction document preparation, and design of grading, drainage systems, Landfill Entrance Road and Scale Facility Design, master planning, and operational fill sequencing for solid waste disposal sites. He also provides Construction Management, Engineering Support, operations planning and serves as project engineer for special projects.

EDUCATION

BS - Civil Engineering (California State Polytechnic University Pomona, California – 1978)

REGISTRATIONS

Registered Civil Engineer (33026), CA 1981
Registered Civil Engineer (33362), AZ 1995
Registered Civil Engineer (99672), TX 2007
Registered Civil Engineer (20487), NV 2009
Certified QSD\QSP (01236), 2011

Registered Civil Engineer (44596), CO 2010
Registered Civil Engineer (20145), NM 2010
Registered Civil Engineer (85367), OR 2011
Registered Civil Engineer (48039), WA 2011
Registered Civil Engineer (43386-6) WI, 2014

MEMBERSHIPS

American Society of Civil Engineers (ASCE)

PROJECT EXPERIENCE

LANDFILL LINED CELL DEVELOPMENT

Frank R. Bowerman Landfill, Orange County, California

Phases VIIA, VIIB, VIIC, VIII-B1, and VIII-B2 Liner Designs - Developed Construction Drawings, Specifications, and Design Report for the groundwater protection system, stockpiling plans, perimeter drainage and erosion control plans, and LCRS system.

Mid-Valley Sanitary Landfill, San Bernardino County, California

Developed liner construction drawings for Unit 3, Phases 1, 2, 3, 4, 5A, 5B, 6, and 7; Unit 1, Phase 1 closure, and Unit 4 Phase 1 Liner, including liner details, leachate collection and recovery system design, base and side slope liner system details, **LCRS sump, leachate pumping system, storage, containment and load-out systems**.

Victorville Sanitary Landfill, San Bernardino County, California

Prepared design of Phase 1A, Phase 1B Stage 1, and Phase 1B Stage 3 Liner Construction Drawings and Specifications. Phase 1B Stage 3 included design of LCRS sump, leachate pumping system, storage, containment and load-out systems. Prepared design of the access road/scale pad, permanent stock pile plans, and on-site access roads to all Phases.

Landers Sanitary Landfill, San Bernardino County, California

Septic Pond Modification and Land Farm Design – Developed a septic pond liner modification (dual containment surface impoundment extension) doubling the existing capacity to a total of 11.8 MG and adding a 1.3-acre lined land farm area for drying of septic sludge.

Prepared design of Phase 1A Liner Construction Drawings and Specifications included design of temporary LCRS sump. Prepared design of new access road to the Phase 1A expansion area.

Barstow Sanitary Landfill, San Bernardino County, California

Septic Pond Design – Developed two additional septic pond liners (dual containment surface impoundment) totaling 2.9 MG.

Tajiguas Landfill, Santa Barbara County, California

Developed liner construction drawings for Phases 2A, 2B, 2C, 3A, 3C, and 3D; including liner details, leachate collection and recovery system design, base and side slope liner system details, leachate collection and recovery system, and interim stormwater protection system design. Provided construction engineering support for each liner phase.

Vasco Road Landfill, Livermore, California

Disposal Units DU-12A, DU-12B, and DU13A Liner Design - Developed Construction Drawings, Specifications, and Design Report for the groundwater protection system, stockpiling plans, perimeter drainage and erosion control plans, and LCRS system.

Avenal Regional Landfill, Kings County, California

Developed liner construction drawings for Phase 2 liner area; including liner details, leachate collection and recovery system design, base and side slope liner system details, leachate collection and recovery system, and interim stormwater protection system design.

Toland Road Landfill, Ventura County, California

Developed Site Master Planning (Phase 2C, 3A, 3B, and 4) and provided design of Phases 2C and 3A liner system drawings and specifications. Performed construction engineering support for both phases. Design tasks included perimeter drainage system design.

Caja Del Rio Landfill, Cell 4B - Santa Fe, New Mexico

Prepared construction plans and specifications for the development of a 14-acre lined disposal cell.

West Miramar Landfill, San Diego, California.

Liner Construction Drawings – Prepared liner construction drawings for liner Modules D and E.

Otay Landfill, San Diego, California

Liner Construction Drawings – Prepared construction drawings for Phase 3B. Provided construction engineering support.

LANDFILL CLOSURE DESIGN

Richmond Class I Landfill

Final Grading Plans - Prepared three final grading plan scenarios for the final closure of this Class I hazardous waste disposal site. Performed hydrology and hydraulic calculations for the revised grading and drainage plan.

Olinda Alpha Landfill, Orange County, California - Phase 1 and Phase 2 Partial Final Closure Construction Design Drawings

Prepared final closure construction drawings and specifications; including grading, drainage and access roads, hydrology and hydraulic calculations, and drainage channel design. Landfill Gas System Design for Phase 1, a 65-acre Monolithic Soil Final Closure Construction Project and Phase 2, is an ET Monolithic Soil Final Closure Construction Project.

Prima Deshecha Landfill, Orange County, California - Waste Management Unit 2 Partial Final Closure Construction Design Drawings

Prepared final closure construction drawings and specifications, including grading, seep and Landfill Gas collection from below the LLDPE Geomembrane Final Cover System Design. Project design was performed as a Sub-Consultant for Huitt-Zollars for this \$80 million La Pata Road Gap Closure Project. The final closure required relocation of approximately 670,000 cubic yards of existing in-place refuse, and re-routing/removal of 16-inch diameter LFG to Energy main header, telemetry lines, condensate

drains, and existing LFG wells from within the roadway area. The final cover section utilized an LLDPE Geomembrane with seep and LFG collection system below the geomembrane cap and drainage collector above the geomembrane. LFG collectors at toe, mid- and upper slope areas were also designed. The exit and entrance ramps are to be located above the closed landfill area, while the main roadway will be constructed within the clean closure area of WMU-2 at the Prima Deshecha Landfill.

Ox Mountain Landfill, Half Moon Bay, California – Phase 1 Partial Final Closure

[Prepared final closure construction drawings and specifications](#), including grading, drainage and access roads, hydrology and hydraulic calculations for this Final Closure Construction Project. Linear Low-Density Polyethylene (LLDPE) Geomembrane with a below liner Seep and Landfill Gas Collection System, toe of slope Infiltration Galleries, and above liner drainage system was utilized for the Landfill Final Cover System.

South Coast Landfill Closure, Mendocino County, California

[Prepared final closure construction drawings and specifications](#), including grading, drainage and access roads, hydrology and hydraulic calculations for this Final Closure Construction Project. Linear Low-Density Polyethylene (LLDPE) Geomembrane with a passive Landfill Gas System and above liner drainage system was utilized for the Landfill Final Cover System.

Vasco Road Landfill, Livermore, California - 2011 Partial Final Closure

[Prepared final closure construction drawings and specifications](#), including grading, drainage and access roads, hydrology and hydraulics calculations for this 22-acre Partial Final Closure Construction Project. Provided construction engineering support throughout construction of the project.

Forward Landfill, Manteca, California - Phase 1B Partial Final Closure

[Prepared final closure construction drawings and specifications, including](#) grading, drainage and access roads and hydrology and hydraulics calculations for this 23-acre partial Final Closure Construction Project. Provided construction engineering support throughout construction of the project.

Forward Landfill, Manteca, California - Phase 1A Partial Final Closure

[Prepared final closure construction drawings and specifications](#), including grading, drainage and access roads and hydrology and hydraulics calculations for this 24-acre Partial Final Closure Construction Project. Provided construction engineering support throughout construction of the project.

Big Bear Sanitary Landfill, San Bernardino County, California

[Prepared final closure construction drawings and specifications](#), including grading, drainage and access roads and hydrology and hydraulics calculations. Design of segmented block retaining wall in conjunction with geotechnical engineer. Develop final cover sections for mono fill slope final cover and alternative final cover (LLDPE geomembrane) for benches, perimeter and access roads and top deck areas. Provided construction engineering support throughout construction of the project.

Milliken Sanitary Landfill, Ontario, California

[Developed Final Closure Construction Drawings for Phase 3 Final Closure Construction.](#)

Trona, Twenty-Nine Palms, Lenwood-Hinkley, Phelan, Yermo and Newberry Springs Sanitary Landfills, San Bernardino County, California

[Prepared closure Construction Drawings and Specifications](#); including perimeter and on-site drainage control system, post-closure erosion control design, and provided construction engineering support for each site.

Colton Landfill, San Bernardino County, California

Final Closure/Post-Closure Maintenance Plan - Developed grading plan and details for Final Closure/Post-Closure Maintenance Plan. Prepared Closure/Post-Closure cost estimate.

Developed grading plan for vertical expansion based on altering slope ratios from 3:1 to 2:1, prepared Final Closure Post-Closure Maintenance Plan documents (Plan netted 6,200,000 yards of additional air-space). Drainage plans for Final Closure/Post-Closure Maintenance Plans. Developed Partial Final Closure Improvement Construction Drawings for the two-phased closure, including both phases of Construction Engineering Support.

Flathead County Landfill, Kalispell, Montana

2019 Phase 1 and Phase 2 – Parts 1 and 2 Entrance Road, Scale House and Scale Facility Construction Drawings, Phase IVA excavation, and 2010 partial final closure construction drawings and specifications.

Santiago Canyon Landfill, Orange County, California

Developed grading and drainage plans for use for final closure construction. Hydrology and hydraulic calculations and perimeter drainage system design for this 140-acre site.

Upland Landfill, Upland, California

Performed final cover grading and drainage channel design.

Coyote Canyon Landfill, Orange County, California

Performed redesign of 200 acres of this 400-acre landfill final closure construction drawing package to provide Gnatcatcher habitat mitigation area for the Orange County Transportation Corridor Authority; including down drain profiles and connections to storm drain, bench and SCE access road design, redesign of Coyote Canyon Road, development of design sections to retrofit monolithic cover section, and composite cover section interface. Also provided the construction manager with technical and engineering support throughout project construction, including trapezoidal channel and storm drain design revisions to avoid construction over refuse areas.

Crittenden Landfill, Mountain View, California

Responsible for preparation of final closure improvements for this 40-acre site. Design of Canyon Fill area dual subdrain pump and discharge piping system, low-permeability material cover, rerouting of landfill gas recover lines to the Laidlaw electrical generating facility, and preparation of project specifications. Project included 500,000 cubic yards of canyon fill and reconsolidation of 50,000 cubic yards of inert demolition debris above the existing municipal refuse prism; grading for interim cover benches, down drains, storm drain, and access roads.

Vista Landfill, Mountain View, California

Final closure improvement plans, design of grading, access roads, parking lots, equestrian pathways (also required to meet ADA requirements for post-closure recreational uses), design of groundwater force main storm drain, grading and paving plan for project air compressor facility, and preparation of project specifications for this 66-acre site.

Shoreline Amphitheater, Mountain View, California

Responsible for preparation of final closure improvement plans utilizing a flexible membrane cover. Project included demolition, removal, and replacement of existing amphitheater facility pedestrian access.

Hesperia Sanitary Landfill, Hesperia, California

Developed FCPMP for this 40-acre landfill. Final cover engineered alternative cover design was two-foot of foundation soil, a geocomposite clay liner and a two-foot protective soil cover layer. Borrow area grading, final grading plan, including on and off-site and perimeter drainage FCPMP drawings were prepared. FCPMP text and closure/post-closure cost estimates were prepared. Also developed final grading and drainage improvement drawings. On-site drainage design included sediment/detention basins. Perimeter drainage channel utilized a Geoweb and concrete trapezoidal channel for this 31-acre landfill. Final cover engineered alternative cover design was a 4-foot Mono-soil cover. Borrow area grading and final grading plan, including on and off-site and perimeter drainage FCPMP drawings were prepared. FCPMP text and closure/post-closure cost estimates were prepared.

Mr. Brewer is a senior civil engineer with over 30 years of experience in general civil, environmental and solid waste design and compliance. He has expertise in project management, landfill gas collection and control system design, air quality compliance and permitting, environmental management, and construction quality assurance for projects located in California, Arizona, Hawaii, and Saipan. Mr. Brewer joined SWT as a Project Manager in October 2017 and brings a wealth of solid waste experience to our team.

Professional Licenses

Professional Engineer (Civil), California, #C50042, 1993

Education

B.S., Civil Engineering

North Dakota State University, Fargo, ND 1988

General Experience Summary

His experience includes, but is not limited to:

- ◆ Marketing & Business Development
- ◆ General Civil (roads, grading, slope stability, etc.)
- ◆ Landfill design and permitting
- ◆ Waste water and leachate treatment systems
- ◆ Regulatory Compliance
- ◆ Compost CASP Systems
- ◆ Landfill-Gas-to-Energy Facilities
- ◆ Project Management/Supervisor/Leadership

EXPERIENCE

SWT Engineering, Inc.

Title: Project Manager

Duties: Project manager and engineer for projects related to active and closed landfills, transfer stations, construction/demolition facilities, compost management systems, landfill gas-to-energy (LFGTE) power plants, flare stations, storm water management, and leachate collection and treatment plants. Recent projects have also included Construction Quality Assurance (CQA) for liner and soil base construction of new landfill cells, construction/cell development, and other construction management related tasks. Mr. Brewer has direct experience with construction and operation of windrow and covered aerated static pile (CASP) compost systems.

Mr. Brewer has extensive experience in permitting and compliance related projects including closure/post-closure maintenance plans, city and county use permits, permit applications and designs, Storm Water Pollution Prevention Plan (SWPPP) and Spill Prevention Control and Countermeasures (SPCC) plan report writing, associated regulatory agency interfacing, preparing notifications/response to regulatory inspections, and administrative warnings. Mr. Brewer is also a Steel Tank Institute (STI) certified SP001 tank inspector for aboveground storage tank compliance.

Republic Services, Inc.

Title: Environmental Manager

Duties: Engineering and environmental compliance duties for active and closed landfills, transfer stations, construction/demolition facilities, compost management, landfill gas-to-energy (LFGTE) power plants, flare stations, storm water management, and leachate collection and treatment plants. As the facility Environmental Manager (EM) responsibilities included managing construction projects for landfill cells and sites, capacity calculations, scheduling/timeline, management of third-party CQA and contractors, and resource and material coordination. More recent projects included grading and pond lining projects, paving construction projects, and slope improvement or repair. Mr. Brewer was also responsible for supervision of the operation and maintenance of a Class 1 waste water treatment plant and covered aerated static pile system.

The EM position also includes preparing landfill construction and ongoing operational budgets for both closed and operating facilities. Mr. Brewer maintained financial responsibility for construction/cell development, closure/post-closure engineering, and operations. As part of compliance Mr. Brewer completed permit applications and designs, including regulatory agency interface, site expansion, modification or changes to the operating plan application, and other related data. Mr. Brewer was also responsible for preparing notifications/response to regulatory inspections, and administrative warnings.

As the site engineer, Mr. Brewer was responsible for the development of fill sequencing plans, as well as engineering review of design and operations.

As part of his job duties he supervised operation and maintenance of a Class 1 leachate treatment plant and operation, maintenance, and compliance of a covered aerated static pile compost system.

Environmental Information Logistics, LLC (EIL)

Title: Project Engineer

Duties: Project engineer responsible for design duties related to solid waste and landfill gas (LFG) including: LFG control and collection system design and layout, gas modeling, well flow modeling, pipe modeling and sizing, flare station design, condensate handling system modeling and design, water balance analyses, liner design, evaporation pond design, construction engineering, and site investigations. Project manager for inspection of facilities for compliance with National Pollutant Discharge Elimination System (NPDES) storm water general permit and site specific storm water pollution prevention plans. Designed modifications to storm water systems as necessary. Related tasks include site and permit review for SWPPP and SPCC preparation or update, Best Management Practices (BMP) design, and surface drainage design.

Engineer responsible for greenhouse gas calculations, modeling and emissions data reporting (EPA e-GGRT system) for facilities in California, Michigan, Indiana, Illinois, and Hawaii. Provided Title V documentation for multiple landfills including annual reports and permit modification applications.

Interfaced with regulatory agencies and provided documents and calculations related to Permits to Operate, Permits to Construct, and Potential to Emit (PTE) analyses. Agency liaison included federal, state, and local agencies.

Earth Tech/AECOM

Title: Project Engineer

Duties: Project engineer responsible for landfill gas control and collection system design and layout, gas modeling, well flow modeling, pipe modeling and sizing, construction engineering, and site investigations. Related tasks include site and permit review for SWPPP and SPCC preparation or update, BMP design, and surface drainage design.

Construction site engineer for various projects including retaining wall and subsequent re-vegetation plan and final cover FML for two storage ponds and adjacent ditch/drainage systems. Operation a Maintenance Technical Manager (Waimanalo Landfill) including supervision of one (1) technician, maintenance and replacement of gas and flare system components, and regulatory compliance during operation.

Interfaced with regulatory agencies related to permitting for operation, closure and expansion of existing landfills, and regulatory compliance. Agencies included EPA, Department of Natural Resources (DNR), Office of Ocean and Coastal Resource Management (OCRM), Regional Water Quality Control Board (RWQCB), and Local Enforcement Agency (LEA).

County of San Diego, Solid Waste Division

Title: Landfill Gas Specialist/Civil Engineer

Duties: Engineer responsible for oversight of landfill closure, including design, construction management, public relations, consultant and contractor meetings and management, and regulatory compliance. Landfill technical manager for County-owned landfills (until public sale of landfills), compliance manager for inactive landfills, landfill gas manager for all County closed sites, including design and modifications of existing flare and gas control systems, grading and drainage design, and regulatory compliance. Managing engineer for Title V landfill (San Marcos Landfill); responsible for Annual, Semi- Annual, and SSM reporting. Interfaced regularly with regulatory agencies including San Diego Air Pollution Control District (SDAPCD) (including presentations to the APCD Board for emergency and regular variances), RWQCB and LEA. Supervised two (2) field technicians.

RUST E&I/Earth Tech

Title: Landfill Gas Engineer/Group Manager

Duties: Project engineer responsible for multiple project work including design, permitting, construction oversight of landfill gas control systems, flare and blower stations, and landfill monitoring systems. Tasks included landfill gas control and collection system design and layout, gas modeling, well flow modeling, pipe modeling and sizing, construction engineering, site investigations, and all related permitting.

Performed seismic evaluation for slope stability of landfill expansion areas, including geologic and historic data analyses, and slope stability calculations and modeling. Duties also included grading and drainage design, report writing, regulatory compliance, and general project management. Construction management including landfill gas collection system installation, new flare station installation (within South Coast Air Quality Management District [SCAQMD]), and landfill perimeter probe installation/bore logging.

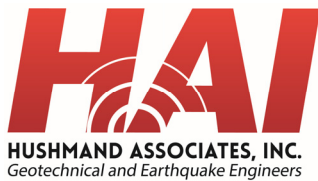
Interfaced with regulatory agencies related to Permits to Operate, Permits to Construct, electrical, and fire permitting (City of Los Angeles). Agencies included SCAQMD, RWQCB, and LEA. Manager of landfill gas group with supervision of one (1) staff engineer and two (2) field technicians.

Kleinfelder, Inc. (Mandeville & Associates)

Title: Staff Engineer

Duties: Landfill grading and drainage design, general engineering and permitting duties related to operation and maintenance of client landfills, site investigations, air monitoring (Rule 1150.1 monitoring and compliance, air SWAT investigations), general construction quality assurance duties related to construction of landfill gas header and control systems, report writing, and general project and compliance management.





BEN HUSHMAND, Ph.D., P.E.

PRESIDENT, PRINCIPAL ENGINEER

PROFESSIONAL EXPERIENCE

Dr. Hushmand has more than 35 years of experience in geotechnical and environmental design, research, testing, and applications, specializing in soil dynamics and analysis and design of soil-structure systems. He has managed and acted as lead engineer in some of the most challenging national and private projects of the last two decades involving seismic hazard evaluations and geotechnical investigations for large public works, including transportation, port and marine, water resources, industrial, and commercial projects; design and seismic evaluation of critical facilities such as schools and hospitals, police stations, 911 centers, and traffic management centers; dynamic load response evaluation of bridges, dams, and underground structures; development of large databases for load carrying capacity of highway bridges and culverts; liquefaction potential evaluations for dams and marine structures; soil-structure interaction problems of foundations and retaining structures; site-specific seismicity evaluations; physical modeling similitude studies of engineering and geologic systems at normal and elevated gravity; and large scale subsurface exploration and geotechnical design of buried structures.

Dr. Hushmand has worked on many projects studying the dynamic behavior of shallow foundations, piles, gravity base offshore platforms, dams, bridges, retaining walls, and liquefiable soils. He has specialized expertise related to experimental and computer modeling studies of the dynamic response of ports, bridges, landfills, earth structures and shallow and deep foundations. His broad and extensive background in dynamic testing has been recognized internationally, and he is one of a select cadre of renowned experts in this field.

RELEVANT PROJECT EXPERIENCE

Seismic Monitoring and Cover Design, Oil Landfill Superfund Site, Monterey Park, CA – In support of the general closure studies of the Oil landfill, two seismic stations were installed to record landfill behavior during earthquakes and analyze recorded landfill response to estimate dynamic properties of municipal solid waste. These properties were used in seismic design of the cover system. Cover system, surface drainage and grading alternatives were evaluated along with slope stability and settlement analysis. Static and seismic slope stability analyses and finite element seismic deformation analyses were performed to estimate landfill slope displacements during the site design earthquake event.

Static and Seismic Slope Stability Analysis of Cell 1 Height Increase - Santa Maria Regional Landfill, Santa Maria, Santa Barbara County, CA – Reviewed available reports and data, performed a site-specific seismic hazard evaluation and slope stability analyses for static and seismic loading conditions based on pseudo-static slope stability analyses or estimating seismically-induced permanent displacements, estimated landfill subgrade settlement due to increased cell height based on elastic solution. Stability analyses were performed to assess static and seismic stability of landfill slopes for the proposed waste height increase within Cell 1 of the landfill. The northern boundary of the landfill is adjacent to the Santa Maria River and near the Santa Barbara/San Luis Obispo County line. The City had a plan to increase elevation of the lined Cell 1 from the approved elevation of 362.5 feet to the maximum allowable elevation of

Registration

- *Civil Engineer, CA No. C44777*
- *40-Hour OSHA Trained, 29 CFR 1910.120 (e)(2)/8 CCR 5192*
- *Radiation Safety and Use of Nuclear Gauges Certificate*

Education

- *Ph.D. Civil (Geotechnical & Earthquake) Engineering, California Institute of Technology (Caltech), 1984*
- *M.S., Civil Engineering, California Institute of Technology, 1978*
- *B.S., Structural Engineering, Sharif Univ. of Technology, Tehran, Iran, 1977*

Professional Organizations & Academic Credentials

- *International Society of Soil Mechanics and Foundation Engineers (ISSMFE)*
- *American Society of Civil Engineers (ASCE)*
- *Earthquake Engineering Research Institute (EERI)*
- *Seismological Society of America (SSA)*
- *Member Technical Review Committee, National Science Foundation (NSF)*
- *Adjunct Faculty, Caltech 1990-2004*
- *Visiting Faculty, USC 1985-1989*
- *Member Soil Dynamics Committee, ASCE 1984-2000*

Year of Experience:

- *Over 35 Years*
- *30 Years with HAI*

410 feet based on slope stability evaluations and regulatory considerations. A site-specific Probabilistic Seismic Hazard Analysis (PSHA) was performed to obtain the design Peak Ground Acceleration (PGA) and Acceleration Response Spectrum (ARS) of the project site corresponding to the Maximum Probable Earthquake (MPE) event. The PSHA was performed for the selected faults and an earthquake scenario using the latest attenuation relationships and the site faulting and seismicity data. The selected attenuation relationships were based on the Next Generation Attenuation (NGA) relationships (NGA West 2). Two critical cross sections were selected to evaluate static and seismic stability of the landfill slopes for the maximum allowable waste height within Cell 1.

Cell Redesign and Bioreactor Evaluation Kettleman Hills Facility Municipal Solid Waste Landfill Unit B-19, Kettleman City, Kings County, CA - Performed analyses to evaluate stability of slopes for the Class II/III municipal solid waste (MSW) and industrial waste landfill unit B-19 (Landfill B-19) at Waste Management, Inc. (WMI) Kettleman Hills Facility (KHF) due to proposed fill plan modifications. The scope of work included evaluating static and seismic stability of the waste slopes for a proposed Landfill B-19 new fill plan and optimizing the fill plan configuration and perimeter stability soil buttress design based on the results of detailed analyses performed in several iterations. Landfill was proposed to be partially transformed to a bioreactor waste storage unit and therefore, HAI evaluated physical and strength properties of waste in the bioreactor unit and its effects on slope stability. The finite element program QUAD4M was used for site response and landfill seismic deformation analyses. This commonly used finite element program provides a tool for maximizing waste capacity and optimizing its design.

Frank R. Bowerman Landfill – Phase VIII Buttress and Liner Design and Construction, Irvine, Orange County, CA - Under a subcontract with SWT Engineering Inc. (SWT), provided peer review of the geological and hydrogeological investigation and geotechnical evaluation performed by Geosyntec Consultants, Inc. in support of design and construction of the Phase VIII A/B Buttress and Liner Project (Phase VIII BLP) at the Frank R. Bowerman (FRB) Landfill, in Orange County, California. The purpose of the project was to develop the Phase VIII A/B disposal area as a California Class III (Municipal Solid Waste, MSW) landfill facility similar to previously permitted and developed phases at the FRB Landfill. HAI peer-reviewed Geosyntec's report documenting the results of the above-noted work, including field investigations, data processing, and engineering evaluations. The report was an integral part of the design package and was submitted by OC Waste & Recycling, the project owner, to the Santa Ana Regional Water Quality Control Board (RWQCB) for review and approval.

Time-Critical Removal Action, Cap Design & Construction for Installation Restoration Site 5, MCAS Miramar, San Diego, CA – Project Manager for design and CQA services provided during design and construction of the landfill final cover. From top to bottom the alternative landfill cover included a 3-ft thick evapotranspiration (ET) soil layer, a 250-mil thick double-sided geocomposite layer; a 60-mil thick microspike high density polyethylene (HDPE) geomembrane layer; and a 2-ft thick foundation layer consisted of a 6-inch thick upper layer of 3/8-inch minus sand and 1.5 ft of consolidated waste. A unique challenge for design of the final cover was to protect the landfill eastern and northeastern slopes from erosion and slope failure due to the presence of San Clemente Creek passing by the landfill and potential flooding. Along the creek, the cover included a 12-inch thick filter gravel wrapped in 12 oz/yd² filter/cushion non-woven geotextile on top of geocomposite layer and a 30-inch thick riprap layer.

Geotechnical Engineering Evaluation, Marine Corps Air Station (MCAS), Landfill Sites 2 and 17, Remedial Action Plan, El Toro, CA – Geotechnical and geological investigation including site-specific seismic hazard evaluation for closure design of Landfill Sites 2 and 17 at El Toro Marine Corps Air Station. Investigation included evaluation of static and seismic stability of refuse slopes and landfill cover system; liquefaction, ground rupture, and landslide hazard evaluations; estimating settlements; and design of the surface water management system.

Missoula Landfill Expansion – Phase I and Supplemental Analysis, Missoula, Montana - Missoula Landfill site belongs to Allied Waste Systems of Montana, LLC (Allied). Allied plans to expand the existing Missoula Landfill footprint by about 83 acres. Under a contract from SWT Engineering, Inc. (SWT) used results of a subsurface investigation for the expansion area, which followed a Hydrogeologic and Soils Characterization Work Plan approved by the Montana Department of Environmental Quality (MDEQ) to design the landfill expansion area. 37 boreholes (with depths ranging from 20 feet to 115 feet) were advanced at the site in order to satisfy the requirements of Administrative Rules of Montana (ARM) 17.50.1311(3) and MDEQ's representatives. The investigation identified depth to bedrock

within the proposed landfill expansion area in accordance with ARM, but it lacked depth to groundwater and geotechnical information that are needed in landfill design. HAI prepared a work plan for a Phase I additional geotechnical engineering investigation at the site to better characterize the site subsurface and groundwater conditions for engineering evaluation of the preliminary excavation and fill design plans for the proposed landfill expansion. HAI's Phase I field investigation consisted of 1) drilling and sampling of three 100-foot deep soil borings, and 2) televiwer acoustic logging in these boreholes. The purpose of the geotechnical field investigation was to provide an initial geotechnical assessment of the site soil and rock shear strength and consolidation properties to be used in stability analysis of the landfill excavation slopes and in estimating the landfill bottom settlements due to waste filling that may affect liner performance, and adverse bedding and structure of sedimentary rock that may affect stability of proposed cut slopes. In addition, HAI performed laboratory testing including triaxial and consolidation tests on the samples collected from compressible layers, site-specific probabilistic seismic hazard analysis using EZFRISK and static and pseudo-static slope stability analyses using computer program SLIDE. HAI's supplemental analysis scope of work included additional stability analyses of the landfill slopes based on the proposed final fill plan as well as the phasing plan configurations prepared by SWT and preparing the documents for licensing package.

Phase 11 Stability Berm and Phase 11a Liner and LCRS, El Sobrante Landfill, Corona, CA – CQA Officer during construction of the Phase 11A at the El Sobrante Landfill, Corona, CA. The 24.4-acre cell is lined with a double-composite liner system comprised of soil and geosynthetic components. The project liner terminates in an anchor trench along its southern edge, which lies at the top of the Phase 11 stability berm. The project liner termination consists of a temporary anchor trench (on the south sideslope) and temporary geomembrane “rainflaps” on the floor. The project LCRS drains by gravity to a vadose zone monitoring sump that was installed under the project bottom liner at the toe of the sideslope. The project bottom liner and LCRS consist of the following components (from bottom to top): 1) Prepared subgrade; 2) 1-foot thick compacted clay liner; 3) 40-mil double-sided textured high density polyethylene (HDPE) geomembrane; 4) Geosynthetic clay liner (GCL); 5) 60-mil double-sided textured HDPE geomembrane; 6) 13-oz/sy woven (cushion) geotextile; 7) 9-inch thick LCRS drainage layer; 8) 8 oz/sy non-woven (filter) geotextile; and 9) 2-foot thick soil operations layer (OPS). The project slope liner system consists of the following components (from bottom to top): 1) Prepared subgrade; 2) 40-mil double-sided textured HDPE geomembrane; 3) GCL; 4) 60-mil double-sided textured HDPE geomembrane; 5) Single-sided geocomposite drainage layer (geonet side facing down); and 6) 2 foot thick OPS. The project also included the construction of a stability berm that shapes the southern perimeter of the Phase 11A liner and LCRS and associated permanent surface water controls (i.e., grouted rip rap channels). The as-built report was submitted to the Regional Water Quality Control Board (RWQCB), San Diego Region, to certify that Phase 11A was constructed and completed in general accordance with the plans and specifications, and Title 27 of the California Code of Regulations.

Phase B2 Final Cover, El Sobrante Landfill, Corona, CA – CQA Officer during construction of the Phase B2 final cover at El Sobrante Landfill, located at 10910 Dawson Canyon Road in Corona, CA. The final cover for this project was an evapotranspirative (ET) cover comprised of the following components, from bottom to top: 1) Foundation Layer: An approximately 12-inch-thick layer of existing interim cover soil, relatively free of organics and refuse, that has been placed over the refuse; and 2) Final Cover Soil: A 4-foot thick minimum ET final cover soil material, free from roots, organic matter, trash, debris, and any other deleterious materials. Based on the technical specifications and CQA plan, the maximum hydraulic conductivity of the ET final cover soil should not exceed 1×10^{-5} cm/sec. In addition to the ET cover, storm water management structures were constructed over the final cover. Field testing services provided by HAI included performing conformance testing of the final cover soil. In-situ testing performed by HAI included Nuclear Gauge, Sand Cone, Bengt-Arne Torstensson (BAT), Sealed Single Ring Infiltrometer (SSRI), and Boutwell tests. Laboratory testing performed by HAI included Moisture Content, Particle-Size Analysis, Modified Proctor Compaction, and Hydraulic Conductivity tests.

Phase II Liner Construction, Las Pulgas Landfill, MCB Camp Pendleton, CA – Technical Advisor during construction of the landfill liner and leachate collection and removal system (LCRS). The landfill liner consisted of a minimum 24 inches of low-permeability soil material, a high-density polyethylene geomembrane liner, a geotextile, a leachate collection gravel drainage layer, and a protective soil cover layer of 24 inches. The lined area was approximately 20 acres.

Phase 2B Liner Construction, Lancaster Landfill & Recycling Center, Lancaster, CA – CQA Officer during the construction of the Class III waste management unit, 10-acre Phase 2B Liner system at the Lancaster Landfill & Recycling Center, primarily consisting of a level base surrounded by 2:1 cut slopes varying in height from 40-50 ft. The single-composite liner system consists of GCL, HDPE, geotextile, gravel, HDPE piping and OPS.

Phase 1C Liner Construction, Lancaster Landfill & Recycling Center, Lancaster, CA – CQA Officer during the construction of the Class III waste management unit, 10-acre Phase 1C Liner system at the Lancaster Landfill & Recycling Center, primarily consisting of a level base surrounded by 2:1 cut slopes varying in height from 40-50 ft. The single-composite liner system consisted of GCL, HDPE, geotextile, gravel, HDPE piping and OPS.

Phase 1B Liner Construction, Lancaster Landfill & Recycling Center, Lancaster, CA – CQA Officer during the construction of the Class III waste management unit, 10-acre Phase 1B Liner system at the Lancaster Landfill & Recycling Center, primarily consisting of a level base surrounded by 2:1 cut slopes varying in height from 40-50 ft. The single-composite liner system consists of GCL, HDPE, geotextile, gravel, HDPE piping and OPS.

LF-2, Cell No. 4 Base Liner Termination, Fink Road Landfill, Patterson, CA, 2005 – CQA Officer during construction of the base liner for the Class III, separate landfill unit LF-2, Cell No. 4 area. CQA services performed during grading observation, material testing during cutting and preparation and backfilling of the landfill slope, inventory of all liner materials (GCL, HDPE, Geotextile); inspection of all fusion welds, air pressure test, and stitching for geotextile.

Phase 1A Liner Construction, Lancaster Landfill & Recycling Center, Lancaster, CA, 2004 – CQA Officer during the construction of the Class III waste management unit, 10-acre Phase 1A Liner system at the Lancaster Landfill & Recycling Center, primarily consisting of a level base surrounded by 2:1 cut slopes varying in height from 60-80 ft. The LCRS consists of GCL, HDPE, geotextile, gravel, HDPE piping and OPS.

Antelope Valley Landfill, Cell IV - Step 5, Antelope Valley, CA, 2005 – CQA Officer during construction of the Cell IV – Step 5. CQA services performed during grading and testing, testing of backfills, observation and testing of geosynthetic materials during installation, preparation of field CQA progress reports, field and laboratory testing of fill materials and aggregates, and quality control of fill placement. The LCRS consists of GCL, HDPE, geotextile, gravel, HDPE piping and OPS.

PROFESSIONAL EXPERIENCE

Dr. Hushmand has more than 10 years of experience in a variety of geotechnical and earthquake engineering projects related to public works infrastructure and MSW landfills. Dr. Hushmand has extensive experience related to design and construction quality assurance (CQA) services for MSW landfills including monitoring and field density testing (nuclear gauge & sand cone) of compacted fills, installation of geosynthetic materials for landfill liner and cover systems, installation of geotextile and geogrid materials for stabilization of soft subgrade soils and reinforcing soil buttresses and slopes, monitoring of slot cut trenches, monitoring pile driving and drilled pile installation, settlement monitoring of deep fills, asphalt field testing, and noise and vibration monitoring. His design experience includes static and seismic design of deep foundations, static and seismic stability analysis of landfill slopes, shallow foundations, retaining structures, and settlement of aggregate silt tailings. He also has experimental experience in model scale testing of underground structures and installation and monitoring of instrumentation such as strain gauges, accelerometers, pressure transducers, inclinometers, and piezometers.

Education

- *Ph.D. Civil Engineering, University of Colorado, Boulder, 2016*
- *M.S. Civil Engineering, University of California, Los Angeles, 2009*
- *B.S. Civil Engineering, University of California, Irvine, 2008*

Registration

- *Civil Engineer, CA No. C78504*
- *40-Hour OSHA Trained, 29 CFR 1910.120 (e) (2)/8 CCR 5192.*
- *Radiation Safety and Use on Nuclear Gauges Certificate*

Year of Experience:

- *10 Years with HAI*

RELEVANT PROJECT EXPERIENCE

Static and Seismic Slope Stability Analysis of Cell 1 Height Increase - Santa Maria Regional Landfill, Santa Maria, Santa Barbara County, CA – Reviewed available reports and data, performed a site-specific seismic hazard evaluation and slope stability analyses for static and seismic loading conditions based on pseudo-static slope stability analyses or estimating seismically-induced permanent displacements, estimated landfill subgrade settlement due to increased cell height based on elastic solution. Stability analyses were performed to assess static and seismic stability of landfill slopes for the proposed waste height increase within Cell 1 of the landfill. The northern boundary of the landfill is adjacent to the Santa Maria River and near the Santa Barbara/San Luis Obispo County line. The City had a plan to increase elevation of the lined Cell 1 from the approved elevation of 362.5 feet to the maximum allowable elevation of 410 feet based on slope stability evaluations and regulatory considerations. A site-specific Probabilistic Seismic Hazard Analysis (PSHA) was performed to obtain the design Peak Ground Acceleration (PGA) and Acceleration Response Spectrum (ARS) of the project site corresponding to the Maximum Probable Earthquake (MPE) event. The PSHA was performed for the selected faults and an earthquake scenario using the latest attenuation relationships and the site faulting and seismicity data. The selected attenuation relationships were based on the Next Generation Attenuation (NGA) relationships (NGA West 2). Two critical cross sections were selected to evaluate static and seismic stability of the landfill slopes for the maximum allowable waste height within Cell 1.

Phase B2 Final Cover, El Sobrante Landfill, Corona, CA – CQA Manager during construction of the Phase B2 final cover at El Sobrante Landfill, located at 10910 Dawson Canyon Road in Corona, CA. The final cover for this project was an evapotranspirative (ET) cover comprised of the following components, from bottom to top: 1) Foundation Layer: An approximately 12-inch-thick layer of existing interim cover soil, relatively free of organics and refuse, that has been placed over the refuse; and 2) Final Cover Soil: A 4-foot thick minimum ET final cover soil material, free from roots, organic matter, trash, debris, and any other deleterious materials. Based on the technical specifications and CQA plan, the maximum hydraulic conductivity of the ET final cover soil should not exceed 1×10^{-5} cm/sec. In addition to the ET cover, storm water management structures were constructed over the final cover. Field testing services provided by HAI included performing conformance testing of the final cover soil. In-situ testing performed by HAI included Nuclear Gauge, Sand Cone, Bengt-Arne Torstensson (BAT), Sealed Single Ring Infiltrometer (SSRI), and Boutwell tests.

Laboratory testing performed by HAI included Moisture Content, Particle-Size Analysis, Modified Proctor Compaction, and Hydraulic Conductivity tests.

Former San Luis Obispo Manufactured Gas Plant Site, San Luis Obispo, CA – Worked as Field Engineer on this project, which consisted of geotechnical related design and construction support for removal of soils. Dr. Hushmand was on-site for construction quality control and assurance. He was involved in construction monitoring during excavation, monitoring stability of a historical building during excavation, testing of backfill, monitoring installation of geo-fabric to stabilize subgrade before compaction, and vibration monitoring. Some of the challenges were ensuring stability of older and historic buildings during excavation and stabilizing soft subgrade. Client: Terra Pacific Group, Inc.

Phase 11B Liner and LCRS, El Sobrante Landfill, Corona, CA, 2017 – Assisted the CQA Manager during construction of the Phase 11B at the El Sobrante Landfill, Corona, CA. The 19.4-acre cell is lined with a double-composite liner system comprised of soil and geosynthetic components. The Project liner system ties to the west into the adjacent Phases 7B and 9A and to the south into the adjacent Phase 11A liner systems. The Project liner terminates in two (2) temporary geomembrane “rainflaps” along its northern and eastern edges. The project bottom liner and LCRS consist of the following components (from bottom to top): 1) prepared subgrade, 2) 1-foot thick compacted clay liner 3) 40-mil double-sided textured HDPE geomembrane 4) GCL 5) 60-mil double-sided textured HDPE geomembrane 6) 11-oz/sy woven (cushion) geotextile 7) 9-inch thick LCRS drainage layer 8) 8 oz/sy non-woven (filter) geotextile and 9) 2-foot thick soil operations layer.

Preliminary Geotechnical Evaluation Report for Reclamation of the Former Azusa Landfill Zone V, Azusa, CA, 2017- The main purpose of this project was to evaluate the settlement of a saturated ~25 feet thick silt tailings layer at the bottom of an aggregate pit due to staged placement of 240 to 300 ft of compacted fill during 35 + years. The project consisted of field investigation, laboratory testing, coming up with parameters for numerical model, and using PLAXIS finite element software to calculate the consolidation settlement of the silt tailings layer.

Phase 12 Liner and LCRS, El Sobrante Landfill, Corona, CA, 2020 - CQA Manager during the construction of a ~28 acre double-composite liner system located on the floor of the landfill and on 2H:1V slopes. Reviewed all aspects of QA/QC of the new cell including earthwork conformance testing, permeability testing of clay, interface friction testing, conformance testing of liner, destructive testing, non-destructive testing, and geoelectric leak detection survey. Was also in charge of conducting weekly construction meetings, regularly updating California Water Boards representative, reviewing field data, and completing a final CQA report. Some of the challenges were compaction & moisture conditioning of clay liner, sharp rocks on the slope, wet weather conditions, and schedule.

Phase C2 Partial Final Closure, El Sobrante Landfill, Corona, CA, 2020 - CQA Manager during the construction of 10 acre Phase C2 Partial Final Closure at El Sobrante Landfill. The cover system is an evapotranspirative (ET) cover comprised of 12-inch thick Foundation Layer and a 4-foot thick ET final cover layer. Based on the technical specifications and CQA plan, the maximum hydraulic conductivity of the ET final cover soil should not exceed 1×10^{-5} cm/sec.

Cells E8 (6th Partial) and E9 (2nd Partial), Waimanalo Gulch Sanitary Landfill, Kapolei, Oahu, Hawaii, 2020- Served as the Project CQA Officer/Manager during construction of Cells E8 (6th Partial) and E9 (2nd Partial) at the Waimanalo Gulch Sanitary Landfill, Kapolei, Oahu, Hawaii. The Project consisted of extension of the Cells E8 and E9 liner system on the landfill side slopes with a slope steepness ranging from 1.5H:1V to 2H:1V. The expansion consisted of approximately 250,000 square feet (sq. ft).

Cells E5/E7 East and Cell E6/West Berm, Waimanalo Gulch Sanitary Landfill, Kapolei, HI, 2019 –CQA Manager during the construction of ~3 acre Cell E5/E7 and Cell E6/West Berm at Waimanalo Gulch Sanitary Landfill, primarily consisting of 1.6:1 to 2:1 slopes. The leachate collection and removal system (LCRS) consists of GCL, HDPE, geotextile, gravel, HDPE piping and operations layer.

Phase C1 Partial Final Closure, El Sobrante Landfill, Corona, CA, 2019-CQA Manager during the construction of 24.1 acre Phase C1 Partial Final Closure at El Sobrante Landfill. The cover system is an evapotranspirative (ET) cover comprised of 12-inch thick Foundation Layer and a 4-foot thick ET final cover layer. Based on the technical specifications and CQA plan, the maximum hydraulic conductivity of the ET final cover soil should not exceed 1×10^{-5} cm/sec.

Geotechnical Investigation for Soil Stabilization Recommendations at Rio San Gabriel Park Overlying an Old Landfill, Downey, CA, 2017- The main purpose of this project was to provide recommendations regarding potential settlement and soil stabilization for future construction in a park overlying an old landfill. The ~25 ft thick landfill operated during the late 1940's and ceased operation around 1955 followed by building a park on top of it. The project consisted of geophysical survey, geotechnical borings, laboratory testing, settlement evaluation, and recommendations.



ERNESTO E. VICENTE, PhD, PE, GE PRINCIPAL GEOTECHNICAL ENGINEER

PROFESSIONAL EXPERIENCE

Dr. Vicente has over 35 years of experience in geotechnical and earthquake engineering, and engineering support to environmental projects in the United States, Latin America, and Southeast and Southwest Asia. Managed and provided technical expertise for geotechnical investigations, geologic hazard assessments, civil engineering design and construction quality assurance for a wide range of industrial, infrastructure, commercial, and environmental projects.

RELEVANT PROJECT EXPERIENCE

El Sobrante Landfill, Corona, Riverside County, CA - Phase 12 Liner & Leachate Collection and Removal System (LCRS)
– Construction Quality Assurance (CQA) Services, including earthwork, subgrade preparation, low-permeability earth and geosynthetic liners placement. *Client: Waste Management (2019).*

Puente Hills Landfill, Lower Western Cut, Landslide Removal and Slope Stabilization Project for New MRF Site Development, Whittier, Los Angeles County, California.

Geotechnical investigation for development of a Materials Recovery Facility (MRF), consisting of investigation and geotechnical remediation of an existing landslide, including extensive static and seismic slope stability evaluation. Field work included geologic mapping and air photo interpretation, excavation and geologic logging of five exploratory trenches; drilling, soil/rock sampling, and downhole geologic logging, of 11 bucket auger borings up to depths of 150 feet; drilling and continuous coring using the HQ wireline system (with carbide bit insert and diamond bits), and geologic logging (including borehole imaging processing system [BIPS] with color plots and statistical diagrams) of eight coreholes up to depths of 200 feet; for a combined total of 2,500 feet of air rotary (coring) and bucket auger borings. Eleven open-well and eight vibrating-wire piezometers were installed in bucket auger holes and coreholes to depths ranging from 65 to 195 feet. Extensive laboratory testing was conducted of selected clay seam specimens, slide plane materials, particularly shear strength properties. Engineering analyses included evaluation of static and seismic stability of cut and buttress fill slopes up to 270 feet high in outdipping sedimentary (claystone, siltstone) bedrock (Fernando and Puente Formation). Recommendations were provided for site grading including removal [2,000,000 cubic yards], buttress fill construction [1,300,000 cubic yards] and subdrains and horizontal drains (hydraugers). *Client: Rust Environment & Infrastructure (EarthTech)/County of Los Angeles Sanitation Districts, 1999-2001.*

Olinda-Alpha Landfill, Brea, Orange County, California - Equipment Maintenance Facility and Gas Plant.

Geotechnical investigation including evaluation of stability of cut slopes up to 130 feet high in outdipping bedrock formation, and buttress fill slope stabilization. Two building pads were developed for the construction of a new equipment maintenance facility and a 100,000-gallon cylindrical metallic water storage tank (approximately 35 feet in diameter and 20 feet high), an LNG plant, and an access road. Conclusions and recommendations were provided regarding geology and seismicity, seismic design criteria, site preparation and grading, slope stability, foundation support, earth pressures and resistance to lateral loads, retaining walls, slabs on grade, pavement, pipelines and utility

Registration

- *Geotechnical Engineer, CA No. G2302*
- *Civil Engineer, CA No. C46895*
- *Hazardous Operations Course (OSHA, Environmental) per 29 CFR 1910.120*
- *Water Survival Course in accordance with API RPT-4 and RPT-7 (2011 Refresher)*

Education

- *Ph.D., Civil/Geotechnical Engineering, Rensselaer Polytechnic Institute, Troy, New York, 1983*
- *M.S. Civil/Geotechnical Engineering, Rensselaer Polytechnic Institute, Troy, New York, 1978*
- *Hydroelectric Developments Diploma, Universidad Nacional, Buenos Aires, Argentina, 1973*
- *Civil Engineer Degree, Universidad Nacional, Cordoba, Argentina, 1972*

Year of Experience:

- *35+ Years*

trenches, soil corrosion potential. The building pads were constructed on engineered fill up to approximately 60 feet in thickness. Grading comprised a) excavation comprised approximately 410,000 cubic yards of mostly sedimentary (sandstone/siltstone/claystone) bedrock, including excavation of the buttress keyway as well as removal of weak clay seams, slipout debris and undocumented fill; b) installation of a subdrain system composed of series of geocomposite finger drains on the cut slopes and a collector subdrain consisting of gravel media and perforated pipe at the bottom of the keyway; and c) placement of approximately 323,000 cubic yards of engineered fill. Geotechnical CQA oversight included ingrade geologic mapping, fill placement and compaction control (field and laboratory testing). *Client: EarthTech, County of Orange Integrated Waste Management Department, 1997-2000.*

Rocky Flats Environmental Technology Site, "Original" and "Present" Landfill Sites. Accelerated Action Design for Final Capping. Geotechnical Investigation, seismic hazard assessment and static and seismic stability analyses and design of final capping. Field investigation, laboratory testing, geologic and subsurface soil property characterization, static and seismic slope stability and earthquake-induced slope deformation analyses. Conclusions and recommendation were presented regarding local geology and subsurface soil conditions, stability of the proposed final cover and meeting with Colorado and EPA regulatory agencies. *Client: EarthTech/Kaiser Hill/U.S. Department of Energy, Golden, Colorado, 2004.*

Layon Municipal Sanitary Landfill, Layon, Inarajan, Guam, Mariana Islands. Geotechnical and earthquake engineering investigation. The Layon site is approximately 176 acres in size and is located near the village of Inarajan. Layon in the higher badland areas, west of the Dandan parcel and southwest of a former NASA tracking station. Within the landfill parcel, the proposed landfill footprint is approximately 128 acres in area, for construction of 11 landfill cells, with a maximum cuts and fills on the order of 80 feet and 40 feet, respectively, and a maximum thickness of MSW fill will be approximately 150 feet. Field exploration for Landfill Cells 1 and 2 included drilling 12 exploratory borings (subsequently converted groundwater monitoring wells) to maximum depths of 75 feet, and excavating 12 test pits within the landfill footprint and vicinity. In addition, for design and construction of the proposed access road four additional exploratory borings were drilled and 33 additional test pits were excavated. Geotechnical laboratory testing included consolidation, triaxial compression (consolidated-undrained (CU) and unconsolidated-undrained (UU), direct shear, hydraulic conductivity, consolidation, soil-geosynthetic interface shear strength, resistance (R-) value, corrosivity, and compaction.

The proposed landfill bottom composite liner section will consist of (from bottom to top): subgrade soils/weathered bedrock, a 24-inch-thick low-permeability (bentonite-amended) soil liner, a layer of flexible 80-mil high density polyethylene (HDPE) geomembrane with both sides textured, geocomposite drainage media consisting of a 300-mil geonet with 10-ounce per square yard geotextile heat bonded to both sides; a 3-foot-thick layer of protective soil, and municipal solid waste (MSW) fills. The landfill is currently operated by GGH Guam, LLC. *Client: A-Mehr, Inc. /Tor Engineering/Guam Department of Public Works (2005-2008).*

Central Maui Landfill – Refuse and Recycling Center, Maui, Hawaii – Refuse & Construction and Demolition Materials, located at Pulehu Road & Hansen Road, Puunome, Maui. Landfill Cell and Recycling Center expansion project, including site geotechnical evaluation, hydrological studies, preliminary cell expansion design including site drainage surface and subsurface drainage studies, and landfill bottom and sideslope liner, static and seismic slope stability assessment. *Client: A-Mehr Inc. (2016).*

Site 3 Landfill Cover Construction, Edwards Air Force Base, Lancaster, CA – Lead Geotechnical Engineer for providing construction quality assurance services for construction of landfill cover. The landfill was in operation from the mid-1960's for waste disposal until 1976. It was estimated that approximately 526,000 cubic yards of household waste and construction debris was disposed at Site 3. The proposed landfill cover consisted of: 6-inch-thick layer of vegetative cover for native grass with a saturated hydraulic conductivity of 1×10^{-2} cm/sec; and an 18-inch-thick evapo-transpiration (ET) cover layer with a saturated hydraulic conductivity of 1×10^{-4} cm/sec or less.

HAI performed the laboratory testing to evaluate the physical characteristics and engineering properties of the preferred borrow materials and performed analyses required to provide geotechnical input for the design of the ET cover and its associated drainage control system during design phase in 2014. HAI is now providing CQA services during construction. *Client: AECOM (2014-ongoing).*

Ventura Regional Landfill [Formerly Toland Road Landfill], located at 3500 Toland Rd, Santa Paula, CA 93060. Landfill Cell expansion project, including site geotechnical evaluation, preliminary cell expansion design including site drainage surface and subsurface drainage studies, and landfill bottom and sideslope liner, static and seismic slope stability assessment. *Client: A-Mehr Inc. (2016).*

Molokai-Naiwa Landfill and Recycling Center, Maunaloa, Molokai, Hawaii. Review of groundwater studies in the region, and hydrology studies of the site. *Client: A-Mehr Inc. (2016).*

El Toro Marine Corps Air Station (MCAS), Irvine, Orange County, California - Final Monolithic Cover of Various Landfills, Remedial Action and Installation Restoration Program (IRP) for Sites 2, 3, 5, 17 and AA3. Geotechnical engineering evaluation for former military (Class II/III) landfill final capping consisting of monolithic cover at five sites for a combined total of approximately 62 acres [Site 2 (27 acres), Site 17 (11 acres), Site AA3 (5 acres), Site 3 (11 acres), and Site 5 (15 acres)]. Scope of work included evaluation of available data from previous geotechnical and environmental explorations at the site, development of a supplementary geotechnical/hydrogeologic field exploration and laboratory testing program, material property characterization, geologic characterization of the site, geologic/earthquake hazard evaluation, engineering analysis, and assistance in development of conceptual design and construction plans and specifications in accordance with CCR Titles 14, 23 and 27, and CFR Section 40, Part 258. Field exploration consisted of cone penetration test (CPT) soundings, test trenches, exploratory borings for subsequent installation of groundwater monitoring wells, gas wells and piezometers, and testing of landfill foundation soils, existing temporary cover soils and potential borrow soils for final landfill cover. Engineering evaluations included detailed analyses of liquefaction potential of subsurface soils, final cover settlement and drainage, static and seismic slope stability, seismically-induced permanent displacement and liquefaction-induced settlement and lateral spread, recommendations for inclusion in earthwork specifications and final cover maintenance). *Client: EarthTech/Department of the Navy, 2000-2005.*

55th Way Landfill, City of Long Beach, California - Final capping and conversion to Neighborhood Park. Geotechnical investigation in support of final landfill closure and post-closure land use. Field exploration, laboratory testing, soil property characterization, settlement analyses. Recommendations for future site grading and foundations of future park structures and perimeter retaining walls. *Client: Earth Tech/EDSA/City of Long Beach, 2004 and 2005.*

Final Capping, Fort Carson Landfill No. 2 (FTC-006), Landfill No. 5 (FTC-009) and Landfill No. 6 (FTC-010), Fort Carson, Colorado. Geotechnical Investigation, settlement and stability analyses and design of final capping for three military landfills. Field investigation included drilling approximately 15 exploratory borings per site to investigate the nature and thickness of existing landfill cover soils, as well as the nature of native materials just outside the footprint of the landfill. Laboratory testing included soil classification and index test, in-situ conditions, permeability, compressibility and shear strength characteristics of foundation soils, existing interim cover soils, and final cover and potential borrow soils. Conclusions and recommendation were presented regarding local geology and subsurface soil conditions, settlement and stability of the proposed final cover. *Client: Rust Environment & Infrastructure (EarthTech)/U.S. Army Corps of Engineers, Omaha District, 1995-96.*

Orange County Sanitation District, Expansion of Plant No. 1, Fountain Valley, Orange County, California. *Client: [HLA, 1999 and DYA, 2002].*

PROFESSIONAL EXPERIENCE

Mr. Ted Mapramook has more than 28 years of experience as a construction quality assurance monitor working on a variety of geotechnical and environmental engineering projects involving massive grading activities, foundation preparation and installation, landfill liner and cover installation, and field instrumentation for construction and post-construction monitoring. Additionally, Mr. Mapramook's extensive experience in geotechnical field investigation and laboratory testing has provided him with exceptional in-depth understanding of soil behavior and foundation construction. He worked as a laboratory technician for Earth Technology Corporation (Earth Tech/currently AECOM) for more than 8 years and continued as a laboratory and field engineering technician at Hushmand Associates, Inc. Mr. Mapramook has worked on a wide range of geotechnical and environmental engineering projects such as landfills, aggregate quarries, industrial wastewater impoundments, landslide and slope stabilization, environmental remediation projects, earth reservoirs, power plants, large housing and commercial developments, and roads and bridges. A summary of Mr. Mapramook's representative work and project experience is provided below.

Registration

- *40-Hour OSHA Health and Safety Trained, 29 CFR 1910.120 (e)(2)/8 CCR 5192 (1988 Certification)*
- *2002-Present Certification 8 hour OSHA Health and Safety Training*
- *EPA Level B: Personal Protection Procedures Training*
- *CPN Training Course on Radiation Safety and Use of Nuclear Gages*

Education

- *Liberal Arts, Golden West College, Huntington Beach, California*

Year of Experience:

- *> 28 Years*

Liner CQA Experience: >8,000,000 ft²

Earthwork CQA Experience: >10,000,000 yd³

PROJECT EXPERIENCE

Phase 12 Liner and LCRS, El Sobrante Landfill, Corona, CA, 2020 - CQA Monitor during the construction of a ~28 acre double-composite liner system located on the floor of the landfill and on 2H:1V slopes. The project bottom liner and LCRS consists of the following components (from bottom to top): 1) prepared subgrade, 2) 1-foot thick compacted clay liner, 3) 40-mil double-sided textured HDPE geomembrane, 4) GCL, 5) 60-mil double-sided textured HDPE geomembrane, 6) 11-oz/sy woven (cushion) geotextile, 7) 9-inch thick LCRS drainage layer, 8) 8 oz/sy non-woven (filter) geotextile, and 9) 2-foot thick soil operations layer. The project slope liner consists of the following components (from bottom to top): 1) prepared subgrade, 2) 40-mil double-sided textured HDPE geomembrane, 3) GCL, 4) 60-mil double-sided textured HDPE geomembrane, 5) Geocomposite drainage layer, and 6) 2-foot thick soil operations layer.

Phase C2 Partial Final Closure, El Sobrante Landfill, Corona, CA, 2020-CQA Monitor during the construction of 10 acre Phase C2 Partial Final Closure at El Sobrante Landfill. The cover system is an evapotranspirative (ET) cover comprised of 12-inch thick Foundation Layer and a 4-foot thick ET final cover layer. Based on the technical specifications and CQA plan, the maximum hydraulic conductivity of the ET final cover soil should not exceed 1 x 10⁻⁵ cm/sec.

Cells E8 (6th Partial) and E9 (2nd Partial), Waimanalo Gulch Landfill, Kapolei, HI, 2020 - CQA Monitor during the construction of ~6 acre extension of the Cells E8 and E9 liner system on the landfill side slopes with slope steepness ranging from 1.5H:1V to 2H:1V. The leachate collection and removal system (LCRS) consists of GCL, HDPE, geotextile, gravel, HDPE piping, and operations layer.

Phase C1 Partial Final Closure, El Sobrante Landfill, Corona, CA, 2019-CQA Monitor during the construction of 24.1 acre Phase C1 Partial Final Closure at El Sobrante Landfill. The cover system is an evapotranspirative (ET) cover comprised of 12-inch thick Foundation Layer and a 4-foot thick ET final cover layer. Based on the technical specifications and CQA plan, the maximum hydraulic conductivity of the ET final cover soil should not exceed 1 x 10⁻⁵ cm/sec.

Cells E5/E7 East and Cell E6/West Berm, Waimanalo Gulch Sanitary Landfill, Kapolei, HI, 2019 – CQA Monitor during the construction of ~3 acre Cell E5/E7 and Cell E6/West Berm at Waimanalo Gulch Sanitary Landfill, primarily consisting of 1.6:1 to 2:1 slopes. The leachate collection and removal system (LCRS) consists of GCL, HDPE, geotextile, gravel, HDPE piping, and operations layer.

Phase 2A-1 Liner Construction, Lancaster Landfill & Recycling Center, Lancaster, CA, 2018 – CQA Monitor during the construction of the Class III waste management unit, 5.5-acre Phase 2A-1 Liner system at the Lancaster Landfill & Recycling Center, primarily consisting of a level base surrounded by 2:1 cut slopes with maximum height of approximately 30 ft. The leachate collection and removal system (LCRS) consists of GCL, HDPE, geotextile, gravel, HDPE piping and operations layer.

Phase 11B Liner and LCRS, El Sobrante Landfill, Corona, CA, 2017 – CQA Monitor during construction of the Phase 11B at the El Sobrante Landfill, Corona, CA. The 19.4-acre cell is lined with a double-composite liner system comprised of soil and geosynthetic components. The project bottom liner and LCRS consist of the following components (from bottom to top): 1) prepared subgrade, 2) 1-foot thick compacted clay liner, 3) 40-mil double-sided textured HDPE geomembrane, 4) GCL, 5) 60-mil double-sided textured HDPE geomembrane, 6) 11-oz/sy woven (cushion) geotextile, 7) 9-inch thick LCRS drainage layer, 8) 8 oz/sy non-woven (filter) geotextile, and 9) 2-foot thick soil operations layer.

El Sobrante Landfill – Phase 11 Stability Berm & Phase 11A Liner & Leachate Collection and Removal System (LCRS), Corona, Riverside County, CA, 2015 - Performed geotechnical observation and testing during construction of the Phase 11A landfill expansion at the El Sobrante Landfill, Corona, CA. The 24.4-acre cell is lined with a double-composite liner system comprised of soil and geosynthetic components. The project liner terminates in an anchor trench along its southern edge, which lies at the top of the Phase 11 stability berm. The project liner termination consists of a temporary anchor trench (on the south sideslope) and temporary geomembrane “rainflaps” on the floor. The project LCRS drains by gravity to a vadose zone monitoring sump that was installed under the project bottom liner at the toe of the side slope. The project also included the construction of a stability berm that shapes the southern perimeter of the Phase 11A liner and LCRS and associated permanent surface water controls (i.e., grouted rip rap channels).

1) Evaporation Ponds No. 1 and 2, and Temporary Drying Pit, SoCalGas' South Needles Compressor Station, Needles, CA; and 2) North Evaporation Pond No. 4, SoCalGas' Blythe Compressor Station, Blythe, CA, 2014-2015 – CQA Monitor during construction of the temporary sediment drying pit and the overlay lining system for the evaporation Ponds No. 1 and 2 at the South Needles Compressor Station, and evaporation Pond No. 4 at Blythe Compressor Station. The drying pit lining system comprised of 1) Prepared subgrade and grading to low point; 2) 10 oz/yd² cushion geotextile; 3) 60-mil thick HDPE geomembrane; 4) 200-mil geonet inside 6 oz/yd² geotextiles (geocomposite); 5) Geomembrane wrapped over K-rails around perimeter; 6) Anchor trench for geomembrane located outside K-rails; and 7) Leak detection system comprised of slotted and solid piping placed under lining system at north end of drying pit and connected to an observation pipe (lysimeter) installed vertically in ground outside of the anchor trench. The overlay lining system for the Evaporation Ponds No. 1 and 2, and No. 4 comprised of 1) Prepared surface of existing liner; 2) 60-mil thick HDPE geomembrane; 3) 250-mil geonet (Pond 2) 200-Mil geonet (Pond 1 and Pond 4); and 4) 80-mil thick HDPE geomembrane.

Phase B2 Final Cover, El Sobrante Landfill, Corona, CA, 2014 – CQA Monitor during construction of the Phase B2 final cover at El Sobrante Landfill, located at 10910 Dawson Canyon Road in Corona, CA. The final cover for this project was an evapotranspirative (ET) cover comprised of the following components, from bottom to top: 1) Foundation Layer: An approximately 12-inch-thick layer of existing interim cover soil, relatively free of organics and refuse, that has been placed over the refuse; and 2) Final Cover Soil: A 4-foot thick minimum ET final cover soil material, free from roots, organic matter, trash, debris, and any other deleterious materials. Based on the technical specifications and CQA plan, the maximum hydraulic conductivity of the ET final cover soil should not exceed 1×10^{-5} cm/sec. In addition to the ET cover, storm water management structures were constructed over the final cover. Field testing services provided by HAI included performing conformance testing of the final cover soil. In-situ testing performed by HAI included Nuclear Gauge, Sand Cone, Bengt-Arne Torstensson (BAT), Sealed Single Ring Infiltrometer (SSRI), and Boutwell tests. Laboratory testing performed by HAI included Moisture Content, Particle-Size Analysis, Modified Proctor Compaction, and Hydraulic Conductivity tests.

Phase II Liner Construction, Las Pulgas Landfill, MCB Camp Pendleton, CA, 2012 – Under contract with CH2M (the CQA Agency for the project), served as CQA Monitor during the full-time onsite monitoring and in-situ and laboratory testing services during construction of two (2) phases of the project. Lined areas were approximately 20 acres and 7.5 acres for Phase II and Phase I, respectively. Phase II construction was conducted between August 2010 and July 2012. Phase I was conducted in 2015. Field and laboratory testing services included performing conformance testing of soil, aggregate, and geosynthetic material components of the landfill liner and leachate removal and collection system (LCRS). Completion of the CQA testing was integral to the success of the project. CQA testing for the liner materials was performed in conformance with the approved CQA Plan. San Diego Regional Water Quality Control Board approved the CQA Reports based on meeting the design and regulatory requirements.

Landfill No. 2 - Southern Expansion, Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, CA, 2011 – CQA Monitor to verify that the approximately 8-acre Landfill No. 2, Southern Expansion was constructed in accordance with the approved construction drawings, specifications, and CQA plan. Landfill No. 2 is entirely located on federal property at MCAGCC Twentynine Palms in the south-central portion of San Bernardino County. Development of the Landfill No. 2, Southern Expansion included a double composite liner with an LCRS, access roads, surface water management features, conceptual grading plans for the final cover system, and a preliminary conceptual layout of a landfill gas (LFG) collection and management system. The key components of the base composite liner system included: A 2-foot thick operations soil layer; 8 oz/yd² geotextile filter fabric placed over the LCRS layer; a 1-foot LCRS drainage layer (granular material with a maximum particle size of 1.5 inches); 16 oz/yd² geotextile cushion fabric; 60-mil HDPE geomembrane liner, single-sided, textured on the bottom and smooth on the top; a reinforced needle-punched GCL; and prepared subgrade.

Phase 2B Liner Construction, Lancaster Landfill & Recycling Center, Lancaster, CA, 2010 – CQA Monitor during the construction of the Class III waste management unit, 10-acre Phase 2B Liner system at the Lancaster Landfill & Recycling Center, primarily consisting of a level base surrounded by 2:1 cut slopes varying in height from 40 to 50 feet. The single-composite liner system consists of GCL, HDPE, geotextile, gravel, HDPE piping and operations layer.

Phase 1A Liner Construction, Lancaster Landfill & Recycling Center, Lancaster, CA, 2004 – CQA Monitor during the construction of the Class III waste management unit, 10-acre Phase 1A Liner system at the Lancaster Landfill & Recycling Center, primarily consisting of a level base surrounded by 2:1 cut slopes varying in height from 60 to 80 feet. The leachate collection and removal system (LCRS) consists of GCL, HDPE, geotextile, gravel, HDPE piping and operations layer.

Antelope Valley Landfill, Cell IV - Step 5, Antelope Valley, CA, 2004 – CQA Monitor during construction of the Cell IV – Step 5. CQA services performed during grading and testing, testing of backfills, observation and testing of geosynthetic materials during installation, preparation of field CQA progress reports, field and laboratory testing of fill materials and aggregates, and quality control of fill placement. The leachate

collection and removal system (LCRS) consists of GCL, HDPE, geotextile, gravel, HDPE piping and operations layer.

Puente Hills Landfill, Whittier, CA - Conducted mass earthwork grading and testing, testing of backfills, observation and testing of base course and asphaltic concrete placement, field and laboratory testing of fill materials and aggregates, and quality control of fill placement. In charge of directing excavation of clay materials and transporting them to stockpiles for blending, screening, and moisture conditioning. Obtained soil samples and conducted particle size analysis and moisture/density measurements to identify which cuts or stockpiles meet specifications. Inspected gravel gradations, filter sand, and geotextile placement and tested backfill during installation of the subsurface barrier. Directed earthwork and served as a geosynthetic monitor for installation and testing of the synthetic lining.

PROFESSIONAL EXPERIENCE

Mr. David Pipkin has more than 16 years of experience as a construction quality assurance monitor working on a variety of geotechnical engineering projects involving massive grading activities, landfill liner installation, and field instrumentation for construction and post-construction monitoring. Mr. Pipkin has worked on a wide range of geotechnical and environmental engineering projects such as landfills, landslide and slope stabilization, earth reservoirs, large housing and commercial developments, and roads and bridges.

PROJECT EXPERIENCE

El Sobrante Landfill, Corona, California

CQA Monitor supervising the 23 acre Phase 12 Composite Liner construction consisting of 2.2 million square feet of geosynthetics, 1.1 million square feet of GCL and additional geotextiles. CQA responsibilities also included sand cone density and nuclear gauge density testing of the compacted clay liner, Modified Proctor compaction and sieve analysis (gradation) laboratory testing, and data management for earthworks and geosynthetics. *Client: Waste Management, 2019-ongoing*

Puente Hills Landfill, Los Angeles County, California - CQA Monitor for Phase 6 Composite Liner construction responsible for earthworks testing, subgrade preparation and data management for earthworks and geosynthetics. *Performed for Advanced Earth Sciences*

Mesquite Regional Landfill, Imperial County, California - CQA Monitor during composite liner construction for the 7-acre Cell 1 expansion, involving 1.6 million sq. ft. of geosynthetics, including HDPE geomembrane, GCL, and geotextiles. *Performed for Advanced Earth Sciences*

Westlake Farms Composting Facility, Kettleman City, California - CQA Monitor supervising construction and CQA testing for clay liner test pads and lime and lime-cement stabilized pads for wastewater ponds, Contractor's equipment pads, access roads and preconsolidation pad for installation of wick drains. The CQA testing included routine compaction tests, in situ hydraulic conductivity tests using Boutwell Method and laboratory hydraulic conductivity tests by flexible wall permeameter. Also provided CQA for composite liner for storm water pond including linear low density polyethylene (LLDPE) and geotextile. Also performed onsite data management of test results. *Performed for Advanced Earth Sciences*

Camp Roberts, California - Foreman/Operator for construction of clay liner test pad for a landfill unit expansion from onsite borrow source. Duties included supervision of borrow source excavation and stockpiling, moisture conditioning and grade control during fill of test pad. *Done for TN & Associates, 2006,*

Registration

- *40-Hour OSHA Trained, 29 CFR 1910.120 (e)(2)/8 CCR 5192*
- *Radiation Safety and Use of Nuclear Gages.*

Certifications

- *Radiation Safety and Use of Nuclear Gages.*
- *ACI Concrete Strength Testing Technician, 2020*
- *Avtec, Diesel Mechanics, 1991-1993*
- *West Coast Training, Heavy Equipment Operation and Surveying, 1993*
- *U.S. Army Aviation Logistic, Apache Helicopter Avionics, Electrical, and Weapons Systems, 1994*

Education

- *Seward High School, 1993*

Year of Experience:

- *17 Years*
- *2 Years with HAI*