

**COLTON SANITARY LANDFILL
AMENDED AND RESTATED SITE LEASE**

Between

SAN BERNARDINO COUNTY

And

BIOFUELS SAN BERNARDINO BIOGAS, LLC

DATED AS OF JUNE 28, 2022

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APPENDIX A DEFINITIONS

- EXHIBIT A LEASED PREMISES LEGAL DESCRIPTION(S)
- EXHIBIT B PARCEL MAP(S)
- EXHIBIT C SCHEDULE OF DAYS AND HOURS OF OPERATION
- EXHIBIT D FORM OF COUNTY CONSENT OF HYPOTHECATION
- EXHIBIT E COLTON SANITARY LANDFILL PROPOSED CORRECTIVE ACTION PLAN

AMENDED AND RESTATED LANDFILL SITE LEASE

THIS AMENDED AND RESTATED LANDFILL SITE LEASE, dated as of June 28, 2022 (this “Lease”), is between BioFuels San Bernardino Biogas, LLC, a Delaware limited liability company, (“LESSEE”), located at 4444 Westheimer Road, Suite 450G, Houston, Texas 77027, and San Bernardino County Department of Public Works, Solid Waste Management Division, California (“COUNTY”), located at 222 W. Hospitality Lane, Second Floor, San Bernardino, California 92415. Concurrent with this Lease, the parties are entering into an Amended and Restated Landfill Gas Sale and Purchase Agreement (Colton Sanitary Landfill) referred to as (“BSA”).

WHEREAS, Lessee and County previously entered into a Landfill Site Lease on the Property (hereinafter defined) on September 24, 2019 (the “Original Lease”);

WHEREAS the Lessee and County wish to amend and restate the Original Lease to modify certain terms of the Original Lease;

NOW, THEREFORE, for and in consideration of the terms herein, and for other good and valuable consideration, the sufficiency and receipt of which are hereby acknowledged, Lessee and County covenant and agree as follows:

Section 1. Definitions

The capitalized terms used in this Lease shall have the meanings specified in Appendix A hereto.

Section 2. PREMISES AND USES

The purpose of this Lease is to provide LESSEE a location within the Colton Sanitary Landfill with a physical address of 850 Tropica Rancho Road, Colton, California 92325 (“Property”) upon which to perform its BSA project obligations, enjoy its BSA rights, and perform such activities as necessary or convenient to the same. The BSA is hereby expressly incorporated in this Lease.

2.1. Premises

COUNTY, in consideration of the covenants, commitments, conditions and obligations herein set forth, the sufficiency and receipt of which are hereby acknowledged, hereby Leases to LESSEE and LESSEE leases from COUNTY, in the AS-IS condition existing at the Effective Date (defined below) of this Lease, the Premises, subject to the terms and conditions herein, including, without limitation, Section 4.6 below. The Premises are more particularly described on Exhibit A attached hereto and incorporated by reference herein. Said real property is hereinafter called the “Premises” which shall be the primary location of LESSEE’s Facility and operations pursuant to the BSA. The Premises are leased subject to all easements, reservations, restrictions, rights and rights-of-way whether of record or not. The Premises does not include access roads utilized by LESSEE to access the Premises, provided, however, LESSEE shall have a non-exclusive easement to all areas necessary or convenient to exercise its rights and obligations herein and as contemplated in the BSA.

If in the course of permitting and/or detail design activities, it is deemed necessary for the development of the project as defined in the BSA and mutually agreed by the Parties, COUNTY may also lease to LESSEE under a non-exclusive basis certain real property either on the Premises which is presently a portion of COUNTY's Colton Sanitary Landfill (hereinafter "Landfill") or other County designated location for the installation of an energy source to provide all or a portion of the parasitic energy load required for the operation of the biogas facility. Approval of the utilization of any portion of the Landfill for such purposes is subject to the provisions of all applicable permits, agreements, municipal requirements, and regulatory requirements. If applicable, said real property will be included in a modified Exhibit A, Leased Premises Legal Description through a written amendment to this Lease approved by authorized representatives of both Parties.

Appurtenant Easements will be granted by the County as reasonably required to provide utilities (natural gas, electrical, water, etc.) to the Premises.

2.2. Appurtenant Easements will be granted by the COUNTY as reasonably required to provide utilities (natural gas, electrical, etc.) to the Premises. Uses

It is expressly agreed that upon the Effective Date, the Premises are leased to LESSEE solely and exclusively for the purposes of (i) collecting, receiving, processing, storing, testing, monitoring, transporting, conveying, marketing, repair, servicing of equipment, distributing, and delivering compressed landfill gas sold by COUNTY to LESSEE, now or in the future, under the express terms and conditions provided by the BSA, (ii) producing Renewable Hydrogen, utilizing renewable natural gas, and (iii) for LESSEE's other rights and obligations pursuant to the BSA, including without limitation, with regard to Environmental Attributes (as defined in the BSA) and the operation of the LESSEE'S Facilities (hereinafter "Permitted Uses"). Permitted Uses includes the construction, installation, maintenance, repair, replacement, modification, and operation of the facility, structures, and fixtures ("Improvements") necessary to fulfill the terms of the BSA and this Lease. Generation of electrical power needed in providing services related to LESSEE'S business is allowed, provided that such electrical generation is in compliance with all applicable laws.

LESSEE covenants and agrees to use the Premises for the above-specified purposes and to diligently pursue said purposes throughout the term hereof. Material failure to continuously use the Premises for said purposes, or the use thereof for purposes not expressly authorized herein, shall be grounds for termination by COUNTY, except to the extent such failure is caused by Force Majeure as defined in the BSA, scheduled and anticipated inactivity or shutdown of LESSEE's facilities, COUNTY's acts or omissions, routine maintenance of LESSEE's facilities, or other conditions occurring in the ordinary course of LESSEE's operations.

2.3. Permitted Uses.

LESSEE shall use and occupy the Premises only for the Permitted Uses and for no other purpose whatsoever. Lessee shall not use or permit the use of the Premises in a manner that is unlawful, creates waste or a nuisance, causes damage to the Premises or neighboring properties, or is inconsistent with the Permitted Uses. LESSEE shall comply with all laws, ordinances and regulations applicable to the use of the Premises. LESSEE shall promptly comply with all

governmental orders and directions for the correction, prevention and abatement of any violations in or upon, or in connection with Premises, at LESSEE's sole expense. Failure of LESSEE to perform this Lease in accordance with its permitted use constitutes a material breach of this Lease.

2.4. Quiet Possession

LESSEE, paying the payments required by this Lease and BSA, and performing the covenants and agreements herein, shall at all times during the term peaceably and quietly have, hold, and enjoy the Premises. If COUNTY for any reason, except as described in Section 13.03 of the BSA, cannot deliver possession of the Premises to LESSEE at the commencement of the term, or if during the lease term LESSEE is temporarily dispossessed through action or claim of a title superior to COUNTY'S, then and in either of such events, this Lease shall not be voidable nor shall COUNTY be liable to LESSEE for any loss or damage resulting therefrom, but there shall be determined and stated in writing by the County, and agreed to by LESSEE, a proportionate reduction of the minimum payments for the period or periods during which LESSEE is prevented from having the quiet possession of all or a portion of the premises.

2.5. Easements and Reservations

COUNTY hereby reserves all rights, title, and interest in any and all subsurface natural gas, oil, minerals, and water on or within the Premises, exclusive of such rights, title, and interests in and to the same, and/or Environmental Attributes (as defined in the BSA), not otherwise granted to LESSEE pursuant to the BSA.

COUNTY reserves the right to grant and use easements or to establish and use rights-of-way over, under, along, and across the Premises for utilities, thoroughfares, or access, as it deems necessary.

COUNTY has the right to enter the Premises for the purpose of operating or making repairs to or developing Landfill operation related services, and for any other purposes stated in this Lease and the BSA.

However, COUNTY shall not unreasonably interfere with LESSEE'S use of the Premises and will reimburse LESSEE for physical damages, if any, to the permanent Improvements located on the leased premises to the extent caused by the negligence or intentional misconduct of COUNTY and resulting from COUNTY exercising the rights reserved in this section. In no event shall LESSEE have the right to abate rents due for such reimbursement.

COUNTY grants LESSEE reasonable vehicular and foot access to the Premises through the Property. Such access shall be available to LESSEE, LESSEE's employees and invitees while this Lease is in effect during the hours and subject to the conditions and terms noted in Section 2.05 and in the BSA.

LESSEE acknowledges the Premises is located contiguous to land used by COUNTY. The Premises will require shared use of access, ingress and egress.

LESSEE shall request from COUNTY necessary appurtenant easements for utilities to serve LESSEE's facilities on the leasehold premises. Such proposed easements shall be identified

in LESSEE's design for its facilities prepared pursuant to the BSA. COUNTY'S approval of appurtenant easements will be conditioned on non-interference with COUNTY's facilities and planned operations and other factors that COUNTY deems relevant, and will be in the sole discretion of COUNTY.

2.6. Competent Management

Throughout the term of this Lease, LESSEE shall provide competent management of the leased premises to the satisfaction of COUNTY. For the purposes of this paragraph, "competent management" shall mean demonstrated ability in the management and operation of a renewable hydrogen production facility and related activities in a clean, safe, maintained, and fiscally responsible manner. COUNTY reserves the right to request a change in LESSEE's management based on LESSEE performing any illegal or disruptive practices on the COUNTY Premises. LESSEE shall provide new management within ten business days' notice of a request for change from the COUNTY.

2.7. Operation of Facilities

A regular schedule of days and hours of operation shall be established by LESSEE to best perform its BSA obligations as set forth in Exhibit C, Schedule of Days and Hours of Operation. Any changes in this schedule shall be subject to the prior written approval of COUNTY through its authorized representative. LESSEE shall diligently and in a creditable manner furnish services in conformity with all applicable rules and regulations of COUNTY. With the exception of personnel performing ongoing operation and monitoring and inspection activities, entry into or upon the Premises by LESSEE will be permitted only during the Permitted Hours of Operation for Site Activities set forth in the most current Solid Waste Facility Permit for the Landfill. If LESSEE desires to have access, for purposes of posting a security guard after construction is complete, the Parties shall mutually agree to such access. Notwithstanding the foregoing, LESSEE may enter the Premises at any time in the event of a life-threatening emergency or the actual or threatened imminent and substantial damage or destruction of the Improvements; in which case, LESSEE shall immediately notify County of the emergency. LESSEE shall access the Premises through the main entrance route to the Property and the gates indicated by the descriptions and drawings included in Exhibits A and B, attached hereto and incorporated herein.

2.8. Approval by the County and Other Agencies.

LESSEE, at its sole cost and expense, may install the Improvements, subject to the LESSEE complying with all provisions of the BSA and the Lease. As a condition of this Lease and subject to LESSEE's completion of any required environmental review, LESSEE shall cause to be maintained all such permits, licenses, approvals, and conditions in force through the term of this Lease. The revocation or expiration of any such permit, license, approval, or conditions shall constitute a material breach of this Lease, subject to cure by LESSEE upon showing the reinstatement, renewal, or obtaining of the same has been substantially commenced and is underway. LESSEE shall provide COUNTY with copies of all approvals required pursuant to this Section prior to the commencement of any construction. Should LESSEE wish to modify the Improvements after its installation, LESSEE shall not do so without the prior written approval of COUNTY, in its sole discretion, and the execution of an amendment of this Lease. LESSEE shall

first conduct any required environmental review, obtaining all required permits, licenses and approvals and satisfying all conditions from the COUNTY and any other governmental or regulatory authorities having jurisdiction over LESSEE's use of the Premises. Should LESSEE modify the Improvements without the prior approval of COUNTY and any other applicable governmental or regulatory authorities or fulfilling any other requirements in this Lease, COUNTY may require that LESSEE remove said modifications at LESSEE's sole cost and expense. Such actions of LESSEE shall constitute a material breach of this Lease, subject to cure by LESSEE upon showing the removal of unauthorized material modifications has been substantially commenced and is underway. LESSEE shall be responsible for any and all fees, charges or other governmental agencies' fees or expenses that may be imposed on the Lessee in connection with LESSEE's use or enjoyment of the Premises at any time during the term of the Lease.

2.9. Third Party/Construction Quality Assurance.

Any construction of the Improvements at the Premises must be observed and documented by an independent third party quality assurance consultant as required by Title 27 of the California Code of Regulations, section 20939. LESSEE will be required to retain the appropriate consultant services to meet this regulatory requirement. LESSEE shall submit copies of all quality assurance reports, including the final Construction Quality Assurance (CQA) and as-built reports, to the COUNTY and the appropriate regulatory agencies, as required by law.

2.10. Covenant of Non-Interference.

LESSEE's Improvements and equipment on the Premises shall not negatively impact any COUNTY facilities or equipment on the Property at any time. LESSEE's equipment shall not negatively impact any other facility existing on the Property. In the event that Lessee's equipment does impact other facilities on the Property, LESSEE shall be required, at its own expense, to retain qualified consultants and/or contractors, subject to COUNTY approval and oversight, to correct the problem. LESSEE shall be required to coordinate with other existing utilities located at the Property now or in the future, to ensure that LESSEE's Improvement and equipment does not interfere with existing utilities.

2.11. County Access.

COUNTY or its duly authorized representatives or agents and other persons for it, may enter into or upon the Premises at any and all reasonable times during the term of this Lease for the purpose of determining whether or not LESSEE is complying with the terms and conditions hereof or for any other purpose incidental to the rights and obligations of the COUNTY as owner of the Premises and Property. COUNTY shall not be liable in any manner for any inconvenience, disturbance, loss of profits, nuisance, or other damage arising out of COUNTY's entry onto the Premises as provided in this section, except for property damage to the extent resulting from the negligence or intentional misconduct of COUNTY or its authorized representatives. LESSEE shall not be entitled to an abatement or reduction of Rent if COUNTY exercises any rights reserved in this section. COUNTY shall conduct COUNTY's activities on the Premises pursuant to this section in a manner that will minimize inconvenience, annoyance, or disturbance to LESSEE.

Section 3. TERM

3.1. Commencement

The term of this Lease shall commence upon the Effective Date. The termination date of this Lease shall correspond with the termination date, including any extension thereof, provided in Article VI of the BSA and shall be subject to the termination provisions in Sections 3.01(a), 6.02, and 13.04 of the BSA and other terms of the BSA and this Lease. The Term shall commence on the Effective Date and shall remain in effect for the remainder of the Option and Construction Period. Unless this Lease and the BSA are terminated as provided in Section 3.01 of the BSA, at the conclusion of the Option and Construction Period or at the Commercial Operation Date, whichever occurs earlier, the term shall automatically convert to twenty (20) years. The Term shall be extended by the number of days (not to exceed 180 days) in which COUNTY's delivery of Landfill Gas to the Delivery Point is interrupted by a Force Majeure event. The Term of this lease shall renew concurrent with that of the BSA.

3.2. Lease Contingencies

The Lease is contingent upon the contractual terms and conditions of the BSA. Any condition requiring or allowing the termination of this Lease by either party shall also be grounds for the termination of the BSA by either party, subject to cure provisions herein and in the BSA.

3.3. Holdover

Any holding over by LESSEE after expiration or termination shall not be considered as a renewal or extension of this Lease. The occupancy of the premises after the expiration or termination of this Lease constitutes a month-to-month tenancy, and all other terms and conditions of this Lease shall continue in full force and effect provided however, the lease payment shall increase by 150% of the prior months' rent. Either party may terminate the month-to-month tenancy on thirty (30) days' notice.

3.4. Quitclaim and Surrender of LESSEE'S Interest

On termination of this Lease, LESSEE shall deliver to COUNTY a quitclaim deed in recordable form quitclaiming all its rights in and to the Premises. COUNTY may record such deed only on the expiration or earlier termination of this Lease. In the event that COUNTY requires any subsequent quitclaim deed, LESSEE or its successor in interest shall deliver the same within five (5) days after receiving written demand.

At the expiration or earlier termination of this Lease, LESSEE shall surrender the Premises to COUNTY free and clear of all liens and encumbrances, except those liens and encumbrances, which existed on the date of execution hereof, and in full compliance with the requirements in the BSA. In the case of termination of this Lease by COUNTY prior to the end of the specified lease term, any liens and encumbrances must be approved in writing by COUNTY.

3.5. Termination

At any time during the Term, LESSEE may terminate this Lease upon not less than 18 months' prior written notice to the COUNTY if LESSEE determines, in its sole discretion, that its operations are not economically viable or best-situated on the Premises for any reason, and such termination shall not be a breach or default or impact such conditions hereunder as are intended explicitly or by their nature to survive termination. Such termination shall be confirmed in writing by the COUNTY upon its receipt of such written notice. LESSEE shall continue to pay to the County Rent, as set forth in Section 5 of this Lease, throughout the entire 18 month notice period. LESSEE shall remove all equipment and improvements, returning the Premises to its original state prior to the end of the 18 month notice period.

Section 4. MAINTENANCE, REPAIRS, AND IMPROVEMENTS

4.1. General

LESSEE shall, at its sole cost, promptly and diligently keep in good order, condition and repair the Premises, including but not limited to (a) repair of the access roads due to any damage beyond normal wear and tear caused by LESSEE's use of said roads during the Option and Construction Period for the Improvements; (b) upon completion of construction of the Improvements, re-grade all access roads used by LESSEE during construction to COUNTY's reasonable satisfaction; (c) perform, at a minimum, monthly inspections of the Premises and the Improvements to assess any adverse impacts to the Property caused by the Improvements and provide written reports of such inspections to COUNTY within seven (7) days of the completion of each inspection; (d) promptly repair any damage to the Property caused by the Improvements, to the reasonable satisfaction of COUNTY, within fifteen (15) days of the submission of the written inspection report to COUNTY except in the case of an emergency, such as those involving exposed waste, which shall be performed immediately; and (e) keep the Premises clean, tidy, and free of debris. Any repairs to the Property to be performed by LESSEE shall be approved in advance by the COUNTY and shall be performed at LESSEE's sole cost. LESSEE shall further, at its sole cost, promptly and diligently keep in good order, condition, and repair the Improvements, any subsequent approved LESSEE improvements, and LESSEE's personal property placed on the Premises by LESSEE and every part thereof, but subject to normal wear and tear and clean and free of debris.

4.2. Waste, Damage, or Destruction

LESSEE agrees to give notice to COUNTY of any fire or other damage that may occur on the Premises within twenty four (24) hours of such fire or damage. LESSEE agrees not to commit or suffer to be committed any waste or injury or any public or private nuisance, to keep the premises clean and clear of refuse and obstructions, and to dispose of all garbage, trash, and rubbish in a manner satisfactory to COUNTY. If the Premises shall be damaged or destroyed by any casualty, LESSEE agrees to make or cause to be made full repair of said damage and to restore the Premises to the condition which existed prior to said damage; or, at COUNTY's option, LESSEE agrees to clear and remove from the Premises all debris resulting from said damage and rebuild the Premises in accordance with plans and specifications previously submitted to COUNTY and approved in writing in order to replace in kind and scope the operation which

existed prior to such damage, using for either purpose the insurance proceeds as set forth in Section 9, Indemnification and Insurance, hereof.

LESSEE agrees that preliminary steps toward performing repairs, restoration, or replacement of the premises shall be commenced by LESSEE within seventy-two (72) hours, and the required repairs, restoration, or replacement shall be completed within two weeks thereafter, unless an extension of time is mutually agreed upon between the Parties in writing.

4.3. Surrender

On the last day of the term hereof, or upon any prior termination, LESSEE shall remove the Improvements and any of LESSEE's personal property located above ground or below ground that LESSEE placed upon the Premises, repair any damage caused by LESSEE or the Improvements, and surrender the Premises to COUNTY as required in Section 9.01 of the BSA.

At termination of this Lease for any reason, LESSEE shall execute, acknowledge, and deliver to COUNTY, within five (5) days after written COUNTY demand, a valid and recordable quitclaim deed covering all of the Premises.

If LESSEE fails or refuses to deliver the required deed, COUNTY may prepare and record a notice reciting LESSEE'S failure to execute this lease provision, and the notice will be conclusive evidence of the termination of this Lease and all LESSEE'S rights to the Premises.

4.4. COUNTY's Rights.

If LESSEE is in default under this Section 4, COUNTY may (but shall not be required to) enter upon the Premises, to perform such obligations on LESSEE's behalf and put the Premises and/or Improvements in good order, condition and repair, and the cost thereof, together with interest thereon at the maximum rate then allowable by law, shall become due and payable as Additional Rent to COUNTY with LESSEE's next Rent installment, provided, however, in the case of a non-emergency where no notice shall be required, COUNTY shall notify Lessee of COUNTY's intention to perform LESSEE's obligations at least ten (10) days prior to performing any work on LESSEE's behalf. If no Rent installment is due to COUNTY, such costs shall become due and payable within thirty (30) days from the date of COUNTY's invoice.

4.5. LESSEE's Obligations as to Landfill.

Except for LESSEE's obligations with regard to the Premises, the Improvements thereto and those areas utilized by LESSEE pursuant to this Lease and the BSA, LESSEE shall have no obligation to repair and maintain the Landfill located on the Property except as set forth in this Lease.

4.6. COUNTY's Obligations.

Subsequent to the Effective Date, COUNTY shall have no obligation to repair and maintain the Premises or the Improvements thereto and facilities placed thereon, except for damage to the extent caused by the COUNTY's negligence or willful misconduct: provided, however, that upon the Effective Date, the Premises shall be in a good condition suitable to LESSEE's intended use

and operations as contemplated herein. LESSEE expressly waives the benefit of any statute now or hereinafter in effect, which would otherwise afford LESSEE the right to make repairs at COUNTY's expense or to terminate this Lease because of COUNTY's failure to perform COUNTY's maintenance or repair obligations for the Premises as required under this Lease.

4.7. Security Measures.

LESSEE acknowledges that use of the Premises is non-exclusive and COUNTY and other third parties will have access to the Premises, provided such access shall not unreasonably interfere with LESSEE's operations. COUNTY shall have no obligation or responsibility to provide security for the Premises, the Improvements, or any of LESSEE's personnel or personal property at the Premises or the Property nor shall COUNTY be liable for any loss, damage, or injury to the Improvements or LESSEE's personnel or personal property thereon. In the event LESSEE desires to provide security at the Premises, LESSEE may do so at LESSEE's sole cost, provided that LESSEE shall obtain COUNTY's written approval prior to installing or implementing any security system, device, operation or plan. COUNTY's approval of any such security system, device, operation or plan is for COUNTY's operational and administrative purposes and shall not be deemed an approval of the adequacy of such system, device, operation or plan.

4.8. Utilities and Utility Installation

4.8.1. Installations. After obtaining COUNTY's written consent, LESSEE may extend any utility lines serving the Premises to the COUNTY approved points on the Premises. LESSEE may also install such distribution panels and equipment, meters and other facilities and equipment as may be reasonably required to connect to the utilities serving the Premises ("Utility Installations"). LESSEE agrees that all Utility Installations shall be constructed in accordance with provisions of this section and that LESSEE shall pay all costs associated with such Utility Installations, including but not limited to the extension and connection of said utilities. LESSEE shall pay for all water, gas, heat, light, power, telephone and other utilities and services supplied to the Premises, together with any taxes thereon. As additional consideration for this Lease, LESSEE agrees that all extended Utility Installations shall become the COUNTY's property upon completion of the extension work. LESSEE shall execute any documentation necessary to transfer the Utility Installations to the COUNTY. COUNTY shall not be required to reimburse LESSEE for the cost of any of the foregoing work.

4.8.2. Plans and Specifications. Prior to the commencement of any construction at the Premises, LESSEE shall provide COUNTY with a complete set of LESSEE's Final Improvement Plans, including but not limited to, Working Plans and Specifications for the proposed Improvements to the Premises and a proposed schedule for the construction of said Improvements. COUNTY's review of LESSEE's plans and specifications, as well as COUNTY's request for changes and/or consent to the construction of the proposed Improvements, shall not constitute a representation of the adequacy of the plans or specifications or expose COUNTY to any liability. LESSEE shall construct on the Premises, only those improvements shown on the Final Plans. Said Final Plans shall be the master plan for development of the Premises. All Improvements depicted on the Final Plan shall be constructed and completed within the time set forth on the construction schedule approved by the COUNTY. Upon the completion of the construction of the Improvements, LESSEE at its sole cost,

shall prepare as-built plans for the Improvements and shall give one (1) copy of each as-built plan to COUNTY.

4.9. Protection of Adjacent Property, Indemnity of the County.

LESSEE shall protect the Property against damage resulting from the performance of any work undertaken by LESSEE or by LESSEE affiliates or their employees, agents, contractors, invitees, sublessees, assignees, designees, principals, officers, consultants, vendors, suppliers, subcontractors, or representatives or anyone either directly or indirectly within LESSEE's control, excluding any damage caused by the willful or negligent act of COUNTY, and shall indemnify the COUNTY against all liens or liability in any way arising out of the performance of the work or the furnishing of labor, services, materials, supplies, equipment or power in connection therewith.

4.10. Costs of Construction

All costs of construction shall be the sole responsibility of LESSEE and shall be paid by LESSEE when due. LESSEE shall conduct any construction program in such a manner so that no mechanic's liens or materialmen's liens shall be asserted, or purportedly asserted, against the Premises or any improvements thereon. If any such lien shall be asserted, LESSEE shall indemnify, defend and hold harmless County and the Premises in accordance with Section 9 of this Lease.

4.11. Compliance with Laws

LESSEE shall not do or permit anything to be done in, on or about the Premises, or bring or keep anything in, on or about the Premises which will in any way conflict with any law, statute, ordinance or governmental rule or regulation now in force or which may hereafter be enacted or promulgated by any public authority. Lessee shall not cause or permit any hazardous material to be brought upon, kept or used in on or about the Premises or the Property by Lessee, its affiliates or their employees, agents, contractors, invitees, sublessees, assignees, designees, principals, officers, consultants, vendors, suppliers, subcontractors, or representatives or anyone either directly or indirectly within LESSEE's control.

Section 5. RENT

5.1. Rent

LESSEE shall pay to COUNTY as Rent for the use and occupancy of the Premises in advance on the first day of each quarter of the term of this Lease without deduction, offset, prior notice or demand, in lawful money of the United States, the following sums of money ("Base Rent"):

5.1.1. Commencing upon the Effective Date and continuing thereafter until termination of the Lease, the monthly Rent shall be ten thousand dollars (\$10,000), payable in quarterly installments of thirty thousand dollars (\$30,000).

5.1.2. If the BSA and the Lease are terminated during the Option and Construction Period as provided for in the BSA, the Rent will be prorated through the effective termination date.

5.2. Annual Base Rent Increase

The Rent shall be increased annually by two percent (2%), beginning on the first anniversary of the Commercial Operation Date and on each subsequent anniversary of the Commercial Operation Date throughout the Term.

5.3. Late Payment Fees and Interest

LESSEE acknowledges that late payment by LESSEE to COUNTY of Rent will cause COUNTY to incur costs not contemplated by this Lease and that the exact amount of such costs is extremely difficult and impracticable to fix. Such costs include, without limitation, administrative, processing, accounting, late charges and interest charges that may be imposed on COUNTY. Therefore, if COUNTY does not receive any installment of Rent due from LESSEE within fifteen (15) days after the date such Rent is due, LESSEE shall pay to COUNTY an additional sum of ten percent (10%) of the overdue Rent as a late charge. The parties agree this late charge represents a fair and reasonable estimate of the costs the COUNTY will incur by reason of late payment by LESSEE. Acceptance of any late charge shall not constitute a waiver of LESSEE's default with respect to the overdue amount, nor prevent COUNTY from exercising any of the other rights and remedies available to COUNTY, until such overdue Rent and any associated late charges are paid in full. Rent which is not paid when due shall bear simple interest from the due date at the rate of five hundredths percent (.05%) per day. **All late payments shall be made with certified funds and shall be credited in the following order: 1) to past due late charges, 2) to interest, 3) to the balance of the accrued Rent.**

5.4. Place and Method of Payment

All checks shall be made payable to: County of San Bernardino and shall be submitted to: County of San Bernardino, Department of Public Works, Solid Waste Management Division, 825 East Third Street, San Bernardino, CA 92415-0845 Attention: Fiscal – Room No.207. The Contract Number set forth on the cover page of this Lease is the account number for this Lease and must be noted on the front of the LESSEE's check. The Rent, late charges, interest and all other monetary obligations of LESSEE pursuant to this Lease shall be paid in lawful money of the United States. The COUNTY reserves the right to demand at any time that payment of Rent, late charges or interest be made with certified funds.

5.5. Utility Service Fees

Beginning on the Effective Date, LESSEE shall pay for water supply services to COUNTY, for all water provided to LESSEE by COUNTY. LESSEE shall provide, at its expense, a COUNTY-approved meter to monitor water consumption. The consumption data shall be provided quarterly thereafter with the landfill gas purchase statement. The water rate shall be reviewed quarterly and adjusted to match the water and sewer rate(s) paid by COUNTY.

Prior to the commencement of construction, LESSEE shall establish a separate meter and service account through Southern California Edison for the provision of all electrical power necessary for the performance of LESSEE's obligations under the BSA. LESSEE shall be solely responsible for the cost of establishing the meter and for payment of all electrical power utilized by LESSEE. The COUNTY agrees to reasonably assist LESSEE in obtaining such meter.

All utility payments due to the COUNTY shall be in addition to the Base Payment and Royalties described in Article V of the BSA

Section 6. Time is of Essence; Provisions Binding on Successors

Time is of the essence for all of the terms, covenants, and conditions of this Lease, and, except as otherwise provided herein, all of the terms, covenants, and conditions of this Lease shall apply to, benefit, and bind the successors and assigns of the respective parties, jointly and individually.

Section 7. Assignment and Subletting

7.1. County's Consent Required.

LESSEE shall not voluntarily or by operation of law, assign LESSEE's interest in this Lease, in the Premises or in any options contained in this Lease, nor sublease, all or any part of the Premises, nor allow any other person or entity (except LESSEE's authorized representatives) to occupy or use all or any part of the Premises, without first obtaining COUNTY's written consent, substantially in the form of Exhibit D attached hereto and incorporated herein by reference, and LESSEE's payment of the Minimum Assignment/Subletting Fee of \$10,000. Except as set forth below, LESSEE shall not encumber LESSEE's interest in this Lease or the Premises. Any assignment, sublease or encumbrance without COUNTY's consent shall be voidable and, at COUNTY's election, shall constitute a default under this Lease. COUNTY's consent to any assignment, sublease or encumbrance shall not constitute a waiver of COUNTY's right to require consent to any subsequent assignment or sublease. For the purposes of this paragraph, the following events shall be deemed to be an assignment requiring COUNTY's prior written consent:

7.1.1. If LESSEE is a partnership, a withdrawal or change, voluntary, involuntary, or by operation of law, of any partner, or the dissolution of the partnership, will be deemed a voluntary assignment.

7.1.2. If LESSEE consists of more than one person, a purported assignment, voluntary, involuntary, or by operation of law, from one person to any other will be deemed a voluntary assignment.

7.1.3. If LESSEE is a corporation, any dissolution, merger, consolidation, or other reorganization of LESSEE, or the sale or other transfer of a controlling percentage of the capital stock of LESSEE, or the sale of more than fifty percent (50%) of the value of the assets of LESSEE, will be deemed a voluntary assignment. The phrase "controlling percentage" means the ownership of and the right to vote stock possessing more than fifty percent (50%) of the total combined voting power of all classes of LESSEE's capital stock issued, outstanding, and entitled to vote for the

election of directors. This paragraph will not apply to corporations the stock of which is traded through an exchange or over the counter.

7.1.4. If LESSEE is a limited liability company, any change in the “controlling membership” following the Effective Date shall be deemed a voluntary assignment. The phrase “controlling percentage” means the ownership of more than (50%) of the LLC.

7.1.5. The transfer, on a cumulative basis, of fifty percent (50%) or more of the voting control of LESSEE shall constitute an assignment requiring COUNTY’s consent; and the involvement of LESSEE or LESSEE’s assets in any transaction, or series of transactions (whether by way of merger, sale, acquisition, financing, transfer, or otherwise) which results or which will result in a reduction of a LESSEE’s Net Worth, (as hereinafter defined), by an amount equal to or greater than twenty-five percent (25%) of LESSEE’s Net Worth as of the Effective Date, or as of the date of the most recent assignment to which COUNTY has consented, or which exists immediately prior to said transaction or transactions, shall be considered an assignment of this Lease by LESSEE and requiring COUNTY’s consent. For the purposes of this Lease, the term “Net Worth” shall be the Net Worth of LESSEE established under generally accepted accounting principles consistently applied.

7.2. Terms and Conditions Applicable To Assignment and Subletting.

The following provisions shall apply to any sublease or assignment pursuant to this Lease:

7.2.1. Irrespective of COUNTY’s consent, any assignment or sublease shall not: (i) be effective without the express written assumption by such assignee or sublessee of all of LESSEE’s obligations under this Lease; (ii) release LESSEE of any of its obligations hereunder; nor (iii) alter the primary liability of LESSEE for the payment of the Base Rent, Water & Sewer Charges, Fees, and other sums due COUNTY pursuant to this Lease or for the performance of any of LESSEE’s other obligations under this Lease and the BSA.

7.2.2. Each request for consent to an assignment or sublease shall be in writing, and shall be accompanied by the following: (i) an assignment or sublease agreement in a form acceptable to the COUNTY, (ii) a certification by LESSEE of all rents or consideration to be paid to LESSEE by the assignee or sublessee, (iii) a current credit report of the assignee or sublessee, including credits reports for each of its principals, (iv) the three most recent years of financial statements of the proposed assignee or sublessee and, (v) information related to the responsibility and appropriateness of the proposed assignee or sublessee to operate a hydrogen production system. LESSEE agrees to pay the Minimum Assignment/Subletting Fee as stated in the Reference Pages and all other costs incurred by COUNTY in reviewing LESSEE’s request and to provide COUNTY with such other and/or additional information and/or documentation as COUNTY may reasonably require in connection with LESSEE’s request.

7.2.3. Without limiting the other instances in which it may be reasonable for COUNTY to withhold its consent to an assignment or sublease request, it shall be deemed reasonable for COUNTY to withhold its consent if any one or more of the following conditions exist: (i) LESSEE is in default of the Lease at the time consent is requested; (ii) the net worth of the proposed assignee or sublessee at the time consent is requested is not at least as great as the net worth of the LESSEE

as existed at the initial Effective Date of the Lease; (iii) the creditworthiness of the proposed assignee or sublessee at the time consent is requested is not at least as good as the creditworthiness of the LESSEE as existed at the initial Effective Date of the Lease; (iv) the proposed assignee or sublessee does not have the financial strength, stability, nor ability to perform all obligations of LESSEE under this Lease; (v) the years and type of business experience of the proposed transferee at the time consent is requested is not as great as years and type of business experience as the LESSEE as of the date consent is requested; or (vi) the proposed assignee or sublessee is in default of any lease, license, permit, use or other agreement between said proposed assignee or sublessee and COUNTY at the time consent is requested or has a history of defaults or violations with the COUNTY at the time consent is requested. The burden of demonstrating to the County's satisfaction that any one or more of the foregoing conditions do not exist shall be on LESSEE.

7.3. Assignment of Rents.

LESSEE irrevocably assigns to COUNTY, as security for LESSEE's obligations under this Lease, all rent due LESSEE from any subletting of all or a part of the Premises pursuant to this Lease to the extent same is equal to amounts owed COUNTY by LESSEE herein, and COUNTY, as assignee and as attorney-in-fact for LESSEE, may collect such rent and apply it toward LESSEE's obligations under this Lease, except that until the occurrence of a Default by LESSEE, LESSEE shall have the right to collect such rent.

7.4. Encumbrance

As part of the construction of any improvements at the Premises, subsequent to the Effective Date, LESSEE may encumber its leasehold interest in the Premises to a Lender furnishing construction financing to LESSEE (or permanent financing to reimburse LESSEE for the costs of construction), provided that COUNTY has consented to such encumbrance by executing a Consent of Hypothecation (the "COUNTY Consent"). The COUNTY Consent shall be in the form attached hereto as Exhibit D, Form of COUNTY Consent of Hypothecation. The term "Approved Encumbrance" shall mean an encumbrance approved by the COUNTY by way of COUNTY Consent. The term "Lender" shall mean the owner and holder of an Approved Encumbrance.

7.4.1. Upon default by LESSEE under any of the terms of an Approved Encumbrance, the Lender may exercise any rights provided in such Approved Encumbrance, provided that before any sale of LESSEE's leasehold interest, whether under power of sale or foreclosure, the Lender shall give to COUNTY notice of the same character and duration as is required to be given to LESSEE by the terms of the encumbrance or the laws of the State of California.

7.4.2. If any default shall continue after the giving of such notice, COUNTY, prior to sale of the leasehold, shall have the right (but not the obligation) to correct such default and initiate an action under Section 8.1, to terminate this Lease. At COUNTY's option, COUNTY may pay to Lender an agreed amount or the amount of principal, accrued interest and other charges which remain unpaid upon any termination pursuant to this Section in exchange for deed of clear title.

7.4.3. If a sale or foreclosure under an Approved Encumbrance occurs or if the Lender acquires the property by assignment in lieu of foreclosure, said purchaser or assignee, as a successor in interest to LESSEE, will be bound by all the terms of this Lease and will assume all the obligations

of LESSEE hereunder. Any acquisition of the leasehold interest by a party other than Lender (whether by purchase at judicial foreclosure proceedings, trustee's sale, or upon assignment from Lender) shall be subject to COUNTY's written approval, which approval shall not be unreasonably withheld, provided that (a) the proposed transferee's overall financial position is substantially as strong as LESSEE's financial position as of the Effective Date and (b) the proposed transferee's experience and expertise with biogas purification systems is equal to or greater than that of LESSEE.

7.4.4. Any other terms applicable to any Approved Encumbrance which are acceptable to COUNTY and which are to be part of this Lease shall be attached to this Lease as Exhibit F, Additional Lender Terms.

Section 8. Defaults and Remedies

8.1. Defaults.

A Default by LESSEE shall refer to any failure by LESSEE to observe, comply with or perform any of the terms, covenants, conditions or rules applicable to LESSEE under this Lease. The term "Breach" shall refer to the occurrence of any one or more of the following Defaults, and, where a grace period for cure after notice is specified herein and only after applicable cure periods and mortgagee, lender or beneficiary rights have been exhausted as referred to in Section 13.01 of the BSA, the failure of LESSEE to cure such Default prior to the expiration of the applicable grace period:

8.1.1. The abandonment of the Premises by LESSEE as defined by California Civil Code §1951.3;

8.1.2. The failure by LESSEE to make any payment of Rent or any other payment required to be made by LESSEE hereunder, as and when due, the failure of LESSEE to provide COUNTY with reasonable evidence of insurance or surety bond required under this Lease, or LESSEE's failure to fulfill any obligation under this Lease which endangers or threatens life or property, where such failure continues for a period of three (3) days, or such reasonable time as determine by COUNTY following written notice thereof by or on behalf of COUNTY to LESSEE. In the event County serves LESSEE with a Notice to Pay Rent or Quit pursuant to applicable Unlawful Detainer statutes, such Notice to Pay Rent or Quit shall also constitute the notice required by this subsection;

8.1.3. The making by LESSEE of any general arrangement or assignment for the benefit of creditors; LESSEE's becoming a "debtor" as defined in 11 U.S.C. §101 or any successor statute thereto (unless, in the case of a petition filed against LESSEE, the same is dismissed within sixty (60) days); the appointment of a bankruptcy trustee or receiver to take possession of all or substantially all of LESSEE's assets located at or on the Premises or of LESSEE's interest in this Lease where possession is not restored to LESSEE within thirty (30) days; or the attachment, execution or other judicial seizure of all or substantially all of LESSEE's assets located at or on the Premises or of LESSEE's interest in this Lease, where such seizure is not discharged within thirty (30) days.

8.1.4. The assignment of the Lease or the sublet of the Premises in violation of Section 7 of the Lease.

8.1.5. The failure of LESSEE to comply with any provision in Section 2 of this Lease, including but not limited to loss or failure to satisfy any condition of any site development, use permit, and construction, or other authorization required by the State, County or other governmental agency having jurisdiction, necessary for construction of the Improvements and/or the operation of the Premises as a biogas purification system.

8.1.6. The failure by LESSEE to continuously operate the Premises as a renewable hydrogen production system, except in the event of a Force Majeure or anticipated and scheduled periods of shutdown or inactivity, or for reasonable maintenance, or as caused by the acts or omissions of COUNTY.

8.1.7. The failure by LESSEE to observe or perform any other terms, covenants, conditions or provisions of this Lease (except as set forth in Sections 8.1.1 through 8.1.6) or the BSA in any material respect to be observed or performed by LESSEE where such failure shall continue for a period of forty-five (45) days after written notice thereof from COUNTY to LESSEE; provided, however, that if the nature of the LESSEE's default is such that more than forty-five (45) days are reasonably required for its cure, then LESSEE shall not be deemed to be in default, if LESSEE commenced such cure within said forty-five (45) day period and thereafter diligently prosecutes such cure to completion.

8.1.8. The discovery by COUNTY that any financial statement of LESSEE or of any assignee given to COUNTY by LESSEE or any assignee was materially false.

8.1.9. A default by LESSEE as to the terms of any approved encumbrance, where such Default continues for a period of forty-five (45) days after written notice thereof by or on behalf of COUNTY.

8.2. Remedies

8.2.1. Other than as provided in Section 8.2.2, if LESSEE fails to perform any affirmative duty or obligation of LESSEE under this Lease, within ten (10) days after written notice to LESSEE (or in case of an emergency, without notice), COUNTY may at its option (but without obligation to do so), perform such duty or obligation on LESSEE's behalf, including, but not limited to, the obtaining of reasonably required, insurance policies, or governmental licenses, permits or approvals. The reasonable costs and expenses of any such performance by COUNTY shall be due and payable by LESSEE to COUNTY within ten (10) days of COUNTY's demand.

8.2.2. In the event of any material default or breach by LESSEE which is not cured pursuant to this Section, COUNTY may at any time thereafter, and without limiting COUNTY in the exercise of any right or remedy which COUNTY may have by reason of such default or breach:

8.2.3. Terminate LESSEE's right to possession of the Premises by any lawful means, but only after applicable cure periods and mortgagee, lender or beneficiary rights have been exhausted as referred to in Section 13.01 of the Landfill Gas Sale and Purchase Agreement, in which case this Lease shall terminate and LESSEE shall immediately surrender possession of the Premises to COUNTY in accordance with Section 9.01 of the BSA. In such event, COUNTY shall be entitled to recover from LESSEE all damages incurred by COUNTY by reason of LESSEE's default including, but not limited to, the cost of recovering possession of the Premises, expenses of reletting, including

necessary renovations and alteration of the Premises, reasonable attorney's fees, and the worth at the time of the award of the unpaid Rent that had been earned at the time of termination of this Lease.

8.2.4. Maintain LESSEE's right to possession, in which case this Lease shall continue in effect whether or not LESSEE shall have abandoned the Premises. In such event, COUNTY shall be entitled to enforce all of COUNTY's rights and remedies under this Lease, including the right to recover Rent as it becomes due hereunder.

8.2.5. Pursue any other remedy now or hereafter available to COUNTY under the laws or judicial decisions of the State of California.

8.3. Survival of Indemnity Provisions.

The expiration or termination of this Lease and/or the termination of LESSEE's right to possession shall not relieve LESSEE from liability under any indemnity provisions of this Lease or the BSA as to matters occurring or accruing during the Term or by reason of LESSEE's occupancy of the Premises.

8.4. No Waiver by County.

COUNTY's receipt of any rent or of any other sum of money paid by LESSEE after the termination and forfeiture of this Lease, or after the giving by COUNTY of any notice to effect such termination, shall not waive the Default, reinstate, continue or extend the Term of this Lease, or destroy or impair the efficacy of COUNTY's notice of termination, unless otherwise agreed in writing by COUNTY. COUNTY's acceptance of the keys to the Premises or any other act of the COUNTY or its agents or employees during the Term of this Lease shall not be deemed to be an acceptance or a surrender of the Premises, unless otherwise agreed in writing by COUNTY.

8.5. No Relief from Forfeiture After Default.

LESSEE waives all rights of redemption or relief from forfeiture under California Code of Civil Procedure sections 1174 and 1179, and any other present or future law, in the event LESSEE is evicted or COUNTY otherwise lawfully takes possession of the Premises by reason of any default or breach of this Lease by LESSEE.

Section 9. INDEMNIFICATION AND INSURANCE

9.1. Indemnification

The LESSEE agrees to indemnify, defend (with counsel reasonably approved by COUNTY) and hold harmless the COUNTY and its authorized officers, employees, agents and volunteers from any and all claims, actions, losses, damages and/or liability arising out of this Lease from any cause whatsoever, including the acts, errors or omissions of any person and for any costs or expenses incurred by the COUNTY on account of any claim except where such indemnification is prohibited by law. This indemnification provision shall apply regardless of the existence or degree of fault of indemnities. The LESSEE indemnification obligation applies to the COUNTY's "active" as well as "passive" negligence but does not apply to the COUNTY's "sole negligence" or "willful misconduct" within the meaning of Civil Code section 2782.

The rights to indemnification set forth in this Section are not intended to be exclusive of any other right or remedy otherwise available. All rights hereunder shall be cumulative and in addition to all other rights and remedies.

9.2. Insurance

9.2.1. Additional Insured

All policies, except for Worker's Compensation, Errors and Omissions and Professional Liability policies shall contain additional endorsements naming the COUNTY and its officers, employees, agents and volunteers as additional named insured with respect to liabilities arising out of the performance of services hereunder. The additional insured endorsements shall not limit the scope of coverage for the COUNTY to vicarious liability but shall allow coverage for the COUNTY to the full extent provided by the policy. Such additional insured coverage shall be at least as broad as Additional Insured (Form B) endorsement form ISO, CG 2010.11 85.

9.2.2. Waiver of Subrogation Rights

The LESSEE shall require the carriers of required coverages to waive all rights of subrogation against the County, its officers, employees, agents, volunteers, contractors and subcontractors. All general or auto liability insurance coverage provided shall not prohibit the LESSEE and LESSEE's employees or agents from waiving the right of subrogation prior to a loss or claim. The LESSEE hereby waives all rights of subrogation against the COUNTY.

9.2.3. Policies Primary and Non-Contributory

All policies required herein are to be primary and non-contributory with any insurance or self-insurance programs carried or administered by the COUNTY.

9.2.4. Severability of Interests

The LESSEE agrees to ensure that coverage provided to meet these requirements is applicable separately to each insured and there will be no cross liability exclusions that preclude coverage for suits between the LESSEE and the COUNTY or between the COUNTY and any other insured or additional insured under the policy.

9.2.5. Proof of Coverage

The LESSEE shall furnish Certificates of Insurance and additional endorsements to the COUNTY evidencing the insurance coverage at the time the Lease is executed shall be provided prior to the commencement of performance of services hereunder, which certificates and endorsements shall provide that such insurance shall not be terminated or expire without thirty (30) days written notice to the COUNTY, and LESSEE shall maintain such insurance from the Effective Date to the termination of the Lease. Within fifteen (15) days of the commencement of this Lease, the LESSEE shall furnish a copy of the Declaration page for all applicable policies and will provide complete certified copies of the policies and endorsements immediately upon request.

9.2.6. Acceptability of Insurance Carrier

Unless otherwise approved by Risk Management, insurance shall be written by insurers authorized to do business in the State of California and with a minimum “Best” Insurance Guide rating of “A- VII”.

9.2.7. Deductibles and Self-Insured Retention

Any and all deductibles or self-insured retentions in excess of \$10,000 shall be declared to and approved by Risk Management.

9.2.8. Failure to Procure Coverage

In the event that any policy of insurance required under this Lease does not comply with the requirements, is not procured, or is canceled and not replaced, the COUNTY has the right but not the obligation or duty to cancel the Lease, but only after applicable cure periods and mortgagee, lender or beneficiary rights have been exhausted as referred to in Section 13.01 of the Landfill Gas Sale and Purchase Agreement or obtain insurance if it deems necessary and any premiums paid by the COUNTY will be promptly reimbursed by the LESSEE.

9.2.9. Insurance Review

Insurance requirements are subject to periodic review by the COUNTY. The Director of Risk Management or designee is authorized, but not required, to reduce, waive or suspend any insurance requirements whenever Risk Management determines that any of the required insurance is not available, is unreasonably priced, or is not needed to protect the interests of the COUNTY. In addition, if the Department of Risk Management determines that heretofore unreasonably priced or unavailable types of insurance coverage or coverage limits become reasonably priced or available, the Director of Risk Management or designee is authorized, but not required, to change the above insurance requirements to require additional types of insurance coverage or higher coverage limits, provided that any such change is reasonable in light of past claims against the COUNTY, inflation, or any other item reasonably related to the COUNTY’S risk .

Any change requiring additional types of insurance coverage or higher coverage limits must be made by amendment to this Lease. LESSEE agrees to execute any such amendment within thirty (30) days of receipt.

Any failure, actual or alleged, on the part of the COUNTY to monitor or enforce compliance with any of the insurance and indemnification requirements will not be deemed as a waiver of any rights on the part of the COUNTY.

9.2.10. Coverages.

The LESSEE agrees to provide insurance set forth in accordance with the requirements herein. If the LESSEE uses existing coverage to comply with these requirements and that coverage does not meet the specified requirements, the LESSEE agrees to amend, supplement or endorse the existing coverage to do so.

9.2.11. Types of Insurance.

Without in anyway affecting the indemnity herein provided and in addition thereto, the LESSEE shall secure and maintain throughout the Lease term the following types of insurance with limits as shown:

9.2.12. Workers' Compensation/Employer's Liability

A program of Workers' Compensation insurance or a state-approved, self-insurance program in an amount and form to meet all applicable requirements of the Labor Code of the State of California, including Employer's Liability with \$1,000,000 limits covering all persons including volunteers providing services on behalf of the LESSEE and all risks to such persons under this Lease.

If LESSEE has no employees, it may certify or warrant to the COUNTY that it does not currently have any employees or individuals who are defined as "employees" under the Labor Code and the requirement for Workers' Compensation coverage will be waived by the COUNTY's Director of Risk Management.

9.2.13. Commercial/General Liability Insurance

The LESSEE shall carry General Liability Insurance covering all operations performed by or on behalf of the LESSEE providing coverage for bodily injury and property damage with a combined single limit of not less than one million dollars (\$1,000,000), per occurrence. The policy coverage shall include:

- a) Premises operations and mobile equipment.
- b) Products and completed operations.
- c) Broad form property damage (including completed operations).
- d) Explosion, collapse and underground hazards.
- e) Personal injury.
- f) Contractual liability.
- g) \$2,000,000 general aggregate limit.

9.2.14. Automobile Liability Insurance

Primary insurance coverage shall be written on ISO Business Auto coverage form for all owned, hired and non-owned automobiles or symbol 1 (any auto). The policy shall have a combined single limit of not less than one million dollars (\$1,000,000) for bodily injury and property damage, per occurrence.

If the LESSEE is transporting one or more non-employee passengers in performance of the Lease obligations, the automobile liability policy shall have a combined single limit of two million dollars (\$2,000,000) for bodily injury and property damage per occurrence.

If the LESSEE owns no autos, a non-owned auto endorsement to the General Liability policy described above is acceptable.

9.2.15. Umbrella Liability Insurance

An umbrella (over primary) or excess policy may be used to comply with limits or other primary coverage requirements. When used, the umbrella policy shall apply to bodily injury/property damage, personal injury/advertising injury and shall include a “dropdown” provision providing primary coverage for any liability not covered by the primary policy. The coverage shall also apply to automobile liability.

9.2.16. Professional Liability

Professional Liability Insurance with limits of not less than one million (\$1,000,000) per claim and two million (\$2,000,000) aggregate limits

or

Errors and Omissions Liability Insurance – Errors and Omissions Liability Insurance with limits of not less than one million (\$1,000,000) and two million (\$2,000,000) aggregate limits

If insurance coverage is provided on a “claims made” policy, the “retroactive date” shall be shown and must be before the Effective Date of the Lease. The claims made insurance shall be maintained or “tail” coverage provided for a minimum of five (5) years after Lease completion.

9.2.17. Environmental Contracts

- a. Environmental Liability Insurance with a combined single limit of not less than five million (\$5,000,000) per claim or occurrence and a separate aggregate for the Lease. The required additional insured endorsement shall protect the COUNTY without any restrictions.
- b. If insurance coverage is provided on a “claims made” policy, the “retroactive date” shall be shown and must be before the date of the start of the Lease. The claims made insurance shall be maintained or “tail” coverage provided for a minimum of five (5) years after contract completion.

9.2.18. Real Property Insurance.

Coverage for all improvements (whether built by LESSEE or COUNTY) against loss or damage by fire, lightning, vandalism, malicious mischief or earthquake, in an amount equal to the full replacement value of such improvements. If the improvements at the Premises are owned by

COUNTY or COUNTY and LESSEE, any loss payable under such policies shall be paid to COUNTY. If the improvements at the Premises are owned exclusively by LESSEE, then LESSEE, or LESSEE's lender, if applicable, shall be the loss payee on such policies. All proceeds from any loss covered by said policy shall first be used to repair and restore the improvements at the Premises. COUNTY shall have discretion not to restore any COUNTY-owned improvements if cost of repair is greater than 60% of the most recent appraisal value of the Leased Premises or where all of the improvements are 60% or more destroyed or made unusable and irreparable. COUNTY has the right, in all instances, to all insurance proceeds.

9.2.19. Contents Insurance.

Fire insurance with limits adequate to cover full cash value of LESSEE's personal property at the Premises.

9.2.20. Special Insurance Requirements.

In addition to the insurance requirements set forth hereinabove, LESSEE shall maintain the following types of insurance with the following minimum limits, if applicable to LESSEE's use of the Premises:

If LESSEE constructs any improvements on or about the Premises, LESSEE shall, provide or cause LESSEE's contractor or subcontractors to furnish Builders All-Risk Insurance covering the entire improvements against loss or damage from the commencement of construction until completion. The Builder's All-Risk Insurance shall be in an amount for the replacement value of the subject improvements and endorsed for broad form property damage, breach of warranty, and explosions, collapse, and underground hazards. The Deductible amount on the Builder's All-Risk Insurance shall not exceed five percent (5%) of the construction cost.

Section 10. IMPROVEMENTS/ALTERATIONS/REPAIRS

10.1. Acceptance of Premises

LESSEE represents and warrants that it has independently inspected the Premises and made all tests, investigations, and observations necessary to satisfy itself of the condition of the Premises. LESSEE agrees it is relying solely on such independent inspection, tests, investigations, and observations in making this Lease. LESSEE further acknowledges that the Premises are in the condition called for by this Lease, except as otherwise provided in the BSA. The Premises shall be deemed accepted by LESSEE upon any entry onto the Premises or use of the Premises by LESSEE following the effective date of this Lease.

10.2. Condition; Use of Premises

COUNTY makes no warranty or representation of any kind concerning the condition of the Premises, or the fitness of the Premises for the use intended by LESSEE, except as explicitly provided herein or in the BSA, and hereby disclaims any personal knowledge with respect thereto, it being expressly understood by the parties that LESSE has personally inspected the Premises, knows its condition, finds it fit for LESSEE's intended use, accepts it as is and has ascertained that it can be used for the limited purposes specified in Section 2.3. Notwithstanding the foregoing,

COUNTY hereby discloses and LESSEE acknowledges that the Property contains solid waste which has resulted in certain volatile organic compounds (VOCs) emanating from the land. For additional information, refer to the "Colton Sanitary Landfill Proposed Corrective Action Plan, M&RP 91-39, October 30, 1991", included as Exhibit E to this Landfill Site Lease.

10.3. Entry and Inspection

COUNTY reserves and shall always have the right, but not the obligation, to enter the Premises for the purpose of viewing and ascertaining the condition of the same, or to protect its interests in the Premises, or to inspect the operations conducted thereon. In the event that such entry or inspection by COUNTY discloses that the Premises are not in a decent, safe, healthy, and sanitary condition, COUNTY shall have the right, after ten (10) days written notice to LESSEE, to have any necessary maintenance work done at the expense of LESSEE, and LESSEE hereby agrees to pay promptly any and all costs incurred by COUNTY in having such necessary maintenance work done, in order to keep the Premises in a decent, safe, healthy, and sanitary condition. Further, if at any time COUNTY determines that the Premises are not in a decent, safe, healthy, and sanitary condition, COUNTY may at its sole option, without additional notice, require LESSEE to file with COUNTY a faithful performance bond to assure prompt correction of any condition which is not decent, safe, healthy, and sanitary. Said bond shall be in an amount adequate in the opinion of COUNTY to correct the said unsatisfactory condition. LESSEE shall pay the cost of said bond. The rights reserved in this section shall not create any obligations on COUNTY or increase obligations elsewhere in this Lease imposed on COUNTY.

10.4. Improvements/Alterations

No improvements, structures, or installations shall be constructed on, in, around, or under the Premises, and may not be altered by LESSEE except as authorized in the Lease or the BSA.

Section 11. Liens

LESSEE shall pay for all labor done or materials furnished in the construction, installation, repair, inspection, operation, maintenance, removal, or any other activity related to the Improvements at the Premises by LESSEE and shall keep the Improvements and Premises and LESSEE's possessory interest therein free and clear of any lien or encumbrance of any kind whatsoever created by LESSEE's act or omission, except to the extent permitted herein or in the BSA.

LESSEE shall pay, when due, all claims for labor or materials furnished or alleged to have been furnished to or for Lessee at or for use on the Premises, and shall not permit any mechanic or material lien to be filed against the Premises or any interest therein. LESSEE shall give COUNTY not less than ten (10) days written notice prior to the commencement of any work on the Premises, and COUNTY shall have the right to post notices of non-responsibility in or on the Premises as provided by law.

LESSEE shall at all times indemnify, defend, and save the COUNTY harmless from all claims, losses, demands, damages, costs, expenses, or liability related to labor or materials for construction, repair, alteration, or installation of structures, improvements, equipment, or facilities within the Site and/or Landfill by or at the direction of the LESSEE, and from the cost of defending

against such claims, including attorneys' fees and costs, but only to the extent not related to the County's negligence or willful misconduct.

If COUNTY shall require, LESSEE shall furnish to COUNTY a surety bond satisfactory to COUNTY in an amount equal to such contested lien, claim or demand indemnifying COUNTY against liability for the same and holding the Premises free from the effect of such lien or claim. In addition, COUNTY may require LESSEE to pay COUNTY's attorney's fees and costs in participating in such action if COUNTY shall reasonably decide it is in its best interest to do so.

During the Term, COUNTY shall not cause any liens or other encumbrances to be placed, or permit its contractors, agents, licensees, other tenants, employees, representatives or any other third party under COUNTY's control to place any liens or other encumbrances against the Improvements.

Section 12. Taxes

12.1. Personal Property.

LESSEE shall pay prior to delinquency all taxes, license fees and public charges assessed or levied against LESSEE or LESSEE's estate in this Lease or LESSEE's improvements, trade fixtures, furnishings, equipment and other personal property.

12.2. Real Property.

LESSEE shall pay LESSEE's share of all real property taxes (as defined in Section 12.4 below) which become due and payable to COUNTY on or before the later of ten (10) days prior to the delinquency thereof, or three (3) days after the date on which LESSEE receives a copy of the tax bill and notice of COUNTY's determination hereunder. LESSEE's liability to pay real property taxes shall be prorated on the basis of a three hundred sixty-five-(365) day year to account for any fraction or portion of a tax year included in the Lease term at the commencement or expiration of the Lease.

12.3. Possessory Interest

LESSEE specifically acknowledges it is familiar with Section 107.6 of the California Revenue and Taxation Code, realizes that a possessory interest subject to property taxes may be created, agrees to pay any such tax, and hereby waives any rights LESSEE may have under said California Revenue and Taxation Code 107.6.

12.4. Definition.

The term "real property taxes" as used herein shall mean:

12.4.1. All taxes, assessments, levies and other charges, general and special, foreseen and unforeseen, now or hereafter imposed by any governmental or quasi-governmental authority or special district having the direct or indirect power to tax or levy assessments, which are levied or assessed against or with respect to (i) value, occupancy, use or possession of the Premises and/or the Improvements, (ii) any improvements, fixtures, equipment and other real

or personal property of LESSEE that are an integral part of the Premises, (iii) use of the Premises, Improvements, public utilities or energy within the Premises;

12.4.2. All charges, levies or fees imposed by reason of environmental regulation or other governmental control of the premises and/or the Improvements;

12.4.3. New excise, transaction, sales, privilege or other taxes now or hereafter imposed upon Lessee as a result of this Lease; and

12.4.4. All costs and fees (including attorney's fees) incurred by LESSEE in contesting any real property taxes and in negotiating with public authorities as to any real property taxes affecting the Premises.

If at any time during the Term, the taxation or assessment of the Premises and/or the Improvements prevailing as of the commencement of this Lease shall be altered, then any such tax or charge, however designated, shall be included within the meaning of the term "real property taxes." If any real property taxes are based upon property or Rents unrelated to the Premises and/or the Improvements, then only that part of such tax that is fairly allocable to the Premises and/or the Improvements, as determined by the COUNTY, on the basis of the assessor's worksheets or other available information, shall be included within the meaning of the term "real property taxes."

12.5. Ownership of Improvements and Personal Property

Notwithstanding anything to the contrary contained in this Lease, title to the Improvements shall be held by LESSEE and all of the Improvements shall remain the property of LESSEE and are not fixtures. The COUNTY acknowledges that LESSEE may enter into financing arrangements including promissory notes and financial and security agreements for the financing of the Improvements with a third party financing entity and may in the future enter into additional financing arrangements with other financing entities. In connection therewith, wherein the Improvements may be collateral ("Collateral") for such financing arrangements; in which case, the COUNTY, subject to prior written approval, (i) consents to the installation of the Collateral to the extent that the Collateral is part of the approved Improvements; (ii) disclaims any interest in the Collateral, as fixtures or otherwise; and (iii) agrees that the Collateral shall be exempt from execution, foreclosure, sale, levy, attachment, or distress for any Rent due or to become due and that such Collateral may be removed at any time without recourse to legal proceedings. COUNTY may require the LESSEE, at its sole cost, to remove, at any time, all or any part of any alterations or improvements made without COUNTY's consent.

12.6. Unavoidable Delay

If the performance of any act required of COUNTY or LESSEE is directly prevented or delayed by reason of strikes, lockouts, labor disputes, unusual governmental delays, acts of God, fire, floods, epidemics, freight embargoes, or other causes beyond the reasonable control of the party required to perform an act, said party shall be excused from performing that act for the period equal to the period of the prevention or delay; provided, however, this provision shall not apply to obligations to make payments as required pursuant to this Lease. In the event LESSEE or COUNTY claims the existence of such a delay, the party claiming the delay shall notify the other party in writing of such fact within ten (10) days after the beginning of any such claimed delay.

12.7. Lessee Improvements

LESSEE plans to improve the Premises as a renewable hydrogen production system in accordance with approvals by COUNTY and receipt of all applicable governing permits as described in the BSA. Failure by LESSEE to comply with the requirements of the BSA shall constitute a major default and subject this Lease to termination by COUNTY subject to the default remedies as reflected in Section 8 and applicable cure provisions herein and within the BSA.

Section 13. HAZARDOUS/TOXIC WASTE

13.1. Definitions.

The following terms shall have the meanings set forth in this paragraph:

13.1.1. Applicable Requirements shall mean all laws, rules, regulations, ordinances, directives, covenants, easements and restrictions of record, permits, the requirements of any applicable fire insurance underwriter or rating bureau, and the recommendations of COUNTY's engineers and/or consultants, relating in any manner to the Premises now in effect or which may hereafter come into effect.

13.1.2. Hazardous Substance shall mean any product, substance, chemical, material or waste whose presence, nature, quantity and/or intensity of existence, use, manufacture, disposal, transportation, spill, release or effect, either by itself or in combination with other materials expected to be on the Premises, is either: (i) potentially injurious to the public health, safety or welfare, or the environment, the Premises; (ii) regulated or monitored by any governmental authority; or (iii) a basis for potential liability of COUNTY to any governmental agency or third party under any Applicable requirements or common law theory. Hazardous Substance shall include, but not be limited to fuel, hydrocarbons, petroleum products, gasoline, crude oil or any products or by-products thereof.

13.1.3. Reportable Use shall mean the installation or use of any above or below ground (i) storage tank; (ii) the generation, possession, storage, use, transportation, or disposal of a Hazardous Substance that requires a permit from, or with respect to which a report, notice, registration or business plan is required to be filed with, any governmental authority; and (iii) the presence in, on, under or about the Premises of a Hazardous Substance with respect to which any Applicable Requirements require that a notice be given to persons entering or occupying the Premises or neighboring properties.

13.2. LESSEE's Covenants.

From and after the Lease Effective Date, LESSEE, at its sole cost, shall comply with any and all the Applicable Requirements with respect to Hazardous Substances, including but not limited to the following: (i) California Health & Safety Code, Division 20, Chapters 6.5, Hazardous Waste Control (inclusive); 6.7, Underground Storage of Hazardous Substances existing on the Premises, (inclusive); and 6.95, Hazardous Materials Release Response Plans and Inventory (inclusive); (ii) California Code of Regulations Title 22, Division 4.5; Title 23, Division 3, Chapter 16, Underground Storage Tank Regulations; and (iii) Title 2, Division 3, entitled "Fire Protection and Explosives and Hazardous Materials", and Title 3, Division 3, Chapter 8, entitled "Waste

Management” of the San Bernardino County Code. LESSEE shall not engage in any activity in, on, under or about the Premises which constitutes a Reportable Use of Hazardous Substances without the express prior written consent of COUNTY, in its sole discretion, or as required or allowed pursuant to the terms of the BSA and compliance in a timely manner (at LESSEE’s sole cost and expense) with all Applicable Requirements. Notwithstanding the foregoing, LESSEE may, without COUNTY’s prior consent, but upon notice to COUNTY and in compliance with all Applicable Requirements, use any ordinary and customary materials reasonably required to be used by LESSEE in the normal course of operating a biogas purification system, so long as such use is not a Reportable Use and does not expose the Premises or neighboring properties to any meaningful risk of contamination or damage or expose COUNTY to any liability therefore, except as required or allowed pursuant to the terms of the BSA. COUNTY may (but without any obligation to do so) condition its consent to any Reportable Use of any Hazardous Substance by LESSEE upon LESSEE’s giving COUNTY such additional assurances as COUNTY, in the reasonable discretion of the COUNTY’s Director of Risk Management, deems necessary to protect itself, the public, the Premises, and the environment against damage, contamination or injury and/or liability therefore, including, but not limited to, the installation (and, at COUNTY’s option, and LESSEE’s sole cost and expense) of reasonably necessary protective modifications to the Premises. LESSEE shall not cause or permit any Hazardous Substance to be spilled or released in, on, under or about the Premises (including, without limitation, through the plumbing or sanitary sewer system), except as required or allowed pursuant to the terms of the BSA.

13.3. Duty to Inform COUNTY.

If LESSEE knows, or has reasonable cause to believe, that a Hazardous Substance has come to be located in, on, under or about the Premises other than as previously consented to by COUNTY or as required or allowed pursuant to the terms of the BSA, LESSEE shall immediately give COUNTY notice thereof, together with a copy of any statement, report, notice, registration, application, permit, business plan, license, claim, action, or proceeding given to, or received from, any governmental authority or private party concerning the presence, spill, release, discharge of, or exposure to, such Hazardous Substance including, but not limited to, all such documents as may be involved in any Reportable Use involving the Premises to be followed up in writing within two (2) days. LESSEE will provide to COUNTY, prior to the termination of this Lease agreement, a soil test and a fuel tank test that will indicate if any leakage has occurred from any tank located on or under the Premises and used by LESSEE. If any leakage is found, LESSEE shall repair the tanks and remove any contaminated soil at LESSEE’S sole cost and expense.

13.4. Indemnification.

Except to the extent caused by COUNTY or its employees, agents, or contractors, LESSEE shall indemnify, protect, defend (with counsel reasonably approved by COUNTY) and hold COUNTY, its officers, agents, employees, and volunteers and the Premises, harmless from and against any and all damages, liabilities, judgments, costs, claims, liens, expenses, penalties and loss of permits (including COUNTY’s attorneys’ and consultants’ fees) arising out of or involving any Hazardous Substance generated, possessed, stored, used, transported, or disposed in, on, upon, or at the Premises by or for LESSEE or by anyone under LESSEE’s control, except to the extent allowed herein or allowed or required pursuant to the terms of the BSA. LESSEE’s obligations under this paragraph shall include, but not be limited to, the effects of any contamination or injury

to person, property or the environment created or suffered by LESSEE, and the cost of investigation (including consultants' and attorneys' fees and testing), removal, remediation, restoration and/or abatement thereof, or of any contamination therein involved, and shall survive the expiration or earlier termination of this Lease. No termination, cancellation or release agreement entered into by COUNTY and LESSEE shall release LESSEE from its obligations under this Lease with respect to Hazardous Substances, unless specifically so agreed by COUNTY in writing at the time of such agreement.

13.5. COUNTY's Right to Perform Tests.

At any time prior to the expiration of the Lease Term, COUNTY shall have the right to enter upon the Premises in order to conduct tests of water and soil, provided such activity does not unreasonably interfere with LESSEE's operations, and to deliver to LESSEE the results of such tests to demonstrate that levels of any hazardous materials are in excess of those levels existing prior to the Effective Date and were caused by LESSEE's operations. The testing shall be at LESSEE's expense if COUNTY has a reasonable basis for suspecting the presence of hazardous materials in the soil or surface or groundwater in on, under, or about the Premises or the Property, which has been caused by or resulted from the activities of LESSEE or its affiliates or their employees, agents, contractors, invitees, sublessees, assignees, designees, principals, officers, consultants, vendors, suppliers, subcontractors, or representatives or anyone either directly or indirectly within LESSEE's control.

13.6. Environmental Assessment.

At any time before the expiration or earlier termination of this Lease, LESSEE, at COUNTY'S sole option, shall cause an environmental assessment of the Premises to be completed by a professional environmental consultant registered with the State of California as a Professional Engineer, Certified Engineering Geologist or Registered Civil Engineer. Said environmental assessment shall be obtained at the sole cost and expense of LESSEE and shall establish what, if any, hazardous substances exist on, in or under the Premises, in what quantities, and from what origins. If any additional hazardous substances exist in quantities greater than that allowed by COUNTY, county, state or federal laws, statutes, ordinances, or regulations and caused by LESSEE's operations, then said environmental assessment shall include a discussion of these substances with recommendations for remediation and removal necessary to effect compliance with those laws or statutes and estimates of the cost of such remediation or removal. LESSEE shall cause the remediation and/or removal of the hazardous substances caused by its operations recommended in the environmental assessment such that compliance with environmental law is achieved and shall be solely responsible for all costs and expenses incurred for the remediation and/or removal of hazardous substances caused by its operations.

13.7. LESSEE Environmental Investigation

LESSEE shall have the right to investigate the state of the Premises, including whether the surrounding areas have been used for the storage, manufacture or disposal of any hazardous substance, hazardous waste, pollutants or contaminants. Section 3.01 of the BSA ("Option and Construction Period") shall be expressly applicable during the Project Milestone Dates under Schedule 2.1 of the BSA, and LESSEE shall have the right to terminate this Lease prior to the

expiration of the Project Milestone Dates under Schedule 2.1 of the BSA for any valid reason provided therein, including but not limited to the discovery of Pollutants or Hazardous Materials at or in the Leased Premises which were not generated or released by LESSEE. In the event that LESSEE's investigations during the Project Milestone Dates under Schedule 2.1 of the BSA reveal the presence of Pollutants or Hazardous Materials, LESSEE may, as an alternative to terminating the BSA and this Lease without liability, propose to COUNTY that COUNTY perform timely remediation of the site of the Pollutants or Hazardous Materials at COUNTY's sole expense, and COUNTY shall in good faith evaluate the proposal and determine whether it has a duty to proceed immediately with remediation and whether the estimated expense of the remediation warrants acceptance of the proposal. In the event that COUNTY determines that it has no legal duty to perform the remediation and the costs of such remediation outweigh benefits to COUNTY, COUNTY may decline LESSEE's proposal and LESSEE shall have the right to immediately terminate this Lease without liability.

13.8. COUNTY Environmental Investigation

Notwithstanding anything to the contrary in this Lease, COUNTY and LESSEE acknowledge and agree that LESSEE's responsibilities with respect to the presence of any hazardous substance disposed of or otherwise placed on or beneath the Premises, or incorporated or migrating into or beneath the premises, shall be limited to those arising from conditions caused by LESSEE's action or inaction during the term of this Lease, or by actions or inactions of third parties hired, contracted, or otherwise controlled by LESSEE, and in no event shall LESSEE be responsible for the action or inaction of the County, other lessees or third parties under control of County with respect to such conditions.

COUNTY agrees to indemnify and defend and hold harmless LESSEE from any and all claims, actions, proceedings, judgements, suits, and damages directly related to environmental liabilities imposed upon LESSEE arising out of COUNTY's or COUNTY's contractors' operations on the Premises prior to the commencement of the Lease, including but not limited to costs of environmental assessments, costs of remediation and removal, any necessary response costs, damages for injury to natural resources or the public, and costs of any health risk assessment or health effect studies, such liability to include attorney's fees, experts fees, and litigation costs.

Section 14. GENERAL PROVISIONS

14.1. BSA

All provisions set forth in the BSA apply to this Lease as though set forth herein. To the extent the terms of the Lease and the terms of the BSA are in conflict, the terms of the BSA shall prevail.

14.2. Notices

Any notice, demand, request, consent, approval or communication required or permitted to be given hereunder shall be in writing and may be served personally or by United States mail, postage prepaid, addressed to LESSEE at the leased premises or at such other address designated in writing by LESSEE; and to COUNTY as follows:

COUNTY:

SAN BERNARDINO COUNTY, a California jurisdiction
Attention: Deputy Director
Solid Waste Management Division
222 West Hospitality Lane, 2nd Floor
San Bernardino, CA 92415-0017

LESSEE:

BioFuels San Bernardino Biogas, LLC
Attention: Brian McCarthy
4444 Westheimer Road, Suite 450G
Houston, Texas 77027

With a copy to:

BioFuels San Bernardino Biogas, LLC
4444 Westheimer Road, Suite 450G
Houston, Texas 77027
Attn: Legal Notices

or to any mortgagee, LESSEE's Lender or beneficiary, as applicable, at such appropriate address designated in writing by the respective party.

Notices shall be deemed delivered upon the earlier of: (i) actual receipt; or (ii) the date of delivery or refusal of the addressee to accept delivery, if such notice is sent as stipulated above. Any party entitled or required to receive notice under this Lease may by like notice designate a different address to which notices shall be sent. Notice given under this section shall be deemed in compliance with applicable statutory notice requirements, including Code of Civil Procedure section 1162 and Civil Code section 1953.

14.3. Waivers

No waiver by COUNTY or LESSEE of any provision hereof shall be deemed a waiver of any other provision hereof or of any subsequent breach by COUNTY or LESSEE of the same or any other provision. COUNTY's or LESSEE's consent to, or approval of, any act shall not be deemed to render unnecessary the obtaining of their consent to or approval of any subsequent act. The acceptance of Rent hereunder by COUNTY shall not be a waiver of any preceding breach by LESSEE of a provision hereof, other than the failure of LESSEE to pay the particular Rent so accepted, regardless of COUNTY's knowledge of such preceding breach at the time of acceptance of such Rent.

14.4. Memorandum of Lease

Following execution of this Lease, either party, at its sole expense shall be entitled to record a Memorandum of Lease (in a form reasonably agreeable to the other) in the official records of

San Bernardino County. Upon termination or expiration of this Lease, LESSEE shall, within ten (10) days of such termination or expiration, execute and record a quitclaim deed (or any other document required by COUNTY) as to its leasehold interest.

14.5. Estoppel Certificate.

LESSEE shall, from time to time, upon at least thirty (30) days prior written notice from COUNTY, execute, acknowledge and deliver to COUNTY a statement in writing (a) certifying this Lease is unmodified and in full force and effect, or, if modified, stating the nature of the modification and certifying that the Lease, as modified, is in full force and effect, and the date to which the rental and other charges, if any, have been paid; and, (b) acknowledging that there are not to LESSEE's knowledge, any defaults, or stating if any defaults are claimed, any statement may be relied upon by any prospective purchaser or encumbrancer of the County Property.

14.6. Provisions Are Covenants and Conditions.

All provisions, whether covenants or conditions, on the part of either party, shall be deemed to be both covenants and conditions.

14.7. Consent.

Except as otherwise specifically provided, whenever consent or approval of either party is required, that party shall not unreasonably withhold such consent or approval.

14.8. Exhibits.

All exhibits referred to in this Lease or attached to this Lease are incorporated herein by reference.

14.9. Survival.

The obligations of the parties, which by their nature continue beyond the term of this Lease, will survive the termination of this Lease.

14.10. Cumulative Remedies.

No remedy or election under this Lease shall be deemed exclusive but shall, wherever possible, be cumulative with all other remedies at law or in equity.

14.11. Compliance with Law

LESSEE shall at all times in the construction, maintenance, occupancy, and operation of the premises comply with all applicable laws, statutes, ordinances, and regulations of county, state, and federal governments at LESSEE'S sole cost and expense. In addition, LESSEE shall comply with any and all notices issued by COUNTY or its authorized representative under the authority of any such law, statute, ordinance, or regulation.

14.12. Public Records Disclosure.

All information received by the COUNTY from any source concerning this Lease, including the Lease itself, may be treated by the COUNTY as public information subject to disclosure under the provisions of the California Public Records Act, Government Code Sections 6250 *et seq.* (the “Public Records Act”). LESSEE understands that although all materials received by the COUNTY in connection with this Lease are intended for the exclusive use of the COUNTY, they are potentially subject to disclosure under the provisions of the Public Records Act. In the event a request for disclosure of any part or all of any information which LESSEE has reasonably requested COUNTY to hold in confidence is made to the COUNTY, the COUNTY shall notify the Lessee of the request and shall thereafter disclose the requested information unless the LESSEE, within five (5) days of receiving notice of the disclosure request, requests nondisclosure, provides COUNTY a legally sound basis for the nondisclosure, and agrees to indemnify, defend, and hold the COUNTY harmless in any/all actions brought to require disclosure. LESSEE waives any and all claims for damages, lost profits, or other injuries of any and all kinds in the event COUNTY fails to notify LESSEE of any such disclosure request and/or releases any information concerning the contract received from the LESSEE or any other source.

14.13. Party Approval or Notice

The approval or consent of either Party or notice to either Party, wherever required in this Lease, shall mean the written approval or consent of, or notice to, that Party or his authorized representative unless otherwise specified. “Authorized representative” shall mean any other individual designated by either Party in written notice to the other.

14.14. Nondiscrimination

LESSEE agrees not to discriminate in any manner against any person or persons on account of race, color, religion, gender, sexual orientation, medical status, national origin, age, marital status or physical disability in LESSEE’S use of the premises, including but not limited to the providing of goods, services, facilities, privileges, advantages, and accommodations, and the obtaining and holding of employment.

14.15. Partial Invalidity

If any term, covenant, condition, or provision of this Lease is found invalid, void or unenforceable by a court of competent jurisdiction, the remaining provisions will remain in full force and effect.

14.16. Number and Gender

Words of any gender used in this Lease shall include any other gender, and words in the singular number shall include the plural, when the tense requires.

14.17. Captions

The Lease Outline, section headings, and captions for various articles and paragraphs shall not be held to define, limit, augment, or describe the scope, content, or intent of any or all parts of

this Lease. The numbers of the paragraphs and pages of this Lease may not be consecutive. Such lack of consecutive numbers is intentional and shall have no effect on the enforceability of this Lease.

14.18. Entire Understanding

This Lease, and the BSA and its Exhibits, contains the entire understanding of the parties. LESSEE, by signing these documents, agrees that there is no other written or oral understanding between the parties with respect to the Premises. Each party has relied on its own examination of the Premises, advice from its own attorneys, and the warranties, representations, and covenants of the documents themselves. Each of the parties in this Lease agrees that no other party, agent, or attorney of any other party has made any promise, representation or warranty whatsoever which is not contained in this Lease.

The failure or refusal of any party to read the Lease or other documents, inspect the Premises, and obtain legal or other advice relevant to this transaction constitutes a waiver of any objection, contention, or claim that might have been based on these actions. No modification, amendment, or alteration of this Lease will be valid unless it is in writing and signed by all parties.

14.19. No Warranty.

Except as otherwise stated in this Lease, Lessee hereby acknowledges that neither the County nor any employees, contractors, or agents of the County has made any oral or written warranties or representations to Lessee relative to the condition or use by Lessee of said Premises and Lessee acknowledges that Lessee assumes all responsibility regarding the Occupational Safety and Health Act, the legal use and adaptability of the Premises and compliance with all applicable laws and regulations in effect during the term of this Lease. Upon use of Premises by Lessee, the same shall conclusively be deemed to be fit and proper for the purposes for which Lessee shall use the Premises.

Section 15. SPECIAL PROVISIONS

15.1. Limited Liability Company Authority

Each individual executing this Lease on behalf of LESSEE represents and warrants that he/she is duly authorized to execute and deliver this Lease on behalf of said limited liability company, in accordance with a duly adopted resolution of the manager of the limited liability company or in accordance with the operating agreement of the limited liability company, and that this Lease is binding upon the limited liability company in accordance with its terms, and that LESSEE is a duly qualified limited liability company and all steps have been taken prior to the date hereof to qualify LESSEE to do business in the state where the premises are situated.

15.2. Standard of Employees

LESSEE and its employees shall at all times conduct themselves and the operations on the leased premises in a creditable, social, and temperate manner. COUNTY shall have the right to demand that LESSEE permanently remove personnel from the leased premises upon good cause.

[SIGNATURES ON NEXT PAGE]

Section 16. SIGNATURES

16.1. Authorized Signatories

The Parties to this Lease represent that the signatories executing this document are fully authorized to enter into this agreement.

IN WITNESS WHEREOF, the parties hereto have caused the Lease to be executed.

LESSEE:
BIOFUELS SAN BERNARDINO COUNTY,
LLC

COUNTY:
COUNTY OF SAN BERNARDINO

By: _____
Brian McCarthy
Chief Investment Officer
Biofuels San Bernardino Biogas, LLC

By: _____
Curt Hagman, Chairman
Board of Supervisors

Date: _____

Date: _____

SIGNED AND CERTIFIED THAT
A COPY OF THIS DOCUMENT
HAS BEEN DELIVERED TO THE
CHAIR OF THE BOARD

LYNNA MONELL, Clerk of the Board of
Supervisors

By: _____
Deputy

Date: _____

Approved as to Legal Form:

TOM BUNTON,
County Counsel
San Bernardino County, California

By: _____
Kristina M. Robb
Principal Assistant County Counsel

Date: _____

APPENDIX A

DEFINED TERMS

As used herein, unless the context otherwise requires, the following terms shall have the following meanings:

“Affiliate” means, with respect to any Person, any other Person that directly or indirectly, or through one or more intermediaries, controls, is controlled by, or is under common control with such Person. “Control” for purposes of this definition includes, without limitation, the ability to vote fifty percent (50%) or more of the voting equity of a Person.

“Agreement” or “BSA” means the Landfill Gas Sale and Purchase Agreement, by and between Lessee and County, as it may thereafter be amended.

“BTU” means the amount of heat required to raise the temperature of one avoirdupois pound of pure water from 60 degrees Fahrenheit to 61 degrees Fahrenheit.

“CCUS Facilities” means any carbon capture, utilization and storage equipment installed at the LESSEE’s Facility for purposes of capturing carbon produced as a byproduct of the clean hydrogen production process.

“Code” means the Internal Revenue Code of 1986, as amended.

“Commercial Operation Date” has the meaning ascribed to it in the BSA.

“Commercially Reasonable” describes those practices, methods, acts and standards that (a) are commonly used by a prudent person or entity in the same business as the COUNTY or the LESSEE, as applicable, in a comparable situation and, (b) in the exercise of reasonable judgment, considering the facts known when engaged in, could have been expected to reach the expected result to the extent such result and the efforts required to attain such result are consistent with Applicable Law, safety, reliability, efficiency, expedition and economy. “Commercially Reasonable” shall not be limited to the optimum practices, methods, acts or standards, but rather shall encompass a spectrum of possible practices, methods, acts or standards.

“County’s Facility” means the Landfill Gas collection and treatment system, comprising the network of extraction wells and interconnecting pipes together with gas moving equipment, attendant valves, pumps, monitoring devices and other extraction related equipment that County maintains, constructs, or licenses the use of, for the purpose of extracting, recovering and combusting Landfill Gas, and/or liquids associated with extraction, recovery and combustion Landfill Gas, from the Landfill, and any pipelines, metering equipment, and any miscellaneous or ancillary equipment of COUNTY located at or near the Landfill.

“Delivery Point” has the meaning ascribed to it in the BSA.

“Effective Date” means September 24, 2019.

“Electric Facility” means the electrical generation facility owned and operated by Buyer, consisting of (i) one or more electrical energy generating units designed and installed by Buyer and, that will be fueled by Landfill Gas, and (ii) any transformers, switch gear, distribution lines, meters and related equipment necessary for the generation and delivery of electric energy to customers.

“Environmental Laws” means any applicable federal, state, or local governmental law, statute, rule, regulation, order, consent decree, decree, judgment, permit, license, covenant, deed restriction, ordinance or other requirement or standard relating to pollution or the regulation or protection of health, safety, natural resources, or the environment, as now existing or hereafter in effect, including, without limitation, those relating to releases, discharges, emissions, injections, leachings, or disposals of Hazardous Substances or hazardous materials into air, water, land or groundwater, to the withdrawal or use of groundwater, to the regulation of Greenhouse Gas emissions, or to the use, handling, treatment, removal, storage, disposal, processing, distribution, transport, or management of Hazardous Substances. “Environmental Laws” shall include, but shall not be limited to, the Clean Air Act; the federal Water Pollution Control Act; the Safe Drinking Water Act; the Toxic Substances Control Act; the Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act of 1986; the Resource Conservation and Recovery Act, as amended by the Solid and Hazardous Waste Amendments of 1984; the Occupational Safety and Health Act; the Hazardous Materials Transportation Act; the Oil Pollution Act of 1990; the California Environmental Quality Act (CEQA) and any similar federal, state or local statutes and regulations.

“Force Majeure” means acts of God; winds; hurricanes; tornadoes; fires; epidemics; landslides; earthquakes; floods; other natural catastrophes; strikes; lock-outs or other industrial disturbances; acts of public enemies; insurrections; military action; war, whether or not it is declared; sabotage; riots; civil disturbances; explosions; the unavailability of Landfill Gas that was not anticipated as of the date the Agreement was entered into, which is not within the reasonable control nor the result of negligence by County or the party supplying Landfill Gas to County, and which by the exercise of reasonable due diligence County is unable to overcome or avoid or cause to be avoided; or any other cause or event, not reasonably within the control of the party claiming Force Majeure (other than the financial inability of such party), which precludes that party from carrying out, in whole or in part, its obligations under the Agreement. Nothing in this provision excuses any party from performing due to any governmental act, failure to act, permit or order, where it was reasonably within such party’s power to prevent, correct, anticipate, or guard against such act, failure to act, or order.

“Government Entity” means any court or tribunal in any jurisdiction or any federal, state, municipal, or other governmental body, agency, authority, department, commission, board, bureau or instrumentality, acting in its capacity as an enforcement, regulatory or permitting agency, and not as a buyer or consumer of Buyer’s Product.

“Greenhouse Gas” or “Greenhouse Gases” means carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and other fluorinated greenhouse gases as defined in 40 CFR 98.6.

“Landfill” means the Colton Sanitary Landfill, an inactive Class III landfill, with an address of 850 Tropica Rancho Road, Colton, California 92324.

“Landfill Gas” means any mixture of hydrocarbons or of hydrocarbons and noncombustible gases, in a gaseous state, consisting primarily of methane and carbon dioxide collected at the Landfill.

“Landfill Gas Delivered” means Landfill Gas delivered by County to the Delivery Point.

“LESSEE’s Facility” means those facilities required for and appurtenant to the hydrogen production facilities, including, without limitation, the Electric Facility, the CCUS Facilities, the interconnection to a utility and/or any pipeline, the hydrogen trailers and/or storage units or tanks, a hydrogen fueling station or other transfilling facility for hydrogen distribution and vehicle loading, constructed by or for LESSEE on the Premises. The LESSEE’s Facility is described by Exhibit A where described areas A-1 and A-2 together constitute the extents of the Facility.

“LESSEE’s Product” means the Renewable Hydrogen product produced by LESSEE’S Facility, inclusive of any and all Renewable Hydrogen product produced as result of renewable natural gas received at LESSEE’S Facility, including, without limitation fuel cell electric vehicle (“FCEV”) grade hydrogen fuel.

“Month” or “month” means the period commencing at 7:00 a.m. local time on the first (1st) day of a calendar month and ending at 7:00 a.m. local time on the first (1st) day of the next calendar month.

“Permitted Uses” means the construction, installation, maintenance, repair, replacement and operation of the facility, structures, and fixtures (“Improvements”) necessary to fulfill the terms of the BSA and this Lease.

“Person” means an individual, partnership, corporation (including a business trust), limited liability company, joint stock company, trust, unincorporated association, joint venture, or other entity, or a government or any political subdivision or agency thereof, or any trustee, receiver, custodian, or similar official.

“Premises” means the real property described in Exhibit A, hereto.

“Quarter” means a three (3)-month period ending March 31, June 30, September 30 or December 31.

“Renewable Hydrogen” means the end product of hydrogen resulting from the processing of delivered renewable natural gas to Buyer’s Facilities.

“SCF” means standard cubic feet.

EXHIBIT A

LEASED PREMISES LEGAL DESCRIPTION(S)

- A.1 Leased Premises A: Exclusive lease area provided for the Colton Sanitary Landfill - Renewable Natural Gas and Hydrogen Processing and Load Out facility.

EXHIBIT "A"
(LEASE AREA)

Parcel 1

That portion of the Tropica Rancho, in the County of San Bernardino, State of California, as per plat recorded in Book 3 of Maps, Page 26, records of said County, more particularly being a portion of Parcel C of the Grant Deed from Forrest N. Daggett and Elizabeth Daggett to the San Bernardino County Flood Control District, in the document recorded in Book 6169, Page 721, Official Records of said County, more particularly described as follows:

Beginning at the Southeast corner of said Parcel C;

Thence North $00^{\circ}15'48''$ West along the East line of said Parcel C a distance of 133.87 feet;

Thence North $87^{\circ}40'24''$ West a distance of 214.51 feet;

Thence North $03^{\circ}28'30''$ West a distance of 0.34 feet to the **True Point of Beginning**;

Thence South $86^{\circ}06'25''$ West a distance of 31.97 feet;

Thence North $04^{\circ}19'06''$ West a distance of 69.08 feet;

Thence North $83^{\circ}10'20''$ East a distance of 84.02 feet;

Thence North $02^{\circ}12'27''$ West a distance of 100.49 feet;

Thence South $87^{\circ}34'42''$ West a distance of 152.98 feet;

Thence North $00^{\circ}24'49''$ East a distance of 129.93 feet;

Thence South $75^{\circ}45'50''$ East a distance of 175.03 feet;

Thence South $11^{\circ}18'12''$ East a distance of 74.30 feet;

Thence South $44^{\circ}50'06''$ East a distance of 158.76 feet;

Thence South $74^{\circ}57'00''$ East a distance of 215.42 feet;

Thence South $01^{\circ}25'08''$ West a distance of 32.99 feet;

Thence North $86^{\circ}41'39''$ West a distance of 260.44 feet;

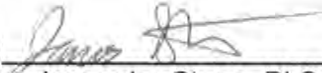
Thence North $86^{\circ}32'27''$ West a distance of 85.05 feet;

Thence South 86°06'25" West a distance of 49.14 feet to the **True Point of Beginning**.

Parcel 1 contains 55391.06 sq.ft. (1.27 acres), more or less.

As shown on Exhibit "B" and by this reference made a part thereof.

This legal description was prepared
by me or under my direction.

by:  01/06/2022
James Ira Stone, PLS 9075 Dated
Deputy County Surveyor



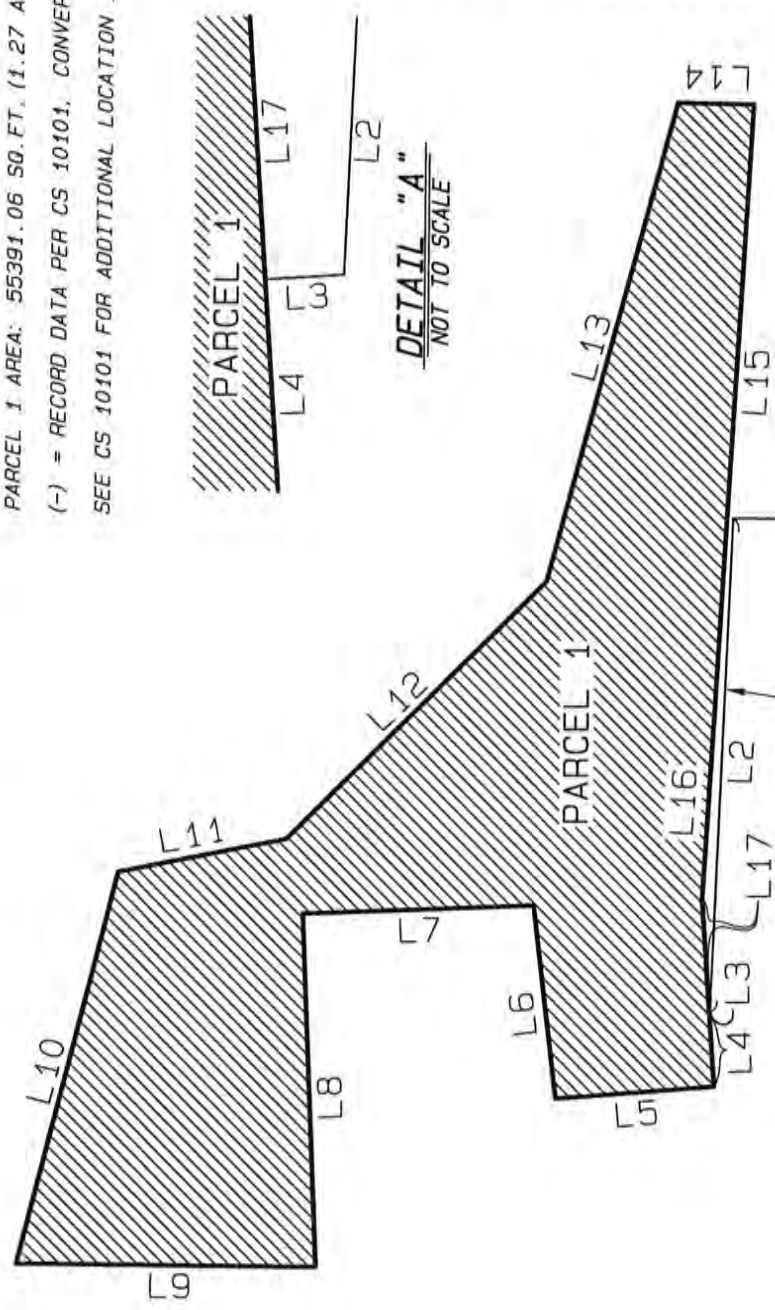
A.2 Leased Premises A-2: Non-Exclusive lease area provided for the Colton Sanitary Landfill - Renewable Natural Gas and Hydrogen Processing and Load Out facility – feedstock conveyance piping.

EXHIBIT B
PARCEL MAPS

Parcel

EXHIBIT "B"
 THAT PORTION OF TROPICA RANCHO, PER BOOK 3 OF MAPS, PAGE 26

PARCEL 1 AREA: 55391.06 SQ. FT. (1.27 ACRES) ±
 (-) = RECORD DATA PER CS 10101, CONVERTED TO GROUND
 SEE CS 10101 FOR ADDITIONAL LOCATION INFORMATION



"L124" PER CS 10101

FD 3/4" IP RE 862 PER
 RS 55/72 & RS 134/79.
 SE COR PARCEL C, PER
 BOOK 6169, PAGE 721, O.R.



This plat was prepared by me
 or under my direction.

By: *James Ira Stone* 1/6/2022

James Ira Stone, PLS 9075 Dated
 Deputy County Surveyor

- L1 = (N00°15'48"W 133.86')
- L2 = (N87°40'24"W 214.50')
- L3 = (N03°28'30"W) 0.34'
- L4 = S86°06'25"W 31.97'
- L5 = N04°19'06"W 69.08'
- L6 = N83°10'20"E 84.02'
- L7 = N02°12'27"W 100.49'
- L8 = S87°34'42"W 152.98'
- L9 = N00°24'49"E 129.93'
- L10 = S75°45'50"E 175.03'
- L11 = S11°18'12"E 74.30'
- L12 = S44°50'06"E 158.76'
- L13 = S74°57'00"E 215.42'
- L14 = S01°25'08"W 32.99'
- L15 = N86°41'39"W 260.44'
- L16 = N86°32'27"W 85.05'
- L17 = S86°06'25"W 49.14'

DETAIL "A"
 NOT TO SCALE

EXHIBIT C

SCHEDULE OF DAYS AND HOURS OF OPERATION

During the normal course of operations, the expected manning schedule, and days and hours of operations are as follows:

- Plant Operations: Monday through Sunday, 24 hours per day, with remote monitoring.
- Plant Staff Operations: A minimum of Monday through Friday, 7 a.m. to 4 p.m.
- Construction and/or Industrial Infrastructure Modification Activities are limited to the Permitted Hours of Operation for Site Activities set forth in the most current Solid Waste Facility Permit for the Landfill.
- Compressed gas truck (tube trailer) loading and unloading activities are limited to the Permitted Hours of Operation for Site Activities set forth in the most current Solid Waste Facility Permit for the Landfill.
- Staff may be on site other than the previously listed hours as required to meet emergency and operational commitments.
- Truck routing and travel hours may be adjusted as needed to comply with the Community's issues.
- All hours are for reference only and will be adjusted as required by the BSA; but are limited to comply with the most current Solid Waste Facility Permit for the Landfill.

EXHIBIT D

FORM OF COUNTY CONSENT OF HYPOTHECATION

The COUNTY OF SAN BERNARDINO, hereinafter referred to as "COUNTY" and _____ hereinafter referred to as "LESSEE", entered into a Lease Agreement dated _____, hereinafter after referred to as "Lease", covering certain real property located in the County of San Bernardino, State of California, hereinafter referred to as "Demised Premises".

By use of the following documents which are attached hereto and made a part hereof, and hereinafter collectively referred to as "Documents", LESSEE proposes to hypothecate its leasehold estate created under said Lease:

These documents are for financing related to leasehold development of said Demised Premises.

On this _____ day of _____, _____, COUNTY hereby consents to the execution, delivery, and recordation of the above stated documents subject to the following terms and conditions:

1. That _____, hereinafter referred to as "LENDER", shall fully reconvey all interest in said real property upon repayment of the loan described in the loan document since the sole purpose of the hypothecation of the subject leasehold estate is to secure the loan amount for LENDER.
2. Except as otherwise provided herein, the above-referenced documents and any other future additional instruments which may be approved by COUNTY or its agents, shall be subject to each and every covenant, condition, and restriction set forth in said Lease, and to all rights and interest of the COUNTY therein, none of which are or shall be waived by this Consent.
3. In the event of any conflict between the provisions of said Lease and the provisions of said documents, the provisions of said Lease shall control.
4. Any additions or modifications to said financing documents shall first be approved by the COUNTY. LESSEE warrants that all documents and agreements pertaining to the hypothecation of its leasehold have been fully disclosed to COUNTY.
5. The proceeds of the loan to LESSEE shall be used solely for payment of expenses incident to construction on the Demised Premises of the improvements allowed under Paragraph 11, IMPROVEMENTS, of the Lease and describe in the loan documents.

COUNTY OF SAN BERNARDINO

NAME OF LESSEE

By: _____

By: _____
(Authorized signature – sign in blue ink)

Dated: _____

Name: _____

Title: _____

APPROVED AS TO LEGAL FORM

Date: _____

MICHELLE D. BLAKEMORE, County Counsel
San Bernardino County, California

By: _____
Deputy County Counsel

Dated: _____

EXHIBIT E

COLTON SANITARY LANDFILL PROPOSED CORRECTIVE ACTION PLAN



COUNTY OF SAN BERNARDINO

COLTON SANITARY LANDFILL
PROPOSED CORRECTIVE ACTION PLAN
M&RP NO. 91-39

PREPARED FOR:

COUNTY OF SAN BERNARDINO
ENVIRONMENTAL PUBLIC WORKS AGENCY
SOLID WASTE MANAGEMENT DEPARTMENT
GARDEN OFFICE NO. 1 BUILDING "D"
621 EAST CARNEGIE DRIVE, SUITE 270
SAN BERNARDINO, CALIFORNIA 92415-0017

PREPARED BY:

BRYAN A. STIRRAT & ASSOCIATES, INC.
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765

IN ASSOCIATION WITH:

MOORE & TABER
1290 N. HANCOCK STREET
ANAHEIM, CALIFORNIA 92807

OCTOBER 30, 1991



BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL AND ENVIRONMENTAL ENGINEERS

**COUNTY OF SAN BERNARDINO
COLTON SANITARY LANDFILL
PROPOSED CORRECTIVE ACTION PLAN
M&RP NO. 91-39**

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**COUNTY OF SAN BERNARDINO
COLTON SANITARY LANDFILL
PROPOSED CORRECTIVE ACTION PLAN
M&RP NO. 91-39**

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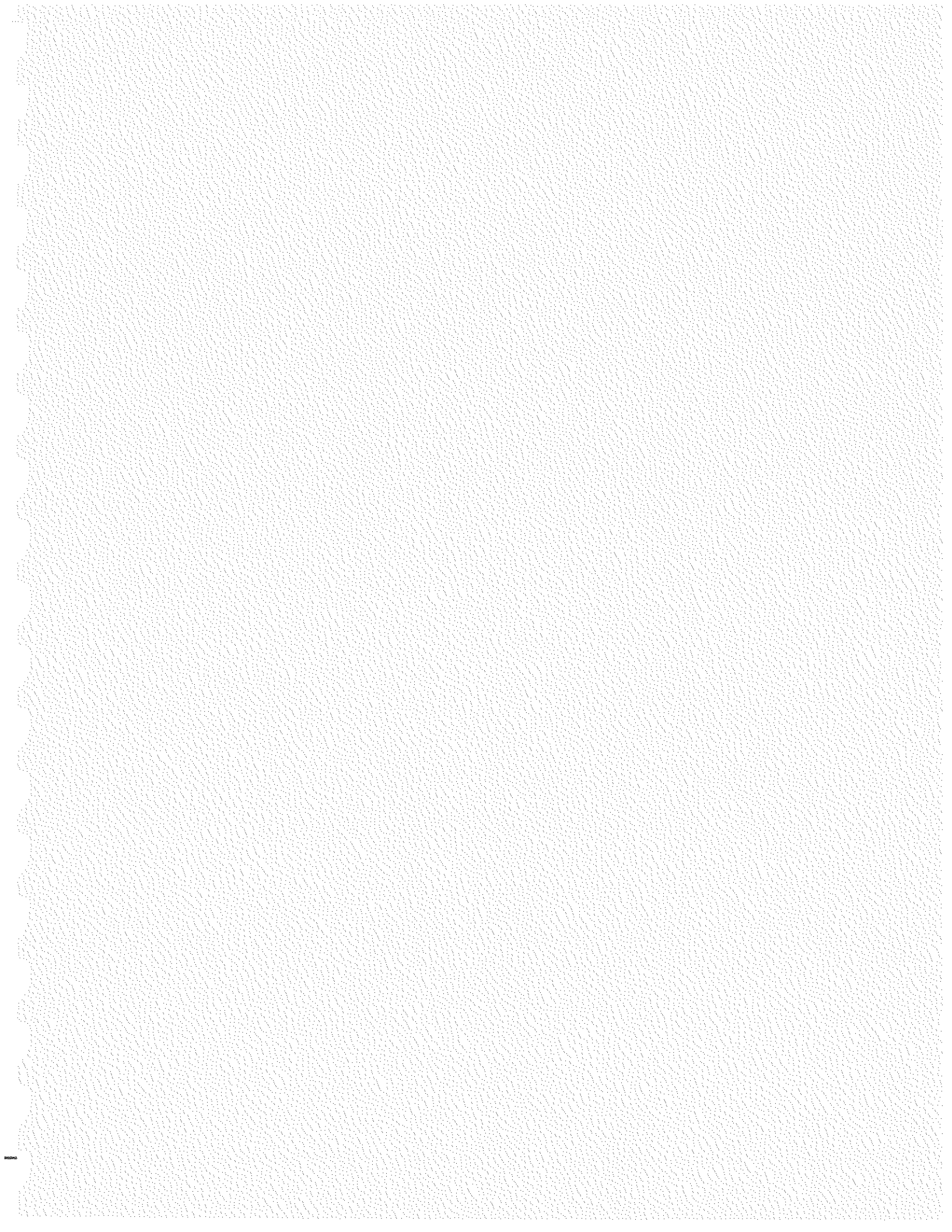
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**COUNTY OF SAN BERNARDINO
COLTON SANITARY LANDFILL
PROPOSED CORRECTIVE ACTION PLAN
M&RP NO. 91-39**

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SECTION 1.0
INTRODUCTION

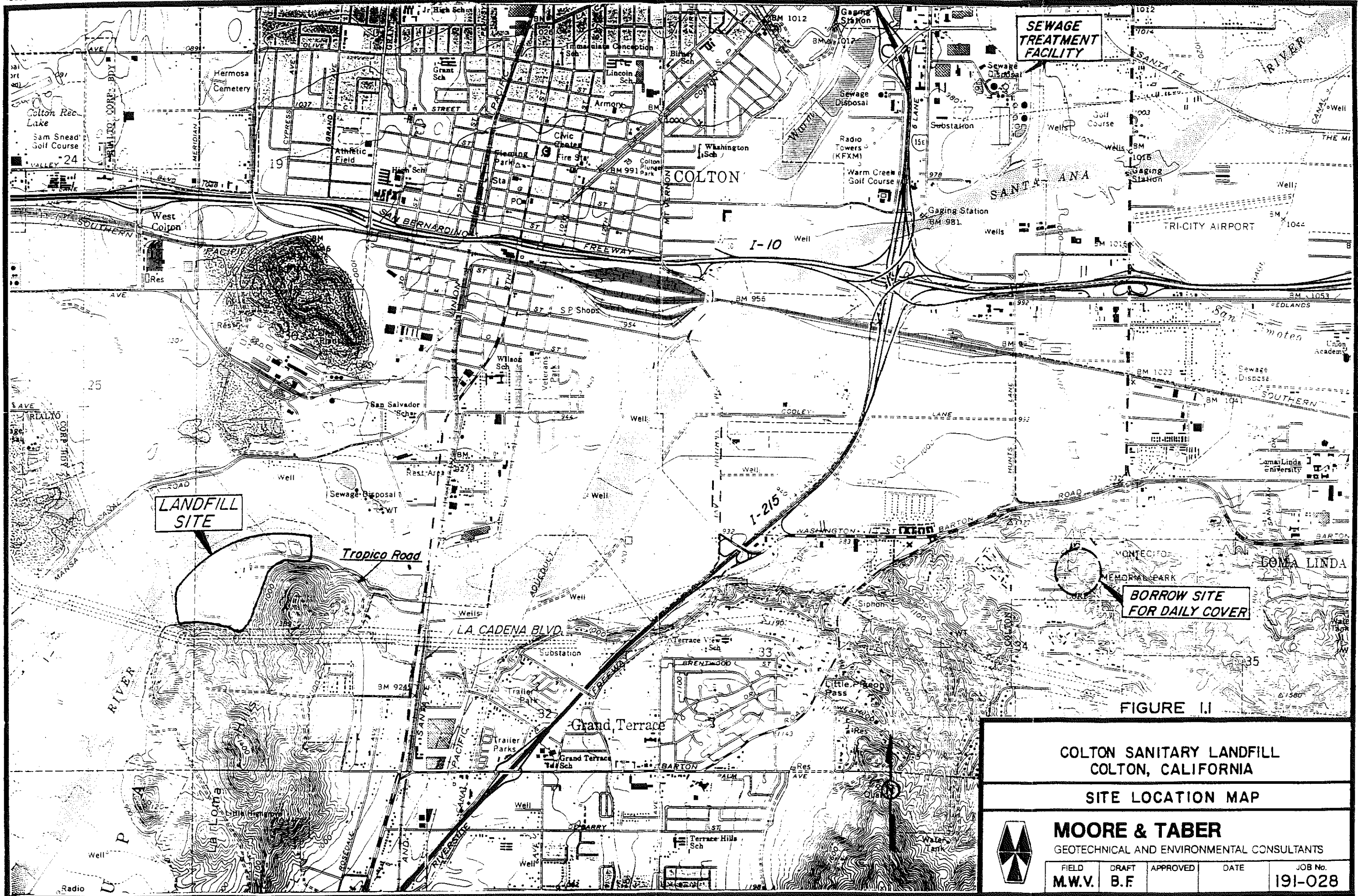
1.0 INTRODUCTION

The Colton Sanitary Landfill is located within the limits of the City of Colton, just off Tropico Road, approximately 2.75 miles southwest of the intersection of the Riverside Freeway (I-215) and the San Bernardino Freeway (I-10) (Figure 1.1). The landfill, owned by the County of San Bernardino Environmental Public Works Agency, Solid Waste Management Department, is classified as a Class III Landfill and accepts all non-hazardous residential, commercial, inert, and demolition wastes. The post-closure end use for the Colton Landfill site is anticipated to be a regional park facility.

In order to operate the Colton Landfill site, the County of San Bernardino obtained Waste Discharge Requirements (WDRs), including a Monitoring and Reporting Program (M&RP) for the facility from the California Regional Water Quality Control Board, Santa Ana Region (RWQCB Order No. 81-123). A Revised M&RP to Order No. 81-123 was issued in 1988 to include the monitoring of wells installed in November 1987 (Phase I SWAT), and wells proposed to be installed as part of the Phase II SWAT. In August of 1991, the RWQCB approved new WDRs including a new M&RP for a vertical height increase at the facility (RWQCB Order No. 91-39).

The new WDR order requires the County to establish a corrective action program to ensure no impairment of beneficial uses at the site. The report presented herein proposes a Corrective Action Plan for remediation of a probable degradation of local water quality in the vicinity of the Colton Landfill. This plan was developed on the basis of hydrogeologic and water chemistry data obtained and evaluated in the recently completed Groundwater Characterization Report for the site (dated October 17, 1991; Moore & Taber Job No. 191-004).

This report is submitted to satisfy the requirements of Provision 3 of the Waste Discharge Requirements for the facility (RWQCB Order No. 91-39).



SEWAGE TREATMENT FACILITY

LANDFILL SITE

BORROW SITE FOR DAILY COVER

FIGURE I.I

COLTON SANITARY LANDFILL
COLTON, CALIFORNIA

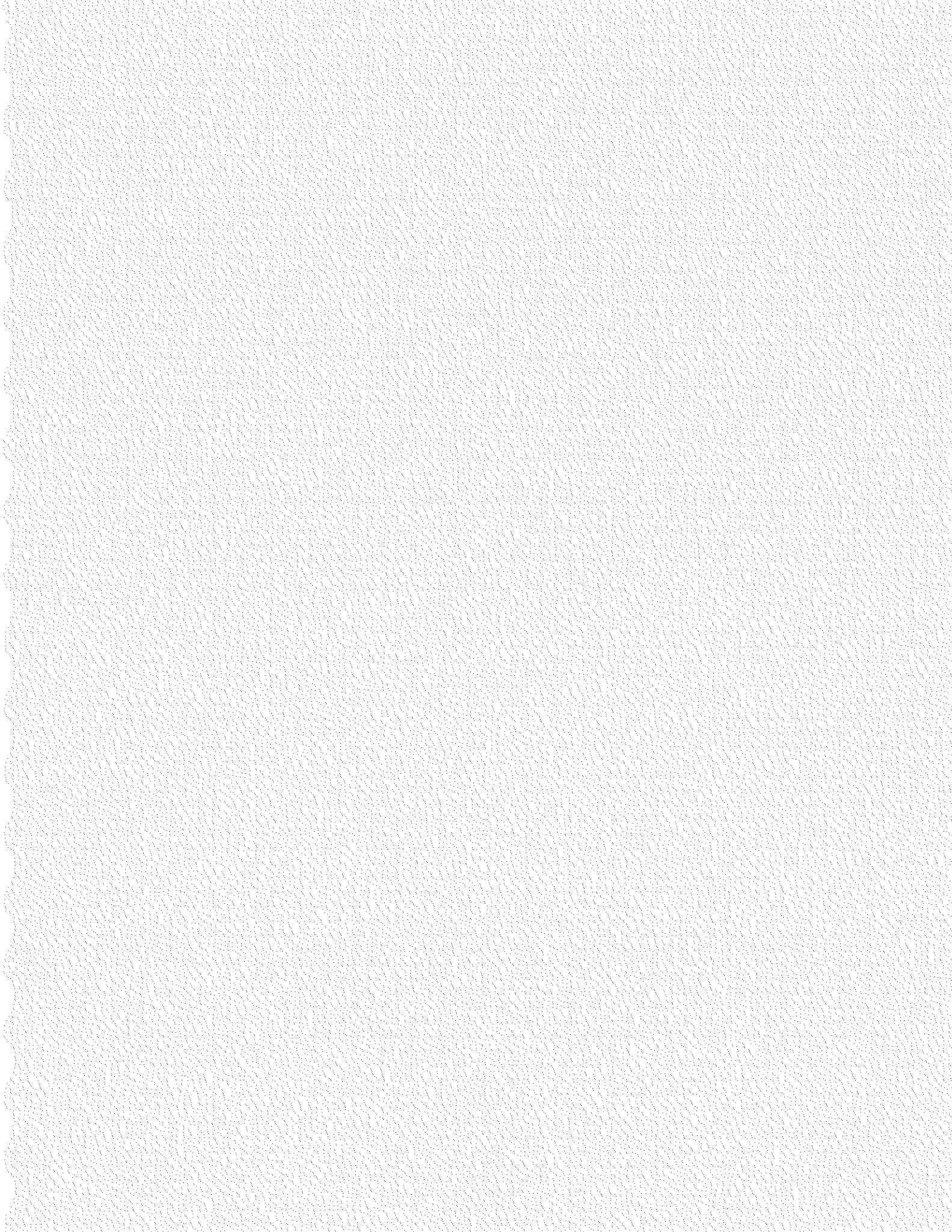
SITE LOCATION MAP



MOORE & TABER

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIELD M.W.V.	DRAFT B.F.	APPROVED	DATE	JOB No. 191-028
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SECTION 2.0
HYDROGEOLOGIC CONDITIONS

2.0 HYDROGEOLOGIC CONDITIONS

2.1 BACKGROUND

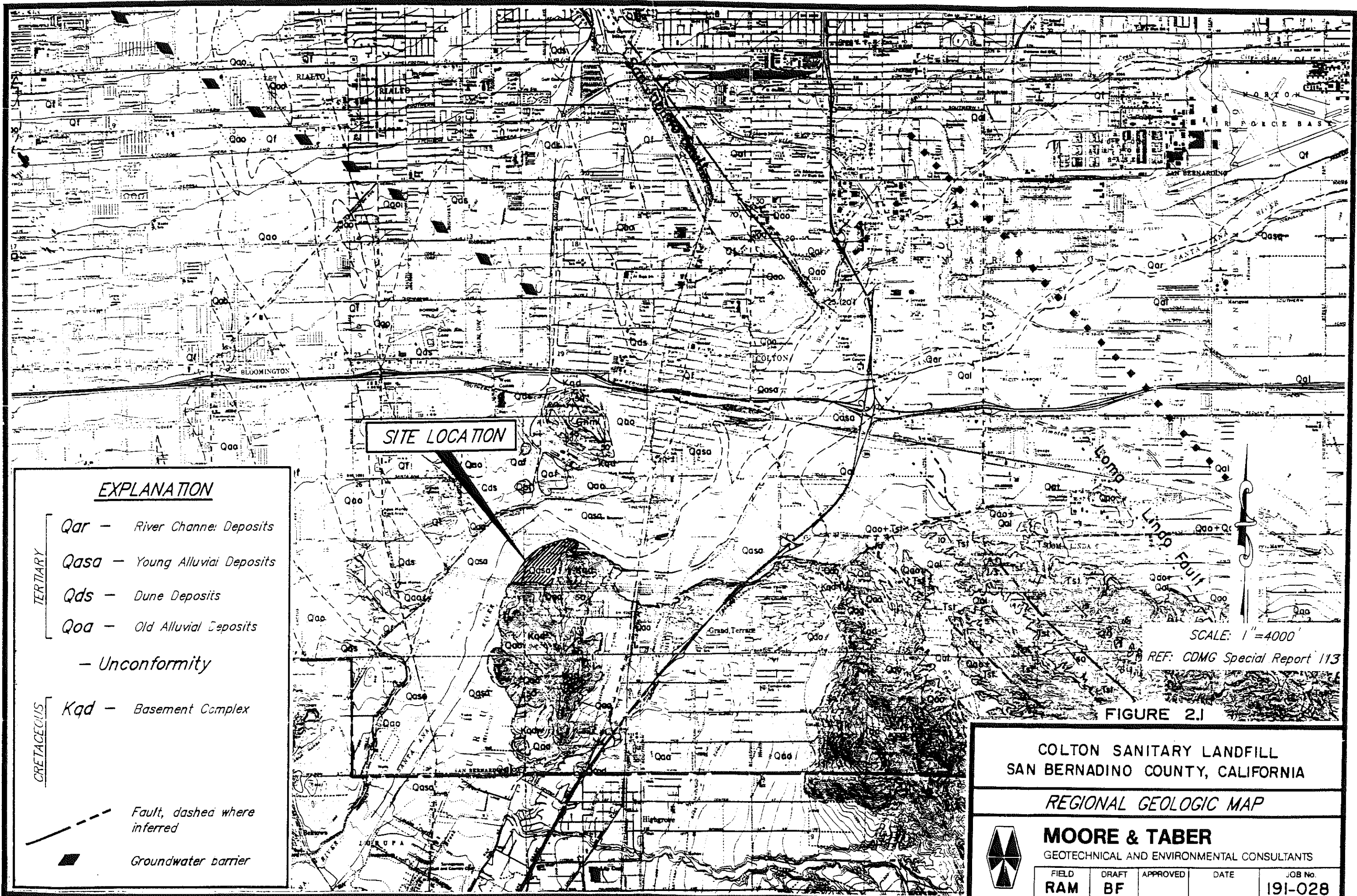
The landfill site is underlain by a considerable thickness of Quaternary alluvium that generally consists of unconsolidated gravels, sands and silts unconformably overlying Mesozoic basement complex (Kqf). Recent river channel deposits (Qar) and young alluvium (Qasa) are exposed within the Santa Ana River channel adjacent to the site (Figure 2.1).

The local groundwater basin is recharged by streams and creeks which carry surface water from the nearby highlands to the Santa Ana River. The larger tributaries in the basin include Lytle and Warm Springs Creeks from the San Gabriel Mountains; Reche Canyon Creek from the Box Springs Mountains; and San Timoteo Wash from the Badland Hills. The coarse unconsolidated Quaternary river channel deposits beneath and adjacent to the property typically have excellent water-bearing and water-yielding characteristics.

Groundwater gradients in the immediate vicinity of the Santa Ana River generally parallel the river and result in southwesterly groundwater flow.

2.2 AQUIFER CHARACTERISTICS

The Groundwater Characterization Report referenced above, discusses in detail the aquifer tests conducted in evaluating hydraulic characteristics of materials at the Colton facility. Based on these results, typical aquifer characteristics for native alluvial materials below the Colton Landfill include an estimated hydraulic conductivity of 20 ft/day and a transmissivity of 7,200 gpd/ft. A reasonable range of potential hydraulic conductivity values of about 15 to 50 ft./day and transmissivity values of 4,500 to 15,000 gpd/ft. was also indicated.



EXPLANATION

- Qar* - River Channel Deposits
- Qasa* - Young Alluvial Deposits
- Qds* - Dune Deposits
- Qoa* - Old Alluvial Deposits
- Unconformity

Kqd - Basement Complex

CRETACEOUS

- Fault, dashed where inferred
- Groundwater barrier

SCALE: 1" = 400'

REF: CDMG Special Report 113

FIGURE 2.1

COLTON SANITARY LANDFILL
SAN BERNADINO COUNTY, CALIFORNIA

REGIONAL GEOLOGIC MAP



MOORE & TABER

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIELD RAM	DRAFT BF	APPROVED	DATE	JOB No. 191-028
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2.3

GROUNDWATER FLOW PATTERNS

Piezometer and groundwater monitoring well elevation data were collected using dedicated transducers and data loggers and manual methods from June 1989 to March 1991. In order to determine groundwater flow patterns at the Colton Landfill site, the groundwater elevation data was integrated with river elevation data and a groundwater flow model was developed using the computer program FLOWPATH. Typical groundwater flowpaths and velocity vectors are shown on Figure 2.2.

In general, the groundwater contours demonstrate that groundwater enters the landfill footprint from the north and northeast and flows out to the west. A comparison of the groundwater flow patterns during different times of the year suggests that in-flow and out-flow zones remain relatively consistent throughout the year with the maximum groundwater gradients occurring near the west corner of the site. In this area, the groundwater contours nearly daylight at the ground surface and sporadic surface seepage is expected. Surface seepage has, in fact, been observed in this area.



199000

Legend

862 Groundwater elevation contour—
in feet above mean sea level


← Groundwater velocity and direction
of flow

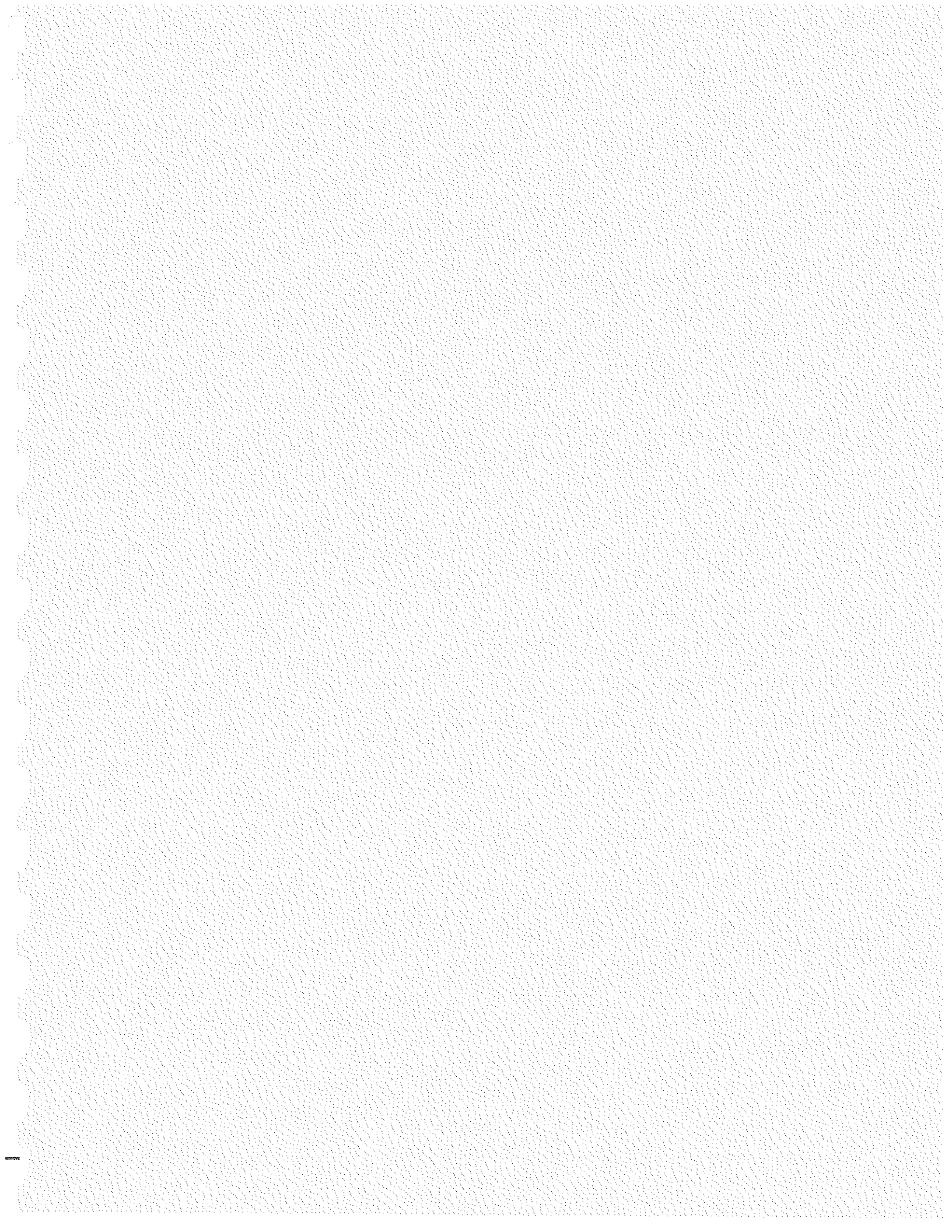
220000
198000



SCALE : 1" = 300'

FIGURE 2.2

COLTON SANITARY LANDFILL HYDROGEOLOGIC CHARACTERIZATION SAN BERNARDINO COUNTY, CALIFORNIA				
GROUNDWATER FLOW - FEBRUARY 1991				
 MOORE & TABER GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS				
PREP. M.W.V.	DRAWN E.G.D.	APPROVED	DATE	JOB No. 191-028



SECTION 3.0
WATER CHEMISTRY

3.0 WATER CHEMISTRY

3.1 BACKGROUND

Groundwater and surface water in the vicinity of the Colton Sanitary Landfill were monitored to evaluate the possible impacts of the landfill on both groundwater and the adjacent Santa Ana River surface water quality. In order to evaluate possible groundwater contamination, "clean water" levels were established on the basis of the Applicable or Relevant and Appropriate Requirements (ARARs) standards established by Federal regulatory agencies. The media of concern for this evaluation was considered to be the groundwater beneath and adjacent to the site, and the Santa Ana River surface water upgradient and downgradient of the site.

Statistical analyses were completed in accordance with CCR Title 23, Chapter 15, Article 5 using analytical methods described in the EPA Interim Final Guidance document "Statistical Analyses of Groundwater Monitoring Data at RCRA Facilities" dated April 1989.

3.2 GROUNDWATER CONDITIONS



Following the groundwater flow characterization, groundwater monitoring locations were categorized as either upgradient or downgradient at the landfill, based on the groundwater flow pattern. Well CL-1 was designated as upgradient or background location, whereas wells CL-2, CL-3, CL-4, CL-5 and CL-6 were considered downgradient.

Statistical analysis of the groundwater monitoring data for the monitoring period July 1988 to July 1991, is summarized in Table 3.1. The median values of the downgradient locations, for the three-year monitoring period, compared to the median background (upstream) location is presented in Table 3.2.

As can be seen, there is statistically significant evidence that the concentrations of several constituents in downgradient wells CL-2, CL-3, CL-4, CL-5 and CL-6 exceed upgradient concentrations (CL-1).

TABLE 3.1
STATISTICAL COMPARISON TO BACKGROUND WELL
BASED ON EPA RECOMMENDED STATISTICAL METHODS

	Statistical Method	CL-2	CL-3	CL-4	CL-5	CL-6
GENERAL CHEMISTRY (ug/l)						
Chemical Oxygen Demand	ANOVA - Nonparametric				?	
Chloride	ANOVA					
Conductivity	ANOVA - Nonparametric					
Hardness	ANOVA - Nonparametric					
Nitrate	Test of Proportions					
pH	ANOVA - Nonparametric		?			
Phosphate	Test of Proportions					
Sulfate	ANOVA					
Total Dissolved Solids	ANOVA - Natural Log					
Total Organic Carbon (TOC)	< 10% detects - No Analysis					
Total Organic Halides (TOX)	< 10% detects - No Analysis					
VIETALS (ug/l)						
Arsenic	Test of Proportions					
Barium	ANOVA - Nonparametric				?	
Boron	ANOVA - Nonparametric					?
Cadmium	< 10% detects - No Analysis					
Calcium	ANOVA - Nonparametric		?			
Copper	< 10% detects - No Analysis					
Iron	ANOVA - Nonparametric					
Lead	< 10% detects - No Analysis					
Magnesium	ANOVA - Nonparametric					
Manganese	ANOVA - Nonparametric				?	
Potassium	ANOVA - Nonparametric				?	
Sodium	ANOVA - Nonparametric		?			
Zinc	< 10% detects - No Analysis					
VOLATILE ORGANICS						
1,1-Dichloroethane	Test of Proportions				?	?
1,1-Dichloroethene	< 10% detects - No Analysis					
1,2-Dichlorobenzene	< 10% detects - No Analysis					
1,2-Dichloroethane	< 10% detects - No Analysis					
1,2-Dichloroethene (Total)	Test of Proportions				?	
1,2-Dichloropropane	< 10% detects - No Analysis					
1,3-Dichlorobenzene	< 10% detects - No Analysis					
1,4-Dichlorobenzene	Test of Proportions				?	?
Chloroform	< 10% detects - No Analysis					
Cis-1,2-Dichloroethene	ANOVA-Nonparametric				?	
Dichlorodifluoromethane	Test of Proportions			?	?	?
Methylene Chloride	< 10% detects - No Analysis					
Tetrachloroethene	Test of Proportions					
Trans-1,2-Dichloroethene	Test of Proportions					
Trichloroethene	ANOVA - Nonparametric		?			?
Vinyl Chloride	Test of Proportions					
PESTICIDES & PBCs, EPA 608 (ug/l)	< 10% detects - No Analysis					

 Definite statistical evidence for contamination
 Statistical evidence, but statistics < critical values

**TABLE 3.2
GROUNDWATER WELLS DATA SUMMARY**

PARAMETER	LOCATION*					
	CL-1	CL-2	CL-3**	CL-4	CL-5	CL-6
GENERAL CHEMISTRY (mg/L)						
Chemical Oxygen Demand	5	5	8	5	10	61
Chloride	60	56	208	57	55	70
Conductivity	812	863	2070	802	952	1110
Hardness	269	326	683	314	365	370
Nitrate	0.05	0.05	0.74	8	0.05	0.08
pH	7.32	7.12	6.79	7.1	6.71	6.82
Phosphate	1.45	0.91		0.15	0.19	1.01
Sulfate	130	145	85	71	130	150
Surfactants	0.100	0.100			0.100	
Total Dissolved Solids	522	572	1013	528	612	739
Total Organic Carbon (TOC)	1.1	1.1	3.1	0.9	2	5.4
Total Organic Halides (TOX)	0.03	0.037	0.028	0.009	0.021	0.031
METALS (mg/L)						
Arsenic	0.003	0.006	0.002	0.002	0.01	0.005
Barium	0.06	0.09	0.10	0.2	0.11	0.11
Boron	0.40	0.30	0.33	0.09	0.4	0.58
Cadmium	0.0029	0.0027	0.0007	0.0027	0.0002	0.005
Calcium	84	102	142	80	107.5	119
Copper			0.02			
Iron	0.05	0.11	1.41	0.01	4.75	3.5
Lead	0.003		0.0027	0.0022		0.002
Magnesium	14	18	80	27	12.75	16
Manganese	0.90	0.90	2.1		1.6	1.1
Molybdenum	0.02			0.03		
Phosphorous	1.7	0.6	NA	0.2		0.2
Potassium	7	9	12	2	11	8
Sodium	66	57	151	48	57.25	56
Zinc	0.01		0.02	0.01	0.01	0.01
VOLATILE ORGANICS (ug/L)						
1,1,1-Trichloroethane						
1,1-Dichloroethane	0.8	0.50	3.1	0.34	1.14	1.97
1,1-Dichloroethene						
1,2-Dichlorobenzene		0.50			1.2	1
1,2-Dichloroethane			2.83			9.5
1,2-Dichloroethene (Total)		1.00	21	1.6	2.8	4.5
1,2-Dichloropropane						
1,3-Dichlorobenzene						0.26
1,4-Dichlorobenzene					1.08	
Chlorobenzene					1.3	1
Chloroform						

TABLE 3.2
GROUNDWATER WELLS DATA SUMMARY

PARAMETER	LOCATION*					
	CL-1	CL-2	CL-3**	CL-4	CL-5	CL-6
VOLATILE ORGANICS (ug/L) CONT.						
Cis-1,2-Dichloroethene		0.50		0.65	1.2	3.4
Dichlorodifluoromethane		0.5	5.2	1.5	4.8	4.40
Methylene Chloride						
Tetrachloroethene	0.9	0.54	4.3	3.4		
Trans-1,2-Dichloroethene	0.3	0.35	9	0.5	1.3	4.2
Trichloroethene	1	0.5	3.4	0.86	1.17	1.22
Vinyl Chloride		0.29	7.6		4.1	1.35
PESTICIDES & PCBS (ug/L)						
4,4'-DDE			0.007		0.007	0.007
4,4'-DDT						
Aldrin			0.005			
Delta-BHC						
Dieldrin			0.005			
Endosulfan I					0.009	
Endosulfan II			0.02			
Endosulfan Sulfate		0.10				
Endrin						
Endrin Aldehyde		0.11	0.018			
Gamma-BHC						

* Reflect median values for the monitoring period July 1988 - July 1991

(Colton:Median91:10/20/91)

** Sampled only on July 1988 and October 1988; well was dry since

NA = Not Analyzed by laboratory.

Shaded areas indicate statistically "Not Detected" (<10% detected)

In order to evaluate the probability that measured values exceed ARAR limits, a simple tolerance interval analysis was completed at the 95 percent level of confidence. These analyses were completed only for those constituents with specified ARAR values and only at those locations where the measured concentrations were found to differ significantly from background levels. The tolerance interval analysis (summarized in Table 3.3) indicates that of the forty parameters analyzed at the five downgradient locations, only three compounds (vinyl chloride, manganese, and iron) exceeded both background water quality concentration and ARARs, and this occurred at only two monitoring locations (CL-5 and CL-6).

Of the parameters identified, vinyl chloride is considered the most significant since it may exist at concentrations above the California primary drinking water standards (0.5 ug/l).

3.3 SURFACE WATER CONDITIONS

The quarterly surface water monitoring program included analysis of Santa Ana River water west and northeast of the Colton Landfill boundary. The designated surface water monitoring stations were assigned upgradient (CL-A) and downgradient (CL-B) designations. No significant difference in the surface water chemistry has been identified at either sample location, nor were any constituents detected above ARAR limits.

3.4 SURFACE SEEPS

As part of the Santa Ana River Trace Organics Investigation (RWQCB November, 1988), five samples were taken from a surface water seep identified near the western boundary of the Colton Landfill. Dichloroethane, trichloroethene and vinyl chloride were consistently detected, with only vinyl chloride exceeding the ARARs. The seep chemistries are considered comparable in contaminant levels to downgradient groundwater quality, as monitored in wells CL-5 and CL-6.

TABLE 3.3
COMPLIANCE WITH ARAR'S AT 95% CONFIDENCE LIMIT
(based on detected values only)

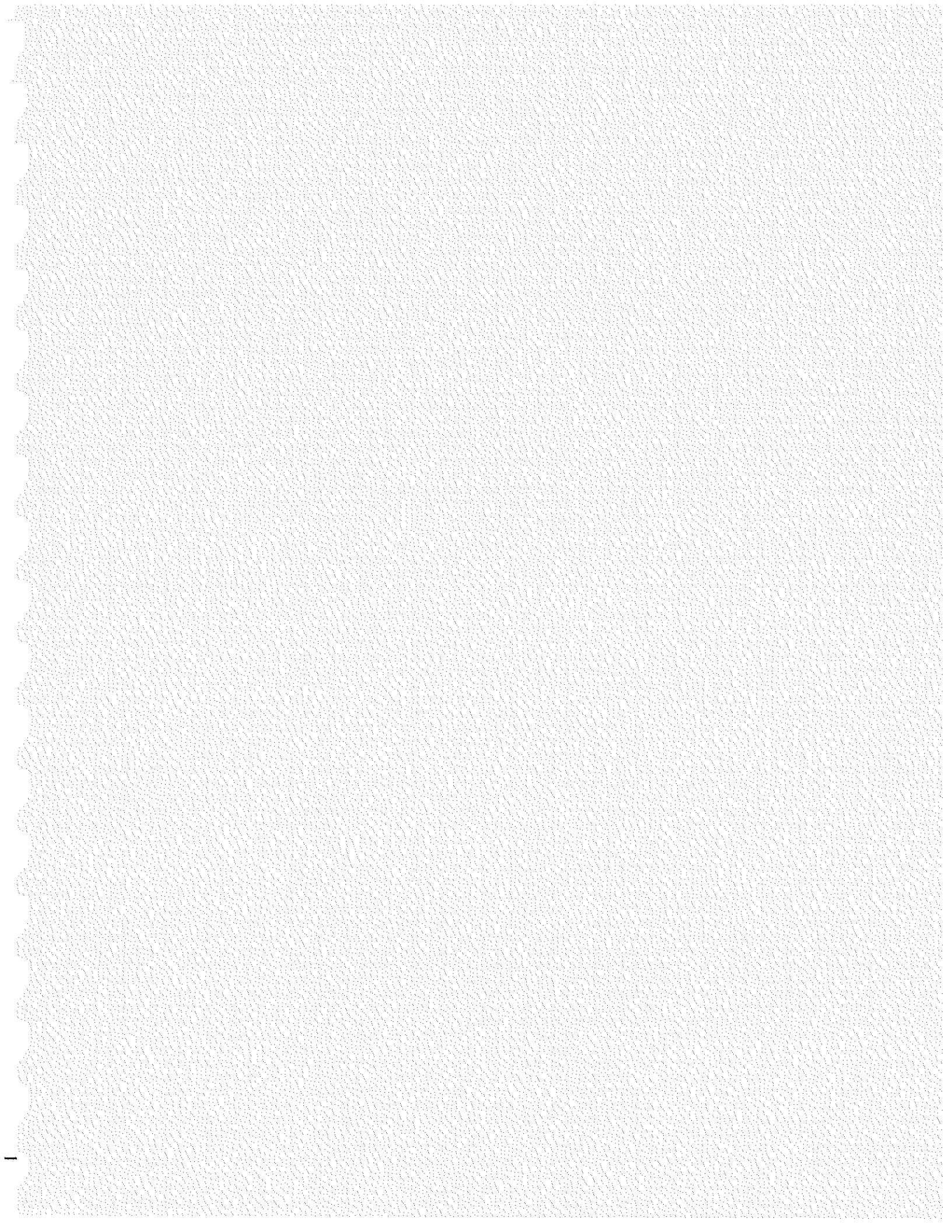
CONSTITUENT	WELL 2	WELL 3	WELL 4	WELL 5	WELL 6
Inorganics					
Chloride	-	*	-	-	yes
Conductivity	-	*	-	yes	yes
Sulfate	-	-	-	-	yes
TDS	-	*	-	yes	yes
Metals					
Iron	-	*	-	no	no
Barium	-	-	yes	yes	yes
Manganese	-	*	-	no**	no**
Volatile Organics					
1-1 Dichloroethane	-	-	-	yes	yes
1-4 Dichlorobenzene	-	-	-	yes	yes
Tetrachloroethene	-	-	yes	-	-
Trichloroethene	-	*	yes	-	yes
Vinyl chloride	-	-	-	no	no

shaded parameters indicate exceedance of background level

- not identified above background

* insufficient data for analysis

** also exceeds ARAR in upgradient well



SECTION 4.0

CONTAMINANT FLOW PATHWAYS

4.0 CONTAMINANT FLOW PATHWAYS

4.1 GENERAL

Based on the groundwater chemistry analysis, discussed in Section 3, Vinyl Chloride is considered the most significant of the constituents of concern. As a result, it was important to study the potential migration pathways for vinyl chloride downstream of the landfill property. Two potential flow pathways were evaluated:

- o Migration to surface waters via seeps
- o Migration in the groundwater beneath the Santa Ana River Channel

4.2 POTENTIAL MIGRATION TO SURFACE WATER

On several occasions in the past, landfill seeps have been identified at the surface along the western property limit. In this area, the theoretical groundwater contours were shown to daylight at existing grades and surface seeps would, in fact, be expected.

The surface seep analysis (Section 3.4) suggests that the chemical characteristics of the seeps are similar in composition to the downgradient groundwater wells. Among the contaminants identified, only vinyl chloride should exist at levels above the ARARS at the point of discharge. In such instances the surface seep may create a health hazard, although its impact on overall Santa Ana River conditions is still expected to be negligible.

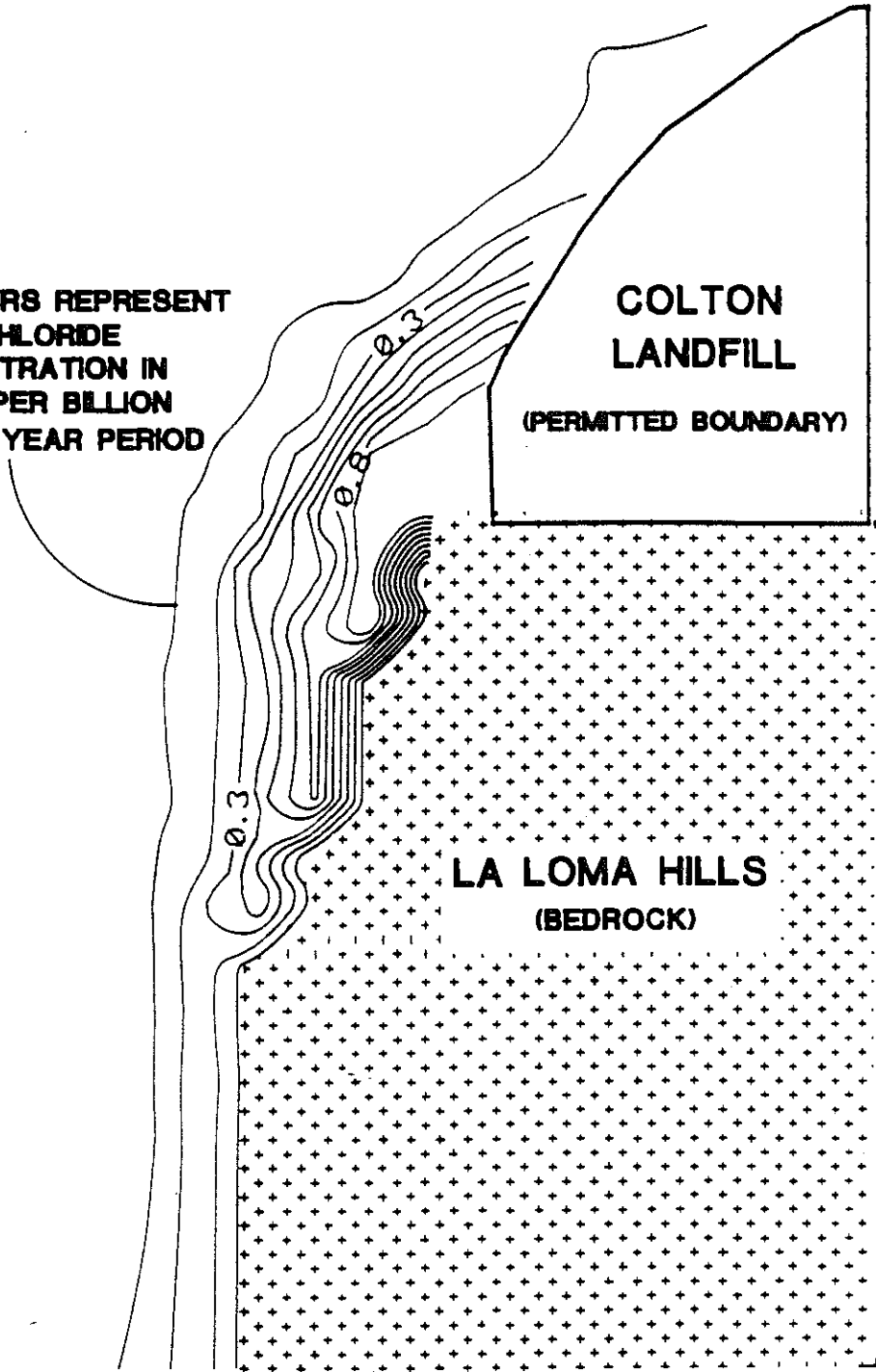
4.3 POTENTIAL MIGRATION TO GROUNDWATER

In evaluating the migration of vinyl chloride in groundwater southwest of the site, a contaminant flow model was developed using the estimated hydrogeologic parameters, the average vinyl chloride concentrations encountered in wells CL-5 and CL-6, and the USGS MOC flow model. The results of the twenty-year

model are presented in Figure 4.1. As can be seen, the vinyl chloride concentration in the groundwater is expected to drop well below primary drinking water standards (0.5 ug/l), solely as a result of dilution, within about 1,000 feet downstream of the landfill boundary.

Considering the potential for chemical degradation over time, vinyl chloride concentrations are anticipated to fall below detection limit concentrations within approximately 1500 feet of the landfill footprint (Figure 4.2).

CONTOURS REPRESENT
VINYL CHLORIDE
CONCENTRATION IN
PARTS PER BILLION
FOR 20 YEAR PERIOD



**COLTON
LANDFILL**
(PERMITTED BOUNDARY)

**LA LOMA HILLS
(BEDROCK)**

FIGURE 4.1

**COLTON SANITARY LANDFILL
HYDROGEOLOGIC CHARACTERIZATION
SAN BERNARDINO COUNTY, CALIFORNIA**

VINYL CHLORIDE CONCENTRATIONS



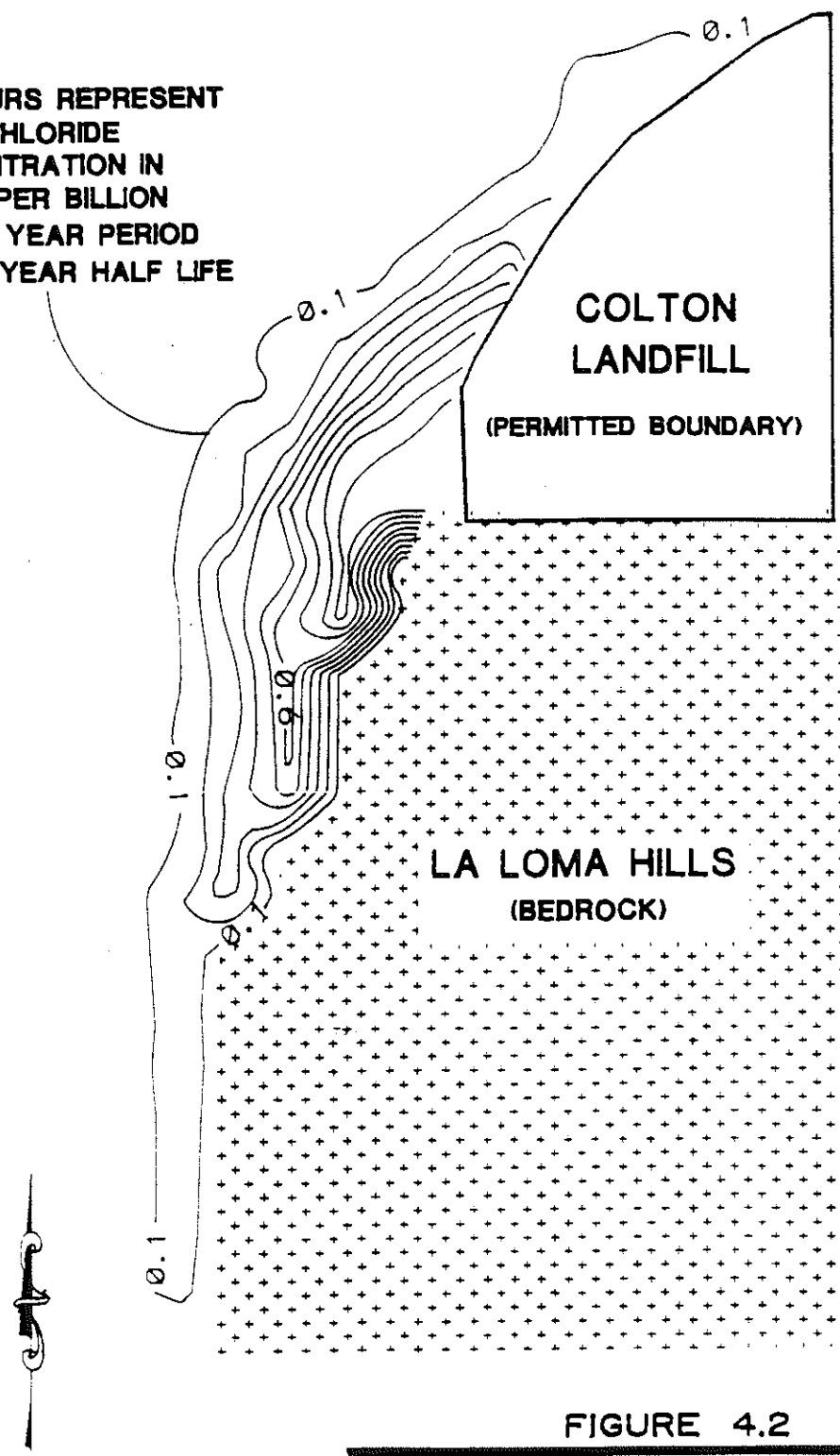
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SCALE : 1" = 500'

CONTOURS REPRESENT
VINYL CHLORIDE
CONCENTRATION IN
PARTS PER BILLION
FOR 20 YEAR PERIOD
WITH 5 YEAR HALF LIFE



SCALE : 1" = 500'

FIGURE 4.2

COLTON SANITARY LANDFILL
HYDROGEOLOGIC CHARACTERIZATION
SAN BERNARDINO COUNTY, CALIFORNIA

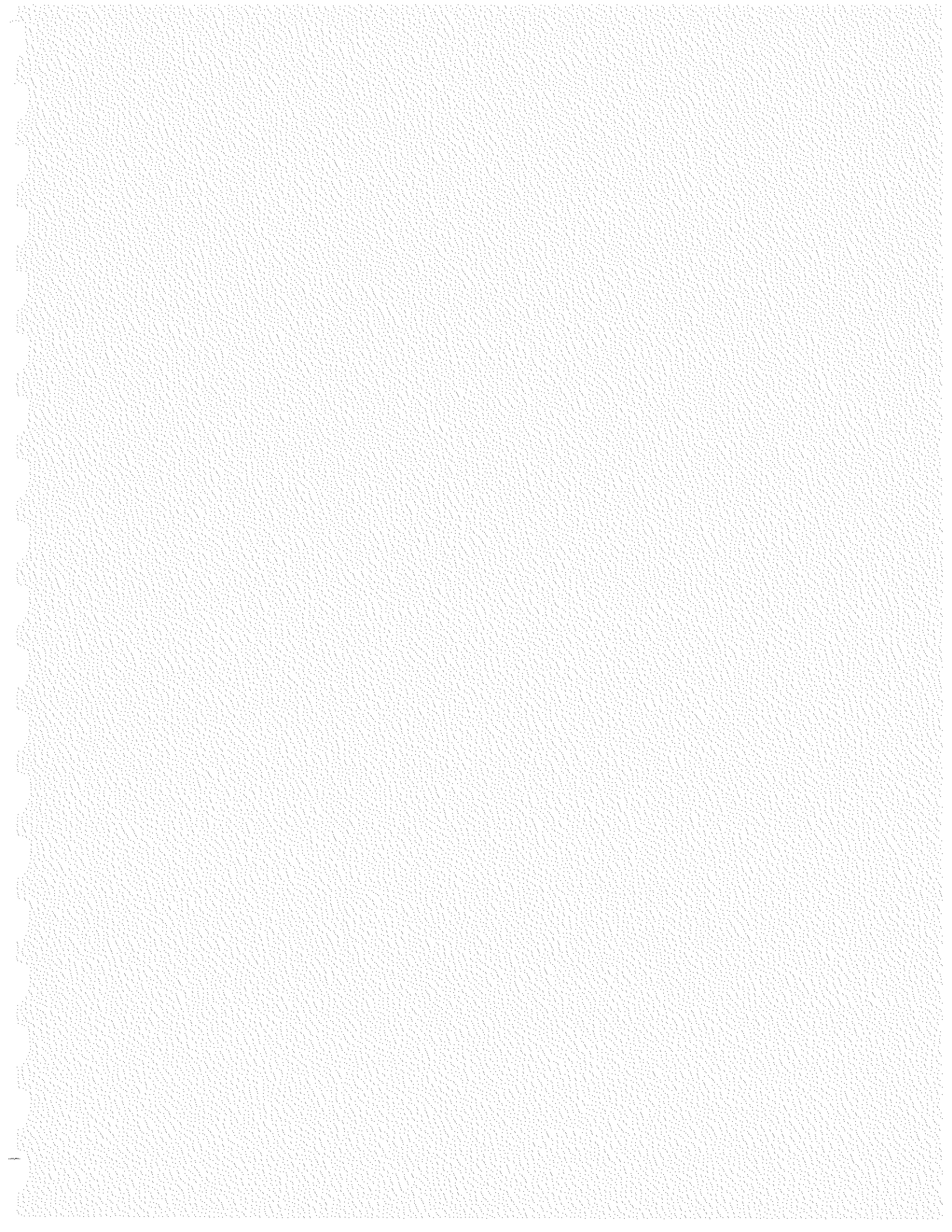
VINYL CHLORIDE CONCENTRATIONS



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SECTION 5.0
CORRECTIVE ACTION ALTERNATIVES

5.0 CORRECTIVE ACTION ALTERNATIVES

5.1 INTRODUCTION

The results of the hydrogeologic investigation, presented previously, suggest that the Colton Landfill may be impacting the surrounding surface and groundwater conditions in the following ways:

- o Direct contact between groundwater and refuse.
- o Creation of groundwater seeps along the western perimeter of the landfill.
- o Minor alteration of groundwater chemistry below and immediately downgradient of the landfill.

The data also indicate that the local deterioration in water quality does not create a significant threat to the overall groundwater and surface water quality in Santa Ana River Basin.

Several remediation alternatives were evaluated as part of the corrective action program. These alternatives are discussed in detail in this section.

5.2 ALTERNATIVE 1: GROUNDWATER EXTRACTION SYSTEM

The first corrective action alternative evaluated for remediation of groundwater adjacent to the landfill site includes collection, extraction and treatment of all affected groundwater. In reviewing the practicality of such a system, modelling of several idealized extraction systems was completed using the hydrogeologic and groundwater data available for the site.

Owing to the expected small cone of depression and high production, a linear extraction well system was not considered viable. Construction of a shallow continuous french drain collection system along the front face of the landfill was considered more economic of flow volumes.

In order to evaluate the effectiveness of a continuous french drain collection system, the flow that would be generated by 6-, 12-, and 18- inch deep drains were modelled using the PC-Seep computer program (Figures 5.1 through 5.6). Table 5.1(a) summarizes the extraction volumes that would be expected at the site given the range of hydraulic characteristics identified. It should be recognized that these volumes would be generated on a continuous basis throughout the service life of the collection system and do not take into account the substantially increased flows that could be generated during high water conditions associated with storm and/or high river flow events.

The data suggests that recovery of contaminants within the upper ten feet of the groundwater system could be effected by a drain placed only 6 to 12 inches below static water levels. A ten-foot depth of recovery is considered reasonable, since the primary constituent of concern in the groundwater emanating from the landfill site (i.e. vinyl chloride) typically concentrates in the shallow environment.

Additional evaluation of the french drain extraction system included calculation of the probable effects of dilution that will occur as an inherent byproduct of collection. In completing this analyses it was assumed that this system would be constructed in line with monitoring wells CL-5 and CL-6 and that contributions from the river (clean) and the landfill (degraded) side of the collection system would be approximately equal. Given these assumptions, it is estimated that the concentration of contaminants would be diluted by at least 50% within the collection system. In the case of vinyl chloride this would likely result in an average concentration of less than 1 ug/l at the extraction point of the drain.

TABLE 5.1(a)
ANTICIPATED FLOW INTO DRAIN

MODEL PARAMETER	6" DEEP DRAIN	12" DEEP DRAIN	18" DEEP DRAIN
No Cutoff Wall Aquifer K = 15 ft/day	5.9 cf/day/ft	11.5 cf/day/ft	17.1 cf/day/ft
No Cutoff Wall Aquifer K = 50 ft/day	19.5 cf/day/ft	38.9 cf/day/ft	58.1 cf/day/ft

TABLE 5.1(b)
ANTICIPATED FLOW INTO DRAIN

MODEL PARAMETER	6" DEEP DRAIN	12" DEEP DRAIN	18" DEEP DRAIN
Cutoff Wall Aquifer K = 15 ft/day	6.4 cf/day/ft	10.5 cf/day/ft	14.6 cf/day/ft
Cutoff Wall Aquifer K = 50 ft/day	22.2 cf/day/ft	36.3 cf/day/ft	50.4 cf/day/ft

(Colton:tb15-1ab:10-30-91)

VELOCITY VECTOR PLOT

(COLTQH)

SERIAL NO. B9099 is licensed to: MOORE & TABER

3-7-91

NO CUT-OFF WALL W/DRAIN - GRADIENT OUT OF LANDFILL

IMPOSED HEAD = 0.0000100 (Jug)

$K = 14.5 \text{ ft/day}$
 $\text{Drain} = 6 \text{ inches deep}$

$Q = 5.9 \text{ Ft}^3/\text{day/ft}$

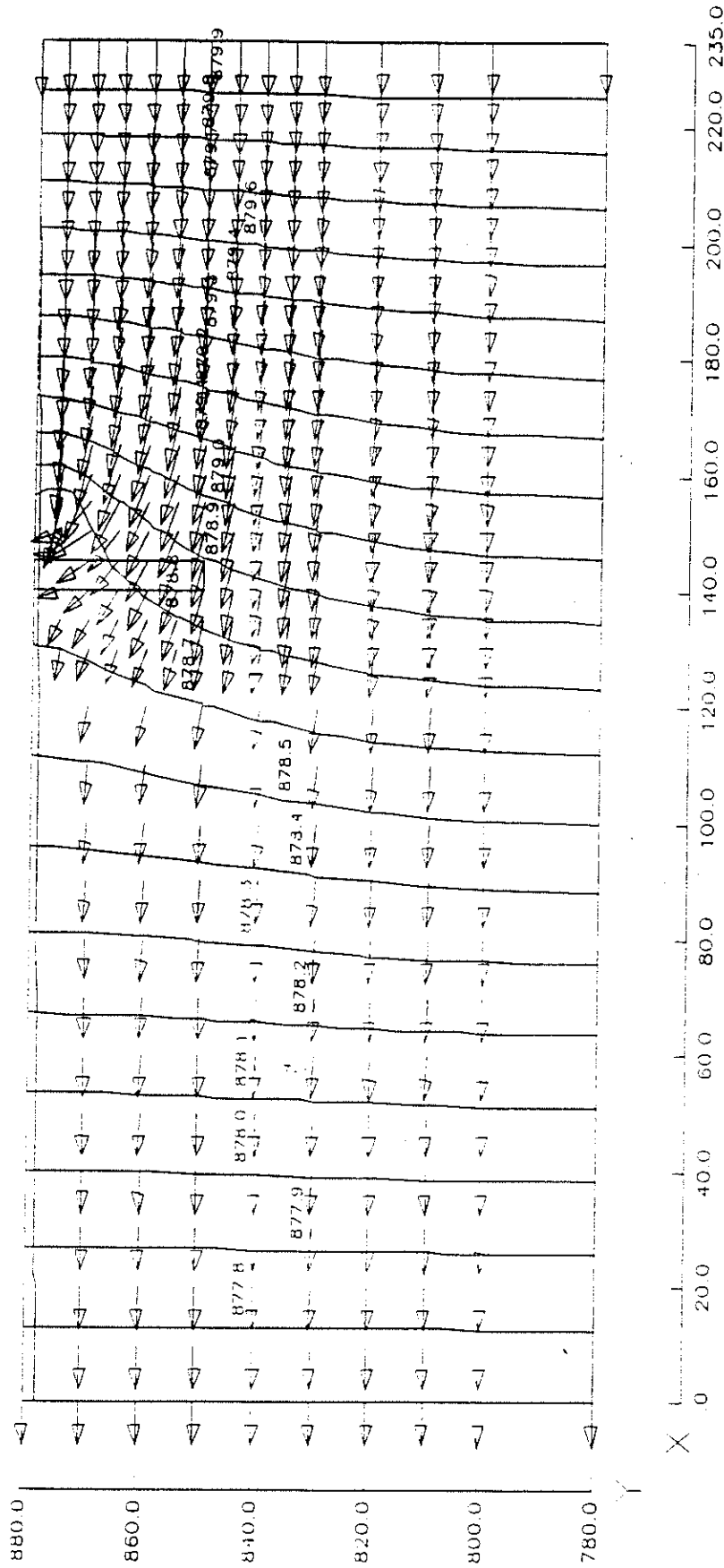


FIGURE 5.1

VELOCITY VECTOR PLOT

SERIAL NO. 25099 is licensed to: MOORE & TABELL

CULIOTT

3-7-91

100 FEET OFF WALL W/DRAIN GRADIENT OUT OF TRENCH

ELAPSED TIME = .0000E+00 (day)

$K = 50 \text{ ft/day}$
 Drain = 6 inches deep

$Q = 19.5 \text{ Ft}^3/\text{day/ft}$

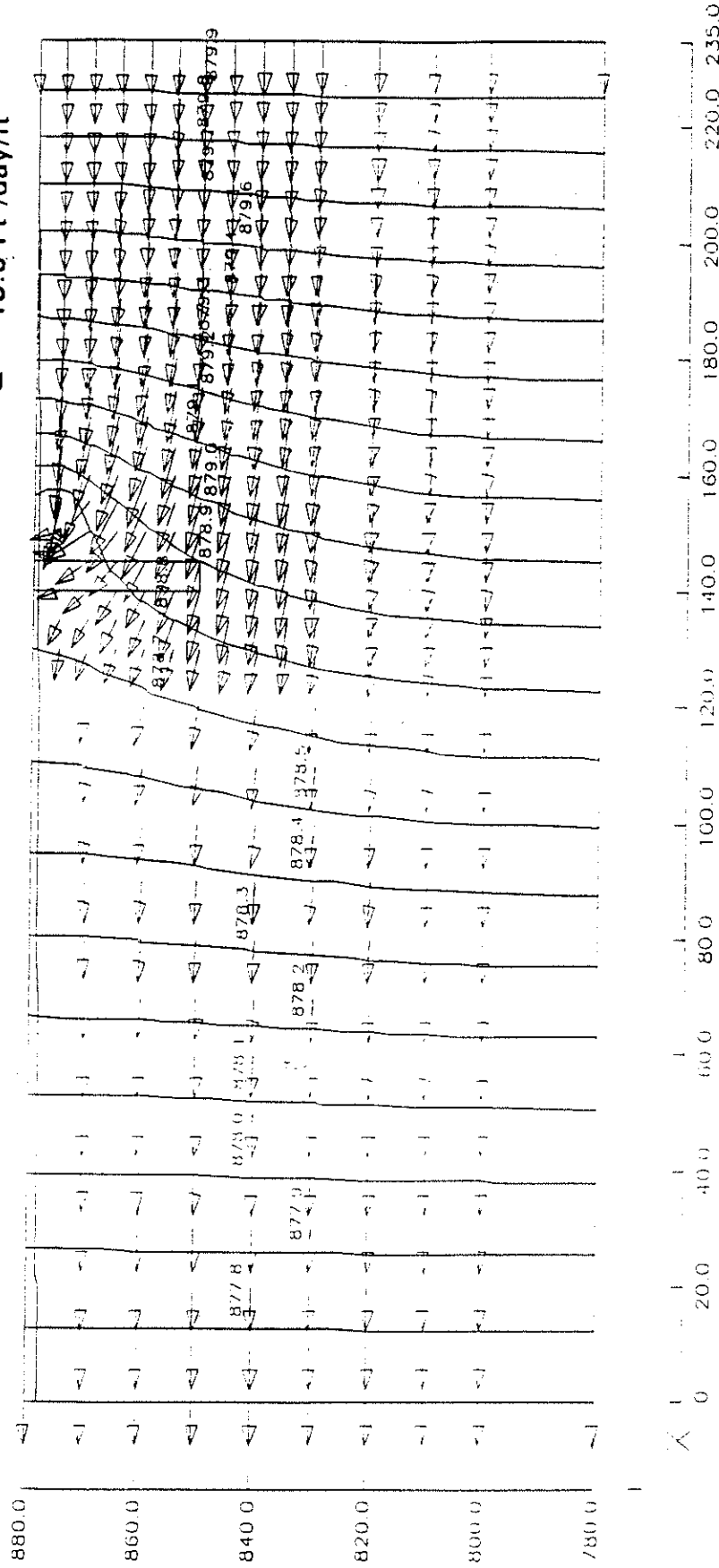


FIGURE 5.2

WATER TABLE ELEVATION

SERIAL DRAINAGE IS CONTROLLED BY MOORE & FABER

CORRECTION

3-7-91

NO CUT-OFF WALL W/DRAIN - GRADIENT OUT OF LANDFILL

LAPSED TIME = .00000E+00 (Day)

K = 14.5 ft/day
Drain = 12 inches deep

Q = 11.5 Ft³/day/ft

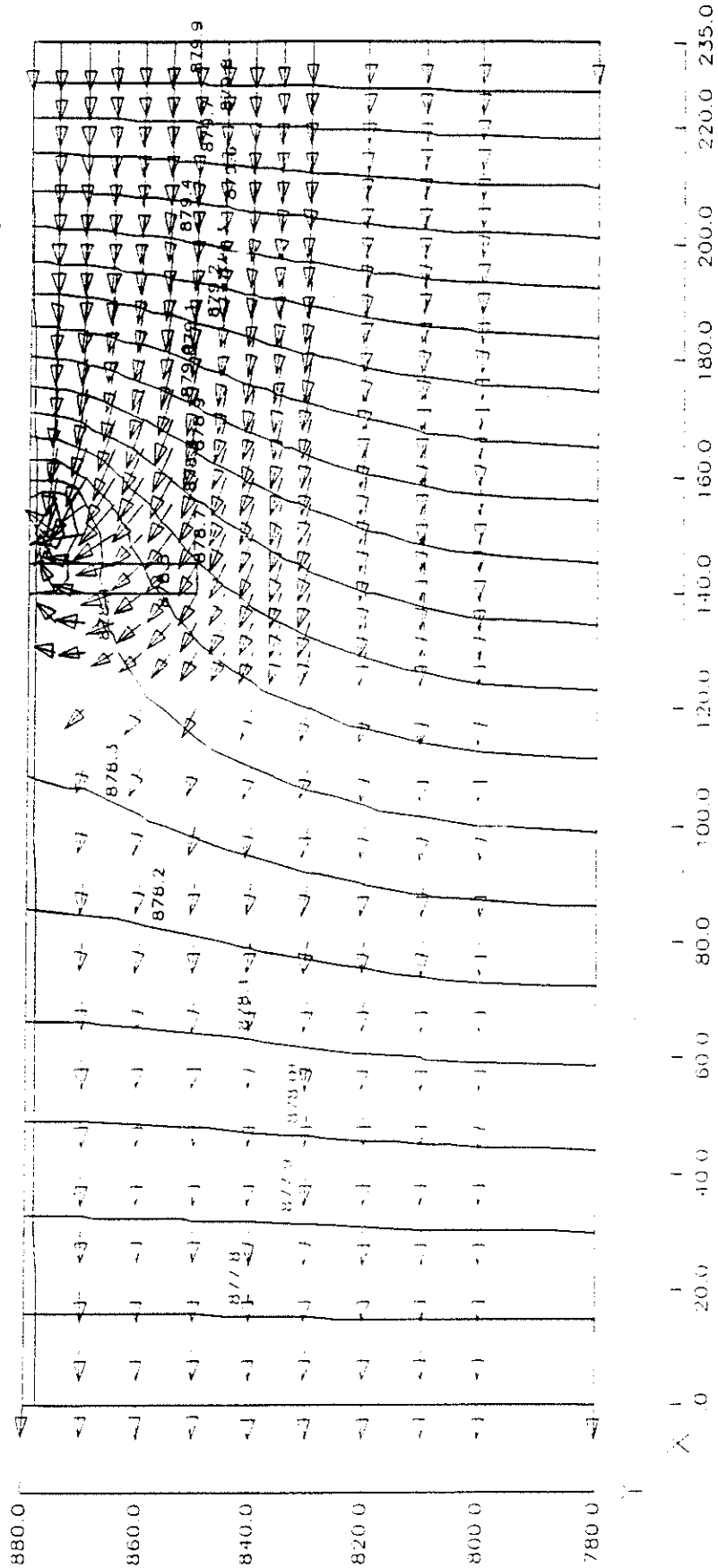


FIGURE 5.3

VELOCITY VECTOR PLOT

SERIAL NO. 890009, licensed to: MOORE & TABER

00110H

3-7-91

NO CUT OFF WALL W/DRAIN GRADIENT OUT OF LANDFILL

$K = 50 \text{ ft/day}$
 $\text{Drain} = 12 \text{ inches deep}$

ELAPSED TIME = .0000E+00 (day)

$Q = 38.9 \text{ Ft}^3/\text{day}/\text{ft}$

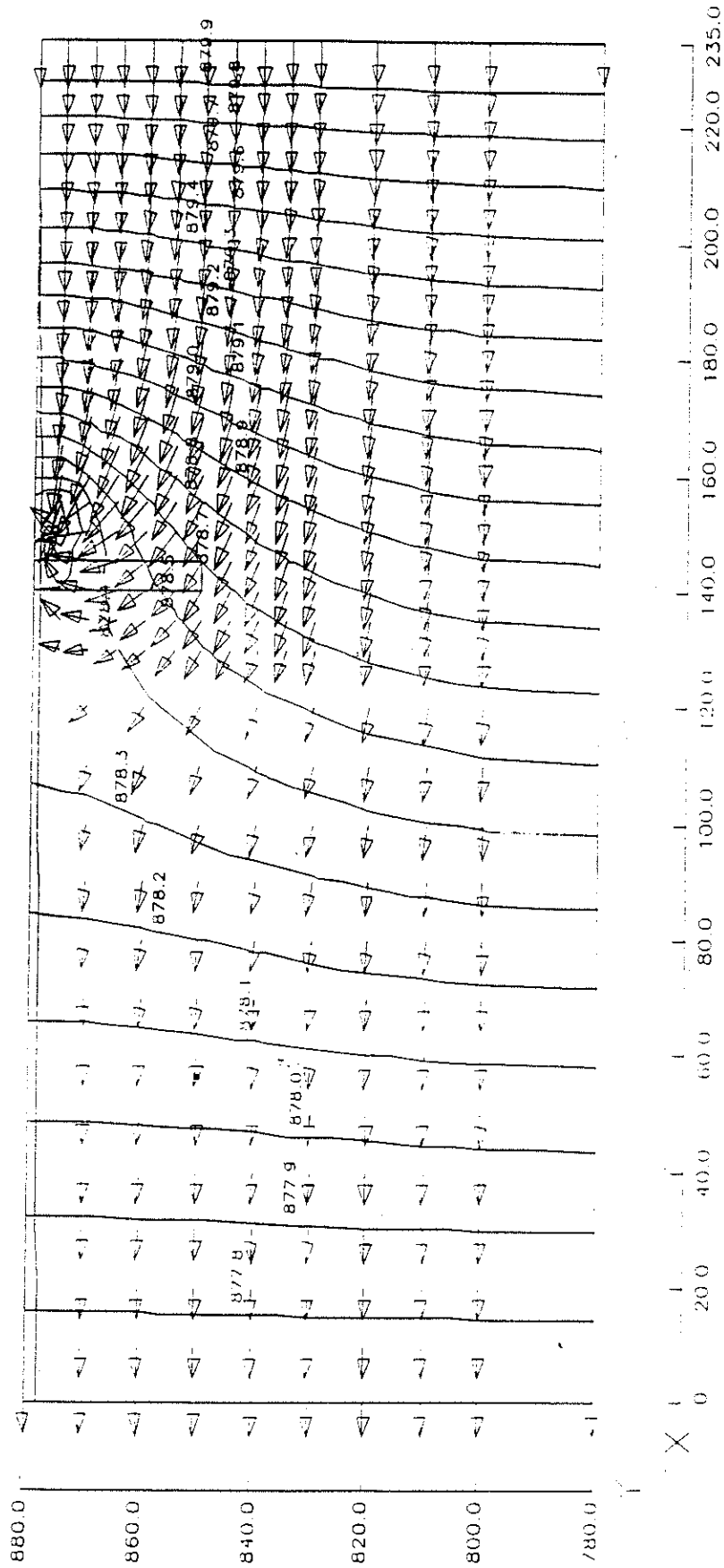


FIGURE 5.4

VELOCITY VECTOR PLOT

CURTIS

SERIAL HD-800599 is licensed to MADDORE & TADDER

5 / 91

HD CUT-OFF WALL W/ DRAIN GRADIENT OUT OF LAIDHIII

$K = 14.5$ ft/day
Drain = 18 inches deep

ELAPSED TIME = .00000E+00 (day)

$Q = 17.1$ Ft³/day/ft

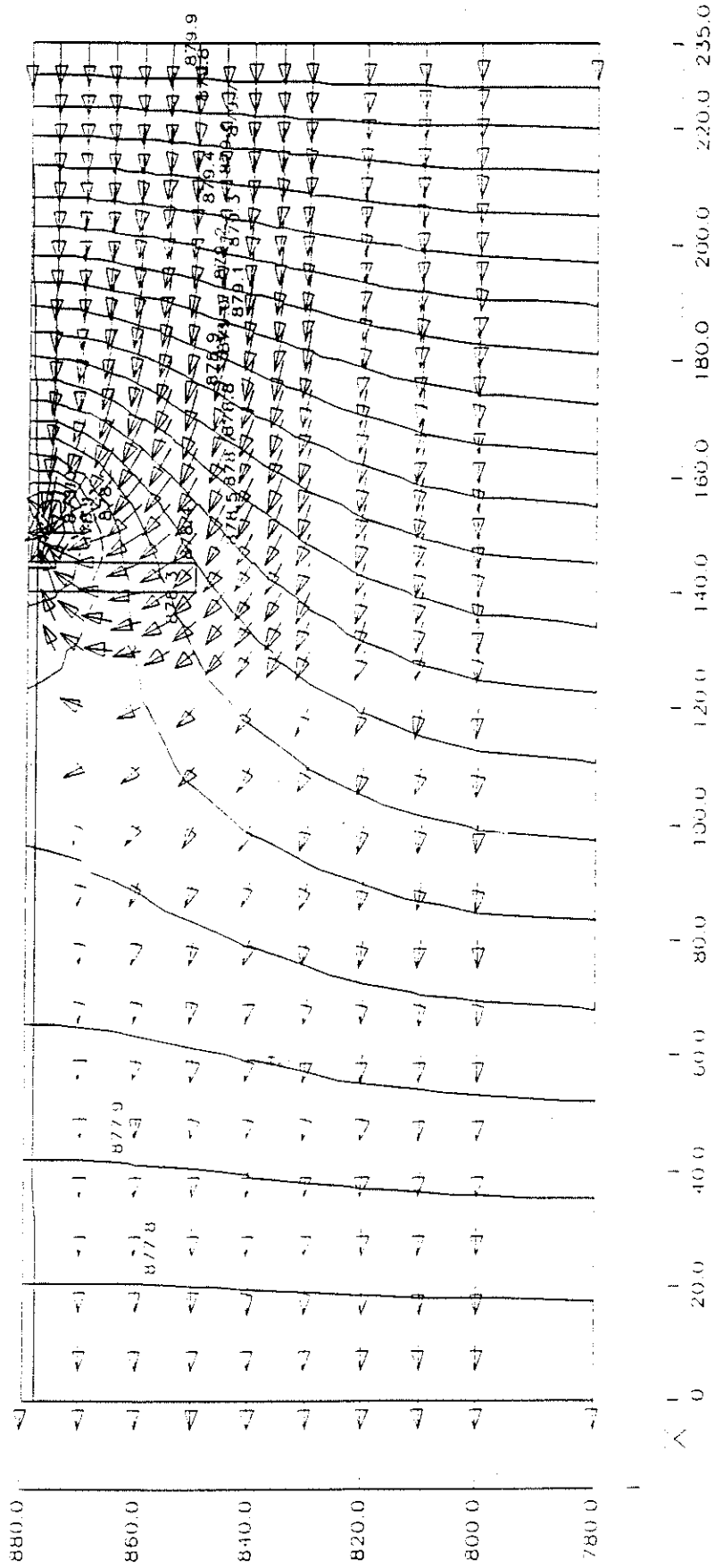


FIGURE 5.5

VELOCITY VECTOR PLOT

SERIAL NO 59007 is licensed to: MOORE & FABER

3-7-91

NO CUTOFF WALL W/DRAIN GRADIENT OUT OF TABLE III

$K = 50 \text{ ft/day}$
 $\text{Drain} = 18 \text{ inches deep}$

ELAPSED TIME = .00000100 (day)

$Q = 58.1 \text{ Ft}^3/\text{day/ft}$

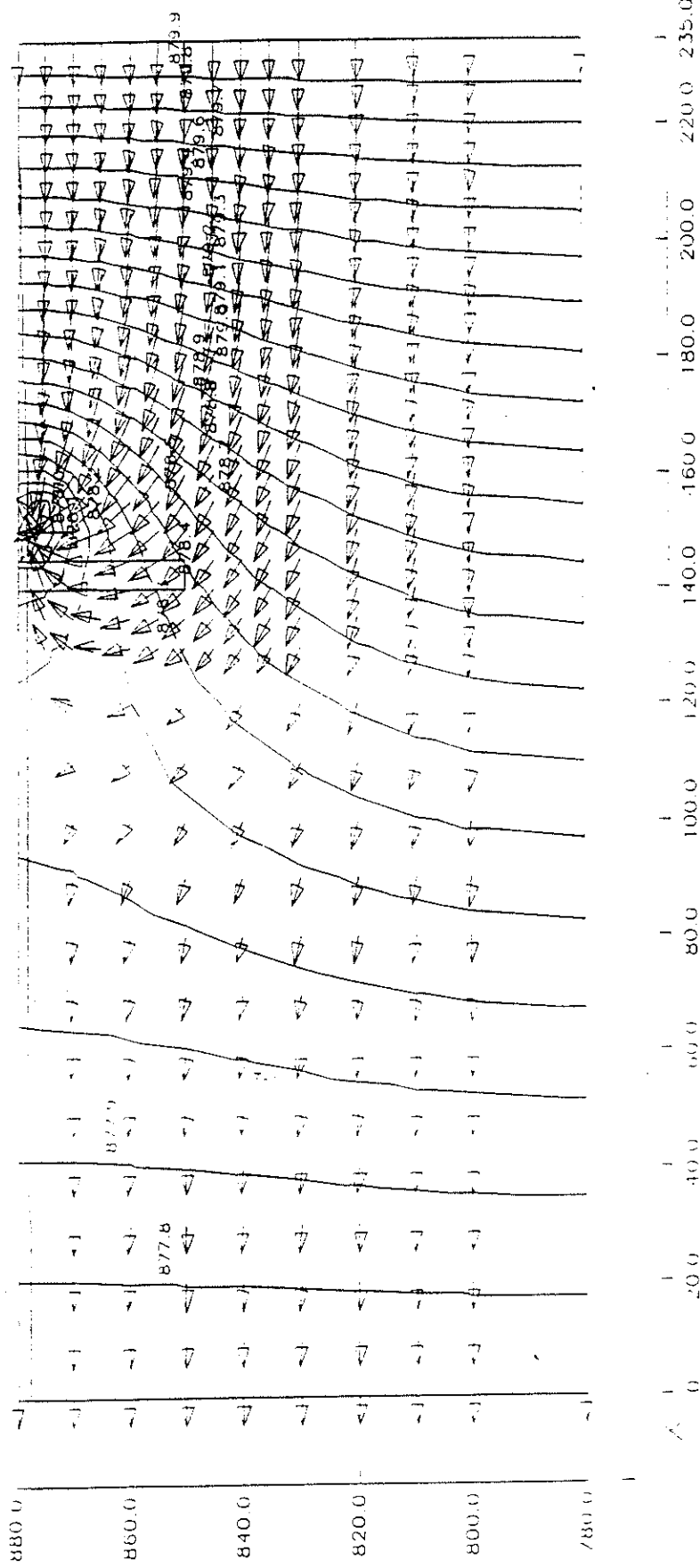


FIGURE 5.6

In attempting to optimize collection of degraded waters and reduce the introduction of clean river water into the system, additional analyses were completed incorporating a limited depth cut-off wall along the downgradient side of the drain. Table 5.1(b) summarizes the flow expected within 6-, 12- and 18-inch deep drains constructed with a 30-foot deep cut-off trench ($K \leq 10^{-7}$ cm/s).

As can be seen, the relatively high hydraulic conductivity of native alluvial materials impedes the efficiency of a shallow cut-off system and therefore, the collection volumes anticipated using the cut-off wall are only slightly less than would be expected without the wall. If a proportional reduction in the dilution factor is assumed, construction of a thirty-foot cut-off wall system would be expected to result in a net reduction in the dilution factor from about 50% to only about 45% and would probably result in an insignificant increase in the average vinyl chloride concentration in the collection system.

5.3 ALTERNATIVE 2: ISOLATION SYSTEMS

A second approach to mitigating groundwater contamination is to construct a cut-off system along the toe of the outside face of the landfill.

Considering the depth to relatively impermeable materials (bedrock) in the vicinity of the front face (as much as three hundred feet; CDMG Special Report 113) a complete isolation system is considered impractical, and therefore was not analyzed further in this report. Partial containment of floating constituents is considered a more viable option and was evaluated further.

Recognizing that the surface seeps present the most probable exposure pathway, a partial cut-off system was evaluated such that liquids migrating below the wall would be unlikely to resurface downgradient of the wall. In evaluating the cut-off system, the PC - Seep computer program was used to generate vectors for flow below 5-, 10- and 15- foot cut-off wall alternatives (Figures 5.7 through 5.9).

VELOCITY VECTOR PLOT

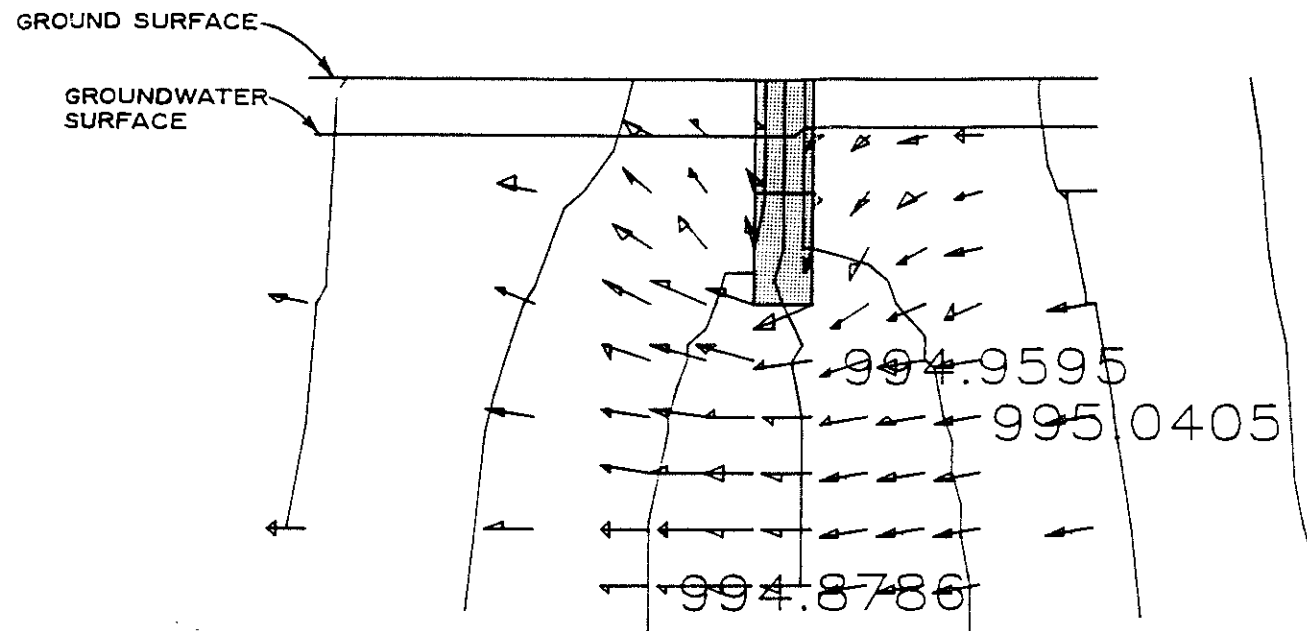
COLTON LANDFILL SEEP REMEDIATION

GROUNDWATER FLOW WITH CUTOFF WALL 15' BELOW GROUNDWATER

ELAPSED TIME = .0000E+00 (day)

SERIAL NO.89099 is licensed to: MOORE & TABER

9-18-91



WALL DETAIL

NOT TO SCALE

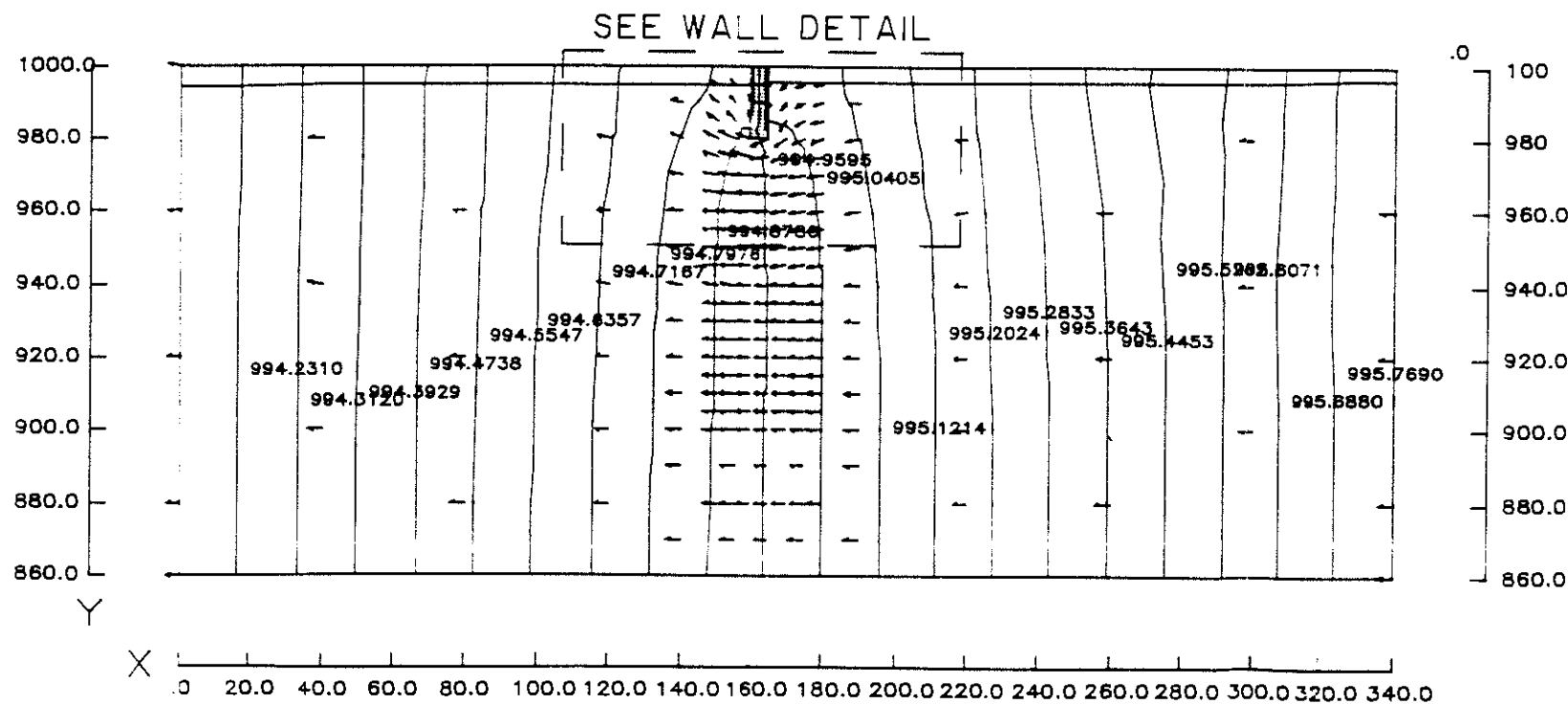


FIGURE 5.7

GROUNDWATER FLOW AROUND A 15' DEEP LOW PERMEABILITY CUT-OFF WALL

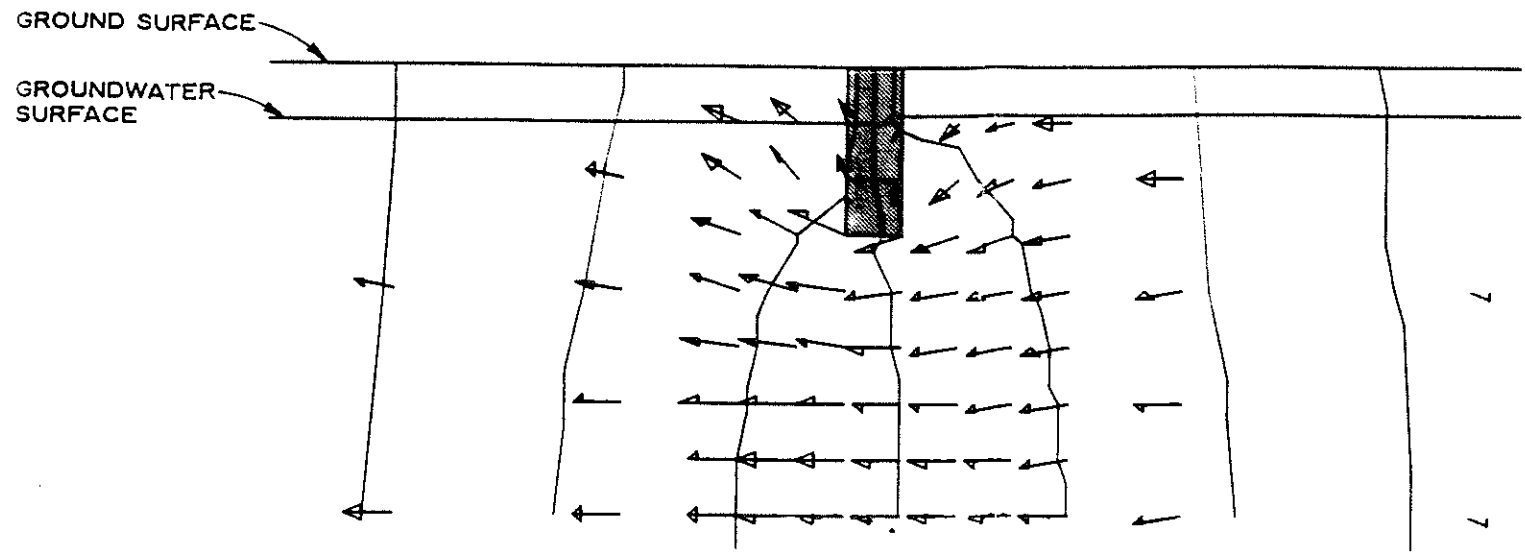
COLTON LANDFILL HYDROGEOLOGIC CHARACTERIZATION



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FIELD MWV	DRAFT	APPROVED	DATE	DRAW No 191-028
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WALL DETAIL

NOT TO SCALE

VELOCITY VECTOR PLOT

SERIAL NO. 89099 is licensed to: MOORE & TABER

COLTON LANDFILL SEEP REMEDIATION

9-18-91

GROUNDWATER FLOW WITH CUTOFF WALL 10' BELOW GROUNDWATER

ELAPSED TIME = .000DE+00 (day)

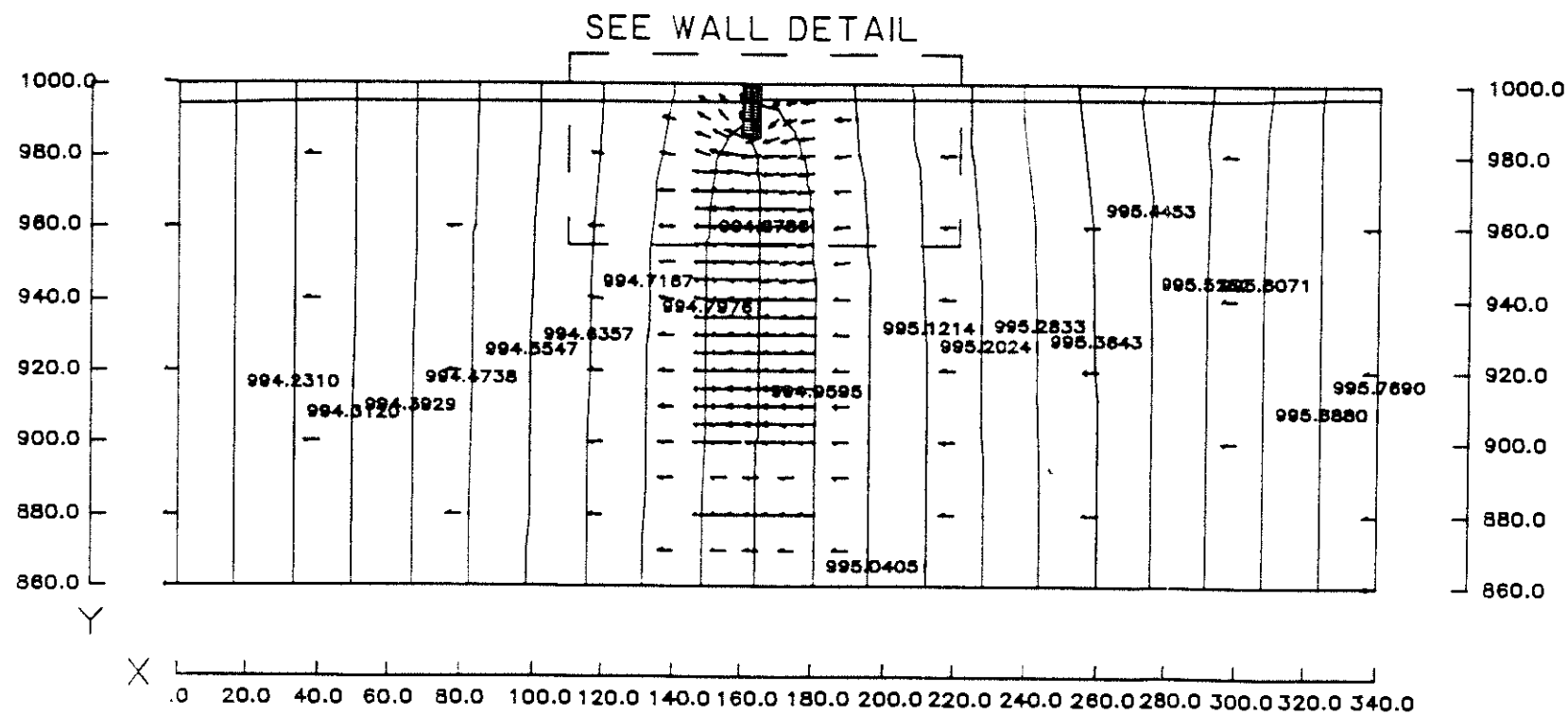


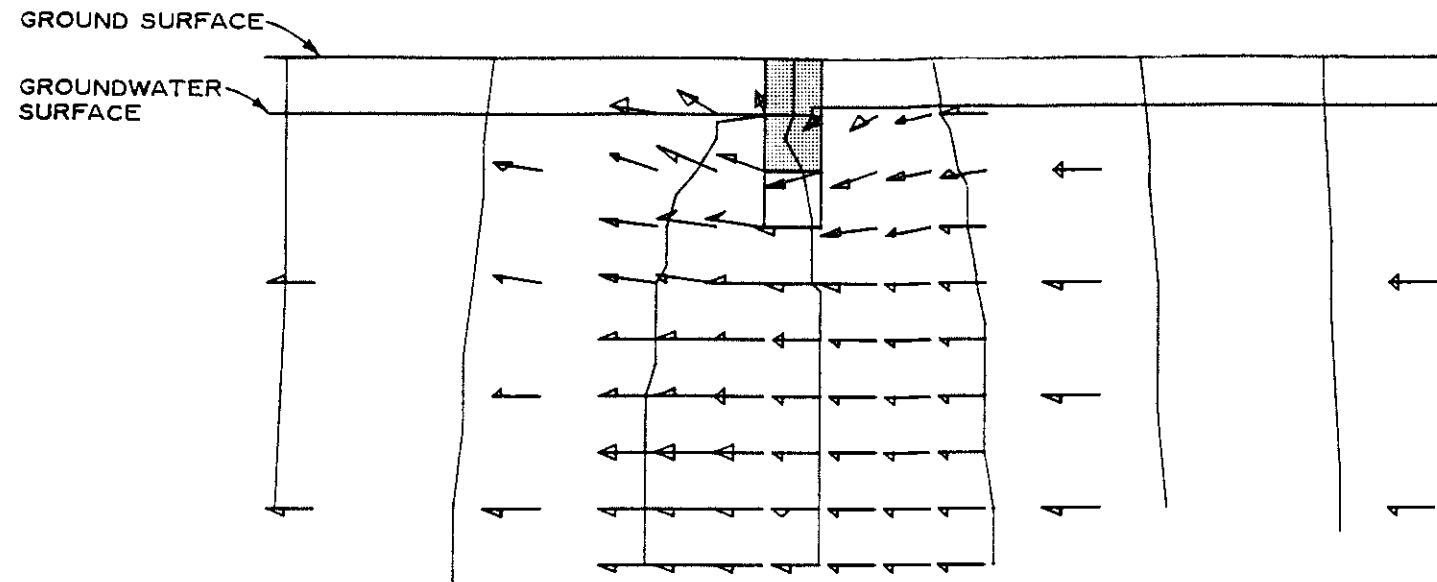
FIGURE 5.8

GROUNDWATER FLOW AROUND A 10' DEEP LOW PERMEABILITY CUT-OFF WALL

COLTON LANDFILL HYDROGEOLOGIC CHARACTERIZATION

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MWV				191-028



WALL DETAIL

NOT TO SCALE

VELOCITY VECTOR PLOT

SERIAL NO.89099 is licensed to: MOORE & TABER

COLTON LANDFILL SEEP REMEDIATION

9-18-91

GROUNDWATER FLOW WITH CUTOFF WALL 5' BELOW GROUNDWATER

ELAPSED TIME = .0000E+00 (day)

SEE WALL DETAIL

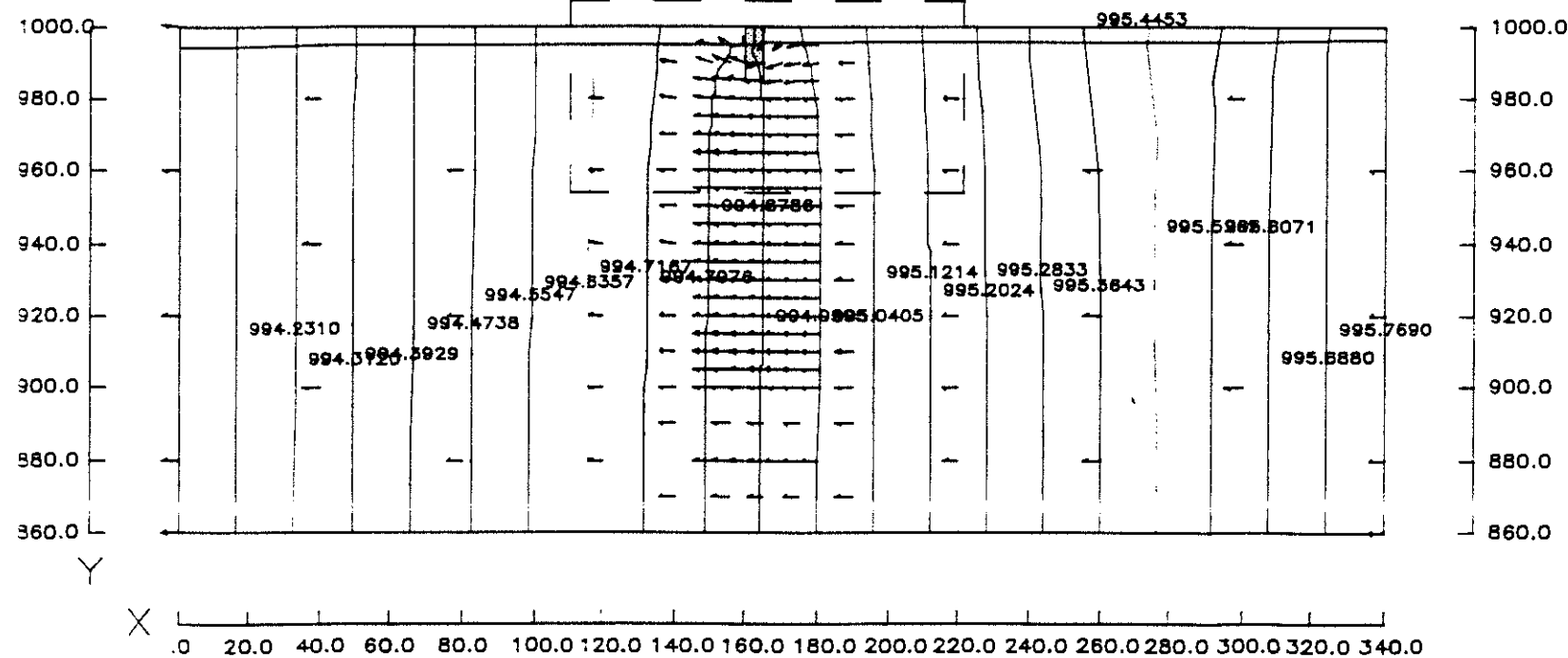


FIGURE 5.9

GROUNDWATER FLOW AROUND A 5' DEEP LOW PERMEABILITY CUT-OFF WALL

COLTON LANDFILL HYDROGEOLOGIC CHARACTERIZATION



MOORE & TABER

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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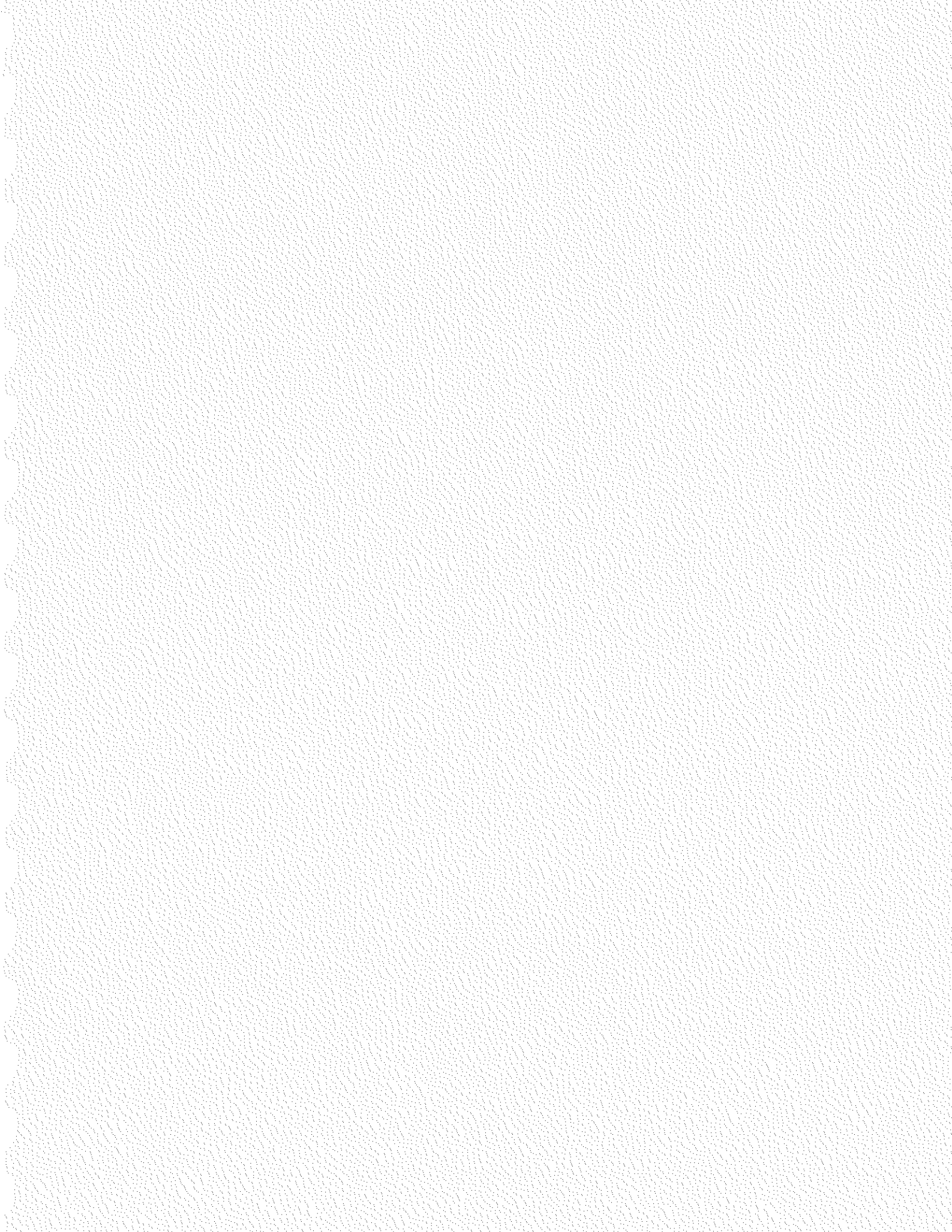
As can be seen, underflow below a five-foot wall would be expected to resurface within a relatively short distance of the landfill. The five-foot depth is therefore considered inadequate. At a depth of 15 feet, however, the model suggests that underflow vectors will not resurface and hence, the surface seeps should be effectively remediated.

It is expected that the partial cut-off system could benefit the deeper groundwater system in that "floaters" constituents (such as vinyl chloride) may be impounded to some degree behind the wall, hence reducing the levels of contamination downstream of the site.

5.4 ALTERNATIVE 3: REGRADING OF RIVER BOTTOM

The overall groundwater flow model developed for the Colton Landfill site (Figure 2.2) suggests that the seeps identified at the northwestern perimeter of the landfill are the probable result of "daylighting" of the groundwater system. A review of the existing river topography further suggests that this daylight condition could be the result of locally depressed ground surface elevations; possibly the result of historic excavation within the channel.

Given this condition, a third potential alternative for remediating the surface seeps at the Colton Landfill involves regrading the existing river channel bottom to a more natural configuration, thereby reducing the local flow velocity and limiting the potential for daylighting of the groundwater system.



SECTION 6.0

PROPOSED CORRECTIVE ACTION PROGRAM

6.0 PROPOSED CORRECTIVE ACTION PROGRAM

6.1 ALTERNATIVES EVALUATION

Based on the available data, construction of a limited depth cut-off wall system along the perimeter of the landfill slope is expected to achieve the most practical, cost-effective mitigation of the potential escape of contaminants from the Colton Landfill site. Although this alternative does not completely remediate potential groundwater degradation in the downgradient wells, it will concentrate the contaminants behind the cut-off wall, and should significantly reduce the contaminant levels downstream.

More global solutions to site remediation (deep cut-off wall and permanent groundwater extraction systems) are considered impractical because of the substantial cost involved and uncertain effectiveness. Such extraction systems are considered potentially self-defeating in that treatment of diluted constituents would likely be impractical from both cost and production viewpoints.

6.2 CUT-OFF WALL DESIGN

The design of a cut-off wall system for the Colton Landfill site should include the following elements:

- o A cut-off wall constructed to a depth of fifteen feet below the existing elevation of groundwater at the trench location
- o A total cut-off wall height approximately equal to the 100-year peak groundwater elevation within the landfill footprint
- o A cut-off wall alignment along the existing northern perimeter road, extending from bedrock on the west to the point of transition in the groundwater system from out-flow to in-flow
- o A cut-off wall material design yielding an effective permeability of at the most 1×10^{-7} cm/s

- o A cut-off wall design incorporating a bentonite slurry mix or equivalent.

The proposed alignment of the cut-off wall system is presented in Figure 6.1. A typical section of the cut-off wall is presented in Figure 6.2.

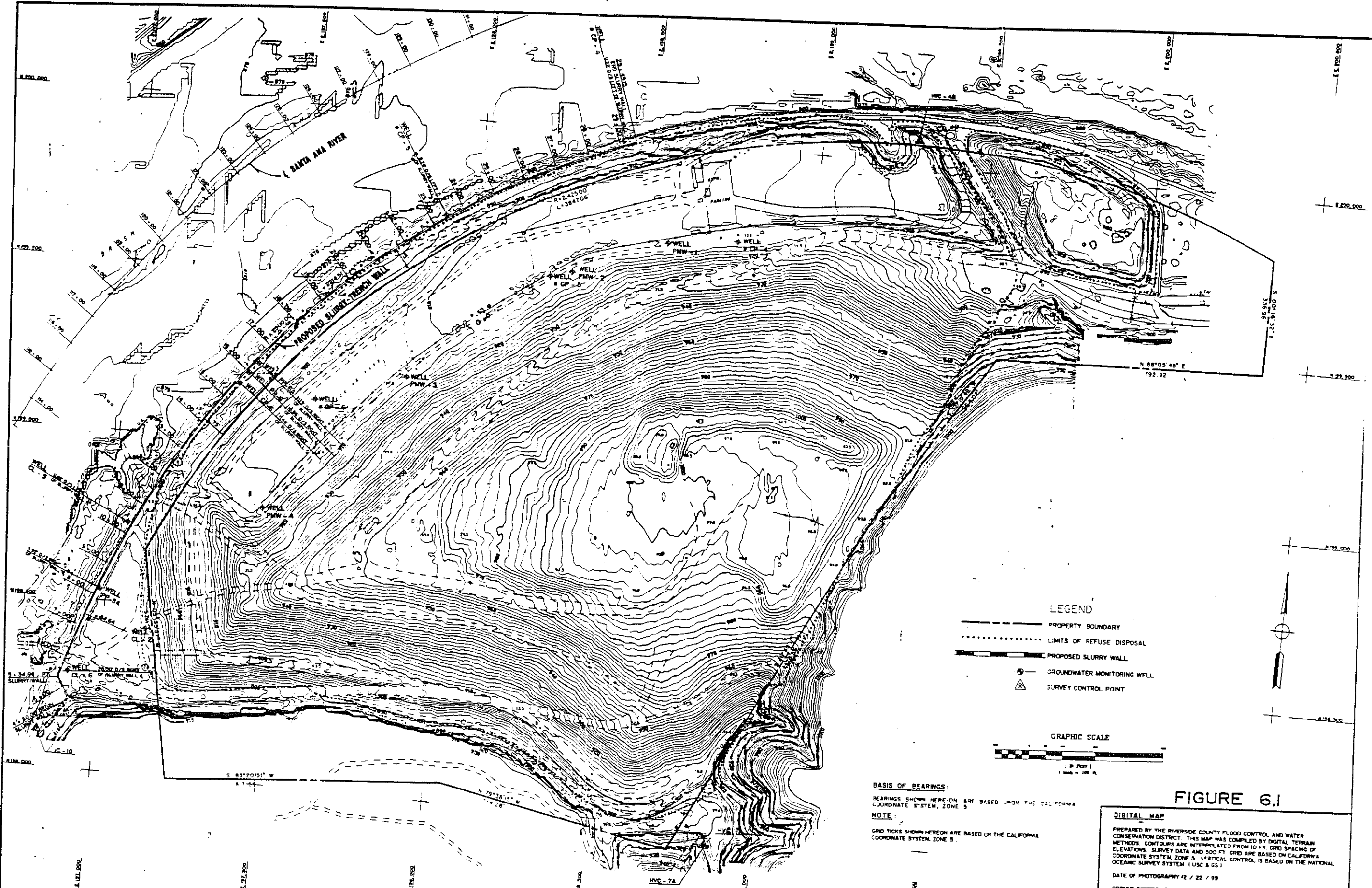
6.3 MONITORING PLAN

Because the recommended remedial system will result in an incomplete isolation of the landfill, continued monitoring of the surface and groundwater systems is recommended. It is proposed that the monitoring plan include sampling of existing wells CL-1, CL-2, CL-5, and CL-6 as well as surface water sampling stations CL-A and CL-B. Two supplemental downgradient wells situated downstream of the landfill are also recommended (Figure 6.3). The first well will be located approximately 100 feet downgradient of the cut-off system, whereas the second well will be located approximately 1,000 feet downgradient of the wall, (where vinyl chloride concentration are expected to approximate ARAR limits).

All construction, development, sampling and testing of the mitigation monitoring wells should be completed in accordance with the requirements of the site Waste Discharge Requirements (RWQCB Order No. 91-39) and the previous SWAT monitoring program.

6.4 WELLS CL-3 AND CL-4

Existing monitoring wells CL-3 and CL-4 are located in a tributary drainage, immediately south of the Colton Landfill site. In their existing location, these wells are probably sampling contaminated groundwater typical of that being contributed to the Santa Ana groundwater system (CL-3); or water extracted from a completely separate hydrogeologic environment (CL-4). Neither well can realistically be considered to sample upgradient conditions.



LEGEND

- PROPERTY BOUNDARY
- LIMITS OF REFUSE DISPOSAL
- PROPOSED SLURRY WALL
- ⊕ GROUNDWATER MONITORING WELL
- ⊕ SURVEY CONTROL POINT

GRAPHIC SCALE

(30 FEET)
 (1 INCH = 100 FT)

BASIS OF BEARINGS:
 BEARINGS SHOWN HERE-ON ARE BASED UPON THE CALIFORNIA COORDINATE SYSTEM, ZONE 9

NOTE:
 GRID TICKS SHOWN HEREON ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM, ZONE 9

FIGURE 6.1

DIGITAL MAP																			
PREPARED BY THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT. THIS MAP WAS COMPILED BY DIGITAL TERRAIN METHODS. CONTOURS ARE INTERPOLATED FROM 10 FT GRID SPACING OF ELEVATIONS. SURVEY DATA AND 500 FT GRID ARE BASED ON CALIFORNIA COORDINATE SYSTEM, ZONE 9. VERTICAL CONTROL IS BASED ON THE NATIONAL OCEANIC SURVEY SYSTEM (USC & GS).																			
DATE OF PHOTOGRAPHY 12 / 22 / 99																			
GROUND CONTROL BY SAN BERNARDINO COUNTY SURVEYOR																			
<table border="1"> <tr> <th colspan="2">REVISIONS</th> </tr> <tr> <th>MARK</th> <th>DESCRIPTION</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		REVISIONS		MARK	DESCRIPTION														
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SLURRY - TRENCH WALL																			

COLTON S/LF 12/89 COMPOSITE WITH 01/89

NO.	REVISION DESCRIPTION	BY

COLTON SANITARY LANDFILL

PLANS PREPARED BY:
DAS
 BRYAN A. STIRRAY & ASSOCIATES
 CONSULTING CIVIL ENGINEERS
 1199 FARROW DRIVE, WALNUT, CA 91790
 (714) - 394 - 5008

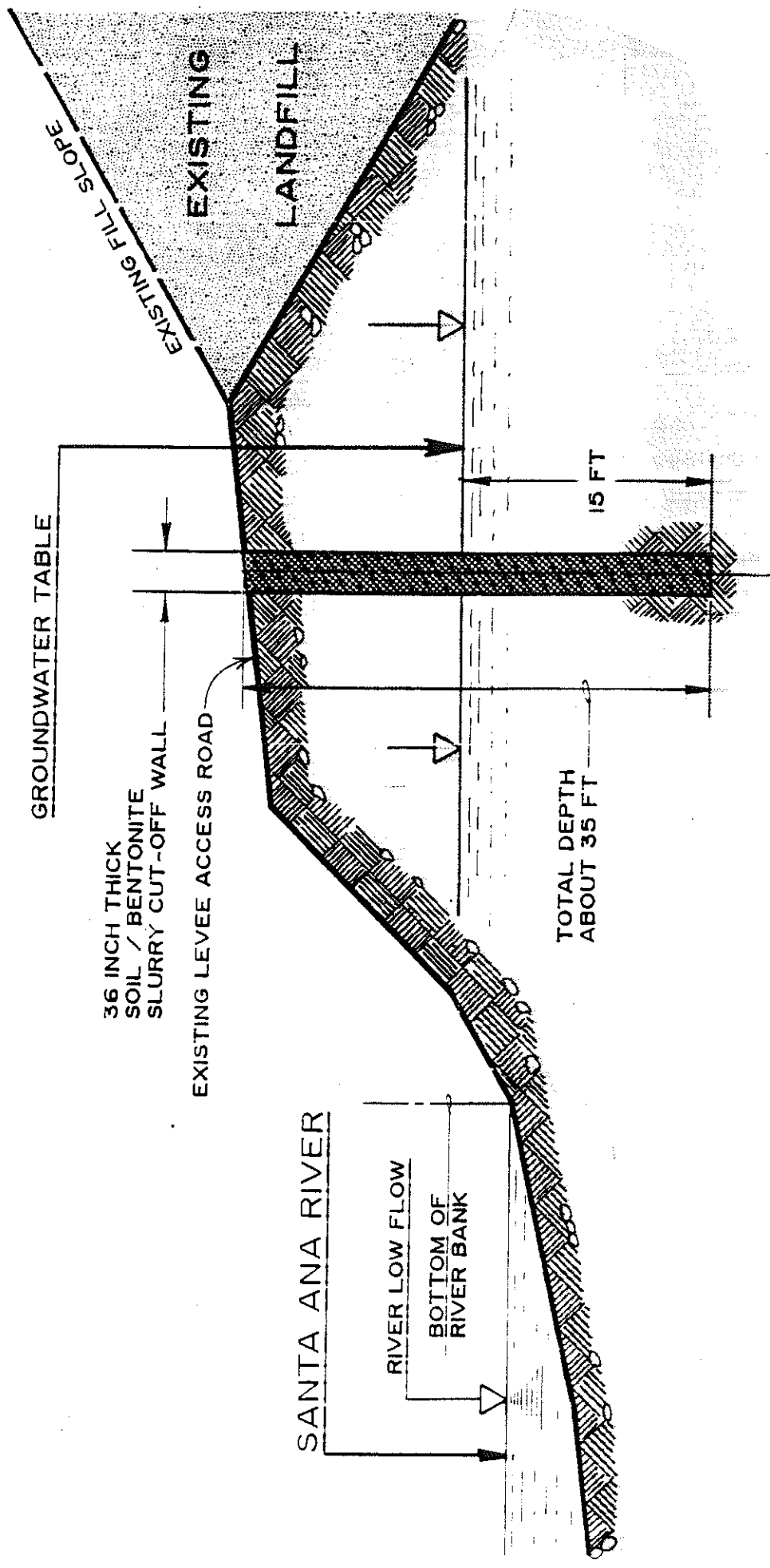


FIGURE 6.2

JOB NO. 9152-2044
 DATE OCT. 1991
 DRAWN BY: PTN
 CHECKED BY: AL B RJ

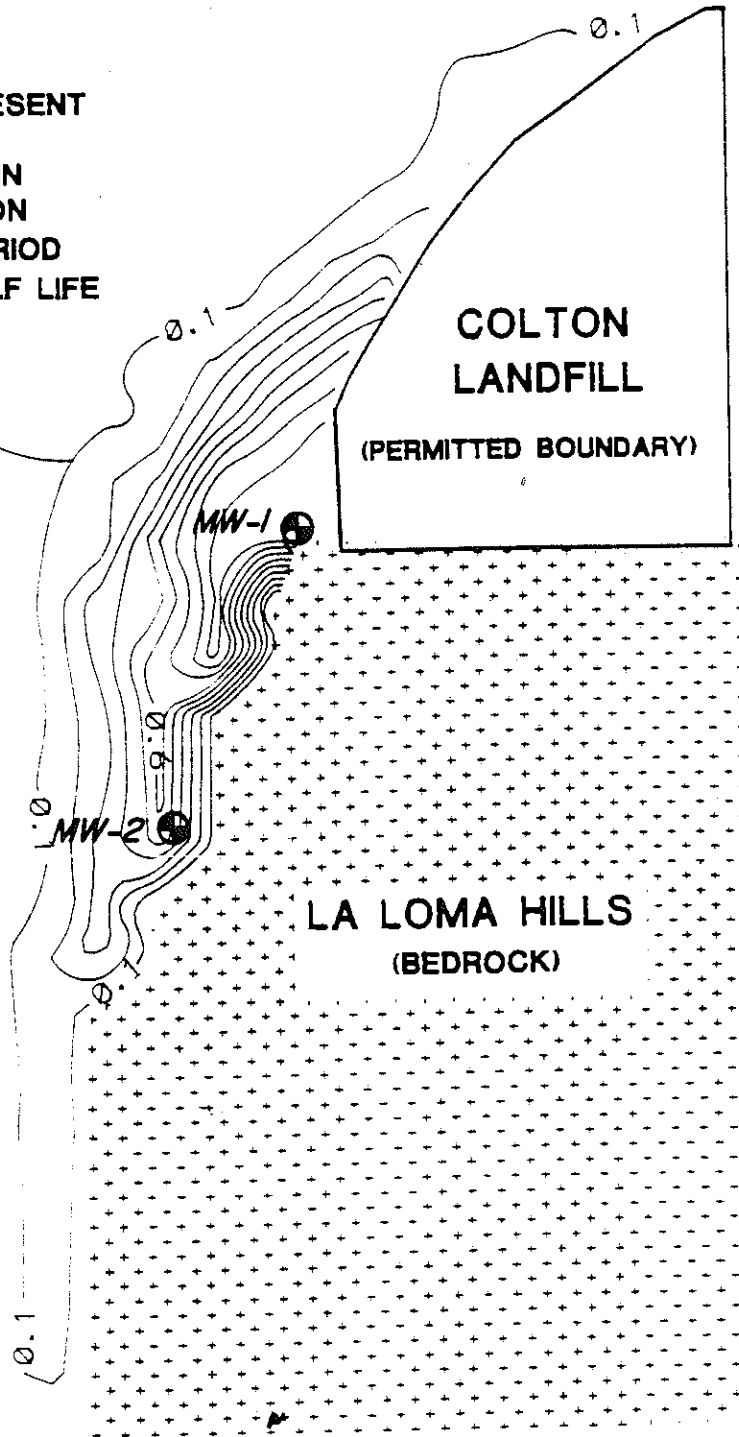
COLTON SANITARY LANDFILL

**PROPOSED SLURRY CUT-OFF WALL
 TYPICAL CROSS-SECTION**

BAS
 [714] 860 7777
BRYAN A. STIRRAAT & ASSOCIATES
 CIVIL AND ENVIRONMENTAL ENGINEERS
 1300 VALLEY CENTER DRIVE • BERKELEY, CALIF. CA 94705

CONTOURS REPRESENT
VINYL CHLORIDE
CONCENTRATION IN
PARTS PER BILLION
FOR 20 YEAR PERIOD
WITH 5 YEAR HALF LIFE

**COLTON
LANDFILL**
(PERMITTED BOUNDARY)



EXPLANATION

 **PROPOSED ADDITIONAL
MONITORING WELLS**

SCALE : 1" = 500'

FIGURE 6.3

**COLTON SANITARY LANDFILL
HYDROGEOLOGIC CHARACTERIZATION
SAN BERNARDINO COUNTY, CALIFORNIA**

VINYL CHLORIDE CONCENTRATIONS



MOORE & TABER

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIELD MWV	DRAFT	APPROVED	DATE	JOB No 191-028
--------------	-------	----------	------	-------------------

Recognizing that wells CL-3 and CL-4 are not upgradient, that the overall alluvial groundwater flow from the area of CL-3 and CL-4 is toward existing well CL-5 and CL-6, and that degradation of local water quality in the vicinity of wells CL-5 and CL-6 is likely to continue, monitoring of wells CL-3 and CL-4 is considered unnecessary. It is recommended that wells CL-3 and CL-4 be eliminated from the existing Monitoring and Reporting Program.

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